# Draft Inner Peel Region Structure Plan

**A submission to the Western Australian Planning Commission prepared under Section 16 of the Environmental Protection Act**

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

**Environmental Protection Authority**
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### Appendices

## 1. Introduction

The primary purpose of this report is to provide the Environmental Protection Authority's (EPA's) advice under Section 16 (j) of the Environmental Protection Act on the Inner Peel Region Structure Plan (WAPC and Government of Western Australia 1996). This advice examines the Inner Peel Region Structure Plan ('the Structure Plan) in relation to the relevant environmental factors and their associated EPA objectives.

The EPA understands the Structure Plan will be finalised following consideration of public submissions (including this submission) and is intended to be used as a basis for formulating part of the Peel Region Scheme ('the Region Scheme'). The Region Scheme covers a greater geographic area than the Structure Plan (Appendix 1: Figure 1).

The proposed Region Scheme was referred to the EPA and Instructions for the Environmental Review of the Region Scheme have been issued. The Instructions separate environmental factors into:

- those which should form the principal basis of the EPA's assessment report to the Minister for the Environment, namely 'environmental factors relevant to the scheme'; and
- those which warrant attention in the Environmental Review but are likely to be addressed at later levels of planning, namely 'deferred environmental factors'.

The more detailed Environmental Review for the Region Scheme ('the Environmental Review') may identify environmental requirements that are inconsistent with the Structure Plan. Where the Region Scheme adopts these environmental requirements it is expected that the Structure Plan would be modified to be consistent with the Region Scheme.

This advice includes a focus on providing guidance for preparation of the Environmental Review for that part of the Region Scheme covered by the Structure Plan and follows the same separation of environmental factors as the Region Scheme instructions.

## 2. Limitations and scope of report

Principally, this report focuses on the elements in the Structure Plan which represent new developments, notably, new residential and industrial areas. Existing residential areas will not be covered.

Proposals currently subject to separate environmental impact assessment from referrals under Section 38 of the Environmental Protection Act have not been considered in this advice. These proposals are:

- Perth to Bunbury Highway - South of Metropolitan Region Scheme Boundary to Bagieau Road, Lake Clifton (Assessment No 786);
- Residential development and drainage, Amarillo Farm, Karnup (Assessment No 940);
- Tourist, residential and recreation development at Point Grey, Shire of Murray (Assessment No 1004).

This advice does not consider the portion of the Structure Plan north of the Metropolitan Region Scheme border because, with the exception of the proposed Residential development at Amarillo farm, these areas were included in the South West Corridor Structure Plan which has recently been assessed by the EPA (Environmental Protection Authority 1994c).

This advice does not consider the land westward of the Lake Clifton catchment (Appendix 1: Figure 1) as this is to be addressed through the Lakelands Planning Strategy. The EPA criteria for the protection of Lake Clifton (EPA 1995) have been endorsed by the Western Australian Planning Commission (WAPC) and would form the basis for the protection of the lake as part of the Lakelands Planning Strategy. At the time of compiling this bulletin the Lakelands Planning Strategy had not been published.

The information above is collated in Appendix 1: Figure 1 which shows the area considered by this Bulletin.

The scope of this advice embraces discussion of biophysical impacts, pollution management and social surroundings (as they relate to biophysical impacts) which would need to be addressed if the Region Scheme were to implement the Structure Plan and its associated policies.

## 3. Basis of the advice

Section 16 (j) of the Environmental Protection Act enables the EPA "to publish reports on environmental matters generally". This provision has been utilised to enable the EPA to make a submission on the Structure Plan issued for public comment by the WAPC. The EPA has not sought advice from other agencies or the public in preparing its submission because the WAPC would receive comment from these sources directly.

The advice contained in this Bulletin was formulated by the EPA based primarily on input from officers of the Department of Environmental Protection.

## 4. Discussion of the environmental factors

### 4.1 Identification of environmental factors

As noted in Section 1 the environmental factors have been identified as either "environmental factors relevant to the scheme" or "deferred environmental factors".

The EPA has determined that the following are environmental factors relevant to the Structure Plan:

Biophysical

- Vegetation in existing and proposed conservation estate;
- Regionally significant vegetation;
- Fauna and habitat in existing conservation estate;
- Regionally significant fauna and habitat;
- Regionally significant wetlands;
- Estuaries - Peel & Harvey Estuary;
- Foreshore stability and dune protection;

Pollution management

- Ground water quality - public water supply;
- Surface water quality - cumulative impacts;
- Odour;
- Gaseous emissions;
- Solid waste disposal;

Social surroundings

- Risk and hazard; and
- Urban bushland.

In addition, the EPA has determined that the following are deferred environmental factors and can be appropriately addressed at subsequent stages in the planning and development approval process.

Biophysical

- Regionally significant vegetation in the rural land;
- Regionally significant wetlands in the rural land; and

Pollution management

- Noise and vibration.

## Environmental factors relevant to the Structure Plan

### 4.2 Vegetation in existing and proposed conservation estate

The EPA's objective for vegetation in conservation estate is that:

> vegetation in the existing and proposed conservation estate should not be adversely impacted.

For the purpose of this objective, the proposed conservation estate is the area (if any) identified by the National Parks and Nature Conservation Authority (NPNCA) for future conservation needs. The EPA expects that the Department of Conservation and Land Management (CALM) would identify any such areas which are inappropriately identified in the Structure Plan in its submission.

The Structure Plan identifies areas in the existing CALM estate and crown reserves (Figure A23 in the Structure Plan) and it is understood that these areas have been categorised appropriately.

Indirect effects on the conservation estate could be significant unless managed properly, notably, edge effects. These can be managed through subdivision design (i.e. providing a hard edge) or by ensuring adjacent land-uses do not have significant off-site effects (e.g. spray drift and weed invasion). Indirect (edge) effects should be addressed in the Environmental Review for the Region scheme. This applies to those zonings which reflect new zoning changes at the town planning scheme level.

### 4.3 Regionally significant vegetation

This environmental factor refers to important vegetation not included or identified for inclusion in the conservation estate and to riparian vegetation. Some areas of bushland identified by the System 6 report on private land could fall into this category.

Regionally significant vegetation should be considered in the context of the national strategy for the conservation of Australia's biodiversity (Commonwealth of Australia 1996) to which Western Australia is a signatory.

The EPA's objectives for regionally significant vegetation are to:

(a) ensure the abundance, diversity, geographical distribution and productivity of vegetation communities is maintained;

(b) protect Declared Rare Flora and Priority Flora consistent with the provisions of the Wildlife Conservation Act 1950; and

(c) ensure riparian vegetation on substantial streamlines is adequately protected.

New development (i.e. new Urban, Commercial or Industrial Zones) which either directly or indirectly (i.e. by being adjacent to) affects these areas should be discussed in the Environmental Review for the Region Scheme.

### Adequate representation of vegetation communities

Meeting the EPA's first objective requires an understanding of vegetation conservation in the Swan Coastal Plain bioregion, a task currently being undertaken as a whole of government approach to the System 6 Update/Urban Bushland Strategy.

For new Urban, Commercial or Industrial Zones, the Environmental Review should detail which areas are considered to warrant protection as regionally significant vegetation and for each area describe its environmental value, tenure, current management, proposed land use allocation, compatibility of the proposed land use and then determine an appropriate recommendation for that area. This information would then be compared with the EPA objective and used to determine or confirm conservation needs in the Swan Coastal Plain bioregion.

