Industry 2030 - Greater Bunbury industrial land and port access planning

Western Australian Planning Commission

A submission by the Environmental Protection Authority to the Western Australian Planning Commission prepared under Section 16(j) of the Environmental Protection Act

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Summary and recommendations

This Bulletin is the Environmental Protection Authority's (EPA) advice to the Western Australian Planning Commission (WAPC) on the *Industry 2030 - Greater Bunbury Industrial Land and Port Access Planning* under Section 16(j) of the Environmental Protection Act.

Industry 2030 - Greater Bunbury Industrial Land and Port Access Planning is a report by the WAPC which summarises four studies that have been prepared to ensure that there are well located and planned industrial estates and transport routes in Greater Bunbury. The four studies are:

- *Kemerton Expansion Study* by BSD Consultants and sub-consultants;
- *Bunbury-Kemerton Transport Corridor Study* by BSD Consultants and the *Bunbury-Kemerton Transport Corridor Study 1997 - Review of Rail Transport Findings* by WPL Railway Engineering Pty Ltd;
- *Preston Industrial Park Land Use and Port Access Study* by Feilman Planning Consultants and sub-consultants; and
- *Bunbury Port Access Road Concept Report* by Halpern Glick Maunsell and Main Roads.

The intent of the EPA's advice is to:

(a) identify the environmental matters which require the draft recommendations in *Industry 2030* to be modified prior to finalisation; and

(b) identify the environmental matters which will require further consideration during subsequent statutory planning processes (i.e. Bunbury Region Scheme, town planning schemes, subdivision and development proposals) so that the environment will be adequately protected.

The EPA will also use the advice provided in this report when assessing subsequent statutory planning instruments and development proposals such as the proposed Bunbury Region Scheme and town planning schemes.

Summary of EPA recommendations

The EPA's recommendations in relation to the *Industry 2030* report are summarised as follows:

Kemerton Expansion Study

The EPA advises that the following modifications should be made to the Structure Plan in order to adequately protect the environment:

- the western boundary of the industrial expansion area should be modified to provide an appropriate buffer distance to the adjacent EPP Lakes (Mialla Lagoon);
- land to be ceded to the Crown for conservation purposes by Kemerton Silica Sand Pty Ltd in accordance with the Minister's environmental conditions (Bulletin 741) should be shown as Conservation on the Structure Plan; and
- the Structure Plan should be modified to protect vegetation of regional significance pending the outcome of vegetation survey in the Kemerton area;

The EPA also advises that:

- prior to finalisation of the structure plan a vegetation survey should be conducted in the Kemerton area, on advice of the EPA, to determine the extent of regionally significant vegetation; and
- prior to finalisation of the structure plan, criteria for water management (including water supply) and a drainage management plan should be adopted due to the high watertable and presence of significant wetlands and watercourses adjacent to the proposed industrial core. The criteria should aim to protect water levels and water quality in important wetlands and protect water quality in Wellesley River.

Bunbury-Kemerton Transport Corridor Study

The EPA advises that on the basis of a comparison of likely environmental impacts, the T1 Bunbury-Kemerton transport corridor option is the environmentally preferred corridor option. The EPA also advises that:

- the final transport corridor alignment should not directly impact on regionally significant wetlands and vegetation and there should be adequate separation from these environmental significant areas;
- the comments and recommendations in the Environmental Protection Authority's report (Bulletin 214) relating to transport corridor options for the proposed aluminium smelter in Kemerton should be considered if the T3 transport corridor option is selected as the final alignment; and
- the alignment eventually selected by Government should be assessed in further detail by the EPA.

Preston Industrial Park Land Use and Port Access Study

The EPA advises that the following modification should be made to the Structure Plan in order to adequately protect the environment:

- EPP Lakes, watercourses and their associated vegetation should be protected with appropriate separation from industrial development.

The EPA also advises that:

- modelling in accordance with the EPA's criteria is required to demonstrate that the strategy plan for the Preston industrial area can accommodate the appropriate buffer requirements for noise, air quality and risk; and
- criteria for water management and a drainage management plan should be adopted by government as part of the assessment of the Bunbury Region Scheme. The criteria and drainage management plan should aim to protect water levels and water quality in significant wetlands and the Preston and Ferguson Rivers.

It is recommended that the following environmental issues be deferred for assessment at the subsequent statutory planning stages:

- subsequent planning instruments should adequately protect, and also prevent incompatible landuses from locating near, the EPP Lakes and watercourses;
- there are several areas of intact remnant vegetation which should be assessed by the EPA to determine their conservation value prior to the land being rezoned in the town planning scheme. A vegetation survey would be required as part of this assessment; and
- the magnitude of solid and liquid waste generated at Preston Industrial Park should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the Environmental Review for the Bunbury Region Scheme.

Bunbury Port Access Road Concept Report

The preferred alignment for the north western portion of the port access road assumes that Preston River will be diverted. The proposal to divert the Preston River is currently subject to formal environmental impact assessment by the EPA under Section 38 of the Environmental Protection Act (Assessment No. 1135). The EPA is not prepared to provide advice on the alignment of the north western end of the port access road until the formal assessment of the proposed Preston River deviation has been completed.

The EPA considers that the proposed Bunbury Port Access Road may cause a number of direct and indirect impacts to the environment and will require further assessment of the project under Part IV of the Environmental Protection Act. As part of this assessment more information in

relation to noise, risk, vegetation and drainage will be required to allow the EPA to properly assess the proposed alignment of the port access road.

The alignment of the Bunbury Port Access Road should not be finalised until an assessment by the EPA's under Part IV of the Environmental Protection Act has been completed.

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1. Introduction

To ensure that there are suitably located and planned industrial estates and transport routes in Greater Bunbury, the State Government commissioned a number of consultants to undertake comprehensive industrial land and port access studies for the Greater Bunbury area.

Industry 2030 - Greater Bunbury Industrial Land and Port Access Planning is a summary of these studies, prepared by the Western Australian Planning Commission (WAPC) to enable all the reports to be easily understood and to assist in widespread community consultation and understanding of the industry and transport studies for Greater Bunbury.

The WAPC is seeking advice and comment from the public and government agencies on the recommendations contained in *Industry 2030*. The primary purpose of the Environmental Protection Authority's (EPA) report is to provide advice to the WAPC under Section 16(j) of the Environmental Protection Act. The intent of the EPA's advice is to:

(a) identify the environmental matters which require the draft recommendations in *Industry 2030* to be modified prior to finalisation; and

(b) identify the environmental matters which will require further consideration during subsequent statutory planning processes (i.e. Bunbury Region Scheme, town planning schemes, subdivision and development proposals) so that the environment will be adequately protected.

The EPA will also use the advice provided in this report when assessing subsequent statutory planning instruments and development proposals such as the proposed Bunbury Region Scheme and town planning schemes.

The Bunbury Region Scheme is currently subject to formal environmental impact assessment by the EPA under Division 3 of the Environmental Protection Act (Assessment No. 1048). The Instructions for the preparation of the Environmental Review document were issued by the EPA in October 1996 pursuant to Section 48A of the Environmental Protection Act. The advice that the EPA has provided in this report concerning environmental matters to be considered by the EPA during the assessment of the Bunbury Region Scheme is generally consistent with the Instructions.

The proposal outlined in the *Bunbury Port Access Road Concept Report,* to divert the Preston River is also currently subject to formal environmental impact assessment by the EPA under Section 38 of the Environmental Protection Act (Assessment No. 1135).

This report does not constitute a formal assessment under Part IV of the Environmental Protection Act and assessments under Section 16 of the Act do not lead to the setting of legally binding environmental conditions.

In compiling this report, the EPA has considered the information provided in each of the consultants' reports summarised in the *Industry 2030* document; specialist advice from the Department of Environmental Protection (DEP) and other government agencies; the EPA's own research and, in some cases, research provided by other experts.

Background information about the *Industry 2030* document is provided in Section 2 of this Report. Section 3 discusses the status and purpose of the report. Section 4 discusses the environmental issues and factors relevant to recommendations contained in *Industry 2030*. The EPA's conclusions and recommendations on the issues raised in Industry 2030 are outlined in Section 5.

There are six figures in Appendix 1. A letter describing the environmental values of the Brunswick River and associated wetlands is contained in Appendix 2. An extract from the EPA's report on the proposed Kemerton Aluminium Smelter is contained in Appendix 3. A list of references is contained in Appendix 4.

2. Background

Bunbury is the regional centre of the South West and the State's largest urban centre outside of Perth. It is expected that Bunbury will continue to experience strong economic and population growth, much of this related to the export and downstream processing of the region's primary resources.

Growth in industry requires planning to ensure industrial areas are suitably located with access to and from the Port of Bunbury. *Industry 2030 - Greater Bunbury Industrial Land and Port Access Planning* is a summary of four studies that have been prepared to ensure that there are well planned industrial estates and transport routes in Greater Bunbury. The four studies are:

- *Kemerton Expansion Study* by BSD Consultants and sub-consultants;
- *Bunbury-Kemerton Transport Corridor Study* by BSD Consultants and the *Bunbury-Kemerton Transport Corridor Study 1997 - Review of Rail Transport Findings* by WPL Railway Engineering Pty Ltd;
- *Preston Industrial Park Land Use and Port Access Study* by Feilman Planning Consultants and sub-consultants; and
- *Bunbury Port Access Road Concept Report* by Halpern Glick Maunsell and Main Roads WA.

The major land use recommendations of the draft industry and transport studies are depicted in Appendix 1- Figure 1.

3. Status and purpose of the advice

The EPA's comments and advice contained in this Bulletin are provided under Section 16 (j) of the Environmental Protection Act which enables the EPA "to publish reports on environmental matters generally".

In its consideration of *Industry 2030*, the EPA acknowledges that once finalised its implementation will mainly be through subsequent statutory planning instruments such as the proposed Bunbury Region Scheme and town planning schemes or specific project proposals. The primary purpose of the EPA's advice in this report is to identify environmental matters which require the draft recommendations contained in *Industry 2030* to be modified prior to finalisation. The EPA's advice is also intended to identify environmental issues and factors which will require further consideration during subsequent statutory planning processes so that the environment will be adequately protected.

It is expected that the proposed Bunbury Region Scheme, future town planning schemes, any amendments to these schemes and specific project proposals will incorporate the EPA's advice contained in this report and undertake the recommended studies. Future schemes and projects will also need to be assessed by the EPA pursuant to the provisions of the Environmental Protection Act.

4. Environmental considerations

The projects summarised in *Industry 2030* involve a variety of proposed land uses such as heavy industry, industrial buffers and transport corridors. Each of the four projects raises a number of environmental matters. This report contains the EPA's environmental assessment and advice on the recommendations contained in the consultant report for each project.

Tables 1, 2 and 3 summarise the EPA's advice for the Kemerton Expansion Study, Bunbury-Kemerton Transport Corridor Study and Preston Industrial Park Land Use and Port Access Study.

Section 4 discusses the environmental issues and factors relevant to recommendations contained in *Industry 2030*. The environmental factors are discussed under headings for the environmental issues raised by the four studies discussed in *Industry 2030*. EPA advice is then provided in relation to environmental matters which require the draft recommendations contained in *Industry 2030* to be modified prior to finalisation and environmental issues and factors which will require further consideration during subsequent statutory planning processes so that the environment will be adequately protected.

4.1 Kemerton Expansion Study

Description

Kemerton Industrial Park is the largest industrial site in the South West region and is one of Western Australia's strategic industrial areas. The Park was established in the early 1980's and is situated within the Shire of Harvey, approximately 17km north-east of Bunbury. The Park was established with the primary purpose of accommodating heavy resource processing industries. The existing Structure Plan for the Park includes a central core for heavy industry (1,200 hectares) and a surrounding buffer area (3,810 hectares) to accommodate potential risk, noise and air emissions. The proposed expansion area includes an additional core of 1,505 hectares and an additional buffer area of 1,620 hectares. Figures 2 and 3 can be compared to determine the changes proposed by the *Kemerton Expansion Study*. The table below summarises the proposed changes.

Summary of Kemerton Expansion Study recommendations

Element	Existing industrial park	Proposed industrial expansion
Core industrial area	1,200 ha	1,505 ha
Support industrial area	273 ha	included within the core expansion area.
Inter industrial buffer	194 ha	nil
Buffer area	3,810 ha	1,620 ha
Total	**5,477 ha**	**3,125 ha**

The *Kemerton Expansion Study* is a strategic planning study aimed at providing the necessary information for the State Government to be pro-active in meeting the specialist needs of industry. The *Kemerton Expansion Study* was prepared by BSD Consultants and sub-consultants for the Department of Resources and Development (DRD), Landcorp, WAPC and the South West Development Commission (SWDC). The recommendations for the expansion of the Kemerton industrial area are depicted in Appendix 1-Figure 2.

The Kemerton Expansion Study concludes that industry could expand to the west, north and east of the existing industrial core.

Environmental Issues and Factors

The main environmental issues raised by the proposed expansion of the Kemerton Industrial Park can be summarised as:

- Buffer requirements for noise, air quality and risk;
- Protecting regionally significant wetlands, watercourses and vegetation;
- Maintaining a sustainable groundwater balance;
- Protecting water quality in Wellesley River and Leschenault Inlet; and
- Solid and liquid waste disposal.

Table 1 summarises the environmental issues raised by the proposed expansion of the Kemerton Industrial Park and identifies the environmental factors relevant to each issue. The table also identifies those environmental issues and factors that should be considered at the structure planning stage and which issues and environmental factors can be assessed and management at subsequent statutory planning stages (i.e. Bunbury Region Scheme and town planning schemes).

Buffer requirements for noise, air quality and risk

Noise

The EPA's objective in relation to this environmental factor is to protect the amenity of nearby residents from noise impacts resulting from activities associated with the industrial area by ensuring that noise levels meet the statutory requirements and acceptable standards.

The following criteria were used by Woodward Clyde (1997) in determining buffer requirements for the Kemerton industrial expansion area:

- the cumulative noise from the entire industry mix received at a residence within 100m of Old Coast Road should comply with 42dB(A) (ie. assigned night time level of 37dB(A) plus 5dB(A)*). To compensate for the additive effect of all industries it is recommended that the noise level received at these residences from an individual industry be limited to 37dB(A).

