REPORT INFORMATION REVIEW: VEGETAION AND FLORA		
REPORT	EHO October 2001 - Point Dunn	
Reviewer 1	B. Keighery	Date 4/07/06
Reviewer 2		Date

REFERENCES: Additional work required, Adequate, All known data covered

BACKGROUND DATA *no information*

Conclusion: Additional work required, Adequate, All known data covered

Attribute	Summary	Comment
Regional Vegetation *yes/no*		
• **types**		
• **complexes**		
• **complexes** ~~FCT's~~	Not matched with	Used as reference to
• **TECs**	any of the Gibson	determine (no match)
Regional Flora *yes/no*	FCT's, no reference	and a wide ephemeral
Total	to Bush Forever	unit
• **Significant**		
• **DRF**		
• **Priority**		
• **Other**		
Site Specific veg/flora:		

SURVEY METHOD *no information*

Conclusion: Additional work required, Adequate, >Adequate

Experience worker *General, Regional 0-3yrs, >3yrs, >10yrs*		
Timing *Dates, years*		
Field technique *Transects, releve, plots*		

VEGETATION UNIT MAPPING *no information*

Conclusion: Additional work required, Adequate, >Adequate

Units Information	Description	Comment
Basis of unit of unit determination	**Wetlands:** *yes/no*	General information
	Uplands: *yes/no*	from EBS
	Height dominant layer: *yes/no*	
	Other layers: No	
	Species listing: No	
Legend *Key, scale, survey points*	General, no detail	
Reference table for Units *Eg Aplin, Specht, Trudgen, Muir, Keighery*	None give	

VEGETATION CONDITION MAPPING *no information*

Conclusion: Additional work required, Adequate, >Adequate

Units Information	Description	Comment
Survey for unit determination	**Method:** transects	Ground Statements, photos for information only.
Reference table for Units *eg Trudgen, Kaeshagen, Keighery*		

FLORA *no information*

Conclusion: Additional work required, Adequate, >Adequate

Attribute	Description	Comment
Flora List		
• Total	17 flora	Verticordia umbellata noted but seems unlikely, need to check
• Native		
• Weeds		
• Taxonomy		
Significant Taxa		
• **DRF**		
• **Priority**		
• **Other**		
Significant species noted by reviewer		

POINT SOURCE DATA

Conclusion: Very Poor, Poor, Adequate, Good, Very Good

Attribute	Description	Comment
Vegetation units		
Cover		
Flora Listed		

Notes

Sources - Bowman Bishaw and Assocs Dec 1988 Proposed Bunbury Holiday Resort NOI (Report R184/3)

- Waterways Commission reports 1993 - Rivers Lower Collie, Brunswick

ENTERED ON GIS

Name: Point Duro Australind – Scheme Amendment No 13 to District Planning Scheme No 1 and Section 48 Environmental Review
Date: 05/05/2006
Capture Author: Thomas Leong / Ian Steward

Comments:
Polygon
Created to match documented study area with high level of accuracy

Accuracy Levels:

- High = Document contained visual and or described spatial references easily copied, resulting in little or no polygon boundary errors
- Acceptable = Document contained visual and or described spatial references with complex boundaries, resulting in minor boundary errors
- Low = Document contained little or no visual and or described spatial references, resulting in polygon boundary errors

Attributes
Report Info – Captured without problems
Custodial/Contact – Captured without problems
Content – Captured without problems

Shire of Harvey

Point Douro Australind

Report on

Scheme Amendment No.13 to District Planning Scheme No.1 and Section 48 Environmental Review

October 2000

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Document Status

Rev No.	Author	Reviewer	Approved for Issue		
			Name	Signature	Date
0	D R Westera	D S Tucker	D S Tucker	D S Tucker	
1	A Napier	D S Tucker	D S Tucker	D S Tucker	04/00
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3	A Napier	D S Tucker	D S Tucker		10/00

Public Invitation to Comment

The Environmental Protection Authority (EPA) and Shire of Harvey are currently assessing Amendment No. 13 to the Shire of Harvey District Planning Scheme No. 1. This document is an Environmental Review that proposes development of Point Douro Australind with a further change in land use. Government agencies and the public via a public submission period are assessing this document.

Following this period, the Shire of Harvey will forward all public submissions to the EPA where these will form part of its assessment report and recommendations as to whether the development should take place and in what form.

You may wish to make a submission in regard to the content of this document and the proposal. A written submission is the most effective way of putting forward your view.

Why write a submission?

A submission is a way to provide information, express your opinion and put forward your suggested course of action - including any alternative approach.

It is useful if you indicate any suggestions you have to improve the proposal.

All submissions may be fully or partially utilised in compiling a summary of the issues raised or where complex or technical issues are raised, a confidential copy of the submission (or part of it) may be sent to the proponent.

The summary of issues is normally included in the EPA's Assessment Report.

Why not join a group?

If you prefer not to write your own comments, it may be worthwhile joining a group or other groups interested in making a submission on similar issues.

Joint submissions may help to reduce the work for an individual or group, while increasing the pool of ideas and information.

If you form a small group (up to ten people) please indicate all the names of the participants. If your group is larger, please indicate how many people your submission represents.

Developing a submission

You may agree or disagree with, or comment on, the general issues discussed in the Environmental Review or the specific proposals. It helps if you give reasons for your conclusions, supported by relevant data. You may make an important contribution by suggesting ways to make the proposal more environmentally acceptable.

When making comments on specific items in the review document :

- clearly state your point of view;

- indicate the source of your information or argument if this is applicable; and
- suggest recommendations, safeguards or alternatives.

Points to keep in mind

By keeping the following points in mind, you will make it easier for your submission to be analysed:

- Attempt to list points so that the issues raised are clear. A summary of your submission is helpful.
- Refer each point to the appropriate section, chapter or recommendation in the Environmental Review.
- If you discuss different sections of the Environmental Review, keep them distinct and separate, so there is no confusion as to which section you are considering.
- Attach any factual information you wish to provide and give details of the source. Make sure your information is accurate.

Remember to include :

- your name;
- your address;
- the date; and
- whether you want your submission to be confidential.

The closing date for submissions is : .....

You are invited to forward your written comments to the Shire of Harvey.

Please address your correspondence to:

Chief Executive Officer

Shire of Harvey

PO Box 500

HARVEY WA 6220

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EXECUTIVE SUMMARY

The Shire of Harvey on 12 August 1997, resolved to initiate Amendment No. 13 to the Shire of Harvey District Planning Scheme No. 1. Amendment No. 13 provides for the rezoning of Lot 5 Old Coast Road Australind from "Tourist Zone" and "Parks and Recreation" Reserve to "Residential Development Zone" and "Recreation and Conservation" Reserve. Development will be based upon a *Point Douro Concept Development Plan* prepared for the site, which includes creation of a residential and water based development. An Outline development Plan will be prepared along with management plans that will provide a detailed design, construction and maintenance of the land.

The *Point Douro Concept Development Plan* proposes modifying the current *'Bunbury Holiday Resort'* plan, approved for the site and rezoned during 1989. To ensure that development of the land is carried out in a sustainable and coordinated manner, a number of other management plans are to be prepared by the proponent and approved by Council, comprising:

- Outline Development Plan.
- Boat Haven Construction and Management Plan.
- Foreshore & Conservation Reserves Management Plan.
- Nutrient Export Management Plan.
- Terrestrial Fauna/Waterbird Protection Plan.
- Developer Contribution Plan.
- Construction Management Plan.

The Point Douro Peninsula proposal has undergone a series of redesigns as a result of the last period of consultation during 1997. This process involved a public meeting held during June 1997, and a site meeting with the Ministry for Planning (MfP) and the Environmental Protection Authority (EPA) during November 1997. These agencies and the Shire of Harvey have outlined a series of points that need to be addressed as part of this study prior to advertising of the amendment.

Under section 48A of the *Environmental Protection Act 1986*, and by direction of the EPA, proposals within an Amendment that could have a significant environmental impact, require the preparation of an Environmental Review. This Environmental Review report assesses the proposal for Amendment No. 13 to be incorporated into the Shire of Harvey District Planning Scheme No. 1. The proponent proposes a new concept for the Point Douro Peninsula which introduces residential development and a Boat Haven into the existing approved development plan. This Environmental Review incorporates past studies and completes the findings of subsequent investigations.

The purpose of this Environmental Review for the Point Douro Peninsula is to provide further information into the proposed amendment that will enable the

community to comment and allow the EPA to evaluate the potential impacts on the environment.

The Environmental Review is based upon a Notice of Intent prepared for the owner by Bowman Bishaw and Associates (1988). That report, (No. RI8143), provides the background to satisfying the Instructions. Certain aspects of the review have also required further investigation due to underlying design changes to the Boat Haven and land uses.

This Environmental Review addresses the actual changes from the original stated Ministerial conditions issued pursuant to the provisions of the *Environmental Protection Act 1986* and the new issues identified by the EPA, MfP and the Shire. Australian Groundwater Consultants Pty Ltd completed the *Point Douro Management Plan* for the original owner. The Management Plan will need to be amended in liaison with the Shire, MfP, Leschenault Inlet Management Authority (LIMA) and the Water and Rivers Commission (WRC).

The Site

The Point Douro Peninsula area includes the following elements:

- The Collie River foreshore and flood plain comprising a deep wide river suitable for boat traffic.
- Samphire Bay, a shallow water area providing an environment for water birds and marine life.
- The Point Douro Peninsula land.

The Peninsula is in private ownership totalling an area of 29.5ha. A 30m reserve to all abutting foreshores was given up at no cost to the community during the previous rezoning process.

Previous use of part of the Peninsula for grazing, a speedway and camping has resulted in extensive degradation of land, particularly at the eastern part of the site. The western tip of the peninsula has large areas of Samphire remaining, which have a significant conservation value.

The Proposal

The new concept plan proposes to:

- Create a residential area in place of the approved tourist motel use.
- Increase the size of the approved artificial water area.
- Remove the Caravan Park from the site.
- Create a series of tourist related uses.
- Create a recreation foreshore area and boat launching facility.

The development has been assessed and designed to ensure best practice in environmental compatibility. A series of design guidelines will be prepared to control development and developer commitments will be established through agreements with LIMA and the Shire.

The development will be serviced by sewer and underground power and the hydraulic design of the artificial water area has been designed to provide additional floodway performance for all flood period events.

The proposed development area of Point Douro will take up approximately 32.5% of the Peninsula. Recreation and conservation land designated in the past and present proposals (including waterways), represents 67.5% of the Peninsula.

The proposal has been defined by physical constraints within the site namely:

- Confining development to the existing degraded land area.
- The 1 in 100 year floodway.
- Artificial water area orientation to enhance floodway performance.

Proposed Design Guidelines, Town Planning Scheme Requirements and Development Commitments associated with the resolution to rezone the land under Schedule 8 of the Scheme, will be amended to require:

- A Management Plan for the conservation area approved by LIMA, WRC, and EPA.
- Restricted building heights (2 storey).
- Council assessment regarding building colours, texture and materials.
- Fencing standards.

Management requirements are discussed within the Review Document. Commitments by the developer are summarised below and will be enshrined in the Town Planning Scheme as Provisions of Amendment 13. These are summarised below:

1. Transfer at no cost to the community, the land designated as "Recreation and Conservation Reserve"
2. Set aside and isolate further land for conservation purposes.
3. Undertake rehabilitation of the conservation area.
4. Establish a mosquito control program.
5. Install walkways within foreshore and conservation areas.
6. Rehabilitate foreshore areas and provide controlled access.
7. Undertake a water-quality monitoring program.
8. Comply with an approved Construction Management Plan.
9. Undertake all construction and development in cooperation with LIMA.

Environmental Impact

The Bunbury Holiday Resort NOI was supported via EPA Bulletin 375. The EPA in its assessment of the new proposal issued a new set of instructions. These have been investigated and a summary of potential impacts are outlined below:

Terrestrial Flora - System 6 : The proposal reflects the original intention of the EPA Bulletin 375 and the LIMA objectives to secure a conservation area, which lies over the western portion of the Peninsula. The land contributed for conservation and recreation purposes represents more than half the site. The area defined specifically for conservation follows the existing Samphire vegetation which provides an environment for wild fowl and other water birds that use the Peninsula.

The most significant benefit is the modified water area extending across the Peninsula which limits access by humans and prevents access by introduced predators. The separation provides the most effective means of protecting the conservation area from any potential impacts.

Terrestrial Fauna / Water Birds : Water bird habitats relate to the existing Samphire and foreshore areas. Compliance with System 6 objectives coupled with the separation of the conservation area provides an environment with separation from human activity. The use of the conservation area is a matter that will need to be assessed by LIMA. The current supported management arrangement provides for a walking trail and bird watching hide.

System 6 Areas C66 and C67 : System 6 recommendations within localities C66 and C67 identify management considerations that pertain to the Point Douro Peninsula and which includes maintaining waterbird and fish habitats, preservation of indigenous flora and allowing passive recreation upon such habitats. System 6 objectives will be met by the proposal. Analysis of projected populations on the site also identify that the current tourism zone may create greater potential impacts upon the adjoining environment. Therefore the change in the nature of the development can also reduce potential impacts. The System 6 objective for urban development within and abutting these localities is for connection to deep sewer and this will occur. The entire sewerage system will be located clear of floodway areas.

System 6 objectives were met under the current plan and will be maintained by the new proposal.

Estuary Integrity : The development of the Peninsula and subsequent use by the community will create potential impacts by foreshore users. The key to improving the estuary foreshore's natural state is through rehabilitation and management of currently degraded areas and by allowing access adjacent to the foreshore with limited controlled access points made available for walkers to view the estuary. Walkways will be located abutting retaining walls defining the edge of development and people and pets will use fencing to control access.

The early establishment of the channel between the development area and the conservation area will assist in limiting the adverse impacts of construction by providing physical separation. It is believed that estuary integrity can be maintained by these management initiatives.

Floodplain : Hydraulic investigations were undertaken and a report on the findings is appended to this report. The development and alignment of the

artificial water area creates additional capacity to disperse floodwaters downstream from the Collie River Bridge.

The water area and associated bank treatments will be developed to a standard that will avoid the risk of scouring and damage during flood events. Hydraulic investigations demonstrate that the water area will improve floodway performance and will provide an opportunity to place permanent structures in the flood plain.

Surface Water Quality : The possible impacts from stormwater drainage, surface runoff and wastewater disposal will be mitigated. Wastewater will be connected to deep sewer and designed to standards that ensure storage capacity for overflow events.

The stormwater system will be designed to Shire requirements. Drainage treatments will comprise of basins for road drainage and soak wells for private drainage. Stormwater will be directed through storage areas to trap pollutants and strip nutrients. Drainage swales will be installed for drainage from parking areas.

Estuary Water Quality : Appropriate licences will be sought for all construction phases to limit turbidity. The developer in liaison with LIMA during and after construction will monitor water quality. The orientation of the Boat Haven will provide a high level of flushing.

Mosquitos : The previous and current developer commitments propose to improve the series of drains and artificial water channels to maximise the natural drainage of the Peninsula. Improvements to the natural drainage system and revegetation of degraded areas will reduce potential breeding sites. Removal of hard packed tracks and the speedway area will significantly reduce water pooling and breeding sites.

Visual Amenity : Visual Amenity of the Peninsula will be maximised by virtue of the severance and preservation of the Peninsula and foreshore treatments. Design controls will be established as part of the Scheme Amendment to install limits to building bulk and standards for architectural styles sensitive to the Point Douro Peninsula environment.

Culture and Heritage : The Peninsula has been investigated for areas of archaeological and ethnographic significance and was found to be clear of areas of aboriginal or European historic significance. These findings are appended to this report.

Statement of Change

The Review describes the proposed changes between the current "Tourist Zone" and the new "Residential Development Zone" and the "Recreation and Conservation" Reserve. The nature of activity within the development area will change from tourism to residential and consequently, the built form will change.

These changes are unlikely to create any further impacts over the current

proposal and may reduce those impacts by the way in which the Peninsula is used for recreational activities.

The currently defined development area will be altered slightly with the new proposal. The variation follows the alignment of a bank, which if removed will improve the floodway performance of the conservation reserve.

The realignment of the water area results in the retention of a contiguous stretch of almost pristine Samphire as a trade off against more degraded area along the Collie River which was previously to be conserved.

The new proposal will provide:

- A dedicated water area for floodway purposes (Modified Water Body).
- Removal of possible floodway impediments within the conservation reserve.
- Retention of equal or greater portions of pristine Samphire.

The impacts and benefits of the new proposal are discussed in detail in the Environmental Review.

Conclusion

Table 1, *'Summary of Relevant Environmental Factors'*, provides a condensed summary of potential impacts of the proposal. The revised development concept coupled with management and design initiatives, will enable the concept to be implemented in a manner which embraces good environmental and town planning principles.

The proposed Amendment No. 13 to District Planning Scheme No.1 is attached overleaf with the Amendment Map. Amendment No. 13 will provide a significant improvement on the current accepted concept for the site and provides additional benefits related to the identified environmental factors. The new concept should ensure management of the Peninsula in perpetuity. This is in contrast to the current proposal, which has not been pursued due to viability considerations and long term economic and environmental sustainability.

The ensuing report describes in detail these factors and the way in which the new concept can integrate into the Point Douro environment.

REPORT TO THE MINISTER FOR PLANNING

PROPOSAL TO AMEND A TOWN PLANNING SCHEME

TOWN PLANNING AND DEVELOPMENT ACT 1928 (AS AMENDED)

LOCAL AUTHORITY:	SHIRE OF HARVEY
DESCRIPTION OF PLANNING SCHEME:	DISTRICT TOWN PLANNING SCHEME No. 1
TYPE OF SCHEME:	DISTRICT TOWN PLANNING SCHEME
SERIAL AMENDMENT NO:	AMENDMENT No. 13

PROPOSAL:

To initiate an amendment to the existing district planning scheme by:

1. Rezoning Lot 5 Old Coast Road (portion of Leschenault Location 23 of Plan 7938) from "Tourist" Zone, "Restricted Uses" and "Parks and Recreation" Reserve to "Residential Development" Zone, "Restricted Uses" "Modified Water Body" Zone and "Recreation and Conservation" Reserve in accordance with the attached zoning map.

2. Modifying the specific provisions in 'Schedule 8 - Restricted Uses', point 12 of Town Planning Scheme No. 1 text by deleting point 2 and including after point 1 in the 'Only Use Permitted' column, as follows:

Special Provisions Relating to the Specified Land

2. Recreation and Conservation Reserve

No activity or development shall occur on the land reserved for Recreation and Conservation other than in accordance with a management plan to be prepared by the proponent and approved by Council.

In considering the management plan for land reserved for Recreation and Conservation, Council shall have regard to advice from the Department of Environment Protection (DEP), the Leschenault Inlet Management Authority (LIMA) and the Water and Rivers Commission (WRC).

3. Subdivision and Development

The level of subdivision and development shall generally be in accordance with the *Point Douro Concept Development Plan* (Ref No. 01) and Environmental Report. No subdivision or development shall occur until an Outline Development Plan (ODP) is prepared by the proponent and approved by Shire of Harvey (Council) and endorsed by the Western Australian Planning Commission (WAPC).

4. ODP Preparation and Implementation

The ODP shall include commitments detailed in *Special Provisions Relating to the Specified Land*, or any variations agreed by the Council and the WAPC. Also, the ODP will be prepared in accordance with the approved Management Plans referred to in points 6 to 11 and will reflect the development envisaged by the *Point Douro Concept Development Plan (Ref No. 01).*

Prior to approval of the ODP, Council shall advertise the draft ODP for public comment in accordance with the provisions of Clause 6.7.3 of the Scheme.

Upon approval and endorsement of the ODP by Council and the WAPC, all subdivision and development shall be in accordance with the ODP.

The Outline Development Plan shall identify and address:

a) subdivision and development in general accordance with the *Point Douro Concept Development Plan* (Ref No. 01);

b) the development of lots for residential purposes ensuring that such development is in accordance with Council's Residential Policy and the R 20 Residential Planning Code standards;

c) the development of lots for tourist and commercial purposes ensuring that such development is in accordance with the R 40 Residential Planning Code standards;

d) the development of land for conservation and recreation purposes;

e) the access road, pedestrian paths, cycle paths, footbridge and infrastructure corridors aligned and constructed as to minimise physical impact to the wetlands subject to advice from the DEP and LIMA;

f) mechanisms to mitigate potential nuisance from mosquito breeding to reduce the opportunity for additional mosquito breeding areas being created;

g) use and development within land designated for floodway;

h) visual management (landscape), comprising guidelines that:

- establish a 'foreshore' theme that relates to abutting landscape;
- establish a time frame for the removal of rubbish; and
- provide for the re-contouring of the site.

i)visual management (building) comprising guidelines that:

- limit buildings to two storeys from modified ground level;
- requires Council assessment of building materials that reflects a theme for areas abutting foreshore;
- establishes a fencing theme for areas abutting foreshore to be uniform construction and of materials sensitive to the natural environment that comprise brick/limestone or wooden piers, with an acceptable infill and of an open construction above 1.1m;(ie. Wooden pickets);
- for the tourist component, incorporates a theme of brick/limestone finishes, timber and brushwood;

j) limits the size of any shop to a maximum of 500 m2 of Gross Lettable Floor Area;

k) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation;

l) Traffic management, particularly but not limited to the proposed access onto Old Coast Road; and

m) proposed methods of incorporating requirements and obligations addressed in management plans referred to in this Amendment.

In considering the Outline Development Plan, Council and the WAPC shall have regard to advice from the Department of Environment Protection (DEP), the Leschenault Inlet Management Authority (LIMA), Water and Rivers Commission (WRC) and the Department of Conservation and Land Management (CALM).

5. Provision of Sewer

All lots will be connected to a reticulated sewerage system. Appropriate contingency measures to cater for emergency overflows or pump station failure will be established with the Water Corporation.

6. Boat Haven Construction and Management Plan

Prior to the approval of the ODP, a Boat Haven Construction and Management Plan shall be prepared by the proponent and approved by Council that incorporates:

a) design standards to meet Environment Protection Authority (EPA) objectives for water quality and beneficial use protection;

b) a water and sediment quality monitoring plan;

c) a maintenance and management agreement for the Boat Haven and channel; and

d) staging and implementation.

In considering the Boat Haven Construction and Management Plan, Council will have regard to advice from the DEP, WRC and LIMA.

7. Foreshore & Conservation Reserves Management

Prior to the approval of the ODP, a Foreshore Conservation Reserve Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) staging and implementation of the Management Plan;

b) interface between the development and adjacent areas;

c) management of human pressures;

d) hydrological impacts;

e) the tenure, detailed design and management of Conservation reserves;

f) the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves;

g) the retention of remnant vegetation and the provision of foreshore buffers;

h) the design and construction of roads; and

i) water management to reduce mosquito-breeding habitat.

In considering the Foreshore Conservation Reserve Management Plan, Council will have regard to advice from the DEP, WRC, CALM and LIMA.

8. Nutrient Export Management Plan

Prior to the approval of the ODP, a Nutrient Export Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) monitoring soil nutrient levels to determine appropriate rates of nutrient application;

b) the use of slow release fertilisers;

c) minimising grassed areas and landscaped open spaces;

d) the use of local species of grasses;

e) encouraging local residents to minimise fertiliser application and plant native species;

f) minimising groundwater use;

g) minimising the potential for water quality problems; and

h) staging and implementation.

In considering the Nutrient Export Management Plan, Council shall have regard to advice from the DEP and LIMA.

9. Terrestrial Fauna/Waterbird Protection Management Plan

Prior to the approval of the ODP, a Terrestrial Fauna/Waterbird Protection Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) compliance with the System 6 objectives;

b) the separation of the conservation zone and providing an environment with separation from human activity;

c) a management arrangement providing for a walking trail and bird watching hide;

d) management measures that encourage waterbird and native fauna into the project area once construction is completed; and

e) staging and implementation.

In considering the Terrestrial Fauna/Waterbird Protection Management Plan, Council shall have regard to advice from the DEP, CALM and LIMA.

10. Developer Contribution Management Plan

Prior to the approval of the ODP, a Developer Contribution Management Plan shall be prepared in accordance with WAPC Planning Bulletin No. 18 (or as amended by the WAPC) by the proponent and approved by Council and the WAPC that addresses:

a) provision of community infrastructure directly associated with the development of the land in relation to foreshore areas, road reserves and public spaces in general;

b) overall management and on going responsibilities; and

c) staging and implementation.

In considering the Developer Contribution Plan, Council and the WAPC shall have regard to advice from the DEP, CALM and LIMA.

11. Construction Management Plan

Prior to the approval of the ODP, a Construction Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) minimisation of clearing and vegetation disturbance;

b) protection of foreshore buffers;

c) control and monitoring of dust, noise and smoke;

d) incorporation of environmental protection specifications in all construction related contracts; and

e) staging and implementation.

In considering the Construction Management Plan, Council shall have regard to advice from the DEP and LIMA.

12. Deed of Agreement

Prior to the amendment being forwarded to the Minister for Planning for determination a Deed of Agreement is required to be entered into with the developer addressing such issues associated with maintenance, infrastructure contributions, bond monies, environmental monitoring and bank guarantees as mentioned within the Scheme Report.

3. Modify Schedule 13 "Interpretations" by including after the *interpretation "Mobile Home Park"* a new interpretation of *"Modified Water Body"* : an area of land modified in such a way as to allow entry of a natural water body or course that functions as a private recreational boating or ornamental purpose".

4. Introduce "Modified Water Body (Table 39)" under the "Non Urban Zones:" heading of Clause 4.1.1 of Town Planning Scheme No.1 text.

5. Include in Schedule 14 "Precinct Area 1 – Leschenault". Pt Lot 5 Old Coast Road, Australind (Pt Douro) is intended to be development for low density residential, low/medium density tourist accommodation and conservation purposes. Development will only be considered which can demonstrate that it will not have a significant adverse impact on the landscape or environmental attributes of the locality as determined through the formal rezoning and environmental review process. A detailed formal environmental review and rezoning will need to be undertaken to the satisfaction of Council and relevant governmental agencies and extensive public consultation undertaken to determine the suitability of any proposal for the site.

6. Introduce new Table 39 to Clause 4.2 "Zoning and Development Tables" of Town Planning Scheme No. 1 text, titled "Zoning and Development Standards - Modified Water Body" as follows:

Table 38

ZONING & DEVELOPMENT STANDARDS **MODIFIED WATER AREA**

POLICY STATEMENT

Intended for the establishment of modified waterways that function as a private recreational boating or ornamental purpose.

DEVELOPMENT STANDARD

NOTE: The following standards will apply to this zone.

LAND USE CATEGORIES		OTHER REQUIREMENTS
		Development shall be in accordance with an Outline Development Plan or any variations agreed by the Shire of Harvey (Council) and approved by the Western Australian Planning Commission
RECREATION & COMMUNITY FACILITIES	P	
CANAL WATERWAYS , MOORINGS AND JETTIES	P	
CANAL WALLS, RETAINING WALLS & FENCES	P	

TABLE 1
SUMMARY OF RELEVANT ENVIRONMENTAL FACTORS

Environmental Factor	EPA Objective	Potential Impacts	Proposed Management	Proposed Outcome
Vegetation Communities Site Specific Factor: Samphire Vegetation Community	• Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.	• Human access to Samphire Bay. • Portion of Samphire in development area.	• Delineation of conservation area. • Rehabilitation of degraded vegetation within foreshore and conservation area. • Separation of human interface from conservation area and foreshores by development components (boat haven, fencing, walkways). • Prepare Conservation Management Plan in liaison with LIMA. • Prepare Landscaping Management Plan as part of ODP.	• Protection of the Samphire vegetation will be achieved by physical separation and by management initiatives.
System 6 - C66 and C67 Site Specific Factor: Identified conservation values – samphire communities.	• Ensure that the conservation values of System 6 recommended areas are not compromised.	• Impact upon Samphire • Deep sewage impact upon inlet overflow.	• Foreshore and Conservation Reserves Management Plan to take cognisance of possible human interference due to walk paths. • Options prepared to preclude access at points. • Deep sewer to accord with Water Corporation design' guidelines for pump stations and pressure mains overflow facilities.	• Controlled access points can regulate the level of passive recreation within the conservation area. • The sewer pump stations will contain emergency storage tanks and located abutting Old Coast Road above the 1:100 year flood level. Overflow will only occur within the development area and will have appropriate back up.

TABLE 1 (Cont.)

Environmental Factor	EPA Objective	Potential Impacts	Proposed Management	Proposed Outcome
Waterbirds / Terrestrial Fauna Site Specific Factor: • Water bird populations • Use of delta by waterbirds. • Specially protected fauna.	• Maintain the abundance, species diversity and geographical distribution of terrestrial fauna. • Protect Specially Protected (Threatened) Fauna, consistent with the provisions of the *Wildlife Conservation Act 1950*.	• Position of samphire and its associated use by waterbirds will be impacted upon by human activities. • Disturbance to waterbirds during construction. • No specially protected fauna was identified therefore no impacts are relevant.	• Delineation of conservation area. • Construction Management Plan to avoid impacts from noise, light and visual disturbance. • Prepare Foreshore and Conservation Reserves Management Plan to protect samphire, foreshore areas and associated bird life. • Preservation of Samphire and foreshores will maintain an environment for existing fauna.	• The identified conservation area relates to pristine samphire and associated water bird habitats located on foreshore and tidal zones and the physical separation of the conservation area allows improved protection of Samphire. • Physical separation provides a control mechanism to human interface and expands opportunities for use in the peninsula by water birds. • The Construction Management Plan will ensure adequate management to avoid impacts to bird life.

TABLE 1 (Cont.)

Environmental Factor	EPA Objective	Potential Impacts	Proposed Management	Proposed Outcome
Estuary Foreshore Site Specific: • North foreshore to Samphire Bay • South foreshore to Collie River	• Maintain the integrity, function and environmental values of the foreshore area.	• Exposure to foreshore by the development area creates impacts by humans and animals (pets). • Access onto foreshore will degrade samphire area. • The foreshore area will be exposed to the development front.	• Delineation of foreshore areas by fences and walkways • Rehabilitation of foreshores to achieve regrowth as natural barrier to access. • Provide controlled access thereby exposing a limited portion of the foreshore area to passive recreation. • Include management and maintenance initiatives to improve foreshore integrity by landscaping rehabilitation and controlling access.	• Access can be controlled to the foreshore frontages by management and physical barriers. • Separation by water, fences and boundary treatments will maintain setbacks to natural foreshores.
Flood plain Site Specific Factor: • Flood plain of the Collie River and inlet and the 1:100 year flood level.	• Ensure that the flow of the floodwater is not inhibited.	• Development within the floodplain will impede flood flows. • Risk of using floodway areas. • Risk to seasonal caravan park.	• Hydraulic study has proved floodway area and assessed impact of artificial waterway. • Design of water area in compliance with DOT and WAPC Policy D.C 1.8 • Deletion of Caravan Park from the proposal.	• Floodway area can be improved by careful hydrological design of the artificial waterbody. • Landscape controls will ensure no future impediment to floodway.

TABLE 1 (Cont.)

Environmental Factor	EPA Objective	Potential Impacts	Proposed Management	Proposed Outcome
Surface and Estuarine Water Site Specific Factor: • Estuary, Boat Haven and River.	• Maintain or improve the quality of surface and estuarine water to ensure that the existing and potential uses, including ecosystem maintenance are protected, consistent with the draft *WA Guidelines for Fresh and Marine Waters* (EPA, 1993)	• Possible impacts on the Boat Haven and Estuary from surface runoff, stormwater drainage, and wastewater disposal. • Possible pollutant impact from boating. • Impacts upon estuary by use of the Boat Haven • Impacts upon estuary during boat haven construction. • Management of Boat Haven and responsibilities.	• Surface runoff from roadways will be piped from road drains to nutrient stripping basins constructed in accordance with Shire and LIMA requirements incorporating planting areas for natural nutrient stripping and silt traps. • All stormwater runoff and water sensitive design features will be in compliance with the conservation and landscaping management plans with regard to nutrient stripping vegetation and maintenance. • Discharge from boat holding tanks will be strictly prohibited. • Construction Management Plan to be prepared. • Obtain licences to dredge and dewater the boat haven from LIMA pursuant to the *Waterways Conservation Act, 1976.* • Prepare a dredging and Dredge Spoil Disposal Management Plan. • Water Quality Monitoring Program to be prepared for short term (construction) and	• Boat haven and estuary surface water quality will be maintained by water sensitive design. • Water quality will be capable of meeting appropriate beneficial uses and the requirements/ criteria of the draft *WA Guidelines for Fresh and Marine Waters* (EPA 1993) • Runoff containment and nutrient stripping techniques will protect the estuary ecosystem. • The Boat Haven will be efficiently flushed by virtue of its orientation and dual connections to the river. • Effects upon the surface water quality can be minimised by implementation of the Construction Management and other Management Plans. • Monitoring during and after construction will highlight the need for corrective action and the

Environmental Factor	EPA Objective	Potential Impacts	Proposed Management	Proposed Outcome
			long term ongoing use) periods.	developer will be responsible for any such action deemed necessary by LIMA.
Mosquitos Site Specific Factor: • Mosquito breeding sites and their effect upon residents. • Effect of mosquito controls upon flora and fauna.	• Mosquito numbers on the site should not adversely affect the health, welfare and amenity of future residents; and • Ensure the breeding of mosquitoes is controlled to the satisfaction of the Health Department without adversely affecting other flora and fauna.	• Mosquito nuisance creating management problems. • Pressure for mosquito control measures creating an adverse impact upon existing flora and fauna.	• Conservation rehabilitation and Management Plan to reduce breeding sites. • Rehabilitation will specifically improve spinner drains and fill in undesirable features created by human interference. • Educate new residents by way of signs of the presence of mosquitos.	• Mosquito breeding sites will be reduced by the development. • Identified mosquito breeding sites will be reduced by rehabilitation measures specified in the Foreshore and Conservation Reserves Management Plan.
Visual Amenity Site Specific Factor: • Visual Amenity of the site when viewed from the surrounding environment.	• Ensure the visual amenity of the area adjacent to the project is not unduly affected by implementation of the proposal.	• Effects of the building bulk of the proposal when viewed from the Estuary, Collie River and Old Coast Road.	• Limit of building heights as established within the design guidelines of the Outline Development Plan. • Implementation of the landscaping plan and Foreshore Conservation Reserves Management Plan.	• The Proposal will not detrimentally impact upon the surrounding environment by virtue of its separation features (boat haven and recreation foreshore) and application of design guidelines.
Aboriginal and Non-Aboriginal Culture and Heritage	• Ensure the proposal complies with the requirements of the *Aboriginal Heritage Act 1972.*	• Potential Impact upon any identified sites of significance.	• Archaeological and ethnographic investigation has cleared the site.	• Proposal will comply with the requirements of the *Aboriginal Heritage Act 1972* (as amended)

1. Introduction

1.1 Purpose of Amendment

The new concept 'Point Douro Peninsula' proposes to introduce residential development and enlarge the Boat Haven from the existing approved development plan at Lot 5 Old Coast Road, Australind. The current proposal the 'Bunbury Holiday Resort' is discussed in detail in Section 2.3.

The new concept the ' Point Douro Peninsula' proposes changes to:

- The proposed Boat Haven by extending the artificial water area towards Old Coast Road.
- Construction of a bridge to create an island foreshore area
- The population character of a portion of the site, by substituting residential uses in place of a tourist site.

The amended proposal will be connected to sewer and all required infrastructure. An area of land will be set aside as the 'Point Douro Conservation Area'.

This Environmental Review will support 'Amendment No. 13' to amend Shire of Harvey District Planning Scheme No.1. The review will describe the environmental implications of this Amendment in accordance with factors identified by the Environmental Protection Authority (EPA) and shown as Appendix C. This requires an assessment of the impacts of three significant areas related to:

- Biophysical surroundings
  - Terrestrial Flora - System 6.
  - Terrestrial Flora - Water birds.
  - Estuary Foreshore.
  - Flood plain integrity.
- Pollution Management
  - Surface Water Quality.
  - Estuarine Water Quality.
- Social Surroundings
  - Mosquitos.
  - Visual Amenity.
  - Aboriginal Culture/heritage.

This document will directly address those issues identified under the EPA instructions while referencing the prior background reports and recommendations of the EPA and Leschenault Inlet Management Authority (LIMA).

This Environmental Review also recommends management provisions to be incorporated into the Amendment to ensure adequate environmental protection and management during the development of the site.

1.2 Location

The Amendment site is located on Lot 5, Old Coast Road, approximately 4km south of Australind in the Shire of Harvey.

It is situated in the Point Douro Peninsula in the Collie River delta and occupies an area of 29.5 ha. The site is immediately north-west of the Collie River bridge and west of the Old Coast Road (Figure 1). The land to be developed includes all of the land known as Point Douro peninsula, excluding a 30 metre wide foreshore reserve (7.77ha) previously excised from the Title during a rezoning process.

The area is proximate to the Perth and Bunbury regions and neighbouring rural districts, and offers adjacent sheltered waters accommodating activities such as swimming, boating, sailing, crabbing and fishing.

The land was originally used for farming and grazing purposes. The original farm buildings had deteriorated to a point where they were demolished.

The Peninsula offered a unique area for stock to range as it only required fencing as a boundary to Old Coast Road. This grazing coupled with the clearing of land created bank and foreshore degradation. The Peninsula continues to be used for unrestricted vehicle access, trail bikes and camping. As a consequence of recent bushfires there has been a continual reduction in the quality of native flora.

Part of the land was previously used as a motor cross and speedway circuit and an oval track still remains located close to the edge of the river.

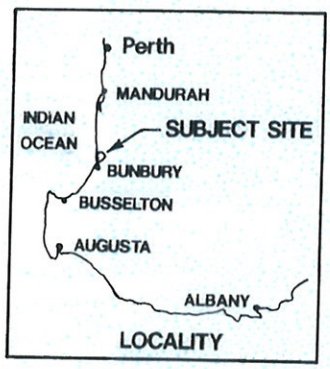
The proposal area is low lying and subject to occasional flooding. The existing proposal for the 'Bunbury Holiday Resort' includes elevation of all the buildings above the 100 year level.

A series of canals and channels in the past were excavated throughout the Peninsula. These comprise:

- Artificial channels previously used for fish trapping.
- Spinner drains to reduce mosquito breeding sites.
- Draining to improve the yield of pasture for grazing purposes.

The most significant channels were created for trapping fish by tidal action. Some 700m of channels have removed significant swathes of Samphire vegetation due to the excavation of the actual channel and placement of soil alongside. A fringe of Samphire herb land is located on the north-west portion of the site.

Plate 1 - 6 provide a photographic record of Point Douro.



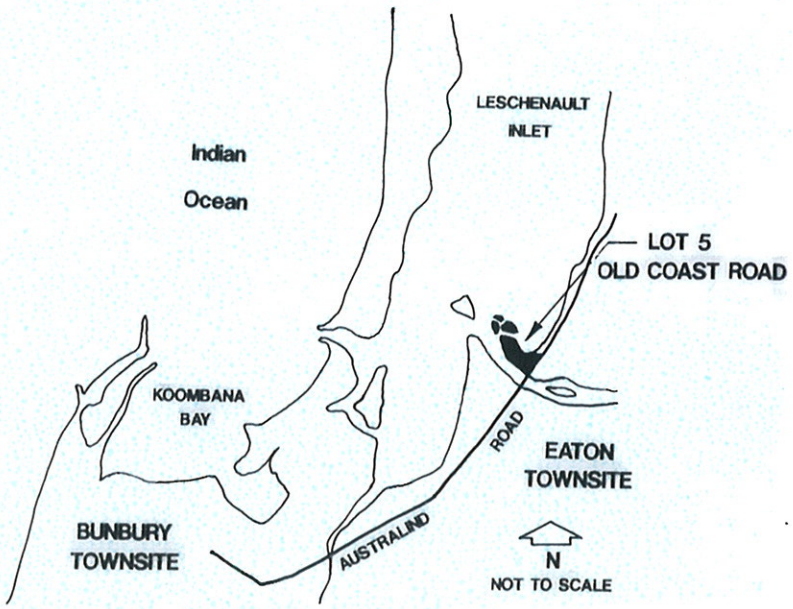


FIGURE 1

SITE LOCATION DIAGRAM

PLATE 1 : Foreshore treatments to Collie River demonstrates the level of historical modifications to the banks

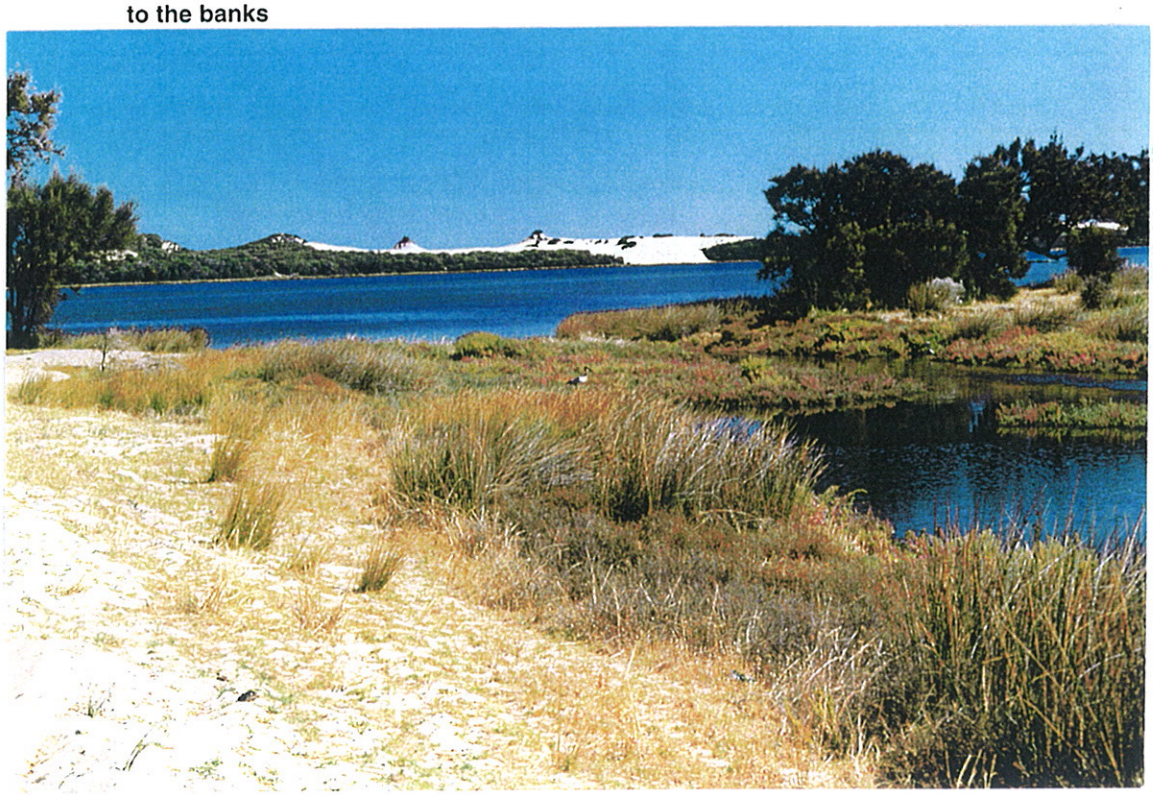


PLATE 2 : Typical samphire heathland present at the end of the Point.

PLATE 1 & 2
PHOTO RECORD OF POINT DOURO

PLATE 3 : Land cleared from vehicle use and evidence of camp fires.

PLATE 4 : Recently burnt Samphire and scrub. The whole of the Peninsula experiences frequent bush fires thought to originate mainly from camp fires.

PLATE 3 & 4
PHOTO RECORD OF POINT DOURO

PLATE 5 : Spinner drain and associated spoil

PLATE 6 : Extensive Samphire and spoil from dredging along the Collie River.

PLATE 5 & 6
PHOTO RECORD OF POINT DOURO

1.3 Background to the Amendment

1.3.1 *Past Investigation*

The investigations of Point Douro were originally initiated through the approval process to create the 'Bunbury Holiday Resort' during 1989 (note concept plan included in Figure 2). The following documents were produced as part of the Amendment process:

- Shire of Harvey District Planning Scheme No. 10, Amendment No. 20.
- Proposed Bunbury Holiday Resort - Lot 5 Old Coast Road Australind. NOI - Bowman Bishaw and Associates, December 1988 (Report No. RI8143)
- Proposed Bunbury Holiday Resort - Lot 5 Old Coast Road Australind - Report and Recommendations of the Environmental Protection Authority Bulletin 375 March 1989.
- Point Douro - Australind Management Plan for the Waterways Commission by Australian Groundwater Consultants Pty Ltd, June 1989.

The Shire Town Planning Scheme No. 10 and new Scheme No. 1 have subsequently incorporated the 'Point Douro Tourist Zone'. This has also been reflected in the Waterways Commission Report No. 39 dated June 1993.

1.3.2 *Relevant Environmental Policies and Guidelines*

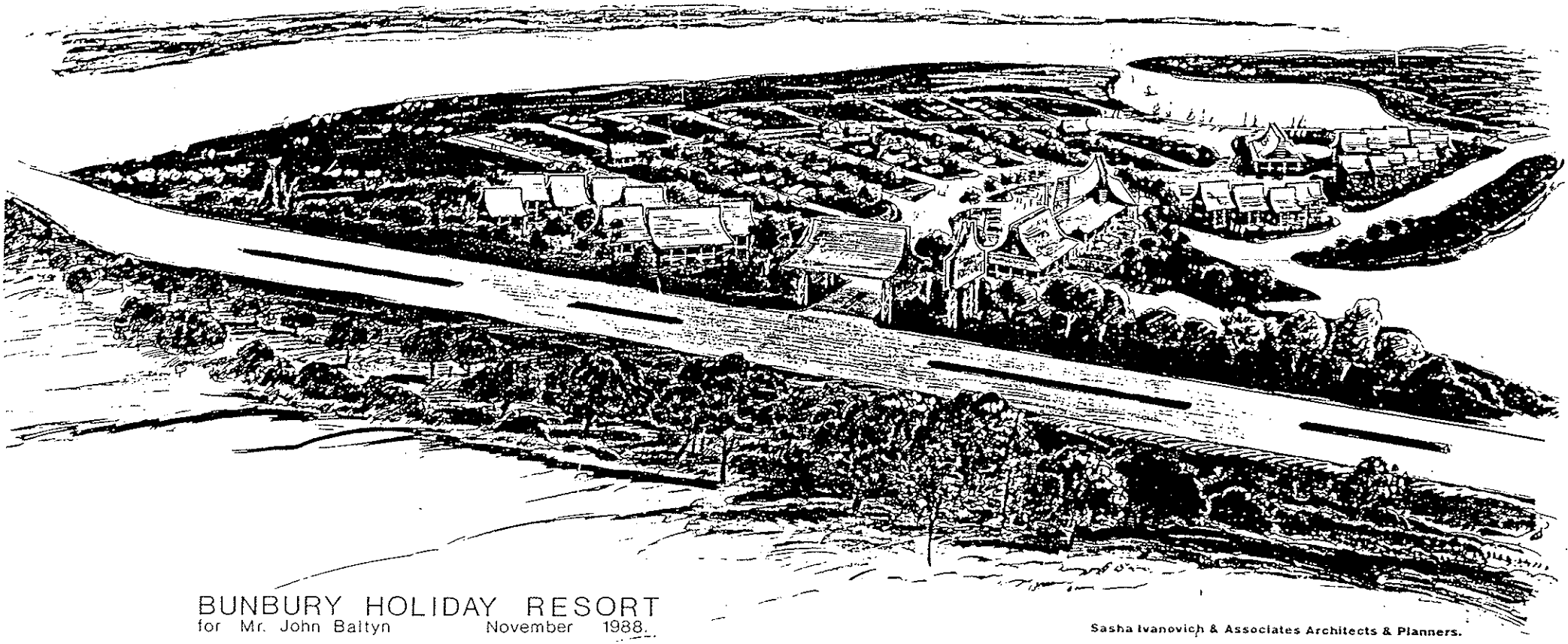
The System 6 recommendations for the Leschenault Inlet relate to the inlet, abutting coastline and the Collie, Brunswick and Wellesley Rivers. System 6 mapping is reproduced at Figure 3. These water bodies were recommended for protection by the Environmental Protection Authority (EPA) in their 'Conservation through Reserves Report for *the Darling System' (The System 6 Study Report).*

The western point of the Point Douro Peninsula has been identified by the EPA Bulletin 375 and the Bowman Bishaw Report (1988) as an area in need of high conservation in accordance with System 6 recommendations C66 and C67. Recommendations pertaining the Pt Douro and surrounding environment include:

- Maintaining the water bird and fish habitats.
- The preservation of local indigenous flora and fauna.
- Allowing only passive recreation.

Specific recommendations of the System 6 report that pertain to Point Douro Peninsula and the surrounding environment include the following:

- The EPA's general recommendations on planning and management of Regional Parks be applied to this area.

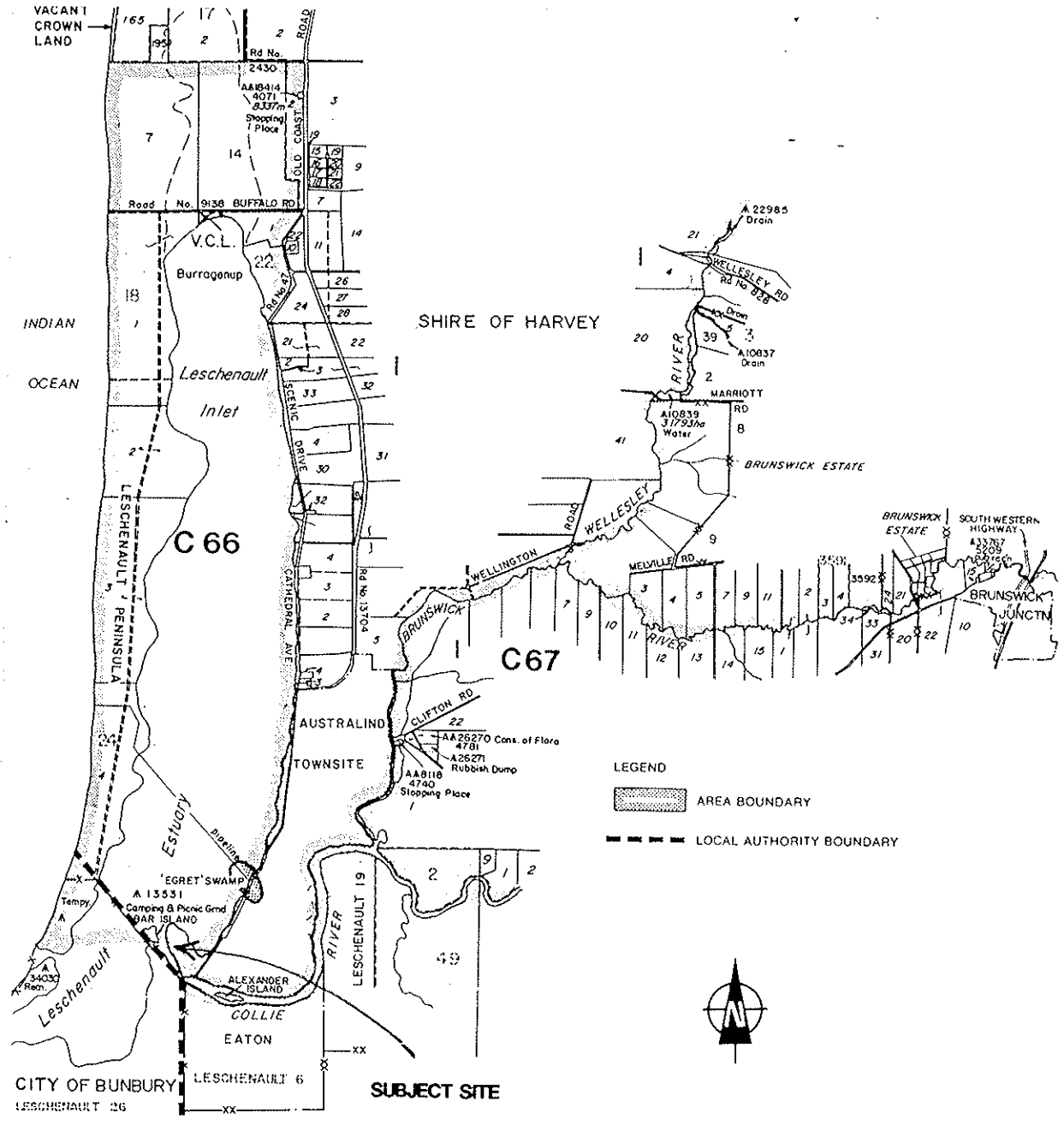


BUNBURY HOLIDAY RESORT
for Mr. John Baltyn November 1988.

Sasha Ivanovich & Associates Architects & Planners.

SOURCE: BOWMAN BISHAW AND ASSOCIATES 1988

FIGURE 2



LANDS DEPARTMENT PUBLIC PLAN No
B 54-4, B 55-4, B 71-4, 411A/40
PRESTON SE 1:25000,
BRUNSWICK JUNCTION, AUSTRALIND;
DCE Ref. No H17, H18, H19,

SOURCE:SYSTEM 6 EPA 1983

FIGURE 3
SYSTEM 6 AREA

- That urban development be only allowed if associated with deep sewage systems, which do not lead to pollution of the inlet.

In addition to the System 6 recommendations the LIMA 'Collie and Brunswick Rivers Foreshore Reserves' study report (June 1993) states:

'conservation, protection and rehabilitation of the ecosystem, landscape, character and general environment of the above mentioned rivers' and

'maximisation of public access and recreational opportunities along the foreshores of the above mentioned rivers in a manner which is sympathetic to the river landscape'

1.4 Authorities Involved

The key bodies involved in the amendment process for 'Amendment No. 13' to the Shire of Harvey District Planning Scheme No.1 are as follows:

- Minister for Planning as the key 'Decision Making Authority' to approve or refuse the amendment. The Minister is advised by the South West Region Planning Committee (SWRPC) under delegation from the Western Australian Planning Commission. The Ministry for Planning provide expert advice to the SWRPC.
- Shire of Harvey as the 'Responsible Authority' and coordinating agency in the amendment process.
- Environmental Protection Authority (EPA) - to coordinate and assess environmental issues.