In the interim the current System 6 report should be utilised. Where there are inconsistencies which cannot be justified on environmental grounds to the satisfaction of the EPA, existing System 6 areas should be protected by identifiable planning mechanisms or be shown on the Structure Plan as Open Space - Conservation.

### Peel Region Park, proposed tourist zone and System 6 area M107

The Peel Regional Park is the first area considered in detail here. The System 6 report identified an number of areas to be included in the Peel Regional Park, for example areas M108, C50, C51 and C52 (See Figure A24 in the Structure Plan) . The System 6 report recommended that:

"Areas identified through planning procedures as open space of regional significance should, where appropriate, be designated as Regional Parks".

The boundary for the Regional Park in the Structure plan has some differences to that recommended in the System 6 report.

The Structure Plan identifies Reserve 31922 on the eastern side of the Harvey Estuary as a Tourist Zone. Reserve 31922 is an A class reserve for Recreation vested in the Shire of Murray and is within System 6 area C51. It is not possible with the information provided in the Structure Plan to assess the potential impacts of tourist development in this area. Should tourist development be planned for this area, it would need to be referred to the EPA for environmental impact assessment. Alternatively, the area could be identified as Open Space - Conservation in the Structure Plan.

A part of System 6 area M107 is within the Structure Plan area and the majority of it is shown as Future Urban (Category A2).

As noted above, where there are inconsistencies which cannot be justified on environmental grounds to the satisfaction of the EPA, existing System 6 areas should be protected by identifiable planning mechanisms or be shown on the Structure Plan as Open Space - Conservation.

### Other regionally significant vegetation, for example threatened or poorly reserved plant communities

Other regionally significant vegetation beyond that already discussed remains in the Peel Region.

For example, two areas of threatened or poorly reserved plant communities are known within the area covered by the Structure Plan, namely Pinjarra 1 and Clifton 1 (Appendix 1: Figure 2). Part of Pinjarra 1 plant community area is shown zoned Industrial. If this inconsistency cannot be justified on environmental grounds to the satisfaction of the EPA this area should be protected by appropriate planning mechanisms or be shown on the Structure Plan as Open Space - Conservation.

In the proposed Rural Zone the Environmental Review should discuss ways in which these areas (e.g. Clifton 1 plant community area) could be identified and protected against

inappropriate development. Regionally significant vegetation in the Rural zone is dealt with in Section 4.16 as a deferred factor.

### Vegetated waterway protection corridors

The EPA's objective for this factor is based on investigation undertaken for the State of the Environment report which indicates that degradation of riparian vegetation (i.e. vegetation along waterways) is a significant concern in Western Australia. One remedy would be the establishment of vegetated waterway protection corridors of at least 50 m on substantial streamlines.

Substantial streamlines in the Structure Plan area include the Serpentine, Harvey and Murray Rivers. The Environmental Review may identify other rivers or creeks which should also be treated as substantial. The Structure Plan and Environmental Review should ensure the EPA objective is met along substantial streamlines. Consideration should also be given to meeting the objective for substantial drains which effectively function as streamlines.

## 4.4 Fauna and habitat in existing conservation estate

The EPA's objective for fauna and habitat in existing conservation estate is that:

> fauna and habitat in the existing conservation estate should not be adversely impacted.

It is understood that the Structure Plan categorises the conservation estate appropriately. The Environmental Review for the Region Scheme could discuss this factor under "Vegetation in existing conservation estate".

## 4.5 Regionally significant fauna and habitat

This environmental factor refers to important sites for fauna not included or identified for inclusion in the conservation estate. Some areas of regionally significant fauna habitat identified by the System 6 report on private land could fall into this category.

Regionally significant fauna and habitat should be considered in the context of the national strategy for the conservation of Australia's biodiversity (Commonwealth of Australia 1996) to which Western Australia is a signatory.

The EPA's objectives for regionally significant fauna and habitat are that:

(a) biological diversity should be protected and essential ecological processes and life support systems maintained; and

(b) important habitat areas for waterbirds should be identified in accordance with international treaties and published advice from Australian Nature Conservation Agency, and be protected from adverse impacts.

### Biological diversity

An evaluation similar to that proposed for regionally significant vegetation to determine conservation needs in the region should be undertaken for this environmental factor. This evaluation would also need to be linked to the System 6 Update/Urban Bushland Strategy bioregion information. In undertaking this exercise consideration needs to be given to national strategy objectives and actions (e.g. integrated management techniques such as wildlife corridors) (Commonwealth of Australia 1996). The extensive use of corridors in the Structure Plan is noted.

### Waterbirds

Waterbirds are recognised as regionally significant fauna in the Peel Region because there are areas of habitat which support waterbirds protected by international treaties, namely the Ramsar

Convention and the Japan-Australia and China-Australia Migratory Birds Agreement. This view is supported on the listing of the Peel-Yalgorup System as a Wetland of International Importance on the basis of waterbirds (Conservation and Land Management 1990), and the listing of several wetlands in the region as important because of waterbird use (Australian Nature Conservation Agency 1993). The wetlands covered under either of these listings are shown in Appendix 1: Figure 3 and are listed below:

- Peel Inlet and Harvey Estuary and their 5 km outlet channel to the Indian Ocean; also the lower (tidal) 1-2 km of inflowing rivers (Harvey River, Murray River and Serpentine River; also associated salt marshes around the system mainly in the far south (Harvey Delta), north-east (Austin Bay to Yunderup) and far north (Creery Marshes, Styx Chimney Marshes, bridges area);
- Yalgorup Lakes System - comprises two parallel lakes, Lake Clifton and Lake Preston and a series of smaller lakes in between: Duck Pond, Boundary Lake, "Linda's Lagoon", Lake Pollard, Martins Tank Lake, Yalgorup Lake, Lake Newnham (North and South);
- Lake McLarty System - comprises Lake McLarty, an unnamed swamp immediately north-west, Meelup Lake, "Robert Bay Swamp" and "Carraburmup (=Carrabungup Swamp) each to the maximum high water mark; and
- Barraghup Swamp.

These areas should be identified as part of the Environmental Review and appropriate protection measures identified. It is likely that most if not all of these areas will be covered under regionally significant wetlands as discussed in Section 4.6 below.

Adverse impacts include increased disturbance from adjacent new developments and should also be considered in the Environmental Review.

### 4.6 Regionally significant wetlands

The EPA's objective for regionally significant wetlands is that:

> key ecological functions of these wetlands should be protected and maintained through appropriate planning mechanisms.

Regionally significant wetlands include lakes protected by the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992, Wetlands of International Importance, important wetlands identified by the Australian Nature Conservation Agency (1993), wetlands with rare vegetation communities not adequately represented in reserves and wetlands identified in System Six. These wetlands are identified in Appendix 1: Figure 3.

One of the key management issues for these wetlands is the provision of adequate buffer areas. Buffer zones should be determined by reference to *Guidelines for design of effective buffers for wetlands of the Swan Coastal Plain* (Australian Nature Conservation Agency 1995), EPA minimum buffer requirements (i.e. 50 m distant from or 1 m AHD higher than the maximum water level, whichever is greater), and liaison with CALM.

The Structure Plan considers buffers in terms of a foreshore reserves for the Peel Regional Park but not for other wetlands. The Structure Plan states that there is a need for an adequate continuous foreshore reserve, with a minimum setback of 20 m from the high water mark where this can be identified (WAPC and Government of Western Australia 1996 p33). This 20 m minimum setback is inconsistent with the EPA's policy, but may be appropriate in some instances (See Australian Nature Conservation Agency, 1995).