- at any other residence around the Park, the cumulative noise from the entire industry mix should comply with the 40dB(A) (i.e. the assigned night time noise level of 35dB(A) plus 5dB(A)*). However to compensate for the additive effect of all industries, it is recommended that the noise level received at these residences from an individual industry be limited to 35dB(A).

- the noise emissions from an industry should comply with the assigned noise level of 65dB(A) at the respective lot boundary.

(Note: * denotes - the Noise Regulation (1997) allow an adjustment of 5dB(A) to be added to the influencing factor).

For simplicity in determining buffer requirements all residences surrounding the Kemerton Industrial Park were assigned the same allowable noise levels, being 35dB(A) from an individual industry or 40dB(A) from the cumulative industry mix.

Woodward Clyde (1997) recommended that for planning purposes, individual industries should strive to achieve 35dB(A) at the park boundary. This is to ensure that cumulative noise from adjacent industries does not exceed 40dB(A). However, the noise emissions received at a residence from an individual industry could be as high as 40dB(A), providing noise from the surrounding industries was 30dB(A) or less.

The DEP has confirmed that the "allowable noise levels" or "noise quotas" for individual industrial lots within the industrial expansion area are modelled on the criteria outlined in the EPA's Draft Guidance Statement for Environmental Noise (EPA, 1998) and will enable acceptable noise levels to be achieved within the buffer area pursuant to the Noise Regulations 1997 (WA Gov, 1997).

Table 1. Summary of EPA advice for the Kemerton Expansion Study

ISSUE	FACTOR	EPA ADVICE
Draft Structure Plan		
Buffer requirements	•Noise	•The "allowable noise levels" for the industrial lots have been based on the criteria outlined in the EPA's Draft Guidance notes for Environmental Noise and will enable the required noise levels to be met within the buffer pursuant to the Noise Regulations 1997.
	•Air quality	•Appropriate modelling has been conducted to ensure that the EPA's air quality criteria and objectives can be met inside the buffer area.
	•Risk	•Appropriate modelling has been conducted to ensure that the EPA's individual risk criteria and objectives can be met inside the buffer area. •The EPA advises that any new projects involving a significant element of risk, including individual, societal and environmental, will require a quantitative risk assessment at an early stage of the environmental assessment process. •The risk associated with the transport of hazardous goods to the industrial expansion area should be considered as part of detailed infrastructure planning for the area.
	General	•The EPA recommends that the Kemerton Advisory Board be responsible for monitoring and ensuring that the cumulative impacts of noise, air quality and risk comply with the EPA's criteria.
Protecting regionally significant wetlands, watercourses and vegetation	•Regionally significant wetlands & vegetation	•The Structure Plan should be modified to protect vegetation of regional significance. •The western boundary of the industrial expansion should be modified to provide an appropriate buffer to the adjacent System wetlands, vegetation and EPP Lakes (Mialla Lagoon). •Land ceded to the Crown for conservation purposes by Kemerton Silica Sand Pty Ltd in accordance with environmental conditions should be shown as Conservation on the Draft Structure Plan. •The provision of 'ecological management areas' to ensure that where landuse changes are proposed on land within the catchment of an important wetland those changes will not lead to unacceptable impacts on either the water quality or the hydrology of that wetland. •The EPA recommends that vegetation in parts of the study area be surveyed and assessed in terms of its regional significance in accordance with the EPA's criteria. •Subsequent planning instruments should adequately protect and also prevent incompatible landuses from locating near the EPP Lakes, System 6 wetlands and that part of Wellesley River identified in System 6 within a conservation reserve through the provision of buffer areas and environmental management areas.
Maintaining a sustainable groundwater balance	•Groundwater quantity	•Prior to finalisation of the Structure Plan criteria for water management and a drainage management plan should be adopted due to the high watertable and the presence of significant wetlands and a watercourse adjacent to the proposed industrial core. The water management criteria should aim to protect water levels in important wetlands. •The EPA recommends that the Kemerton Advisory Board be responsible for monitoring the drainage management plan.

Bunbury Region Scheme		
Protecting water quality in Wellesley River and Leschenault Inlet	•Water quality	•Prior to finalisation of the Structure Plan criteria for water management and a drainage management plan should be adopted due to the high watertable and the presence of significant wetlands and watercourses adjacent to the proposed industrial core. The water management criteria should aim to protect water quality in the Wellesley River and Leschenault Inlet. •The EPA recommends that the Kemerton Advisory Board be responsible for monitoring the drainage management plan.
Solid and liquid waste disposal	•Industrial waste	•The magnitude of solid and liquid waste generated at Kemerton Industrial Park should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the inclusion of the Kemerton expansion area within the Bunbury Region Scheme.

There have been complaints from Australind residents in relation to high noise levels from existing industries in the Kemerton area. The structure plan for the Kemerton industrial expansion area has been designed so that there will be no increase in noise levels in existing residential areas.

Air quality

The EPA's objective in relation to this environmental factor is to ensure that air emissions do not adversely affect the environment or health, welfare and amenity of nearby landuses by meeting the statutory requirements and acceptable standards.

The air quality impacts from the proposed Kemerton expansion area were predicted using the DEP's dispersion model (EPA, 1992). This model was specifically developed by the DEP to predict pollutant dispersion at coastal regions such as Kwinana.

The DEP has confirmed that the appropriate modelling has been conducted and the proposed buffer around the Kemerton industrial expansion area is adequate to ensure that air quality standards can be met inside the buffer area.

The DEP is currently developing a State-wide Environmental Protection Policy (EPP) for air quality which will implement the National Environmental Protection Measures (NEPM) standards for air quality management programmes and the assessment of development proposals. The Kemerton Advisory Board will provide the means for setting emissions limits and industries in Kemerton will need to comply with the EPP.

The EPA advises that new project proposals will need to be assessed under Part IV of the Environmental Protection Act and issued with a works approval and licence under Part V of the Act.

Risk

The EPA's objective in relation to this environmental factors is to prevent, abate and control off-site risk from hazardous industrial plant for the protection and management of the environment.

There are two primary measures of risk employed with respect to human safety. *Individual risk* is a measure of the frequency, per year, that an individual under some specified circumstance will experience a specified level of harm. *Societal risk* is a measure of the frequency that specified numbers of individuals within a community or population as a whole will sustain a specified level of harm.

The EPA has adopted criteria for *individual risk* and is in the process of developing criteria for *societal risk.*

The EPA's Preliminary Guidance No. 2 (March 1998) has set the off-site *individual risk* criteria for fatalities from hazardous industrial plant at the following levels:

(a) A risk level in residential zones of one in a million per year or less, is so small as to be acceptable to the EPA.

(b) A risk level in "sensitive developments", such as hospitals, schools, child care facilities and aged care housing developments of one half and one in a million per year or less is so small as to be acceptable to the EPA.

In the case of risk generators within the grounds of the sensitive development necessary for the amenity of the residents, the risk level can exceed the risk level of one half in a million per year up to a maximum of one in a million per year, for areas that are intermittently occupied, such as garden areas and car parks.

(c) Risk levels from industrial facilities should not exceed a target of fifty in a million per year at the site boundary for each individual industry, and the cumulative risk level imposed upon an industry should not exceed a target of one hundred in a million per year.

(d) A risk level for any non-industrial activity located in buffer zones between industrial facilities and residential zones of ten in a million per year or less, is so small as to be acceptable to the EPA.

(e) A risk level for commercial developments, including offices, retail centres and showrooms located in buffer zones between industrial facilities and residential zones, of five in a million per year or less, is so small as to be acceptable to the Environmental protection Authority.

The DEP has verified that:

- the modelling conducted by Woodward Clyde (1997) is in accordance with the EPA's Preliminary Guidance Statement No. 2; and
- the draft Structure Plan provides an adequate buffer between the heavy industry core and other "sensitive developments" to ensure that the EPA's risk criteria are achieved.

The DEP recommends that risk associated with the transport of hazardous goods to the industrial expansion area should be considered as part of detailed infrastructure planning for the area.

The EPA advises that a new project involving a significant element of risk will require an individual and societal risk assessment at an early stage of the environmental assessment process. The need for such an assessment will depend on the hazardous nature of the project and will be determined on a case-by-case basis. The EPA also advises that cumulative risk contours should be updated ensuring that cumulative risk criteria would not be exceeded.

Assessment of buffer requirements for noise, air quality and risk

The modelling and assessments conducted for noise, air quality and risk indicate that noise emissions is the most constraining factor, meaning that it requires the largest buffer area in order to meet the EPA's criteria.

The EPA considers that for the assumed industry characteristics with respect to sound power levels, air emissions and operational risks, the buffer area around the Kemerton expansion area in the draft Structure Plan provides adequate separation between the proposed industry and surrounding landuses to accommodate the impacts of noise, air quality and risk in accordance with the EPA's environmental objectives and criteria for these environmental factors.

The EPA recommends that the Kemerton Advisory Board be responsible for monitoring and ensuring that the cumulative impacts of noise, air quality and risk comply with the EPA's criteria.

Protecting regionally significant wetlands, watercourses and vegetation

Regionally significant wetlands and watercourses

The EPA's objective in relation to this environmental factor is to maintain the integrity, functions and environmental values of regionally significant wetlands and watercourses.

Regionally significant wetlands include those lakes protected by the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 (referred to as the Lakes EPP) proposal has been assessed. Regionally significant watercourses are those identified as having regionally significant conservation value in the System 6 report.

There are two chains of wetlands in the study area which run parallel to the eastern and western boundaries of the Kemerton expansion study area. Within these wetland chains there are 15 EPP Lakes. Many of the wetlands have been ranked as having moderate to very high conservation value using EPA Bulletins 374 and 686 (EPA, 1994).

A number of wetlands on the west boundary of the Study Area are also identified as having regionally significant conservation value in the System 6 report. Kialla Lagoon and Myalup Swamp (recommendation C63) (DCE, 1983), are located within the proposed buffer area. The Wellesley River is identified in System 6 as having regional conservation value. These EPP lakes, System 6 wetlands and watercourses are identified in the constraints map (Appendix 1-Figure 4).

Key management issues for these regionally significant wetlands and watercourses include:

- the provision of adequate buffer areas to separate the wetlands from adjacent landuses;
- the provision of 'ecological management areas' to ensure that where landuse changes are proposed on land within the catchment of an important wetland those changes will not lead to unacceptable impacts on either the water quality or the hydrology of that wetland; and
- water balance and drainage management (this management issue is discussed below as a separate environmental issue) .

Buffer zones should be determined by reference to Guidelines for Design of Effective Buffers for Wetlands of the Swan Coastal Plain (Davies and Lane, 1995) and EPA minimum buffer requirements.

None of the wetlands or watercourses protected by the Lakes EPP or identified in System 6 are located within the proposed industrial expansion area.

The wetlands to the north of the industrial expansion area were mapped by Mattiske (1993) as part of the EPA's environmental assessment of the Kemerton silica sand mining proposal (EPA 1994). On the basis of this study Mattiske (1993) concluded that the diversity of floristic and structural components of the less disturbed areas warrant protection from effects of any mining or exploration activities. A condition was imposed by the EPA requiring these wetlands to be ceded to the Crown. The EPA advises that these wetlands should therefore be included with a wetland conservation area as part of the draft structure plan for the Kemerton Expansion Area.

Regionally significant vegetation

The EPA's objective in relation to this environmental factor is to maintain the abundance, diversity, geographical distribution and productivity of regionally significant vegetation communities.

The DEP has advised the EPA that the Kemerton Expansion Study area contains vegetation with very significant conservation values at the regional scale. These include areas of vegetation that are of critical importance in meeting the EPA's objectives for the conservation of vegetation types and their associated flora and fauna on the Swan Coastal Plain between Perth and Bunbury.

The proposal as currently envisaged by the proponents will have a very large impact on the vegetation, flora and fauna conservation values of the area through clearing for industry and possible impacts from pollutants such as phytotoxic emissions.

The DEP is concerned that despite there being large areas of relatively intact remnant vegetation in the study area within a region that is generally cleared, there is no reference to the significance of this remnant vegetation in a regional context.

The DEP considers that the vegetation in the study area is likely to have values in the following roles:

- conservation of plant communities;
- conservation of flora, including declared rare flora and other flora of conservation significance;
- conservation of endangered fauna;
- provision of habitat for fauna;
- significant wetlands;

- linkages and corridors across the Swan Coastal Plain; and
- landscape value.

The EPA recommends that vegetation in the Kemerton study area be surveyed and assessed in terms of its regional significance.

The Department of Resources Development (DRD) has appointed a consultant to undertake a vegetation survey of parts of the Kemerton Study area.

The EPA has adopted criteria to be used when conducting the vegetation survey and assessing the significance of the vegetation within the Kemerton Study area. The survey and assessment of the vegetation in the Kemerton area should be based on these criteria. The WAPC is advised that the Kemerton expansion structure plan should not be finalised until after the vegetation survey and the EPA's recommendations in relation to the survey have been completed.

The EPA has also requested the DEP to provide a further briefing to the EPA at a later time on the results of the vegetation work so that final advice to the WAPC on the significance of the vegetation and areas of vegetation that should be conserved and protected from clearing and the impacts of industry can be determined.

Maintaining a sustainable groundwater balance

Groundwater quantity

The EPA's objective in relation to this environmental factors is to maintain a sustainable groundwater balance in order to maintain the integrity, functions and environmental values of regionally significant wetlands and watercourses.

Subsurface drainage may be needed over most of the study area to control the height of water table levels. It is anticipated that the subsurface drainage will lower groundwater levels and reduce groundwater recharge to the wetlands.

Because of the high watertable and the presence of significant wetlands adjacent to the proposed industrial core the EPA advises that prior to finalisation of the Kemerton Expansion Structure Plan, criteria for water management (including water supply) and a drainage management plan should be adopted by government. The criteria should aim to protect water levels in important wetlands and protect water quality in Wellesley River.