Other important involved agencies, used to provide specific supporting advice on environmental factors are as follows:

- Leschenault Inlet Management Authority (LIMA) - relating to the inlet and its protection.
- Water and Rivers Commission (WRC) - floodway issues.
- Department of Aboriginal Affairs.
- Water Corporation.
- Main Roads WA.
- Department of Transport (Marine and Harbours).

The amendment process pertains to the Shire of Harvey District Planning Scheme No. 1 and the amendment process takes place pursuant to the *Planning Legislation Amendment Act 1996* and the *Environmental Protection Act 1986* (as amended).

1.4.1 Consultation Process

Consultation with the local community and relevant authorities has already been implemented culminating in a meeting at the Australind Hall. Various

modifications to the concept plan have been carried out to alleviate concerns bought out by the meeting. This document has been prepared for a formal public consultation process.

As part of the consultation process people are invited to read the proposal and make their comments. The amendment process will support the following steps (note Figure 4 -*"Procedures for Approval of Artificial Waterways and Canal Estates"):*

1) Assessment by the Shire of Harvey - This step was initiated via a meeting at the Australind Hall attended by local community councillors and staff on the 23 June 1997 and subsequent resolution to rezone at Councils meeting of August 1997.
2) Grant of Advertising for public comment by the SWRPC - Prior to the SWRPC approving initiation of advertising process, the matter is referred to the EPA to determine the level of assessment.
3) Environmental Review - Prepare Environmental Review and lodge with the Shire, SWRPC (via the MfP) and EPA for approval.
4) Advertising - SWRPC approves the public advertising process and the proposal receives comment from local community groups and Government Instrumentalities.
5) Public Response - Submissions are forwarded to the Shire and documented.
6) Shire Assessment - The Shire assesses and tabulates all submissions, makes recommendations and forwards this to the SWRPC via the MfP. Environmental related submissions are tabulated and referred to the EPA.
7) EPA and SWRPC to assess Shire response and public submissions and make a recommendation to the respective Minister.

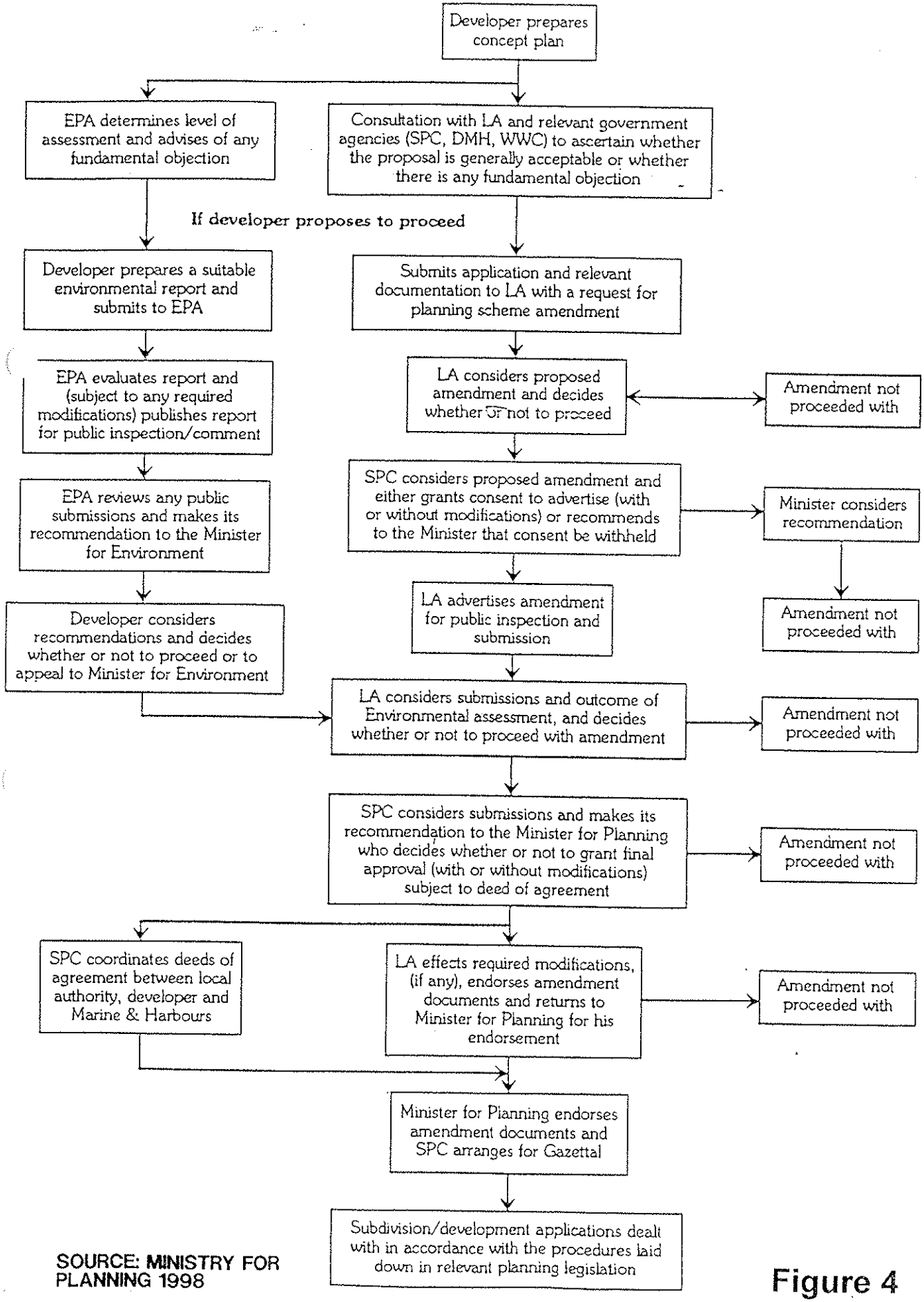
This document will be available throughout the public submission process and copies will be available at the Shire Library, and Environmental Protection Authority Library. Copies of the original NOI Report will also be made available at these offices (copies of the report are already held by these agencies).

1.5 The Environmental Assessment Process

Recent changes to the *Planning Legislation Amendment Act 1996* requires that region schemes, town planning schemes and amendments to these schemes must be referred to the EPA for environmental impact assessment. Division 3 of Part IV of the *Environmental Protection Act 1986* is designed to enable the assessment of land uses at the stage of rezoning rather than development.

PROCEDURES FOR APPROVAL OF ARTIFICIAL WATERWAYS AND CANAL ESTATES

(For details refer to Policy DC 1.8)



SOURCE: MINISTRY FOR PLANNING 1998

Figure 4

1.6 The Planning Framework :

1.6.1 Statement of Planning Policy

A *Statement of Planning Policy (SPP)* may make provision for any matter, which may be the subject of a town planning scheme, but must be directed primarily towards broad general planning, and facilitating the coordination of planning.

An *SPP* may apply throughout Western Australia or in specified portions of the State and may apply generally or to a particular class of matters.

The *Town Planning and Development Act 1928* [as amended] *("Act")* requires that the preparation of an *SPP* have due regard to:

- demographic, social and economic factors and influences;
- conservation of natural resources for social, economic, environmental, ecological and scientific purposes;
- characteristics of the land;
- characteristics and disposition of land uses;
- amenity and environment;
- communications; and
- developmental requirements of public authorities.

An *SPP* is a flexible but powerful planning instrument. Once published (Gazetted) all levels of planning must have regard to the *SPP*. In the absence of a regional planning scheme, the primary tool for implementing an *SPP* is via local government town planning schemes. Section 7(5) of the *Act* states that:

"every local authority in preparing or amending a town planning scheme-

shall have due regard to any approved statement of planning policy prepared under section 5AA which affects its district;"

On an ongoing basis, the WAPC and other decision-makers, including appellant bodies must have regard to the policies of an *SPP* in determining planning applications (subdivision and development). Other State government agencies and authorities are also expected to abide by an *SPP*.

1.6.2 State Planning Strategy

The State Planning Strategy (SPS) was adopted by WAPC under Section 5AA of the Act as an SPP in "*Statement of Planning Policy No. 8 - "State Planning Framework*", in December 1998.

The SPS concluded that the highest priority should be given to a planning strategy for the South-Western sector of the State.

It recommended that growth pressures be managed under a South-West Urban

System that provides a framework to improve the effectiveness of planning, minimises environmental impacts, supports social objectives, and establishes a basis for the staged expansion of infrastructure.

Under the SPS a South-West Urban System implementation study is to be undertaken which amongst other things, will identify land required for long term urban expansion and establish a regional population strategy that:

- reinforces the importance of the *"Greater Bunbury Structure Plan"* as the basis of development in the region;
- ensures that land identified for future urban development is included in each respective local planning scheme;
- ensures that the provision of social and service infrastructure is adequate to support a range of lifestyles in smaller regional towns; and
- monitors townsite growth and population distribution to ensure that infrastructure provision matches the demographic profile of the locality.

1.6.3 Bunbury- Wellington Region Plan

The Minister for Planning released the *Bunbury-Wellington Region Plan (BWRP)* in November 1995. The BWRP incorporates a range of initiatives on urban development, rural land use, resource development and conservation of the environment for the City of Bunbury and the Shire's of Harvey, Collie, Donnybrook-Balingup, Capel and Dardanup.

The *BWRS* also produced the *"Greater Bunbury Structure Plan"*, which is relevant to the land. The Structure Plan identified the land as part *"Parks, Recreation and Drainage"* and part *"Tourism and Recreation Development"*.

It is understood that the reference to *"Tourism and Recreation Development"* in the Structure Plan reflected the zoning of the land under the original Amendment 20 to Town Planning Scheme No. 10. It should be noted that the Structure Plan will be used to guide the WAPC in relation to undertaking the Greater Bunbury Region Planning Scheme. It would appear likely that the area defined for development purposes in the Structure Plan will be referred simply as 'urban'.

The stated purpose of the *BWRPS* is to:

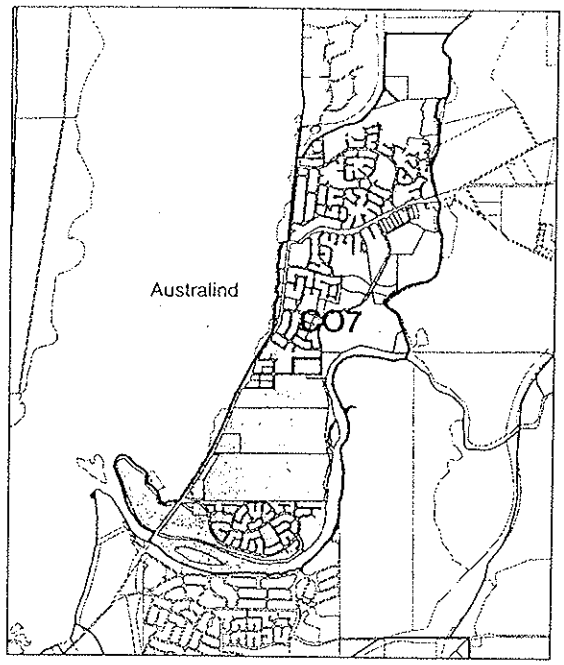
- *Ensure intra and inter-generational equality in relation to the use of natural resources;*
- *Facilitate the efficient allocation of resources;*
- *Create certainty for investors in the economic and social development of the region;*
- *Provide regional guidance for all involved in the use of land which balances economic, social and environmental considerations;*
- *Help reduce ad hoc and duplicated decision-making and activity by coordinating action by Government agencies, private sector organisations*

and community groups;

- *Assist in the ongoing formulation of policy on land use and development at different levels of government;*
- *Assist local government in preparing and implementing local planning strategies, schemes and other local planning and development matters; and*
- *Provide for the preservation and reservation of land for public purpose.*

The land is included in '*Planning Unit CO7: Australind* 'and identifies the major issues, planning considerations and planning guidelines for the area. *'Planning Unit CO7'* is included as Figure 5.

PLANNING UNIT CO7: AUSTRALIND



UNIT DEFINITION

Major Surface Water Catchment: Collie River Catchment

Location: Bounded by Leschenault Estuary on the west, Collie River on the south, Brunswick River on the east and the Leschenault Planning Unit on the north.

Local Authority: Shire of Harvey

Physical Features: The soils/land form consist of a narrow fringe of estuarine flats adjacent to the Leschenault Inlet and Collie River mouth, some wide river terraces, with the remainder being undulating Spearwood Dunes. The remnant natural vegetation consists of pockets of samphire and sedges adjacent to the estuary, paper barks and flooded gums along the rivers, and tuart/jarrah peppermint woodland on the dunes.

Existing Land Uses: The area is substantially subdivided for single residential development. Many urban facilities are available including schools, neighbourhood shopping centre, municipal branch office and minor sporting and cultural facilities. SCM plant exists north of Clifton Park. Bunbury Golf Course (private) and a caravan park are located south of SCM.

ISSUES, OPPORTUNITIES AND CONSTRAINTS

- The Australind precinct was identified in the *Bunbury Region Plan* as being existing urban, urban expansion (medium term) and parks, recreation and drainage.
- The area is fast developing but is limited by the capacity to provide reticulated sewerage.

PLANNING POLICIES AND GUIDELINES

PREDOMINANT LAND USES:
Existing Urban, Future Urban (Category A), Industrial, Tourism and Recreation Development, Public Purposes, Parks, Recreation and Drainage and Areas under Consideration for Conservation Scenic Protection and Reservation.

*****

1. Prevent further expansion of the Australind Village Shopping Centre beyond 7000m G.L.A. to protect the future of the proposed East Australind District Centre.
2. Wide river foreshore reserves should be preserved and progressively developed as leisure, recreation and conservation areas.
3. Efforts should be made to secure a continuous foreshore reserve along the Leschenault Estuary.
4. Investigate alternative methods of effluent disposal to allow for residential infill at South Australind.
5. Maintain existing buffers while SCM continues to operate from its present South Australind site, but acknowledge potential for alternative future use within the buffer reserve.
6. Observe catchment management principles.

FIGURE 5
PLANNING UNIT CO7

2. Description of 'Amendment No. 13' Shire of Harvey District Planning Scheme No. 1

2.1 'Amendment No. 13'

The new 'Amendment No 13' concept plan proposes to rezone much of Lot 5, Old Coast Road from a 'Tourist Zone' to the extended 'Residential Development Zone and Recreation and Conservation Reserve' see Figure 5a overleaf and the Amendment Resolutions at Appendices A and B. LIMA considers this type of development most appropriate to the site as it allows maximum public use of the Collie River Estuary and Leschenault Inlet.

The current plan for the 'Bunbury Holiday Resort' occupies land within the confines of the property boundary defined along the western boundary by the Boat Haven.

The new proposal will cover a development area bounded by the existing property boundary and the new alignment of the boat haven and conservation area. Changes made by the new proposal may be summarised as:

- Extension of the boat haven within the development area (Modified Water Body).
- Creation of an additional opening to the water area to the Collie River.
- Introduction of a larger permanent form of development over what is now nominated as the 'Caravan Park'.
- Amendment to built form that will result in additional buildings within the development area that would be visible from Old Coast Road and the Collie River.
- Amended boundary to the conservation area to improve the floodway performance of the boat haven.
- Accommodation of a permanent residential population as opposed to a tourist population.

2.2 Past Research

The NOI Report by Bowman Bishaw provides a detailed account of environmental factors. The findings of this report have been condensed within Section 3 and further covered below, as has the response from the Report and Recommendations of the Environmental Protection Authority Bulletin 375.

The outcomes of these reports provide the current baseline analysis of the site.

2.3 Description of Existing Approved Proposal

The concept of the proposed 'Bunbury Holiday Resort' was introduced during 1989 for Point Douro and ultimately zoned for tourism purposes via Amendment No. 20 to Town Planning Scheme No. 10.

The 'Bunbury Holiday Resort' was to comprise a complex that would focus on a boat haven which bisected the site north/south and included the following facilities:

- 194 caravan sites;
- 40-60 camping sites;
- 46 holiday units (4-6 beds);
- a restaurant;
- take-away service restaurant;
- swimming pool and recreational facilities;
- boat haven with launch ramp and moorings; and
- Manager's residence, shop and petrol sales outlet.

The proponent assembled a summary of commitments which were developed as part of the management plan for the site.

The 'Bunbury Holiday Resort' was to serve a perceived demand for tourist facilities adjacent to the Leschenault Inlet. South West tourism growth at that time continued at a steady rate of 498,000 at 1982 to 584,000 at 1985/86 of which 15% of holiday makers chose caravan parks for accommodation.

The growth of Busselton, Dunsborough, Yallingup and Margaret River as dominant South West destinations has seen a change in the nature of tourism opportunities in the region. These factors include:

- The continued urban expansion of Bunbury and Australind has seen a gradual change in the lifestyle offered within the area from a low density rural to more urbanised environment.
- The improvement in major link roads including the Australind and Bunbury Bypass, the upgrade of the Old Coast Road and Bussell Highway now makes the more distant coastal areas highly accessible needing under three hours of travel time for holiday makers to reach the increasingly dominant South West attractions.
- The proposals for the expansion of hotels and timeshare apartments within the Bunbury townsite and on Pelican Point opposite have continued to take up projected growth.
- The number of high quality and competitive tourist facilities within the South West have created increasing popularity and drawn tourist populations further south.

Investigations of Pelican Point and Point Douro were being commenced at the time of the release of the Bunbury Region Plan (September 1986) which highlighted areas of further growth. This growth has now been occurring over the past 10 years and has contributed to a change in the region's character. This effect has seen changes to the original concepts for both Pelican Point and Point Douro by reducing the components of tourism related uses.

The *Greater Bunbury Region Structure Plan* 1995 introduces new future urban lands to support the foreseen demands by Kemerton Industrial area future work force. Areas nominated include Australind and Binningup. The Structure Plan saw the need to identify potential urban infill sites for development as innovative medium density houses and for urban renewal.

The recent urban growth within the vicinity of the Point Douro Peninsula, Samphire Bay and Leschenault Inlet has gradually changed the use of the area to a community recreation resource as opposed to visitor based. The local community use foreshore areas for walking, wading, fishing and crabbing.

The development of Point Douro to the currently zoned level of tourist based intensity is therefore not believed to be economically feasible.

The current owner of the land, Dewsbury Pty Ltd, acquired the Point Douro Peninsula in 1994 and in reassessing the viability of the site examined a number of options.

2.4 New Options

This proposal is based upon a series of options presented to Council and amended due to community feedback, DEP requirements and hydraulic investigations. Figure 6 depicts the series of options developed.

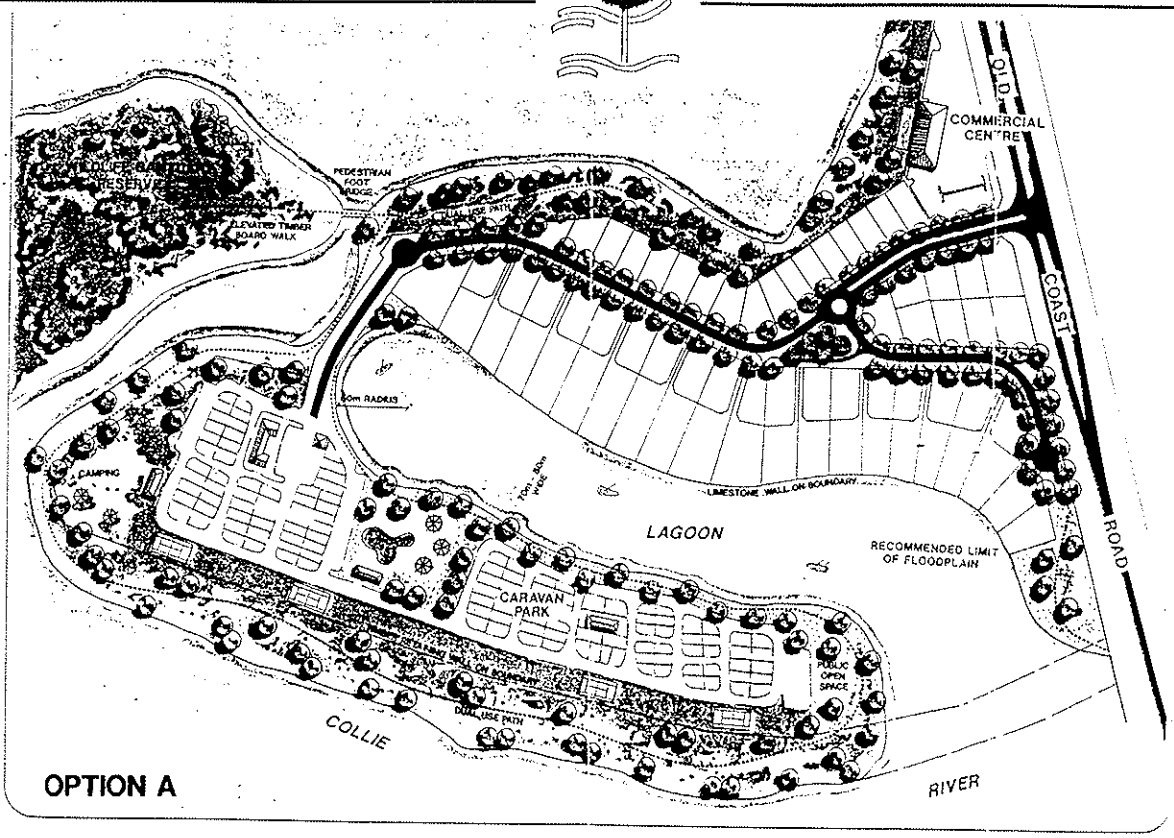
2.4.1 Option A:

Artificial water area open to the Collie River with the Caravan Park located in the current approved position. The proposed motel and holiday units would be substituted for residential uses. The Collie River foreshore was considered as most important for recreational access. While the northern foreshore was seen to be more suited to a low impact use such as a walk trail and bird watching areas.

The points of the community meeting and Council's concerns included:

- LIMA Policy.
- Floodway impediment.
- Public access along the foreshore.
- Bridge connection over lagoon.

As a result of these factors the proposal was amended.



DATE: 22 APRIL 1997
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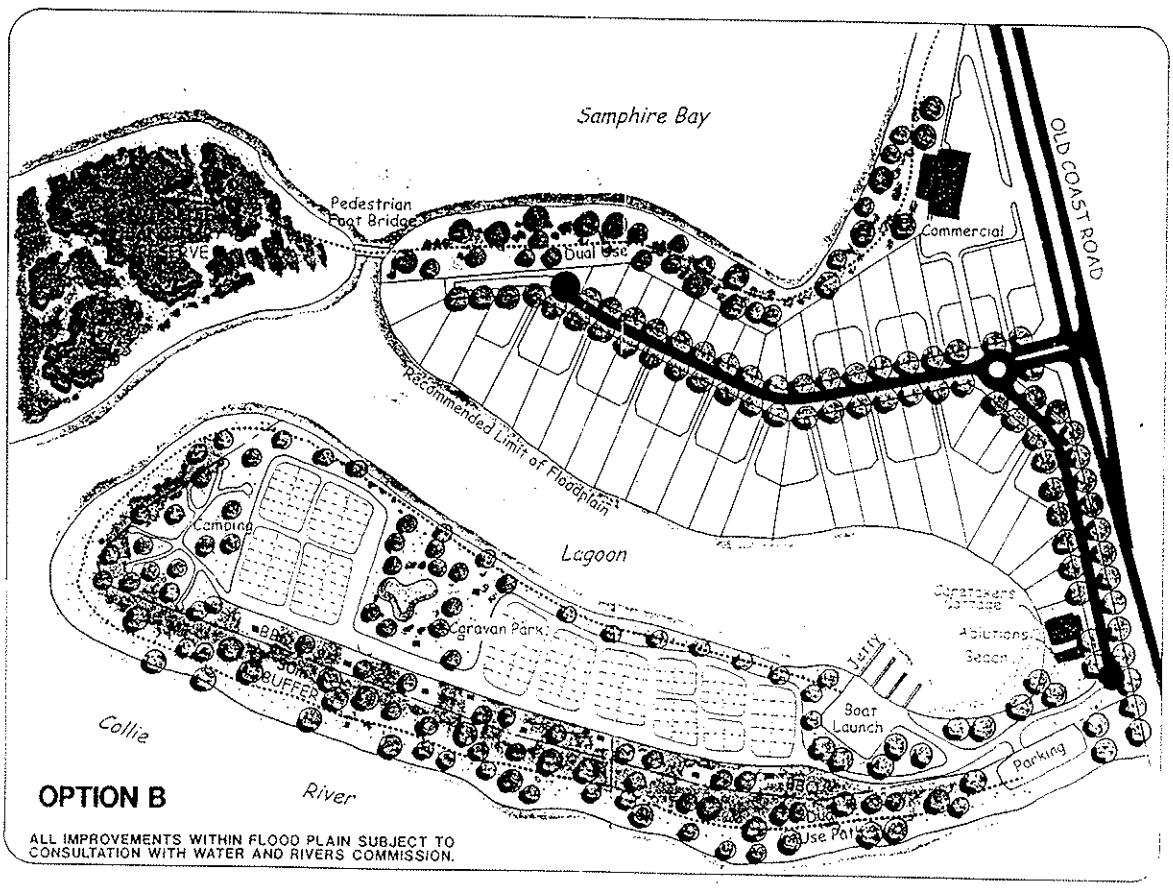
DRG.NO. 5134.0108.PF

CONCEPT PLAN

PLAN DEPICTING THE DETAILS TREATMENT OF THE SITE AN ABUTTING SANCTUORY AND FORESHORE RESERVES.



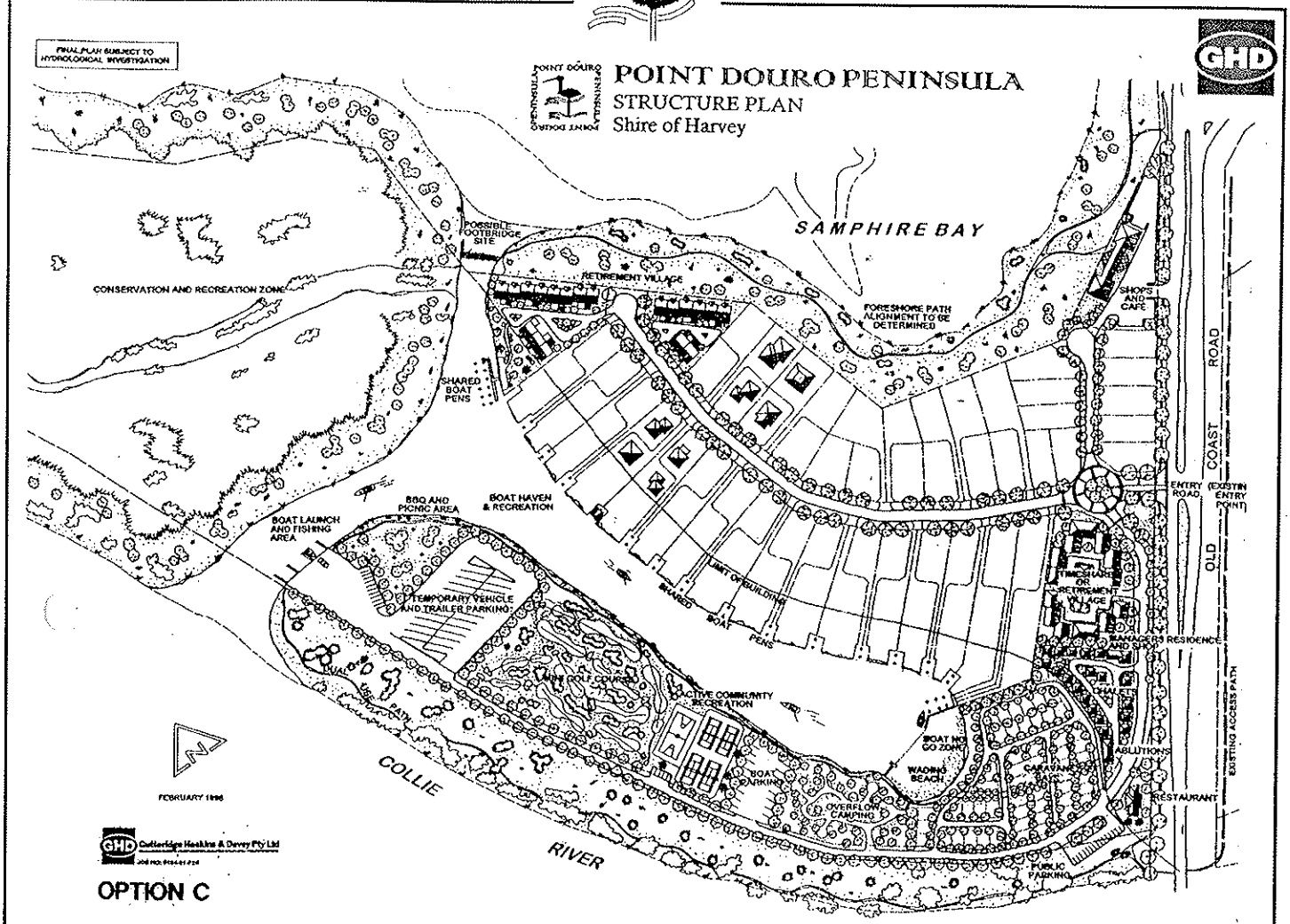
ALL IMPROVEMENTS WITHIN FLOOD PLAIN SUBJECT TO CONSULTATION WITH WATER AND RIVERS COMMISSION.

DATE: 21 JULY 1997
SCALE 1:2500
DRG.NO. 5134.01

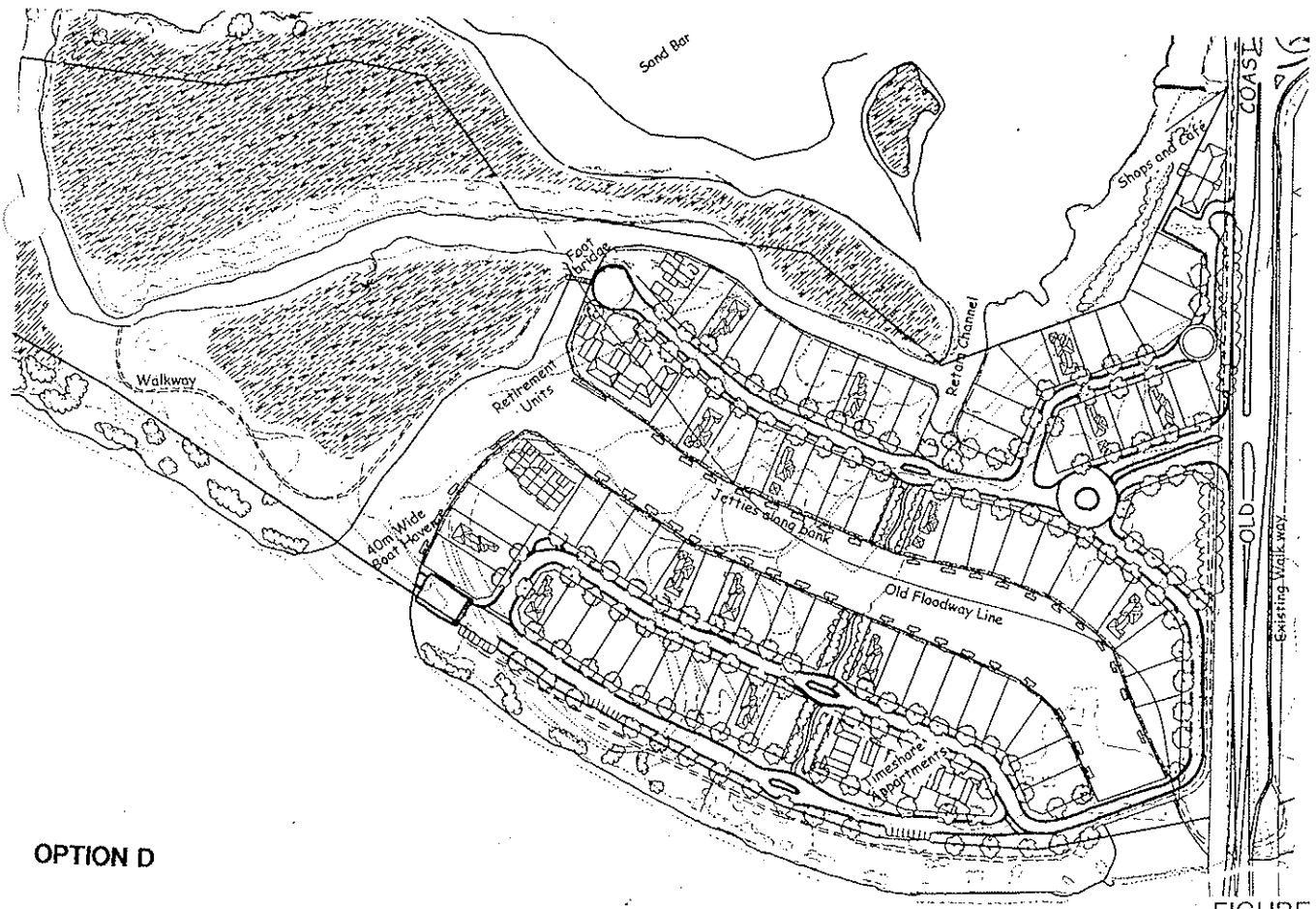
CONCEPT PLAN

PLAN DEPICTING THE DETAILED TREATMENT OF THE SITE AND ABUTTING SANCTUARY AND FORESHORE RESERVES.

FIGURE 6



OPTION C



OPTION D

FIGURE 6

2.4.2 *Option B:*

Option B reversed the opening to the water body and deleted the bridge. This arrangement provided continuous pedestrian and vehicle access along the Collie River foreshore.

The caravan park was to contain facilities and permanent structures at specific points of flood levels. This option required management investigations to ensure the caravan park would be vacated during flood events.

This was presented to the Council during August 1997 where it was resolved to allow the rezoning process to proceed and that an Environmental Review be undertaken. The review commenced with an on site meeting with DEP and MfP representatives.

2.4.3 *Option C:*

As a result of review investigations the proposal was amended to:

- Move the water way that separated the conservation area east to preserve an area of Samphire.
- Use part of the floodway for the frontage of residential lots.
- Include chalet accommodation, time share unit site and a small retirement village to create greater accommodation choice.
- Reduce the size of the caravan park and substitute a series of private recreation facilities using the public access road to define the edge of the Collie River foreshore.

This option and the draft review document was presented to the DEP, MfP and the Shire and comments were presented at a Technical Assessment Group (TAG). The major issue identified was development within the floodway and it was therefore resolved to require the Review include a hydraulic investigation to prove that such development could occur without impeding the floodway during a 1 in a 100 year event.

2.4.4 *Option D:*

Option D has been amended as a result of hydraulic investigation to allow a more permanent built form and mix of development to occur upon the floodway.

2.5 The 'Amendment No. 13' Proposal

The current development plan (Figure 7) involves a mix of land use activities centring upon a boat haven which acts as a relief floodway. The components of the development plan are discussed in subsequent sections.

2.5.1 *Residential*

Waterfront Sites : A series of sites fronting the artificial water area, will be provided with boat moorings and water access. The balance of sites will have

access to the proposed boat ramp facilities. Water front lots are approximately 800m2 in area.

Foreshore Sites : All sites will be separated from the foreshore by water, limestone retaining walls and open fencing. Road access for lots fronting the River will be taken from the rear of these sites to provide a shoreline buffer area.

Other Sites : The balance of sites are served by a cul-de-sac leading off the main entry road.

Generally, lots have been designed to accord with the R12.5 to R20 code. The special sites will accord with the R40 density code pursuant to District Planning Scheme No. 1 and discussed below. Actual lot numbers will be subject to final design and dependant upon assessment by the Shire and WAPC.

2.5.2 *Recreation Facilities*

Recreational facilities will be developed upon the Collie River foreshore and will be located at the termination of the public access road. They will comprise:

- a boat ramp and car park.
- seating, tables and BBQ's.
- a playground.
- walk paths.
- wooden bollard fencing.

Details of the development of the foreshore will be included in the Outline Development Plan, Foreshore and Conservation Reserves Management Plan and the Developer Contribution Plan.

The integrated nature of the development of Point Douro hinges on the surrounding landscape, the water area and the recreation facilities provided. All facilities complement the respective residential and tourist uses. These facilities will also be available to the local community.

Management of these facilities will be distributed under various agreements and via contributions from residential components. The overall management of this precinct may involve the Shire, should it wish to participate in management issues.

Maintenance of the recreation precinct will follow strict guidelines to limit the use of fertilisers. The Nutrient Export Management Plan will propose specific guidelines for fertiliser minimisation by use of local native grasses and ground cover.

2.5.3 *Commercial*

The commercial component is proposed to compromise a restaurant and shops. The building is envisaged to all have a frontage to open timber decking linked to the dual use pathway along the foreshore reserve. Types of retailing anticipated will include a delicatessen/newsagent.

The interface of the foreshore area abutting the commercial precinct will comprise a public road, landscaping and limestone retaining wall. This will form the interface while buildings will be set upon the wall to allow for flood level clearance access.

2.5.4 *Tourist Facilities*

Tourist facilities are distributed throughout the development. The tourist components compromise:

- Restaurant - will contain a reception room for small function and serve to cater for holiday makers, passers-by and the local community. The centre will contain a boardwalk and outdoor dining area. The building will contain a dominance of timber features, limestone treated walls, iron-roofing, boardwalks, decking and native landscaping which will be designed sensitive to the riverine vegetation.
- 'Timeshare" - will cater for tourist demand for timeshare apartments. The need for a flexible zone is seen important due to the significant number of timeshare units proposed in Pelican Point. Should demand be realised an appropriate concept plan would be presented to Council.
- Retirement unit complexes - provide a living environment to retirees, many of which may wish to enjoy the recreation facilities provided on the peninsula. The village and dwellings will provide for boat and caravan storage areas for residents.

2.5.5 *Roads*

Two access points are proposed from the site onto Old Coast Road. One central access point will serve the residential and tourist components of the site and the second access point to the north to serve the commercial component of the site.

Minor modifications to the median strip along Old Coast Road are proposed to accommodate vehicles entering and leaving the site. The roadway provides a clear line of sight in both directions, the central median strip is well formed and over 6m wide. The entry road is aligned close to the existing median strip and a turning lane would provide a 100m long deceleration lane. This entry point provides a high level of safety and is able to cater for the projected traffic demand from the site.

A single driveway will provide access to the commercial centre for north bound traffic. Should motorists wish to travel south they may enter onto the main entry road via a link road within the site. This negates the need for any further median opening.

Appropriate carriageway treatment with parking mix will complement the streetscape, and give additional character to the residential and tourist components.

POINT DOURO PENINSULA

CONCEPT DEVELOPMENT PLAN (01)

PT. DOURO PENINSULA

SHIRE OF HARVEY

FIGURE 7

PROPOSAL PLAN

Job Number: N:\611\51340100
MARCH 2000

Point Douro Australind
Environmental Review

BIRD LIST FOR POINT DOURO

Black Swan
Australian Shelduck
Pacific Black Duck
Grey Teal
Darter
Little Pied Cormorant
Pied Cormorant
Little Black Cormorant
Great Cormorant
Australian Pelican
White-faced Heron
Little Egret
Great Egret
Australian White Ibis
Osprey
Whistling Kite
White-bellied Sea-Eagle
Bar-tailed Godwit
Black-tailed Godwit
Whimbrel
Eastern Curlew
Common Greenshank
Terek Sandpiper
Common Sandpiper
Grey-tailed Tattler
Ruddy Turnstone
Great Knot
Red-necked Stint
Curlew Sandpiper
Sharp-tailed Sandpiper
Pied Oystercatcher
Black-winged Stilt
Red-necked Avocet
Pacific Golden Plover
Grey Plover
Red-capped Plover
Greater Sandplover
Hooded Plover
Silver Gull
Caspian Tern
Crested Tern
Fairy Tern

Australian Ringneck
Red-capped Parrot
Common Bronzewing
Pallid Cuckoo
Sacred Kingfisher
Splendid Wren
Striated Pardalote
Western Gerygone
Yellow-rumped Thornbill
Singing Honeyeater
Brown Honeyeater
White-fronted Chat
Rufous Whistler
Grey Fantail
Willie Wagtail
Black-faced Cuckoo-shrike
Black-faced Woodswallow
Dusky Woodswallow
Australian Magpie
Australian Raven
Tree Martin
Welcome Swallow
Silvereye
Little Grassbird
Richard's Pipit

Rita & George Watkins.

2.5.6 *Drainage and Sewer*

The drainage and sewer infrastructure will be designed in detail at the subdivision stage. Initial design criteria have been assessed and applied to the site in order to ensure there are no critical design shortfalls that may create problems at the design stage.

Sewer

The sewer pickup across the site is achievable at grades exceeding 1:300. Pump stations will be designed in accordance with Water Corporation requirements as outlined in the Wastewater Manual Volume 2, Part 4 - Design Criteria. The pump station will be located alongside the landscaped swale basin abutting Old Coast Road and constructed to the following standards:

- 4 hours storage by pump station wet well and sewer network at the ultimate design peak wet weather flow. In practice, the storage commitments will cater for inflows for the duration substantially greater than three hours.
- A duty and standby pump with automatic changeover to cater for pump failure.
- An alarm dialler will ring the control centre when power or pump failure occurs at the pump station and the level of the sewage in the pump station rises to the alarm level.
- The electrician on standby will inspect the pump station as soon as practical, normally within an hour and will attend to any repair work which is possible.
- If the problem is not immediately repairable, the electrician will implement contingency arrangements
- Tankers are available on standby to remove sewage inflows from the site until pumping functions have been restored, either under normal operational mode or under contingency arrangements.

It is most unlikely that an overflow would occur with the above measures and procedures in place.

A typical feature of all wastewater pump stations is commitment for control of any emergency overflows to a single point however unlikely or infrequently they may occur. The emergency overflow system incorporates a double baffle overflow which retains solids and floatable material in the sewer system.

Two pump stations will be located within the site to serve the 'mainland' and 'island' components of the development. The stations will be situated adjacent to the drainage facilities. Exact pump station locations will be established at the engineering design stage in liaison with the Water Corporation and the EPA.

Drainage

All public roads will be kerbed and drained to Shire requirements. The piped drainage system will convey run off to nutrient stripping basins for stormwater control. The drainage will comprise a piped system to a landscaped storage and

settlement basins at points midway across the site and at entry of the site. These basins will also take the form of a landscaped nutrient stripping basin.

All drainage within specific development sites including the retirement village, time-share units, restaurant and commercial precinct will be contained on the site within soak wells, green storage and swale drains as part of the overall site landscape plan.

Within the foreshore recreation area, the access road for boat users and the associated parking area will be drained via swales, berms and a shallow basin to trap all run off for infiltration. The boat ramp will be designed with maximum impermeable surfaces graded back to the abutting swale drain to minimise pollutant transfer during boat launching and pick up.

The overall drainage from the road and boat ramp represents a minor component of surface run off and can be effectively managed by landscaped swales. All other impermeable surfaces can be drained to edges and naturally infiltrate.

2.5.7 *Modified Water Body - Boat Haven*

The average width of the boat haven is 40m, being in accordance with the requirements stated under the WACP Policy No. D.C.1.8 (*"Canal Estates and Other Artificial Waterway Developments - February 1999)* and Department of Transport (Marine and Harbours). This width also optimises the hydraulic function of the water area as an alternative floodway during a 1:100 year flood event.

The orientation of the water body serves to improve and complement the floodway characteristics of the Collie River. Providing openings at both ends allows for flushing by prevailing tides and minimises the level of siltation from the river.

As part of the amendment resolution the water area has been defined as:

"Modified Water Area : An area of land modified in such a way as to allow entry of a natural body of water or course that functions as a recreational, boating or ornamental purpose."

Council may wish to develop controls via policy related to this zone where design issues need clarification. In this case design issues will be outlined within the Boat Haven Construction and Management Plan for the site.

The water area has been subject to full hydraulic investigation and this is documented in Appendix D.

Boat Haven Construction

The Boat Haven will accommodate water front lots provided with boat access and moorings via jetties and mooring poles.

The Haven wall will be stepped so as to provide a point for personal water access. This first wall step is at mean sea level. The wall is stepped at 1.5m to

achieve a 1.8m garden level which grades to 2.0m (refer to Plan at Figure 8 and Cross Sections, Figure 9). Walls adjacent to the boat access points will be formal limestone which will become graded and landscaped. Fencing will conform to the landscaping plan for Point Douro Peninsula and will incorporate limestone piers and open fill set back from the bank edge to provide landscaping.

2.5.8 *Foreshore Reserves, Pedestrian System and Conservation areas*

Foreshore

A 30m wide foreshore reserve around the whole site has been previously ceded to the Crown.

It is proposed to upgrade the foreshore reserves by replanting native species. Foreshore vegetation will need to be buffered from potential impacts such as earthworks and included as part of the Foreshore and Conservation Reserves Management Plan to be approved for the area.

Foreshore access around the site would be provided for pedestrians. Figure 9 shows a cross section for the foreshore reserve along the north of the site.

The northern foreshore interface within Samphire Bay will contain separating elements for foreshore preservation by water or the following:

1) A limestone retaining wall topped by an open picket fence and piers to provide an aesthetic backdrop.
2) Landscape screen along the fence line.
3) Dual use path within 3m of the fence line to ensure the maximum depth of distinctly separate foreshore area.
4) Installation of a fence to discourage domestic animals. The 1.5m high fence will be constructed of 3mm galvanised bar at 50mm spaces with a wire cross brace top and bottom. The steel mesh ends project above the top brace. The fence will continue along the length of the foreshore interface not separated by water.
5) The area to the waterline will be rehabilitated in liaison with LIMA.

Pedestrian Circulation

Dual use paths will link from the Old Coast Road to the conservation area. Public circulation is also available via internal access roads. The public would be able to walk from the bridge to the wildlife sanctuary, onto the commercial area of the site and under the Collie Bridge via internal roads and foreshore links.

Continuous access will be available along the Collie River foreshore via the new bridge. A dual use path will be provided along the east side of Old Coast Road. This path will be linked to a pedestrian circulation system on Point Douro.

Conservation Area

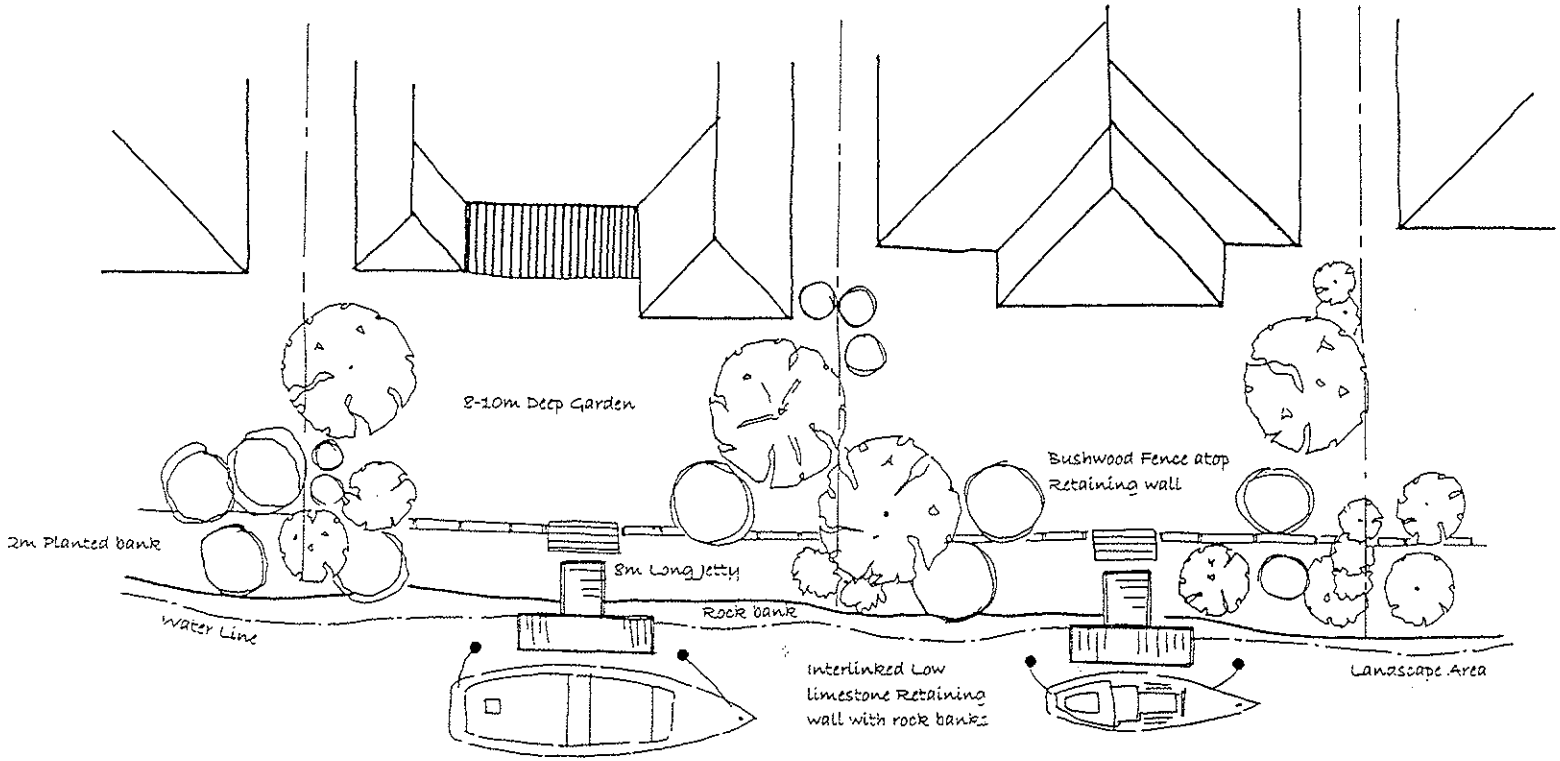
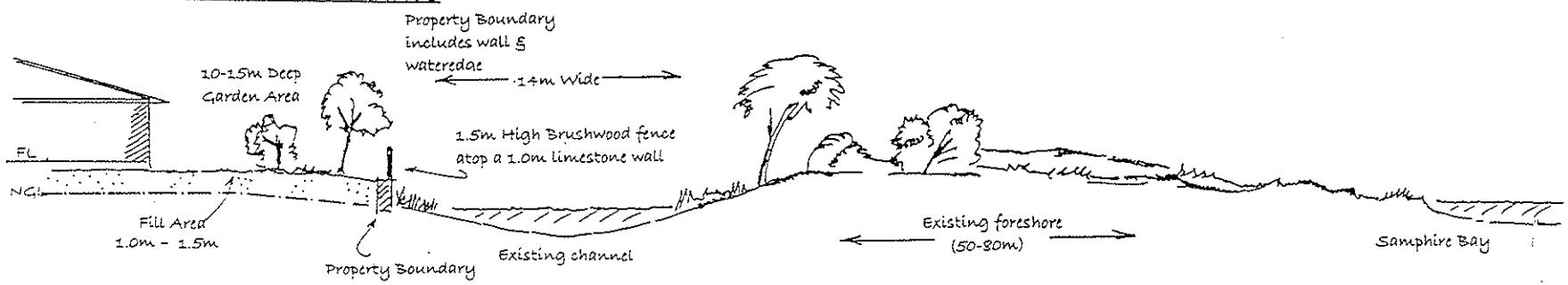


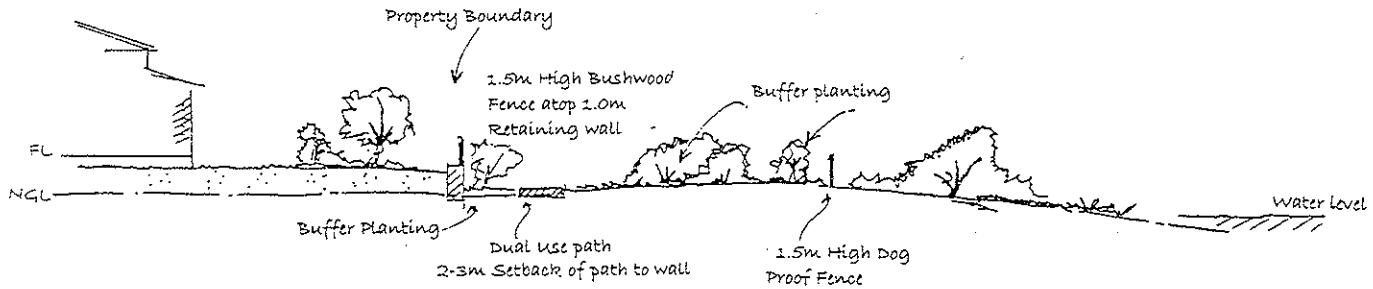
FIGURE 8

INDICATIVE WATERWAY EDGE TREATMENTS - PLAN SECTION

CROSS SECTION TO WATER CHANNEL



CROSS SECTION TO FORESHORE



CROSS SECTION TO BOAT HAVEN

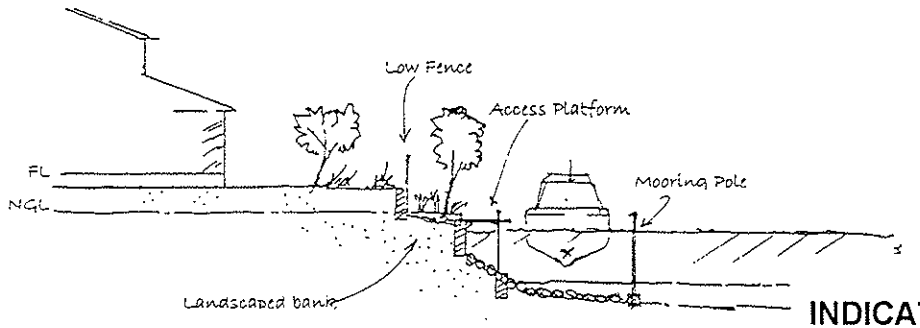


FIGURE 9

INDICATIVE WATERWAY EDGE TREATMENTS - CROSS SECTIONS

The conservation area is described further in the report and within the proponent commitments. The conservation area was identified as part of the existing plan for the site and comprises the following elements:

- Water separation to isolate the conservation area.
- Provision of a single controlled access point to the area via path with gate to prevent access by domestic animals.
- Rehabilitation of the area in accordance with the approved Management Plan.
- Development of a walkway and bird watching hide.
- Filling and re-contouring of drainage channels.
- Minimisation of mosquito breeding sites.