The issue of adequate buffers for these wetlands should be discussed as part of the Environmental Review for the Region Scheme when considering new urban and industrial zones which directly or indirectly affect regionally significant wetlands. Regionally significant wetlands in the Rural zone are dealt with in Section 4.17 as a deferred factor.

The Structure Plan shows the following roads going across wetlands covered by the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992:

- the new local road south of Yunderup Road; and
- the Dunkerton to Husband Road link.

The Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 requires any proposal for filling, excavation, or drainage into or out of any lake to be referred to the EPA.

These proposals should be referred to the EPA for environmental impact assessment when detailed alignment and construction details are determined. It is noted that the Structure Plan acknowledges that the Dunkerton to Husband Rd link at Goergup Lake would require environmental impact assessment where it crosses the lake (which is also part of System 6 area M108).

In finalising the structure plan, consideration should be given to road alternatives to avoid alignment across lakes.

### Paganoni wetlands

Urban development is planned for land surrounding the Paganoni wetlands, also covered by the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992. The Structure Plan notes that land use changes on either side of Paganoni wetlands may result in changes to the water regime (WAPC and Government of Western Australia 1996 p52).

High water levels could significantly affect wetland vegetation through direct loss of species (particularly mature trees) and changes to vegetation structure.

Determining a range of acceptable water levels has been undertaken both at Jandakot and Gnangara (See documentation associated with EPA Bulletins 587 & 817 (Environmental Protection Authority 1991& 1996)). Changes to water balance can be predicted reasonably well. A number of best management practices to limit changes to water balance are identified in the *Planning and management guidelines for water sensitive urban (residential) design* published by the Environmental Protection Authority, Water Authority of Western Australia and Department of Planning and Urban Development in June 1994 (Environmental Protection Authority, et al. 1994b).

The EPA considers that the environmental impact of the urban development surrounding Paganoni wetlands should be discussed in the Environmental Review and an acceptable water management regime proposed before development is approved.

## 4.7 Estuaries (The Peel Inlet-Harvey Estuary)

The EPA's objectives for the Peel Inlet-Harvey Estuary are that:

> the environmental quality objectives for the Peel Inlet-Harvey Estuary specified in the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 and the water quality guidelines specified in EPA Bulletin 711 for the protection of aquatic ecosystems are met.

The EPA notes that the environmental quality objectives for new urban and industrial development in the Peel Inlet-Harvey Estuary will need to be refined for the Murray and Harvey River sub-catchments to take into consideration nutrient exports from existing land-use. The environmental quality objective for the Serpentine River sub-catchment is being refined through environmental impact assessment of the proposed residential development at Amarillo Farm on the basis of advice from the Water and Rivers Commission.

The most significant aspect of this environmental factor is the management of drainage and the contaminants it carries, particularly phosphorus. A large proportion of the land identified in the Structure Plan as Future Urban Category B, some areas of Future Urban Category A1 or A2 and some Industrial land is located on seasonally waterlogged land (mostly palusplain), which could require significant drainage and/or filling in order to permit development. Drainage provides a pathway for phosphorus to reach the Peel Inlet-Harvey Estuary.

Reliance on nutrient stripping basins has been proposed for urban developments with similar drainage problems at Ellenbrook and Jandakot. In both cases, the EPA has set water quality objectives in order to protect important water bodies down stream of these areas and sought a commitment to developing contingency plans if the nutrient stripping ponds are found to be ineffective.

The EPA has previously expressed concerns regarding urban development of land subject to waterlogging or high water table and the effectiveness of nutrient stripping basins. In its advice on the North-East Corridor Structure Plan the EPA stated that "*There is a lack of experience in the Perth area with the operation of detention/nutrient stripping ponds and it is difficult to verify their effectiveness in removing nutrients*" (Environmental Protection Authority 1994).

The Amarillo proposal is located on seasonally waterlogged land, and, in considering the this proposal, the EPA requested that the Water and Rivers Commission refine environmental (water) quality objectives for phosphorus export from urban development in the Serpentine River catchment. The Water and Rivers Commission advice is reproduced in Appendix 2.

The Structure Plan partly acknowledges the above concerns in the context of Amarillo, when it states "there is no indication at present that drainage/environmental issues east of the Serpentine at Amarillo can be resolved without a further experimental phase" (WAPC and Government of Western Australia 1996 p53).

The EPA has yet to finalise its assessment of the Amarillo development and the environmental quality objectives for phosphorus as proposed by the Water and Rivers Commission may need to be modified.

New urban and industrial zones on land which is either waterlogged or has a high water table, as is proposed in the Structure Plan, will need to be assessed as part of the Environmental Review. The Environmental Review will need to provide adequate information to demonstrate that water quantity and quality can be managed to meet environmental objectives. Otherwise it is doubtful that the land would sustain the proposed land use from an environmental perspective.

The Environmental Review should consider management of drainage from new industrial zones to reduce contaminants such as hydrocarbons and heavy metals.

### 4.8 Foreshore stability and dune protection

The EPA's objective for foreshore stability and dune protection is that:

> coastal processes should be maintained to ensure that the physical stability and ecological integrity of the coastline is not affected

The EPA notes that a coastal management strategy considered to form part of the Structure Plan (WAPC and Government of Western Australia 1996 p64) has recently been adopted by the Ministry for Planning. The EPA has not viewed the strategy, but expects that:

- consistent with the appropriate WAPC policy, that the strategy would identify areas of instability due to active coastal processes; and
- it would include mechanisms to ensure coastal processes are not adversely affected by new developments.

The Environmental Review should discuss the strategy in relation to the above expectations.

### 4.9 Groundwater quality for future public water supply area

This factor relates to the protection of groundwater aquifers for existing and future public water supply use. The Environmental Protection Authority's objective is:

> groundwater quality and quantity in the proposed public water supply area at Karnup should be protected.

The Structure Plan proposes that a Rural Groundwater Protection Zone be ultimately placed over part of the Karnup groundwater mound which is likely to be a future public water supply area. The final extent of the area of land required as an Underground Water Pollution Control Area (UWPCA) has not yet been determined and it is understood that the Region Scheme initially will not zone any land as Rural Groundwater Protection. In the interim, the zoning proposed for the area should not compromise the future protection of the aquifer and the declaration of an UWPCA. The Environmental Review should discuss how this could be achieved.

The boundary of this area and allowable land uses will also need to be consistent with the proposed State Groundwater Environmental Protection Policy, and associated schedule for the Karnup mound.

A new major road is proposed to link the eastern side of the proposed Amarillo Industrial area with Pinjarra. A portion of this road, south of Lakes Road crosses the future public water supply area (See Figure 13 of the Structure Plan). It is recommended that the final alignment of this road be determined following final definition of the UWPCA.

## 4.10 Surface water quality - cumulative impacts

### 4.10.1 Peel Inlet-Harvey Estuary

This environmental factor is concerned with water quality parameters other than phosphorus which has been addressed in Section 4.7. Parameters of concern include heavy metals, hydrocarbons, and turbidity which leads sedimentation of waterways.

The EPA's objective for Surface water quality - cumulative impacts Peel Inlet-Harvey Estuary are that:

(a) the cumulative impact of diffuse sources of water quality contaminants should not result in pollution; and

(b) sedimentation should not occur beyond natural levels in waterways.

#### Cumulative impact of diffuse sources

Pollution occurs when contaminant levels exceed the criteria specified for the beneficial use of the area. As previously noted, EPA Bulletin 711 specifies water quality criteria for the protection of aquatic ecosystems.