Protecting water quality in Wellesley River and Leschenault Inlet

Water quality

The EPA's objective in relation to this environmental factor is to maintain the integrity, functions and environmental value of the watercourse and estuaries.

Most of the existing Kemerton industrial area and areas to the south of the park are within the Leschenault Inlet Management Area, areas to the north of the existing industrial are not, including parts of the proposed expansion area.

The EPA advises that prior to finalisation of the Kemerton Expansion Structure Plan criteria for water management and a drainage management plan should be adopted by government. The criteria should aim to protect water levels and water quality in important wetlands, the Wellesley River and Leschenault Inlet.

Solid and liquid waste disposal

The EPA's objective in relation to these environmental factors is to ensure that wastes are contained and isolated from ground and surface water surrounds and treatment or collection does not result in long term impacts on the natural environment or public health.

At present there is no wastewater disposal infrastructure in Kemerton that would be able to accept and discharge wastewater from future industry. Each industry manages its own wastewater disposal facility and is obliged to undertake all environmental management requirements associated with the method of disposal. The only wastewater discharged outside of the industrial area is from Millenium Inorganic Chemicals Ltd which discharges into an ocean outfall.

A brief study of the means of wastewater disposal by Burns Roe and Worley (1998) has concluded that ocean outfall is the most viable means of disposal. The elevated topography to the west of Kemerton is a suitable location for a shared facility which would receive treated wastewater from industry and allow it to gravitate to an ocean outfall.

Without an approved strategy for waste disposal from the Kemerton industrial area that is able to embrace all industry, each industry would pursue its own approach to wastewater disposal that might result in a large number of ocean outfalls. The preferred approach is to have a single managed means of disposal.

DRD, Landcorp and the DEP commissioned Dames and Moore to undertake a study to identify potential sites for the location of an industrial liquid waste disposal facility within 75km of the Kemerton Industrial Park. Three areas were identified where a solid industrial waste disposal facility could be established. Further study by government and assessment by the EPA is required before a final site can be selected.

The magnitude of solid and liquid waste generated at Kemerton Industrial Park should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the inclusion of the Kemerton expansion within the Bunbury Region Scheme.

EPA Advice

The EPA advises that the following modifications should be made to the Structure Plan in order to adequately protect the environment:

- the western boundary of the industrial expansion area should be modified to provide an appropriate buffer distance to the adjacent EPP Lakes (Mialla Lagoon);
- land to be ceded to the Crown for conservation purposes by Kemerton Silica Sand Pty Ltd in accordance with the Minister's environmental conditions (Bulletin 741) should be shown as Conservation on the Structure Plan; and
- the Structure Plan may require modification to protect vegetation of regional significance pending the outcome of vegetation survey in the Kemerton area;

The EPA also advises that prior to finalisation of the structure plan:

- a vegetation survey should be conducted in the Kemerton area, on advice of the EPA, to determine the extent of regionally significant vegetation; and
- criteria for water management (including water supply) and a drainage management plan should be adopted due to the high watertable and the presence of significant wetlands and watercourses adjacent to the proposed industrial core. The criteria should aim to protect water levels and water quality in important wetlands and protect water quality in Wellesley River.
- The EPA recommends that the Kemerton Advisory Board be responsible for monitoring the drainage management plan.

It is recommended that the following environmental issues be deferred for assessment at the subsequent statutory planning stages:

- the magnitude of solid and liquid waste generated at Kemerton industrial area should be estimated and details of where the waste will be disposed and how it will be managed

should be considered as part of the inclusion of the Kemerton expansion area within the Bunbury Region Scheme;

- subsequent planning instruments should adequately protect and also prevent incompatible landuses from locating near the EPP Lakes, System 6 wetlands and that part of Wellesley River identified in System 6 within a conservation reserve through the provision of buffer areas and environmental management areas;
- the risk associated with the transport of hazardous goods to the industrial expansion area should be considered as part of detailed infrastructure planning for the area;
- where the EPA is of the opinion that a new project in the Kemerton industrial area involves a significant element of risk, both individual, societal and environmental, it will require a quantitative risk assessment at an early stage of the EIA process. The need for such an assessment will depend on the hazardous nature of the project and will be determined on a case-by-case basis. Cumulative risk contours would need to be updated ensuring that cumulative risk criteria would not be exceeded; and
- the EPA recommends that the Kemerton Advisory Board be responsible for monitoring and ensuring that the cumulative impacts of noise, air quality and risk comply with the EPA's criteria.

4.2 Bunbury-Kemerton Transport Corridor Study

Description

Major industrial estates like Kemerton Industrial Park require efficient access to a port. At present the Port of Bunbury is the preferred port to service industries at Kemerton. To maximise the use of existing infrastructure at the Port of Bunbury appropriate transport connections are required between the Port of Bunbury and Kemerton Industrial Park.

The Bunbury-Kemerton Transport Corridor Study by BSD Consultants for the WAPC, examined opportunities and constraints for improved transport connections between the Port of Bunbury and Kemerton Industrial Park. Three different corridor options were assessed: Option T1, T2 and T3 (refer to Appendix 1-Figure 5). State Cabinet has deleted Option T2 from further consideration.

The Bunbury-Kemerton Transport Corridor Study concludes that T1 is the preferred transport corridor on environmental grounds. T1 is also the preferred option because it will cause the least impact on agricultural and non agricultural landuses and will have the lowest construction cost.

The T3 corridor is the least preferred option because of high capital cost and high environmental and landuse impacts.

Environmental Issues and Factors

Table 2 identifies the environmental issues and factors and summarises the likely environmental impacts of the three transport corridor options.

The main environmental issues raised by the three transport corridor options can be summarised as:

- Impact on regionally significant wetlands, watercourses and vegetation;
- Noise impacts;
- Greenhouse gas emissions; and
- Impact on Declared Rare Flora and Specially Protected Fauna.

Table 2. Summary of EPA advice for the Kemerton Bunbury Transport Corridor Study

ISSUE	FACTORS	ADVICE
Transport Corridor Option T1		
Impact on regionally significant wetlands and vegetation	•Regionally significant wetlands and watercourses	T1 does not impact on any regionally significant wetlands or watercourses
	•Regionally significant vegetation	•T1 impacts the least on remnant vegetation
Noise impact	Noise	•Noise modelling indicates no significant constraints.
Greenhouse	Greenhouse	•T1 is the longest route and will use the most amount of energy.
Transport Corridor Option T2		
State Cabinet has deleted Option T2 from further consideration		
Transport Corridor Option T3		
Impact on regionally significant wetlands, watercourses and vegetation	•Watercourses	•The T3 alignment passes over the Wellesley and Collie Rivers which are both identified in System 6.
	•Regionally significant wetlands	•The T3 alignment passes through an EPP Lake associated with the Wellesley River. The wetland is considered to be an important rookery.
	•Regionally significant vegetation	•The T3 alignment would dissect an extensive area of remnant vegetation. •The vegetation where the alignment crosses the Wellesley River is considered to be in very good condition.
Impact on Declared Rare Flora and Specially Protected Fauna	•Declared Rare Flora •Specially Protected Fauna	•DRF are located near the T3 alignment and priority species may also be located near the T3 alignment.
Noise impact	Noise	•Noise modelling indicates that there are no significant constraints.
Greenhouse	Greenhouse	•T3 is the shortest route and will use the least amount of energy.

Assessment

Transport Corridor Option T1

The T1 alignment does not impact on any regionally significant wetlands or watercourses and has the least impact on remnant vegetation.

Transport Corridor Option T2

State Cabinet has deleted Option T2 from further consideration and for this reason EPA has not assessed this option.

Transport Corridor Option T3

The T3 alignment passes through extensive areas of remnant vegetation, wetlands protected by the Environmental protection (Swan Coastal Lakes) Policy (Lakes EPP) and watercourses identified as having regionally significant conservation value in the System 6 report (recommendation C67) (DCE, 1983). These watercourses are the Brunswick and Collie Rivers.

Public concern was raised about likely impacts of the proposed rail alignment on an EPP lake in the T3 corridor where the alignment crosses the Brunswick River. In response to these concerns DRD appointed a consultant to assess the wetland (refer to Appendix 2). The report concluded that the wetland is considered to be an important bird rookery, the plants communities fringing the wetland are considered to be in very good condition and poorly represented.

Declared Rare Flora is located near the T3 alignment and priority species may also be located near the alignment.

In 1985 the Environmental Protection Authority (EPA) considered a number of transport corridor options between the Wellesley River and the South West Highway, for a proposed aluminium smelter in Kemerton (EPA, 1985)(Bulletin 214). Bulletin 214 included a number of recommendations and comments in relation to the corridor options (refer to Appendix 3) which should be considered if the T3 transport corridor option is selected as the final alignment.

EPA Advice

The EPA advises that:

- on the basis of a comparison of likely environmental impacts, T1 is the environmentally preferred corridor option;
- the final alignment should not directly impact on regionally significant wetlands and vegetation and there should be adequate separation from these environmental significant areas;
- the comments and recommendations in the Environmental Protection Authority's report (Bulletin 214) relating to transport corridor options for the proposed aluminium smelter in Kemerton should be considered if the T3 transport corridor option is selected as the final alignment; and
- the alignment eventually selected by Government should be assessed in further detail by the EPA.

4.3 Preston Industrial Park Land Use and Port Access Study

Description

The Preston Industrial Park is an established industrial area which contains general and light industry, together with rural land, some houses and a range of other land uses. The Preston Industrial Park is approximately 64 square kilometres in area.

The area has been targeted for further industrial development for a number of years by various planning studies. In recent years a number of residential and rural residential areas have been

developed near Preston which has constrained the development of the locality for major industrial purposes. The provision of low impact light and general industries, together with mixed businesses in close proximity to Bunbury and the port, with road and rail access, is now seen as being a more appropriate land use for the locality. The WAPC appointed Feilman Planning Consultants to prepare the *Preston Industrial Park Land Use and Port Access Study* and finalise structure planning for Picton and Preston (refer to Figure 6).

Environmental Issues and Factors

The main environmental issues raised by the proposed Preston Industrial Park can be summarised as:

- Buffer requirements for noise, air quality, and risk;
- Protecting regionally significant wetlands, watercourses and vegetation;
- Maintaining a sustainable groundwater balance;
- Protecting water quality in the Preston and Ferguson Rivers; and
- Solid and liquid waste disposal.

Table 3 summarises the environmental issues raised by the proposed Preston Industrial Park and identifies the environmental factors relevant to each issue. The table also identifies those issues and environmental factors that should be considered "up front" at the structure planning stage and which environmental issues and factors can be "deferred" for assessment and management at subsequent statutory planning stages (i.e. Bunbury Region Scheme).

Buffer requirements for noise, air quality and risk

Noise

The EPA's objective in relation to this environmental factor is to protect the amenity of nearby residents from noise impacts resulting from activities associated with the industrial area by ensuring that noise levels meet the statutory requirements and acceptable standards.

It is proposed to radiate industrial development out from a central core industrial area, through general/medium, light, service industrial, mixed use and landscape buffer areas.

The footprints developed from the computer modelling undertaken for the Kemerton industrial expansion have been applied to the Preston Industrial Area. In general the modelling interpretations conclude that there should be at least a 1km separation between low noise/risk industries and residential areas and a 1.5km separation between medium noise/risk industries and residential areas.

High noise and risk industries are considered inappropriate in the Preston industrial area because an adequate buffer can not be provided within the boundaries of the industrial area.

Approximately 680ha of land within the study area is more than 1km from the boundary and is available for development of low-moderate, risk and air emission industry types.

The buffer requirements for the industrial area will be contained within the boundaries of the industrial precinct.

Modelling in accordance with the EPA's Draft Guidance notes for Environmental Noise has not been conducted. The EPA advises that this modelling should be conducted as part of the rezoning of the land in the town planning scheme to demonstrate that the proposed strategy plan for the Preston industrial area will enable acceptable noise levels to be achieved within the buffer area pursuant to the Noise Regulations 1997.

Table 3. Preston Industrial Park

ISSUE	FACTOR	ADVICE
Draft Structure Plan		
Buffer requirements	•Noise •Air quality •Risk	•Modelling in accordance with the EPA's criteria is required to demonstrate that the strategy plan for the Preston industrial area can accommodate the appropriate buffer requirements for noise, air quality and risk.
Protecting regionally significant wetlands and vegetation	•Regionally significant wetlands, watercourses & vegetation	•The EPP Lakes and associated vegetation must be protected with appropriate buffers to industrial development. •There are several areas of intact remnant vegetation which should be assessed by the EPA to determine their conservation value prior to the land being rezoned in the town planning scheme. A vegetation survey would be required as part of this assessment.
Bunbury Region Scheme		
Maintaining a sustainable groundwater balance	•Groundwater quantity	•As part of the assessment of the Bunbury Region Scheme criteria for water management and a drainage management plan should be adopted by government. The criteria should aim to protect water levels in important wetlands and the Preston and Ferguson Rivers.
Protecting water quality in the Preston and Ferguson Rivers and regionally significant wetlands.	•Water quality	•Prior to finalisation of the amendment to include the Preston industrial area in the Bunbury Region Scheme criteria for water management and a drainage management plan should be adopted by government. The criteria should aim to protect water levels and water quality in important wetlands and protect water quality in the Preston and Ferguson Rivers. •Subsequent planning instruments should adequately protect the EPP Lakes and watercourses and also prevent incompatible landuses from locating near these areas.
Maintaining a sustainable groundwater balance	•Groundwater quantity	•As part of the assessment of the Bunbury Region Scheme criteria for water management a drainage management plan should be adopted by government. The criteria should aim to protect water levels in important wetlands and the Preston and Ferguson Rivers.
Solid and liquid waste disposal	•Industrial waste	•The magnitude of solid and liquid waste generated at Kemerton should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the Environmental Review of the Bunbury Region Scheme.

Air quality

The EPA's objective in relation to this environmental factors is to ensure that air emissions do not adversely affect the environment or health, welfare and amenity of nearby landuses by meeting the statutory requirements and acceptable standards.

There was no assessment made of likely impacts of air emissions as part of the *Preston Industrial Park Land Use and Port Access Study* and the EPA advises that appropriate air dispersion modelling is required to ensure that air quality standards can be met within the Preston industrial area.