The area will be accessible via a footbridge over the northern outlet of the boat haven. This point offers the advantage of restricting access to boats.

2.5.9 *Summary of Components*

The physical components of the new proposal are summarised in the following Table 2:

Table 2 : Summary of Components

Activity Components	Comment	Total Area
Residential Development		
· Water front sites	· 34 Lots	
· Foreshore sites	· 17 Lots	5.2 ha
· Balance Sites	· 22 Lots	
Special Residential		
· Retirement Village	· Single site	1.72 ha
· Short stay accommodation	· 3 sites	
Tourism		
· Chalets	· Single site	
· Managers dwelling/shop	· As part of the chalet complex	
	· Includes carpark	0.86 ha
· Restaurant	· Includes carpark	
· Commercial		
Recreation and Conservation		
· Boat ramp and parking	Includes access road	0.5 ha
· BBQ's and facilities		
· Foreshore areas	0.775ha	0.775 ha
· Conservation ares	8.2ha	14.15 ha
Water area		
· Total artificial water area	Relief floodway is less than total area	4.1 ha
· Relief floodway area		
Drainage		
· Drainage basin	Includes P.O.S areas for drainage purposes	1.0 ha
· Open space drainage		
Total land set aside for building		7.78 ha
Total Area		**29.5 ha**

The proposed development area of Point Douro will take up approximately 32.15% of the Peninsula. Recreation conservation land and waterways designated in the past and present proposals represents 67.5% of the Peninsula.

2.6 Changes to the Existing Plan

The amended plan for the Point Douro Peninsula involves changes in land use and human activity. Departures from the original plan comprise:

- deletion of the Caravan Park and extension of the modified water body to serve new residential lots;
- substitution of the restaurant, managers residence, petrol station and a portion of the holiday units with residential lots; and
- creation of a relief floodway, island and bridge to better utilise the site.

The changes required investigation of :

1) Traffic impact from new residential use

2) Hydraulic function of the new boat haven

3) Social and environmental assessment of a different population character

4) Any changes to the overall management of the Point Douro Peninsula.

Figure 10 depicts changes to the Boat Haven boundary overlayed upon the aerial photo.

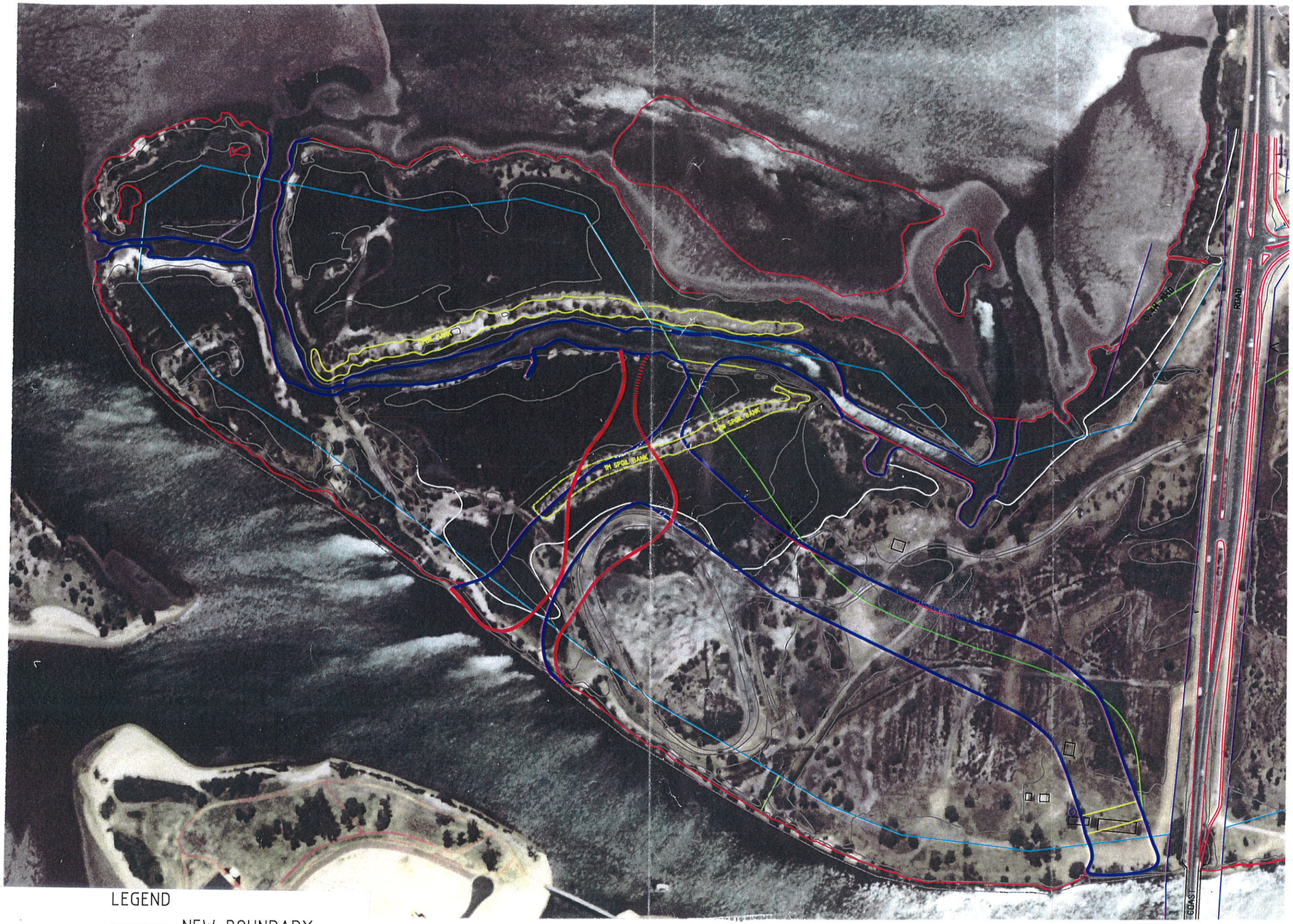
The effects of the changes are summarised below :

Traffic : Traffic generation from the site under either development proposal will not adversely impact upon Old Coast Road. The entry/exit point is some 250m from any existing access points therefore no conflict is likely with current traffic movements. The new concept would see more consistent traffic levels throughout the year and a reduction in projected peak traffic demand of 25% during summer months.

Population Character : The peak population will reduce by 40% by introducing residential development into the new concept. The character of the population will change to a permanent population which will create a community identity and a potentially more sensitive attitude to the utilisation of the surrounding environmental resources.

Relief floodway : Hydraulic investigation using up to date modelling techniques has proved that the water area will act as a relief floodway with capacity to allow the excision of a portion of the site from the floodway. This arrangement will act to improve floodway performance.

Visual appearance : Over 60% of the Point Douro Peninsula will be provided for a distinctly separated wildlife conservation area and additionally protected and rehabilitated foreshore areas. Less than 30% of the Peninsula will be subject



LEGEND

NEW BOUNDARY

CURRENT BOUNDARY

Date: 19.01.2000
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FIGURE 10
CHANGES OVERLAYED ON AERIAL PHOTO

to development. The new concept will cover the same development area and will involve being the substitution of the Caravan Park with residences.

Commercial : The new concept has deleted the use of storage and distribution of petrol from the site.

Tourism : The tourism component is specifically targeted to attract a small sustainable tourism population to support the integrated commercial activities.

2.7 Evaluation of Alternatives

The alternative development scenarios for the site are limited. They are discussed below :

RECREATION / CONSERVATION - The Shire of Harvey suggested the balance of the site be purchased by the State Government for use as recreation and conservation.

The Minister For Planning investigated the site and after consultation with the Shire considered there are higher acquisition priorities in the district. Past reports and references indicate:

- The portion of the land within the Point Douro Peninsula proposed for development does not have high conservation values worthy of preservation.
- The development area is predominantly degraded and has little environmental value.
- Land on the opposite side of Old Coast Road has been acquired in the past for recreation. No further land is required in the local area to cater for recreation purposes.
- The current plan for Point Douro was supported by the EPA and LIMA partly due to the proposed establishment of a conservation reserve for the head of the Peninsula.

TOURISM PURPOSES : The use of the site wholly for tourism purposes is not feasible due to the reasons outlined in Section 2.3. These are:

- The growth and urbanisation of Australind and Bunbury.
- Competing South West destinations.
- Resultant reduced tourist component on Pelican Point.

The current plan has not been implemented since its approval in 1989 due to viability considerations. This factor coupled with the level of rehabilitation and improvements proposed within the Point Douro Peninsula makes the project unworkable.

NO DEVELOPMENT : The site may remain in an undeveloped state awaiting the opportunity for tourism demand to create viability. The factors that diminish viability is not a decline in tourism demand in the region but the circumstances created by better alternatives, improvements in transport and the nature of

human activity. The urbanisation of Australind, development of the continued change in character of the district from what was a small isolated centre to a large residential community.

Maintaining the tourist zone will ensure continued degradation of the Point Douro Peninsula, no delineation of the conservation area and no early rehabilitation coupled with increased use.

The Point continues to be used for unrestricted vehicle access vehicle and rubbish dumping and camping. Recent bushfires have also reduced the quality of native flora.

RESIDENTIAL / TOURIST PURPOSES : The introduction of viable land use activity provides the impetus for :

- The creation of water based and land based recreation focus.
- Opportunity to create a completely protected wildlife area on the Peninsula.
- Opportunity to rehabilitate foreshore areas and encourage controlled recreation and boating activities (in accordance with LIMA objectives).
- Opportunity to control present and future activity away from sensitive foreshore areas.
- Create a management plan in liaison with LIMA, and the Shire for sustainable and future management.
- Introduce a permanent local community as opposed to a transient and peak summer population that could place greater demands upon the surrounding environment and subsequent management difficulties.

The crucial factor in the protection of the Point Douro Peninsula is to create the impetus to put the management options into practice which is not achievable under current proposed land use activities.

2.8 Project Staging and Statutory Obligations

Upon the resolution of the identified issues and finalisation of the rezoning process, the development of the site will take place via applications for subdivision underpinned by agreements with various approval bodies.

Development of the first stage will include residential development with the construction of the Boat Haven, and associated infrastructure. Final development of the residential areas is likely to be in a further 2 stages.

The project will take at least 3 years to complete commencing with application to subdivide the land to initiate extension of services such as sewer, power and water. The delineation and protection of the conservation area would occur as part of the first stage of development.

Development of the site will accord with agreed management plans pertaining to earthworks, site rehabilitation and foreshore treatments. The project will be under control of:

- Section 20 of the *Town Planning and Development* Act 1928 (as amended).
- The Shire of Harvey District Planning Scheme No. 1 pursuant to the *Town Planning and Development Act 1928* (as amended).
- The *Environmental Protection Act* 1986 to resolve environmental issues prior to the finalisation of rezoning.
- The *Waterways Conservation Act 1976* (as amended) to guide and control changes to the water area and rehabilitation of foreshore and conservation areas.
- Agreement of the Shire and the proponent to ensure development of the water area and its ongoing management are carried out.

Commitments by the proponent and management considerations are outlined under Sections 3 and 4.

2.8.1 EPA Bulletin

In response to the report by Bowman Bishaw (1988) which assessed the original proposal, the EPA in its 1989 Bulletin No 375 made the following decision:

RECOMMENDATION 1

The Environmental Protection Authority considers that the development proposal as described in the Notice of Intent to be environmentally acceptable subject to the proponent's commitments contained within the Notice of Intent and the following recommendations.

RECOMMENDATION 2

The Environmental Protection Authority recommends that the area proposed the Nature Conservation Zone in the Notice of Intent be zoned a "Recreation and Conservation Area" under the Shire of Harvey District Planning Scheme, together with appropriate land use controls. This area, together with the existing foreshore reserve adjacent to the Resort Zone Area B, should be subject to a management plan, prepared by the proponent to the satisfaction of the Leschenault Inlet Management Authority (LIMA). Initial implementation of the Management Plan should be the responsibility of the proponent, to the satisfaction of LIMA. Until implementation of this plan, vehicle access to the site should be restricted, with the exception of vehicles involved in mosquito control, and public access managed to minimise disturbance to Samphire vegetation.

RECOMMENDATION 3

The Environmental Protection Authority recommends that no dewatering be undertaken on the site associated with construction of the Boat Haven unless a further submission addressing this impact has been received by the EPA and approval granted.

RECOMMENDATION 4

The Environmental Protection Authority recommends that the proponent be responsible for the monitoring and management of water quality within the Boat

Haven, and that prior to commencement of development an appropriate water quality monitoring and management program be prepared by the proponent to the satisfaction of the EPA and LIMA. Water Quality in the boat haven and entrance channels should be regularly monitored by the proponent for the first three years after construction. These results should be incorporated in a Report, to be submitted to LIMA and the Environmental Protection Authority for comment on an annual basis. If any problems are indicated by the monitoring program, these should be addressed by the proponent to LIMA's satisfaction . The final location of the refuelling facility, stormwater drainage, sullage and boat pump-out facilities should be referred to the Environmental Protection Authority and LIMA for approval prior to construction.

The following key comments were made relating to each recommendation:

- The development area proposed was determined by DEP and LIMA as being acceptable, provided the areas of high conservation value and waterbird nesting sites are well protected.
- Construction abutting Samphire Bay must not impact upon the foreshore and bird life. There should be minimal disturbance of waterbird colonies and ongoing noise and light associated with the development should be well controlled.
- Establish a conservation area and prepare a management plan. Ownership of this area should be the subject of on-going negotiation between the proponent, LIMA and the Shire.
- Further information is required regarding the dewatering operation associated with the construction of the Boat Haven. The shallow aquifer may be affected by the proposed development, and this needed to be recognised.
- A mosquito control program is to be part of the overall management plan.
- Water Quality to be monitored as per the commitment to control any erosion in foreshore areas.
- Landscaping associated with the development to be compatible with the existing environment.

2.8.2 *Waterways Commission Report - 1993*

The Waterways Commission Report No. 37 for LIMA (June 1993) outlines the following guidelines for Point Douro.

"The Waterways Protection Precinct at Point Douro is in accordance with the development plan approved by the Minister for the Environment, dated 14 September 1989. The illustrated line is subject to the adherence of the developer to the stated Ministerial conditions pursuant to the commitments of the Environmental Protection Act 1986 and the implementation of the Point Douro Management Plan.

- saltmarsh

- floodway/floodplain
- reserve 32868 and 26858
- high recreational potential of the area
- valuable conservation area for waterbirds and associated wetland habitat.

Recommendations

1) Support the continued implementation of the Integrated Mosquito Control strategy for Point Douro and Pelican Point."

(The development plan referred to is the existing approval for the "Bunbury Tourist Resort)".

2.8.3 EPA Review Criteria

Due to the new concept plan which proposes introduction of residential development and extension of the canal, the EPA has issued new instructions.

This Environmental Review is under the direction of the EPA instructions issued on 28 October 1997 which are at Appendix C.

3. Environmental Factors Relevant to the Proposal of the Amendment

The following environmental factors are those listed in the EPA's Review instructions of October 1997.

3.1 Vegetation Communities

3.1.1 EPA Objective

Maintain the abundance, species diversity, geographic distribution and productivity of the vegetation communities.

3.1.2 Existing Environment

The flora type and distribution was assessed and mapped in detail by Bowman Bishaw (1988) and reflected in the Waterways Commission Report, (June 1993). A vegetation map and table of identified species by Bowman Bishaw (1988) are reproduced at Appendix E. Aerial photos from 1988 and 1998 are included at Appendix F to show any changes over that time.

The vegetation cover over most of the site is low, with some clumps of trees occurring at the Collie River margin and on low dunes. It comprises of Samphire herb land to the south and east, mainly occurring in low lying areas and abandoned channels. Of these *Halosarcia halocnemoides* and *H.incidia* are predominant, with strands of *Sarcoconia blackiana* and *Threlkeldia diffusa.*

The deeper channels between the Collie River and the 'Cut', as well as the central basin of the Inlet, support sparse submerged aquatic vegetation with the exception of masses of detached macro-algae which drift into the area. Phytoplankton populations in the Leschenault Inlet are also sparse.

The major relief is provided by the remnant stands of Flooded gums (*Eucalyptus rudis*) and by patches of She-oak (*Casuarina obesa*) and paper bark (*Melaleuca raphiophylla*). Other species recorded on the peninsula were *Hakea prostrata*, saltbush and introduced species such as couch, kikuyu, pigface, *Watsonia* and *Oxalis*.

The Peninsula has been substantially degraded due to vehicle usage, grazing, burning and weed invasion. In the eastern areas bordering the road, and adjacent to the vehicle tracks on the property, pasture grasses and weeds have replaced almost all of the natural understorey.

The north-western portions of the Peninsula and the foreshores of the Collie River and Samphire Bay have a higher conservation value. In particular the Samphire communities extending from the end of the Peninsula are significant for supporting bird populations.

The natural vegetation in these areas is generally in good condition and has significant value as a component of the Leschenault Inlet ecosystem. However, no rare or endangered species were identified in the study area, or are expected to exist.

No Samphire communities have been listed in Gibson *et al.* (1994) so there is no indication in that document as to their representation in conservation reserves. However, the species within the community are common and widespread which gives some indication that they are not likely to be poorly reserved. Similar Samphire flats occur within most western coastal estuaries and are often well conserved due to their saline nature and flooding potential.

The other remnant vegetation on the Peninsula is made up of common species but its original composition is unknown and therefore it cannot be related to communities recorded in Gibson *et al* (1994).

3.1.3 Potential Impacts

Some of the well conserved Samphire vegetation in the proposal zone can potentially be disturbed through human activity causing a decline in the health and abundance of this community. This could subsequently impact upon waterbirds, aquatic invertebrate fauna, fish and crab populations that shelter, feed and breed among the vegetation.

Impact of Boat Haven Alignment :

Concern was expressed by the DEP that moving the Boat Haven west may encroach into the Samphire vegetation. This issue was identified after an on site meeting with representatives from the DEP. Although no objections were raised in principle to moving the entry, it was identified that protection of the Samphire should be a priority.

The new edge of the Boat Haven was determined by site and aerial photo investigation. Boundary selection criteria included:

- Areas of land already degraded or affected such as the speedway and spoil banks.
- The condition of existing Samphire.
- Existing boat haven configuration.

The northern connection of the Boat Haven to Samphire Bay was delineated by the floodline and original Boat Haven alignment. The edge of the Boat Haven southward follows the existing spoil bank. Removal of the bank is also proposed to improve floodway performance.

The Boat Haven alignment has been amended to follow the bank which will be removed to improve floodway performance. The bank does not contain Samphire therefore it was considered beneficial to remove it in light of floodway issues.

3.1.4 Proposed Management

Using the Boat Haven to define the conservation reserve provides the most effective means of preventing access by animals and humans and significantly reduces the risk of frequent bushfires during the summer months. Separation of the conservation area and limiting of public access is the primary conservation measure which will prevent further degradation and allow natural rehabilitation. Active rehabilitation by the proponent will only occur where necessary and where approved by LIMA as part of a Foreshore and Conservation Reserves Management Plan. This Management Plan will be developed by the proponent.

Further protection measures are desirable to assist in the more rapid rehabilitation of the Peninsula. The management plan will provide the means for additional protection. The proposal will support the EPA's objective of maintaining species diversity, geographic distribution and productivity of vegetation communities.

3.1.5 Proposed Outcome

The development proposal has the advantage of creating water separation achieving a distinct barrier and deep buffers. These factors provide the best possible management tool to maintain identified areas of environmental significance.

The provision of landscaped areas in the development zone, including the planting of native flowering shrubs and trees, is proposed to replace any vegetation lost that may have been of significance as faunal habitat.

3.1.6 Relevant Scheme Provisions

A number of Scheme Provisions apply but only the relevant points are listed below. See also Table 3 points 1, 2, 6,9 and 11.

2. *Recreation and Conservation*

   No activity or development shall occur on the land reserved for Recreation and Conservation other than in accordance with the management plan approved by LIMA and WRC in association with DEP.

3. *Subdivision and Development*

   q) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation.

4. *Foreshore and Conservation Reserves Management*

   Prior to ODP a Foreshore and Conservation Reserve Management Plan shall be prepared and approved by Council that addresses :

   c) *management of human pressures;*

   d) *the tenure, detailed design and management of Conservation reserves;*

   e) *the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves;*

f) *the retention of remnant vegetation and the provision of foreshore buffers.*

10. Construction Management Plan

a) *minimisation of clearing and vegetation disturbance;*

b) *protection of foreshore buffers.*

3.2 System 6 - C66 & C67

3.2.1 EPA Objectives

Ensure that the conservation values of the System 6 recommended areas are not compromised.

3.2.2 Existing Environment

A systematic study (System 6 Report, 1983) completed by the (then) Department of Conservation and Environment identified areas of bushland, landscape and open space of regional significance in Perth and surrounding regions. The System 6 study covered the most intensively used part of the state where the land values are high and competition for differing land values is often intense (Environmental Protection Authority, 1994). The Leschenault Inlet and Collie River regions were recommended for conservation by the 'System 6 Report' (EPA 1983) for their high conservation, recreation and landscape values.

The specific locality C66, includes the Leschenault Peninsula north of the Collie River mouth, the area of land between Old Coast Road and the ocean for a distance of 2.6km northwards from the northern end of the Leschenault Inlet and the eastern shore of the Inlet which includes Point Douro Peninsula. The locality C67 includes mostly the Collie River from the mouth in the Leschenault Inlet to approximately 4km upstream. System 6 mapping is reproduced in Figure 3.

Specific recommendations of the System 6 report that pertain to Point Douro Peninsula and the surrounding environment include the following:

- That the EPA's general recommendations on planning and management of Regional Parks be applied to this area.
- That urban development be only allowed if associated with deep sewered systems which do not lead to pollution of the Inlet.

The western point of Point Douro was designated as a recreation reserve under the Town Planning Scheme 10 Amendment No 20 in 1989.

3.2.3 Potential Impacts

Clearing and modification of the site for development of the proposed residential and recreational water development will have minimal impact upon the Samphire or terrestrial vegetation in the conservation area of the western portion of the Peninsula. The remainder of the site undergoing land development has

previously been modified for various land uses such as cattle grazing and speedway, rendering it substantially degraded.

The Samphire community and adjacent areas utilised by bird colonies have the potential to be affected during the construction phase by careless activity.

3.2.4 *Proposed Management*

Management considerations that pertain to the Peninsula include maintaining waterbird and fish habitats, preservation of indigenous flora and allowing only passive recreation upon such habitats. As described previously the Samphire and associated bird life are the most significant environmental value occurring at Point Douro.

A rationalisation of the reserve boundary and segregation of the western point from the remainder of Point Douro Peninsula with the exception of a pedestrian access bridge will ensure the area can naturally rehabilitate and provide new nesting sites.

The EPA Bulletin 375 and the Bowman Bishaw Report (1988) both highlight the need to protect the area identified as high conservation value in accordance with System 6 recommendations C66 and C67.

The System 6 objectives are met by virtue of the installation of deep sewer and separation of the conservation area by the water area. This issue has been previously addressed by the EPA Bulletin 375 which both identified the significance of the conservation area as delineated by the existing concept plan. No objections were raised to the use of walk trails within the conservation area.

The proposal provides a very high level of conservation. The separation of the area, limiting pubic access via the footbridge and the creation of defined walk paths and bird watching hide will improve the ability for waterbirds to nest and feed. Should LIMA wish to restrict human access, this could be achieved through removal of the footbridge option.

Recommendation 2 of the EPA report identifies the need for a Management Plan to be prepared to the satisfaction of LIMA with the initial implementation of the plan being the responsibility of the proponent. A Foreshore and Conservations Reserves Management Plan will be prepared to satisfy this recommendation. Public access to the site should be restricted to minimise disturbance to the Samphire vegetation.

3.2.5 *Proposed Outcome*

The proposal will meet System 6 objectives to localities C66 and C67 by:

- maintaining the water bird habitats and preserving local indigenous flora;
- allowing only passive recreation; and
- the installation of a deep sewer system for all urban development.

The utilisation of degraded land for the development area and creation of buffers to identified significant conservation areas will assist in supporting System 6 objectives.

3.2.6 Relevant Scheme Provisions

The following Scheme Provisions apply. Refer also to Table 3, points 1,2 3, 4, 5, 8, 9, 11 and 12.

2. *Recreation and Conservation*

   No activity or development shall occur on the land reserved for Recreation and Conservation other than in accordance with the management plan approved by LIMA and WRC in association with DEP.

3. *Subdivision and Development*

   q) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation.

4. *Sewer*

   All lots will be connected to a reticulated sewerage system. Appropriate contingency measures to cater for emergency overflows or pump station failure will be established with the Water Corporation.

5. *Boat Haven Construction and Management Plan*

   Prior to approval of ODP by the proponent of the Boat Haven, a Boat Haven Construction and Management Plan shall be prepared by the proponent and approved by Council that incorporates :

   a) Design standards to meet EPA objectives for water quality and beneficial use protection;

   b) a water and sediment quality monitoring plan.

6. *Foreshore and Conservation Reserves Management*

   Prior to ODP a Foreshore and Conservation Reserve Management Plan shall be prepared and approved by Council that addresses :

   c) *management of human pressures;*

   d) *the tenure, detailed design and management of Conservation reserves;*

   e) *the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves;*

   f) *the retention of remnant vegetation and the provision of foreshore buffers.*

7. *Minimising Nutrient Export*

   Prior to ODP, a Nutrient Export Management Plan shall be prepared by Council that addresses :

   a) *monitoring soil nutrient levels to determine appropriate rates of nutrient application;*

   b) *the use of slow release fertilisers;*

   c) *minimising grassed areas and landscaped open spaces;*

   d) *the use of local species;*

   e) *encouraging residents to minimise fertiliser application and plant native species;*

KEY
1. TERRESTRIAL
2. SAMPHIRE FLATS
3. MUD FLATS
4. DEEPER WATER

LEGEND
- NEW BOUNDARY
- PROPERTY BOUNDARY
- HABITAT BOUNDARY

Date: 11.09.2000
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GHD

POINT DOURO
ENVIRONMENTAL REVIEW 1999

FIGURE 10A
HABITATS, & PROPOSED DEVELOPMENT

f) *minimising groundwater use;*

g) *minimising the potential for water quality problems during staging and implementation.*

8. *Terrestrial Fauna/Waterbirds*

Prior to ODP, a Terrestrial Fauna/Waterbird Protection Plan shall be prepared and approved by Council that addresses:

a) *compliance with the System 6 objectives;*

b) *providing and environment with separation from human activity;*

d) management measures that encourage waterbird and native fauna into the project area once construction is completed.

10. *Construction Management Plan*

a) *minimisation of clearing and vegetation disturbance;*

b) *protection of foreshore buffers.*

3.3 Terrestrial Fauna / Waterbirds

3.3.1 EPA Objective

- *Maintain the abundance, species diversity and geographical distribution of terrestrial fauna and waterbirds.*
- *Protect Specially Protected (Threatened) Fauna, consistent with the commitments of the Wildlife Conservation Act 1950.*

3.3.2 Existing Environment

Avifauna

Bowman Bishaw (1988) drew upon survey information from Ninox Wildlife Consulting *'A survey of the Birds of Pelican Point'* report to Le Prevost Semenuik and Chalmer 1989 to determine the use of Point Douro by waterbird population. It identified that the Point Douro area regularly accommodates a number of local and migratory species that locate along the fringes associated with the Samphire herb lands.

Further examination of the proposed development area was made by Hart Simpson and Associates in February and August 2000 and has resulted in a list of fauna observed and a report on the values of particular areas of the site (Appendix G).

The conservation of waterfowl is identified as an important aspect of Leschenault Inlet by the System 6 Study Report (EPA, 1983). Although not specifically identified in the System 6 study, Point Douro and Pelican Point are recognised as contributing to waterfowl habitat. Of the birds recorded in the vicinity of the proposal site, the majority were common birds such as pelicans, cormorants, seagulls, ducks (black and grey teal) and swans. Certain species

were identified to be of conservation importance such as the Great Egret and Yellow-billed Spoonbill.

The tidal flats of the estuary show much larger concentrations of waterbirds, including a high proportion of trans-migratory shorebirds covered by international treaties (CAMBA and JAMBA) such as stints, plovers, sandpipers. The migratory shorebirds arrive at the Leschenault Inlet in summer and leave by Autumn. During Winter and Spring the inundated tidal flats support breeding pairs of ducks, large numbers of cormorants and moderate numbers of herons, egrets and spoonbills. Figure 10a indicates the major habitat zones on Pt Douro and Appendix G lists water birds both observed and expected within each zone.

The most valuable zones are the isolated tidal pools and the estuary and river foreshore, particularly those vegetated with Samphire. The patchy and degraded nature of the woodland/shrubland complex at Lot 5 is considered to be the reason for the low numbers of land bird species recorded.

Other Fauna

The study undertaken on Pelican Point, located on the southern side of the Collie River indicated that various frog and reptile species were expected to be present when water is available. The survey by Hart Simpson and Associates found small numbers of relatively common reptile species (see Appendix G) with no Priority species being observed. The abundance of these species is likely to be seasonal and fairly low, as a result of the seasonal nature of wetlands and highly degraded vegetation on the site. No amphibious species were observed or heard.

Threatened Fauna

No rare or endangered species are expected to occur on the proposal site (Hart Simpson report - Appendix G). A Priority 1 skink *Glaphyromorphus 'kontoolasi'* was recorded once in 1966 in a samphire habitat near the Preston River and could possibly be at the site but was not observed during a one day search. The highly degraded nature of the terrestrial habitats at the development site indicate that any wildlife populations which may occur on the site are likely to be relictual and in low abundance. The site also supports small to moderate numbers of introduced vermin species such as foxes, rabbits and mouse species.

3.3.3 *Potential Impacts*

Construction activities, mainly limited to the development phase and property construction later, may generate noise and vibration that can cause disturbance to waterbird and land based animal populations. Until waterbirds have become accustomed to human presence, regular disturbance can seriously disrupt activities such as feeding, breeding and roosting. An avifaunal international literature search conducted by Ninox Consulting (1991) for the Pelican Point development showed the primary impact on waterbirds resulted from disturbance through water sports, hunting and angling. No activities of this kind will take place with the exception of boat use in the boat haven area. The conservation

area will provide a haven for those waterbirds seeking shelter, and minimal disturbance is to occur in this area.

Most terrestrial fauna have disappeared due to fire, stock grazing and ground compaction and remnant populations of terrestrial vertebrates are estimated to be small. The introduction of pet dogs and cats into the area once construction is complete can have an impact on bird populations through harassment and predation.

Road casualties are a common occurrence in areas with high levels of both traffic and wildlife. Young ducks moving from their breeding areas to wetlands are one of the main casualties. Low speed limits within the development are expected to reduce the loss of birds, however to the immediate east of the site is the major road artery Old Coast Road linking Bunbury to Australind.

The land on the eastern side of the Old Coast Road has intermittent wetlands that may attract ducks or other shorebirds in the months of higher rainfall.

Both Bowman Bishaw (1988) and the EPA Bulletin identified the need for protection measures to be in place during construction and rehabilitation.

The EPA commented in Bulletin 375 that:

"The EPA and LIMA consider that development of the type described in the NOI in these areas is an acceptable form of land use provided that the areas of high conservation value and the waterbird nesting sites are well protected. However, the following points should be taken into consideration by the proponent.

During the construction phase of the development adjacent to the Samphire Bay there should be minimal disturbance to the waterbird colonies, and on-going noise and light associated with the development should be well controlled. Advice (to be) sought from LIMA and the Department of Conservation and Land Management (CALM)"

3.3.4 Proposed Management

Compliance with the System 6 objectives coupled with the separation of the conservation area provides an environment with separation from human activity. The current supported management arrangement provides for a walking trail and bird watching hide.

A Terrestrial Fauna/Waterbird Protection Plan will be prepared which will detail the commitments of the proponent and responsibilities. This will include the results of a survey of waterbirds to be carried out in November/December in order to assess migratory wader use of the shallows.

Management measures to encourage waterbird and native fauna into conservation and foreshore zones once construction is completed may include the following:

- Enforcing strict control of cats and dogs in the development area by signs and community education.

- constructing sloping banks to appropriate parts of the channels and boat haven to provide extra shallow wading areas.
- Planting a range of native species of trees and shrubs by incorporating them into a landscaping plan to screen wading areas from residences and to encourage nectar feeding birds and other species into the area.
- Setting walk trails back from the waters edge to minimise disturbance.
- Controlling public access through appropriate location of car parks, picnic and barbecue areas and boat ramps.

3.3.5 Proposed Outcome

It is unlikely there will be a change in the number of trans-equatorial shorebirds utilising the estuary. The conservation area to the west will provide the greatest opportunities for the waterbirds to feed and nest. The conservation of the reserve and rehabilitation of foreshore areas and buffers will promote sustainable use of the area by birds.

3.3.6 Relevant Scheme Provisions

The following Scheme Provisions apply. See also Table 3, points 2, 3, 6, 8, 11 and 12.

2. *Recreation and Conservation*

   No activity or development shall occur on the land reserved for Recreation and Conservation other than in accordance with the management plan approved by LIMA and WRC in association with DEP.

3. *Subdivision and Development*

   q) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation.

6. *Foreshore and Conservation Reserves Management*

   Prior to ODP a Foreshore and Conservation Reserve Management Plan shall be prepared and approved by Council that addresses :

   c) *management of human pressures;*

   d) *the tenure, detailed design and management of Conservation reserves;*

   e) *the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves;*

   f) *the retention of remnant vegetation and the provision of foreshore buffers.*

8. *Terrestrial Fauna/Waterbirds*

   Prior to ODP, a Terrestrial Fauna/Waterbird Protection Plan shall be prepared and approved by Council that addresses:

   a) *compliance with the System 6 objectives;*

   b) *providing and environment with separation from human activity;*

d) *management measures that encourage waterbird and native fauna into the project area once construction is completed.*

10. *Construction Management Plan*

a) *minimisation of clearing and vegetation disturbance;*

b) *protection of foreshore buffers.*

3.4 Estuary Foreshore

3.4.1 EPA Objective

Maintain the integrity, function and environmental values of the foreshore area.

3.4.2 Existing Environment

The estuary and foreshore interface occurs along the western and northern foreshores comprising a 30m deep reserve ceded in the past without cost to the Crown. The definition of the foreshore area is confusing due to drainage channels installed by the original owner to drain marshland and trap fish.

The property boundary is generally defined by the northern or estuary edge of the drainage channel. Beyond the channel the foreshore area comprises fringing vegetation in varying condition. A portion of the development area is defined by the edge of the existing artificial channel which provides a buffer to the foreshore beyond.

The Collie River foreshore has been relatively stable (ie. has not eroded due to river or storm generated flow) over a reasonable period of time. This is indicated by aerial photographs and local evidence.

Past shoreline development modifications associated with recreational use of the River and Inlet have resulted in habitat alteration, and the shallow waters of the Leschenault Inlet have been dredged in places to allow boating in the estuary. The mouth of the Collie River, adjacent to Point Douro has been dredged to maintain the depth of the channels.

3.4.3 Potential Impacts

During earthworks and filling of the northern section of the site there is the potential to cause interference to the foreshore area if the construction phase is not properly managed.

3.4.4 Proposed Management

The proponent will design and install specific treatments to the estuary foreshore to provide a distinct barrier between the edge of the proponent's land by use of retaining walls, walkways and fencing to prevent access by domestic animals and human interface.

Foreshore interface treatments have been discussed under Section 3.8 and will be part of the landscape plan (under the Outline Development Plan). Foreshore management will assist in improving the current uncontrolled access by pedestrians and vehicles. The changes to the use of the development area are also likely to assist in controlling the use of the foreshores.

All landscaping will need to be planned so as to not create excess obstruction within the floodway zone. Shoreline protection will be constructed in liaison with LIMA adjacent to the artificial water body entries.

A Foreshore and Conservation Reserve Management Plan will be developed to direct construction and earthworks through respective phases. It is particularly important that the Management Plan provides clear definition of the edge of the foreshore reserve during earthworks. The requirement for a management program is outlined in the provisions for the Scheme Amendment. Techniques to protect the foreshore and conservation areas will include:

- Erection of temporary star picket and wire fencing to delineate the foreshore reserve and manage access.
- Flagging and barriers erected to ensure no uncontrolled access to foreshores until walkways and fencing are installed.
- Careful construction of retaining walls to ensure no fill or machinery intrude into foreshore zones.
- Strict work practice during daylight working hours. No night time work will be undertaken abutting foreshore reserves.

A Foreshore and Conservation Reserve Management Plan will apply to all foreshore zones. The proponent will formulate the management plan in liaison with the Shire and formalise a performance and monitoring system over the total construction process.

3.4.5 *Proposed Outcome*

The protection and consolidation of the foreshore area will be achieved by the provision of a buffer zone and the removal of a portion of the artificial drainage channel to provide space to accommodate public access in a managed form.

Foreshore and conservation areas subject to past interference from dredging of channels and drains will be filled and rehabilitated as part of the Management Plan. This will be integral with the design of the north end of the boat haven outlet.

3.4.6 *Relevant Scheme Provisions*

The following Scheme Provisions are relevant to the protection the foreshores. Refer also to Table 3, points 6, 9, 10 and 11.

6. *Foreshore and Conservation Reserves Management*

   Prior to ODP a Foreshore and Conservation Reserve Management Plan shall be prepared and approved by Council that addresses :

b) interface between the development and adjacent areas;

c) *management of human pressures;*

d) *hydrological impacts*

e) *the tenure, detailed design and management of Conservation reserves;*

g) *the retention of remnant vegetation and the provision of foreshore buffers.*

10. *Construction Management Plan*

a) *minimisation of clearing and vegetation disturbance;*

b) *protection of foreshore buffers.*

3.5 Flood plain

3.5.1 EPA Objectives

Ensure that the flow of floodwater is not inhibited.

3.5.2 Existing Environment

The floodway limit has been delineated for a 1 in 100 year flood event based upon past modelling by the Public Works Dept of WA (1985) (PWDWA) for the Leschenault Inlet Flood Study. The floodway line relates to the extent of flooding over the existing natural ground level. The flood plain RL is 0.3m as determined by Water Authority data and confirmation by Bowman Bishaw (1988) who further indicate that some limited filling of depressions within the floodway can occur up to the 0.3m level.

It is important to note the floodway demarcation line has been established by the PWDWA 'Regional Flood Study' (George 1981) and accounts for:

- Recurrent 10 year water level rises (1.72m AHD).
- Maximum tidal influences and wave run-up during storm events (total 2.4m AHD).
- Greenhouse level rises. Bowman Bishaw (1988) have made allowance to increase the current 2.4m AHD level requirement for buildings to 2.5m AHD for possible future influences over the next 50 - 100 years.

The Bowman Bishaw (1988) report commented:

"*Construction of the "cut" through Leschenault Peninsula in 1951 changed the hydrological characteristics of both the Leschenault Inlet and the lower reaches of the Collie River. The improved flushing and exchange of marine waters that resulted, means that the lower reaches of the Collie River are tidally flushed and dominantly marine in character while flood flows tend to stream straight across the Inlet and out through the "cut" to ocean beyond.*

A review of the water quality data continuing monitoring adjacent to the Collie River Bridge (Waterways Commission, unpublished data) and other studies in

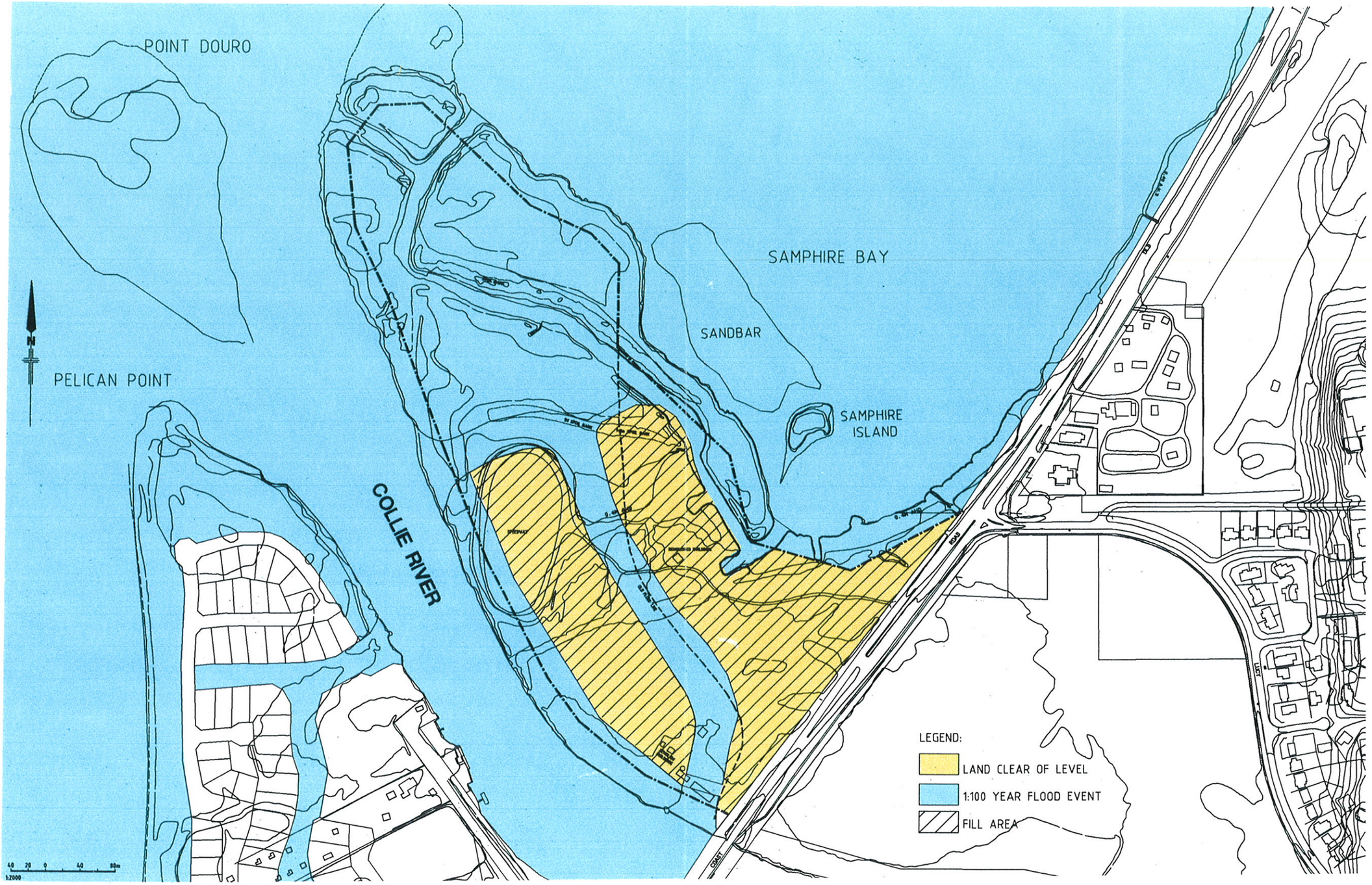


FIGURE 11
FLOODWAY LEVEL PREDICTION

the estuary (Kinhill 1988; Le Provost, Semeniuk and Chalmer, 1983; 1986) have documented high water quality, suitable for diverse beneficial uses including direct contact recreation, ecosystem preservation and harvesting of aquatic life. The Collie River estuary and southern part of the Leschenault Inlet is not prone to algal nuisance associated with eutrophication, and supports a relatively low phytoplankton population that is more typical of coastal lagoons. This is attributed to the high rate of tidal exchange between the southern Leschenault Inlet - Collie River estuary and sea. The rate of flushing of this area was greatly increased by the man-made opening to the sea at Turkey Point (the "cut")".

3.5.3 Potential Impacts

The majority of Point Douro will be inundated in a 1:100 year flood event. A floodline has been established to protect the integrity of the floodway.

3.5.4 Proposed Management

The hydraulic analysis carried out by GHD during 1999 has determined that a channel of 40m wide and 2.0m deep will serve as a relief floodway and carry the full capacity of the 1:100 year flood waters that would flow across the site. The study's findings, calculations and mapping are included in Appendix D.

The study's results confirm that floodway performance is improved to the extent that the land from the Collie River to the edge of the artificial water way can be utilised for development. The study's findings have provided opportunity to use the land for permanent buildings in place of the current caravan park proposal. A permanent connection to the Collie River is proposed due to the benefits of the relief floodway and the need to maintain a vehicular connection during flood periods.

The proposed bridge will allow floodwater to pass beneath at a predicted 1.92m AHD level and will also allow boating access to a limited height level. Most boating traffic will enter from the Collie River to the west.

The boat haven depth volume cross section will be maintained between the two Collie River entries thereby permitting a continuous minor flow component from the river. This will occur as river flow and force acts along the south bank due to the orientation of the river centre line under the bridge.

Ten and 25 year flood events will continue to fill the water area however flows through the water body will maintain a back water effect. Only 1:50 and 1:100 year flood events will see major flow being directed into Samphire Bay.

The proposed waterway will ensure an improved performance and will be maintained within the private domain negating maintenance costs to the Shire or LIMA. Figure 11 depicts the areas that will flood in a 1:100 year flood event.

3.5.5 Proposed Outcomes

Hydraulic Analysis has verified the artificial water body will provide an efficient floodway that will maintain existing natural hydrology.

The floodway will always remain as a permanent water area thereby preserving the integrity of the development area up to a 1 in 100 year flood event.

3.5.6 Relevant Scheme Provisions

The relevant Scheme Provisions are as follows. Refer also to Table 3, points 1, 10, 13.

3) *Subdivision and Development*

The Outline Development Plan shall identify and address:

a) *subdivision redevelopment in general accordance with the CDP;*

b) *the development of lots for residential purposes ensuring that such development is in accordance with Council's Residential Policy and the R code standards;*

g) use and development within land designated for floodway;

h) the type of reserve and vesting of the Boat Haven and Modified Water Body, as well as the management arrangements and responsibilities associated with maintenance of the Boat Haven and Modified Water Body.

5. *Boat Haven Construction and Management Plan*

Prior to approval of ODP by the proponent of the Boat Haven, a Boat Haven Construction and Management Plan shall be prepared by the proponent and approved by Council that incorporates :

a) Design standards to meet EPA objectives for water quality and beneficial use protection;

b) a water and sediment quality monitoring plan.

c) a water sediment quality monitoring plan; and

d) a maintenance and management for the Boat Haven and channel.

3.6 Surface and Estuarine Water Quality

3.6.1 EPA Objective

Maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA 1993).

3.6.2 Existing Environment:

In an evaluation of water quality data from recent (Waterways Commission, 1992, 1993) and previous studies (LSC 1986) has been used to assess the water quality status of the lower reaches of the Collie River.

The evaluation concluded that the water quality characteristics of the Collie River were simular to those of other rivers in the Swan Coastal Plain. However, the reduced phytoplankton population of the lower reaches of the Collie River was found to be typical of coastal marine embankments and this was attributed to the high rate of exchange between the estuarine lower reaches of the Collie River and Leschenault Inlet, and between the Leschenault Inlet and the ocean.

The artificial opening to the sea at Turkey Point is responsible for the rate of flushing within the estuarine system.

The major source of nutrients to the Inlet is the input of nutrient-enriched fresh water from agricultural areas within the Collie River catchment and input from the Brunswick and Wellesley Rivers. Analysis of water quality data by LSC (1986) determined the nutrient status of the near shore waters to be low for most of the year, however in times of high winter flows from the Collie River decreased salinities and slightly elevated nutrient levels were recorded.

3.6.3 *Potential Impacts*

Water quality impacts were identified by Reidal & Byrne (1991), and comprise of:

- Fertilisers - the landscape management and water monitoring program will ensure minimal use well below current agricultural standards.
- Stormwater run-off - will be controlled by swales, sumps, silt traps and compensation basins, in order to ensure no direct drainage into the estuary. The design of drainage features will follow water sensitive design initiatives in accordance with Shire requirements. On-site containment is the recognised drainage priority.
- Anti-fouling coatings, oils and fuels were examined based upon comparative monitoring data sourced from Marine and Harbours. This data concluded it is likely impacts from this source upon the estuary will be negligible.
- Potential impact of nutrient infiltration from on-going management of areas of public open space and the golf course on estuary water quality.
- Occasional fuel/oil spills within the canal and marina, seen as an on going risk.
- Occasional accumulation of weeds, rubbish and debris within the artificial waterways.

3.6.4 *Proposed Management*

The proponent will develop a Boat Haven Construction and Management Plan which will detail the design features and actions to be carried out to minimise risks to water quality. This will include management issues for the Boat Haven to minimise the risk of fuel and oil spills, bilge and sewage pollution and littering.

A Nutrient Export Management Plan will be developed which will formalise the commitments required for reducing nutrient input from the project area. Measures to minimise the application of fertiliser used on recreation areas include:

- Use of slow release fertilisers.
- Minimising grassed areas and landscaped open spaces.

- Encouraging local residents to minimise fertiliser application and plant native species.

Minimising groundwater use by the following measures:

- Adoption of appropriate water conservation measures such as seasonal modifications to the irrigation program and dawn/dusk irrigation.
- Use of stormwater runoff
- Monitoring of soil moisture levels to determine appropriate irrigation requirements
- Planting of native drought tolerant species throughout the landscaped areas of the site.

Generally minimise the potential for water quality problems by the following management measures:

- Banning sewage discharge from boats in the boat haven and surrounding Inlet.
- Minimise the discharge of stormwater by diverting roadway runoff to nutrient stripping basins in accordance with Shire and LIMA.

3.6.5 *Proposed Outcome*

Surface Water Quality

The Boat Haven and estuary water quality will be maintained by a water sensitive design.

Water quality will be capable of meeting appropriate beneficial uses and the requirements/criteria of the draft WA Guidelines for Fresh and Marine Waters (EPA 1993)

The estuary ecosystem will be protected by runoff containment and nutrient stripping techniques detailed in the Landscape Management Plan and Nutrient Export Management Plan.

Estuarine Water Quality

The Boat Haven will be efficiently flushed by virtue of its orientation and dual connections with the river.

Effects upon water quality can be minimised by implementation of the Construction Management Plan and other Management Plans including a Boat Haven Management Plan.

Monitoring during and after construction will highlight the need for corrective action and the developer will be responsible for such action deemed necessary by LIMA.

3.6.6 *Relevant Scheme Provisions*

The following Scheme Provisions will apply. Refer also to Table 3, points 3, 5,

7, 9 and 10.

4. *Sewer*

All lots will be connected to a reticulated sewerage system. Appropriate contingency measures to cater for emergency overflows or pump station failure will be established with the Water Corporation.

5. *Boat Haven Construction and Management Plan*

Prior to approval of ODP by the proponent of the Boat Haven, a Boat Haven Construction and Management Plan shall be prepared by the proponent and approved by Council that incorporates :

a) Design standards to meet EPA objectives for water quality and beneficial use protection;

b) a water and sediment quality monitoring plan.

c) a water sediment quality monitoring plan; and

d) a maintenance and management for the Boat Haven and channel.

7. *Minimising Nutrient Export*

Prior to ODP, a Nutrient Export Management Plan shall be prepared by Council that addresses :

a) *monitoring soil nutrient levels to determine appropriate rates of nutrient application;*

b) *the use of slow release fertilisers;*

c) *minimising grassed areas and landscaped open spaces;*

d) *the use of local species;*

e) *encouraging residents to minimise fertiliser application and plant native species;*

f) *minimising groundwater use;*

g) *minimising the potential for water quality problems during staging and implementation.*

10. *Construction Management Plan*

a) *minimisation of clearing and vegetation disturbance;*

b) *protection of foreshore buffers.*

3.7 Mosquito Control

3.7.1 EPA Objective

- *Mosquito numbers on and off site should not adversely affect the health, welfare and amenity of future residents; and*
- *Ensure the breeding of mosquitos is controlled to the satisfaction of the Health Department of Western Australia without adversely affecting other flora and fauna.*

3.7.2 Existing Environment

Point Douro features prominently as a breeding site in a Health Department of Western Australia report entitled ***Mosquito Eradication in the Bunbury Region, Western Australia*** (Wright, 1986). The report identified the location of mosquito breeding sites in the vicinity of Eaton and Bunbury. The most abundant mosquitos in the area, and those that cause the greatest problem due to the fact they are most active during the day and night are the species *Aedes vigilax* and *Aedes camptorhynchus* (brackish water species). Mosquitos are known as carriers of a number of diseases in Western Australia including Ross River virus, Barmah Forest virus and Australian encephalitis - although advice from the Shire indicates that Australian encephalitis is not found in the area.

The brackish water species both lay desiccation - resistant eggs in moist substrates exposed by receding waters in tidal salt-marsh areas. The eggs lie dormant for indefinite periods until temporary stagnant pools are formed by tidal inundation, then hatch within two to three days and larval development commences. The rate of hatching and larval development is largely dependant upon temperature; the life cycle from an egg to adult may be completed within approximately one week during summer but may take up to three weeks during winter.

The low lying inter-tidal salt marsh flats on the Point Douro Peninsula, particularly towards the north-western end of the Peninsula and within the proposed conservation area are ideal breeding grounds for these two species of mosquito. The shallow stagnant pools left after tidal movements, become a potential mosquito breeding ground especially during the warmer months.

3.7.3 Potential Impacts

A.vigilax and *A. camptorhynchus* both actively seek blood meals from humans (among other animals) and currently constitute a major nuisance to existing nearby residential areas of Clifton Park and Eaton, as well as future development to occur at Point Douro. The two identified species of mosquito have been found to carry the Ross River Virus.

Human activity has provided additional breeding grounds through earthworks, dredging soil, wheel tracks and the disused speedway.

3.7.4 Proposed Management

Bowman Bishaw (1988) describe in detail the breeding habitats and mosquito species that inhibit the Bunbury region. It is important to highlight that:

- The tidal zones and salt marshes provide ideal breeding grounds.
- Any stagnant pools or minor depressions provide breeding opportunities.
- Identified species are a major nuisance to existing urbanised areas nearby.
- There is an increasing incidence of the Ross River Virus carried by the identified mosquito species.