The proposed growth in the Peel Region allowed for by the Structure Plan (including Amarillo) could add to or create surface water quality problems. The Environmental Review should estimate the possible changes to water quality in the Estuary from growth associated with the proposed land uses in the Peel Region, and, if necessary, describe management measures to ensure environmental quality objectives or criteria are met.

#### Sedimentation

The EPA's objective for this factor is based on research undertaken for the State of the Environment report which indicates that sedimentation of waterways is a significant concern in Western Australia. The Environmental Review should discuss planning controls which could be used to reduce sediment loads to watercourses (e.g. requirements for stabilisation of development sites etc).

### 4.10.2 Marine waters

The EPA's objective for surface water quality - cumulative impacts Marine waters is that:

> nutrient export (particularly nitrogen) from the Peel Region (including the Peel Inlet-Harvey Estuary catchment) into the nearshore marine waters should be minimised and reduced

For this objective the catchment includes coastal sewerage treatment plants discharging into marine waters, other treatment plants on the coastal plain catchment of the Peel Inlet-Harvey Estuary and stormwater run-off.

The Peel Inlet-Harvey Estuary contributes significant loads of nitrogen (450-900 tonnes per annum) into the nearshore marine environment. Preliminary water quality studies have raised concerns that these outflows may be adversely influencing the marine environment (DEP In press)

The proposed growth in the Peel Region allowed for by the Structure Plan (including Amarillo) could add to or create water quality problems in marine waters. The Structure Plan does not address this environmental factor. However, the Environmental Review should estimate possible changes to and impacts to marine water quality from growth in the Peel Region.

## 4.11 Air quality - Odour

This factor relates to the need to provide for adequate separation distance between odour producing land uses and residential areas.

The Environmental Protection Authority has two objectives relevant to this factor:

(a) to ensure that odours from new odour-producing land uses do not adversely affect the welfare and amenity of residents in nearby existing and proposed future residential areas; and

(b) to ensure that where there is an existing odour-producing land use, new residential areas are located so that the welfare and amenity of those new residents are not adversely affected.

The EPA notes that the Structure Plan shows Future Urban within the desirable buffer areas of the Gordon Road and Halls Head wastewater treatment plants. Further, Appendix 3 of the Structure Plan notes that there are three poultry farms at Furnisdale/Barragup which are on land identified as Future Urban Category B.

The Environmental Review should address this matter. In general, the EPA would not support residential areas within the recommended generic buffer distances without proper scientific justification which shows that odour levels for any new residents would be acceptable. The EPA has endorsed the Queensland odour criteria, subject to acceptance by the Water Corporation and Ministry for Planning. The DEP is currently developing criteria a better understanding of odour assessment based on a study of poultry farm odours expected to be undertaken in the first half of 1997. The poultry farm study is expected to lead to a more formal odour policy by the end of 1997.

## 4.12 Air quality - Gaseous emissions

This section assesses the Structure Plan in relation to gaseous emissions from industrial zones and then to the broader matter of regional air quality, in particular, smog and haze.

### 4.12.1 Gaseous emissions from industrial zones

The Environmental Protection Authority's overall objective for gaseous emissions from industrial zones is that:

> gaseous emissions from industrial zones should not adversely affect the health, welfare and amenity of nearby land users.

The EPA recognises that the Environmental Protection Act has a role with respect to limiting gaseous emissions from industry but considers that some control can also occur through sound planning and planning controls.

The Structure Plan proposes a number of industrial areas in the region and it is understood that they would be for general rather than heavy industry. It is assumed, therefore, that any industry which is located there would be managed so that levels of noxious gases would be at acceptable levels within and outside the boundary of the zone. The Environmental Review should discuss how the planning system could ensure that the zone is managed accordingly. The use of compatible zonings could be one such management option.

### 4.12.2 Regional air quality - smog and haze

The EPA's objective for regional air quality - smog and haze is that:

> criteria outlined in Department of Environmental Protection Technical Series 86 should be met.

The EPA's objective is an interim objective, pending the outcome of the National Environmental Protection Measure for ambient air quality.

Regional air quality is influenced by a range of factors including:

- transport (influenced by factors such as travel distances resulting from the juxtaposition of land-uses and the modal share of cars, public transport, cycling and walking);
- wood stoves;
- development controls (e.g. smoke from land development sites);
- hazard reduction burning; and
- industrial emissions.

The EPA is concerned that should urbanisation occur in the region to the extent proposed in the Structure Plan, air quality in the Peel and greater Perth area could deteriorate further. The EPA believes that the Environmental Review should address this matter by estimating the likely impact on regional air quality in the event that Peel is developed as proposed in the Structure Plan, using the models already available to government, notably, those used by the Department of Environmental Protection. Proposed urban design measures which could limit generation of emissions should also be referred to (e.g. the Community Codes).

### 4.12.2 Greenhouse gases

The WAPC has recently released its State Planning Strategy (WAPC, 1996) and reference is made to this factor. The Strategy noted that "Planning can play a role at a local level to reduce the consumption of energy" and "design of urban developments may contribute to the stabilisation of carbon dioxide and other greenhouse gases" (p38).

The EPA believes that planning at all levels can contribute to stabilisation of emissions of carbon dioxide and other greenhouse gases. The Structure Plan should show how the broad criteria set in the State Planning Strategy can be implemented at the regional and local levels of planning. Where appropriate, the Environmental Review of the Region Scheme for Peel should also address this factor.

## 4.13 Solid waste disposal

The EPA's objective for solid waste disposal and management is that:

> there be a reduction of 50% in waste going to landfills achieved by waste avoidance, re-use and recycling strategies and that the remaining waste is disposed of in an environmentally acceptable manner, including landfill.

The Structure Plan does not consider whether the proposed growth in the Peel Region could pose significant problems for waste disposal, nor how the planning process can assist in waste reduction to landfill.

The Environmental Review of the Region Scheme should estimate the magnitude of waste to be disposed of, detail how and where the waste is to be disposed of and discuss how planning measures can be used to minimise waste production. It should consider the impact of these strategies on the regional environment, and how the impacts can be ameliorated.

## 4.14 Risk and hazard

Certain land uses, notably industry, could generate levels of risk and hazard which would be unacceptable for residential areas. Transport of hazardous goods also has risks.

The EPA's objective for risks and hazard is that:

> risk levels should be as low as reasonably achievable and comply with acceptable standards.

The EPA's criteria for the assessment of the fatality risk of proposed hazardous and industrial developments is outlined in Bulletins 611 and 627.

Land uses identified in the Structure plan which could generate risk include: gas pipelines (explosion and fire), water treatment plants (chlorine storage) and certain industries which could be located within the industrial zones.

The Environmental Review should address this matter. Generally, this would require the identification of these land uses (existing and future), calculation of individual risk contours, and locating new residential areas or other new land use so that no future or existing residents would be exposed to unacceptable risk.

It should be noted that national standards are being developed for societal risk. Where this can be done, the Environmental Review should also address this matter.

In the Industrial Zones, planning mechanisms should be proposed, where appropriate, to ensure that unacceptable risk is contained within the zone, or that compatible zones which satisfy appropriate buffer requirements are provided.

Transport of dangerous goods is likely to be an issue in the Peel Region. The EPA has recently recommended that the Ministers for the Environment, Transport, and Mines undertake a risk study to integrate the road transport of dangerous and hazardous goods in the greater Perth metropolitan area with particular reference to environmentally sensitive areas such as wetlands and regionally significant vegetation.