Risk

The EPA's objective in relation to this environmental factor is to prevent, abate and control off-site risk from hazardous industrial plant for the protection and management of the environment.

The DEP recommends that risk associated with the transport of hazardous goods to the industrial expansion area should be considered as part of detailed infrastructure planning for the area.

Modelling in accordance with the EPA's Preliminary Guidance Statement No. 2 (March 1998) to demonstrate that the proposed strategy plan for the Preston industrial area will enable acceptable risk levels to be achieved within the buffer area, has not been conducted.

The EPA advises that any new project in the proposed industrial area which involves a significant element of risk, both public and environmental, will require a quantitative risk assessment at an early stage of the environmental assessment process. The need for such an assessment will depend on the hazardous nature of the project and will be determined on a case-by-case basis. The EPA also advises that cumulative risk contours could be updated ensuring that cumulative risk criteria would not be exceeded.

Protecting regionally significant wetlands, watercourses and vegetation

Regionally significant wetlands and watercourses

The EPA's objective in relation to these environmental factors is to maintain the integrity, functions and environmental values of regionally significant wetlands and watercourses.

There are four wetlands within the Study Area that are listed in the Lakes EPP (refer to Appendix 1-Figure 6).

Many of the wetlands in the region have already been drained, filled or otherwise damaged.

There are two watercourses in the Preston Industrial Park; the Preston and Ferguson Rivers. There are also many artificial drains in the area which were constructed to remove surface water and lower the groundwater level.

River foreshore reserves are necessary to maintain environmental values. Th EPA advises that the foreshores of the Preston and Ferguson Rivers should be reserved for conservation in subsequent statutory planning stages.

The key management issues for these regionally significant wetlands and watercourses include:

- the provision of adequate buffer areas to separate the wetlands from adjacent landuses;
- the provision of 'ecological management areas' where incompatible landuses are restricted; and
- water balance and drainage management (this management issue is discussed below as a separate environmental issue) .

Buffer zones should be determined by reference to Guidelines for Design of Effective Buffers for Wetlands of the Swan Coastal Plain (Davies and Lane, 1995) and EPA minimum buffer requirements. Detailed planning on the appropriate width of the foreshore reserve should occur at the scheme amendment and subdivision stages.

Regionally significant vegetation

EPA's objective in relation to this environmental factor is to maintain the abundance, diversity, geographical distribution and productivity of regionally significant vegetation communities.

The majority of the land in the Preston Industrial Park is farmland. Most of the vegetation has been completely cleared or heavily grazed.

The are 10 Priority plant species which could potentially occur in the Preston locality. Five of these species have been confirmed within the study area. From the limited survey data available there appears to be two areas in the eastern part of the study area containing significant flora.

There is a very high probability that Priority species will also be found both in the western portion of the study area in the remnant vegetation, on road verges, fence lines and creek margins in the eastern portion.

There are several areas of intact remnant vegetation which should be assessed by the EPA to determine their conservation value prior to the land being rezoned in the town planning scheme. A vegetation survey would be required as part of this assessment. It is recommended that the vegetation associated with the wetlands be protected as part of the wetland buffer.

Maintaining a sustainable groundwater balance

Groundwater quantity

The EPA's objective in relation to this environmental factors is to maintain a sustainable groundwater balance in order to maintain the integrity, functions and environmental values of regionally significant wetlands and watercourses.

Groundwater from within the study area is likely to be abstracted from the Leederville or the Yarragadee Formations.

Subsurface drainage may be needed over parts of the study area to control the height of water table levels. It is anticipated that the subsurface drainage will lower groundwater levels and reduce groundwater recharge to the wetlands.

Due to the high watertable and the presence of significant wetlands within the proposed industrial area the EPA advises that as part of the assessment of the Bunbury Region Scheme criteria for water management and a drainage management plan should be adopted by government. The criteria should aim to protect water levels in significant wetlands and the Preston and Ferguson Rivers.

Protecting water quality in the Preston and Ferguson Rivers and regionally significant wetlands

Water quality

The EPA's objective in relation to this environmental factor is to maintain the integrity, functions and environmental value of the watercourses and estuaries.

Management measures to protect water quality in the Preston and Ferguson Rivers should be included in an overall water management plan for the area as part the assessment of the Bunbury Region Scheme.

The EPA advises that prior to finalisation of the amendment to include the Preston industrial area in the Bunbury Region Scheme criteria for water management and drainage management should be adopted by government. The criteria should aim to protect water quality in the Preston and Ferguson Rivers.

Solid and liquid waste disposal

The EPA's objective in relation to this environmental factors is to ensure that wastes are contained and isolated from ground and surface water surrounds and treatment or collection does not result in long term impacts on the natural environment.

The magnitude of solid and liquid waste generated at Preston industrial area should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the inclusion of the Preston expansion within the Bunbury Region Scheme.

EPA Advice

The EPA advises that the following modification should be made to the Structure Plan in order to adequately protect the environment:

- EPP Lakes, watercourses and their associated vegetation should be protected with appropriate separation from industrial development.

The EPA also advises that:

- Modelling in accordance with the EPA's criteria is required to demonstrate that the strategy plan for the Preston industrial area can accommodate the appropriate buffer requirements for noise, air quality and risk; and

- criteria for water management and a drainage management plan should be adopted by government as part of the assessment of the Bunbury Region Scheme. The criteria and drainage management plan should aim to protect water levels and water quality in significant wetlands and the Preston and Ferguson Rivers.

It is recommended that the following environmental issues be deferred for assessment at the subsequent statutory planning stages:

- subsequent planning instruments should adequately protect the EPP Lakes and watercourses and also prevent incompatible landuses from locating near these areas;
- the likely environmental impact of infrastructure such as gas pipelines will require environmental assessment by the at subsequent planning and development stages;
- there are several areas of intact remnant vegetation which should be assessed by the EPA to determine their conservation value prior to the land being rezoned in the town planning scheme. A vegetation survey would be required as part of this assessment; and
- the magnitude of solid and liquid waste generated at Preston Industrial Park should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the Environmental Review for the Bunbury Region Scheme.

4.4 Bunbury Port Access Road Concept Report

Description

Previous planning studies have identified the need for a future high standard freight road between the proposed Bunbury Outer Ring Road and the Port of Bunbury to accommodate an increasing number of heavy haulage vehicles accessing the Port of Bunbury. The port access road would also form part of the service corridor between the Preston Industrial Park and the Bunbury port.

Consultants Halpern Glick Maunsell prepared the draft *Bunbury Port Access Road Concept Report* for Main Roads WA.

The port access road is planned to be a high speed, free flowing facility, with provision for an dual carriageway standard between the Bunbury Outer Ring Road and the connecting road to Eaton, and a single carriageway standard thereafter to the Port.

Assessment

The preferred alignment for the north western portion of the port access road assumes that Preston River will be diverted. The proposal to divert the Preston River is currently subject to formal environmental impact assessment by the EPA under Section 38 of the Environmental Protection Act (Assessment No. 1135).

EPA Advice

The EPA is not prepared to provide advice on the alignment of the north western end of the port access road until the formal assessment of the proposed Preston River deviation has been completed.

The EPA considers that the proposed Bunbury Port Access Road may cause a number of direct and indirect impacts to the environment and will require further assessment and management under Part IV of the Environmental Protection Act.

As part of this assessment more information will be required in relation to the following environmental factors to allow the EPA to properly assess the proposed alignment of the port access road:

Risk

Further information is required on the likely risks to the environment and surrounding land uses associated with the transport of chemicals and hazardous goods.

Noise

Further information is required on the likely impacts of noise on surrounding land uses.

Vegetation

Additional information is required for the EPA to determine the likely environmental impacts on vegetation.

Drainage

Information is required for the EPA to determine the likely environmental impacts of runoff from the port access road on the environment .

The alignment of the Bunbury Port Access Road should not be finalised until an assessment by the EPA's under Part IV of the Environmental Protection Act has been completed.

5. Conclusions and Recommendations

The intent of the EPA's advice is to:

(a) identify the environmental matters which require the draft recommendations in *Industry 2030* to be modified prior to finalisation; and

(b) identify the environmental matters which will require further consideration during subsequent statutory planning processes (i.e. Bunbury Region Scheme, town planning schemes, subdivision and development proposals) so that the environment will be adequately protected

The EPA will also use the advice provided in this report when assessing subsequent statutory planning instruments and development proposals such as the proposed Bunbury Region Scheme and town planning schemes.

The EPA's recommendations in relation to the *Industry 2030* report are summarised as follows:

Kemerton Expansion Study

The main environmental issues raised by the proposed expansion of the Kemerton Industrial Park are:

- Buffer requirements for noise, air quality and risk;
- Protecting regionally significant wetlands and vegetation;
- Maintaining a sustainable groundwater balance;
- Protecting water quality in Wellesley River and Leschenault Inlet; and
- Solid and liquid waste disposal.

The EPA advises that the following modifications should be made to the Structure Plan in order to adequately protect the environment:

- the western boundary of the industrial expansion area should be modified to provide an appropriate buffer distance to the adjacent EPP Lakes (Mialla Lagoon);
- land to be ceded to the Crown for conservation purposes by Kemerton Silica Sand Pty Ltd in accordance with the Minister's environmental conditions (Bulletin 741) should be shown as Conservation on the Structure Plan; and
- the Structure Plan may require modification to protect vegetation of regional significance pending the outcome of vegetation survey in the Kemerton area;

The EPA also advises that:

- prior to finalisation of the structure plan a vegetation survey should be conducted in the Kemerton area, on advice of the EPA, to determine the extent of regionally significant vegetation; and
- prior to finalisation of the Structure Plan criteria for water management (including water supply) and a drainage management plan should be adopted due to the high watertable and the presence of significant wetlands and watercourses adjacent to the proposed industrial core. The criteria should aim to protect water levels and water quality in important wetlands and protect water quality in Wellesley River.
- the EPA recommends that the Kemerton Advisory Board be responsible for monitoring the drainage management plan.

It is recommended that the following environmental issues be deferred for assessment at the subsequent statutory planning stages:

- the magnitude of solid and liquid waste generated at Kemerton Industrial Park should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the inclusion of the Kemerton expansion area within the Bunbury Region Scheme;
- subsequent planning instruments should adequately protect and also prevent incompatible landuses from locating near the EPP Lakes, System 6 wetlands and that part of Wellesley River identified in System 6 within a conservation reserve, through the provision of buffer areas and environmental management areas;
- the risk associated with the transport of hazardous goods to the industrial expansion area should be considered as part of detailed infrastructure planning for the area.
- where the EPA is of the opinion that a new project involves a significant element of risk, both public and environmental, it will require an individual, societal and environmental risk assessment at an early stage of the EIA process. The need for such an assessment will depend on the hazardous nature of the project and will be determined on a case-by-case basis. Cumulative risk contours would need to be updated ensuring that cumulative risk criteria would not be exceeded.

Bunbury-Kemerton Transport Corridor Study

The main environmental issues raised by the three transport corridor options can be summarised as:

- Impact on regionally significant wetlands, watercourses and vegetation;
- Noise impacts;
- Greenhouse gas emissions; and
- Impact on Declared Rare Flora and Specially Protected Fauna

The EPA advises that on the basis of a comparison of likely environmental impacts, T1 is the environmentally preferred corridor option. The EPA also advises that:

- the final alignment should not directly impact on regionally significant wetlands and vegetation and there should be adequate separation from these environmental significant areas;
- the comments and recommendations in the Environmental Protection Authority's report (Bulletin 214) relating to transport corridor options for the proposed aluminium smelter in Kemerton should be considered if the T3 transport corridor option is selected as the final alignment; and
- the alignment eventually selected by Government should be assessed in further detail by the EPA.

Preston Industrial Park Land Use and Port Access Study

The main environmental issues raised by the proposed Preston Industrial Park can be summarised as:

- Buffer requirements for noise, air quality and risk ;
- Protecting regionally significant wetlands, watercourses and vegetation;
- Maintaining a sustainable groundwater balance;
- Protecting water quality in the Preston and Ferguson Rivers; and
- Solid and liquid waste disposal.

The EPA advises that the following modification should be made to the Structure Plan in order to adequately protect the environment:

- EPP Lakes, watercourses and their associated vegetation should be protected with appropriate separation from industrial development;

The EPA also advises that:

- modelling in accordance with the EPA's criteria is required to demonstrate that the strategy plan for the Preston industrial area can accommodate the appropriate buffer requirements for noise, air quality and risk; and
- criteria for water management and a drainage management plan should be adopted by government as part of the assessment of the Bunbury Region Scheme. The criteria and drainage management plan should aim to protect water levels and water quality in significant wetlands and the Preston and Ferguson Rivers.

It is recommended that the following environmental issues be deferred for assessment at the subsequent statutory planning stages:

- subsequent planning instruments should adequately protect and also prevent incompatible landuses from locating near the EPP Lakes and watercourses;
- the likely environmental impact of infrastructure such as gas pipelines will require environmental assessment by the at subsequent planning and development stages;

- there are several areas of intact remnant vegetation which should be assessed by the EPA to determine their conservation value prior to the land being rezoned in the town planning scheme. A vegetation survey would be required as part of this assessment; and
- the magnitude of solid and liquid waste generated at Preston Industrial Park should be estimated and details of where the waste will be disposed and how it will be managed should be considered as part of the Environmental Review for the Bunbury Region Scheme.

Bunbury Port Access Road Concept Report

The EPA considers that the proposed Bunbury Port Access Road may cause a number of direct and indirect impacts to the environment and will require further assessment and management under Part IV of the Environmental Protection Act. As part of this assessment more information in relation to noise, risk, vegetation and drainage will be required to allow the EPA to properly assess the proposed alignment of the port access road.

The alignment of the Bunbury Port Access Road should not be finalised until an assessment by the EPA's under Part IV of the Environmental Protection Act has been completed.