Bowman Bishaw (1988) commented that:

- Mosquito Control is generally the responsibility of both State and local governments
- The Health Department is responsible when mosquitos affect health by acting as vectors for disease transmission, as may be the case with Point Douro.
- Local authorities are responsible for control of local mosquito plagues.
- Control measures commonly involve physical modification of breeding sites, 'fogging' selected areas with insecticide to reduce adult populations, and applying larvicides to identified breeding areas. Responsibility for control of mosquito breeding areas within the Shire of Harvey exceeds the resources of the Shire Council.

In order to reduce mosquito breeding sites past and current undertakings will involve:

- Drainage of breeding sites, existing spinner drains will be cleaned out by the proponent. Additional drainage will also be constructed where appropriate.
- Rehabilitate vehicle damaged drains and culverts.
- Filling of breeding sites to prevent the formation of stagnant pools. Some sites within the conservation area require only very shallow fill to ensure their proper drainage following inundation.

If the mosquito numbers still exceed tolerable levels, then targeted use of an approved larvicide is proposed. Larvicides to control mosquitos would only be used following consultation with LIMA, the Shire and Health Department. The role of the developer in relation to the application at larvicide will be determined in the Developer Contribution Plan.

The site rehabilitation strategies will complement mosquito control by reduction of potential breeding areas through:

- Site re-contouring in consultation with LIMA.
- Revegetation and rehabilitation.
- Maintenance and improvement of spinner drains.
- Specific identification of stagnant pools and ponding areas, for removal or drainage.
- Compliance with relevant Shire and LIMA mosquito control strategies.

3.7.5 *Proposed Outcome*

- Mosquito breeding sites will be reduced by the development.
- Identified mosquito breeding sites will be reduced by rehabilitation measures specified in the Foreshore and Conservation Reserves Management Plan.

It is also likely that the WAPC will require mosquito control measures as part of any conditional subdivision approval.

3.7.6 Relevant Scheme Provisions

The following Scheme Provisions will apply. Refer also to Table 3, point 4.

3) *Subdivision and Development*

The Outline Development Plan shall identify and address:

f) mechanisms to mitigate potential nuisance from mosquito breeding to reduce the opportunity for additional mosquito breeding areas being created.

4) *Foreshore and Conservation Reserves Management*

Prior to ODP A Foreshore Conservation Reserve Management Plan shall be prepared and approved by Council that addresses :

i) water management to reduce mosquito-breeding habitat.

3.8 Visual Amenity

3.8.1 EPA Objective

Ensure the visual amenity of the area adjacent to the project should not be unduly affected by the implementation of the proposal.

3.8.2 Existing Environment

The Point Douro Peninsula is low lying with predominantly low vegetation cover. The eastern and north-eastern sections adjacent to Old Coast Road have been cleared and covered by introduced grass species.

This landform extends for some 30% of the peninsula and is most visible from Old Coast Road. The area adjacent to the Collie River contains the remains of the original sheds and a speedway track.

The area with the most significant appearance is the land toward the western portion of the peninsula. This section remains largely in its natural state and has been nominated as forming the proposed conservation reserve. The Point Douro peninsula, particularly that portion within the proposed residential zone currently presents a derelict appearance with haphazard earthworks and drainage, broken fencing and an extensive network of vehicle tracks. Refuse, old car bodies and rusting metal litter the area.

An important issue in the development of the site is to create a concept that will ensure protection of the unique surrounding landscape. Identified elements that relate to various boundaries of the site include:

- Conservation area of low woodland and Samphire flats to the edge of the estuary.
- Collie River foreshore and associated riverine environment.
- The northern foreshore to Samphire Bay.
- Views to and from Old Coast Road.

3.8.3 *Proposed Management*

Landscape: The new concept will include the following commitments by the proponent which will be detailed in a landscape management plan which will be part of the Outline Development Plan:

- To rehabilitate all affected areas.
- To remove rubbish and re-contour old earthworks.
- Remove race tracks and other vehicle tracks and rehabilitate.

Buildings: The proposal will be developed under a set of guidelines that will:

- Limit residential and tourist accommodation buildings to two storeys.
- Require assessment and Council consent of building materials.
- Limit commercial buildings to single storey.

The landscape management plan will serve to rehabilitate foreshores and establish a theme within the development that will relate to abutting landscape.

The tourist component of the site will be developed using a theme which will also be employed within the residential portion. The predominant features will involve limestone finishes, timber and brushwood. Limestone walls will be used within the tourist areas and for residential boundaries.

3.8.4 *Proposed Outcome*

The development, when viewed from Old Coast Road, will present homes and the Boat Haven which has the combined effect of also buffering the conservation area beyond. The built area represents less than 33% of the Peninsula comprising two 4ha strips of land. The artificial water area will assist in contributing a high level of visual amenity within the development area. The critical importance with regard to visual amenity is the separation of visual elements. Figure 12 indicates the homogenious landscape units which comprise:

- Key areas of contiguous Samphire.
- Key conservation areas of Samphire and tidal zones
- Wildlife protection areas.
- Foreshore and recreation areas.
- Extent of recreation areas.
- Extent of development areas.

The proposal will set aside a substantial land holding for preservation and will:

- Create a natural water body using a mix of hard wall and embankments stabilised by native landscaping.
- Introduce an overall landscape plan for the whole site.
- Introduce design guidelines controlling built from within the proposal.
- Construct public facilities that will create a riverside recreational resource.

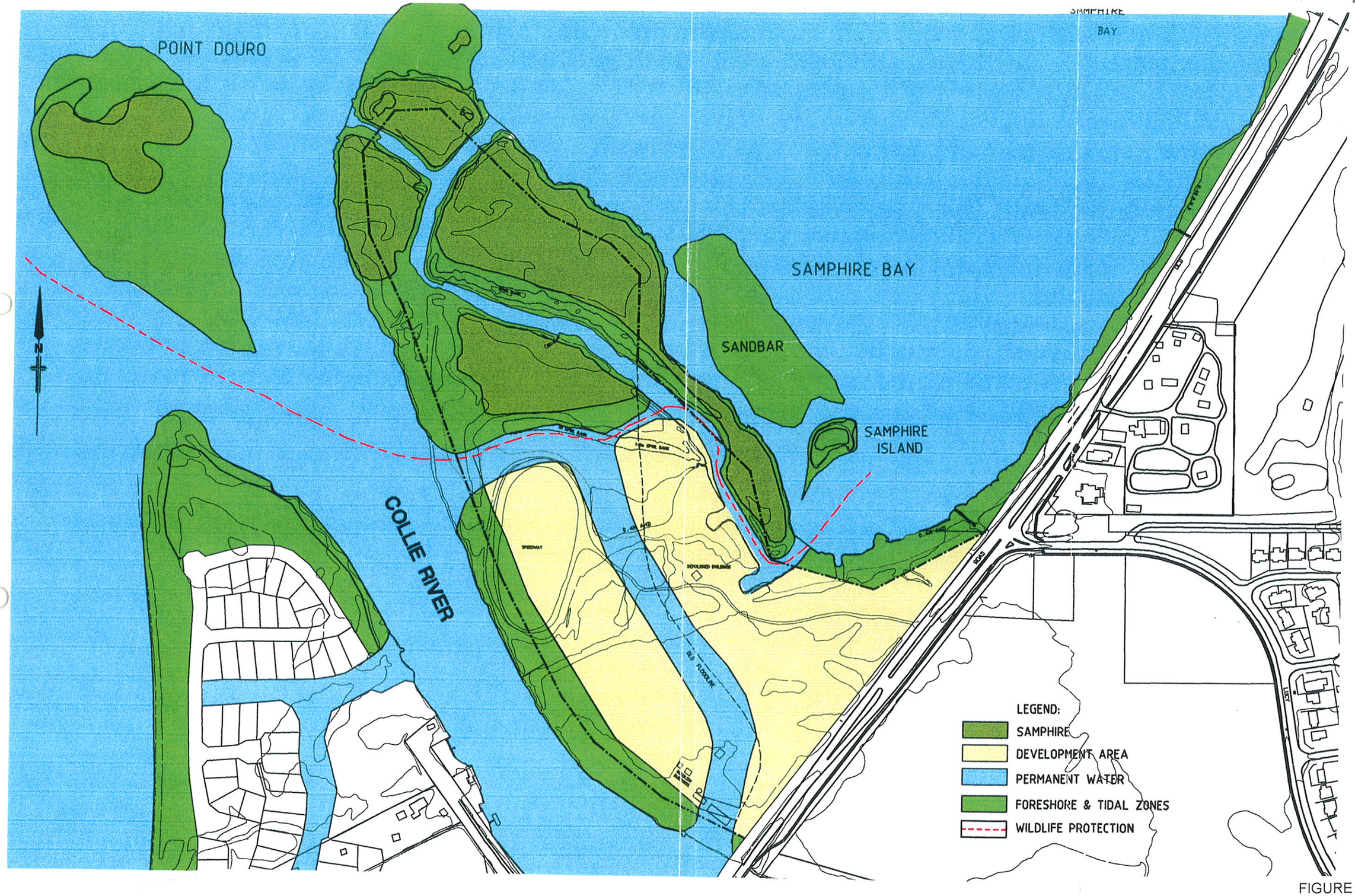


FIGURE 12
PROPOSED RESULTANT LAND UNITS

Given consideration of the above factors and the management measures proposed, it is believed that the EPA's objective to *'ensure that the visual amenity of the area adjacent to the project should not be unduly affected by the proposal'* can be met.

3.8.5 Relevant Scheme Provisions

The following relevant scheme provisions apply. Refer also to Table 3 point 1, 2 and 9.

3) *Subdivision and Development*

The Outline Development Plan shall identify and address:

a) subdivision in general accordance with the ODP;

b) the development of lots for residential purposes ensuring that such development is in accordance with Council's Residential Policy and the R Code standards;

c) the development of lots for tourist and commercial purposes;

d) the development of land for conservation and recreation purposes;

e) the access road, pedestrian paths, cycle paths, footbridge and infrastructure corridors aligned and constructed as to minimise physical impact to the wetlands subject to advice from the EPA and LIMA;

h) visual management (landscape), comprising guidelines that:

- *establish a 'foreshore' theme that relates to abutting landscape;*
- *establish a time frame for the removal of rubbish; and*
- *provide for the re-contouring of the site.*

i) visual management (building) comprising guidelines that:

j) limit buildings to two storeys from modified ground level

k) requires Council assessment of building materials that reflects a theme for areas abutting foreshore;

l) establishes a fencing theme for areas abutting foreshore to be uniform construction and of materials sensitive to the natural environment that comprise brick or wooden piers, with an acceptable infill and of an open construction above 1.1m; (ie. wooden pickets);

m) for the tourist component, incorporates a theme of limestone finishes, timber and brushwood;

p) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation.

3.9 Culture and Heritage (Indigenous and Non-Indigenous)

3.9.1 EPA Objectives

- *Ensure that the proposal complies with the requirements of the Aboriginal Heritage Act 1972 and*
- *Ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.*

3.9.2 *Existing Environment*

Indigenous Heritage : Prior to European settlement in the mid-nineteenth century, the region was inhabited by aborigines of distinct sociological groupings based on kinship and a regional system of land tenure. They were hunters and gatherers and therefore spent much of their time in the vicinity of food sources. Archaeological investigations have shown that Aborigines congregated around the estuaries, lagoons and permanent lakes of the Swan Coastal Plain during summer and dispersed in small groups during winter into the Darling Scarp and Plateau.

Ethnographic Survey : An Ethnographic survey of the Point Douro Peninsula was carried out by R. O'Connor and T. Hart in August and September 1998 (Appendix H). Their comments are summarised below:

- As a result of the consultative process and the field survey it has been established that the area of proposed development on Point Douro does not contain any sites of Aboriginal significance.
- When the proposal to conduct the survey was produced in April 1998, two Applications for Determination of Native Title had been made in respect of lands which included the study area, namely the Ugle-Noongar and Kickett 2 claims. Both Applications claimed to represent (inter alia) the Bunbury Nyungar people, who also have a local incorporated representative body, the Bunbury Aboriginal Progress Association. In addition, the Bunbury Aboriginal people are represented on the State Commission of Elders by local elder Mr Andy Nebro. In the period between preparing the proposal and carrying out the field survey, the Kickett 2 claim was withdrawn.
- Such a withdrawal, however does not remove the need to involve the local Aboriginal people in the consultative process. This process commenced at the offices of Bunbury Aboriginal Progress Association, whose officers assisted in nominating the field survey team.
- In this capacity as an elder and local member of the Commission of Elders, Mr Andy Nebro also participated in the field survey.
- The field survey was carried out on foot by the survey team. All sectors of the study area were accessible and the entire area was therefore inspected thoroughly.
- As a result of the survey, it has been established that the area of proposed development on Point Douro is clear of areas of Aboriginal significance.

Archaeological Investigation : Quartermaine Consultants carried out archaeological investigations during August 1998 for the Pt Douro Peninsula. The analysis is contained in Appendix I. The report made the following comments :

- The survey area has been disturbed in some parts as a result of building and recreational facilities, including a dirt race track. Most of the remainder of the land is saline flats. There are two very low sand rises but one of these appears

to have been augmented by material from an adjacent drain. The entire area is very low lying and flat and is subject to flooding.

- Conditions for site discovery were very good. Surface visibility was good on the sandy surface, which covered most of the survey area that was not waterlogged Samphire flats.
- No archaeological sites were discovered within the designated survey area, nor were there any previously recorded sites in the immediate vicinity.
- It is considered that any major archaeological sites would have been found given the size, environment and disturbed nature of the project area.
- In light of the present investigation, given the small size and disturbed nature of the project area, it is considered that no further archaeological work is warranted. It is recommended that the development may proceed.

Non-Indigenous Heritage : Australind was settled by Europeans soon after the establishment of the town of Bunbury in 1841. The initial site of Australind was situated on the eastern shore of the Leschenault Estuary as the centre for the ill-fated London based business venture to breed horses for the Indian army. The size of the town dwindled after the failure of the venture. Bunbury on the other hand, continued to grow and became a regional centre around its harbour facilities. At the time the main produce shipped was timber and agricultural products (wood, wheat and livestock).

There are no built European historical sites on the peninsula. Buildings which were part of the original farming activities in the area have been demolished and there are no other apparent articles of interest.

3.9.3 Potential Impacts

No impacts from the proposed development are envisaged.

3.9.4 Proposed Management

As there are no known ethnographic or archaeological sites in the proposal area no management is proposed. However, in order to comply with the requirements of the Aboriginal Heritage Act (1972) the proponent is aware of the requirement to ensure that any aboriginal cultural material discovered during the works is immediately referred to a qualified archaeologist.

3.9.5 Proposed Outcome

It is believed that the EPA's objectives to ensure that *'changes to the biological and physical environment resulting from the project will not adversely affect cultural associations with the area'* can be met.

3.9.6 Relevant Scheme Provisions

The following Scheme provisions apply. Refer also to Table 3, point 9.

10. *Prior to ODP, a Construction Management Plan shall be prepared by the proponent for*

each stage that addresses :

a) *minimisation of clearing and vegetation disturbance;*

b) *protection of foreshore buffers;*

c) *control of dust, noise and smoke;*

d) *incorporation of environmental protection specifications in all construction related contracts.*

4. Summary of Environmental Impacts and Management

4.1 Summary of Findings

The findings of the respective sub-sections indicate that the potential environmental impacts will not create detrimental or unmanageable effects upon the surrounding environment.

All objectives can be met and managed.

Terrestrial Flora : The Samphire and associated bird life will be preserved by virtue of the separation provided by the boat haven and the associated protection and treatment of the estuary foreshore. Entry by the public will be controlled. The development proposal has the advantage of creating water separation achieving a distinct barrier and deep buffers. These factors provide the best possible management tool to maintain identified areas of environmental significance.

System 6 : The proposal will not adversely impact upon System 6 objectives to localities C66 and C67. This will be achieved because the development will :

- Maintain the bird habitats which have a high conservation value and preserve most of the local indigenous flora.
- Allow only passive recreation within the conservation areas.
- Provide deep sewerage to all areas.

The utilisation of degraded land for development area and creation of buffers to identified significant environmental factors will assist in supporting System 6 objectives

Estuary Foreshore : The separation paths, fencing and landscaping will ensure protection of the foreshore area and control of access by humans and animals. This will improve the current situation which includes degraded banks and uncontrolled access.

Flood plain : Hydraulic analysis has verified that the modified water body will provide an efficient floodway that will maintain the existing natural hydrology. The flood way will always remain as a permanent water area thereby preserving the integrity of the floodway.

Surface Water Quality : The effective hydraulic function of the water body pertaining to the flood plain and surface water quality is assured through the boat haven design.

Estuarine Water Quality : Potential water quality impacts were identified by Reidal & Byrne (1991) these comprise of:

- Fertilisers - the landscape management plan and water monitoring program will ensure minimal use well below current agricultural standards.

- Stormwater Runoff - will be controlled by swales, sumps, silts traps and compensation basins, to ensure no direct drainage into the estuary. The design of drainage features will include water sensitive design initiatives in accordance with the Shire's requirements.
- Anti-fouling coatings, oils and fuels were examined based upon comparative monitoring data sourced from the (Marine and Harbours). This concluded that there were negligible impacts from this source upon the estuary.

Sewerage System : The sewer systems will be constructed as a sealed system in order to ensure that no floodwaters may enter the systems through vents or buildings. The entire system will be constructed clear of the floodway and all building floor levels will be clear of any possible flood event. Sewage systems abutting waterways is the subject of design requirements by the Water Corporation and EPA.

Effects During Construction : Construction will take place in accordance with the requirements detailed within the body of this report.

Appropriate licences will be sought from LIMA, EPA, DOT and Shire complete with legal agreements and scheme requirements where necessary. Water Quality during construction can be managed via commitments outlined by the developer.

Management: Waterway management will be the responsibility of the proponent/developer as will water quality monitoring. Owner responsibilities and maintenance obligations will be established to satisfy the Shire and LIMA.

Mosquito Control : will be achieved by:

- Improvements and extensions to the existing network of spinner drains.
- Filling of redundant drains, channels and identified depressions.
- Application of larvicide with approval from Shire, Health Department and LIMA.

Visual Amenity : The proposal will set aside a substantial area of land for preservation and will:

- Create a natural water body using a mix of hard walls and embankments stabilised by native landscaping.
- Introduce an overall landscape plan for the whole site.
- Introduce design guidelines controlling built form within the proposal.
- Construct public facilities that will create a riverside recreational resource.

Culture and Heritage : Archaeological and ethnographic surveys of the project area have been undertaken. Surveys indicate the Point Douro site is clear of sites of indigenous and European culture and heritage.

4.2 Environmental Management to be incorporated within Amendment 13

Bowman Bishaw (1988) prepared a list of commitments that pertained to the management of the conservation area and foreshore reserves and management during construction which were accepted by the EPA. These commitments were not originally included in the Amendment No. 20 documents but will be formalised through being part of a range of Management Plans.

The production and implementation of the Management Plans will become provisions of Amendment No.13 and other commitments will be adhered to via approvals and licences issued during the construction phase of the proposal.

Table 3 summarises the Environmental Management Recommendations to be incorporated into Amendment No.13. A cross reference is provided in the table that describes the relevant Scheme provision as proposed. These provisions will 'trigger' the recommended management action that will be implemented during the course of developing the land.

TABLE 3
ENVIRONMENTAL MANAGEMENT RECOMMENDATIONS

No.	Reference in Report	Recommended Action	Action Responsibility	AM 13 Provision
1	Sections 2 & 3	***Design*** **Outline Development Plan** The design, construction and management of the development will generally be in accordance with the *Point Douro Outline Development Plan* and Report, submitted as Amendment 13 to the Shire of Harvey District Planning Scheme No. 1, including commitments detailed in (B) *Special Provisions Relating to the Specified Land*, or any variations agreed by the Shire of Harvey (Council) and approved by the Western Australian Planning Commission (WAPC), with the concurrence of the Department of Environmental Protection (DEP) and the Leschenault Inlet Management Authority (LIMA). No subdivision or development shall occur until an Outline development Plan (ODP) is prepared by the Proponent and approved by the Shire of Harvey and endorsed by the Western Australian Planning Commission (WAPC).	Proponent to prepare ODP	Schedule 8, Area 12 Part 3
2	Sections 3.2.4, 3.4.4	***Design*** **Roads, Paths and Infrastructure** The access road, pedestrian paths, cycle paths, footbridge and infrastructure corridors will be aligned and constructed so as to minimise physical impact to the wetlands as required by the relevant authority (RA), subject to advice from the DEP and LIMA.	Proponent to construct	Schedule 8, Area 12 Part 3
3	Section3.5.4	***Design*** **Waterway Quality** The boat haven design and development will ensure that water quality will be capable of meeting the requirements/criteria of the draft WA Guidelines for Fresh and Marine Waters (EPA 1993).	Proponent to construct	Schedule 8, Area 12 Part 5(a)
4	Section 3.7.4	***Design*** **Mosquito Breeding Habitat** No additional mosquito breeding areas will be created. Detailed design of water management will seek to reduce breeding habitat. Mechanisms to mitigate potential nuisance from mosquito breeding will be determined by the RA and the Health Department of WA.	Proponent to design	Schedule 8, Area 12 Part 3(c) & 6(I)
5	Section 3.2.4	***Infrastructure*** **Sewer** All lots will be connected to reticulated sewerage. Appropriate contingency measures to cater for emergency overflows or pump station failure will established with the Water Corporation in consultation with LIMA.	Proponent to construct	Schedule 8, Area 12 Part 4

Environmental Management Recommendations (Cont.)

	Reference in Report	Recommended Action	Action Responsibility	AM 13 Provision
6	Sections 3.1.4, 3.2.4, 3.4.4	***Construction*** **Foreshore & Conservation Reserves Management** Prior to approval of the ODP, a Foreshore and Conservation Reserve Management Plan shall be prepared by the proponent to the requirements of the RA that addresses: a) staging and implementation of the Management Plan; b) interface between the development and adjacent areas; c) management of human pressures; d) hydrological impacts; e) the tenure, detailed design and management of Conservation reserves; f) the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves; g) the retention of remnant vegetation and the provision of foreshore buffers; h) the design and construction of roads; and i) water management to reduce mosquito breeding habitat. In considering the Foreshore Conservation Reserve Management Plan, RA will have regard to advice from the DEP, CALM and LIMA.	Proponent to prepare Foreshore and Conservation Reserve Management Plan	Schedule 8, Area 12 Part 6
7	Section 3.6.4	***Environmental Management*** **Minimising Nutrient Export** Prior to approval of the ODP, a Nutrient Export Management Plan shall be prepared by the proponent and implemented by the RA that addresses: a) the use of slow release fertilisers; b) minimising grassed areas and landscaped open spaces; c) encouraging local residents to minimise fertiliser application and plant native species; d) minimising groundwater use; minimising the potential for water quality problems during staging and implementation. In considering the Nutrient Export Management Plan, RA will have regard to advice from the DEP, CALM and LIMA.	Proponent to prepare Nutrient Export Management Plan	Schedule 8, Area 12 Part 7

Environmental Management Recommendations (Cont.)

	Reference in Report	Recommended Action	Action Responsibility	AM 13 Provision
8	Section 3.3.4	*Environmental Management* **Terrestrial Fauna/Waterbirds** A migratory bird survey will be conducted in November/December to assess waterbird use of the Peninsula. Prior to approval of the ODP, a Terrestrial Fauna/Waterbird Protection Plan shall be prepared by the proponent and implemented by the RA that addresses: a) compliance with the System 6 objectives; b) providing an environment with separation from human activity; c) a management arrangement providing for a walking trail and bird watching hide; d) management measures that encourage waterbird and native fauna into the conservation and foreshore zones once construction is completed; and e) staging and implementation. In considering the Terrestrial Fauna/Waterbird Protection Plan, Council will have regard to advice from the DEP, CALM and LIMA.	Proponent to prepare Terrestrial Fauna/Waterbird Protection Plan	Schedule 8, Area 12 Part 8
9	All sections	*Construction* **Construction Management** Prior to approval of the ODP, Construction Management Plan shall be prepared by the proponent and implemented by the RA that addresses: a) minimisation of clearing and vegetation disturbance; b) protection of foreshore buffers; c) control and monitoring of dust, noise and smoke; d) incorporation of environmental protection specifications in all construction related contracts; and e) staging and implementation.	Proponent to prepare Construction Management Plan	Schedule 8, Area 12 Part 10

Environmental Management Recommendations (Cont.)

	Reference in Report	Recommended Action	Action Responsibility	AM 13 Provision
10	Sections 3.3.4, 3.5.4, 3.6.4	*Boat Haven* **Boat Haven Construction & Management** Prior to approval of the ODP, a Boat Haven Construction and Management Plan shall be prepared by the proponent and implemented by the RA that addresses: a) incorporation of the EPA objectives for water quality and beneficial uses; b) excavation to -2.0m AHD and maintenance to navigable depth of -2.0m AHD (including entrance channel); c) stabilisation of banks; d) appropriately armouring of entrance to avoid erosion due to boat traffic; e) extension of armouring upstream and downstream from entrance in Collie River; f) where the boat haven is to be de-watered for excavation, the process of extracting prior to discharge to the Collie River; g) agreements with land owners, Council and LIMA for the operation and maintenance of the waterway; h) monitoring of water quality in the boat haven and adjacent Collie River; and i) staging and implementation. In considering the boat haven construction and management, Council will have regard to advice from the DEP and LIMA.	Proponent to prepare Boat Haven Construction and Management Plan	Schedule 8, Area 12 Part 5
11	Section3.4.4	*Management and Monitoring* **Foreshore and Conservation Reserve Management Plan Reporting** Annually for the duration of each construction stage, and then 12 months following, the management of areas adjacent to the relevant construction area and designated within the Foreshore and Conservation Reserve Management Plan will be monitored and reported to agencies referred to in the Management Plan.	Proponent to monitor.	Schedule 8, Area 12 Part 6, 10
12	Section3.3.4	**Terrestrial Fauna/Waterbird Protection Plan Implementation** Monitoring as provided for by the Terrestrial Fauna/Waterbird Protection Plan which will be part of the Foreshore and Conservation Reserves Management Plan.	Proponent to monitor.	Schedule 8, Area 12 Part 8, 10

Environmental Management Recommendations (Cont.

13	Section3.6.4	**Boat Haven Depth Monitoring** Annually for five years following commencement of construction of the Boat Haven and then at an interval determined by experience, the depths of the Boat Haven will be monitored to determine that there is adequate flushing and safe navigable depths in accordance with the Boat Haven Construction and Management Plan.	Proponent to monitor during construction with continued monitoring being the responsibility of new land owners.	Schedule 8, Area 12 Part 5, 10

5. Implementation of Management Measures

The current Point Douro Management Plan, which was developed for the existing proposal, pertains to two key elements:

- the conservation areas and foreshores; and
- the boat haven.

The Management Plan was prepared by Australian Groundwater Consultants during 1989 and involved negotiations with the Waterways Commission. From these negotiations it was agreed that:

- The Management Plan would be established by the Waterways Commission.
- Management of monitoring would be carried out by LIMA.
- The proponent would assume responsibility for funding the implementation of the management plan.

A payment figure was negotiated to fund the implementation of the plan by the proponent. The proponent also agreed to the following commitments:

- Limiting vehicular access to the nature conservation area.
- Monitoring (and controlling if necessary) access pressures on Samphire Bay foreshore reserve.

This was established as a management and implementation mechanism. The management plan covered the following issues identified by the EPA :

- Access control - to conservation areas and foreshore walkers and boaters.
- Mosquito Control- drainage.
- Embankment Stabilisation - armouring of banks.
- Revegetation - as per proponent commitments.
- Refuse collection - within the site.
- Drainage - retention and stripping.
- Public Information - educate and inform.

The original commitments offered by Bowman Bishaw (1988) and reported within Amendment No. 20 to Shire Town Planning No. 10 were not listed within the Scheme but as part of the Management Plan approved by LIMA.

The proposed provisions of the Scheme Amendment No.13 include a series of Management Plans which will detail the existing commitments made by the proponent for each of the issues.

The management and monitoring responsibilities of the proponent and subsequent landowners will be provided for in the respective Management Plans and are formalised in the Scheme Provisions.

6. References

1. Australian Groundwater Consultants P/L (June 1989) Point Douro - Australind Management Plan (2234/1).
2. Bowman Bishaw & Associates (December 1988) Proposed Bunbury Holiday Resort NOI (Report No. RI 8143).
3. Department of Conservation and Environment (1983) The System 6 Study. Recommendations & Report EPA 1983.
4. Engineering Division PWDWA (September 1981) Leschenault Estuary, Collie River, Preston River, Regional Flood Study.
5. Environmental Protection Authority WA (March 1989) Proposed Bunbury Holiday Resort Lot 5 Old Coast Road Australind (Bulletin 375).
6. Environmental Protection Authority WA (March 1992) The Sanctuary Pelican Point Bunbury (Bulletin 616).
7. Environmental Protection Authority WA (October 1993) Western Australian Water Quality Guidelines for Fresh and Marine waters (Bulletin 711).
8. ERM Mitchell McCotter P/L - South West Regional Tourism Strategy 1995 prepared for South West Development Commission, Commonwealth Department of Tourism and WA Tourism Commission.
9. Gutteridge Haskins & Davey Pty Ltd (July 1996) Point Douro Development Plan.
10. Keighery B, Keighery G and Gibson N (1997) Floristic of Reserves and Bushland areas of the Perth Region.
11. Le Provost Environmental Consultant (August 1991) Pelican Point Bunbury PER (August 1991).
12. Ninox Wildlife Consulting (1986). A Survey of the birds of Pelican Point near Bunbury, Western Australia. Appendix 2 in Pelican Point Country Club and Resort, Bunbury. Public Environmental Report. Perth : Le Provost Semeniuk and Chalmer.
13. Ninox Wildlife Consulting (1990). Waterbird and Terrestrial Vertebrates of the Proposed Pelican Point Resort Development. Report to LeProvost Environmental Consultants, July 1990.
14. O'Connor Quartermaine & Bodney for Le Provost Environmental Consultants, (June 1990) Report on a Survey for Aboriginal Sites Pelican Point, Bunbury.
15. P Greaves. South West Tourism Study - Interim Report 1984 WA Tourism Commission.

16. Riedel & Byrne P/L for the Provost Environmental Consultants (October 1990) Canal Geometry Water Quality Exchange Pelican Point.

17. WA Tourism Commission "Tourism Research Brief on the South West" Bunbury 1998.

18. WA Tourism Commission Tourism Industry Development Division "Bunbury Daytrips" Nov. 97.

19. WA Tourism Commission Tourism Research Brief on Bunbury, Manjimup, Margaret River, Augusta 1998.

20. Waterways Commission & LIMA (1993) Fringing Vegetation of the Lower Collie and Brunswick Rivers 1992.

21. Waterways Commission & LIMA (June 1993) Collie and Brunswick Rivers Foreshore Reserves Study Draft Report (Report 39).

22. Waterways Commission (January 1992) Leschenault Waterways Management Programme 1992 (Report No. 26)

23. Waterways Commission LIMA & South West Development Commission (June 1994) Lot 137 Clifton Park Management Plan (Report No. 49).

24. Western Australian Planning Commission "Bunbury Wellington Region Plan" November 1995.

Appendix A

Report to the Minister for Planning

REPORT TO THE MINISTER FOR PLANNING

PROPOSAL TO AMEND A TOWN PLANNING SCHEME

TOWN PLANNING AND DEVELOPMENT ACT 1928 (AS AMENDED)

LOCAL AUTHORITY:	SHIRE OF HARVEY
DESCRIPTION OF PLANNING SCHEME:	DISTRICT TOWN PLANNING SCHEME No. 1
TYPE OF SCHEME:	DISTRICT TOWN PLANNING SCHEME
SERIAL AMENDMENT NO:	AMENDMENT No. 13

PROPOSAL:

› initiate an amendment to the existing district planning scheme by:

1. Rezoning Lot 5 Old Coast Road (portion of Leschenault Location 23 of Plan 7938) from "Tourist" Zone, "Restricted Uses" and "Parks and Recreation" Reserve to "Residential Development" Zone, "Restricted Uses" "Modified Water Body" Zone and "Recreation and Conservation" Reserve in accordance with the attached zoning map.

2. Modifying the specific provisions in 'Schedule 8 - Restricted Uses', point 12 of Town Planning Scheme No. 1 text by deleting point 2 and including after point 1 in the 'Only Use Permitted' column, as follows:

Special Provisions Relating to the Specified Land

2. Recreation and Conservation Reserve

No activity or development shall occur on the land reserved for Recreation and Conservation other than in accordance with a management plan to be prepared by the proponent and approved by Council.

In considering the management plan for land reserved for Recreation and Conservation, Council shall have regard to advice from the Department of Environment Protection (DEP), the Leschenault Inlet Management Authority (LIMA) and the Water and Rivers Commission (WRC).

3. Subdivision and Development

The level of subdivision and development shall generally be in accordance with the *Point Douro Concept Development Plan* (Ref No. 01) and Environmental Report. No subdivision or development shall occur until an Outline Development Plan (ODP) is prepared by the proponent and approved by Shire of Harvey (Council) and endorsed by the Western Australian Planning Commission (WAPC).

4. ODP Preparation and Implementation

The ODP shall include commitments detailed in *Special Provisions Relating to the Specified Land*, or any variations agreed by the Council and the WAPC. Also, the ODP will be prepared in accordance with the approved Management Plans referred to in points 6 to 11 and will reflect the development envisaged by the *Point Douro Concept Development Plan (Ref No. 01).*

Prior to approval of the ODP, Council shall advertise the draft ODP for public comment in accordance with the provisions of Clause 6.7.3 of the Scheme.

Upon approval and endorsement of the ODP by Council and the WAPC, all subdivision and development shall be in accordance with the ODP.

The Outline Development Plan shall identify and address:

a) subdivision and development in general accordance with the *Point Douro Concept Development Plan* (Ref No. 01);

b) the development of lots for residential purposes ensuring that such development is in accordance with Council's Residential Policy and the R 20 Residential Planning Code standards;

c) the development of lots for tourist and commercial purposes ensuring that such development is in accordance with the R 40 Residential Planning Code standards;

d) the development of land for conservation and recreation purposes;

e) the access road, pedestrian paths, cycle paths, footbridge and infrastructure corridors aligned and constructed as to minimise physical impact to the wetlands subject to advice from the DEP and LIMA;

f) mechanisms to mitigate potential nuisance from mosquito breeding to reduce the opportunity for additional mosquito breeding areas being created;

g) use and development within land designated for floodway;

h) visual management (landscape), comprising guidelines that:

- establish a 'foreshore' theme that relates to abutting landscape;
- establish a time frame for the removal of rubbish; and
- provide for the re-contouring of the site.

i) visual management (building) comprising guidelines that:

- limit buildings to two storeys from modified ground level;
- requires Council assessment of building materials that reflects a theme for areas abutting foreshore;
- establishes a fencing theme for areas abutting foreshore to be uniform construction and of materials sensitive to the natural environment that comprise brick/limestone or wooden piers, with an acceptable infill and of an open construction above 1.1m;(ie. Wooden pickets);
- for the tourist component, incorporates a theme of brick/limestone finishes, timber and brushwood;

j) limits the size of any shop to a maximum of 500 m2 of Gross Lettable Floor Area;

k) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation;

l) Traffic management, particularly but not limited to the proposed access onto Old Coast Road; and

m) proposed methods of incorporating requirements and obligations addressed in management plans referred to in this Amendment.

In considering the Outline Development Plan, Council and the WAPC shall have regard to advice from the Department of Environment Protection (DEP), the Leschenault Inlet Management Authority (LIMA), Water and Rivers Commission (WRC) and the Department of Conservation and Land Management (CALM).

5. **Provision of Sewer**

All lots will be connected to a reticulated sewerage system. Appropriate contingency measures to cater for emergency overflows or pump station failure will be established with the Water Corporation.

6. **Boat Haven Construction and Management Plan**

Prior to the approval of the ODP, a Boat Haven Construction and Management Plan shall be prepared by the proponent and approved by Council that incorporates:

a) design standards to meet Environment Protection Authority (EPA) objectives for water quality and beneficial use protection;

b) a water and sediment quality monitoring plan;

c) a maintenance and management agreement for the Boat Haven and channel; and

d) staging and implementation.

In considering the Boat Haven Construction and Management Plan, Council will have regard to advice from the DEP, WRC and LIMA.

7. **Foreshore & Conservation Reserves Management**

Prior to the approval of the ODP, a Foreshore Conservation Reserve Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) staging and implementation of the Management Plan;

b) interface between the development and adjacent areas;

c) management of human pressures;

d) hydrological impacts;

e) the tenure, detailed design and management of Conservation reserves;

f) the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves;

g) the retention of remnant vegetation and the provision of foreshore buffers;

h) the design and construction of roads; and

i) water management to reduce mosquito-breeding habitat.

In considering the Foreshore Conservation Reserve Management Plan, Council will have regard to advice from the DEP, WRC, CALM and LIMA.

8. Nutrient Export Management Plan

Prior to the approval of the ODP, a Nutrient Export Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) monitoring soil nutrient levels to determine appropriate rates of nutrient application;

b) the use of slow release fertilisers;

c) minimising grassed areas and landscaped open spaces;

d) the use of local species of grasses;

e) encouraging local residents to minimise fertiliser application and plant native species;

f) minimising groundwater use;

g) minimising the potential for water quality problems; and

h) staging and implementation.

In considering the Nutrient Export Management Plan, Council shall have regard to advice from the DEP and LIMA.

9. Terrestrial Fauna/Waterbird Protection Management Plan

Prior to the approval of the ODP, a Terrestrial Fauna/Waterbird Protection Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) compliance with the System 6 objectives;

b) the separation of the conservation zone and providing an environment with separation from human activity;

c) a management arrangement providing for a walking trail and bird watching hide;

d) management measures that encourage waterbird and native fauna into the project area once construction is completed; and

e) staging and implementation.

In considering the Terrestrial Fauna/Waterbird Protection Management Plan, Council shall have regard to advice from the DEP, CALM and LIMA.

10. Developer Contribution Management Plan

Prior to the approval of the ODP, a Developer Contribution Management Plan shall be prepared in accordance with WAPC Planning Bulletin No. 18 (or as amended by the WAPC) by the proponent and approved by Council and the WAPC that addresses:

a) provision of community infrastructure directly associated with the development of the land in relation to foreshore areas, road reserves and public spaces in general;

b) overall management and on going responsibilities; and

c) staging and implementation.

In considering the Developer Contribution Plan, Council and the WAPC shall have regard to advice from the DEP, CALM and LIMA.

11. Construction Management Plan

Prior to the approval of the ODP, a Construction Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) minimisation of clearing and vegetation disturbance;

b) protection of foreshore buffers;

c) control and monitoring of dust, noise and smoke;

d) incorporation of environmental protection specifications in all construction related contracts; and

e) staging and implementation.

In considering the Construction Management Plan, Council shall have regard to advice from the DEP and LIMA.

12. Deed of Agreement

Prior to the amendment being forwarded to the Minister for Planning for determination a Deed of Agreement is required to be entered into with the developer addressing such issues associated with maintenance, infrastructure contributions, bond monies, environmental monitoring and bank guarantees as mentioned within the Scheme Report.

3. Modify Schedule 13 "Interpretations" by including after the *interpretation "Mobile Home Park"* a new interpretation of *"Modified Water Body"* : an area of land modified in such a way as to allow entry of a natural water body or course that functions as a private recreational boating or ornamental purpose".

4. Introduce "Modified Water Body (Table 39)" under the "Non Urban Zones:" heading of Clause 4.1.1 of Town Planning Scheme No.1 text.

5. Include in Schedule 14 "Precinct Area 1 – Leschenault". Pt Lot 5 Old Coast Road, Australind (Pt Douro) is intended to be development for low density residential, low/medium density tourist accommodation and conservation purposes. Development will only be considered which can demonstrate that it will not have a significant adverse impact on the landscape or environmental attributes of the locality as determined through the formal rezoning and environmental review process. A detailed formal environmental review and rezoning will need to be undertaken to the satisfaction of Council and relevant governmental agencies and extensive public consultation undertaken to determine the suitability of any proposal for the site.

6. Introduce new Table 39 to Clause 4.2 "Zoning and Development Tables" of Town Planning Scheme No. 1 text, titled "Zoning and Development Standards - Modified Water Body" as follows:

Table 39

ZONING & DEVELOPMENT STANDARDS MODIFIED WATER AREA

POLICY STATEMENT

Intended for the establishment of modified waterways that function as a private recreational boating or ornamental purpose.

DEVELOPMENT STANDARD

NOTE: The following standards will apply to this zone.

LAND USE CATEGORIES		OTHER REQUIREMENTS
RECREATION & COMMUNITY FACILITIES	P	Development shall be in accordance with an Outline Development Plan or any variations agreed by the Shire of Harvey (Council) and approved by the Western Australian Planning Commission
CANAL WATERWAYS , MOORINGS AND JETTIES	P	
CANAL WALLS, RETAINING WALLS & FENCES	P	

Appendix B

Amendment Resolutions and Amendment Map

TOWN PLANNING AND DEVELOPMENT ACT 1928 (AS AMENDED)

RESOLUTION TO AMEND A
TOWN PLANNING SCHEME
SHIRE OF HARVEY

DISTRICT PLANNING SCHEME No. 1
AMENDMENT 13

Resolved that Council, pursuant to Section 7 of the Town Planning and Development Act, 1928 (as amended) amend the above Town Planning Scheme by:

1. Rezoning Lot 5 Old Coast Road (portion of Leschenault Location 23 of Plan 7938) from "Tourist" Zone, "Restricted Uses" and "Parks and Recreation" Reserve to "Residential Development" Zone, "Restricted Uses" "Modified Water Body" Zone and "Recreation and Conservation" Reserve in accordance with the attached zoning map.

2. Modifying the specific provisions in 'Schedule 8 - Restricted Uses', point 12 of Town Planning Scheme No. 1 text by deleting point 2 and including after point 1 in the 'Only Use Permitted' column, as follows:

3. Modify Schedule 13 "Interpretations" by including after the *interpretation "Mobile Home Park"* a new interpretation of *"Modified Water Body"* : an area of land modified in such a way as to allow entry of a natural water body or course that functions as a private recreational boating or ornamental purpose".

4. Introduce "Modified Water Body (Table 39)" under the "Non Urban Zones:" heading of Clause 4.1.1 of Town Planning Scheme No.1 text.

5. Include in Schedule 14 "Precinct Area 1 – Leschenault". Pt Lot 5 Old Coast Road, Australind (Pt Douro) is intended to be development for low density residential, low/medium density tourist accommodation and conservation purposes. Development will only be considered which can demonstrate that it will not have a significant adverse impact on the landscape or environmental attributes of the locality as determined through the formal rezoning and environmental review process. A detailed formal environmental review and rezoning will need to be undertaken to the satisfaction of Council and relevant governmental agencies and extensive public consultation undertaken to determine the suitability of any proposal for the site.

6. Introduce new Table 39 to Clause 4.2 "Zoning and Development Tables" of Town Planning Scheme No. 1 text, titled "Zoning and Development Standards - Modified Water Body" as follows:

DATED THIS DAY OF 24TH OF APRIL 2001

.....
CHIEF EXECUTIVE OFFICER

TOWN PLANNING AND DEVELOPMENT ACT 1928 (AS AMENDED)

RESOLUTION DECIDING TO AMEND A
TOWN PLANNING SCHEME
SHIRE OF HARVEY

DISTRICT PLANNING SCHEME No. 1
AMENDMENT 13

The Council of the Shire of Harvey under and by the virtue of the powers conferred upon it on that behalf of the Town Planning and Development Act, 1928 (as amended), hereby amends the above Town Planning Scheme by:

1. Rezoning Lot 5 Old Coast Road (portion of Leschenault Location 23 of Plan 7938) from "Tourist" Zone, "Restricted Uses" and "Parks and Recreation" Reserve to "Residential Development" Zone, "Restricted Uses" "Modified Water Body" Zone and "Recreation and Conservation" Reserve in accordance with the attached zoning map.

2. Modifying the specific provisions in 'Schedule 8 - Restricted Uses', point 12 of Town Planning Scheme No. 1 text by deleting point 2 and including after point 1 in the 'Only Use Permitted' column, as follows:

Special Provisions Relating to the Specified Land

2. Recreation and Conservation Reserve

No activity or development shall occur on the land reserved for Recreation and Conservation other than in accordance with a management plan to be prepared by the proponent and approved by Council.

In considering the management plan for land reserved for Recreation and Conservation, Council shall have regard to advice from the Department of Environment Protection (DEP), the Leschenault Inlet Management Authority (LIMA) and the Water and Rivers Commission (WRC).

3. Subdivision and Development

The level of subdivision and development shall generally be in accordance with the *Point Douro Concept Development Plan* (Ref No. 01) and Environmental Report. No subdivision or development shall occur until an Outline Development Plan (ODP) is prepared by the proponent and approved by Shire of Harvey (Council) and endorsed by the Western Australian Planning Commission (WAPC).

4. ODP Preparation and Implementation

The ODP shall include commitments detailed in *Special Provisions Relating to the Specified Land*, or any variations agreed by the Council and the WAPC. Also, the ODP will be prepared in accordance with the approved Management Plans referred to in points 6 to 11 and will reflect the development envisaged by the *Point Douro Concept Development Plan (Ref No. 01).*

Prior to approval of the ODP, Council shall advertise the draft ODP for public comment in accordance with the provisions of Clause 6.7.3 of the Scheme.

Upon approval and endorsement of the ODP by Council and the WAPC, all subdivision and development shall be in accordance with the ODP.

The Outline Development Plan shall identify and address:

a) subdivision and development in general accordance with the *Point Douro Concept Development Plan* (Ref No. 01);

b) the development of lots for residential purposes ensuring that such development is in accordance with Council's Residential Policy and the R 20 Residential Planning Code standards;

c) the development of lots for tourist and commercial purposes ensuring that such development is in accordance with the R 40 Residential Planning Code standards;

d) the development of land for conservation and recreation purposes;

e) the access road, pedestrian paths, cycle paths, footbridge and infrastructure corridors aligned and constructed as to minimise physical impact to the wetlands subject to advice from the DEP and LIMA;

f) mechanisms to mitigate potential nuisance from mosquito breeding to reduce the opportunity for additional mosquito breeding areas being created;

g) use and development within land designated for floodway;

h) visual management (landscape), comprising guidelines that:

- establish a 'foreshore' theme that relates to abutting landscape;
- establish a time frame for the removal of rubbish; and
- provide for the re-contouring of the site.

i)visual management (building) comprising guidelines that:

- limit buildings to two storeys from modified ground level;
- requires Council assessment of building materials that reflects a theme for areas abutting foreshore;
- establishes a fencing theme for areas abutting foreshore to be uniform construction and of materials sensitive to the natural environment that comprise brick/limestone or wooden piers, with an acceptable infill and of an open construction above 1.1m;(ie. Wooden pickets);
- for the tourist component, incorporates a theme of brick/limestone finishes, timber and brushwood;

j) limits the size of any shop to a maximum of 500 m2 of Gross Lettable Floor Area;

k) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation;

l) Traffic management, particularly but not limited to the proposed access onto Old Coast Road; and

m) proposed methods of incorporating requirements and obligations addressed in management plans referred to in this Amendment.

In considering the Outline Development Plan, Council and the WAPC shall have regard to advice from the Department of Environment Protection (DEP), the Leschenault Inlet Management Authority (LIMA), Water and Rivers Commission (WRC) and the Department of Conservation and Land Management (CALM).

5. Provision of Sewer

All lots will be connected to a reticulated sewerage system. Appropriate contingency measures to cater for emergency overflows or pump station failure will be established with the Water Corporation.

6. Boat Haven Construction and Management Plan

Prior to the approval of the ODP, a Boat Haven Construction and Management Plan shall be prepared by the proponent and approved by Council that incorporates:

a) design standards to meet Environment Protection Authority (EPA) objectives for water quality and beneficial use protection;

b) a water and sediment quality monitoring plan;—

c) a maintenance and management agreement for the Boat Haven and channel; and

d) staging and implementation.

In considering the Boat Haven Construction and Management Plan, Council will have regard to advice from the DEP, WRC and LIMA.

7. Foreshore & Conservation Reserves Management

Prior to the approval of the ODP, a Foreshore Conservation Reserve Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) staging and implementation of the Management Plan;

b) interface between the development and adjacent areas;

c) management of human pressures;

d) hydrological impacts;

e) the tenure, detailed design and management of Conservation reserves;

f) the establishment and ongoing management of private conservation areas to ensure appropriate links to public Reserves;

g) the retention of remnant vegetation and the provision of foreshore buffers;

h) the design and construction of roads; and

i) water management to reduce mosquito-breeding habitat.

In considering the Foreshore Conservation Reserve Management Plan, Council will have regard to advice from the DEP, WRC, CALM and LIMA.

8. Nutrient Export Management Plan

Prior to the approval of the ODP, a Nutrient Export Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) monitoring soil nutrient levels to determine appropriate rates of nutrient application;

b) the use of slow release fertilisers;

c) minimising grassed areas and landscaped open spaces;

d) the use of local species of grasses;

e) encouraging local residents to minimise fertiliser application and plant native species;

f) minimising groundwater use;

g) minimising the potential for water quality problems; and

h) staging and implementation.

In considering the Nutrient Export Management Plan, Council shall have regard to advice from the DEP and LIMA.

9. Terrestrial Fauna/Waterbird Protection Management Plan

Prior to the approval of the ODP, a Terrestrial Fauna/Waterbird Protection Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) compliance with the System 6 objectives;

b) the separation of the conservation zone and providing an environment with separation from human activity;

c) a management arrangement providing for a walking trail and bird watching hide;

d) management measures that encourage waterbird and native fauna into the project area once construction is completed; and

e) staging and implementation.

In considering the Terrestrial Fauna/Waterbird Protection Management Plan, Council shall have regard to advice from the DEP, CALM and LIMA.

10. Developer Contribution Management Plan

Prior to the approval of the ODP, a Developer Contribution Management Plan shall be prepared in accordance with WAPC Planning Bulletin No. 18 (or as amended by the WAPC) by the proponent and approved by Council and the WAPC that addresses:

a) provision of community infrastructure directly associated with the development of the land in relation to foreshore areas, road reserves and public spaces in general;

b) overall management and on going responsibilities; and

c) staging and implementation.

In considering the Developer Contribution Plan, Council and the WAPC shall have regard to advice from the DEP, CALM and LIMA.

11. Construction Management Plan

Prior to the approval of the ODP, a Construction Management Plan shall be prepared by the proponent and approved by Council that addresses:

a) minimisation of clearing and vegetation disturbance;

b) protection of foreshore buffers;

c) control and monitoring of dust, noise and smoke;

d) incorporation of environmental protection specifications in all construction related contracts; and

e) staging and implementation.

In considering the Construction Management Plan, Council shall have regard to advice from the DEP and LIMA.

12. Deed of Agreement

Prior to the amendment being forwarded to the Minister for Planning for determination a Deed of Agreement is required to be entered into with the developer addressing such issues associated with maintenance, infrastructure contributions, bond monies, environmental monitoring and bank guarantees as mentioned within the Scheme Report.

3. Modify Schedule 13 "Interpretations" by including after the *interpretation "Mobile Home Park"* a new interpretation of *"Modified Water Body"* : an area of land modified in such a way as to allow entry of a natural water body or course that functions as a private recreational boating or ornamental purpose".

4. Introduce "Modified Water Body (Table 39)" under the "Non Urban Zones:" heading of Clause 4.1.1 of Town Planning Scheme No.1 text.

5. Include in Schedule 14 "Precinct Area 1 – Leschenault". Pt Lot 5 Old Coast Road, Australind (Pt Douro) is intended to be development for low density residential, low/medium density tourist accommodation and conservation purposes. Development will only be considered which can demonstrate that it will not have a significant adverse impact on the landscape or environmental attributes of the locality as determined through the formal rezoning and environmental review process. A detailed formal environmental review and rezoning will need to be undertaken to the satisfaction of Council and relevant governmental agencies and extensive public consultation undertaken to determine the suitability of any proposal for the site.

6. Introduce new Table 39 to Clause 4.2 "Zoning and Development Tables" of Town Planning Scheme No. 1 text, titled "Zoning and Development Standards - Modified Water Body" as follows:

Table 39

ZONING & DEVELOPMENT STANDARDS MODIFIED WATER AREA

POLICY STATEMENT

Intended for the establishment of modified waterways that function as a private recreational boating or ornamental purpose.

DEVELOPMENT STANDARD

NOTE: The following standards will apply to this zone.

LAND USE CATEGORIES		OTHER REQUIREMENTS
RECREATION & COMMUNITY FACILITIES	P	Development shall be in accordance with an Outline Development Plan or any variations agreed by the Shire of Harvey (Council) and approved by the Western Australian Planning Commission
CANAL WATERWAYS , MOORINGS AND JETTIES	P	
CANAL WALLS, RETAINING WALLS & FENCES	P	

ADOPTION

Adopted by the resolution of the Council of the Shire of Harvey at the Ordinary Meeting of the Council held on the 24th day of April 2001

SHIRE PRESIDENT

CHIEF EXECUTIVE OFFICER

FINAL APPROVAL

Adopted for final approval by resolution of the Shire of Harvey at the Ordinary Meeting of the Council held on the ..... day of ..... 2002.