In considering the proposed residential development and drainage at Amarillo Farm, Karnup, the EPA was made aware of the potential public health risk from mosquito-borne viruses in the Peel region. The EPA notes that the Structure Plan makes brief reference to mosquito and midge nuisance problems for residential development (WAPC and Government of Western Australia 1996 p13). However, the results of mosquito monitoring and the implications for structure planning are not explicit elsewhere in the Structure Plan. The EPA considers that public health risks should be addressed in the Structure Plan and understands that the Health Department of Western Australia has made a submission on the Structure Plan.

### 4.15 Urban bushland

Urban bushland (other than regionally significant vegetation) is recognised as a significant local environmental issue of interest to the public. The Environmental Review should discuss how this matter would be addressed.

## Deferred environmental factors

### 4.16 Regionally significant vegetation in the rural land

It is possible that there could be areas of regionally significant vegetation within the proposed Rural Zone, including the proposed Rural Living Zone. Under the existing local authority planning schemes development and subdivision could take place within this zone which would not require re-zoning at the Region Scheme level. To avoid the loss of these important areas, the Environmental Review should identify those areas known to be of regional significance, and then propose a mechanism that would either ensure that these areas are protected, or that development which could either directly or indirectly impact on these areas are referred to the EPA for environmental impact assessment.

### 4.17 Regionally significant wetlands in the rural land

It is possible that there could be wetlands of regional significance within the proposed Rural zone, including the proposed Rural Living Zone. Under the existing local authority planning schemes development and subdivision could take place within this zone which would not require re-zoning at the Region Scheme level and could impact on these important wetlands. To avoid any impacts on these wetlands, the Environmental Review for the Region Scheme should identify those wetlands known to be of regional significance (as described in Section 4.6 of this Bulletin), and then propose mechanisms that would either ensure that these wetlands are protected, or that development which could either directly or indirectly impact on these areas are referred to the EPA for environmental impact assessment.

### 4.18 Noise and vibration

The EPA's main concern here relates to noise and vibration from the rail corridor. The EPA's objective for noise and vibration is that:

> noise and vibration in residential areas near land uses generating significant levels of noise should meet statutory requirements and acceptable standards.

The Environmental Review should discuss the mechanism through which this matter would be addressed and at what level of planning.

The EPA is aware that in some instances, road transport noise can impact adversely on residential development as could have occurred at Marlston Hill in Bunbury (Environmental Protection Authority 1995a). The Environmental Review should consider whether or not similar situations, namely significant road noise impacts on residential areas, are likely to occur in the Peel Region Scheme area.

## 5. Summary

### 5.1 Matters to be addressed in the Environmental Review

The Environmental Review should describe how each EPA objective is to be met. In particular, for each of the following environmental factors the Environmental Review should:

*Biophysical impacts*

*Vegetation in existing conservation estate*

- For new Urban, Commercial and Industrial Zones, ensure indirect (edge) effects are minimised, particularly through subdivision design;

*Regionally significant vegetation*

- For new Urban, Commercial and Industrial Zones, identify and protect an adequate representation of ecosystems in the context of the Swan Coastal Plain bioregion;
- For new Urban, Commercial and Industrial Zones, ensure existing System 6 recommended areas and known threatened or poorly reserved plant communities are adequately protected until the System 6 update/Urban Bushland Strategy is complete. Particular reference should be made to the Peel Regional Park boundaries and System 6 area M107;
- Describe how regionally significant vegetation in the Rural zone can be identified and protected from inappropriate development;
- Ensure that substantial streamlines are identified and their riparian vegetation is protected or enhanced;
- Ensure indirect (edge) effects are minimised;

*Fauna and habitat in existing conservation estate*

- Ensure indirect (edge) effects are minimised;

*Regionally significant fauna and habitat*

- For new Urban, Commercial and Industrial Zones, identify regionally significant fauna and habitat in the context of the Swan Coastal Plain bioregion;
- Describe how regionally significant fauna and habitat areas in the proposed Rural zone can be identified and protected from inappropriate development;
- Identify important waterbirds habitats and describe appropriate protection measures;

*Regionally significant wetlands*

- For new Urban, Commercial and Industrial Zones, identify and protect from direct and indirect impacts regionally significant wetlands and their proposed buffer zones (using information in Section 4.6 of this Bulletin);
- Describe measures to protect the Paganoni wetlands from unacceptable changes to the water regime from urbanisation;

*Estuaries (The Peel Inlet-Harvey Estuary)*

- For new Urban, Commercial and Industrial Zones on seasonally waterlogged land (i.e. palusplain) provide adequate information to demonstrate that water quantity and quality can be managed to meet environmental quality objectives and the appropriate water quality criteria from EPA Bulletin 711;

*Foreshore stability and dune protection*

- Explain how the recently published coastal management strategy will be implemented to ensure coastal processes are maintained so the physical stability of the coastline is not affected;

*Pollution management*

*Ground water quality for future public water supply area*

- Describe how the zoning proposed for the future public water supply area at Karnup ensures groundwater quality and quantity in this area will be protected;

*Surface water quality - cumulative impacts*

- Estimate possible changes to water quality in the Peel Inlet-Harvey Estuary from the growth identified in the Structure Plan and, if necessary, describe possible management measures;
- Discuss planning controls which could be used to reduce sedimentation in waterways;
- Estimate possible changes to water quality in marine waters from the growth identified in the Structure Plan and, if necessary, describe possible management measures;

*Odour*

- Explain how the desirable (or scientifically determined) buffer areas around Gordon Road and Halls Head waste-water treatment plants and existing poultry farms are to be maintained whilst the odour producing land-uses continue;

*Gaseous emissions*

- Discuss on-going management of industrial zones to ensure acceptable levels of emissions within industrial areas and at residential zone boundaries;
- Estimate possible changes to air quality in the Peel Region from growth proposed in Structure Plan using existing models.

*Solid waste disposal*

- Estimate the magnitude and type of wastes resulting from growth in the Peel Region and discuss how these wastes can be managed;

*Social surroundings*

*Risk and hazard*

- Identify land-uses which generate risks and hazards, calculate risk contours and locate new residential areas in areas where risks are acceptably low;
- Consider societal risk where appropriate;
- Consider public health risks from mosquito-borne viruses; and

*Urban bushland*

- Discuss urban bushland.

For the following deferred environmental factors the EPA considers the Environmental Review should:

*Biophysical*

*Regionally significant vegetation in the rural land*

- Identify mechanisms to protect these areas;

*Regionally significant wetlands in the rural land*

- Identify mechanisms to protect these areas; and

*Pollution management*

*Noise and vibration*

- Discuss potential impacts on residential areas from the rail alignment and road noise.

## 5.2 Proposals which should be deferred until further information is available

Referral of the following proposals in the Structure Plan is necessary when more information is available:

- development in the Tourist zone over Reserve 31922;
- the new local road south of Yunderup Road;
- the Dunkerton to Husband Road link;

New urban and industrial development on the palusplain will need to demonstrate that drainage quality and quantity can be managed to meet environmental objectives.

The alignment of the road linking the Amarillo industrial area to Lakes road should be determined following final definition of the UWPCA.

## Appendix 1

## Figures

Figure 1: Structure Plan area, Region Scheme area and area considered within the scope of this report. Areas currently subject to environmental impact assessment and excluded from this report are shown.

Figure 2: Threatened or poorly reserved plant communities within the Structure Plan area.

Figure 3: Wetlands identified as Important by the Australian Nature Conservation Authority or Wetlands of International Importance under the Ramsar convention.