Appendix 1

Figures (Source: Industry 2030, Western Australian Planning Commission, May 1998)

1. Industry 2030 Draft Strategy Plan
2. Kemerton Expansion Study Draft Final Structure Plan
3. Original Kemerton industrial area
4. Kemerton Expansion Study constraints map
5. Bunbury-Kemerton Rail Transport Corridor Options
6. Preston Industrial Park Strategy Plan

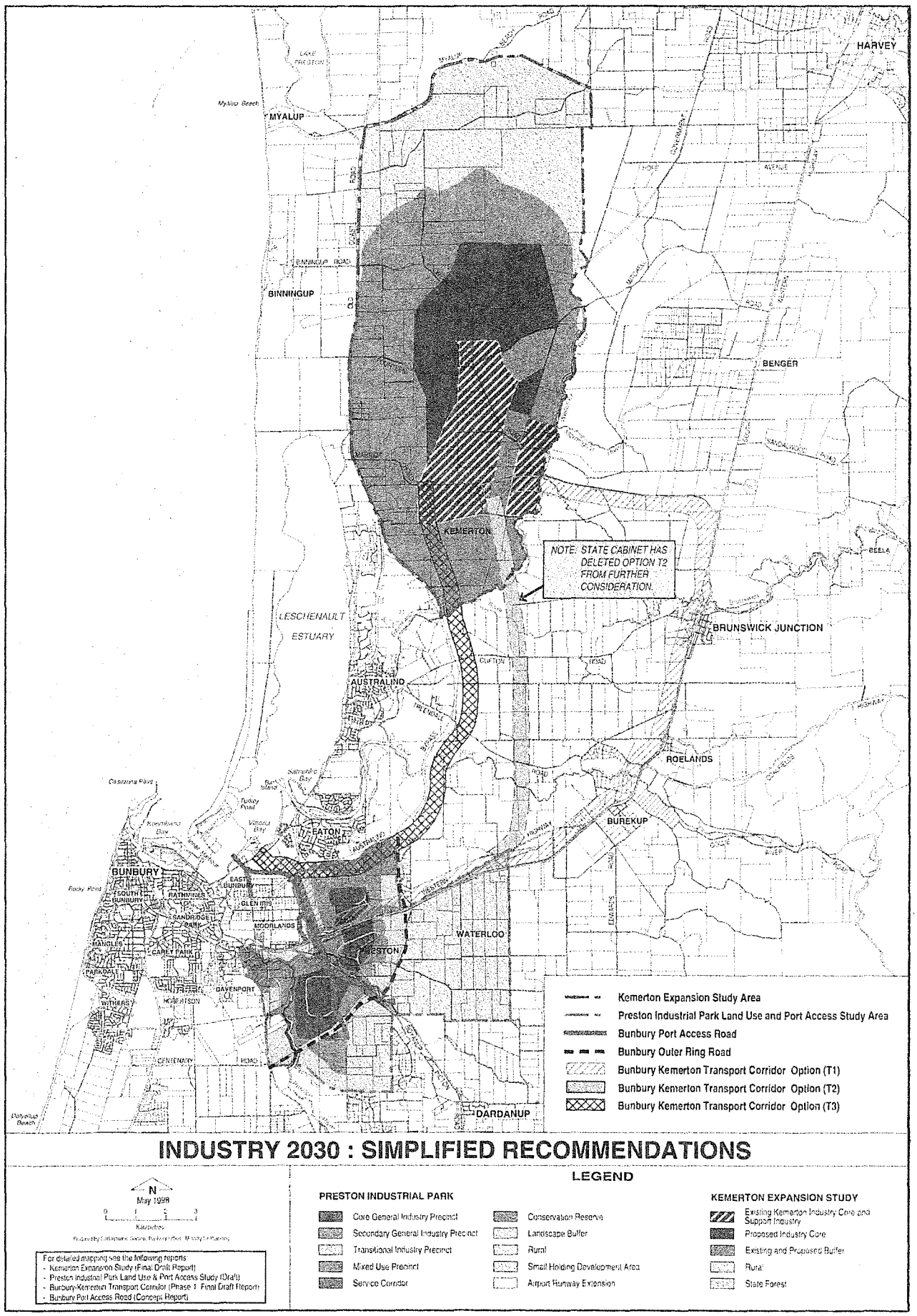

Figure 1. Industry 2030 Draft Strategy Plan (Source: Industry 2030, Western Australian Planning Commission, May 1998.

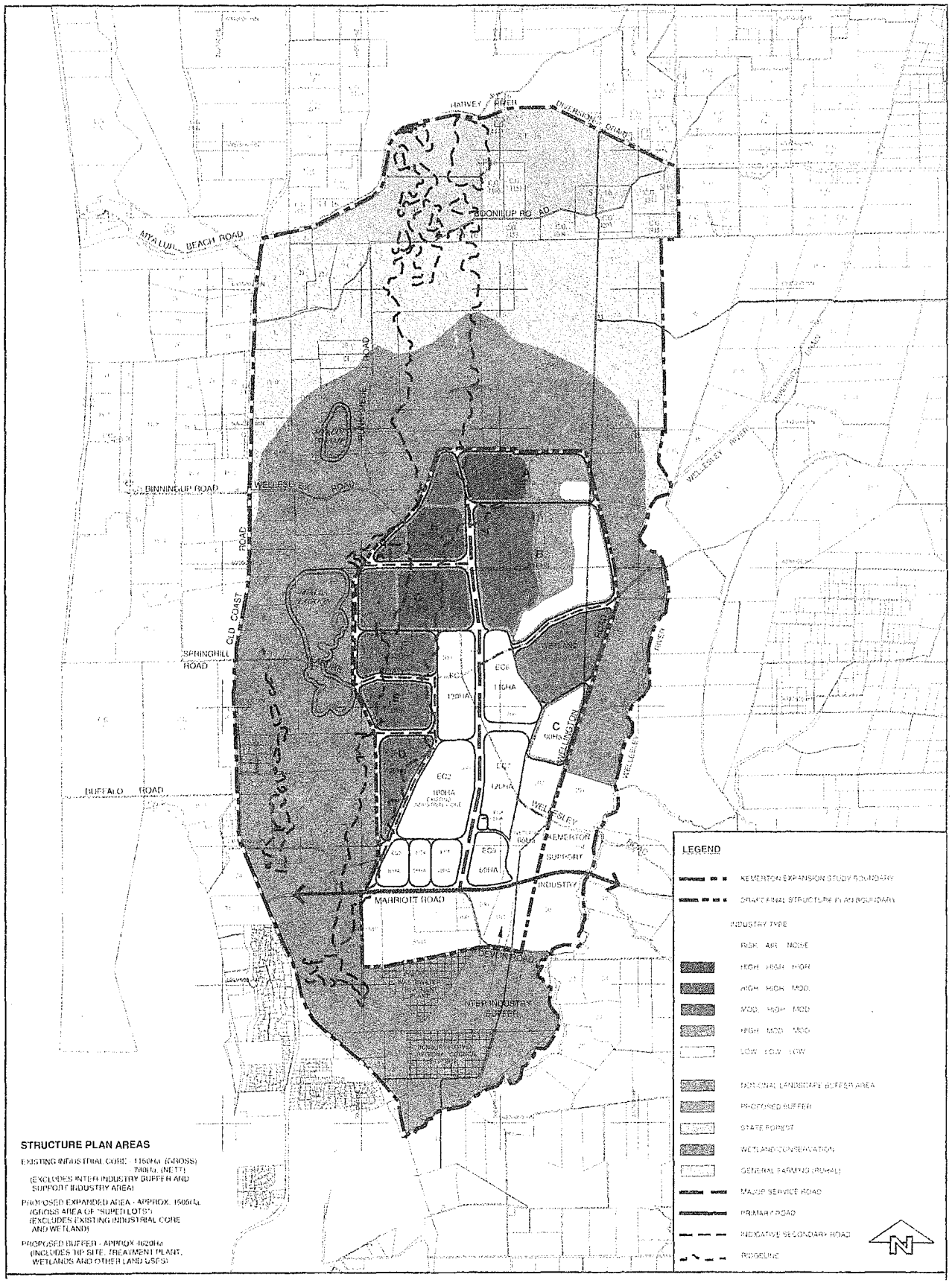

Figure 2. Kemerton Expansion Study Draft Final Structure Plan (Source: Industry 2030, Western Australian Planning Commission, May 1998).

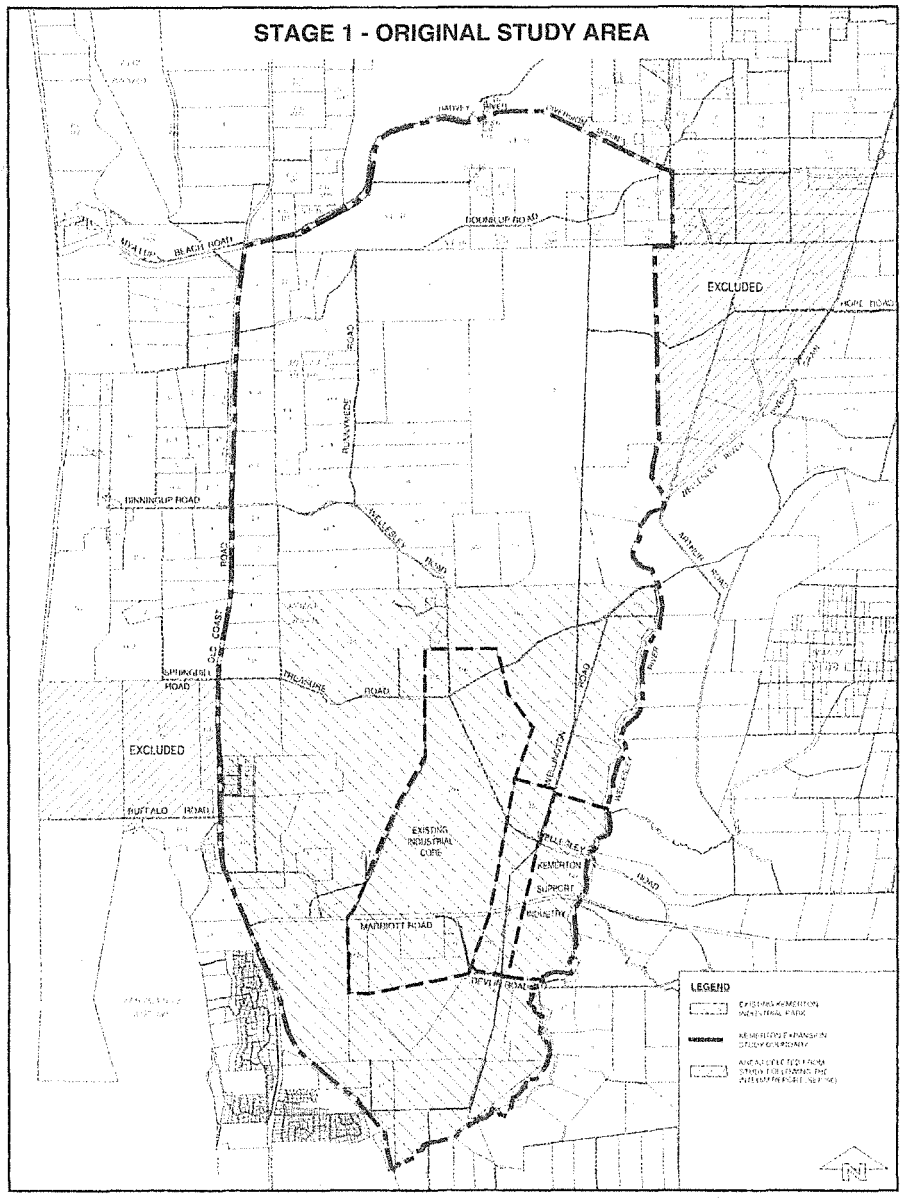

Figure 3. Original Kemerton industrial area (Source: Industry 2030, Western Australian Planning Commission, May 1998).

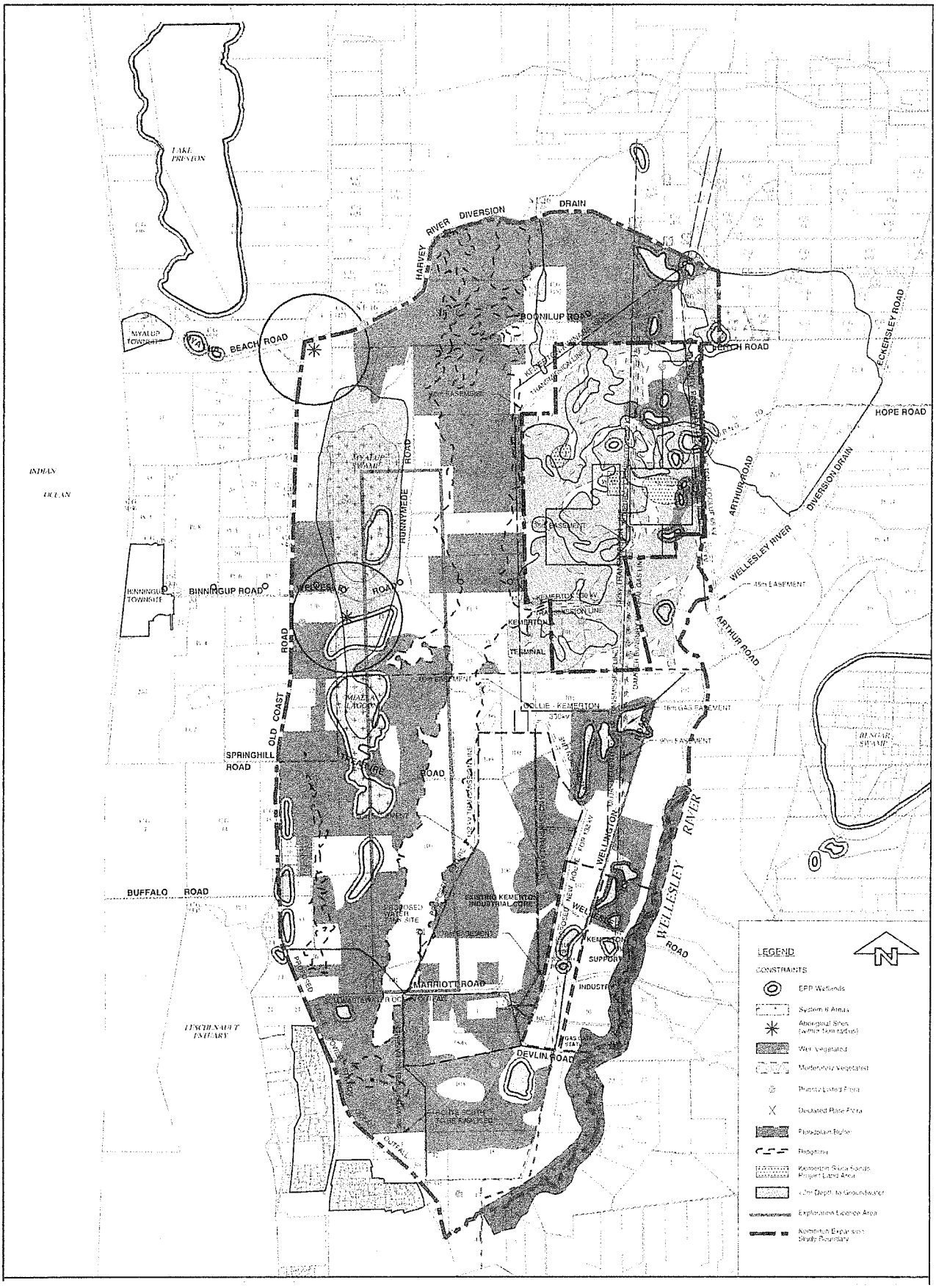

Figure 4. Kemerton Expansion Study constraints map (Source: Industry 2030, Western Australian Planning Commission, May 1998).