The Common Seal of the Shire of Harvey was hereunto affixed by the authority of a resolution of the Council in the presence of:

.....
SHIRE PRESIDENT

.....
CHIEF EXECUTIVE OFFICER

Recommended/submitted for final approval

.....
CHAIRPERSON WESTERN AUSTRALIAN
PLANNING COMMISSION

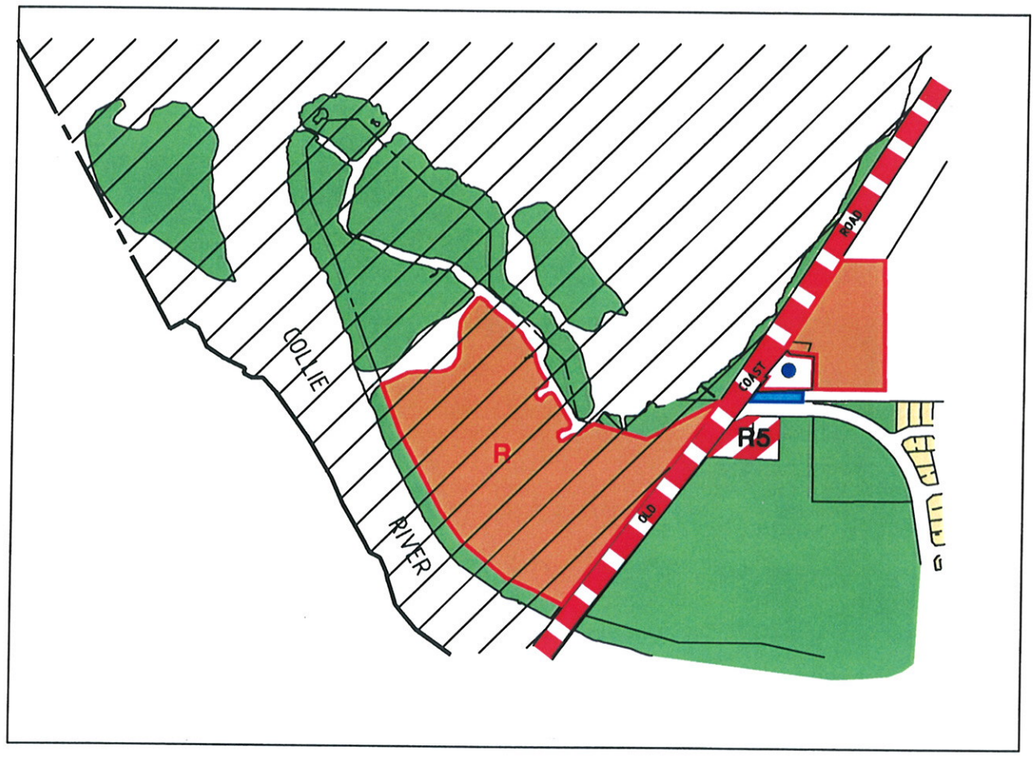
.....Date

Final Approval Granted

.....
MINISTER FOR PLANNING & INFRASTRUCTURE

.....Date

EXISTING ZONING



SCHEME AMENDMENT MAP

ROADS

- IMPORTANT REGIONAL ROADS

RESERVES

- RECREATION
- RECREATION AND CONSERVATION

AREAS

- PLACE OF LANDSCAPE VALUE
- SPECIAL USE
  DENOTED AS FOLLOWS:
  R RESTRICTED USE

ZONES

- RESIDENTIAL DEVELOPMENT
- SHOP
- TOURIST
- MODIFIED WATER BODY
- R12 R CODES
- HOTEL

200 100 0 200 400m

Date: 28.03.2000

N:\611\51340100\CAD\01P32.dwg Rev E

Town Planning Development Act 1928 (as amended)
and Town Planning Regulations 1967 (as amended)

District Planning Scheme No. 1

Shire of Harvey

Amendment No. 13

Appendix C

EPA Environmental Review Instructions

Table 7
Environmental Factors Relevant to the Scheme

CONTENT Preliminary Environmental Factors	Site Specific Factor	SCOPE OF WORK Work Required For The Environmental Review	EPA Objective
Biophysical			
Terrestrial Flora	Vegetation Communities	*What is the impact on samphire communities?* Assess the condition an distribution of samphire present. Document environmental impacts and management provisions. *Are there vegetation communities present that are poorly represented? (Use "Floristics of Reserves and Bushland Areas of the Perth Region (System 6) Parts XI-XV" (1997) by Keighery, B., Keighery G. and Gibson, N.* Identify the community types present in the amendment area and discuss their representation in existing conservation reserves. Where community types within the amendment area are poorly represented in conservation reserves discuss how they will be protected in the long term. *What will be the development setbacks adjoining the samphire flats? What rehabilitation/revegetation measures will be undertaken on the amendment site?* Show how the samphire communities will be protected.	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.
	System 6 - C66 & C67	*What will be the impact on System 6 areas? Discuss the consistency of the proposal with System 6.* Discuss the impact of the proposed management on System 6 Recommendation Area C66 (Point Douro Peninsula), and the Collie River Delta in Recommendation C67. (Refer to DCE (1983) The Darling System - System 6. Part II Recommendations for Specific Localities and EPA (1989) Proposed Bunbury Holiday Resort, Lot 5 Old Coast Road Australind, Report and Recommendations of the EPA, Bulletin 375, Perth, WA). Discuss how these areas of high conservation value will be managed, particularly in relation to the samphire and waterbird habitat.	Ensure that the conservation values of System 6 recommended areas are not compromised.
Terrestrial Fauna	Waterbirds	*What will be the impact on significant habitat of waterbirds?* *What is the existing usage of the present delta area by waterbirds?* Assess the presence and distribution of waterbirds. Document environmental impacts (direct and indirect) and management provisions for their protection.	Maintain the abundance, species diversity and geographical distribution of terrestrial fauna.
	Specially Protected (Threatened Fauna)	Survey CALM's database and the site for Declared or Threatened Fauna species. Document how Declared or Priority species will be protected and managed.	Protect Specially Protected (Threatened) Fauna, consistent with the provisions of the Wildlife Conservation Act 1950.

Table 7
Environmental Factors Relevant to the Scheme

CONTENT Preliminary Environmental Factors	Site Specific Factor	SCOPE OF WORK Work Required For The Environmental Review	EPA Objective
Estuary	Foreshore	Assess the stability of the foreshore, assess the impact from future pressures and document management provisions.	Maintain the integrity, function and environmental values of the foreshore area.
Floodplain	Floodplain of the Collie River and Leschenault Inlet	*What are the environmental and hydrological values of the floodplain?* *What are the possible hydrological impacts (possible flood) on nearby land?* Document the impact on the floodplain and how the floodplain will be managed in relation to LIMA's guidelines.	Ensure that the flow of floodwater is not inhibited.
Pollution Management			
Surface Water Quality	Estuary / lagoon / Collie River	*What is the risk of impact in the estuarine water quality from surface runoff, stormwater drainage and wastewater disposal as a result of the implementation of the Amendment?* Document how surface water and sewage will be managed in relation to Water & Rivers Commission (LIMA) guidelines and how Best Management Practice with respect to Water Sensitive Urban Design Guidelines is incorporated. *Could the development lead to unacceptable impacts on water quality within the Leschenault Inlet?* Document how the wastewater disposal and water supply will be configured in relation to the 100 year flood level, and what emergency overflow approach will be undertaken. Document how the wastewater and water supply system will be sealed in the event of a 100 year flood to avoid contamination of each system and the natural environment. Assess and document impacts and management provisions.	Maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993).
Estuarine Water Quality	Estuary/Lagoon Collie River	*What will be impact of the lagoon on the Collie River?* *What will be the impact of dredging on the estuary?* *What will be the flushing characteristics of the lagoon?* *Who will be responsible for waterway management (particularly the lagoon)?* Document how future estuarine water quality will compare with the current levels in the Amendment area. Assess and document impacts and management provisions.	Maintain or improve the quality of marine water consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA 1993).

Table 7
Environmental Factors Relevant to the Scheme

CONTENT Preliminary Environmental Factors	Site Specific Factor	SCOPE OF WORK Work Required For The Environmental Review	EPA Objective
Social Surroundings			
Social	Mosquitoes	Document what mosquito control measures will be implemented	(i) Mosquito numbers on the site should not adversely affect the health, welfare and amenity of future residents; and (ii) Ensure the breeding of mosquitoes is controlled to the satisfaction of the Health Department without adversely affecting other flora and fauna.
Aesthetic	Visual Amenity	Assess and document the current level of visual amenity, the impacts and management provisions, with particular reference to the Leschenault Estuary, System 6 C66 and C6, and the road.	Ensure the visual amenity of the area adjacent to the project is not unduly affected by implementation of the proposal.
Culture and Heritage	Aboriginal Culture and Heritage	*Are there any areas of Aboriginal significance likely to be affected by the implementation of the Amendment, and if so how will this be managed?* Identify aboriginal cultural and heritage sites of significance through archaeological and ethnographic surveys of the project area and through consultation with local aboriginal groups and the Aboriginal Affairs Department	Ensure that the proposal complies with the requirements of the Aboriginal Heritage Act 1972.

Appendix D

Hydraulic Analysis

WATER AND RIVERS
COMMISSION

YOUR REF
OUR REF 2373
ENQUIRIES Rick Bretnall
DIRECT TEL 9278 0448

Chief Executive Officer
Shire of Harvey
PO Box 163
HARVEY WA 6220

(Attention: Mr Charles Lockwood)

Derek Westra
For your info
RB 30/6

Dear Charles

PROPOSED DEVELOPMENT
POINT DUORO AUSTRALIND

I refer to our meeting at your office on 15 June 1999.

The Water and Rivers Commission in carrying out its role in floodplain management provides advice and recommends guidelines for development on floodplains with the object of minimising flood risk and damage.

Based on the Collie River Flood Study the land is affected by flooding during major river flows. The attached plan shows the 100 year flood levels that can be expected during a 1% average probability flood, or what is more commonly known as, the 100 year flood. This magnitude of flood has generally been adopted in Australia and overseas as the basis for floodplain management planning. Greater floods are expected to occur but will, of course, be less frequent.

The concept plan by GHD has been assessed with regard to our guidelines for acceptable development at the Collie River mouth and is considered acceptable with regard to major flooding subject to the following conditions being satisfied to ensure adequate flood protection:

- the design of the development ensures that the 100 year flood level at the downstream side of the bridge is no higher than 2.16 m AHD. Hydraulic calculations done on the GHD concept plan show that this condition is satisfied.

- future development has a minimum habitable floor level of 0.60 metre above the adjacent 100 year flood level

For your information, the attached plan of the proposed development shows the expected river flows and average velocities in the waterways during a 100 year flow.

Rick Bretnall.

RICK BRETNALL
A/PROGRAM MANAGER, ENVIRONMENTAL PLANNING
30 June 1999
rbre610

HYATT CENTRE 3 PLAIN STREET EAST PERTH WA 6004
PO BOX 6740 HAY STREET EAST PERTH WA 6892 TEL (08) 9278 0300 FAX (08) 9278 0301
EMAIL ADDRESS correspondence@wrc.wa.gov.au

WATER AND RIVERS
COMMISSION

YOUR REF
OUR REF 2373
ENQUIRIES Rick Bretnall
DIRECT TEL 9278 0448

Chief Executive Officer
Shire of Harvey
PO Box 163
HARVEY WA 6220

(Attention: Mr Charles Lockwood)

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For your information, the attached plan of the proposed development shows the expected river flows and average velocities in the waterways during a 100 year flow.

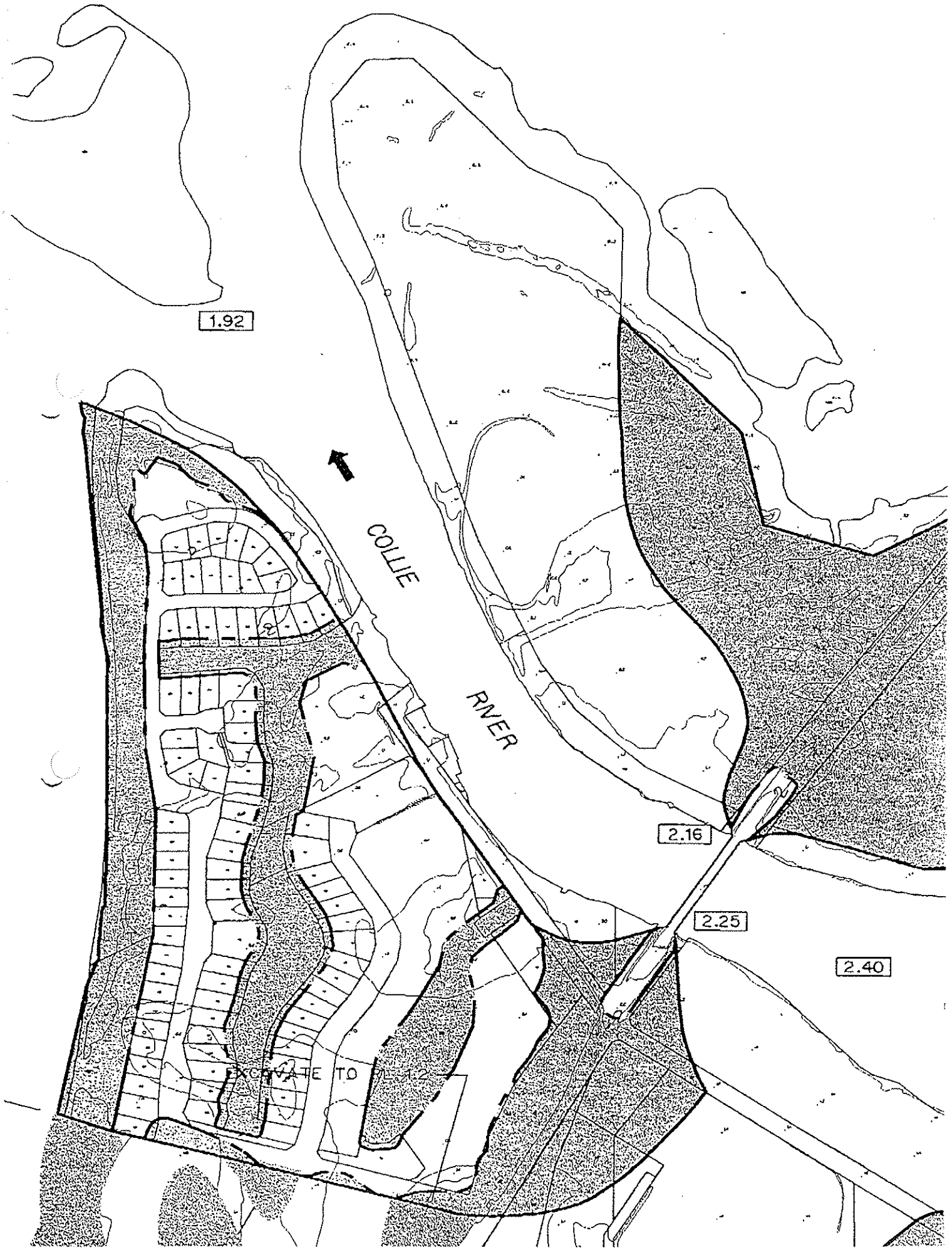
Rick Bretnall.

RICK BRETNALL
A/PROGRAM MANAGER, ENVIRONMENTAL PLANNING
24 June 1999
rbre610

Copy also sent to Barry Halligan 29/6/99

RB.

HYATT CENTRE 3 PLAIN STREET EAST PERTH WA 6004
PO BOX 6740 HAY STREET EAST PERTH WA 6892 TEL (08) 9278 0300 FAX (08) 9278 0301
EMAIL ADDRESS correspondence@wrc.wa.gov.au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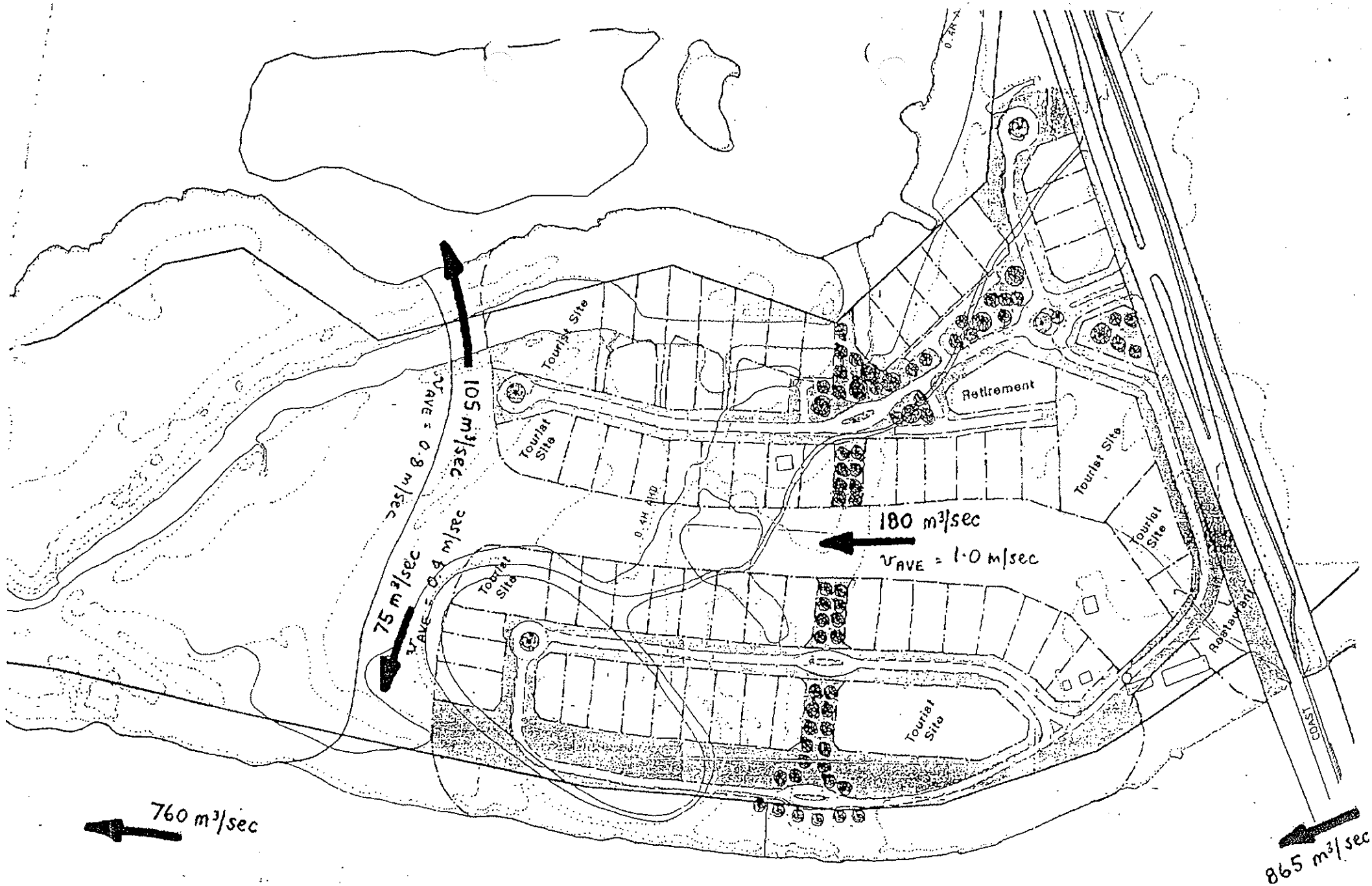
COLLIE
RIVER
2.16
2.25
2.40
EXCAVATE TO RL 1.2



Gutteridge Haskins & Davey Pty Ltd

PERTH • BUNBURY • ALBANY • KALGOORLIE

PETER NG
POINT QUORO PENINSULA

PROPOSED SUBDIVISION OPTION 2
POINT QUORO PENINSULA

Dwg 5174-81-01P2B

NEW PLAN

27 May, 1999

14696:DRW:jr
Our Ref: 611\51340100
Direct line: 9429 6637

Waters and Rivers Commission
3 Plain Street
EAST PERTH WA 6004

Attention: Rick Bretnall

Dear Sir

SHIRE OF HARVEY SCHEME AMENDMENT NO.13
Pt Douro Australind Development Proposal

I refer to our correspondence and mapping forwarded to you on 18th May 1999 and our subsequent meeting with yourself, Ian Weaver and Derek Westera on 20th May 1999.

Issues brought out of discussion confirmed that the hydraulic modelling undertaken has verified the ability to utilise portions of the development area for permanent structures.

As pointed out some minor details may be included upon the concept plan which include:

- A more tangential curve of the canal edge between the Australind Bridge and the proposed bridge.
- Moorings to be established that keep craft in line with possible flow events - ie tidal or river movement.

Issues confirmed in discussion are summarised below:

- The proposed modified water area modelled will allow permanent structures to be erected upon the area of the site originally proposed for a caravan park. The 40m channel provides added efficiency in carrying the 1:100 year design flow which therefore reduces the area of the site necessary for floodway purposes.
- The channel will be subject to both tidal and riverine flushing, reflecting in part the Collie riverine system.
- The minimum canal width is 40m. Jetties and structures will be constructed to maintain that required profile.
- The predicted 1:100 year channel flow and velocities are relatively low presenting low erosion risk from the design flood event. Wall, bank and channel base treatments will be constructed to a standard engineering design in accordance with D.O.T. requirements.

- The northern channel to Samphire Bay need only be a shallow swale to control breakout in extreme flow events. This area, as with the conservation reserve, will be inundated in a 1:100 year event.
- The Environmental Review will include a flood map to indicate the areas that will be inundated in a 1:100 year flood event.

At this stage we will be meeting with DEP next week. Council officers preferred that the new design and associated flood issues be resolved first with the Water and Rivers Commission prior to their own assessment.

Thank you for your comments and assistance. We will submit the revised Review Document to you within 2-3 weeks.

Please call Ian Weaver on 9429 6554 or Derek Westera on 9429 6637 if you have any questions.

Yours faithfully

D R WESTERA

18 May, 1999

13985:IJW:jr
Our Ref: 611\51340100
Direct line: 9429 6554

Water and Rivers Commission
3 Plain Street
EAST PERTH WA 6004

Attention: Rick Bretnall

Dear Sir

SHIRE OF HARVEY SCHEME AMENDMENT NO.13
PT DOURO AUSTRALIND DEVELOPMENT PROPOSAL

The Shire referred Amendment No.13 to DEP, Water and Rivers Commission and Ministry for Planning during July 1997. The DEP issued its Environmental Review instructions during October 1997 and the Review was completed early 1998.

In response to DEP comments regarding the review a Technical Assessment Group was established by the Shire to discuss its implications. At the meeting held on 15th July 1998 attended by various representatives, including yourself, it was resolved that several issues be investigated and included within the review document.

The shire on behalf of the Technical Group provided these instructions to GHD during September 1998 which included investigations of the effects of the 1 in 100 year flood event.

A Hydraulic Investigation of the site was completed during March 1999 and the results of that study are attached.

The investigations have found:

- The proposed canal will improve floodway performance by lowering the flood event water levels downstream of the Collie River Bridge.
- The investigations have determined that the canal provides opportunity to fill and develop part of the existing floodway within the study area.

Your comments are requested in regard to the study outcome. The findings will be presented to the Technical Group during May and we would be grateful if you could attend that meeting at the Shire of Harvey to discuss these issues.

At this stage we await your response prior to requesting the Shire arrange a meeting. Please call me on 9429 6554 for any questions.

Yours faithfully

I J WEAVER

Copy to:
Chief Executive Officer
Shire of Harvey
PO Box 500
Harvey WA 6220
Attention : Chadd Hunt

Attachment:
Hydraulic Investigation Study Report

Shire of Harvey Scheme Amendment No.13
Pt Douro Australind Development Proposal

This report presents the outcomes of our hydraulic assessment addressing the effects of the proposed Point Douro Development on flood levels in the lower Collie River.

Background

Proposed development at Point Douro introduces a canal type waterway within the development site to add amenity to the development. However, portions of the proposal encroach into the identified Collie River floodway.

To identify the impacts of such encroachment, the Shire of Harvey has requested an assessment of the effects of the development proposal on flood levels in the Collie River.

To mitigate adverse effects of the encroachment, it is proposed to provide equivalent conveyance of floodwaters through the development's canal system.

Objective

The objective of this model study was to determine the basic geometry and characteristics of an artificial waterway to offset the effects of the proposed development on Collie River flood levels. Specifically, the target criterion was to ensure that the 100 year Average Recurrence Interval (ARI) design flood levels, upstream of the Australind Bridge, were not adversely affected.

Approach

A 1993 investigation by the Water Authority used a steady state backwater analysis program IRWASP to assess the hydraulic characteristics of the Collie River and its floodplain. The model examined a number of design flood events and determined the likely extents of the 100 year ARI flood. The study report plans also presented predicted flood levels at various points along the watercourse.

To assess the hydraulic effects of the proposed development, a similar steady state hydraulic modelling approach was used. A HEC-RAS model of the existing watercourse was set up based on data from the Water Authority IRWASP model. The schematic layout of this model is presented in Figure 1. The HEC-RAS model was calibrated to produce the same water surface level results as the IRWASP model for the existing case. Output data from the existing case model is presented in Table 1.

The model was then amended to reflect the proposed changes to the geometry of the watercourse and floodplain. Figure 3 shows the branched model used and Tables 2 & 3 present the output data.

Profiles down the main channel and through the canal are shown in Figures 4 and 5 respectively.

A comparison of the Collie River 100 year ARI water surface profiles for the existing and proposed cases is presented in Table 4.

Table 4: Comparison of 100 year ARI model results

River Station (m)	Water Surface Elevation Existing Case, IRWASP model (m AHD)	Water Surface Elevation Existing Case, HEC-RAS model (m AHD)	Water Surface Elevation Proposed Case, HEC-RAS model (m AHD)
955	2.34.	2.37	2.32
857	2.25	2.37	2.19
827	2.16	2.14	2.13
750	2.14	2.18	2.13
600	2.08	2.08	2.07
397	1.97	1.98	1.95
163	1.92	1.95	1.92
50	(1.92)	1.92	1.92

Results

By providing a canal of 40m minimum base width and a nominal invert at -2.0 m AHD, as shown in Figure 4, the effects of encroachment on upstream flood levels are not only mitigated, but are reduced to below existing levels.

However, a bridge will be required across the canal to provide access to the island created by the canal (Figure 5). The afflux through the bridge is significant and becomes the dominant control point in the backwater profile through the canal. By providing a minimum bridge waterway of 34 m width with the bridge deck above the 100 year ARI flood level, afflux is controlled to the extent that the corresponding water levels at the Australind Bridge are unaffected by the development proposal.

Conclusions

By providing equivalent conveyance of floodwaters through an artificial watercourse, the effects of encroachment of the proposed development can be mitigated to the extent that there is no significant change in water levels upstream of the Australind Bridge.

For the case presented, the basic criteria to achieve this outcome were:

- encroachment is restricted to land within the development area;
- a canal of 34 m minimum base width and a nominal invert level of -2.0 m AHD is constructed to augment the Collie River;
- an access bridge over the canal will provide a minimum waterway base width of 30 m at a nominal invert level of -2.0 m AHD.
- a floodway of base width 40 m at nominal level 0.8 m AHD is provided to allow a breakout of flood flows to the estuary.

Many other permutations of channel geometry, bridge dimensions and floodway configurations could achieve the same basic result. It is recommended that the final design arrangement be checked to ensure that it produces the same fundamental outcome. That is, there is no adverse change to flood levels upstream of the Australind Bridge as a result of the development.

Attachments:

Figures 1, 2, 3, 4 & 5

Tables 1 & 2

TABLE 1.

HEC-RAS Plan: Plan 02 River: Collie River Reach: Main Channel

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Main Channel	955	865.00	-2.54	2.37		2.44	0.000243	1.27	790.23	310.00	0.21
Main Channel	857	865.00	-2.04	2.37	0.04	2.41	0.000190	1.04	972.48	397.04	0.18
Main Channel	842	Bridge									
Main Channel	827	865.00	-2.63	2.14		2.24	0.000394	1.48	669.66	343.13	0.26
Main Channel	750	865.00	-2.04	2.18		2.20	0.000139	0.79	1246.85	535.76	0.15
Main Channel	600	865.00	-2.24	2.08		2.17	0.000343	1.43	743.53	340.00	0.24
Main Channel	397	865.00	-2.94	1.98		2.09	0.000400	1.69	722.72	325.00	0.27
Main Channel	163	865.00	-2.04	1.95		2.00	0.000256	1.11	962.24	486.72	0.20
Main Channel	138	865.00	-2.04	1.92		1.99	0.000335	1.26	796.19	385.25	0.23
Main Channel	50	865.00	-2.04	1.92	0.04	1.96	0.000198	0.89	1110.74	530.76	0.18

TABLE 2.

HEC-RAS Plan: 100yrFull

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Clifton Pk Reach	955	865.00	-2.54	2.32	-0.16	2.39	0.000339	1.27	774.30	310.00	0.21
Clifton Pk Reach	857	865.00	-2.77	2.19	-0.10	2.34	0.000474	1.75	494.48	130.00	0.29
Clifton Pk Reach	842	Bridge									
Clifton Pk Reach	827	865.00	-2.63	2.13		2.23	0.000388	1.47	665.50	341.62	0.26
Main Channel	788.5*	685.00	-2.55	2.14		2.21	0.000240	1.20	602.74	269.48	0.20
Main Channel	750	685.00	-2.34	2.13		2.20	0.000239	1.13	626.55	226.52	0.20
Main Channel	675	685.00	-2.29	2.10	-0.28	2.18	0.000271	1.23	573.25	191.68	0.21
Main Channel	600	685.00	-2.24	2.07	-0.31	2.15	0.000296	1.33	532.92	174.55	0.23
Main Channel	500	685.00	-2.59	2.00	-0.32	2.12	0.000383	1.56	462.98	155.96	0.26
Main Channel	397	685.00	-2.94	1.95	-0.21	2.08	0.000413	1.63	466.78	167.00	0.27
Main Channel	350.2*	685.00	-2.76	1.95	-0.25	2.05	0.000352	1.46	514.28	190.20	0.25
Main Channel	303.4*	685.00	-2.58	1.94	-0.26	2.03	0.000319	1.35	549.53	212.40	0.23
Main Channel	256.6*	685.00	-2.40	1.94	-0.24	2.01	0.000297	1.26	578.40	230.84	0.22
Main Channel	209.8*	685.00	-2.22	1.93	-0.21	2.00	0.000284	1.20	600.18	243.10	0.22
Outlet	163	760.00	-2.04	1.92	-0.08	1.99	0.000299	1.19	692.38	315.36	0.22
Outlet	138	760.00	-2.04	1.92	-0.08	1.97	0.000264	1.12	782.39	375.26	0.21
Outlet	50	760.00	-2.04	1.92	-0.07	1.95	0.000153	0.78	1110.74	530.76	0.15

TABLE 3

HEC-RAS Plan: 100yrFull

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Estuary Link	Swale	478	105.00	-1.00	2.01	-0.28	2.02	0.000187	0.42	248.32	124.88	0.10
Estuary Link	Swale	460	105.00	0.90	1.98	1.34	2.01	0.001673	0.85	124.22	116.72	0.26
Estuary Link	Swale	440	105.00	0.80	1.92	1.43	1.97	0.003276	0.98	102.86	121.59	0.35
Douro Harbour	Harbour	985	180.00	-2.10	2.15		2.20	0.000144	0.93	193.64	49.85	0.15
Douro Harbour	Harbour	980	180.00	-2.10	2.15	-0.69	2.20	0.000144	0.93	193.61	49.85	0.15
Douro Harbour	Harbour	974	Bridge									
Douro Harbour	Harbour	968	180.00	-2.10	2.07		2.12	0.000154	0.95	189.64	49.81	0.16
Douro Harbour	Harbour	885	180.00	-2.10	2.09		2.10	0.000039	0.51	356.10	89.82	0.08
Douro Harbour	Harbour	785	180.00	-2.10	2.05		2.09	0.000157	0.96	188.32	49.79	0.16
Douro Harbour	Harbour	685	180.00	-2.10	2.03		2.08	0.000159	0.96	187.51	49.78	0.16
Douro Harbour	Harbour	585	180.00	-2.10	2.01		2.06	0.000162	0.96	186.69	49.77	0.16
Douro Harbour	Harbour	528	180.00	-2.10	2.01		2.04	0.000114	0.81	221.59	59.77	0.13
Douro Harbour	River Link	428	75.00	-2.10	2.01	-0.76	2.02	0.000058	0.49	218.88	126.99	0.09
Douro Harbour	River Link	394	75.00	-2.10	2.01	-0.75	2.02	0.000045	0.41	278.32	181.00	0.08
Douro Harbour	River Link	333	75.00	-2.10	2.01	-1.20	2.01	0.000017	0.31	393.53	237.00	0.05
Douro Harbour	River Link	284	75.00	-2.10	2.01	-1.20	2.01	0.000020	0.34	324.53	180.00	0.06
Collie River	Clifton Pk Reach	955	865.00	-2.54	2.32	-0.16	2.39	0.000339	1.27	774.30	310.00	0.21
Collie River	Clifton Pk Reach	857	865.00	-2.77	2.19	-0.10	2.34	0.000474	1.75	494.48	130.00	0.29
Collie River	Clifton Pk Reach	842	Bridge									
Collie River	Clifton Pk Reach	827	865.00	-2.63	2.13		2.23	0.000388	1.47	665.50	341.62	0.26
Collie River	Main Channel	788.5*	685.00	-2.55	2.14		2.21	0.000240	1.20	602.74	269.48	0.20
Collie River	Main Channel	750	685.00	-2.34	2.13		2.20	0.000239	1.13	626.55	226.52	0.20
Collie River	Main Channel	675*	685.00	-2.29	2.10	-0.28	2.18	0.000271	1.23	573.25	191.68	0.21
Collie River	Main Channel	600	685.00	-2.24	2.07	-0.31	2.15	0.000296	1.33	532.92	174.55	0.23
Collie River	Main Channel	500	685.00	-2.59	2.00	-0.32	2.12	0.000383	1.56	462.98	155.96	0.26
Collie River	Main Channel	397	685.00	-2.94	1.95	-0.21	2.08	0.000413	1.63	466.78	167.00	0.27
Collie River	Main Channel	350.2*	685.00	-2.76	1.95	-0.25	2.05	0.000352	1.46	514.28	190.20	0.25
Collie River	Main Channel	303.4*	685.00	-2.58	1.94	-0.26	2.03	0.000319	1.35	549.53	212.40	0.23
Collie River	Main Channel	256.6*	685.00	-2.40	1.94	-0.24	2.01	0.000297	1.26	578.40	230.84	0.22
Collie River	Main Channel	209.8*	685.00	-2.22	1.93	-0.21	2.00	0.000284	1.20	600.18	243.10	0.22
Collie River	Outlet	163	760.00	-2.04	1.92	-0.08	1.99	0.000299	1.19	692.38	315.36	0.22
Collie River	Outlet	138	760.00	-2.04	1.92	-0.08	1.97	0.000264	1.12	782.39	375.26	0.21
Collie River	Outlet	50	760.00	-2.04	1.92	-0.07	1.95	0.000153	0.78	1110.74	530.76	0.15

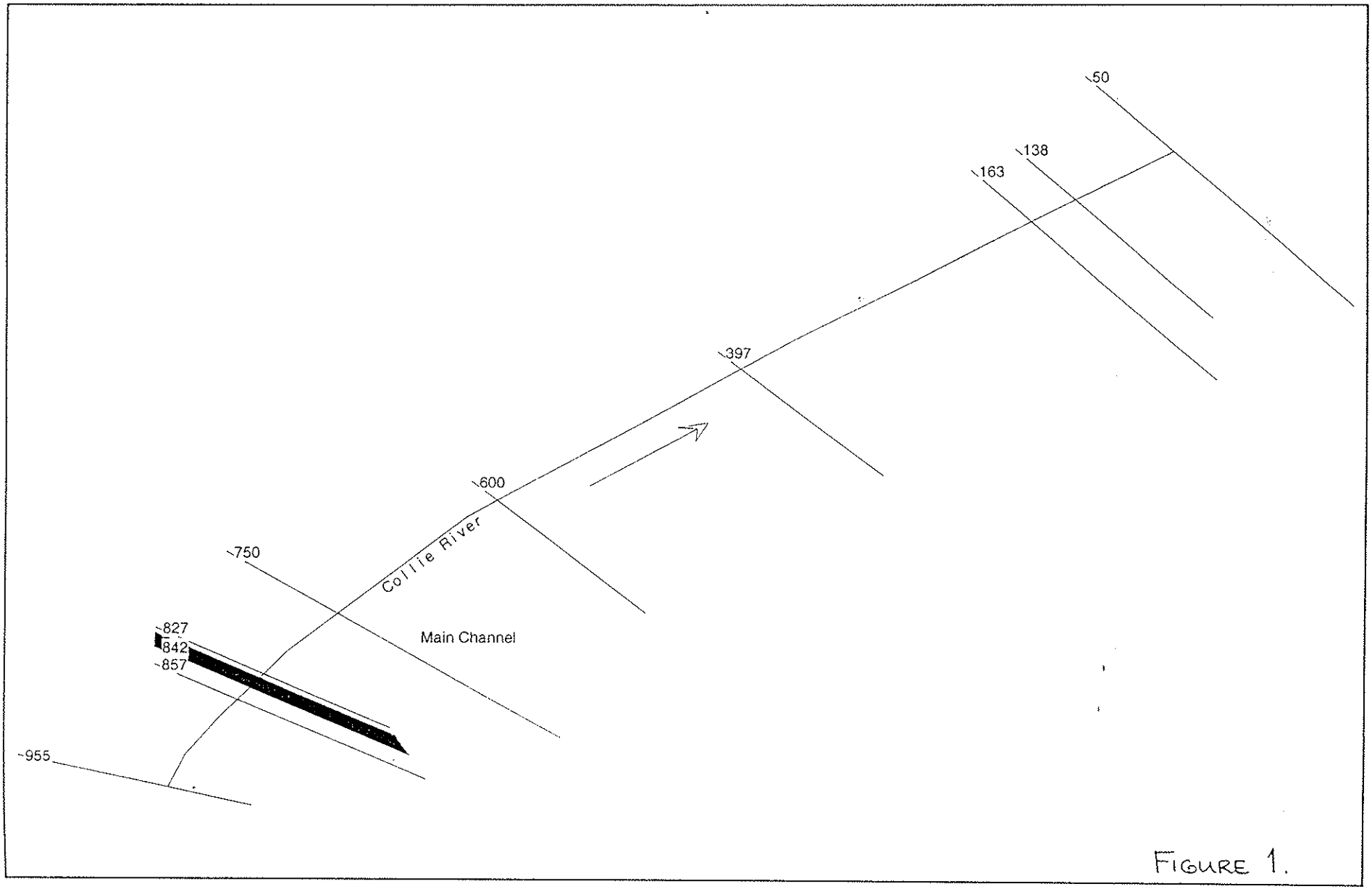

50
138
163
397
600
750
Collie River
Main Channel
827
842
857
955

FIGURE 1.

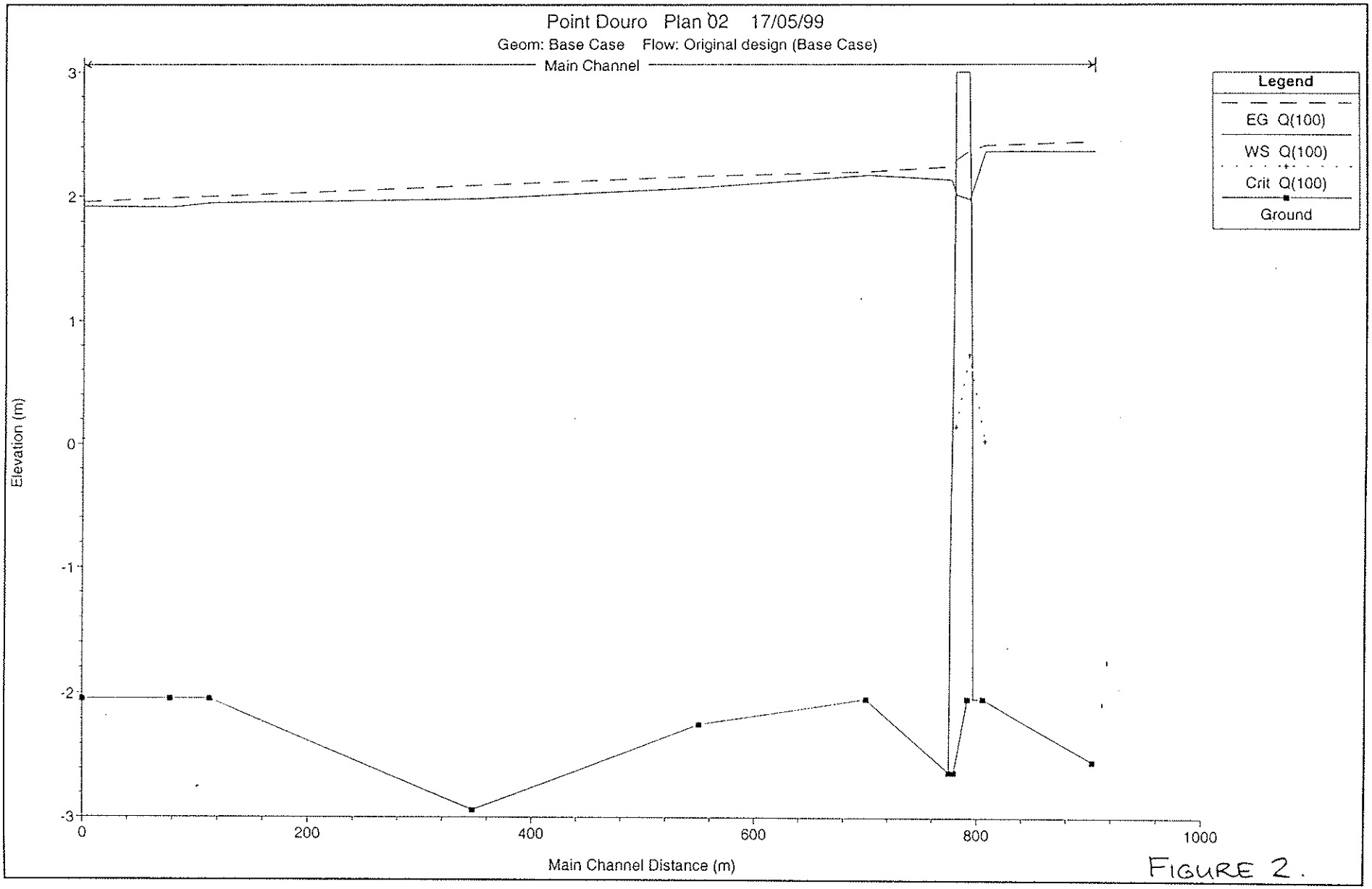

Point Douro Plan 02 17/05/99
Geom: Base Case Flow: Original design (Base Case)
Main Channel
Legend
EG Q(100)
WS Q(100)
Crit Q(100)
Ground
Elevation (m)
3
2
1
0
-1
-2
-3
0
200
400
600
800
1000
Main Channel Distance (m)

FIGURE 2.

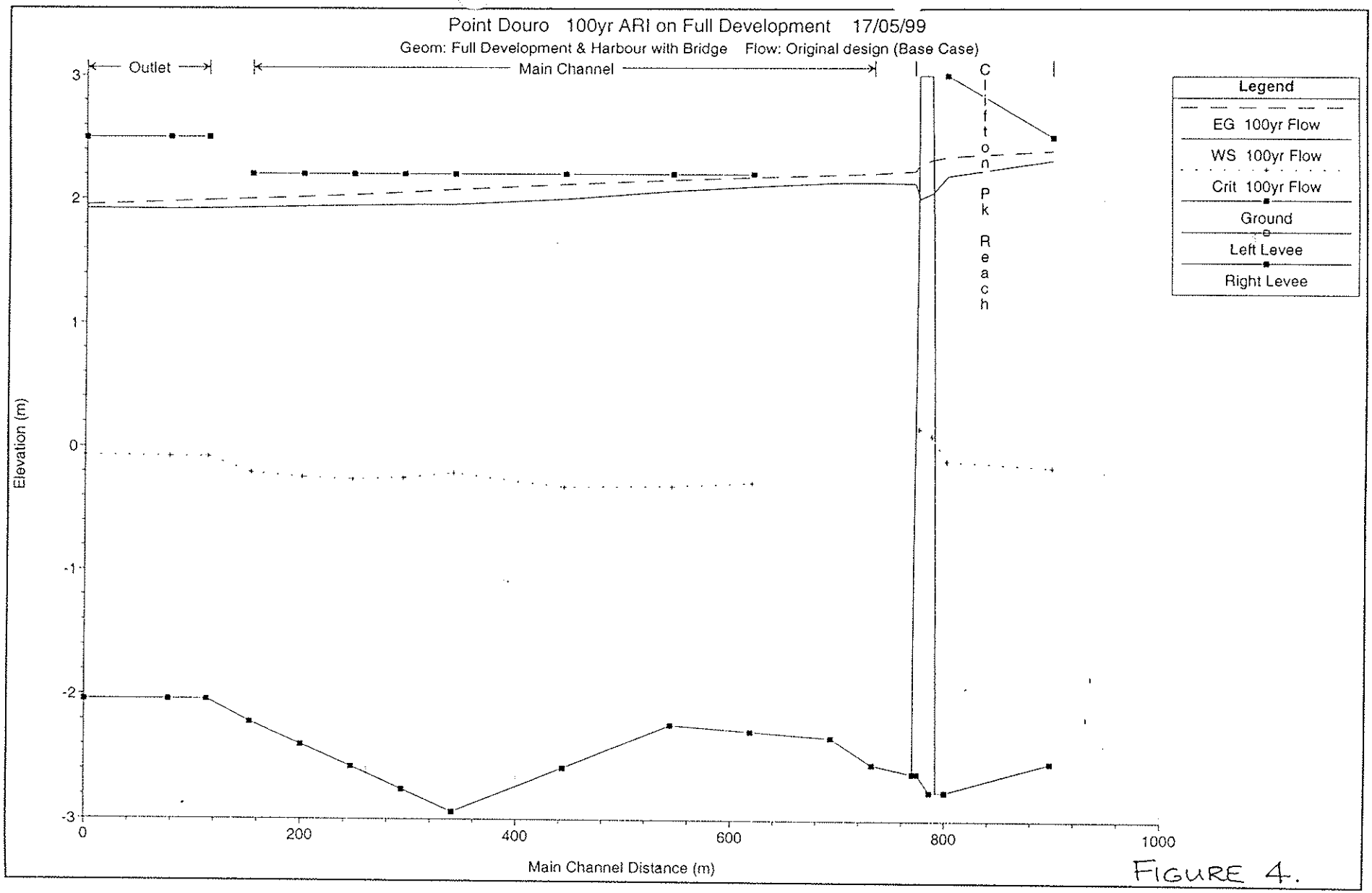

Point Douro 100yr ARI on Full Development 17/05/99
Geom: Full Development & Harbour with Bridge Flow: Original design (Base Case)
Outlet
Main Channel
Clifton Pk Reach
Legend
EG 100yr Flow
WS 100yr Flow
Crit 100yr Flow
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
3
2
1
0
-1
-2
-3
0
200
400
600
800
1000

FIGURE 4.

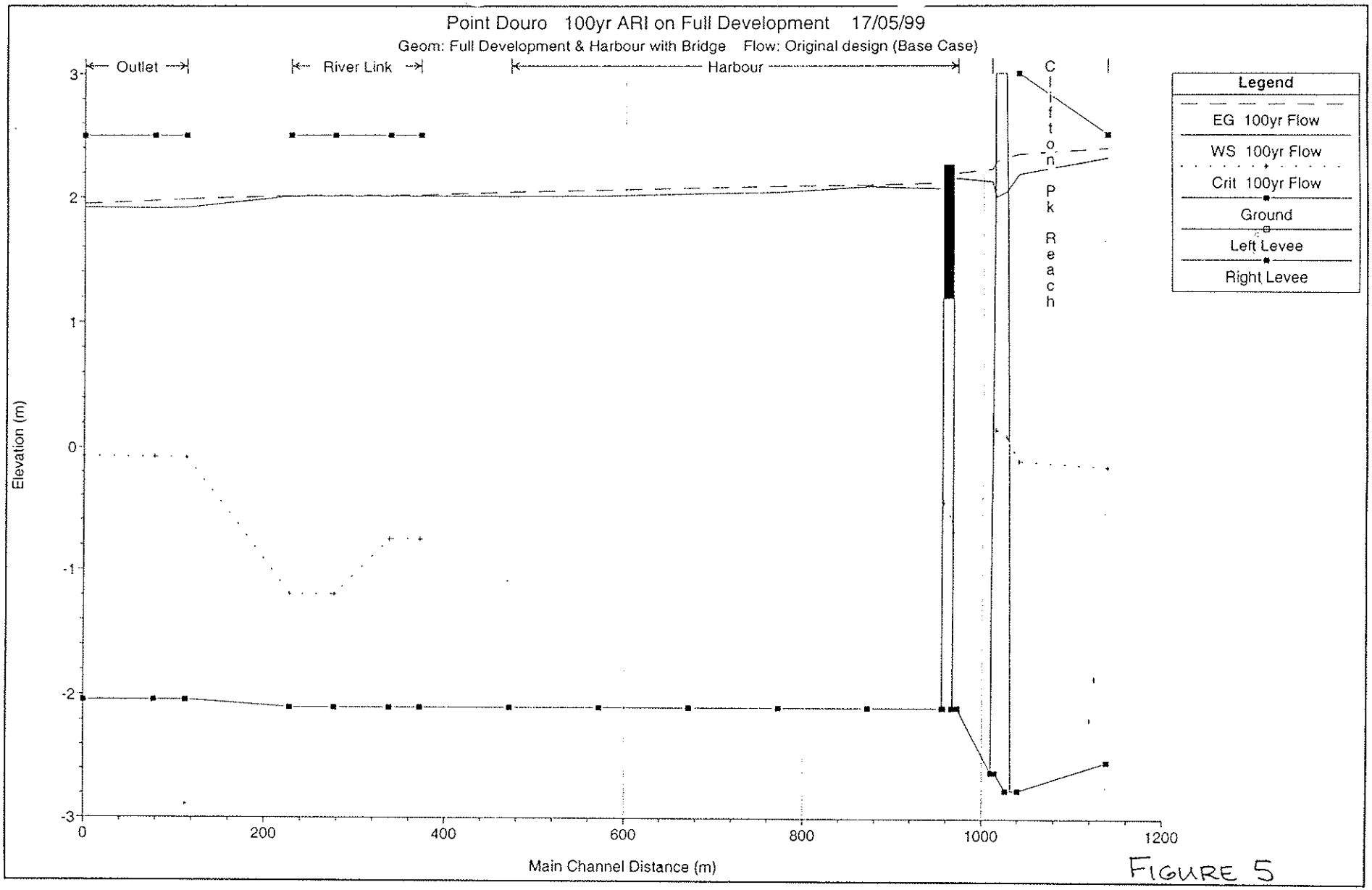

Point Douro 100yr ARI on Full Development 17/05/99
Geom: Full Development & Harbour with Bridge Flow: Original design (Base Case)
Outlet
River Link
Harbour
Clifton Pk Reach
Legend
EG 100yr Flow
WS 100yr Flow
Crit 100yr Flow
Ground
Left Levee
Right Levee
Elevation (m)
Main Channel Distance (m)
3
2
1
0
-1
-2
-3
0
200
400
600
800
1000
1200

FIGURE 5

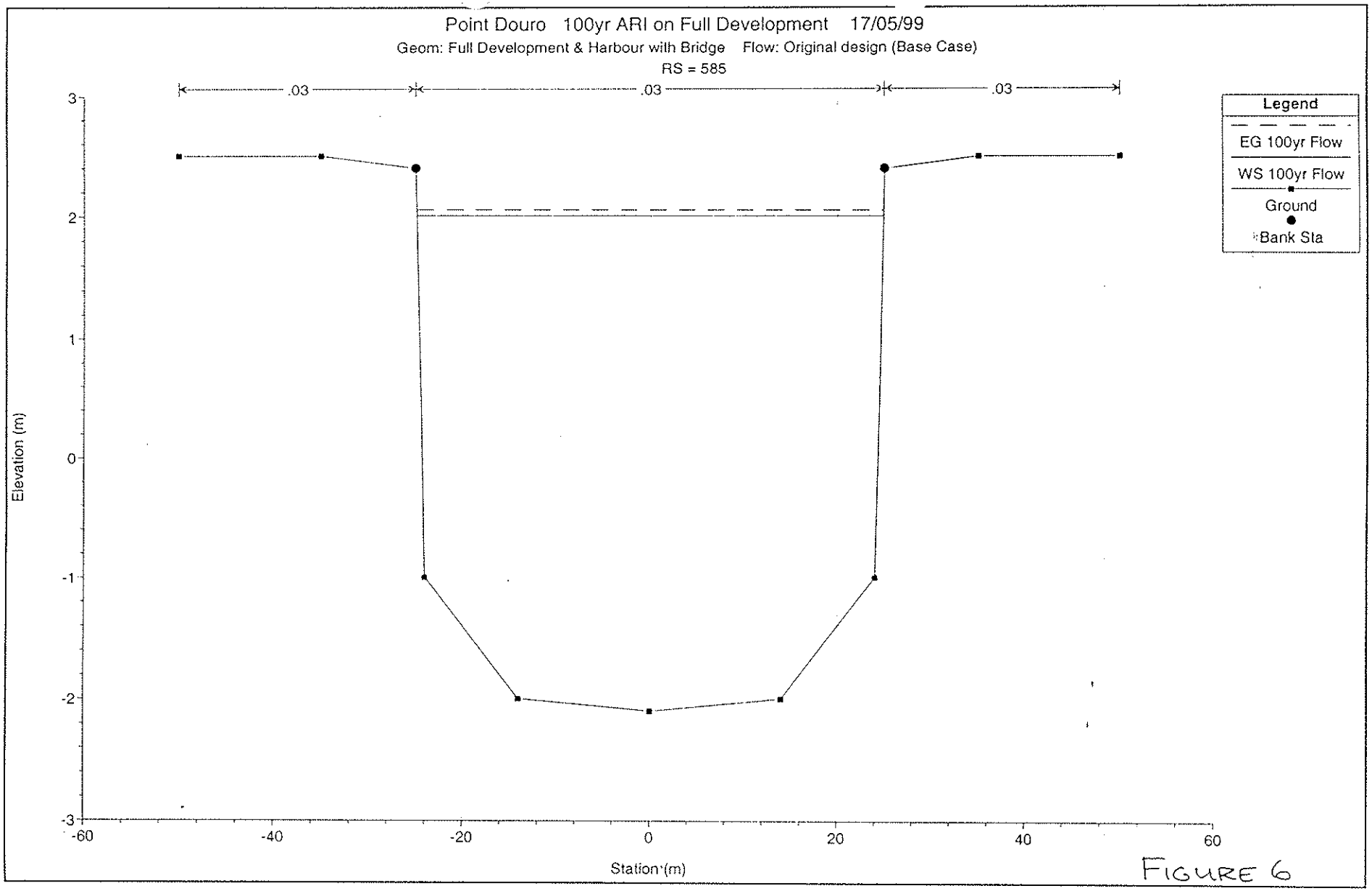
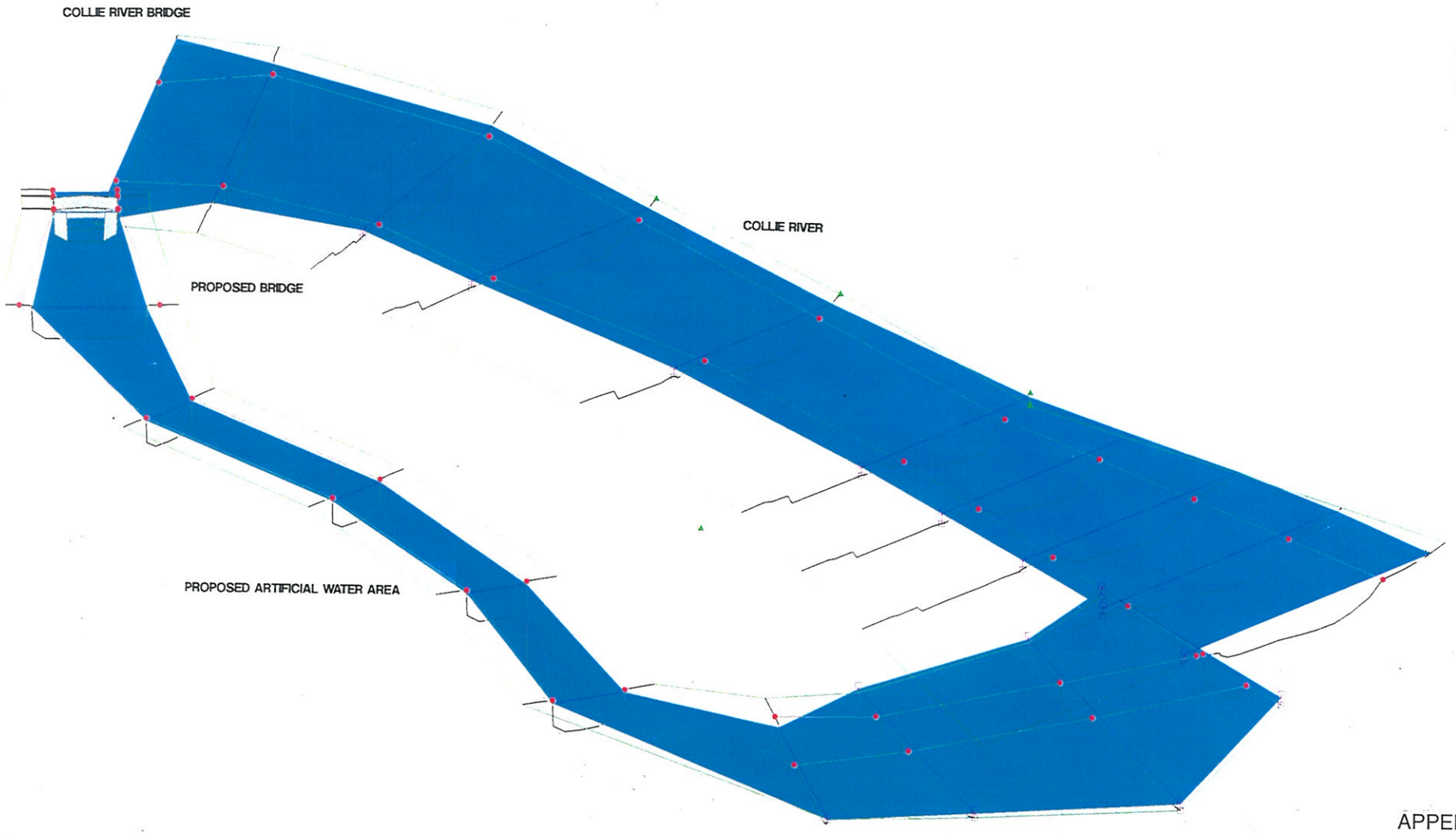