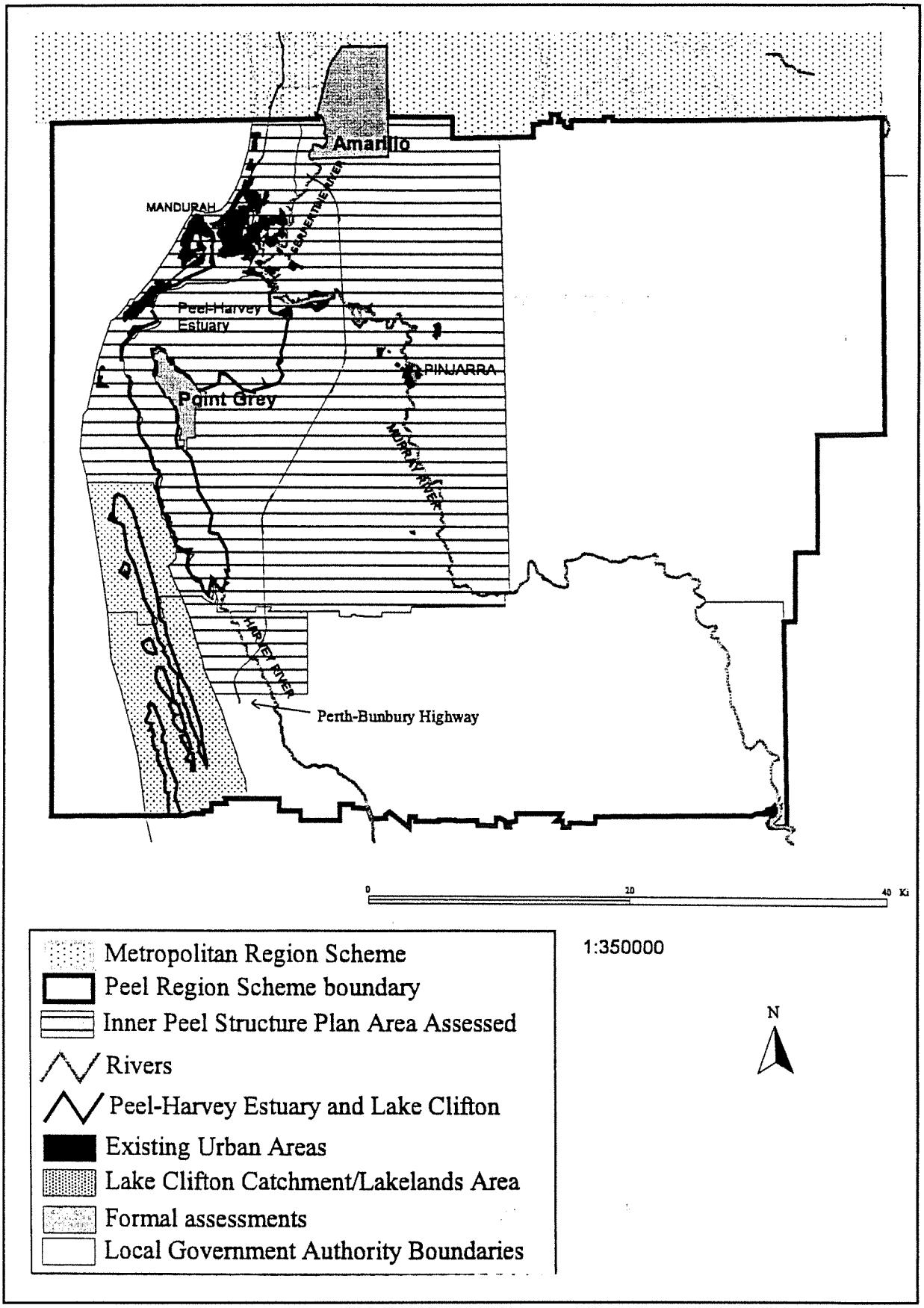


*Figure 1. Structure Plan area, Region Scheme area and area considered within the scope of this report. Areas currently subject to environmental impact assessment and excluded from this report are shown.*

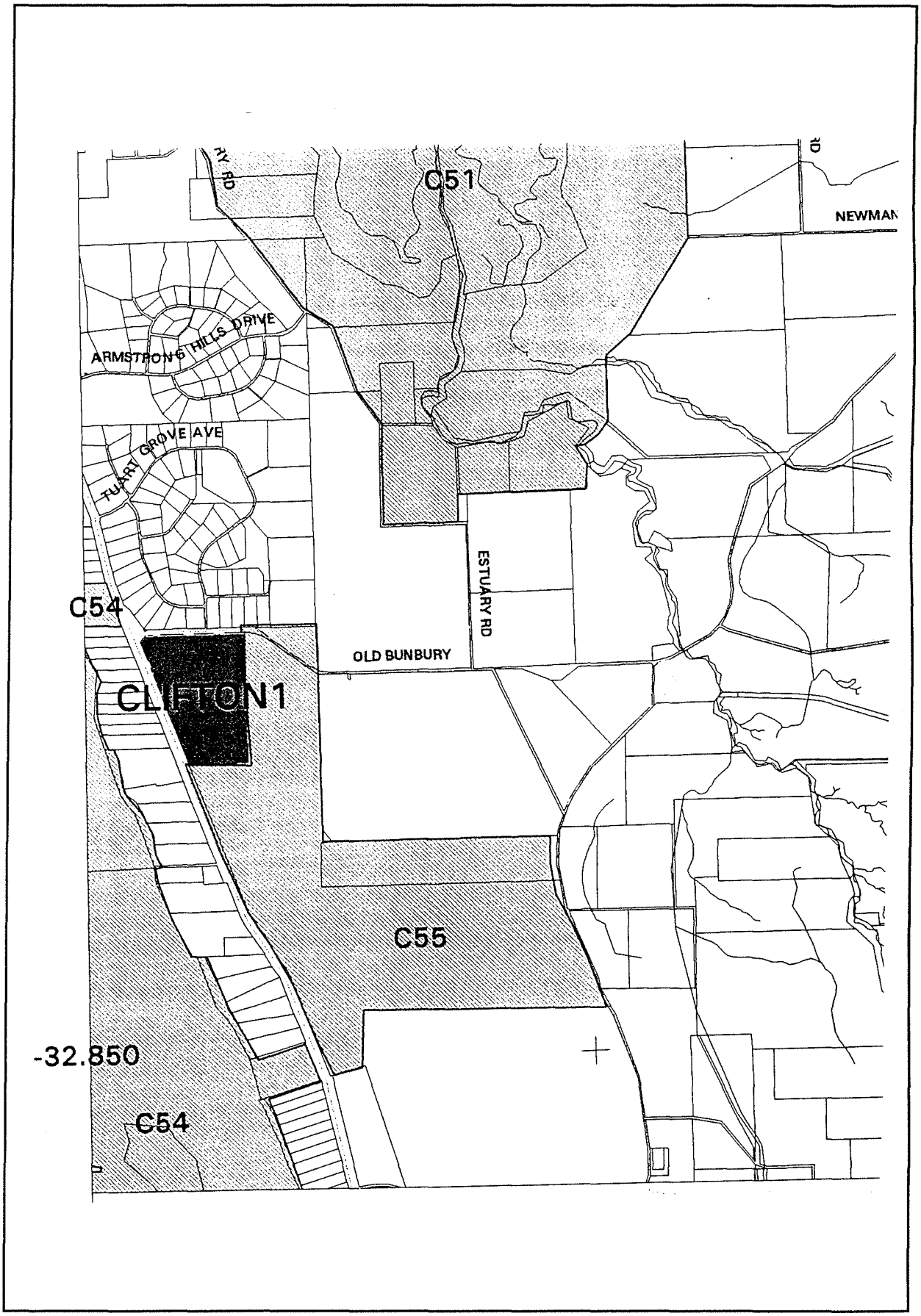


*Figure 2. Threatened or poorly reserved plant communities within the Structure Plan area.*