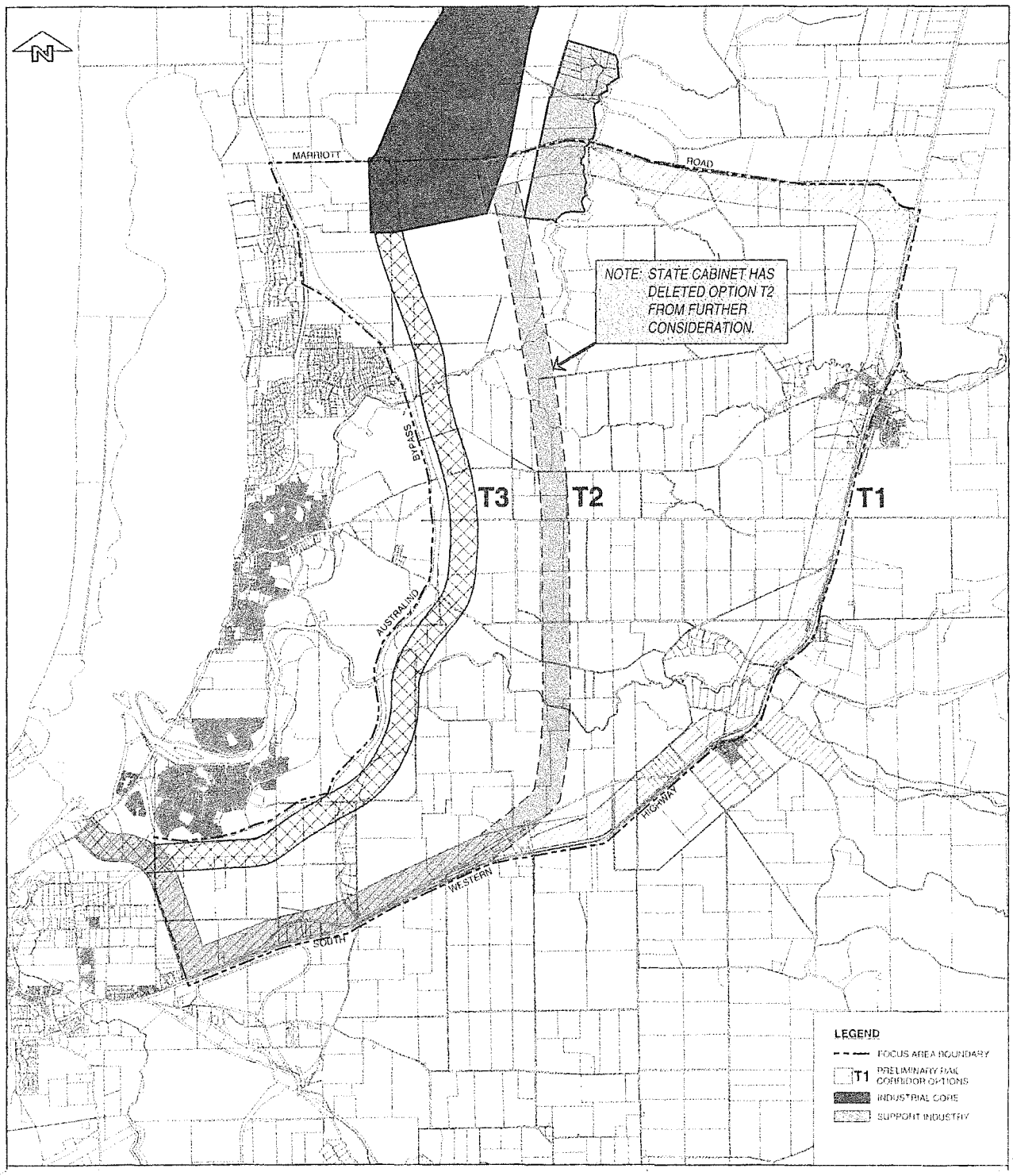

Figure 5. Bunbury-Kemerton Rail Transport Corridor Options (Source: Industry 2030, Western Australian Planning Commission, May 1998).

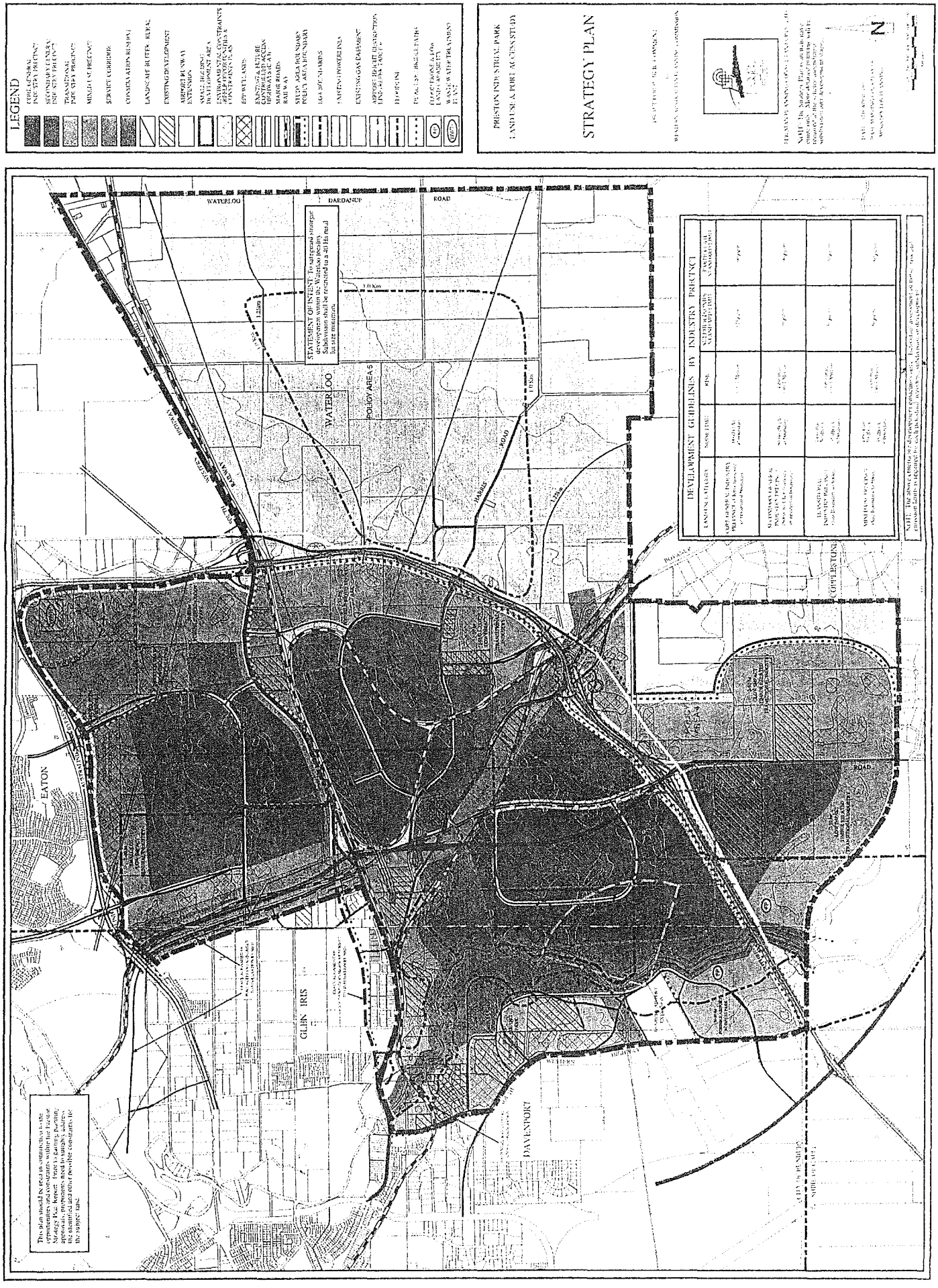

Figure 6. Preston Industrial Park Strategy Plan (Source: Industry 2030, Western Australian Planning Commission, May 1998).

Appendix 2

Letter to the Department of Resources Development from Muir regarding Brunswick River.

MUIR

Our Ref.: ME98-064-002

Department of Resources Development
Post Office Box 7606
CLOISTERS SQUARE
PERTH WA 6850

Attention: Mr Peter Goodall

Dear Mr Goodall

EVALUATION OF WETLAND - BRUNSWICK RIVER

1.0 INTRODUCTION

This letter report is in response to the request by Department of Resources Development (DRD) to provide an independent assessment of a wetland located near the Brunswick River, about 11 km north-east of Bunbury.

The wetland is located on the western-most of two possible railway routes, one of which is proposed to eventually connect the Kemerton Industrial Estate (about 35 km north-east of Bunbury) with Bunbury Port (WA Planning Commission 1998, Figure 9). The route under examination is referred to as T3 and crosses the Brunswick River somewhere in a 600 m corridor located just east of the Perth-Bunbury Highway (Figure 1 attached to this letter). The exact location of the railway alignment is yet to be determined.

Public concern has been expressed about damage to the wetland from railway construction and this has prompted DRD to seek a view on its significance.

2.0 BACKGROUND

The riverine margins (including the wetland) of the Brunswick River downstream from Brunswick Junction are a System 6 Reserve (Recommendation C67 of Department of Conservation and Environment 1983). The Department of Environmental Protection (DEP) has the wetland portion of the river floodplain specifically mapped as an Environmental Protection (Swan Coastal Plain Lakes) Policy (EPP) wetland (DEP map titled "Lakes EPP" and dated 27/05/1998).

The wetland is not distinguished from floodplain on Map 2031 II NW of Hill *et al.* (1996) where it is shown as Area 22. It is also not shown as an EPP wetland on this map.

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The wetlands along the T3 route have been mapped by BSD Consultants (1997). The BSD report (Plan 4) shows the wetland, and Plans 5 and 7 also of that report show the System 6 Reserve, but the report does not recognise the wetland as an EPP wetland on either Plan 5 (Environmental Constraints) or Plan 6 (EPP Wetlands). The area which includes the wetland is shown on BSD Plan 8 as Park, Recreation and Drainage, and on Plan 11 as Recreation.

3.0 FIELD EVALUATION

3.1 Method

The site was examined on foot on 12 June 1998. The wetland was examined from the south bank, and the area along the river examined for a distance of about 1.5 km. The north bank of the southern branch (Figure 1 attached to this letter) was examined for a short distance, and also the north branch superficially. Some discussion was held on site with Chris Bishop (DEP Bunbury) with regard the latter areas in particular.

3.2 Results of Examination

Geomorphology and River Flow

The Brunswick River at this point consists of three "channels" (Figure 1):

- the north channel contained very little water at the time of examination and appears to take surplus water when the river flows at above-usual depths. Water which was present appeared to be stagnant or slow-moving and may represent water from rainfall rather than river flow;
- the south channel contains the main river channel on its north side. The main channel near the bridge is about 7 m wide and was flowing rapidly at the time of examination. Depth was not obvious but it was probably about 1 m deep;
- south of the main channel was a broad expanse of water which includes the EPP wetland on its southern margin (Figure 2). Water flow through the wetland could not be visually determined but was probably stagnant or very slow on 12 June. It is reported (Chris Bishop, DEP, pers. comm.) that local people have indicated the wetland remains for a time after the river level drops and is then separated from the river by a low bank. It would appear, therefore, that the wetland is probably an old stream channel which fills and becomes part of the river when the level rises.

East of the T3 corridor the old stream channel has been cleared for pasture and there appears to be an "island" (at least in part) about 30 to 50 cm higher than the Brunswick River main channel. Remnants of the old stream channel are apparent.

The southern margin of the river valley is quite steep (mostly about 15°) and drops off steeply into the bed of the wetland.

Vegetation

The upper slopes of the river valley margin adjacent to the wetland have Mixed Jarrah (*Eucalyptus marginata)* and Marri *(E. calophylla*) woodland to 14 m tall and 30-70% canopy cover. There isa poorly-defined middle stratum of Peppermint (*Agonis flexuosa*) and some Kunzea (probably

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K. ericifolia) to 5-6 m tall. Understorey includes numerous sedges and sedge-like species (e.g. *Lomandra*) together with Grass Trees (similar to *Xanthorrhoea brunonis*), Pineapple Bush (*Dasypogon bromiliaefollus*) and Buttercup (*Hibbertia hypericoides*). I consider the vegetation of the upper slopes to be typical of the area and soil type and, from my personal experience, with about average species diversity.