Point Douro 100yr ARI on Full Development 17/05/99
Geom: Full Development & Harbour with Bridge Flow: Original design (Base Case)
RS = 585
.03
.03
.03
Legend
EG 100yr Flow
WS 100yr Flow
Ground
Bank Sta
Elevation (m)
3
2
1
0
-1
-2
-3
-60
-40
-20
0
20
40
60
Station (m)

FIGURE 6

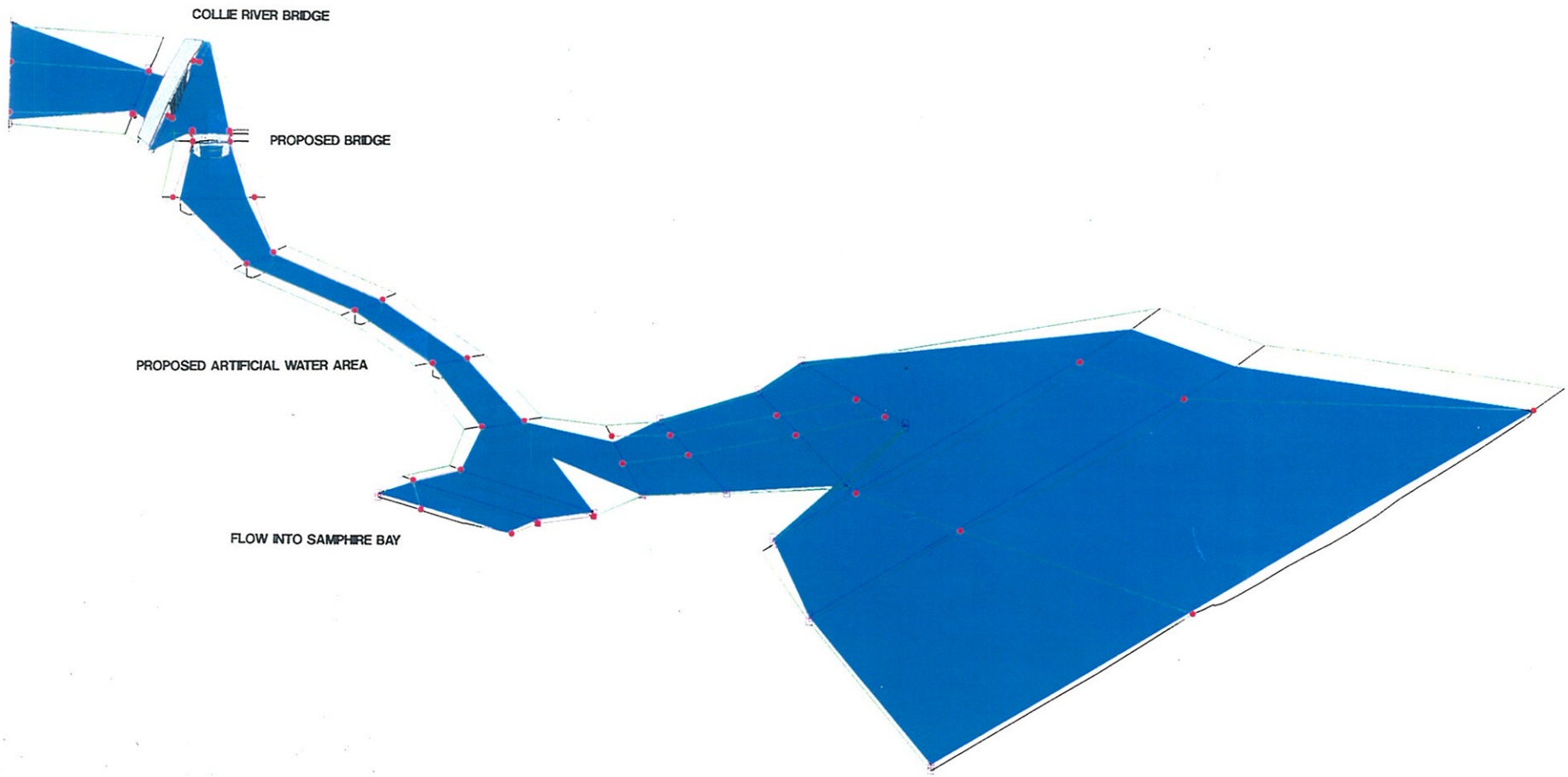
Point Douro 100yr ARI on Full Development 13/04/99



APPENDIX D

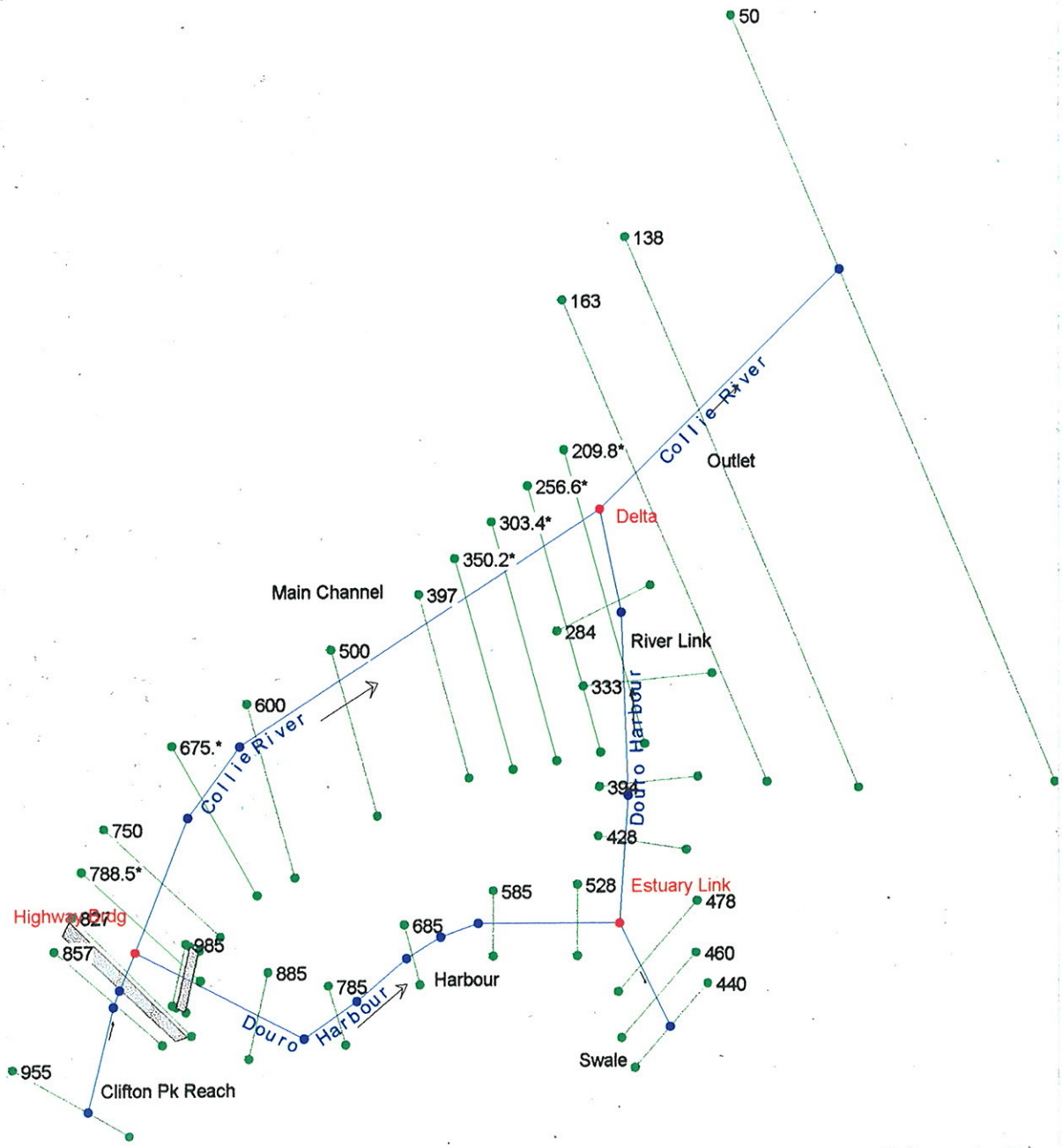
COMPUTER MODELLED HYDRAULIC ANALYSIS
3D AERIAL VIEW FACING SOUTH

Point Douro 100yr ARI on Full Development 13/04/99



APPENDIX D

COMPUTER MODELLED HYDRAULIC ANALYSIS
3D AERIAL VIEW FACING SOUTH

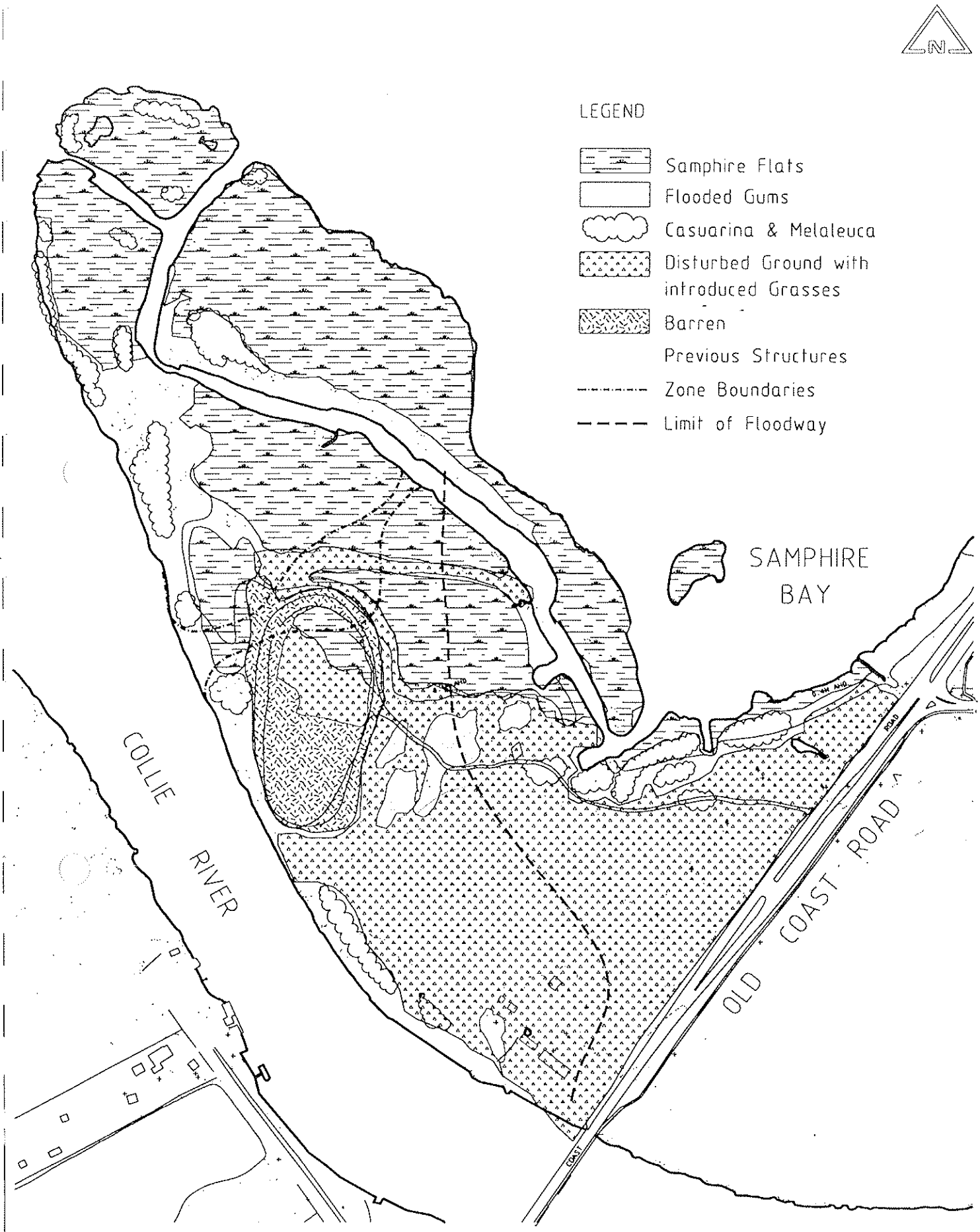


APPENDIX D

COMPUTER MODELLED HYDRAULIC ANALYSIS PROFILES

Appendix E

Vegetation Map and Species List



Appendix E
Existing Vegetation at Point Douro

Date: 19.01.2000
N:\611\51340100\cad\01P36.dwg

Source: Bowman Bishaw & Associates

TABLE 6

LIST OF SPECIES OF PLANTS IDENTIFIED ON LOT 5, OLD COAST ROAD AUSTRALIND

FAMILY No.	FAMILY		IDENTIFICATION	COMMON NAME	FLORA OF PERTH
32	Cyperaceae	1	Ghania trifidia		883
52	Juncaceae	2	Juncus krussii	Sea rush	868
		3	Juncus polyanthemus		869
54	Liliaceae	4	Burchardia umbellata		786
70	Casuarinaceae	5	Casuarina obesa	Swamp sheoak	75
90	Proteaceae	6	Hakea prostrata	Harsh hakea	342
105	Chenopodiaceae	7	Halosarcia halocnemoides	Shrubby samphire	87
			Halosarcia halocnemoides ssp. Halocnemoides	Samphire	88
		8	Halosarcia india ssp. Bidens	Samphire	88
		9	Sarcocornia blackiana	Samphire	90
		10	Threlkeldia diffusa	Samphire	91
110	Aizoaceae	*	Carpobrotus edulis	Pigface	77
165	Papilionaceare	11	Jacksonia furcellata		273
		12	Viminaria juncea	Swishbush	309
168	Oxalidaceae	*	Oxalis pes-carpae	Soursop	495
		*	Oxalis prupurea	Large flower wood sorrel	495
226	Dilleniaceae	13	Hibbertia	Hibbertia	407
273	Myrtaceae	14	Eucalyptus rudis	Flooded gum	418
		15	Melaleuca raphiophylla	Swamp paperback	419
		16	Melaleuca viminea		693
345	Asteraceae	17	Olearia axillaris		

plus Weksonia (Text)
Couch
Kikuyu

SOURCE : BOWMAN BISHAW AND ASSOCIATES 1988

APPENDIX E
SPECIES LIST

Appendix F

Comparative Aerial Photographs

N

Date: 19.01.2000
N:\611\51340100\01PF1.dwg

Source: DOLA

APPENDIX F

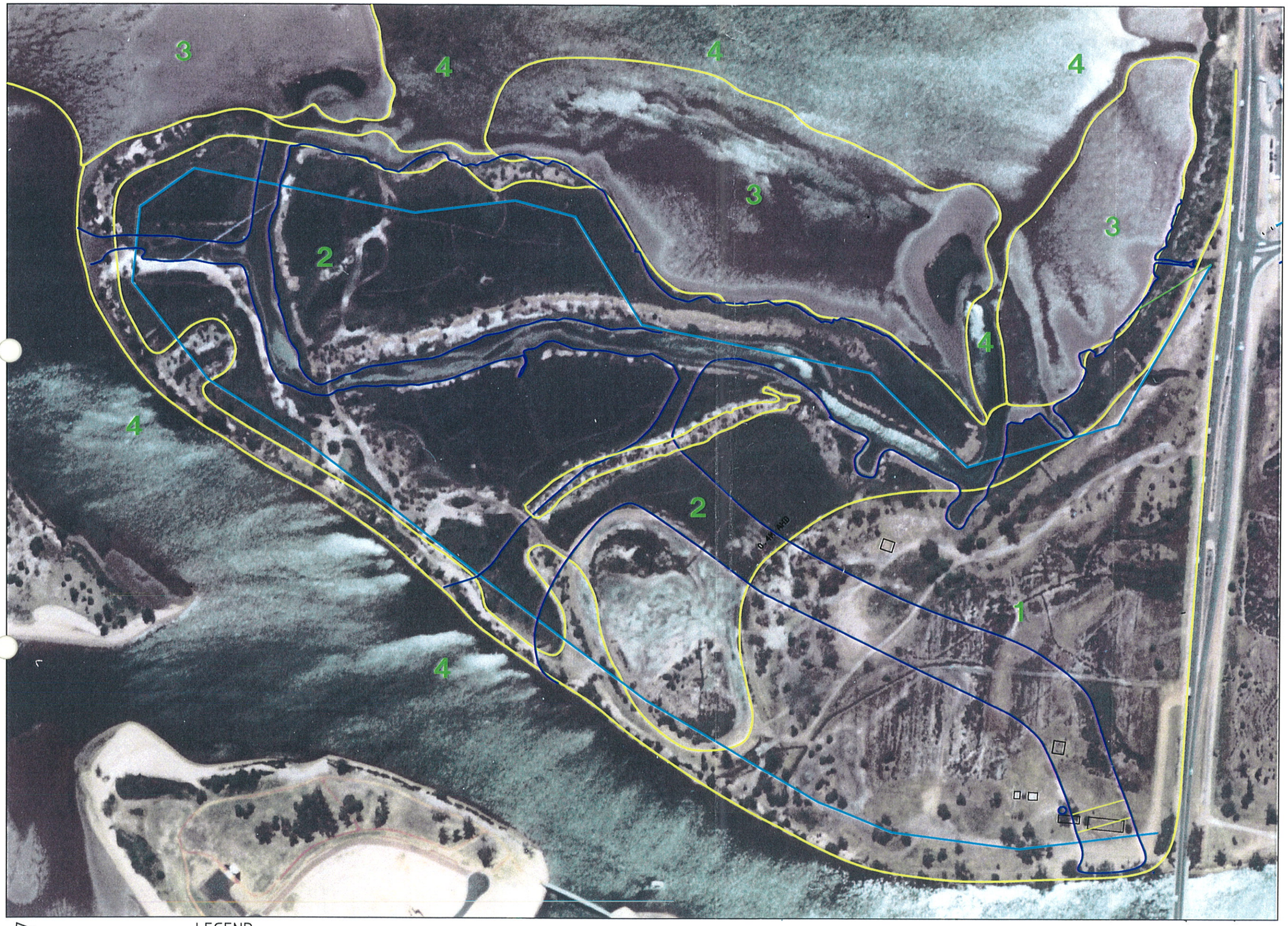
AERIAL PHOTO – 27.11.1989

Date: 19.01.2000
N:\611\51340100\01PF2.dwg

Source: DOLA

APPENDIX F

AERIAL PHOTO – 25.09.1998



KEY
1. TERRESTRIAL
2. SAMPHIRE FLATS
3. MUD FLATS
4. DEEPER WATER

LEGEND
- NEW BOUNDARY
- PROPERTY BOUNDARY
- HABITAT BOUNDARY

N

Date: 11.09.2000
N:\611\51340100\01PF04.dwg

GHD

POINT DOURO
ENVIRONMENTAL REVIEW 1999

FIGURE 1
HABITATS, & PROPOSED DEVELOPMENT

Appendix G

Results of Fauna Survey

POINT DOURO.

FAUNA SURVEY.

Prepared by

Hart, Simpson and Associates Pty Ltd

for

Gutteridge Haskins and Davey Pty Ltd

September 2000

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3. METHODS. 3

4. RESULTS. 4

5. DISCUSSION. 9

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TABLE 2. BIRDS RECORDED IN THE TERRESTRIAL PART. 8

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FIGURE 1. HABITATS.

APPENDIX 1. PREVIOUS REPORT, FEBRUARY 2000.

APPENDIX 2. AQUATIC BIRDS FOUND OR EXPECTED TO OCCUR.

1. SUMMARY.

It is proposed to develop the Point Douro site on the Leschenault Inlet. Following an initial appraisal of the fauna in February 2000, further information was sought by the Department of Environmental Protection. This report provides further information and summarises all the results to date.

The site is a peninsula at the mouth of the Collie River where it enters the Leschenault Inlet. Essentially the site can be divided into a terrestrial section which is proposed for development, and an area of samphire flats and mud flats which will not be developed.

The vegetation of the terrestrial section is severely degraded due to past use of the area as a farm. The current vegetation is completely dominated by weeds with only scattered individuals of native plants and a few poorly developed samphire areas. The soils are sandy in very low rises, giving way to muddy soils in the lowest points. The fauna is impoverished as a result of the poor condition of the habitat. An opportunistic survey recorded only seven species of reptiles, bird species which would be expected to occur in such a disturbed environment, and introduced mammals. Any rare species which may be present would be passing birds making incidental use of the site.

The vegetation of the wetter section is largely intact apart from tracks and the excavation of drains and canals. Weeds are not common except on the disturbed edges and spoil banks. The soils are muddy and give way to mud banks in the estuary. The terrestrial ground fauna is extremely sparse. A particular watch was kept for a rare and poorly known skink (*Glaphyromorphus 'kontoolasi'*)which was once recorded in similar habitat near Bunbury in 1966 but has not been seen since. It was not found. It is not known what other habitats this species occupied, and it may not have lived primarily in samphire flats. All or most of this wet habitat on Point Douro is inundated at times, and the adjacent terrestrial areas provide only poor quality habitat. Aquatic birds are common. Many species would be expected to be present including a series of small wading birds on the mud flats. While these small waders are not generally rare species, they are protected under international treaties and they are managed by habitat protection.

The value of the terrestrial part of the site for fauna is very limited. While it is conceivable that the skink which was once recorded near Bunbury could be present, the poor quality of the habitat gives this only a very low probability.

The value of the wetter part of the site for fauna is high. It is conceivable that the skink which was once recorded near Bunbury could be present, although searches in the general region have not found it, and its habitat and status are poorly known. The

value of the mud banks for the small wading birds has always been recognised, and there is no proposal to develop these areas. The proposed management of the project will protect the important values for the fauna.

2. INTRODUCTION.

It is proposed to develop the Point Douro site on the Leschenault Inlet. Following an initial appraisal of the fauna in February 2000, further information was sought by the Department of Environmental Protection. This report provides further information and summarises all the results to date.

Specifically the further information requested was:

- Carry out a survey for the possible presence of a rare and poorly known skink *Glaphyromorphus 'kontoolasi'* which was once recorded in similar habitat near Bunbury in 1966 but has not been since. This is now a Priority 1 species.

- Map the extent of the habitats available for aquatic birds.

The results of the further study are given here, and all results are summarised.

3. METHODS.

A one day visit was made to the site in February 2000, to examine the condition of the vegetation and record birds opportunistically. This happened to include a low tide interval.

In September another one day visit was made with two people to re-assess the previous interpretation, to record birds opportunistically, and to carry out an intensive opportunistic search for reptiles and in particular the skink (*Glaphyromorphus "kontoolasi"*). This second visit was carried out at a time of high water and the mud flats were not visible. The small wading birds are effectively not present in September as they are mainly summer migrants.

The extent of the different habitats available for aquatic birds was drawn from an aerial photograph.

4. RESULTS.

Description of the Site

Dryland area - This has a severely degraded vegetation, now reduced to scattered trees of *Eucalyptus rudis, Casuarina obesa* and *Melaleuca rhaphiophylla* with occasional shrubs of *Melaleuca*, two *Jacksonia* species and some ground cover species. Weeds are completely dominant. Most of the land has been used for grazing or otherwise cleared for farming activities or tracks, including a car racing track. The area is also intersected with spinner drains for mosquito control and deeper channels which were used for fish trapping.

Low lying areas - These areas are largely dominated by samphire (*Halosarcia* spp.) swards, some infested with weed species but most in good condition. Again, the area is disturbed by spinner drains and deeper channels with their associated spoil banks but with the more intact areas of vegetation remaining to the west of the site.

An initial description of the site was made in February 2000 with a further visit in September. The photographs which formed part of the original report are reproduced below.
The only additional information from the September visit was that it was clear that all or most of the wet area on the peninsula had been inundated recently. This is probably a normal winter event after storms and very high tides. The site has been mapped (Figure 1) into habitats of:

1. Terrestrial areas of low sandy rises with minor areas prone to flooding.

2. Samphire flats prone to flooding.

3. Bare mud flats and shallow water potentially suitable for small wading birds.

4. Deeper water used only by larger birds.

The ground search found no frogs, reptiles or mammals in the samphire flats themselves, but the species in Table 1 (below) were found in the terrestrial part including some parts very close to the samphire flats.

TABLE 1. Ground species found in the terrestrial part (zone 1 on Figure 1).

Species	Numbers of individuals
SKINK LIZARDS	
Acritoscincus trilineatum	10
Egernia sp (not caught)	1
Hemiergis quadrilineata	3
Menetia greyii	12
Tiliqua rugosa	1 (skin)
SNAKES	
Pseudonaja affinis (Dugite)	1
	2 (skins)
Ramphotyphlops australis (Blind Snake)	1
MAMMALS	
House Mouse	1
Black Rat	1
Rabbit	Numerous signs

PLATE 1. Typical severely disturbed dry area.

PLATE 2. Typical edge showing high value mud flats.

PLATE 3. Samphire area, prone to flooding, which favours the larger species.

PLATE 4. An old artificial channel, showing the sharp edges which give little wading bird habitat and the spoil banks now covered with weeds.

Birds were recorded opportunistically in both February and September. The complete list of 22 species recorded in the terrestrial part of the site is given in Table 2 (below).

TABLE 2. Birds recorded in the terrestrial part of the site.

Falco cenchroides	Nankeen Kestrel
Barnardius zonarius	Australian Ringneck
Todiramphus sanctus	Sacred Kingfisher
Malurus splendens	Splendid Fairy-wren
Pardalotus striatus	Striated Pardalote
Gerygone fusca	Western Gerygone
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Anthochaera carunculata	Red Wattlebird
Lichenostomus virescens	Singing Honeyeater
Ephthianura albifrons	White-fronted Chat
Pachycephala rufiventris	Rufous Whistler
Colluricincla harmonica	Grey Shrike-thrush
Grallina cyanoleuca	Magpie-lark
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Cracticus torquatus	Grey Butcherbird
Gymnorhina tibicen	Australian Magpie
Corvus coronoides	Australian Raven
Anthus novaeseelandiae	Richard's Pipit
Hirundo neoxena	Welcome Swallow
Hirundo nigricans	Tree Martin
Zosterops lateralis	Silvereye

The aquatic birds which were or might be found in the wetter parts of the site are listed in Appendix 2 in their preferred habitats but many would be found in the other habitats at times.

The Little Grassbird was recorded, and was common in September. It is not strictly aquatic but is only found in dense vegetation in wet places such as the edge of the peninsula (see Plate 2). A few other species may also occur in this habitat along the edge of the estuary.

5. DISCUSSION.

Habitats, and fauna present.

In terms of fauna habitat, the site can be divided into a terrestrial section which has severely degraded vegetation (Plate 1), and a wet area which can be divided into samphire flats which are prone to flooding (Plate 3), bare mud flats (Plate 2), and deeper water (Plate 4).

The ground fauna of the terrestrial part is impoverished with a ground search revealing only seven reptiles (Table 1), all of them common and widespread species which would be expected to occur in such a habitat. No frogs were found. The only mammals found were the ubiquitous introduced species of mice, rats and rabbits. Similarly the bird fauna (Table 2) is dominated by widespread and opportunistic species able to make use of such an environment, and a few passing individuals of other species making use of some features such as the trees.

The wetter areas are essentially intact, and only the samphire flats are disturbed with various drains, channels and spoil banks (Plate 4). A search revealed a complete absence of any frogs, reptiles or mammals, and probably few if any species occur there. In particular a search was carried out for the skink *Glaphyromorphus "kontoolasi"* which was recorded once in 1966 near Bunbury in a samphire flat, but has never been seen since despite specific searches in the general region by the W.A. Museum. These wet areas can be expected to support a good aquatic bird fauna with differences in species distribution between the vegetated areas, bare mud flats and deeper water (Appendix 2).

Rare species.

A search was carried out of the CALM Rare Fauna Database for the entire Leschenault Inlet region. This produced records of the following non-marine species:

Schedule 1.
Chuditch (*Dasyurus geofroii*)
Western Ringtail Possum (*Pseudocheirus occidentalis*)
Baudin's Cockatoo (*Calyptorhynchus baudinii*)

Schedule 4.
Peregrine Falcon (*Falco peregrinus*)
Carpet Python (*Morelia spilota imbricata*)

Priority 3.
Brush-tailed Phascogale (*Phascogale tapoatafa*)

Priority 4.
Quenda (*Isoodon obesulus*)
Western Brush Wallaby (*Macropus irma*)

None of these terrestrial species would be found on the site considered here because the habitat is so poor and isolated, and the birds would be present only as incidental individuals overhead.

The only other species which might be present is the skink *Glaphyromorphus "kontoolasi"* (a Priority 1 species) which was recorded once in 1966 in a samphire flat near the Preston River when three individuals were collected. It has not been seen since despite specific searches in the general region. This species is very poorly known and it is not known if samphire flats were its preferred habitat or whether it was simply recorded there because most other low-lying areas have been cleared in the Bunbury area. Its nearest relative, which is very similar in body shape, is typical of wet areas and dense vegetation. It is conceivable that this species is present in the site considered here, although it was not found. The samphire areas are prone to inundation and the adjacent terrestrial habitat is degraded, but there is a thin strip of vegetation along the estuary which would give some potential for the site to be part of a larger area of habitat. There is only a very small chance that this species is present on the site considered here.

The wet areas, particularly the mud flats, have a large bird fauna including a series of trans-equatorial migrants (Appendix 2). These species are protected under international agreements (JAMBA, CAMBA), but none have a gazetted Schedule 1 or 4 rare status and only the Eastern Curlew and Hooded Plover have any classified conservation status (Priority 4). The occurrence of these species has been well known for many years, and was well documented for the adjacent Pelican Point development (Ninox Wildlife Consulting 1990). The Ninox report drew on an extensive previous survey of the Leschenault Inlet. It showed that while there was a very large bird fauna present, this was largely restricted to the wet areas, with only 4% of the individuals recorded within the landward boundary. The flooded samphire areas and channels were the most significant land habitat, mainly for the larger birds, while the mud flats were more significant for the smaller species including the trans-equatorial migrants. A survey of the site considered here will only confirm these general conclusions.

The species listed as protected under international treaties are not necessarily rare species, but require protection in more than one country if they are to be conserved. They are managed locally by habitat protection. The high conservation value of the estuary and in particular the mud flats has been recognised for many years and included in the design of the project.

Environmental management.

Douro Point was part of the System 6 site C66, but its status as private property was always recognised and joint management with owners rather than purchase was accepted as likely. In the 1993 EPA Status Report this part of C66 was described as "intent being met" on the basis that appropriate restrictions were being applied on developments.

The proposed development (see Figure 1) will protect the main fauna values and probably enhance the long term conservation of the site for fauna by:

- Formalising access to the site via development on the terrestrial area.
- Planting in and around the dry areas proposed for development which will enhance the value of the site for the bird fauna at least, although these species are not of high conservation significance.
- Preserving most of the wet areas including all of the mud flats which are of high conservation value.
- Isolating the wet areas and mud flats from existing disturbance and proposed development by including a wall and screening vegetation of indigenous species along the edges. This is necessary as many of the smaller wading bird species are disturbed by people and dogs and can be driven from sites by excessive disturbance.
- Creating some new edges along the canal, although these will be of much less value than the natural mud flats with very gentle slopes which are feeding and resting habitat (see Plates 2 and 4).

In summary, the proposed development will:

- Have low direct impacts on the fauna regionally as a result of clearing of the low quality habitat
- Have low direct impacts on the fauna regionally because the high value habitats will be protected.
- Have low long term impacts on the fauna of the high conservation wet areas provided that the wet areas are isolated and screened sufficiently to prevent excessive disturbance.

Environmental management.

Douro Point was part of the System 6 site C66, but its status as private property was always recognised and joint management with owners rather than purchase was accepted as likely. In the 1993 EPA Status Report this part of C66 was described as "intent being met" on the basis that appropriate restrictions were being applied on developments.

The proposed development (see Figure 1) will protect the main fauna values and probably enhance the long term conservation of the site for fauna by:

- Formalising access to the site via development on the terrestrial area.
- Planting in and around the dry areas proposed for development which will enhance the value of the site for the bird fauna at least, although these species are not of high conservation significance.
- Preserving most of the wet areas including all of the mud flats which are of high conservation value.
- Isolating the wet areas and mud flats from existing disturbance and proposed development by including a wall and screening vegetation of indigenous species along the edges. This is necessary as many of the smaller wading bird species are disturbed by people and dogs and can be driven from sites by excessive disturbance.
- Creating some new edges along the canal, although these will be of much less value than the natural mud flats with very gentle slopes which are feeding and resting habitat (see Plates 2 and 4).

In summary, the proposed development will:

- Have low direct impacts on the fauna regionally as a result of clearing of the low quality habitat
- Have low direct impacts on the fauna regionally because the high value habitats will be protected.
- Have low long term impacts on the fauna of the high conservation wet areas provided that the wet areas are isolated and screened sufficiently to prevent excessive disturbance.

Monitoring.

The only monitoring required would be to confirm that the design aims have been met and that there is extensive use of the wet sites, particularly the mud flats, by birds after construction. A quantitative study of a single small site is difficult because the bird species and numbers are erratic in response to tide, weather and season.

APPENDIX 1. Copy of the initial report on the fauna of the site (February 2000). The photographs of this report are reproduced above as pages 6 and 7 in the text of the main report.

23/2/00

Gutteridge Haskins and Davey Pty Ltd
P.O. Box Y3106
Perth 6832

Attn: Anna Napier

Point Douro Peninsula, fauna.

Dear Anna

I examined the site in accordance with the DEP guidelines and letter.

For fauna habitat, the site can be divided into two sections:

1. The dry land part. This has a severely degraded vegetation, now reduced to scattered trees of *Eucalyptus rudis*, *Casuarina obesa* and Melaleucas with a few shrubs of Melaleucas, two *Jacksonia* species and a few other species, and a few sedge-like species. Weeds are completely dominant. There are a few low-lying areas with samphires. Most of it has been cleared and grazed, or built on. There are also old tracks and drains. The fauna is impoverished in accordance with the degraded condition of the vegetation. The surviving fauna will be restricted to widespread and opportunistic species able to make use of such an environment, and a few passing individuals. On a series of transects I recorded only the following birds:

Kestrel
Splendid Fairy-Wren
Yellow-rumped Thornbill
Singing Honeyeater
Grey Shrike-Thrush
Willie Wagtail
Raven
Pipit
Welcome Swallow

This is a fauna typical of disturbed sites in this region. There are probably some frog species, a few reptile species, but no native mammals except bats overhead.

This area has very poor conservation value for fauna and almost no potential for rare species except for occasional passing individuals overhead such as Peregrine Falcons and Cockatoos.

2. The low-lying areas of samphires and the associated mud flats.

The peninsula has been severely altered by drainage and the construction of banks over a long time, possibly for drainage, flood control and mosquito control. In one area there is a set of channels which may be the remains of some past development. Despite these disturbances the vegetation is largely intact. Weeds are restricted to the more disturbed parts. In general the condition improves towards the end of the peninsula where there is more wet land. The most obvious impact is the creation of new channels with water, and banks of soil.

On a series of transects I recorded the following birds:

Black Swan
Black Duck
Darter
Little Black Cormorant
Little Pied Cormorant
Pied Cormorant
Pelican
White-faced Heron
Great Egret
Little Egret
Australian White Ibis
Yellow-billed Spoonbill
Eastern Curlew
Common Greenshank
Red-necked Stint
Pied Oystercatcher
Pacific Golden Plover
Red-capped plover
Silver Gull
Fairy Tern
Caspian Tern
Little Grassbird

This is part of the very large water bird fauna which would be expected to occur, and many other species would be found by a longer survey. In general the larger species occur more commonly in the flooded areas of samphires, while the smaller wading species are restricted to the mudflats. The survey was carried out at low tide when it happened that most of the smaller wading birds were off-shore and were not present or could not be identified with any certainty.

The wet areas probably have very few frogs and reptiles, and no native mammals except possibly the Water Rat, and bats overhead.

The wet areas, particularly the mud flats can be expected to have a large bird fauna. This includes a series of trans-equatorial migrants which are protected under international agreements, but there are few species with a classified conservation status, and probably none with a gazetted rare status. This has been well known for many years, and was well documented for the adjacent Pelican Point (Ninox Wildlife Consulting 1990). The Ninox report drew on an extensive previous survey of the Leschenault Inlet. It showed that while there was a very large bird fauna present, this was largely restricted to the wet areas, with only 4% of the individuals recorded within the landward boundary. The flooded samphire areas and channels were the most significant land habitat, mainly for the larger birds, while the mud flats were more significant for the smaller species including the trans-equatorial migrants.

There is no need to carry out a new detailed fauna survey of the Point Douro site as the bird fauna will not have changed, and the high conservation values of the estuary and associated wet areas are well known and recognised, and have increased over time as the value of wet areas has become more generally appreciated.

It should be noted that the species listed as protected under international treaties are not rare species, but require protection in more than one country if they are to be conserved. They are managed locally by habitat protection.

A search was carried out of the CALM Rare Fauna Database for the entire Leschenault Inlet region. This produced records of the following non-marine species:

Schedule 1.
Chuditch (*Dasyurus geofroii*)
Western Ringtail Possum (*Pseudocheirus occidentalis*)
Baudin's Cockatoo (*Calyptorhynchus baudinii*)

Schedule 4.
Peregrine Falcon (*Falco peregrinus*)
Carpet Python (*Morelia spilota imbricata*)

Priority 3.
Brush-tailed Phascogale (*Phascogale tapoatafa*)

Priority 4.
Quenda (*Isoodon obesulus*)
Western Brush Wallaby (*Macropus irma*)

None of these terrestrial species would be found on the site considered here because the habitat is so poor and isolated, and the birds would be present only as incidental passing individuals overhead.

Douro Point is part of the System 6 site C66, but its status as private property was always recognised and joint management with owners rather than purchase was accepted as likely. In the 1993 EPA Status Report this part of C66 was described as "intent being met" on the basis of appropriate restrictions on developments.

The fauna habitat values are best summarised in the attached photographs (Plates 1-4).

From the point of view of the fauna, the proposed development will both protect the main fauna values and probably enhance the long term conservation of the fauna. This is being achieved by:

- The dry land habitats being lost are of low conservation value.
- Planting in and around the dry areas proposed for development will enhance the vale of the site for the bird fauna at least, although these species are not of high conservation significance.
- The wet areas and mud flats of high conservation value are being largely preserved.
- The wet areas and mud flats are being largely isolated from disturbance. This is necessary as many of the smaller species are readily disturbed by people and dogs when they are too close.
- Some creation of new edges, although these will be of less value than the natural mud flats with very gentle slopes.

The only improvements which could be made would be to include screening vegetation of indigenous species along the edges, particularly opposite the mud flats, and within the conservation area to give the artificial channels low sloping sides as far as possible rather than abrupt edges of lesser value (see Plate 4). Sloping edges are not needed in the developed area.

The DEP letter mentions a baseline survey to determine the effect following development. This is not needed as the bird fauna is well known and is part of a very large fauna using the estuary. The fauna can only be protected by good design of the development, and if monitoring shows that the high values have been lost it will too late to remove the development. The only monitoring required would to confirm that the design aims have been met and there is extensive use of the wet sites by the birds after construction.

Please do not hesitate to contact me if you require any further information.

Yours faithfully

Dr Ray Hart

REFERENCE:

Ninox Wildlife Consulting (1990). Waterbird and Terrestrial Vertebrates of the Proposed Pelican Point Resort Development. Report to LeProvost Environmental Consultants, July 1990.

APPENDIX 2. List of aquatic bird species found or which could be expected to occur in their preferred habitats (Figure 1) of Samphire flats (2), Mud flats (3), and Deeper water (4).

Species actually seen at some time are identified by "S".

			2.	3.	4.
ANATIDAE					
Biziura lobata	Musk Duck				X
Cygnus atratus	Black Swan	S			X
Tadorna tadornoides	Australian Shelduck	S			X
Anas superciliosa	Pacific Black Duck	S			X
Anas gibberfrons	Grey Teal	S			X
PODICIPEDIDAE					
Tachybaptus novaehollandiae	Australasian Grebe				X
Poliocephalus poliocephalus	Hoary-headed Grebe				X
Podiceps cristatus	Great Crested Grebe				X
ANHINGIDAE					
Anhinga melanogaster	Darter	S			X
PHALACROCORACIDAE					
Phalacrocorax melanoleucos	Little Pied Cormorant	S			X
Phalacrocorax varius	Pied Cormorant	S			X
Phalacrocorax sulcirostris	Little Black Cormorant	S			X
Phalacrocorax carbo	Great Cormorant	S			X
PELECANIDAE					
Pelecanus conspicillatus	Australian Pelican	S			X
ARDEIDAE					
Ardea novaehollandia	White-faced Heron	S	X	X	
Egretta garzetta	Little Egret	S	X	X	
Egretta sacra	Eastern Reef Egret		X	X	
Ardea pacifica	White-necked Heron	S	X	X	
Ardea alba	Great Egret	S	X	X	
Ardeola ibis	Cattle Egret		X	X	
THRESKIORNITHIDAE					
Plegadis falcinellus	Glossy Ibis		X	X	
Threskiornis molucca	Australian White Ibis	S	X	X	
Threskiornis spinicollis	Straw-necked Ibis		X	X	
Platalea regia	Royal Spoonbill		X	X	
Platalea flavipes	Yellow-billed Spoonbill	S	X	X	
RALLIDAE					
Fulica atra	Eurasian Coot				X
SCOLOPACIDAE					
Gallinago hardwickii	Latham's Snipe		X		
Gallinago stenura	Pin-tailed Snipe		X		
Limosa limosa	Black-tailed Godwit			X	
Limosa lapponica	Bar-tailed Godwit			X	
Numenius phaeopus	Whimbrel			X	
Numenius madagascariensis	Eastern Curlew	S		X	

			2.	3.	4.
Tringa stagnatilis	Marsh Sandpiper			X	
Tringa nebularia	Common Greenshank	S	X	X	
Tringa glareola	Wood Sandpiper		X	X	
Xenus cinereus	Terek Sandpiper			X	
Actitis hypoleucos	Common Sandpiper			X	
Heteroscelus brevipes	Grey-tailed Tattler			X	
Arenaria interpres	Ruddy Turnstone			X	
Calidris tenuirostris	Great Knot			X	
Calidris canutus	Red Knot			X	
Calidris alba	Sanderling			X	
Calidris ruficollis	Red-necked Stint	S	X	X	
Calidris subminuta	Long-toed Stint			X	
Calidris melanotos	Pectoral Sandpiper		X	X	
Calidris acuminata	Sharp-tailed Sandpiper		X	X	
Calidris ferruginea	Curlew Sandpiper		X	X	
Limicola falcinellus	Broad-billed Sandpiper		X	X	
Philomachus pugnax	Ruff			X	
Phalaropus lobatus	Red-necked Phalarope		X	X	
HAEMATOPODIDAE					
Haematopus longirostris	Pied Oystercatcher	S	X	X	
Haematopus fuliginosus	Sooty Oystercatcher		X	X	
RECURVIROSTRIDAE					
Himantopus himantopus	Black-winged Stilt		X		
Cladorhynchus leucocephalus	Banded Stilt		X	X	
Recurvirostra novaehollandiae	Red-necked Avocet		X		
CHARADRIIDAE					
Pluvialis fulva	Pacific Golden Plover	S	X	X	
Pluvialis squatarola	Grey Plover		X	X	
Charadrius ruficapillus	Red-capped Plover	S	X	X	
Charadrius bicinctus	Double-banded Plover		X	X	
Charadrius dubius	Little Ringed Plover			X	
Charadrius mongolus	Lesser Sand Plover		X	X	
Charadrius leschenaultii	Greater Sand Plover		X	X	
Elseyornis melanops	Black-fronted Dotterel		X	X	
Thinornis rubricollis	Hooded Plover		X	X	

			2.	3.	4.
LARIDAE					
Larus pacificus	Pacific Gull				X
Larus novaehollandiae	Silver Gull	S			X
Sterna nilotica	Gull-billed Tern				X
Sterna caspia	Caspian Tern	S			X
Sterna bergii	Crested Tern	S			X
Sterna dougallii	Roseate Tern				X
Sterna nereis	Fairy Tern	S			X
Sterna anaethetus	Bridled Tern				X
Chlidonias leucopterus	White-winged Black Tern				X
SYLVIIDAE					
Megalurus gramineus	Little Grassbird	S	X		

Appendix H

Report of an Ethnographic Survey

REPORT ON AN ARCHAEOLOGICAL INVESTIGATION

FOR ABORIGINAL SITES

POINT DOURO PENINSULA DEVELOPMENT

Prepared for Gutteridge Haskins & Davey Pty Ltd

By Gary Quartermaine

August 1998

2.0 ARCHAEOLOGICAL CONTEXT

2.1 Previous Archaeological Research

The earliest evidence for prehistoric occupation of the South-West of Australia is dated at 38,000 years ago, for a stratified site at Upper Swan, located 25 km northeast of Perth (Pearce and Barbetti, 1981). Two other sites in the south-west have also yielded Pleistocene dates, Devil's Lair and Helena River. A number of Holocene sequences have yielded data on possible cultural/environmental changes during, and after, the recent transgression of the sea, for the metropolitan region (see Clarke and Dortch, 1977; Hallam, 1974; and Pearce, 1978). This work postulates increased populations on the Coastal Plain, rising to a peak just before European contact.

Devil's Lair, a cave site in aeolian limestone 20km north of Cape Leeuwin in the Leeuwin-Naturalist Block, has yielded Pleistocene dates in the order of 30,000 years ago. A date of 31,400+/-15,000 years ago has been obtained for a sample taken from above two occupation features and artefact assemblages. The upper-most level that is believed to contain in situ archaeological material has a date of 6,490+/-145 years ago. Archaeological assemblages from this site contain a variety of mammal, bird and reptile species, mussel and emu shell, a number of different stone artefacts and a range of diverse bone tools. Some of the stone tools have a dark staining that may indicate hafting with gum (Dortch and Merrilees, 1973; and Dortch, 1977).

As part of a regional survey of the Metropolitan area, Hallam (1986:5) concludes that the majority of sites lie around the lakes and swamps of the Swan Coastal Plain, and that site numbers double in the last few hundred years. Four phases of occupation are suggested for the Coastal Plain. These are:

a. Early - low number of sites centred towards coast. Artefacts include steep scrapers on flakes and scrapers made from an Eocene fossiliferous chert. This phase was up to 5000 years ago.

b. Middle - from 5000 - 500 years ago. Showed a contraction of occupation to sites near permanent water. Artefacts were made on quartz and green chert and included backed blades, adzes, scrapers and flakes.

c. Late - from 500 years ago. Concentration of sites on the Coastal Plain. Fabricators (bipolar cores) were introduced and a large percentage of assemblages were made up of quartz flakes, chips and debitage (Hallam, 1974 and 1986).

d. Final - post European contact and settlement. Use of introduced materials, such as glass, pottery and clay pipes, for the manufacture of artefacts.

Prehistoric stone tool industries in the South-West have been classified into earlier and later phases (Dortch, 1977). The early phase industries have only been documented from a few well-dated sites. They include small thick flake scrapers, bipolar cores, notched-denticulated pieces, flakes from discoidal cores, and single and multi-platform cores.

These artefacts have been manufactured from a range of lithic materials, including a distinctive Eocene fossiliferous chert. It appears that access to this chert was lost after the last marine transgression (Dortch, 1977; and Glover, 1975).

Later phase stone industries, generally found in archaeological contexts dating from 4,000 years ago, include the addition of geometric microliths, backed blades, and a variety of adze flakes, which are part of the Australian "small tool tradition" (Dortch, 1977; and Mulvaney, 1975).

Anderson (1984) has proposed a land-use model for prehistoric exploitation of the Swan Coastal Plain, and its hinterland, based on regional research into the relative proportions of variously sized surface artefact scatters and their associated artefact densities. This model suggests that, due to the variation in resources available in the three different environmental zones investigated, there was more intensive use of the coastal plain than either the adjacent forest or open woodland plateau.

The seasonal movement of Aboriginal groups relates to the exploitation of the various resources available in the different environmental situations.

Hallam (1986) concludes that Aborigines congregated around the estuaries and lagoons of the coastal plain in the summer and dispersed, in small groups, in winter through a wider hinterland which included the area of the Darling Scarp and Plateau.

Bunbury (Bunbury and Morrell, 1930:79), while in the vicinity of the Leschenault Estuary, met a large party of Aborigines in the northern part and another party of 100-200 men and boys further south in the early days of European settlement.

2.2 Archival Research

The *Aboriginal Heritage Act* 1972 (as amended) is administered by Aboriginal Affairs Department's Division of Heritage and Culture. The AAD maintains a Register in the form of a computerised data data base of reported Aboriginal sites. Each reported Aboriginal site is designated by a site number, basic category (ethnographic and /or archaeological) and type (e.g. engravings, ceremonial, artefacts, etc) and its position is recorded as 1,000 metre x 1,000 metre square based on the Australian Metric Grid coordinates.

As a result of previous surveys and independent research, six archaeological sites have been recorded and registered with the W.A. Museum within two kilometres of the proposed development (Brown, 1984; O'Connor, et al, 1989; Quartermaine, 1990, 1995, 1996) None of these sites are within the project area (see Table 1). All of these sites are artefact scatters. The artefact sites are all in road cuttings or disturbed sand areas. They are all on the south side of the Collie River.

TABLE 1 : REGISTERED ARCHAEOLOGICAL SITES

Site No.	Grid Ref. SI50-6	Site type	Site Name
S1740	378.6312	Artefacts	Bunbury 01
S1741	378.6312	Artefacts	Bunbury 02
S1744	378.6312	Artefacts	Bunbury 05
S1952	378.6312	Artefacts	Australind Bypass Road 1
S2611	378.6313	Artefacts	Estuary Drive 1
S2612	378.6313	Artefacts	Estuary Drive 2

From the existing information, it is possible to make the following conclusions:

1. Small, low density surface artefact scatters are the most numerous archaeological sites.

2. Quartz is the dominant lithic material used for the manufacture of artefacts.

3. Flakes and chips form the major class of artefact types in the artefact assemblages.

4. River margins, swamp margins, and areas of devegetated sand are the main site locations.

3.0 METHODS

3.1 Obligations under the Act

The Western Australian *Aboriginal Heritage Act*, 1972, makes provision ...

"... for the preservation on behalf of the community of places and objects customarily used by or traditional to the original inhabitants of Australia or their descendants, or associated therewith, and for other purpose incidental thereto."

The Act defines the obligations of the community relating to sites (see Appendices 1 & 2).

An archaeological survey is aimed at identifying the effects of proposed disturbance of the physical environment on historic and pre-historic Aboriginal sites. In recognition of the significance of this area to living Aboriginal people, an investigation of Aboriginal interests was conducted by Rory O'Connor.