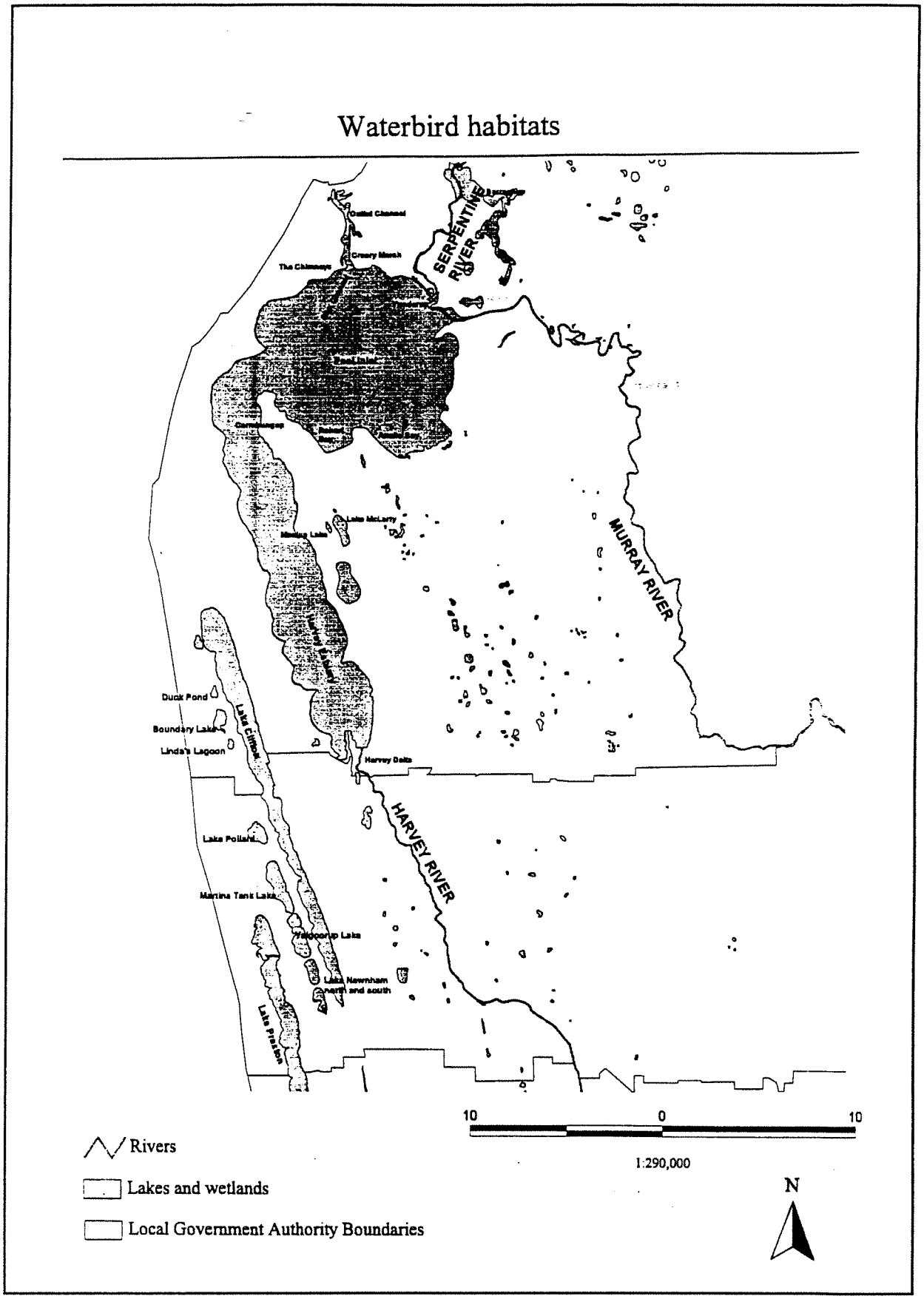


***Figure 3. Wetlands identified as Important by the Australian Nature Conservation Authority or Wetlands of International Importance under the Ramsar convention.***

# Appendix 2

## Water and Rivers Commission advice regarding water quality performance standards for Amarillo

**Water and Rivers Commission**
**Recommended Amarillo phosphorus Strategy**

## Objective

The Water and Rivers Commission recommends that the management of surplus water at the Amarillo subdivision should include best management practices to ensure that phosphorus and water discharges from the site are minimised. Setting a phosphorus export target as the primary objective may tell against minimising phosphorus export and is not recommended. However a standard is required as a performance guarantee and as a trigger to invoke additional control measures to limit phosphorus export.

## Best Management Practice

The minimum components of a BMP system are listed below. The BMP system must be designed for approval during the EMP phase.

Best practice is to include;

- detailed studies and modelling of the water and phosphorus balances on the site to optimise design of the management systems.
- riparian vegetation along the drains to trap sediment, prevent erosion and assimilate phosphorus and other deleterious substances
- wetlands to strip nutrients and trap sediments
- a drainage system designed to minimise lowering of groundwater levels by keeping drains above the AAMGL.
- extensive tree plantings in POS and reserves to maximise evaporation and transpiration.
- local use of groundwater to reduce the water table levels and minimise drain flows, preferably including a public irrigation water supply based on local wells.
- sewers to collect all wastewater
- extensive riparian vegetation protection along the Serpentine River.
- "continuous" measurement of phosphorus and water flow in drain outlets from the developed urban areas until there is confidence in the performance of the drainage system.
- conduct trials of alternative treatments to demonstrate that the phosphorus criteria are met and to refine the practice to reduce phosphorus levels further, as far as is practical and economic.

## Performance Standard

The BMP approach must be backed by performance standards to protect the Serpentine River and ensure that the practices are properly designed and operated. If the BMP system fails to achieve a flow weighted annual average total phosphorus concentration of discharging waters less than 0.075 mg/L or a total mass of phosphorus entering the Serpentine River less than 0.225 kgP/ha/a additional measures must be employed to reduce the phosphorus levels below those levels.

The Commission believes that phosphorus levels well below these levels will be achieved with the BMP approach.

## Appendix 1 - Background to acceptable phosphorus export criteria

### General Drain Water Quality

Generalised phosphorus criteria for drains (OCM publication "Catching the Slug" June 1992) includes the following.

| phosphorus (mg/L) | Class |
|---|---|
| less than 0.05 | pristine |
| 0.05 to 0.15 | Low |
| 0.15 to 0.25 | Moderate |
| 0.25 to 0.40 | High |

The recommendation puts the site within the Low class.

### Peel Harvey EPP Phosphorus Criteria

The EPP allowable average phosphorus yield from the Serpentine River Catchment is 0.27 kg/ha/a. At an expected drainage water yield of 3,000 kL/a this represents 0.09 mg/L, if the drainage water is the only export source of phosphorus.

The recommendation allows a phosphorus load of 83% of the EPP areal average load.

### Other urban drains

Comprehensive phosphorus monitoring of urban sandy Western Australian drains is not available.