The lower slopes are dominated by Swamp Paperbark (*Melaleuca raphiophylla*) to 8 m tall, some Peppermint and *Agonis linearifolia* shrubs to 3 m tall, and an open understorey of sedges, Bracken (*Pteridium esculentum*), and mixed creepers and shrubs. The weed species Blackberry, Watsonia and Arum Lily are very abundant, but not evenly distributed along the banks.

In the wetland, and with the bases inundated at the time of survey, are scattered Flooded Gum (*Eucalyptus rudis*) to 12 m tall over Swamp Paperbark to 10 m tall, and smaller trees, possibly Swamp Paperbark or *Melaleuca incana*. The trees were not inspected closely because numerous birds were nesting there and the examiner did not want to disturb them. There were small amounts of Duckweed (*Lemna minor*) floating on the water, suggesting it was near-stagnant.

This vegetation type is not particularly unusual *per se*, but it is poorly represented in substantial stands. Most has been cleared for agriculture and broad stands in river-fringing situations such as along the Brunswick River I would consider very scarce. In addition, most locations where it does occur are backed by agriculture, not remnant Jarrah/Marri woodland as occurs at the present site.

Flora
The survey was brief and no attempt was made to compile a species list other than the obvious dominants. A specimen was collected, however, of a prostrate *Adenanthos*.

A small number of these *Adenanthos* plants (possibly 4 or 5) was noted, but exact number is uncertain as the plants are creeping and prostrate and what can appear to be a number of individuals can prove, on detailed examination, to be only one.

The specimen closely resembles *Adenanthos cygnorum chamaephyton* (previously known as *A. teges*) which is a Priority 1 plant species listed by the Department of Conservation and Land Management (CALM) as being known from only a few populations which are under threat. Muir Environmental (Muir Environmental 1997) has recently undertaken an investigation of this species, in which populations of the plant were recorded from Chidlow, Sawyers Valley and Collie. As I have limited time for this present study, I have taken the liberty of sending the specimen from Brunswick River to Paul Armstrong, a taxonomic botanist specialising in rare flora, to check its identity. He will contact you directly in due course.

Fauna
Kangaroos and other generalist fauna occur in the fringing woodland, but the most significant area, and the area of primary interest, is the wetland. At the time of examination there were about 50 active nests of Little Black Cormorant (*Phalacrocorax sulcirostris*), several nests were observed with eggs, and although no young were seen, they were heard calling and were probably very small. About another hundred Cormorants were "hanging about" the area.

The nests were suspended in flooded trees away from the bank edges. The habitat is ideal for this species because the bank, as indicated, is steep and drops rapidly into the water. This ensures that the nests are protected from foxes and cats because the water gets over wading depth for these predators quite close to shore.

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Also observed, although not observed nesting, were Australasian Grebe (*Tachybaptus novae-hollandiae*), Black Duck (*Anas superciliosa*), Grey Teal (*Anas gracilis*), White-faced Heron (*Egretta novaehollandiae*), Little Egret (*Egretta garzetta*) and Nankeen Night Heron (*Nycticorax caledonicus*). About 2 km north of the wetland a small flock of Australian White Ibis (*Threskiornis molucca*) was observed, and it is quite possible this species breeds in the wetland a little later in the season.

4.0 DISCUSSION AND CONCLUSIONS

As you are aware, the examination was, by necessity of other commitments, very brief. Nonetheless, in my opinion;

- the wetland area, used as a rookery, is very important for conservation;
- the fringing vegetation along the river is well preserved and scarce, and clearing should be minimised and preferably avoided; and
- there are very few sections of rivers of this nature in the south-west where there remains a "buffer" of bushland in good condition to protect and enhance the river foreshore.

The Wetland

The rookery is quite small, but it must be remembered that many of the larger rookeries, such as those which occurred along the Leschenault Estuary and near the SCM plant near Bunbury, are becoming increasingly disturbed and are gradually being abandoned by some species of nesting birds. Other rookeries, such as those near Mandurah, have been given over to urban development. The rookeries which remain are becoming increasingly scarce and under pressure, and must be preserved. I strongly recommend that the rookery be left intact and that the railway alignment be moved to at least 300 m away from it.

Fringing Vegetation

Maintenance of the fringing vegetation, which is in very good condition compared to that in most of the south-west, should be a priority. The vegetation of the proposed railway alignment on Route T3 is probably the best section along the whole river, and to place the crossing at this location would require considerable defence. I recommend the alignment be placed about 400 m to the east (exact distance uncertain), just east of the Perth-Bunbury Natural Gas Pipeline. Most of the riverine fringing vegetation has already been cleared from that area and so damage would be much less.

As you are aware, creation of discontinuities in linear vegetation strips by roads, railways, etc., decreases the connectivity of bushland for fauna movement and should be avoided or minimised as much as possible, especially in areas which are mostly cleared. That being so, the existing severance caused by the installation of the Natural Gas pipeline should be taken advantage of. I suggest the railway line be constructed as close as possible to the Natural Gas pipeline easement so that one very wide connectivity barrier is created rather than one smaller one (the pipeline) and one wide one (the railway). It could be argued that this would be less satisfactory than two less wide barriers, but considering the other issues such as weed invasion and fire protection, I would favour one wide easement.

Buffer Woodland

As indicated, the wetland and adjacent fringing vegetation is in as good condition as it is at this point because of the uncleared vegetation adjacent. I would recommend against any clearing of remnant woodland along this stretch of river for at least 300 m from the river margin at high water.

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Developments which cause major disturbance should be definitely avoided and would include urbanisation (dogs, cats, children, noise), commercial development (noise, odours, pollutant emissions), or major transport corridors (noise, vibration).

In summary, I recommend the proposed T3 Route be amended to follow the east side of the Natural Gas pipeline easement and that protection management be put in place as soon as possible for the wetland and remnant fringing vegetation. If, for geotechnical or other reasons, it is not possible to place the railway east of the gas pipeline, it should be as close as possible to the western side of the pipeline (as far as possible from the Highway) and with absolute minimal clearing of vegetation.

Thank you for the opportunity to undertake this work. We apologise for its brevity which is due to circumstances beyond our control, and hope that it meets your immediate needs. If you require any further clarification, please do not hesitate to contact us on our return from overseas on 13 July 1998.

Yours sincerely

Barry G Muir
Director
Scientific Content
12 June 1998

Jennifer H Muir
Director
Quality Assurance

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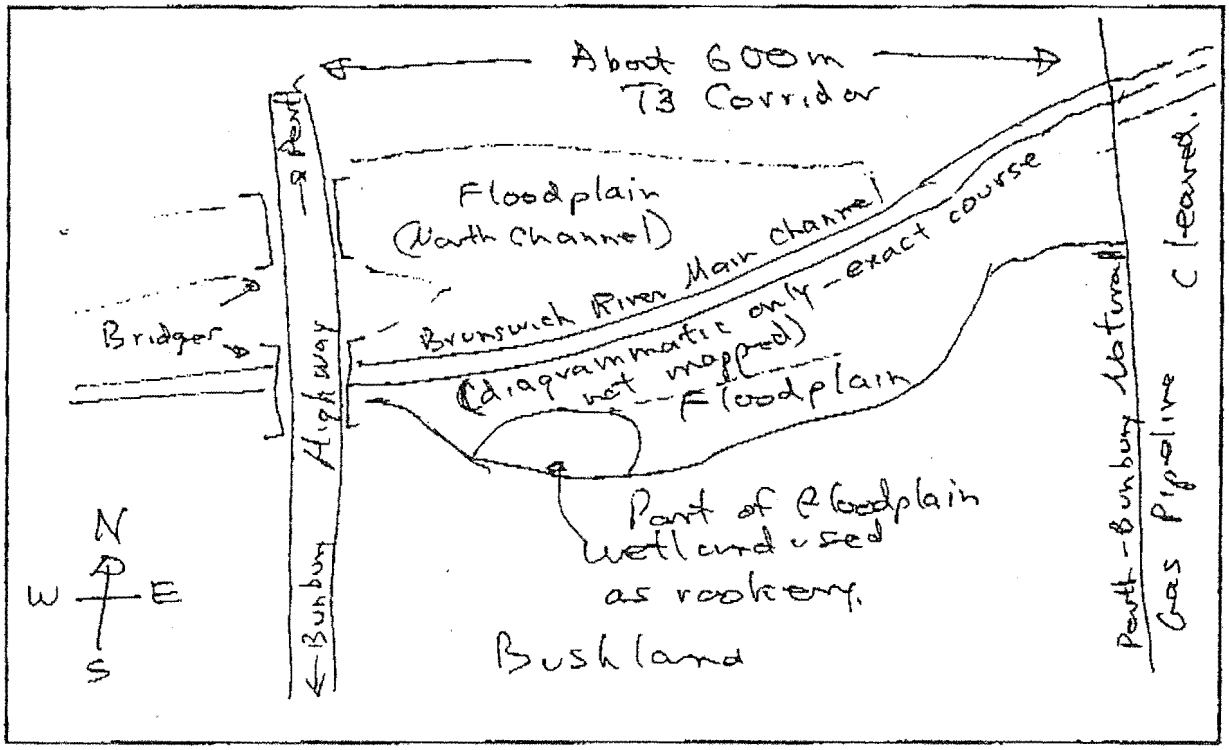

FIGURE 1
LOCATION PLAN
(not to scale)

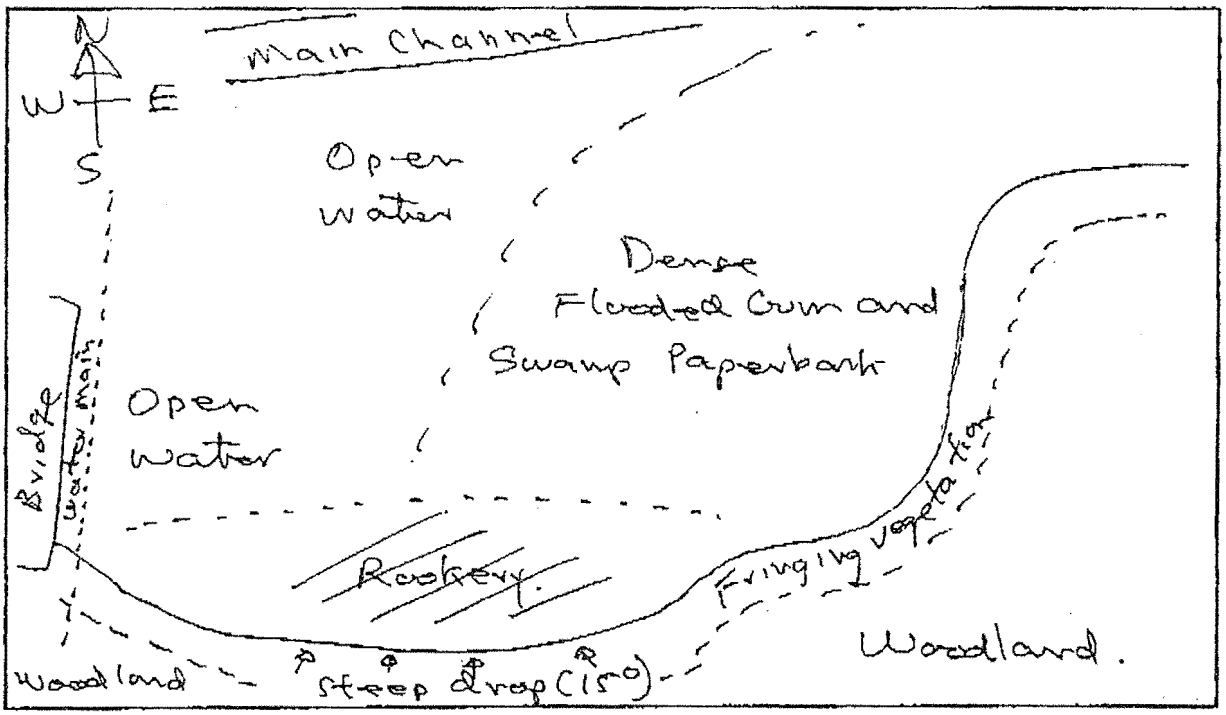

FIGURE 2
SCHEMATIC RIVER DETAIL
(not to scale)

Appendix 3

Extract from the Environmental Protection Authority's Report on the proposed Kemerton Aluminium Smelter (Bulletin 214)

APPENDIX D

INFRASTRUCTURE REQUIREMENTS OF THE ALUMINIUM SMELTER

1. INTRODUCTION

The ERMP outlined, in Section 3, the criteria used by the proponent to determine the location of the smelter. Among these were the following:

- proximity of location to assured long-term supplies of reasonable cost electrical energy. The available price of electricity will normally reflect energy, generation and transmission costs, the last generally increasing with distance;
- proximity of location to assured supplies of alumina, which is a major input to the production of aluminium. A location close to a suitable source of alumina should achieve transport cost saving; and
- the capital and operating costs of such physical infrastructure as power generation and transmission equipment, rail and road links and port facilities have a major impact on the economic viability of an aluminium smelter.

Clearly infrastructure provision is an important aspect of any major development, including the aluminium smelter. Each component is an integral part of the complete project and should, therefore, be subject to review and assessment as part of the whole development.

Marriott Road is the only form of physical infrastructure that is located within the proposed smelter site. All other services need to be provided.

This Appendix discusses many of the infrastructure components required by the proposed aluminium smelter. Provision of power to the smelter site has already been discussed in Appendix C.

2. SERVICES CORRIDOR STUDY

As with several other aspects of the proposal to establish an aluminium smelter at Kemerton, the provision of infrastructure was not dealt with in any detail in the ERMP, but rather some components have been outlined in a separate Government document, prepared by consultants to the Government and co-ordinated by the Department of Resources Development.

2.1 OUTLINE OF STUDY

The Aluminium Smelter Services Corridor Study (Dames and Moore, 1985) was prepared at the request of the Authority to assist with identification of physical and social environment impacts in relation to the provision of services to the Kemerton smelter. It was specifically intended to facilitate selection of a cost-effective railway alignment, to consider options for achieving a safe rail crossing of South West Highway and to assess the scope for providing other services within the proposed rail corridor. Due to the location of the smelter site, the study concentrated on the identification of possible corridors from the Wellesley River to the South West Main Line railway between Benger and Brunswick Junction.