The consultant is obliged to submit site documentation on appropriate forms for lodgement and submission to the Heritage and Culture Division, Aboriginal Affairs Department, for any newly recorded Aboriginal sites.

3.2 Survey Design

The survey design involved the following stages of operation.

i) Background research - this involved familiarisation with AAD Aboriginal site files, survey reports, plus maps and environmental information for the area to be surveyed. Previously recorded Aboriginal sites, registered with the AAD, are listed in Table 1.

ii) Survey strategy - this consisted of a systematic survey of the project area.

The field survey was completed using 1:20,000, 1:100,000, and 1:250,000 topographic maps of the area and plans of the development area. The survey was conducted by gaining access to the area by vehicle and then undertaking pedestrian transects.

Meandering traverses were made on foot within the designated survey area. Because of the good surface visibility, it was possible to inspect a large section of the area that was not water-logged. It is considered that at least 50% was covered and all potential archaeological site locations were checked during the field inspection.

Access was possible to most parts of the survey area by foot. Surface visibility varied depending on the vegetation cover and disturbance but was restricted to those areas not water-logged. Disturbance was from now removed buildings, tracks and rubbish dumping. Parts of the area were samphire covered saline flats with the entire area being of very low relief.

3.3 Site Definitions

Aboriginal material culture is based, to a large extent, on non-durable materials, such as wood, bark, fibre and skins, that have a limited life in the archaeological record. Stone tools, conversely, remain as often the only evidence of prehistoric activity. Bone, either as a tool, as refuse, or as a burial, falls somewhere between these extremes. Lofgren (1975:7) describes spears, spear-throwers and clubs for men, and digging sticks, wooden carrying dishes and grindstones for women, as the basic implements of Aboriginal life.

Therefore, stone artefact sites reflect only one aspect of Aboriginal material culture which utilised a wide range of materials from the natural environment.

For the purpose of this investigation, an archaeological site is defined as "any place containing traces of past human activity" (Fagan, 1980:7). This is manifested in a number of different site components which may occur singularly or with one or more of the others to form an archaeological site. The most common of these are surface artefact scatters, quarries, art sites, stone arrangements, rockshelters with evidence of occupation, grinding patches, shell middens, burials and marked trees.

An artefact scatter is recorded as a site if it contains a concentration of artefacts in association, three or more with a density of at least 1/100m^2. Areas of solitary artefacts, called Isolated Finds, are recorded but not reported as Aboriginal sites.

The above definition of archaeological sites is a scientific definition. The assessment as to whether such sites are covered by the provisions of the W.A. *Aboriginal Heritage Act*, 1972, Section 5, is made for the Trustees of the W.A. Museum by the Aboriginal Cultural Material Committee. Such assessment is undertaken as part of a Section 18 application for site disturbance. When sites are discussed in this report, it is in the context of the scientific definition and not Section 5 of the above Act.

4.0 RESULTS

No archaeological sites were di scovered within the designated survey area, nor were there any previously recorded sites in the immediate vicinity.

Conditions of site discovery were very good. Surface visibility was good on the sandy surface, which covered most of the survey area that was not water-logger samphire flats.

It is considered that any major archaeological sites would have been located given the size, environment and disturbed nature of the project area.

5.0 CONCLUSIONS

5.1 Discussion

This report documents an archaeological survey for Aboriginal sites of the Proposed Point Douro Peninsula Development and was commissioned by Gutteridge Haskins & Davey Pty Ltd.

The project area is situated in Clifton Park, Bunbury, and encompasses an area of land on the Point Douro peninsula. It is bounded by the Collie River on the south side and the Old Coast Road on the east side. The remainder abuts Leschenault Inlet. The maximum dimensions are 800 metres NW/SE and 450 Metres SW/NE. It is comprised of Lot 5 and encompasses 21.777 hectares of land.

Field conditions were reasonable. Surface visibility varied according to the density of surface vegetation but was good,. Much of the area has already been disturbed by recreational activities.

The archaeological survey involved an investigation of previous research in the area, a sample field survey of the project area, and the recording of any archaeological material located.

The field survey involved a series of traverses across the project area, using the existing roads and tracks as reference points. The sample survey covered at least 50% of the area and, based on the results, it is considered that any major archaeological sites would have been located.

As a result of the field survey, no archaeological sites were located within the designated survey area. The results of the investigation are consistent with the model outlined in Section 2.2. Sites are usually associated with features in the landscape, such as water sources, rockshelters or lithic outcrops. The majority of the survey area has been disturbed and has a low potential to contain archaeological sites.

5.2 Recommendations

The recommendations which follow are based on field observations and investigations of previously recorded sites in area.

1. In the light of the present investigation, given the small size and the disturbed nature of the project area, it is considered that no further archaeological work is warranted. It is recommended that the development may proceed.

2. It is pointed out that human interference to Aboriginal sites is an offence, unless authorised under the Act, as outlined in Section 17 of the W.A. *Aboriginal Heritage Act*, 1972. Therefore, it is recommended that the Developers take adequate measures to inform any project personnel of this requirement.

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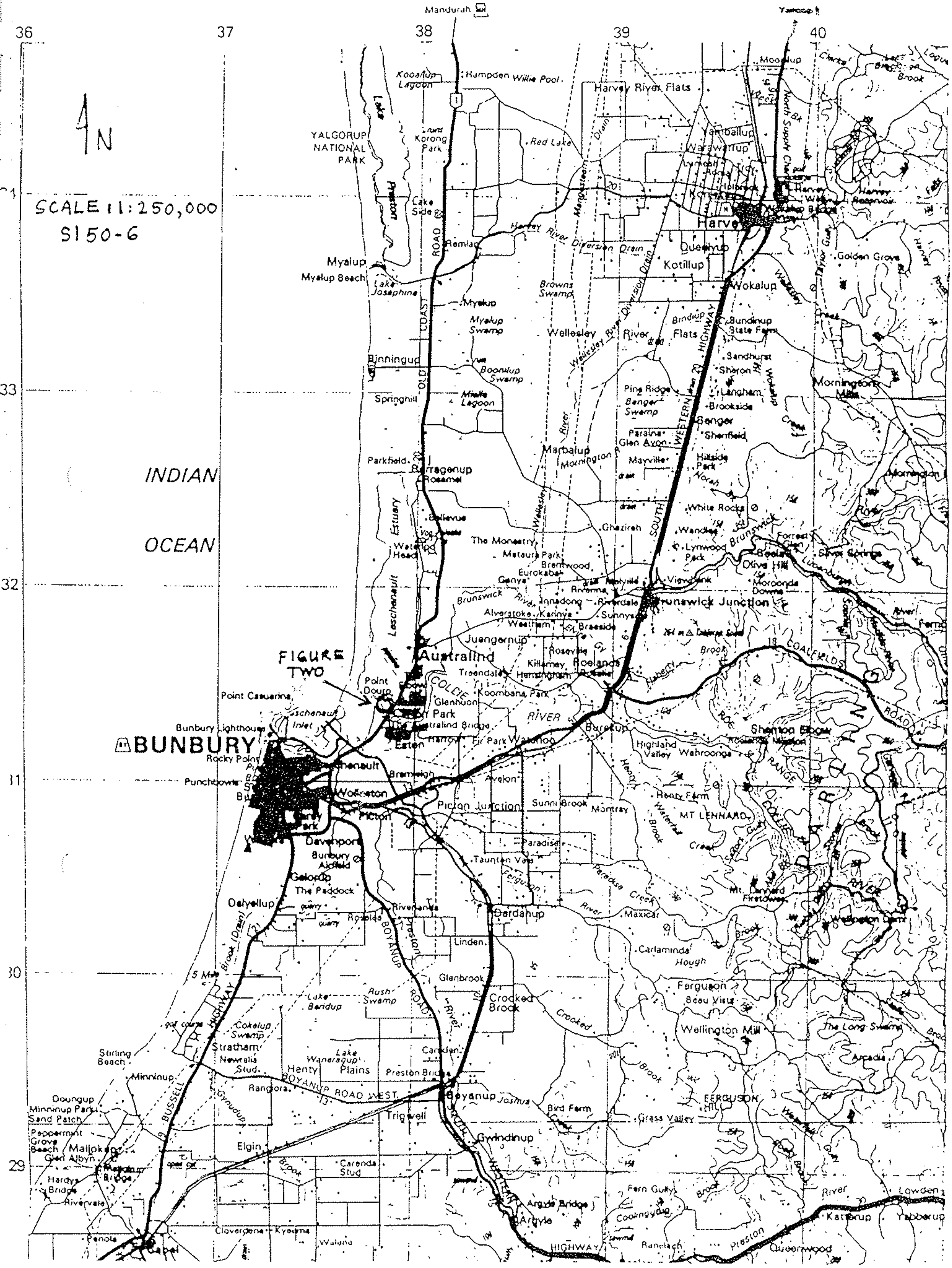
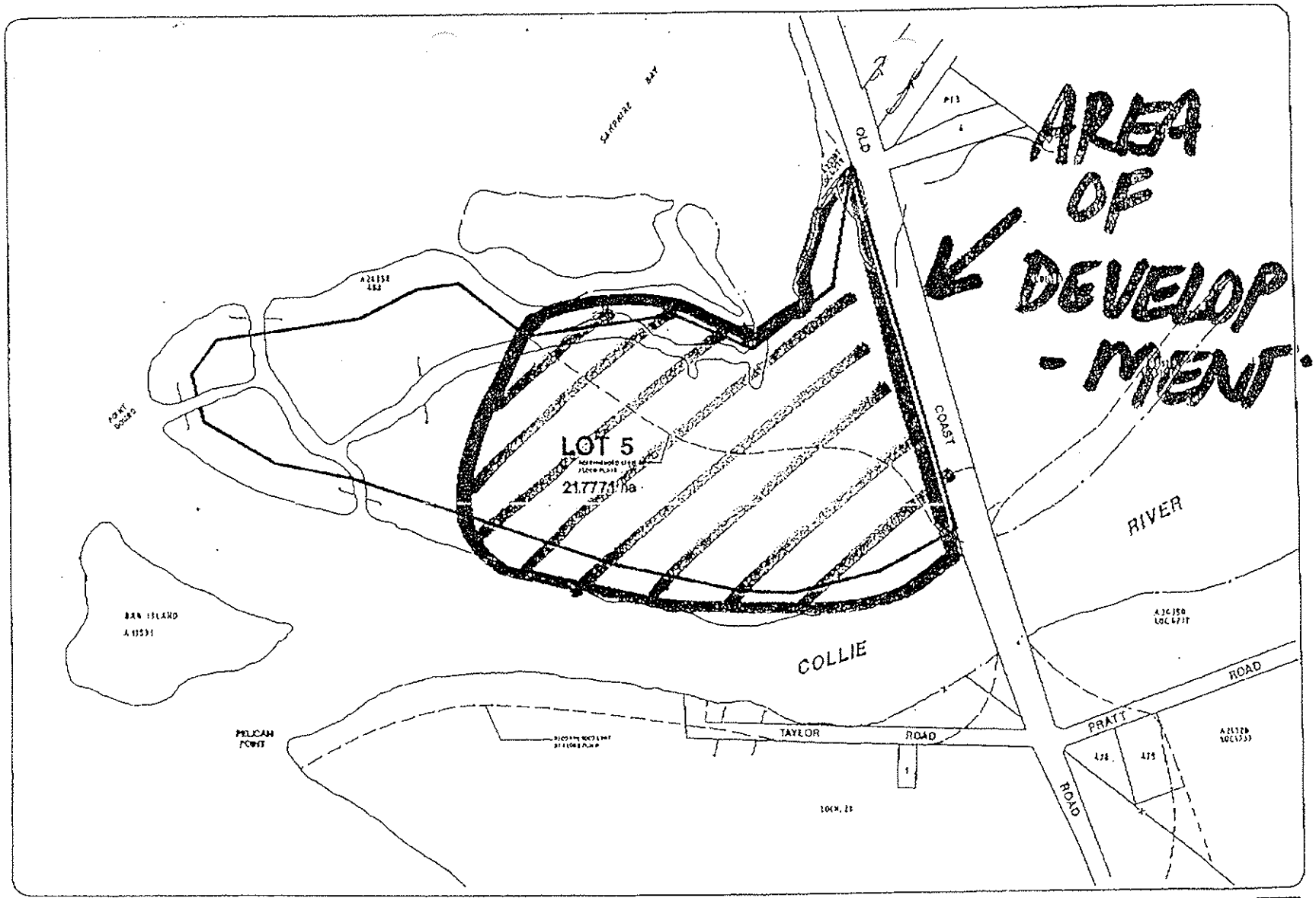


FIGURE 1 : Locality Plan



PLAN SHOWING EXISTING LOT BOUNDARY AND OWNERSHIP

Gutteridge Haskins and Davey Pty Ltd

Urban and environmental planners

FIGURE 2

PHOTO RECORD OF POINT DOURO

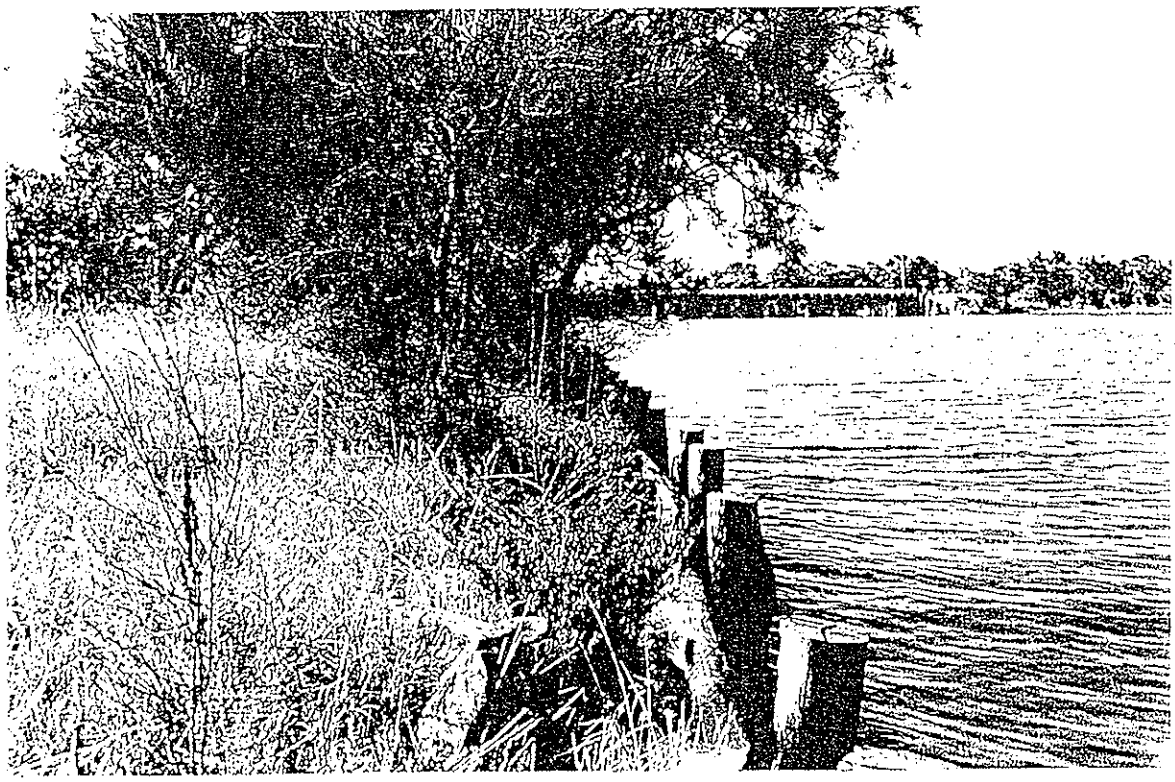


PLATE 1 : Foreshore treatments to Collie River demonstrates the level of historical modifications to the banks

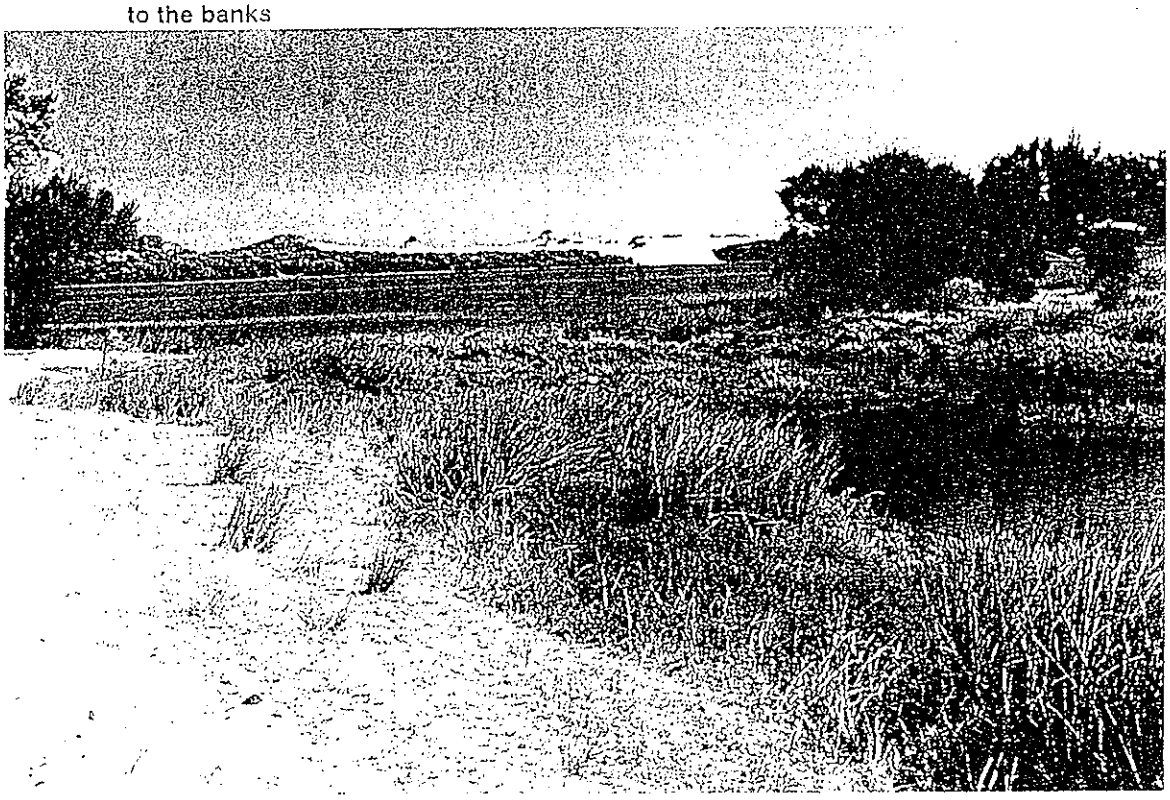


PLATE 2 : Typical samphire heathland present at the end of the Point.

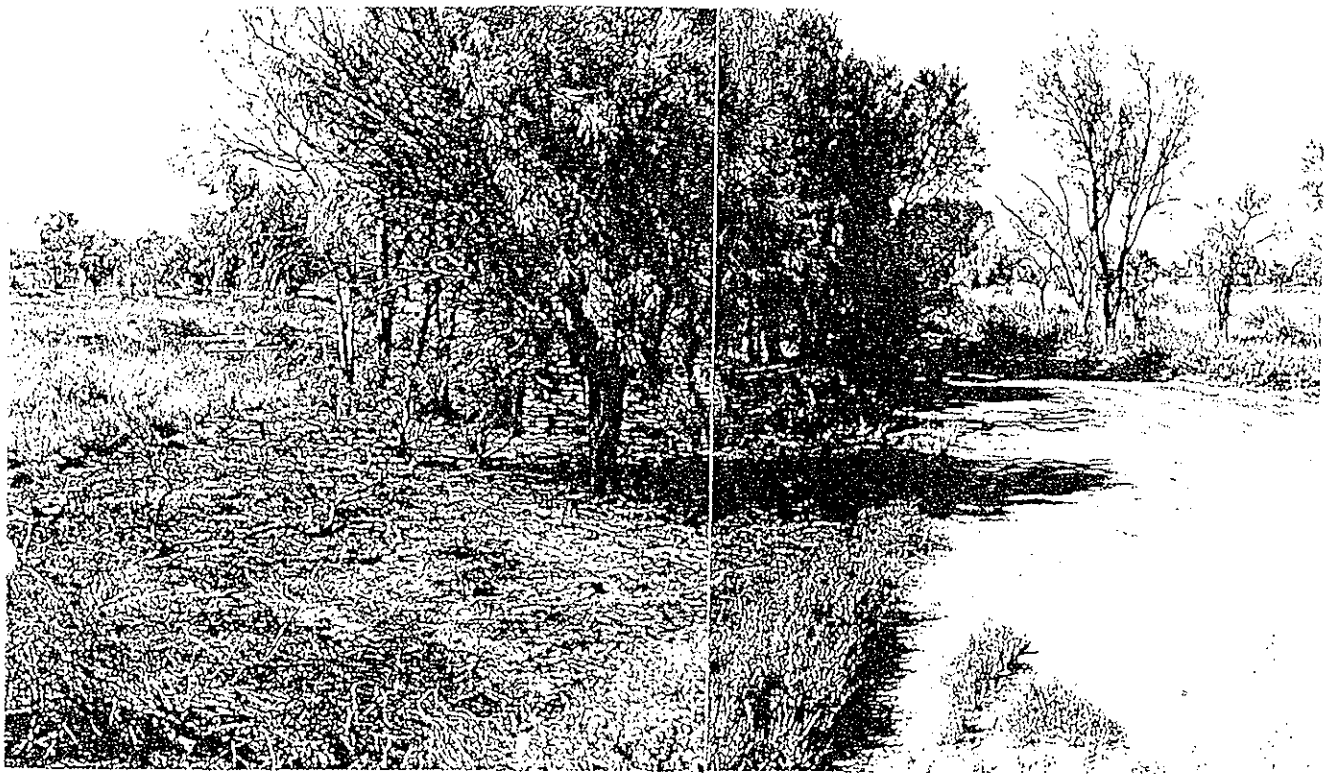


PLATE 3 : Land cleared from vehicle use and evidence of camp fires.

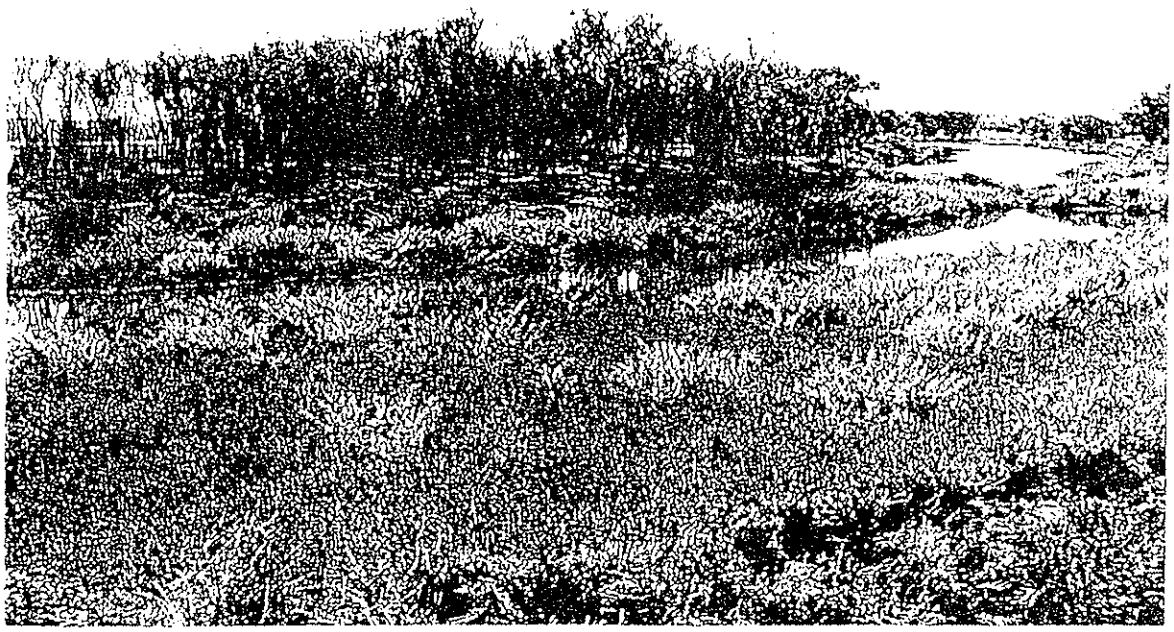


PLATE 4 : Recently burnt Samphire and scrub. The whole of the Peninsula experiences frequent bush fires thought to originate mainly from camp fires.

APPENDICES

APPENDIX 1

OBLIGATIONS RELATING TO SITES UNDER THE ABORIGINAL HERITAGE ACT, 1972

Report of Findings

"15. Any person who has knowledge of the existance of anything in the nature of Aboriginal burial grounds, symbols or objects of sacred, ritual of ceremonial significance, cave or rock paintings or engravings, stone structures or arranged stones, carved trees, or of any other place or thing to which this Act applies or to which this Act might reasonably be suspected to apply shall report its existance to the Registrar, or to a police officer, unless he has reasonable cause to believe the existance of the thing or place in question to be already known to the Registrar."

Excavation of Aboriginal Sites

"16. (1) Subject to Section 18, the right to excavate or to remove any thing from an Aboriginal site is reserved to the Registrar.

(2) The Registrar, on the advice of the Committee, may authorise the entry upon and excavating of an Aboriginal site and the examination or removal of any thing on or under the site in such manner and subject to such conditions as the Committee may advise."

Offences Relating to Aboriginal Sites

"17. A person who-

(a) Excavates, destroys, damages, conceals or in any way alters any Aboriginal site; or

(b) In any way alters, damages, removes, destroys, conceals, or who deals with in a manner not sanctioned by relevant custom, or assumes the possession, custody or control of, any object on or under an Aboriginal site,

commits an offence unless he is acting with the authorisation of the Registrar under Section 16 or the consent of the Minister under Section 18."

Consent to Certain Uses

"18. (1) For the purposes of this section, the expression "the owner of any land" includes a lessee from the Crown, and the holder of any mining tenement or mining privilege, or of any right or privilege under the Petroleum Act, 1967, in relation to the land.

(2) Where the owner of any land gives to the Trustees notice in writing that he requires to use the land for a purpose which, unless the Minister gives his consent in this Section, would be likely to result in a breach of Section 17 in respect of any

Aboriginal site that might be on the land, the Committee shall, as soon as they are reasonably able, form an opinion as to whether there is any Aboriginal site on the land, evaluate the importance and significance of any such site, and submit the notice to the Minister together with their recommendations in writing as to whether or not the Minister should consent to the use of the land for that purpose, and, where applicable, the extent to which and the conditions upon which his consent should be given.

(3) When the Committee submit a notice to the Minister under subsection (2) of this section he shall consider their recommendation and having regard to the general interest of the community shall either -

(a) Consent to the use of the land the subject of the notice, or a specified part of the land, for the purpose required, subject to such conditions, if any, as he may specify; or

(b) Wholly decline to consent to the use of the land the subject of the notice for the purpose required,

and shall forthwith inform the owner in writing of his decision.

(4) Where the owner of any land has given to the Committee notice pursuant to the subsection (2) of this section and the Committee have not submitted it with their recommendation to the Minister in accordance with that subsection the Minister may require the Committee to do so within a specified time, or may require the Trustees to take such other action as the Minister considers necessary in order to expedite the matter, and the Committee shall comply with any such requirement.

(5) Where the owner of any land is aggrieved by a decision of the Minister made under subsection (3) of this section he may, within the time and in the manner prescribed by the rules of court, appeal from the decision of the Minister to the Supreme Court which may hear and determine an appeal.

(6) In determining an appeal under subsection (5) of this section the Judge hearing the appeal may confirm or vary the decision of the Minister against which the appeal has been made or quash the decision of the Minister, and may make such order as to the costs of the appeal as he sees fit.

(7) Where the owner of the any land gives notice to the Committee under subsection (2) of this section, the Committee may if they are satisfied that it is practicable to do so, direct the removal of any object to which this Act applies from the land to a place of safe custody.

(8) Where consent has been given under this section to a person to use any land for a particular purpose nothing done by or on behalf of that person pursuant to, and in accordance with any conditions attached to, the consent constitute an offence against the Act."

APPENDICES

APPENDIX 2

Notes on the Recognition of Aboriginal Sites

There are various types of Aboriginal Sites, and these notes have been prepared as a guide to the recognition of those types likely to be located in the survey area.

An Aboriginal Site is defined in the Aboriginal Heritage Act, 1972, in Section 5 as:

"(a) Any place of importance and significance where persons of Aboriginal descent have, or appear to have, left any object, natural or artificial, used for, or made for or adapted for use for, any purpose connected with the traditional cultural life of the Aboriginal people, past or present;

(b) Any sacred, ritual or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;

(c) Any place which, in the opinion of the Committee is or was associated with the Aboriginal people and which is of historical, anthropological, archaeological or ethnographical interest and should be preserved because of its importance and significance to the cultural heritage of the state;

(d) Any place where objects to this Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or removed."

Habitation Sites

These are commonly found throughout Western Australia and usually contain evidence of tool-making, seed grinding and other food processing, cooking, painting, engraving or numerous other activities. The archaeological evidence for some of these activities is discussed in details under the appropriate heading below.

Habitation sites are usually found near an existing or former water source such as a gnamma hole, rock pool, spring or soak. They are generally in the open, but they sometimes occur in shallow rock shelters or caves. It is particularly important that none of these sites be disturbed as the stratified deposits which may be found at such sites can yield valuable information about the inhabitants when excavated by archaeologists.

Seed Grinding

Polished or smoothed areas are sometimes noticed on/near horizontal rock surfaces. The smooth areas are usually 25cm wide and 40 or 50cm long. They are the result of seed grinding by the Aboriginal women and indicate aspects of past economy.

APPENDICES

Habitation Structures

Aboriginal people sheltered in simple ephemeral structures, generally made of branches and sometimes of grass. These sites are rarely preserved for more than one occupation period. Occasionally rocks were pushed aside or used to stabilise other building materials. When these rocks patterns are located they provide evidence for former habitation sites.

Middens

When a localised source of shellfish and other foods has been exploited from a favoured camping place, the accumulated ashes, hearth stones, shells, bones and other refuse can form mounds at times several metres high and many metres in diameter. Occasionally these refuse mounds or middens contain stone, shell or bone tools. These are most common near the coast, but examples on inland lake and river banks are not unknown.

Stone Artefact Factory Sites

Pieces of rock from which artefacts could be made were often carried to camp sites or other places for final production. Such sites are usually easily recognisable because the manufacturing process produces quantities of flakes and waste material which are clearly out of context when compared with the surrounding rocks. All rocks found on the sandy coastal plain , for example, must have been transported by human agencies. These sites are widely distributed throughout the State.

Quarries

When outcrops of rock suitable for the manufacture of stone tools were quarried by the Aborigines, evidence of the flaking and chipping of the source material can usually be seen in situ and nearby. Ochre and other mineral pigments used in painting rock surfaces, artefacts and in body decoration are mined from naturally occurring seams, bands and other deposits. This activity can sometimes be recognised by the presence of wooden digging sticks or the marks made by these implements.

Marked Trees

Occasionally trees are located that have designs in the bark which have been incised by Aborigines. Toeholds, to assist the climber, were sometimes cut into the bark and sapwood of trees in the hollow limbs of which possums and other arboreal animals sheltered. Some tree trunks bear scars where section of bark or wood have been removed and which would have been used to make dishes, shield, spearthrowers and other wooden artefacts. In some parts of the state wooden platforms were built in trees to accommodate a corpse during complex rituals following death.

APPENDICES

Burials

In the north of the state, it was formerly the custom to place the bones of the dead on a ledge in a cave after certain rituals were completed. The bones were wrapped in sheets of bark and the skull placed beside this. In other parts of Western Australia the dead were buried, the burial position varying according to the customs of the particular area and time. Natural erosion, or mechanical earthmoving equipment occasionally exposes these burial sites.

Stone Structures

If one or more stone are found partly buried or wedged into a position which is not likely to be the result of natural forces, then it is probable that the place is an Aboriginal site and that possibly there are other important sites nearby. There are several different types of stone arrangements ranging simple cairns or piles of stones to more elaborate designs.

Low weirs which detain fish when tides fall are found in coastal ares. Some rivers contain similar structures that trap fish against the current. It seems likely that low stone slab structures in the south west jarrah forests were built to provide suitable environments in which to trap some small animals. Low walls or pits were sometimes made to provide a hide or shelter for a hunter.

Elongated rock fragments are occasionally erected as a sign or warning that a special area is being approached. Heaps or alignments of stones may be naturalistic or symbolic representations of animals, people or mythological figures.

Paintings

These usually occur in rock shelters, caves or other sheltered situations which offer a certain degree of protection from the weather. The best known examples in Western Australia occur in the Kimberley region but paintings are also found through most of the states. One of several coloured ochres as well as other coloured pigments may have been used at a site. Stencilling was a common painting technique used throughout the state. The negative image of an object was created by spraying pigment over the object which was held against the wall.

Engravings

This term described designs which have been carved, pecked or pounded into a rock surface. They form the predominant art form of the Pilbara region but are known to occur in the Kimberleys in the north to about Toodyay in the south. Most engravings occur in the open, but some are situated in rock shelters.

APPENDICES

Caches

It was the custom to hide ceremonial objects in niches and other secluded places. The removal of objects from these places, or photography of the places or objects or any other interference with these places is not permitted.

Ceremonial Grounds

At some sites the ground has been modified in some way by the removal of surface pebbles, or the modeling of the soil, or the digging of pits and trenches. In other places there is not noticeable alteration of the ground surface and Aborigines familiar with the site must be consulted concerning its location.

Mythological Sites

Most sites already described have a place in Aboriginal mythology. In addition there are many Aboriginal sites with no man-made features which enable them to be recognised. They are often natural features in the landscape linked to the Aboriginal Account of the formation of the world during the creative "Dreaming" period in the distant past. Many such sites are located at focal points in the creative journeys of mythological spirit beings of the Dreaming. Such sites can only be identified by the Aboriginal people who are familiar with the associated traditions.

APPENDICES

APPENDIX 3

SITE INFORMATION SHEETS

REGISTERED SITES

ARCHAEOLOGICAL SITE INFORMATION SHEET

W.A. MUSEUM Site No. S 1740 Site name : BUNBURY 01

Map reference -
Map SI 50-6 1:250,000 Imperial 368.882 Metric 378.312
1:100,000 Metric
Other

Recorder - NOVAK, CLARKE, CP

Date - APRIL 1978

Report - Report on a Survey for Ab-Sites at the proposed Pelican Point Development, Bunbury. June 1990
S OCon 1992 139/92

Author - O'Connor & Quartermaine Client - LeProvost Environm. Cons.
Site Type - ARTEFACTS

Dimensions - 500 x 300m

Components - Artefact scatter in sand pit. White sand overlying yellow sand Sparse.

Landform/environment - coastal plain

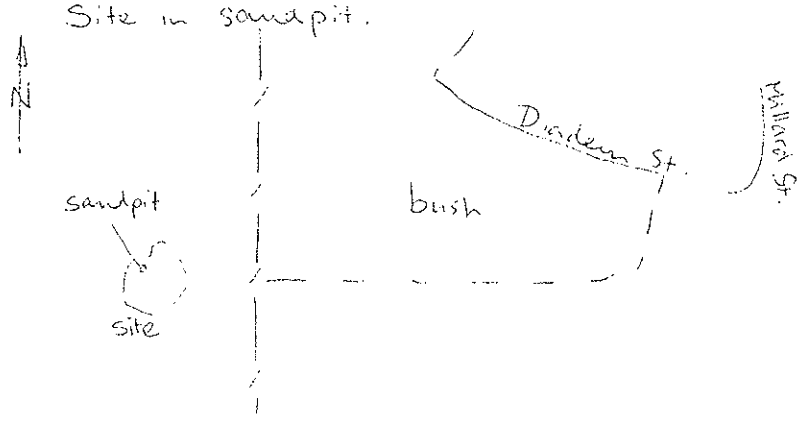
No. of Artefacts - ~ 10

Artefact assemblage - flakes, cores (some bipolar) scrapers, chips

Lithic types - quartz, chert (1 Flake)

Other comments - ——

Sketch map Follow a track starting about 100m W of the corner of Dividen St & Millard St. in Eaton. Follow the track S & E for about 1km Cross fence going NS. Follow fence W to a sand pit, about 17 Site in sandpit.



ARCHAEOLOGICAL SITE INFORMATION SHEET

W.A. MUSEUM Site No. S 1741 Site name : BUNBURY 02

Map reference -
Map SI 50-6 1:250,000 Imperial 368.882 Metric 378.312
1:100,000 Metric
Other

Recorder - VN, JC, CP

Date - APRIL 1978

Report - ——

Author - —— Client - ——

Site Type - ARTEFACTS

Dimensions - ——

Components - Spase artefacts in a firebreak

Landform/environment - coastal plain; white sand

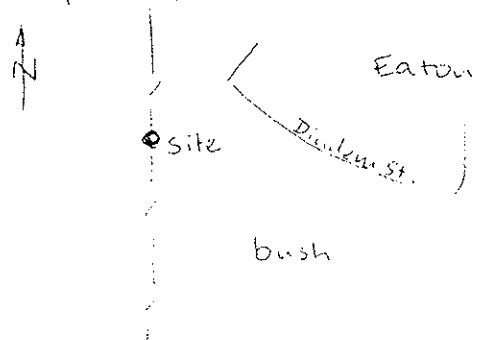
No. of Artefacts - 3

Artefact assemblage - flakes

Lithic types - quartz

Other comments - ——

Sketch map Located in a firebreak along NS running fence. Fence about 100m W of the W end of Diadem Street, in Eaton. Artefacts found about 150m SW from street corner.



ARCHAEOLOGICAL SITE INFORMATION SHEET

W.A. MUSEUM Site No. S 1744 Site name : BUNBURY 05

Map reference -
Map S150-6 1:250,000 Imperial 368.882 Metric 378.312
1:100,000 Metric
Other

Recorder - V Novak, J Clarke, C Peck

Date - April 1978

Report - ——

Author - —— Client - ——

Site Type - ARTEFACTS

Dimensions - ——

Components - Artefact scatter on grey sandpatch in a paddock

Landform/environment - Coastal plain grass

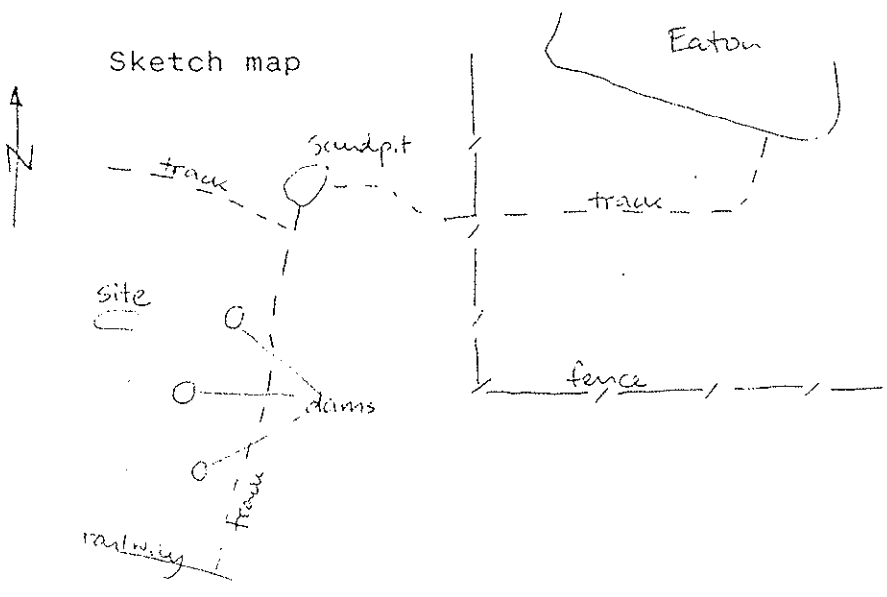
No. of Artefacts - 10

Artefact assemblage - flakes

Lithic types - quartz

Other comments - ——

Sketch map



From Eaton, East end of Diadem Rd, follow track 5m W to sandpit. About 350m is a dam and from there about 270m WSW is a cave patch of grey sand.

ARCHAEOLOGICAL SITE INFORMATION SHEET

W.A. MUSEUM SITE NO. S 1952 SITE NAME AUSTRALIND BYPASS ROAD 1

MAP SHEET - 1:250,000 SI 50-6 1:100,000 _____

GRID REF. AMG 378. 6312

OTHER REFERENCE Imp: 368. 882

RECORDER SH BROWN & S. KEE

DATE MARCH 1984

REPORT A Survey for Ab-Sites along the proposed Australind Bypass road.

AUTHOR _____ CLIENT - MRD

SITE TYPE ARTEFACTS ARC

DIMENSIONS 80 x 50m

LANDFORM/ENVIRONMENT coastal swamp edge, sandy, trees & grasses with bare ground in between.

). OF ARTEFACTS 10

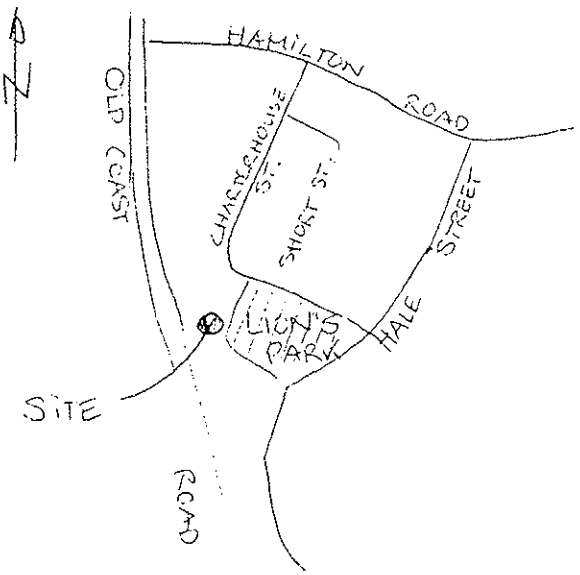
ARTEFACT ASSEMBLAGE frag., chips, fl. piece, scraper

LITHIC TYPES quartz

COMPONENTS Stone artefact scatter in white sand along adjacent firebreaks and on banks of a dam.

OTHER COMMENTS ——

JKETCH MAP



DATE 11-8-98 RESEARCHER CH

ARCHAEOLOGICAL SITE INFORMATION SHEET

W.A. MUSEUM SITE NO. S2611 SITE NAME ESTUARY DRIVE 1

MAP SHEET - 1:250,000 SI 50-6 1:100,000 _____

GRID REF. AMG 378.6313

OTHER REFERENCE imp: 368.033

RECORDER G. QUARTERMAINE

DATE JUNE 1990

REPORT on a Survey for Ab-Sites at the proposed Pelican Point Development

AUTHOR R.Romar, G.Quartermaine, C. Bodney CLIENT - LeProvost Semeniuk & Chalmers Arc.

SITE TYPE ARTEFACTS

DIMENSIONS 10 x 10m

LANDFORM/ENVIRONMENT Sandy depression, sparse vegetation of grass & paperbarks.

NO. OF ARTEFACTS 5

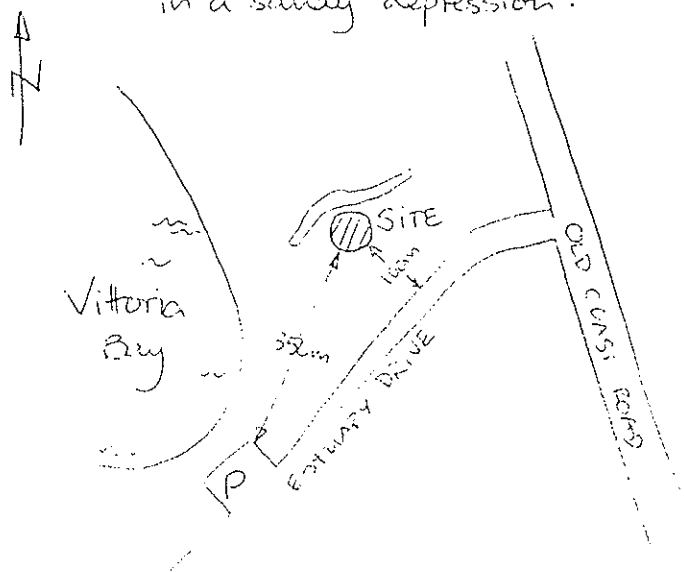
ARTEFACT ASSEMBLAGE flakes, chips

LITHIC TYPES quartz

COMPONENTS Small, low density surface artefact scatter in sandy depression.

OTHER COMMENTS —

SKETCH MAP Between Vittoria Bay & Estuary Road, 1 0m from road in a sandy depression.



DATE 11-8-92 RESEARCHER C.N

ARCHAEOLOGICAL SITE INFORMATION SHEET

W.A. MUSEUM SITE NO. S2612 SITE NAME ESTUARY DRIVE 2

MAP SHEET - 1:250,000 SI 50-6 1:100,000 _____

GRID REF. AMG 378.6313

OTHER REFERENCE imp: 368.883

RECORDER G. QUARTERMAINE

DATE JUNE 1990

REPORT on a Survey for Ab-Sites at the proposed Pelican Point Development

AUTHOR R O'Connor, G Quartermaine, C. Bovey CLIENT - Le Provost Semeniuk & Chalmers

SITE TYPE ARTEFACTS ARC

DIMENSIONS 15 x 15m

LANDFORM/ENVIRONMENT sandy, sparse grass & paperbark

NO. OF ARTEFACTS 7

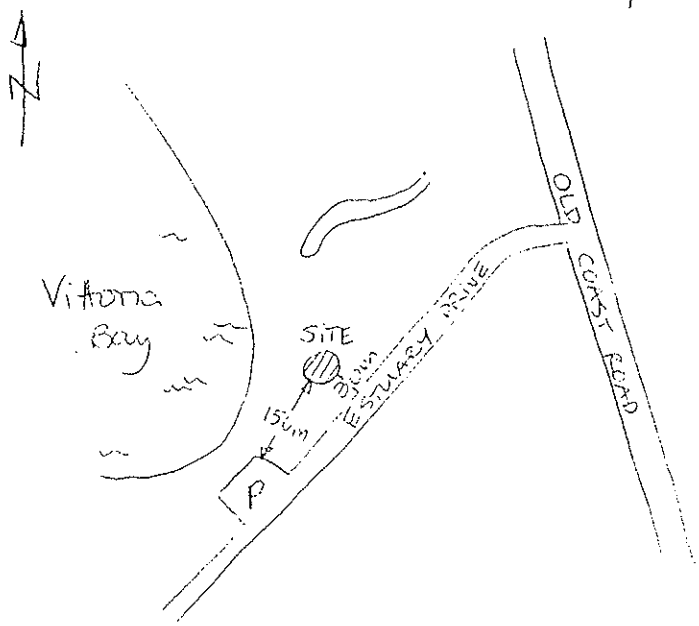
ARTEFACT ASSEMBLAGE chips

LITHIC TYPES quartz

COMPONENTS Small, low density quartz artefact scatter near a well

OTHER COMMENTS —

SKETCH MAP Near a well 200 SSW of ESTUARY DRIVE 1 (S 2611)



DATE 11-8-98 RESEARCHER CM

Appendix I

Report on an Archaeological Investigation

REPORT ON AN ETHNOGRAPHIC SURVEY OF THE

POINT DOURO PENINSULA

Prepared for Gutteridge, Haskins and Davey Pty. Ltd.
By Rory O'Connor.
September 1998.

ABSTRACT

An ethnographic study of the Point Douro Peninsula was commissioned by Gutteridge Haskins and Davey Pty. Ltd. and carried out by R. O'Connor and T.Hart in August and September 1998.

As a result of the survey it has been established that the area of proposed development on Point Douro is clear of areas of Aboriginal significance.

This report details the results of that survey, along with relevant background historical, anthropological and methodological information.

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Figure One: Designated Survey Area

Appendix One: Notes on the *Aboriginal Heritage Act*

Appendix Two: Notes on the Recognition of Aboriginal Sites

Appendix Three: Aboriginal Clearance Documents

1.0 INTRODUCTION

1.1 Background

This report, which is based on a period of field research carried out in August and September 1998, was commissioned by Gutteridge, Haskins and Davey Pty. Ltd. The aim of the research was to locate Aboriginal persons who retain traditional cultural links with the Bunbury area and to consult with them in regard to proposed development on Point Douro Peninsula in order to avoid unlawful disturbance of areas of Aboriginal significance in the course of that development.

1.2 Research Brief

The study area is shown in Figure One . In regard to that area, the objectives of the survey were:

(i) to identify any Aboriginal sites, as defined by the *Aboriginal Heritage Act (1972- 80),* therein; and

(ii) within that area, to ascertain whether or not any such sites will be disturbed by proposed development.

The findings of the survey are to be reported in a format suitable for the Aboriginal Cultural Material Committee to:

(i) determine whether there is an Aboriginal site within the survey area; and

(ii) evaluate the importance and significance of any such site.

The ethnographic survey considered sites of significance to Aboriginal people; archaeological sites were researched by Quartermaine Consultants and are reported upon separately.

1.3 Acknowledgements

The author gratefully acknowledges the assistance and advice of Mr Ted Hart, Aboriginal Liaison Consultant, of Mr Andy Nebro J.P., Mr F.Thorne, Ms. A.Thorne, Mr P.Michael, Mr M.Michael and Mr H.Bennell..

2.0 SOCIAL AND HISTORICAL BACKGROUND.

2.1 Anthropological Considerations

The Aboriginal political geography of Southwestern Australia has been described in O'Connor (1984), O'Connor, *et al.*, (1985) and O'Connor and Quartermaine (1986 and 1987). The following summarised points are relevant to the present exercise.

2.1.1 Southwestern Aborigines were a distinct sociocultural group in pre-contact times.

2.1.2 Dialectal variation occurred within a single southwestern language family.

2.1.3 A regional system of land tenure, based on either kinship or dialectal units existed.

2.1.4 As contemporary accounts of this system are internally inconsistent and sometimes contradictory, it is now impossible to reconstruct the pre-contact political geography of the region.

2.1.5 Territorial separateness disappeared soon after European settlement, due to population movements, deaths and the development of fringe camps (and later settlements and "missions").

2.1.6 The development of a widely-scattered population of people of mixed-ethnic background, who live in the southwest of this State, see themselves as sharing a common identity and refer to themselves as "Nyungars", occurred during the nineteenth century.

2.1.7 Continuity with the traditional past, knowledge of regional mythology and knowledge of areas of religious significance were passed to the present senior adult generation of Nyungars by a pivotal generation of culture transmitters. Among these, in the Metropolitan Region, were Maitland Sandy, Chitty Hedland, Daglish Granny,

Sam Broomhall, Herbert Dyson, Bulyil, Wandi, Lottie Harris and Ollie Worrell and George Winjan and Kitty in the Peel Region.

2.1.8 There is now a determination among the present senior adult generation to protect remaining areas of significance from development.

2.2 Significance

Significance is attributed by Aboriginal people to areas in the southwestern region of Western Australia on the basis of former or current domestic usage, or on the basis of relevance to traditional ritual or mythology. Broadly speaking, this distinction can be viewed as a series of dichotomies between historical and mythological, human and supernatural, or mundane and sacred areas. Thus, one area may be viewed as significant from a historical/human/mundane viewpoint, and another from a mythological/sacred viewpoint.

In addition to the above, a substantial number of Aboriginal sites are mentioned in Hammond (1933), Moore (1885), Bates (numerous dates) and other historical sources. Any sites not known to contemporary Aborigines cannot reasonably be classified as "sites of significance to living Aborigines". However, rediscovery or realisation of the existence of such sites could lead to an attribution of significance. Thus, the neat compartmentalisation resulting from European academic disciplines may not fit absolutely the Aboriginal models; any archaeological or historical site in the survey region could also be potentially significant to Aboriginal people.

In the course of a previous survey in the Peel Region, however, a further aspect of significance, which the present author terms "generalised significance" was encountered. This has been touched upon in O'Connor and Quartermaine (1989), but not considered there in detail. The Aboriginal elders from the Peel Region referred to

the undeniable fact that the region's wetlands and rivers were Aboriginal food and water resources, access tracks and campsites. They also pointed out that those areas were spiritual repositories, not in the sense of the ubiquitous Waugal myth, which has been previously recorded in relation to the Murray and Serpentine Rivers, but in a more general sense which draws on the fundamentals of Aboriginal philosophico-religious belief. In this belief system all living creatures, including humans, share a common spiritual essence and therefore, by extension, every living being represents a part of the wider spiritual universe. The region's wetlands, as breeding grounds for numerous living creatures, are therefore repositories of this spiritual essence realised generationally by individuals. This is clearly a development from the commonly held notion that significance is only attributable specifically. However, if Section Five of the *Aboriginal Heritage Act* is carefully considered, it is clear that it would be difficult to argue that areas to which this generalised significance is attributed are not Aboriginal sites within the meaning of the Act, as they are clearly being described by the Aboriginal people concerned as "sacred" places "of importance and special significance to persons of Aboriginal descent".

3.0 THE SURVEY

3.1 Methodology

Four separate stages were involved in this work, as follows:

(i) examination of existing ethnographic database;

(ii) consultation with Aboriginal elders/organisations;

(iii) inspection of designated survey area;

(iv) report preparation.

3.2 Ethnographic Database

There are two components to this database - firstly, previous regional ethnographic and socio-historical works, relevant aspects of which have been used to form the brief historical sketch in Chapter Two and secondly, information on previously-recorded sites contained within the Site Register at the Aboriginal Affairs Department.

A search of the Site Register revealed that no areas of significance have been previously recorded within the designated survey area .

3.3 Consultation and Field Survey

When the proposal to conduct the survey was produced in April 1998, two Applications for Determination of Native Title had been made in respect of lands which included the study area, namely the Ugle-Noongar and Kickett 2 claims. Both

Applications claimed to represent (*inter alia*) the Bunbury Nyungar people, who also have a local incorporated representative body, the Bunbury Aboriginal Progress Association. In addition, the Bunbury Aboriginal people are represented on the State Commission of Elders by local elder Mr Andy Nebro. In the period between preparing the proposal and carrying out the field survey, the Kickett 2 claim was withdrawn.