Occasional monitoring of drainage water quality in seven urban sandy sites in Perth undertaken by the Water Authority during 1990/91 gave phosphorus concentrations of 0.014 to 1.72 mg/L for 175 samples with a mean of 0.193 mg/L. This has allowed phosphorus yields in the range 0.095 to 0.538 kg/ha/a to be estimated for the seven sites, 5 of which fell under the Peel Harvey EPP limit of 0.27 kg per ha limit. The monitoring was limited in duration and frequency and can not be reliably extended to the Amarillo site which will have different mixes of residential, commercial and POS areas and different drainage characteristics. The most similar siteto Amarilo and the one with the lowest phosphorus discharge, South Lakes, had a phosphorus concentration of 0.02 to 0.40 mg/L with an average of 0.094 mg/L.

### EPA Guidelines for phosphorus in aquatic Ecosystems

EPA guidelines indicate that phosphorus criteria should be determined on a site specific basis. However a phosphorus concentration of 0.1 mg/L is cited as an upper limit, above which deleterious impacts may occur.

**Appendix 2 - Urban Drainage Phosphorus sampling (WAWA, 1990/91)**

| Total phosphorus mg/l | Season | Place | No Samples |
|---|---|---|---|
| 0.444 | Autumn | Balcatta | 10 |
| 0.050 | Spring | Balcatta | 8 |
| 0.102 | Winter | Balcatta | 7 |
| 0.377 | Autumn | Bayswater II | 8 |
| 0.080 | Spring | Bayswater II | 9 |
| 0.048 | Winter | Bayswater II | 8 |
| 0.233 | Autumn | Bayswater I | 10 |
| 0.040 | Spring | Bayswater I | 6 |
| 0.130 | Winter | Bayswater I | 7 |
| 0.730 | Autumn | Beatrice Ave | 6 |
| 0.219 | Spring | Beatrice Ave | 10 |
| 0.374 | Winter | Beatrice Ave | 12 |
| 0.322 | Autumn | Myaree | 10 |
| 0.111 | Spring | Myaree | 11 |
| 0.107 | Winter | Myaree | 9 |
| 0.156 | Autumn | South Lake | 13 |
| 0.041 | Spring | South Lake | 10 |
| 0.056 | Winter | South Lake | 7 |
| 0.181 | Autumn | Woodlands | 5 |
| 0.058 | Spring | Woodlands | 6 |
| 0.035 | Winter | Woodlands | 3 |

# Appendix 3

# References and bibliography

Australian Nature Conservation Agency 1993, *A directory of important wetlands in Australia,* Commonwealth of Australia

Australian Nature Conservation Agency 1995, *Guidelines for the design of effective buffers for wetlands on the Swan Coastal Plain,* Australian Nature Conservation Agency

Conservation and Land Management 1990, *Wetlands nominated by the government of Western Australia for inclusion on the list of Wetlands of International Importance - Ramsar Convention,* Perth, WA

Commonwealth of Australia 1996, *The national strategy for the conservation of Australia's biological diversity*, Commonwealth Department of the Environment, Sport and Territories.

Dendy, T. 1987, 'The value of corridors (and design features of same) and small patches of habitat', in *Nature conservation The role of remnants of native vegetation*, vol. D.A. Saunders, G.W. Arnold, A.A. Burbidge & A.J.M. Hopkins (ed.), Surrey Beatty & Sons Pty Ltd, Perth WA

Department of Environmental Protection 1996, *Ambient air quality data summary Western Australia (January 1996 - March 1996) Technical Series 86* Department of Environmental Protection, Perth WA.

Department of Environmental Protection in Press, *Southern Metropolitan Coastal Waters Study* Department of Environmental Protection, Perth WA.

Environmental Protection Authority 1983, *Conservation Reserves for Western Australia - The Darling System - System 6 (Parts I and II),* Department of Conservation and Environment, Perth WA, Report 13, October 1983

Environmental Protection Authority 1991, *Jandakot Groundwater Scheme Stage 2,* Perth WA, Bulletin 587, October 1991

Environmental Protection Authority 1992a, *Urban development of part Lot 12 and Reserve 34664 (affecting part of System 6 Recommendation M107), Golden Bay,* Environmental Protection Authority, Perth, WA, Bulletin 648, September 1992

Environmental Protection Authority 1992b, *Urban development of Lot 1001 (affecting part of System 6 Recommendation M107), Singleton,* Environmental Protection Authority, Perth, WA, Bulletin 648, September 1992

Environmental Protection Authority 1993, *Murrayfield airpark and resort complex,* Perth WA, Bulletin 713, October 1993

Environmental Protection Authority 1994a, *Metropolitan Region Scheme Amendment 950/33 and North-East Corridor Structure Plan,* Perth WA, Bulletin 754

Environmental Protection Authority 1994b, *Preliminary maps of Threatened or poorly reserved communities requiring interim protection for the Swan Coastal Plain.*

Environmental Protection Authority 1994c *Proposal to change land use affecting System Six areas and lakes protected under the Environmental Protection Policy to Urban, Industrial, Special Uses and transportation purposes, to be reflected in the major Metropolitan Region Scheme Amendments for the South West Corridor*, Perth WA Bulletin 746, July 1994

Environmental Protection Authority, Water Authority of Western Australia and Department of Planning and Urban Development 1994, Planning *and management guidelines for water sensitive urban (residential) design* , Perth WA, June 1994

Environmental Protection Authority 1995 *Criteria of environmental acceptability for land use proposals within the catchment of Lake Clifton,* Perth WA Bulletin 788 November 1995

Environmental Protection Authority 1995, *Bunbury Harbour City - Marlston Hill Development - Proposed changes to Environmental Conditions*, Perth WA, Bulletin 774.

Environmental Protection Authority 1996a, EPA Guideline preparation Factors/objectives/positions, Unpublished, Perth, WA 11 July 1996.

Environmental Protection Authority 1996, *Gnangara mound groundwater resources,* Perth WA, Bulletin 817

Environmental Protection Authority 1996, *Letter to Minister for the Environment regarding Urban development within System 6 recommended areas M2 & M6 Pt Lot 2 between Marmion Avenue and Indian Ocean, Burns Beach, 12 July 1996*

Gerritse, R.G., Barber, C.& Adeney, J.A. 1990, *The impact of residential urban areas on groundwater quality: Swan Coastal Plain, Western Australia,* CSIRO Division of Water Resources, Perth Laboratory, Water Resources Series No 3

Greenhouse Coordination Council 1994, *Revised greenhouse strategy for Western Australia 1994,* Greenhouse Coordination Council, Perth WA

Minister for the Environment & Authority, E.P. 1989, *Statement that a proposal may be implemented - Peel Inlet - Harvey Estuary Management Strategy Stage 2,* Perth WA, 4 January 1989

V & C Semenuik Research Group 1989, *Environmental and landscape audit of the southwest, northwest andnortheast corridors, Perth metropolitan area Stage 1 Interim report: The northwest corridor study,* Department of Planning and Urban Development, Unpublished

WAPC& Government of Western Australia 1996, *The Inner Peel Region structure plan - Mandurah - Pinjarra/Point Grey,* Ministry for Planning, Perth WA, July 1996

Water Authority of Western Australia 1991, *Nutrients in Perth urban surface drainage catchments characterised by applicable attributes,* Perth WA, Report WS85

Wells, M.R. 1989, *Land capability study of the Shires of Mandurah and Murray: Land Resources Series No 2,* Western Australian Department of Agriculture, Perth, WA