2.2 INFRASTRUCTURE LINKS EXAMINED

Infrastructure links considered in the Corridor Study were:

- railway;
- road;
- water supply;
- natural gas; and
- telecommunications.

As the railway has major design constraints and least flexibility for change, evaluation of corridor options concentrated around the selection of a suitable railway route.

The possibility of locating the railway in conjunction with the proposed SECWA transmission line from Muja was reviewed but not considered to be feasible. The major reasons presented in the Corridor Study for this were:

- electric and magnetic fields produced around transmission lines can interfere with radio communication, telegraph and signalling facilities, thus affecting safe railway operations;
- the possibility of an accident where transmission lines fall onto the railway is such that construction in close proximity is to be avoided; and
- to achieve sufficient separation between a railway and a transmission line to overcome the above problems would require parallel easements of 40m and 60m respectively. Such

a 100m wide corridor would seem to defeat the concept of minimising physical and aesthetic disruption, which the common easement approach seeks to promote (Dames and Moore, 1985).

Based on previous experience, the consultants preparing the Corridor Study considered it unlikely that a single road would be effective in reducing the effects of traffic generated as a consequence of the construction and operation of the smelter. Departure and original destinations will be diverse and it would be expected that a variety of routes would be used, particularly within the Shire of Harvey.

The ERMP indicates that water supplies are expected to be obtainable from aquifers beneath the smelter site.

The existing natural gas pipeline to Bunbury passes through the Kemerton area. The necessary lateral to the smelter site would only be approximately 1 kilometre in length.

Telecommunications can be supplied either by microwave link to Bunbury or underground cables. The former would have minimal impact and the latter would have limited and transitory effects on the environment. The Corridor Study concludes that restriction of communication links to a services corridor would not be appropriate.

Port facilities would be required by the smelter. Further discussion of this is given in Section 3.3 of this Appendix.

2.3 RAILWAY CORRIDOR OPTIONS

A total of nine options for a railway alignment were considered in the Corridor Study. These are outlined in Table D-1 and illustrated in Figure D-1.

It is important to note that the Corridor Study did not consider corridor options within the Kemerton area.

The following recommendations were made in the Corridor Study:

- railway access can be provided with the least disruption to properties, land use and residents by selection of the Cactus Channel route option;
- land disruption can be minimised by incorporating that section of Beaufort Drain which parallels the channel, into a common easement with the railway spur. Wherever possible this easement should be limited to 40 metres, and should utilize the existing drain reserve as appropriate. Suitable provision for curves must however be allowed for;
- the opportunity to share common roads for access to the track, drains and channels should be pursued by the relevant authorities, with suitable provision for their respective operational requirements;
- careful consideration should be given to the potential impact of a railway on the householders at the junction of Wellesley Road and Beaufort Drain. If deviation around this house is likely to result in ongoing noise disturbance and property severance, it may be preferable to both the owners and Westrail, for Westrail to purchase the house;
- consultations with all relevant authorities and affected landowners should occur on an ongoing, as required basis;
- one of the most sensitive issues will be provision of a crossing of the railway spur by the South Western Highway. On the available information, deviation of the highway to the central or western alignment shown on Figure 4 (Figure D-1 in this Appendix), with a suitably protected level crossing, appears to be the best solution. This recommendation should be kept under review as detailed design proceeds to allow selection of the preferred alignment;
- adequate road access to both the east and west of the site will be required prior to smelter construction. On balance, it is recommended that existing routes be upgraded. Detailed selection of routes requires more information on demography and likely sources of construction materials. These aspects should be subject to detailed consultation between the Shire of Harvey, the project proponents and the relevant government authorities; and
- all other services are best provided on site or independently of the service corridors discussed in this report. (Dames and Moore, 1985, p.32.)

3. COMMENTS

3.1 INFRASTRUCTURE

The Authority is of the view that the environmental implications of any project can only be determined by subjecting all aspects of the proposal to close scrutiny. Where the effects are likely to be contentious or significant, there is a clear need to involve the public in this process.

Table D-1 Options Considered for Eastern Services Corridor

CORRIDOR OPTION	APPROX. LAND REQUIREMENT (1)(ha)	APPROX. LENGTH TO LAND MANAGEMENT BOUNDARY (km)	DRAINS/ CHANNELS AFFECTED (2)	NUMBER OF STRUCTURES AFFECTED BUILDINGS	DAMS	SECONDARY ROAD CROSSINGS (3)	INTER-PADDOCK BRIDGES	LOTS SEVERED	COMMENTS
ROAD 3030	47	11	1	6	1	2	—	1	Passes through swamp area, adjacent to special rural zone.
WELLINGTON	51	12.5	1	6	2	2	—	1	Crosses transmission line at 40° angle. Passes through swamp area.
PARTRIDGE	27	6.5	7	25	4	2	14	1	Residences both sides of Partridge Road.
CACTUS	25	6.2	5	1	1	1	0	0	Few trees bordering channel. Large farm lots.
BUTTERCUP — D	26	6.7	8	11	1	3	2	4-5	Numerous trees bordering 'D' drain. Transmission line nearby.
CRANE	26	7.2	4	10	2	3	9	3-4	Sterilization of land between railway and channel. Transmission line nearby.
MELVILLE	26	6.6	5	13	1	3	13	4-5	Housing on both sides of the road. Transmission line nearby.
MARRIOTT	26	6.9	7	7	2	2	4	1-2	Assumes Crane-Buttercup route in common. Proximity to transmission line.
ELVIRA	40.4	10.2	—	—	—	9	—	—	Crosses over nine secondary roads and two main rivers.

(1) To edge of Land Management Site
(2) Includes Wellesley River as a drain
(3) Does not include South West Highway
(-) Not assessed.

Source: Dames and Moore (1985)

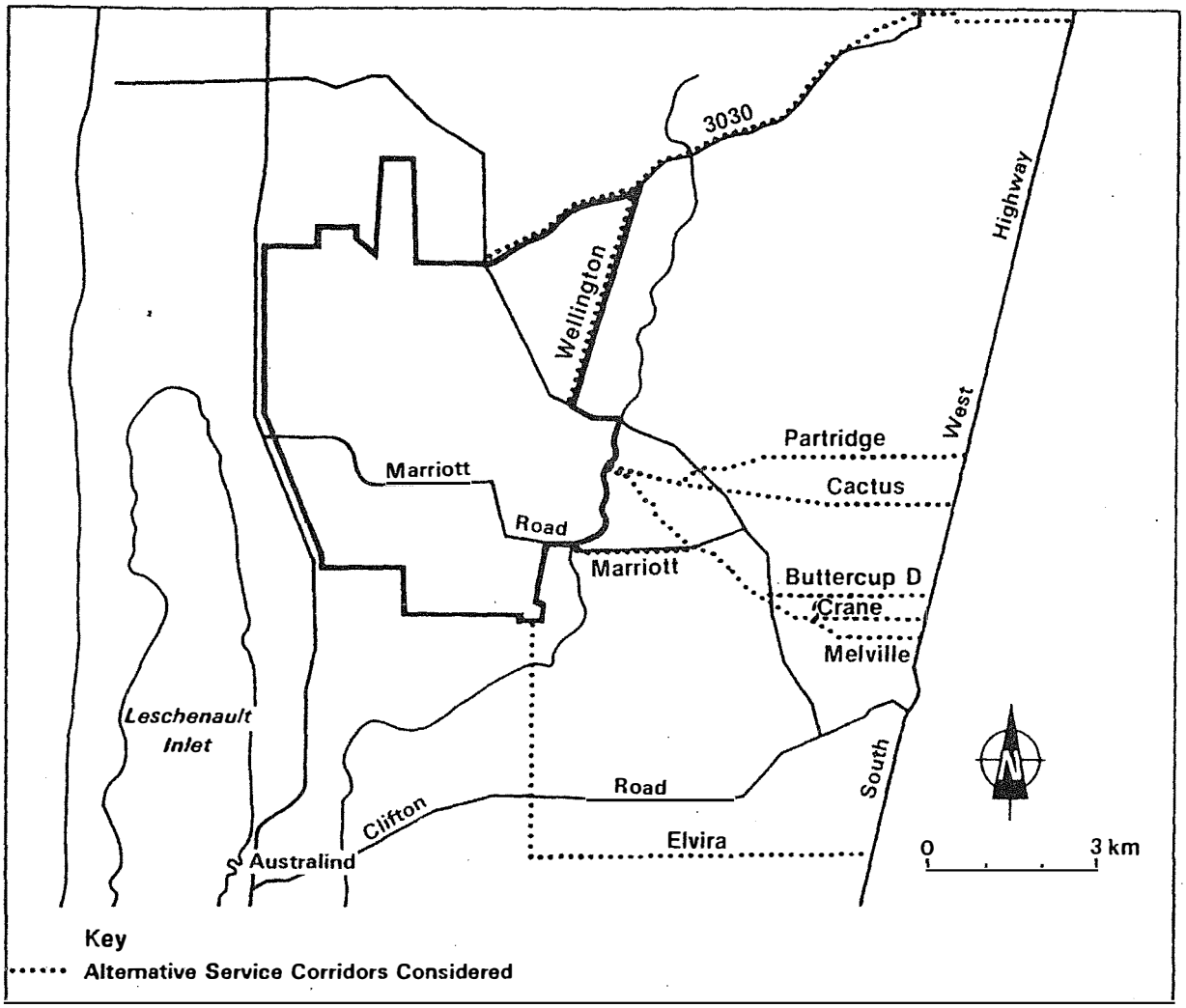

FIGURE D-1 Location of Options Considered for Eastern Services Corridor. Source : Dames and Moore (1985).

When the ERMP was being considered for public release, the Authority noted that a separate public document to address infrastructure requirements of the smelter was intended. One report, the Public Environmental Report on the "Proposed Transmission Line Interconnections for Proposed Aluminium Plant (Kemerton)', had already been accepted for release concurrently with the ERMP. Comment on this report is provided in Appendix C.

The Authority indicated that a similar document on infrastructure components should be prepared by the State and released to the public during the ERMP review period. Of particular concern to the Authority was the need to co-ordinate the provision of the services in order that the impact of them could be minimised. This could be achieved by limiting the number of service corridors to the smelter. One was already proposed in the transmission line PER and because technical problems might preclude transmission and railway lines running continuously for any distance, it was clear that at least one additional corridor was required, for the necessary rail connection to the smelter. It was envisaged by the Authority that this document would not only include consideration of those services to be located within the corridor but should mention those services to the smelter that could not or would not be part of the corridor, such as port facilities.

The Corridor Study was released on 17 April, to coincide with the last two weeks of the public review period of the ERMP.

3.2 DISCUSSION OF THE CORRIDOR PROPOSAL

The Corridor Study is a first stage analysis of the means by which service connections from the east of the smelter site can be consolidated. It is likely that only two major services would be required from this direction, power lines and the railway. Each will have a separate corridor although only the railway requires acquisition and substantial alteration of the landscape.

The railway alignment preferred in the Corridor Study has not been subject to any detailed geotechnical or other investigations and can, therefore, only be considered as preliminary at

this time. Based on the information provided in the Corridor Study and summarised in Table D-1, the Cactus Channel option appears to minimise the effects on the biophysical and social environments. Most other routes would cause significant social disruption.

Several specific aspects of the corridor proposal require further comment. As indicated in the Corridor Study recommendations, the means by which the railway crosses the South West Highway will be a sensitive issue. The Corridor Study has indicated a preference for a level crossing on either the central or western alignment. Given the nature of the topography of this area, any embankments or bridge structures will be highly visible on the landscape. In addition, the projected use of the railway is such that interference to road traffic would be limited and of short duration. In terms of environmental implications, the Authority would favour a level crossing along the central highway alignment as this would minimise disruption to existing land uses. However, it is appreciated that public safety factors are paramount and this may require grade separation.

The Authority has indicated in Section 7.1.1.1 that the shallow groundwater on the development site constitutes a major constraint which will, at the very least, substantially change the site preparation requirements. At worst this could entail a change of orientation of the potlines on site which, in turn, would require a reassessment of the services corridor options and the location of other infrastructure components, such as the SECWA substation.

Until the plant site and orientation are finally determined, the recommended location of the services corridor from the east can only be considered as preliminary.

RECOMMENDATION 28:

The EPA recommends that any significant potential environmental impact associated with the alignment, construction or operation of the railway should be referred to the EPA so that the environmental impacts can be addressed.

As mentioned earlier, the Wagerup — Bunbury natural gas pipeline passes through the Kemerton area. The Authority's desire to reduce the number of service corridors to the proposed smelter should be applied to the required pipeline lateral. The railway corridor provides an opportunity to achieve this.

RECOMMENDATION 29:

The EPA recommends that consideration be given by SECWA and Westrail to locating the proposed natural gas pipeline later within the proposed railway easement to the aluminium smelter, and the SECWA continue to liaise with the EPA.

3.3 PORT REQUIREMENTS

When the Authority sought the preparation of infrastructure documentation, one component mentioned was the requirements of the smelter for port facilities. This had been briefly mentioned in Section 4.10.1 of the ERMP, where augmentation of shore-based infrastructure was seen as being necessary.

Several recent studies have examined future requirements of and demands for port facilities at Bunbury. These include the Bunbury Port Strategy (Bunbury Port Authority/Co-ordinator General of Transport, 1984) and the Bunbury Port Industrial Area Study (T.S. Martin & Associates, 1984). Included in the former study is a review of the implications of an aluminium smelter on port facilities. The conclusion reached in this study was that:

". . . the port will be able to comfortably handle the smelter trade over the existing general purpose berth without the need for any major redevelopment such as a new berth' (Bunbury Port Authority/Co-ordinator General of Transport, 1984, p. 46).

Although berth expansion will not be necessary, the smelter will require the establishment of a range of new facilities associated with the unloading, loading and storage of raw materials and aluminium metal. The impact of the development of these facilities has yet to be determined, but they may raise environmental issues.

In the event that any environmental impacts are identified, details of proposals for loading, off-loading and storage facilities at the Port of Bunbury should be provided to the Authority.

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