Such a withdrawal, however, does not remove the need to involve the local Aboriginal people in the consultative process, and that process commenced at the offices of the Bunbury Aboriginal Progress Association, whose officers assisted in nominating the field survey team.

In his capacity as elder and local member of the Commission of Elders Mr Andy Nebro also participated in the field survey.

Three attempts were made to contact Mr Clarrie Ugle at the Aboriginal Medical Service offices in Perth and two visits were made to his house over a three-week period. Messages were also left at both of these locations asking Mr Ugle to contact the members of the study group. However, despite these efforts, Mr Ugle made no attempt to contact the author or Mr Hart, Aboriginal Liaison Consultant. Contacting Mr Ugle, in any event, is a formality because of his Native Title Applicant status - knowledge of traditional Aboriginal sites in the Bunbury region is held by the Bunbury people who carried out the field survey. Nonetheless, should he contact any member of the study team in the future, then a copy of this report will be shown to him and the consultative and field survey processes explained.

The field survey was carried out on foot by the survey team. All sectors of the study area were accessible and the entire area was therefore inspected thoroughly.

4.0 RESULTS OF SURVEY

As a result of the consultative process and the field survey it has been established that the area of proposed development on Point Douro does not contain any sites of Aboriginal significance.

POINT DOURO PENINSULA
ENVIRONMENTAL UNITS AND LAND USE ACTIVITY
Shire of Harvey

POINT DOURO PENINSULA

SAND BAR

POINT DOURO

DRAINAGE CHANNEL

SAMPHIRE BAY

SAND BAR

ROAD

PELICAN POINT

FORESHORE AND COMMUNITY RECREATION

SAMPHIRE ISLAND

OLD SPEEDWAY TRACK

FORESHORE AND COMMUNITY RECREATION

COLLIE RIVER

COAST

OLD

STUDY AREA

FORESHORE AND COMMUNITY RECREATION

LEGEND

- FORESHORE AND COMMUNITY RECREATION
- CONSERVATION AND PASSIVE RECREATION
- WILDLIFE PROTECTION AREA
- DEVELOPMENT ZONE
- SAMPHIRE AREAS
- PROPERTY BOUNDARY

N

FEBRUARY 1998

Gutteridge Haskins & Davey Pty Ltd

JOB NO: 5134-01-P26

FIGURE 7

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Appendix One:

Notes on the *Aboriginal Heritage Act*

and

Appendix Two:

Notes on the Recognition of Aboriginal Sites

APPENDIX ONE

OBLIGATIONS RELATING TO ABORIGINAL SITES UNDER THE *ABORIGINAL HERITAGE ACT*.

Section 15: Report of Findings.
Any person who has knowledge of the existence of any thing in the nature of Aboriginal burial grounds, symbols or objects of sacred, ritual or ceremonial significance, cave or rock paintings or engravings, stone structures or arranged stones, carved trees, or of any other place or thing to which this Act applies or to which this Act might reasonably be expected to apply shall report its existence to the Registrar, or to a police officer, unless he has reasonable cause to believe the existence of the thing or place in question to be already known to the Registrar.

Section 16: Excavation of Aboriginal Sites.
(1) Subject to section 18, the right to excavate or to remove any thing from an Aboriginal site is reserved to the Registrar.
(2) The Registrar, on the advice of the Committee, may authorise the entry upon and excavation of an Aboriginal site and the examination or removal of any thing on or under the site in such manner and subject to such conditions as the Committee may advise.

Section 17: Offences Relating to Aboriginal Sites.
A person who -
(a) excavates, destroys, damages or conceals or in any way alters an Aboriginal site; or
(b) in any way alters, damages, removes, destroys, conceals, or who deals with in a manner not sanctioned by relevant custom, or assumes the possession, custody or control of, any object on or under an Aboriginal site,
commits an offence unless he is acting with the authorisation of the Registrar under section 16 or the consent of the Minister under section 18.

Section 18: Consent to Certain Uses.
(1) For the purposes of this section, the expression "the owner of the land" includes a lessee from the Crown, and the holder of any mining tenement or mining privilege, or of any right or privilege under the *Petroleum Act 1967*, in relation to the land.
(2) Where the owner of the land gives to the Committee notice in writing that he requires to use that land for a purpose which, unless the Minister gives his consent under this section, would be likely to result in a breach of section 17 in respect of any Aboriginal site that may be on the land, the Committee shall, as soon as it is reasonably able, form an opinion as to whether there is any Aboriginal site on the land, evaluate the importance and significance of any such site, and submit the notice to the Minister together with its recommendation in writing as to whether or not the Minister should consent to the use of the land for that purpose, and, where applicable, the extent to which and the conditions upon which his consent should be given.

(3) Where the Committee submits a notice to the Minister under subsection (2) of this section he shall consider its recommendation and having regard to the general interest of the community shall either -

(a) consent to the use of the land the subject of the notice, or a specified part of the land, for the purpose required, subject to such conditions, if any, as he may specify, or

(b) wholly decline to consent to the use of the land the subject of the notice for the purpose required,

and shall forthwith inform the owner in writing of his decision.

(4) Where the owner of any land has given to the Committee notice pursuant to subsection (2) of this section and the Committee has not submitted it with its recommendation to the Minister in accordance with that subsection the Minister may require the Committee to do so within a specified time, or may require the Committee to take such other action as the Minister considers necessary in order to expedite the matter, and the Committee shall comply with any such requirement.

(5) Where the owner of any land is aggrieved by a decision of the Minister made under subsection (3) of this section he may, within the time and in the manner prescribed by rules of court, appeal from the decision of the Minister to the Supreme Court which may hear and determine the appeal.

(6) In determining an appeal under subsection (5) of this section the Judge hearing the appeal may confirm the decision of the Minister against which the appeal is made or quash the decision and substitute his own decision which shall have effect as if it were the decision of the Minister and may make such order as to the costs of the appeal as he sees fit.

(7) Where the owner of any land gives notice to the Committee under subsection (2), the Committee may, if it is satisfied that it is practicable to do so, direct the removal of any object to which this Act applies from the land to a place of safe custody.

(8) Where consent has been given under this section to a person to use any land for a particular purpose n thing done by or on behalf of that person pursuant to, and in accordance with any conditions attached to, the consent constitutes an offence under this Act.

APPENDIX 2

NOTES ON THE RECOGNITION OF ABORIGINAL SITES

There are various types of Aboriginal sites, and these notes have been prepared as a guide to the recogni-ion of those sites that may be located within the survey area.

An Aboriginal Site is defined in the Aboriginal Heritage Act 1972-80, Section 5 as;

a) Any place of importance or significance where persons of Aboriginal descent have, or appear to have, left any object natural or artificial, used for , or made for or adapted for use for, any purpose connected with the traditional cultural life of the Aboriginal people, past or present;

b) Any sacred, ritual or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;

c) Any place which, in the opinion of the Committee is or was associated with the Aboriginal people and which is of historical, anthropological, archaeological or ethnographic interest and should be preserved because of its importance and significance to the cultural heritage of the State;

d) Any place where objects to this Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or removed.

HABITATION SITES

These are commonly found throughout Western Australia and usually contain evidence of tool-making, seed grinding and other food processing, cooking, painting, engraving or numerous other activities. The archaeological evidence for some of these activities is discussed in detail under the appropriate heading.

Habitation sites are usually found near an existing or former water source such as gnamma hole, rock pool, spring or soak. They are generally in the open, but they sometimes occur in shallow rock shelters or caves. It is particularly important that none of these sites be disturbed as the stratified deposits which may be found at such sites can yield valuable information about the inhabitants when excavated by archaeologists.

APPENDIX 2 CONTINUED....

PAINTINGS

These usually occur in rockshelters, caves or other sheltered situations which offer a certain degree of protection from the weather. The best known examples in Western Australia occur in the Kimberley region but paintings are also found throughout most of the State. Several coloured pigments may have been used at a site. Stencilling was a common painting technique used throughout the state. The negative image of an object was created by spraying pigment over the object which was held against a wall.

ENGRAVINGS

This term describes designs which have been carved, pecked or pounded into a rock surface. They form the predominant art form of the Pilbara region but are known to occur in the Kimberleys in the north to Toodjay in the south. Most engravings occur in the open but some are situated in rock shelters.

CACHES

It was the custom to hide ceremonial objects in niches and other secluded places. The removal of objects from these places, the taking of photographs of the places or objects or any other interference with these places is not permitted.

CEREMONIAL GROUNDS

At some sites the ground has been modified in some way by the removal of surface pebbles, or the modeling of the soil, or the digging of pits and trenches. In other places there is no noticeable alteration of the ground surface and Aborigines familiar with the site must be consulted concerning its location.

MYTHOLOGICAL SITES

Most sites already described have a place in Aboriginal mythology. In addition there are many Aboriginal sites with no man-made features which enable them to be recognised. They are often natural features in the landscape linked to the Aboriginal account of the formation of the world during the creative "Dreaming" period in the distant past. Many such sites are located at focal points in the creative journeys of mythological spirit beings of the Dreaming. Such sites can only be identified by the Aboriginal people who are familiar with the associated traditions.

APPENDIX 2 CONTINUED....

MARKED TREES

Occasionally trees are located that have designs in the bark which have been incised by Aborigines. Toeholds, to assist the climber, were sometimes cut into the bark and sapwood of trees in the holow limbs of which possums and other arborial animals sheltered. Some tree trunks bear scars where sections of bark or wood have been removed to make dishes, shields, spearthrowers and other wooden artefacts. In some parts of the State wooden platforms were built in trees to accomodate a corpse during complex rituals following death.

BURIALS

In the north of the State it was formally the custom to place the bones of the dead on a ledge in a cave after certain rituals were completed. The bones were wrapped in sheets of bark and the skull placed beside this. In other parts of Western Australia the dead were buried, the burial position varying according to the customs of the particular area and time. Natural erosion, or mechanical earthmoving equipment occasionally exposes these burial sites.

STONE STRUCTURES

If one or more stones are found partially buried or wedged into a position which is not likely to be the result of natural forces, then it is probable that the place is an Aboriginal site and that possibly there are other important sites nearby. There are several different types of stone arragements ranging from simple cairns or piles of stones to more elaborate designs. Low weirs which trap fish when tides fall are found in coastal areas. Some rivers contain similar structures that trap fish against the current. It seems likely that low stone slab structures in the south-west jarrah forests were built to provide suitable environments in which to trap some small animals. Low walls or pits were sometimes made to provide a hide or shelter for hunting.

Elongated rock fragments are occasionally erected as a sign or warning that a special area is being approached. Heaps or alignments of stones may be naturalistic or symbolic representations of animals, people or mythological figures.

APPENDIX 2 CONTINUED....

SEED GRINDING

Polished or smooth areas are sometimes observed on/near horizontal rock surfaces. The smooth areas are usually 25cm wide and 40 or 50cm long. They are the result of seed grinding by the Aboriginal women and indicate aspects of a past economy.

HABITATION STRUCTURES

Aboriginal people sheltered in simple ephemeral structures, generally made of branches and sometimes grass. These sites are rarely preserved for more than one occupation period. Occcasionally rocks were pushed aside or were used to stabilise other building materials. When these rock patterns are located they provide evidence evidence of former habitation sites.

MIDDENS

When a localised source of shellfish and other foods have been exploited from a favoured camping place, the accumulated ashes, hearth stones, shells, bones and other refuse can form mounds at times several metres high and many metres in diameter. Occasionally these refuse mounds or middens contain stone, shell or bone tools. These are most common near the coast but examples on inland lakes and river banks are not known.

STONE ARTEFACT FACTORY SITES

Pieces of rock from which artefacts could be made were often carried to camp sites or other places for final production. Such sites are usually easily recognisable because the manufacturing process produces quantities of flakes and waste material which are clearly out of context when compared with the surrounding rocks. All rocks found on the sandy coastal plain, for example must have been transported by human agencies. These sites are widely distributed throughout the State.

QUARRIES

When outcrops of rock suitable for the manufactufre of stone tools were quaried by the Aborigines, evidence of the flaking and chipping of the source material can usually be seen in situ and nearby. Ochre and other mineral pigments used in painting rock surfaces, artefacts and body decoration are mined from natuarlly occurring streams, bands and other deposits. This activity can sometimes be recognised by the presence of wooden digging sticks or the marks made by these implements.

Appendix Three:

Aboriginal Clearance Documents

27.8.98

The Roads House Reconsidering Environmental Uses and Land Use Activity in the Shire of Harvey has been inspected and no significant sites were found.

L Thorne
Tony Thorne
[signature]
Malcolm Michael
[signature]

2.9.98

Point Douro development is a case of Aboriginal significant sites.

[illegible] J.P

(Andy McBride)

BIRD LIST FOR POINT DOURO

Black Swan
Australian Shelduck
Pacific Black Duck
Grey Teal
Darter
Little Pied Cormorant
Pied Cormorant
Little Black Cormorant
Great Cormorant
Australian Pelican
White-faced Heron
Little Egret
Great Egret
Australian White Ibis
Osprey
Whistling Kite
White-bellied Sea-Eagle
Bar-tailed Godwit
Black-tailed Godwit
Whimbrel
Eastern Curlew
Common Greenshank
Terek Sandpiper
Common Sandpiper
Grey-tailed Tattler
Ruddy Turnstone
Great Knot
Red-necked Stint
Curlew Sandpiper
Sharp-tailed Sandpiper
Pied Oystercatcher
Black-winged Stilt
Red-necked Avocet
Pacific Golden Plover
Grey Plover
Red-capped Plover
Greater Sandplover
Hooded Plover
Silver Gull
Caspian Tern
Crested Tern
Fairy Tern

Australian Ringneck
Red-capped Parrot
Common Bronzewing
Pallid Cuckoo
Sacred Kingfisher
Splendid Wren
Striated Pardalote
Western Gerygone
Yellow-rumped Thornbill
Singing Honeyeater
Brown Honeyeater
White-fronted Chat
Rufous Whistler
Grey Fantail
Willie Wagtail
Black-faced Cuckoo-shrike
Black-faced Woodswallow
Dusky Woodswallow
Australian Magpie
Australian Raven
Tree Martin
Welcome Swallow
Silvereye
Little Grassbird
Richard's Pipit

Rita & George Watkins.

WATER AND RIVERS
COMMISSION

Leschenault Inlet
Management Authority

YOUR REF
OUR REF SWB6814
ENQUIRIES Mike McKenna
DIRECT TEL (08) 9721 0666

Mr Keith Leece
Chief Executive Officer
Shire of Harvey
PO Box 163
HARVEY, WA 6220

Dear Sir

Re: POINT DOURO – Rezoning and Development

Thank you for referring the "Point Douro Australind – Scheme Amendment No 13 to District Planning Scheme No 1 and Section 48 Development Proposal, September 2000" (henceforth referred to as the 'Development Proposal') for our consideration and comments.

The Leschenault Inlet Management Authority (LIMA) and Water and Rivers Commission (WRC) are greatly concerned over the proposal to rezone and redevelop the Point Douro peninsula. LIMA and WRC do not support the current proposal for rezoning and development.

The recent community meeting on Monday the 19th November only acted to further stress LIMA and the community's opposition to the current development proposal. This was vindicated by a unanimous vote opposing the proposal presented by consultants GHD.

The Royal Society of WA Workshop held on 3rd December, further highlighted the significance of Point Douro and the Estuary at State, national and international level.

On the basis of this information, Dr Vic Semeniuk, Publicity Officer for the Royal Society of WA. stated that Point Douro should not be developed due to its national geoheritage significance.

LIMA does not support the proposed development on the Point Douro peninsula and cites the following information in support of its position.

1. THE SIGNIFICANCE OF POINT DOURO

The Royal Society of Western Australia, after publishing over 20 years of research on the estuary, has identified Point Douro as nationally significant for its geoheritage and the Leschenault Estuary as being significant globally because of its microfauna, nationally for its mangroves, state wide because of its peripheral vegetation and regionally because of its geomorphic setting (Semenuik et al., 2000).

SOUTH WEST REGION
UNIT 2 LESCHENAULT QUAYS AUSTRAL PARADE BUNBURY WA 6230 PO BOX 261 BUNBURY WA 6231
TELEPHONE (08) 9721 0666 FACSIMILE (08) 9721 0600
E-MAIL ADDRESS correspondence@wrc.wa.gov.au
NATIONAL RELAY SERVICE (AUSTRALIAN COMMUNICATION EXCHANGE) 132 544
MANAGING AND PROTECTING WESTERN AUSTRALIA'S MOST VITAL RESOURCE
ABN 60 061 300 220

Additionally the estuary is a significant habitat for migratory birds protected under international agreements (Japan and China – Australia Migratory Bird Agreement – JAMBA and CAMBA respectively). As such, these habitat areas have been identified for special protection in the LIMA Management Program to meet the commitments of these agreements. Dr. Vic Semenuik, an eminent member of the Royal Society, said for these reasons, the Leschenault Estuary should be regarded as a "national asset" and afforded protection under the international RAMSAR treaty for the protection of wetlands.

Dr Semenuik presented his findings on the Leschenault Estuary to the community at a public meeting on the 3rd December. Dr Semenuik explained that the Collie River delta (including Point Douro) was "unique" and of statewide significance and worthy of protection, and that because of this significance a canal development at Point Douro was inappropriate. This is inconsistent with comments in the Development Proposal, which states: "*The portion of land within the Point Douro peninsula proposed for development does not have high conservation values worthy of conservation*".

Furthermore, Dr Semenuik went on to say that, if the information and understanding had been available at the time of the Pelican Point canal development proposal, that development would not have progressed.

Recommendation

In recognition of the national geoheritage significance of Point Douro, LIMA recommends;

- The Shire and EPA rejects the proposal in recognition of Australia's obligation under international migratory bird agreements
- The Shire and EPA rejects the proposal in recognition of Point Douro as a "national asset" due to its national significance for its geoheritage.

2. THE ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The Environmental Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) provides for the protection of the environment, especially matters of national environmental significance. Under "the Act" the Commonwealth has a new role in managing certain environmental matters. The legislation affects the way in which developers, local government and state agencies carry out their work.

Triggers that activate "the Act" include listed migratory bird species and matters of national heritage. Penalties under the Act range from $550,000 for individuals and $5.5 million for a body corporate. The proposal contains no reference to the Act and an assessment on whether referral is needed.

Matters that need referral under "the Act" include;

- The national geoheritage value of Point Douro
- Migratory birds protected under JAMBA and CAMBA

LIMA advises the Shire of Harvey that it believes the proponent of the proposal and the Shire of Harvey with an administrative responsibility are required to refer the development proposal for assessment under the Act.

Recommendations

To ensure that legal obligations under the Biodiversity and Conservation Act are satisfied, LIMA recommends:

- The Shire of Harvey requests the proponent to refer the proposal for assessment under the Environmental Protection and Biodiversity Conservation Act.
- The Shire of Harvey and EPA defer any decision on the rezoning and development proposal until the matter has been assessed under "the Act".

3. LESCHENAULT WATERWAYS MANAGEMENT PROGRAM 1992

LIMA's opposition to the current proposal is consistent with the Leschenault Waterways Management Program 1992, a statutory document, which the proponents have failed to address in the Development Proposal. Significant policy directions from the Management Program, not addressed in the Development Proposal include;

Residential Canal Development

Section 12.2 LIMA Policies reads;

1) The Authority considers that the waterways of the Leschenault Estuary, Inlet and Rivers are not suitable residential and canal development.
2) These waterways are nutrient enriched and experience abundant macroalgal growth and microscopic algal blooms in the lower reaches of the Collie River.
3) These conditions could lead to water quality and management problems in artificial waterways connected to these waters.

Canal developments generally are located on low-lying land adjacent to waterways. This land is either wetland (either rush marsh or samphire marsh). Port and flood control works have removed a large amount of this type of wetland from the system. The remaining wetlands are in an important part of the estuarine system and their protection is a prime objective of LIMA.

Should a development be proposed then the criteria for approval of canal developments, as set out in the Canal Steering Committee Report, should be strictly adhered to. Note; the development proposal has failed to address this requirement.

LIMA will apply the following criteria in its assessments of such developments:

1) The proposal should not increase nutrient loading to the estuarine system and should, where possible, reduce nutrient loading. A nutrient management plan would be required and should detail the current situation, anticipated loading, fertiliser practices, water quality monitoring, future management of the land and associated stormwater management.

2) The proposal should provide for public access through the development particularly along the foreshore
3) The proposal should not involve land of environmental value such as wetland habitats, backwaters, System 6 areas, flora and fauna reserves or conservation areas.

Residential Development General

Section 12.1 of LIMA Policies reads;

a) LIMA is opposed to further residential development on the eastern foreshore of the estuary. Further residential development of the foreshore would conflict with the aims and objectives of the Waterways Conservation Act, section 24 (4)(a).
b) LIMA believes there is scope for private development for recreational and tourist activities rather than private residential projects on prime foreshore areas.
f) Residential development on the foreshores of the Collie, Brunswick and Preston Rivers should not occur below the 100 year flood line where areas of environmental value exist.

Therefore, the following comments contained within the Development Proposal are a gross misrepresentation of LIMA's position;

- *Section 2.7 - The current Plan for Point Douro was supported by the EPA and LIMA partly due to the proposed establishment of a conservation reserve for the head of the peninsula.*
- *Section 2.8.1- The development area proposed was determined by DEP and LIMA as being acceptable, providing the areas of high conservation value and waterbird nesting sites are well protected.*

While the LIMA management policy does not oppose the current zoning for the property, it does however, reflect its opposition to any rezoning of Point Douro for residential purposes.

Mechanisms Supporting LIMA's Position

Not only do the following points aid to clarify the stance taken by LIMA on this matter, but also go towards providing justification why this development should not proceed in this very sensitive area.

- Section 28 part 1 of the *Waterways Conservation Act 1976* describes the powers of a Management Authority as involving the ability to "*perform any duty and exercise any power in, and in relation to, the area of the waters and associated land placed under its control* in order to conserve and manage the waters and associated land.
- Section 28 part 3 further states that " *a Management Authority in, or in relation to, its area*" has the ability to "*(d) control and manage the associated land... directed at the abatement, control and prevention of litter and other forms of pollution*"
- The "*precautionary principle*" under which, where an activity has the potential to result in adverse environmental effects or harm, management measures to protect the environment should be implemented in the absence of scientific evidence.
- The Guidelines for Managing Externalities (Draft) by the COAG High Level Steering Group. Under these guidelines, government has a responsibility to take all reasonable and practicable steps to prevent their actions causing foreseeable harm to the environment both now and in the future.

- Eighteen species of birds, protected by the Japan-Australia and China-Australia Migratory Bird Agreements (JAMBA and CAMBA), occur in the northern estuary. Governments are bound by these agreements to protect these species and their habitats.

Recommendations

On the basis of the LIMA, Management Program, policies and recommendations, it is recommended that the Shire of Harvey and EPA return the proposal to the proponents before considering the proposal;

- To ensure that the LIMA position is accurately represented
- To ensure that the policy directives in the LIMA Leschenault Waterways Management Program 1992 are addressed in the proposal.
- To ensure the proposal complies with the Canals Development policy

4. STATE WATER QUALITY MANAGEMENT STRATEGY & ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The WA Government is a signatory to the National Water Quality Management Strategy (NWQMS) as part of Council of Australian Governments (CoAG) water law reforms. The State water quality management strategy (SWQMS) has been published on behalf of several state government agencies with responsibility for implementing the NWQMS.

The principles of ecologically sustainable development (ESD), to which the Western Australian Government is a signatory are defined in the 1992 National Strategy for Ecologically Sustainable Development. The guidelines of ESD (ARMCANZ & ANZECC,1988) forms the foundation of the SWQMS.

One of the objectives of ESD is to protect biological diversity and maintain essential ecological processes and life support systems.

The SWQMS has a series of guiding principles. Principles 2 & 8 recommend a cautious approach when evaluating proposals, developing water quality criteria/guidelines and management plans to avoid, wherever practical, serious irreversible change to the environment.

Recommendation

To comply with state policy and strategies LIMA recommends;

- The Shire and EPA reject the proposal on the principle of ecological sustainable development on the basis that the Western Australian Government is a signatory to the national agreement referred to above.
- The shire rejects the proposal on the basis of the precautionary principle under the State Water Quality Management strategy.

5. GUIDELINES FOR MANAGING ENVIRONMENTAL EXTERNALITIES

The High Level Steering Group on COAG strategic water law reform has issued guidelines for managing externalities. Under the framework for managing externalities, governments have a responsibility to take all "reasonable and practicable" steps to prevent their actions causing foreseeable harm to the environment both now and in the future. The environmental consequences of recommending the development proposal have been clearly documented by agencies and other eminent scientists.

Recommendation

- The Shire rejects the development proposal under the principles of managing environmental externalities and recognising that it has a responsibility to take all reasonable and practicable steps to prevent their actions which may cause foreseeable harm to the environment both now and in the future.

6. AMENDMENT NO.13 (SECTION 2.5)

The new 'Amendment No. 13' concept plan described in the Development Proposal states: "*(2.1) rezone much of Lot 5 Old Coast Road from a 'Tourist Zone' to the extended 'Residential Development Zone' and 'Recreation and Conservation Reserve'. LIMA considers this type of development most appropriate for the site as it allows maximum public use of the Collie River Estuary and Leschenault Inlet*".

This again is a gross misrepresentation of the LIMA position and policy. LIMA has made no indication that this is the case. In fact, LIMA has consistently opposed rezoning and development at Point Douro.

Under the current zoning for the area, the proposed residential area is listed as a restricted use tourist area. The potential impacts from a tourist facility, LIMA believes, would be less than from the proposed canal and residential development. Due to the majority of the site being subject to flooding and adjacent to mosquito breeding areas, development under the current zoning plan would be less likely to proceed. Hence, LIMA opposes any change to the existing zoning unless council supports a change to 'Recreation and Conservation Reserve' zoning for the entire Pt Douro site.

Recommendation

- The Shire of Harvey and EPA refer the development proposal back to the proponent to correct the misrepresentation of the LIMA position.

7. SYSTEM 6 – C66 & C67 (SECTION 3.2)

The Point Douro peninsula and associated areas have been afforded 'System 6' protection. This has been recognised in the Development Proposal:

- The Leschenault Estuary and Collie River regions have been recommended for conservation by the 'System 6 Report' (EPA, 1993) for their high conservation and recreation value.
- The specific locality C66 (Leschenault Inlet) ..which includes the Point Douro peninsula. The locality C67 (Brunswick, Collie and Wellesley Rivers) includes mostly the Collie River from the mouth of the Leschenault Inlet to approximately 4km upstream.

These areas have been identified for their **high** conservation and recreation value. with comments made in the 'Conservation Reserves of Western Australia' Report (EPA 1983) stressing the importance of conserving remnant vegetation and limiting public access. as follows:

- (C67) Important management considerations include the preservation of the local indigenous flora and natural features, and allowing only passive recreation.(Department of Conservation and Environment. 1983)

The proposal to develop the Point Douro site is against the conservation considerations identified in the 'System 6' report and hence LIMA would not support the proposal on these grounds.

Recommendation

To comply with state policy as defined in the System 6 Report LIMA recommends;

- The Shire of Harvey and EPA reject the proposal on the basis of EPA, System 6 Recommendations C66 & C67 as the area has already been identified as being under 'System 6' classification and as having high conservation value as a habitat for migratory and water birds, and hence should be excluded from rezoning for residential purposes.

8. THE AMENDMENT PROPOSAL - MODIFIED WATER BODY (SECTION 2.5.7)

The proposed construction of a canal to provide a boat haven and access to the Collie River and Estuary, raises the issue of safe access to these areas and subsequently Koombana Bay. The lower Collie River is not of sufficient depth, especially in the vicinity of Bar Island to accommodate large hulled boats. The inability to negotiate the river by such craft may aggrieve some residents of the proposed development and result in pressuring local or state government, to dredge the lower Collie River.

The recent statement by Department of Planning and Infrastructure (DPI), Coastal Facilities has stated that;

- *The Governments main task in respect to maritime facilities is to match their availability with user requirements. Users, particularly the commercial boating and fishing industries together with recreational boaters need these facilities to enhance their access to marine resources in a safe and efficient manner.*

- *In the interests of equity to the community, the Government considers that the cost of maritime facilities should, wherever possible be recovered from their major users.*
- *Local Governments generally have a responsibility for providing and managing those public resources which can be identified as being of direct benefit to their local communities.*

The Collie River mouth is within the Shire boundary and is not a navigable channel and under the DPI interpretation is the responsibility of the Shire of Harvey. The Shire has refuted this but this issue clearly needs resolution before the rezoning is considered by the Shire.

The cut has historically been used as passage to Koombana Bay, but a significant sand bar has now established at the Cut heads where it enters Koombana Bay. With the right tide and swell this is very hazardous to small boats, but is a popular surfing area.

Recommendation and Advice

- The Shire of Harvey needs to resolve the responsibility to maintain safe navigable waterways such as the navigation channel at the Collie River mouth before considering the rezoning.
- Prospective purchasers should be advised that the "Cut" connecting the Leschenault Estuary to Koombana Bay is not a navigable waterway, and no responsibility can be accepted for accidents resulting from the use of the cut by boats.
- The Shire investigate the liability issues that will arise if a canal development is approved and the Collie River is not adequately dredged by the Shire to maintain safe access to jetties and moorings that the purchasers of the lots will expect. There will be a real expectation from lot owners that they will have safe access, and the responsibility for that safe access will rest with the Shire as the approving body.

9. THE ENVIRONMENTAL ASSESSMENT PROCESS

LIMA is concerned that the developer has predominantly excluded it in the consultative process for this development. The 'Procedures for the Approval of Artificial Waterways and Canal Estates (1.5, Figure 4)' has not been complied with in this proposal. This figure clearly indicates that as a concept plan is developed, local government authorities and relevant government agencies (including the Waterways Commission, now Water and Rivers Commission and LIMA) should be consulted to ascertain whether the proposal is "generally acceptable or whether there is any fundamental objection."

LIMA obviously has a range of fundamental objections to the proposal and requests that these be addressed as a matter of priority and resolved before the proposal proceeds to rezoning consideration by the Shire. LIMA is concerned that its policy is not clearly represented in the proposal.

Recommendation

LIMA recommends;

- The development proposal be withdrawn from rezoning consideration, until the procedures and state policy are complied with.

10. THE PLANNING FRAMEWORK (SECTION 1.6)

The land under consideration is included in 'Planning Unit CO7: Australind' (Figure 5 of the Development Proposal). The following planning policies and guidelines are listed in the proposal:

2. Wide river foreshore reserves should be preserved and progressively developed as leisure, recreation and conservation areas
3. Efforts should be made to secure a continuous foreshore reserve along the Leschenault Estuary
6. Observe catchment management principles

The Point Douro peninsula provides a unique opportunity to develop the area as leisure, recreation and conservation areas due to the absence of existing infrastructure on the site and to satisfy the public demand for access to these areas.

Recommendation

- The Shire of Harvey and EPA reject the development proposal and refer the proponent to consider the development of the site under the current zoning with an emphasis on the area for leisure, recreation and conservation areas.

11. WATERWAYS COMMISSION REPORT 1994

The Development Proposal makes reference to the "Waterways Protection Precinct (WPP)" and the proposal's adherence to the Waterways Commission Guidelines in excluding development from those areas nominated.

The issue now exists to what extent the WPP extends over the site. The Waterways Commission report referenced by the consultants indicates that the Protection Precinct includes the river channel, *floodprone land*, and the embankments and buffers on each side of these areas. The delineation representing the area of land subject to flooding is not in dispute and has been recognised in the GHD report after consultation with Water and Rivers Commission hydrologists. It is important to consider the following comments found in the Waterways Commission report:

- The precinct focuses attention on areas where the protection of waterways and adjacent foreshore margins is of **high priority.**
- Ideally the WPP should include and work to protect all flood prone land adjacent to waterways.
- Floodprone land along waterways should be protected in order to maintain the natural process of flooding and the ecosystems that exist on it.
- The WPP should therefore include and protect all native vegetation adjacent to waterways.
- The Waterways Protection Precinct may be described as the area of critical importance in protecting the waterways ecosystem.

- Within the precinct Leschenault Inlet Management Authority will seek to limit the extent and nature and nature of environmental change and thus protect this valued asset.(3.2/3.3 Waterways Commission, 1994)

In considering the flood prone area specified within the consultant's report, and the appropriate buffer areas, the actual area available at Point Douro outside the WPP, and hence available for development, is considerably less than the area proposed. As stated, LIMA will oppose any development within the WPP at the Point Douro peninsula.

Recommendations and Advice

- That the WPP be re-evaluated to reflect the guidelines provided in the Waterways Commission Report and Royal Society of Western Australia findings, being inclusive of all floodprone land to the 1 in 100 year floodline.
- All development to be excluded from this area consistent with the management guidelines.

12. DRAINAGE AND SEWER (SECTION 2.5.6)

The Leschenault Waterways Management Plan (1992) states that: *12.1 h) All stormwater runoff from residential subdivisions should be suitably trapped.*

All stormwater drainage within the development should be designed in accordance with the principles of Best Management Practices and Water Sensitive Urban Design outlined in "A Manual for Managing Urban Stormwater Quality in Western Australia" (Water and Rivers Commission 1998), and not exclusively to Shire requirements, as indicated in 2.5.6 and 3.6.3 of the Development Proposal. These guidelines now recommend that a linear system of nutrient stripping and retention basins be employed for the treatment of stormwater drainage. Under the current proposal, little or no provision has been made by the developer for a linear network of basins or the appropriate space to accommodate the requirements to implement water sensitive urban design.

LIMA also has concerns that any potential excavation to create these basins may intercept the shallow groundwater table and potentially acid soils, possibly resulting in transference of nutrients and acids into the estuary and Collie River through groundwater movement.

Additionally, there are grave concerns regarding the direct run-off of nutrients from private property and foreshore areas that are typically grassed and fertilised. Dr Semenuik, at the recent public meeting, was also concerned about nutrient inputs from any residential development at Point Douro, as these inputs would influence microalgae populations to the detriment of the *globally* significant foramnifera that feed upon them.

Recommendations and Advice

- The developer must seek approval from LIMA for any stormwater or drainage connections to the Collie River and for dredging a canal connection, under the provisions of the Waterways Conservation Act 1976.

- The developer is to be advised that the development of urban stormwater design is not to be exclusively to Shire requirements, as indicated in 2.5.6 and 3.6.3 of the Development Proposal.
- The development to comply with the requirements of water sensitive design, including an increased space for the water treatment train.

13. SIGNIFICANCE OF PERIPHERAL VEGETATION

The peripheral vegetation of the Leschenault Estuary has been recognised by the Royal Society of WA as being of *statewide* significance. In the attached document "Peripheral wetland habitats and vegetation of the Leschenault Inlet (Pen et al. 2000)", the extent of fringing vegetation has decreased from some 700ha in 1941 to about 350ha in 1989 (Reference Figure 26). The subsequent loss of remnant fringing forest and saltmarsh as a result of the Lakes and Pelican Point developments has resulted in approximately 70% of the total peripheral vegetation being lost, leaving Point Douro as the largest single aggregate of remnant vegetation in the southernmost two-thirds of the estuary.

The Development Proposal states that "*(3.1.3) Some of the well conserved Samphire vegetation in the proposal zone can potentially be disturbed through human activity causing a decline in the health and abundance of this community. This could subsequently impact upon waterbirds, aquatic invertebrate fauna, fish and crab populations that shelter, feed and breed among the vegetation.*"

Leschenault Estuary supports up to 57 species of waterbirds. The salt marshes and samphire of Point Douro support all 18 bird species identified and scheduled under the JAMBA and CAMBA international migratory bird agreements. Australia is committed to the protection of these birds under these agreements, which is inclusive of their habitats. The DEP, upon their visit to the site commented that "*(3.1.3) ...protection of the Samphire should be a priority*".

Dr Vic Semeniuk from the Royal Society also commented that the degraded areas of vegetation identified in the proposal could be easily regenerated to improve its already significant habitat value, disclaiming the following misleading comment from the Development Proposal; "*(Section 2.7) The development area is predominantly degraded and has little environmental value*".

The waterbirds use the Point Douro habitats to feed on mosquito larva that breed there and also to roost or loaf in. Residential development and mosquito control would have obvious impacts upon the habitat and food chain of the estuary's waterbirds.

In the Development Proposal's assessment of the vegetation, the document states that "*(Section 3.1.2) similar Samphire flats* (to those at Point Douro) *occur within most western coastal estuaries and are often well conserved due to the saline nature and flooding potential.*" The Samphire communities at Point Douro are historically flooded after significant rainfall and tidal events. The influence imposed upon these communities by the clearing of land for development, the absence of normal flooding regimes by the canal acting as a floodway, the permanent waterbodies associated with the canal and boat haven, and the prevalence of permanent water in historically tidal channels are yet to be investigated or eluded to in the proposal.

The raising of localised groundwater levels, potential waterlogging and increased periods of inundation of these areas are likely to have an adverse effect on these vegetation communities, which are only sporadically subjected to flooding conditions. In fact, "the most marked decline in fringing forest was in the central area of Pelican Point" (Pen et al., 2000). The change from fringing forest to saltmarsh and a "chaotic plant assemblage" was suspected to be a result of an alteration of the drainage patters associated with the urban and canal developments. Until these effects can be more fully understood, the development in its current form should be deferred.

Additionally, under the Relevant Scheme Provisions in the Development Proposal, the following statement is made: *(Section 3.1.6) 3. Subdivision and Development q) proposed methods to supplement existing vegetation and increase fauna habitat, particularly in areas of degraded remnant vegetation.*

This statement appears misleading, as conventional thinking would suggest that the removal of remnant native samphire and saltbush communities and replacing them with an urban development adopting predominantly exotic garden plant species would in fact, result in a reduction in native fauna habitat.

Recommendations and Advice

- The Shire of Harvey and EPA reject the proposal on the basis that development under the proposed zoning will not provide better protection to the remaining remnant vegetation, as claimed.
- No reduction in native peripheral vegetation should occur as part of this development proposal.
- The Shire should defer the proposal on the basis that there is not adequate understanding of the impact that the development proposal will have on the delicate water balance and the relationship to peripheral vegetation

14. MOSQUITO CONTROL (SECTION 3.7)

The development proposal to control mosquitos includes the following preventative measures (3.7.4):

- Filling of breeding sites to prevent the formation of stagnant pools.
- Site re-contouring to reduce potential breeding areas.
- Use of an approved larvicide should mosquito numbers still exceed **tolerable** levels.

The proposal clearly states; *"(Section 3.7.4) if mosquito numbers still exceed tolerable levels, then targeted use of an approved larvicide is proposed."*

LIMA has clearly stated that it will not approve the increased use of larvicide as a consequence of the development.

The Shire of Harvey has existing sampling sites to determine mosquito numbers on which their control measures are based. The development of a residential area in proximity to these mosquito breeding areas may realise a *tolerable* level at lower concentrations than present due to human

annoyance. Mosquito control implemented as a result of a *subjective* determination by residents should not be a consideration since the mosquito larvae form a valuable food source for migratory birds and an important link in the estuarine ecosystem.

Additionally, the use of mosquito larvicide to prevent maturation of larva to adulthood has unknown effects on those faunal species which predate on the mosquitos. The predation of large numbers of genetically altered larva is likely to have an adverse effect on the consumers, and hence these practices should be discouraged until more information is available or research is performed.

Ongoing drainage and runelling has had a significant impact on the samphire and wetlands of the Knapps channel. This impact has been documented in the Royal Society Publication, page 307. Pen. Seeming & Semeniuk: Peripheral Wetland Habitats. Increased runnelliong and larvicide use in the Point Douro area are expected to cause the same significant reduction in samphire and wetland habitat.

The effects of the proposed canal on the hydrology of the existing channels also, are yet to be determined. Providing a secondary water source to the channels transversing the nominated conservation areas may in fact provide a greater opportunity for mosquito breeding. These channels are historically only subject to tidal inundation. The addition of a second water source at the canal, in addition to normal tidal movement may provide for a greater area being inundated during high tides, and realise a proportional area of potential pooling sites which can be utilised by mosquitos for breeding. This additional water movement has also, untold effects on the native vegetation and the conservation area as a result of the change in the site's hydrology, which has not been predicted through flood modelling.

Recommendations and Advice

- LIMA recommends that the proposed rezoning and development proposal be deferred until more information is made available on the potential impact of mosquito control.
- LIMA will not support the use of Larvicide in the conservation area and Samphire since the increased impact on the food chain of birds has not be quantified.
- The Shire reject the proposal on the basis that any increase in runelling and larvicide use in the Point Douro Conservation zones will cause long term detrimental damage to the samphire and wetland vegetation

15. FLOOD PLAIN (SECTION 3.5)

LIMA has a series of issues and concerns regarding the floodway, hydraulic analysis calculations and assumptions used by GHD in the hydraulic analysis. These were first raised in May 2001 to GHD, but following no response were raised again in September 2001 and at a meeting held in October 2001. A response from GHD agreed that;

- The hydrology/hydraulics would need further analysis as a consequence of the LIMA submission.
- The issues raised by LIMA will have to be considered as part of the advertising process before referral to MfP and EPA

Issues Regarding GHD modelling

The hydraulic analysis in Appendix D of the Development Proposal does not document any critical assumptions made in the modelling. LIMA concerns include;

1) The model used was the US Army Corp of Engineers, Hydraulic Engineering Centre – River Analysis System (HEC-RAS). This model is widely used and accepted, however the modelling for Pt Douro was done only as one-dimensional flow calculations, more suited to a straight section of river, not a complex system of bends and channel splits such as at Pt Douro. The HEC-RAS reference manual details the program limitations of the one-dimensional flow calculation model.
2) Appropriate modelling of the proposal downstream of the bridge is quite complex due to the flow splits, junctions, skews and turns that cannot be represented through the basic HEC-RAS one-dimensional model used by GHD.
3) The Douro Harbour modelling needs recalculating using the HEC-RAS "Momentum Based Junction Method" for the junctions and Chapter 6 of the manual for the bridges. This will make allowances for the skew of the proposed bridge and harbour channel to the main Collie River flow direction and the impact of the signification flow splits, angles and junctions in the individual reaches.
4) Some of the cross sectional top widths seem incorrect, especially at channel junctions.
5) The modelling appears to rely upon dredging of the riverbed to maintain adequate flow depths. If the river bed is not maintained then the proposed modifications may actually increase the risk of flooding on the site and in upstream areas.

Questions Regarding Modelling

1) Why have different minimum riverbed levels been used at the river stadia 857m section in Tables 1 & 2?
2) The plan view of the HEC RAS model layout does not appear to match the angles of the channels on the current proposal. Will this result in different model results from those currently provided?
3) In the GHD Tables 1 and 2 it appears that the velocity in the Collie will increase from 1.04 m/s to 1.75 m/s at location 857 (just upstream of the bridge) and will increase from 0.79 m/s to 1.13 m/s at location 750 (at start of entry to the new channel) Some of this may be caused through the incorrect channel top widths used.

Questions Regarding Impact of Pt Douro Canal

1) What is a safe velocity in the Collie River such that scour will not occur on the banks?
2) It is understood that some increase in velocity may aid in desilting the river but will this cause further impacts downstream or along the banks?
3) Will the new Douro Harbour channel cause increased velocities in the Collie River especially upstream of the bridge?

4) If so, will the increased velocities in the Collie River increase the risk of bed and bank erosion and subsequent loss of fringing vegetation in a large flood?

5) Has modelling been done of the velocity distributions across the channel and the effects on the banks?

6) Was the change in channel shape made by GHD that was referred to in the GHD letter of 27 May 1999 to Waters and Rivers where it referred to "a more tangential curve of the canal edge between the Australind Bridge and the proposed Bridge"? There is concern that once rezoning boundaries are in place that any such required changes will not be readily achieved.

7) What damage will the breakout of a 100-year event at the junction harbour, swale and river reach cause to the sandfire flats immediately downstream?

8) Is the revised plan that was to be submitted to WRC as referred in the 27 May 1999 letter of GHD the same as the plan in the current proposal?

9) If the new boat channel is planned to be below the current silted riverbed level, will it not also silt up in future years as the current channel has done?

10) Has any allowance in the modelling been made for Greenhouse effects and likely rising water levels?

11) The bridge over the boat channel is stated as needing a span of 34 metres. Is this needed as a clear span at the 100-year level?

12) Would this bridge produce less impedance to the flow if it were moved further downstream in the Douro Harbour channel?

13) If modelling has assumed dredging in the new situation shouldn't this be also considered in the current base case?

14) What prevents the Douro Channel silting up at the East End?

15) Will adequate flushing of the boat channel occur in normal tides due to two openings?

Hydraulic analysis and further flood modelling is clearly still required, and acknowledged by GHD, to determine floodway velocities and the effect of that water within a 100 year event upon the conservation reserve. This may impact upon vegetation, habitat value and mosquito breeding at Point Douro. As the flood analysis is one of the most important aspects associated with current proposal, the decision by the Shire of Harvey to consider the rezoning application should be deferred until appropriate responses and additional modelling has been undertaken to support the proposal. Additional modelling may well demonstrate that the current proposal is not viable.

Canal Maintenance

This development proposal is significantly different from any other canal development in WA as it performs the function of a relief floodway as well as the normal functions as a navigable waterway. This is believed to be unique to WA, and brings with it a new series of responsibilities for local government.

The current proposal has not addressed the significant issues and responsibilities associated with the operation and maintenance of a relief floodway. The proposal has made no estimates of the required

frequency of dredging to maintain the design performance of the relief floodway. No consideration has been made where the dredge spoil will be held for settlement during dredging operation. Pumping dredge spoil more than several hundred meters is expensive and storage of the spoil for several days will be required to satisfy the requirements of a dredge spoil and disposal licence issued under the Waterways Conservation Act.

Statement of Planning Policy; State Coastal Planning Policy

The proposal fails to address the distance to allow for sea level change. Under the Coastal SPP, the vertical change predicted by the current model between the years 2000 and 2100 is 0.38m. The inter governmental Panel on Climatic Change (IPCC) have made these recommendations. The component for sea level rise must be built into the current levels for floor height above the 100 year flood levels.

Recommendations and Advice

On the basis that the Point Douro Canal will act as a floodway as well as a residential canal, LIMA recommends:

- The Shire of Harvey and EPA defer consideration of the rezoning proposal until the proponent provides an ongoing strategy for canal dredging to satisfy any legal liability that may fall onto the Shire in regard to lack of performance of the canal relief floodway.
- The Shire of Harvey and EPA defer consideration of the application until GHD completes revised canal floodway modelling and assesses the potential impacts as a matter of priority.
- The proposed heights for lot fill and floor levels need to be increased by 0.38m to adjust for IPCC recommendations for climate change.

16. CULTURE AND HERITAGE (SECTION 3.9)

LIMA has concerns regarding the cultural and heritage assessment by the developer. The developer has failed entirely to recognise the Geoheritage significance of the Collie River Delta and in particular the Point Douro Delta. In addition, LIMA feels that the aboriginal heritage and culture issues associated with Point Douro have been assessed only in a superficial manner.

Geoheritage Significance

The Royal Society of Western Australia has identified the Collie River delta, of which Point Douro is a predominant and integral part, has significant statewide geoheritage significance. The Collie Delta is a distinctive delta system when compared with other intra-estuarine deltas in southern and southwestern Australia. It is located within an estuarine lagoon, and has been wholly separated from oceanic processes. It is an unusual and asymmetrically delta in that it portrays the attributes of two types of deltas: while overall it appears to be a fluvial-built delta (ie. it projects out from the hinterland), its southern part is fluvial dominated in internal form, and its northern part is wave dominated in its internal form. Such morphology within a delta has to date never been described elsewhere worldwide, and has important geoheritage significance.

The northern part is comprised of a sand bar and tidal flat system (technically termed a "chenier plain"), and reflects the effects of wave actions that impinges on the coast from the large fetch of Leschenault Inlet by northerly and northwesterly wave trains during winter storms. The southern part of the delta was protected from these wave trains by virtue of its orientation (facing south to southwest), and by the Collie River channel. The Collie delta thus stands unique in Western Australia as an intra-estuarine delta. Furthermore, the chenier plain style of delta land (ie. sand bar and tidal flat form) is not present in other intra-estuarine deltas in Western Australia, and is again of geoheritage significance (Semenuik & Semenuik, undated).

The new State Planning Policy (SPP) for coastal planning has set objectives for protection and conservation including heritage. The proposal fails to address this policy from a geoheritage aspect.

Aboriginal Significance

LIMA is also concerned that the cultural significance for Aboriginal people has not been fully examined and warrants further investigation. The locality suggests a high potential for aboriginal significance due to the historical usage and access to hunting grounds both at the estuary and the river.

WA Museum anthropology department's curator of archaeology, Charles Dortch has been quoted saying the Leschenault Inlet Estuary would have been a very popular place for Noongars. It would have been loaded with fish and crabs. Estuarine fishing was the single most important pursuit, and they would have used group fishing techniques and tidal weirs to catch them.

Extracts: Sylvia J Hallam, Fire and Hearth: a study of Aboriginal usage and European usurpation in South-western Australia

> *Among such plenitude, no wonder they were able to proceed along the estuary for some miles....along a native path near the edge to the crossing of the bar at the mouth of the Collie...*
> *They were then able to follow a path northward the whole length of the Leschenault Estuary (idib:128). Such tracks reflected constant movement and usage....Numerous and well beaten paths near the banks of the estuary indicated the constant pressure of considerable numbers....many deserted huts....They would not dare to move at night without a fire stick... for fear of the evil spirit.*

Waakal is the Noongar creator. It created the hills, the birds, animals and rivers. The local story of Ngarngungudditj Wargal or hairy face snake has been told by John Sara with help from George E Webb (deceased) and Joseph Northover.

> *The snake came down through Collie creating the hills and rivers down to Turkey Point (Australind Pelican Pont area) and Eelaap (Bunbury).*
> *He pushed his big body and turned to form the Estuary and Koombana Bay. He then came back up the Collie River to a place called Minninup Pool. When the moon is high in the sky you can see the spirit resting there.*

> *Koombana Bay (before the Breakwater rocks had begun) was a beautiful sea bay front from the ocean and Turkey Point was an aboriginal ceremony camping hunting and correbee ground.*
> *The Walgal is the great mythical snake that controls the lives action totems and beliefs of the Noongar people.*

Mr Joseph Northover (a elder from the Collie region) recently stated that he would be surprised if there was no aboriginal heritage and significance of Point Douro due to the Walgal myth.

Extract: W. St. Pierre Bunbury and W.P. Morrell (1930); Early Days in Western Australia – Being the Letters and the Journal of Lieut. H.W. Bunbury, Oxford University Press.

> *About five miles from where we slept we came upon the Collie River which flows into the estuary at a low, flat point, in two branches of considerable depth and width, the only way of crossing which was by the bar formed at its mouth, where the bottom is of hard sand.*
> *A long and tiresome wade brought us to the little island in the centre of the river from whence we again struck out into the estuary and passed to the left bank by the sandy bank.*
> *This is the only place where the Collie can be crossed for at least ten miles up, with the exception of a native ford pointed out to me on another occasion about two miles higher up...*
> *On the left bank of the Collie I found about 150 natives assembled to receive us ...*

The cultural and heritage information failed to identify these significant issues.

Mr Andy Nebro, has not resided in the Bunbury Noongar community for some time. The current recognised Bunbury aboriginal elder, Mr Trevor Eades also believes the area has some significance from an aboriginal cultural and heritage background.

Recommendations and Advice

In consideration of the proponent not recognising the geoheritage issues and concerns from local aboriginal elders, LIMA recommends;

- The proponent is instructed to seek further confirmation that the area has no significance from an aboriginal cultural and heritage aspect.
- The developer evaluates the geoheritage significance and makes appropriate recommendations in the proposal.
- The proponent is directed to address the geoheritage significance under the coastal SPP guidelines

17. OTHER POINTS OF CONCERN

- The visual amenity over Samphire Bay will be greatly impacted with the area being built above 100 year flood level with housing.
- Macroalgae in Samphire Bay is an important part of the ecosystem. It is part of the energy cycle in the estuary. Removing of rotting microalgae because of unpleasant odour or visual amenity would not be supported.
- Access to the conservation areas is still possible by domestic and pest fauna species. All reasonable measures should be made to exclude these animals from these areas.
- The Development Proposal fails to recognise the cultural heritage of the Point Douro area as a recreational area for the residents of Australind, Eaton and Clifton Park. A large residential development will result in a reduction in recreational value and appeal of the site.
- The single access to the proposed development area to and from Old Coast Road will result in increased traffic congestion making the merging of traffic difficult.

Summary

Point Douro has been identified as "unique" and having statewide significance, as well as national and international significance when included as part of the greater Leschenault Estuary. The Point Douro site is an important habitat for waterbirds and migratory birds identified and protected under international agreements to which Australia has made commitments to protect the habitats that support these birds. In fact the Royal Society of Western Australia's Dr Vic Semenuik believes the area should be sanctioned for protection under the international RAMSAR treaty.

Dr. Semenuik also states that if there had been the same understanding and knowledge available when the adjacent Pelican Point proposal was submitted, as is now available to assess the current Point Douro development, the Pelican Point canal development would never have proceeded. The full impact of the Pelican Point development on the lower Collie River and the Leschenault Estuary has yet to be realised. Extensive loss of native vegetation and loss of bird habitat and wetland sites are immediately identified, but the long term effects of development impacts on the unique characteristics of the estuary, and Point Douro, however, are currently unknown (Semenuik et al. 2000).

The "precautionary principle" states that where an activity has the potential to result in adverse environmental effects or harm, management measures to protect the environment should be implemented in the absence of scientific evidence. The Royal Society of Western Australia has presented over 20 years of scientific research that quantifies the Estuary and Point Douro as being "unique" and worthy of being afforded protection. LIMA's position to oppose the Pt Douro development is consistent with objectives specified in the Leschenault Waterways Management Plan (1992), and believes that should council be dissatisfied with the information presented by the Royal Society, the "precautionary principle" should be applied until the ultimate effects of the Pelican Point development , or greater research into this development at Point Douro be investigated.

LIMA formally requests that the rezoning and subsequent development in the current proposed arrangement of Lot 5 Old Coast Road, known as Point Douro, not proceed at this time.

Should you have any further queries please contact Mike McKenna a. Commission in Bunbury on (08) 9721 0666.

Yours sincerely.

Graeme Edwards
Chairman - Leschenault Inlet Management Authority 18/12/01

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