

# **Southern River - Forrestdale - Brookdale - Wungong Draft Structure Plan**

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**Western Australian Planning Commission**

**A submission by the Environmental Protection Authority under  
Section 16(j) of the Environmental Protection Act**

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## **1. Introduction**

### **1.1 Purpose**

The purpose of this Environmental Protection Authority (EPA) report is to provide advice on the Southern River-Forrestdale-Brookdale-Wungong Draft Structure Plan. Section 16(j) of the Environmental Protection (EP) Act empowers the EPA “*to publish reports on environmental matters generally*”. Because the EPA reports publicly its advice can be seen and considered by the public, industry, State and Local Government and other stakeholders.

### **1.2 Scope**

The EPA’s advice on the Southern River-Forrestdale-Brookdale-Wungong Draft Structure Plan (draft Structure Plan) (WAPC 1999) is provided to ensure environmental issues are adequately recognised and integrated into future planning in a sustainable way.

### **1.3 Key Principles Guiding the EPA Advice**

In considering the draft Structure Plan the EPA was guided by the following key principles:

#### **1.3.1 Sustainability**

The EPA supports the concept of ecologically sustainable development (ESD), as set out in the National Strategy for Ecologically Sustainable Development (Commonwealth of Australian 1992), that is “development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends”. A core objective of the National Strategy for Ecologically Sustainable Development is to provide for equity within and between generations.

#### **1.3.2 Conservation of Biological Diversity**

The Commonwealth and all State governments have signed the National Strategy for Conservation of Australia’s Biological Diversity that establishes the goal of conserving biological diversity and maintaining ecological processes and systems. Maintaining biodiversity is not only about protecting flora and fauna in nature conservation reserves, it is also about wise use of biological resources outside reserves and safeguarding the life-support systems of earth.

#### **1.3.3 Interdependence**

Ecological processes are interconnected with physical and biological systems, food webs and natural cycles. Being interconnected and interrelated requires an understanding and appreciation that affecting or managing one part of the environment may affect one or a number of other parts. Research has demonstrated that these interrelated and interdependent systems can be finely balanced.

#### **1.3.4 Precautionary Principle**

The precautionary principle provides a means of considering environmental impacts and making decisions in a cautious way, where a high value element of the environment might be affected, and there is a lack of knowledge, or insufficient knowledge, or certainty about potential impacts and management of impacts and cumulative effects.

### **1.3.5 Prevention of pollution**

A primary responsibility of the EPA is to make recommendations to prevent pollution of the environment so that alterations to the environment do not cause unacceptable detriment or degradation of the environment and its beneficial uses. (Beneficial use of the environment is defined in the Environmental Protection Act 1986).

### **1.4 EPA advice issued under Section 16(j)**

This report is advice provided under Section 16(j) of the EP Act. It does not constitute a formal assessment under Part IV of the EP Act and does not lead to the setting of legally binding environmental conditions. In compiling this report, the EPA has considered the information in the draft Structure Plan, specialist advice from the Department of Environmental Protection (DEP) and information from other government agencies.

The EPA will take into account the advice set out in this report, when determining the level of environmental assessment on subsequent statutory proposals. Specifically, this report makes a number of recommendations which should be fulfilled prior to the Structure Plan being finalised and rezoning, subdivision or development proceeding.

## **2. Background and Context**

The Southern River-Forrestdale-Brookdale-Wungong Draft Structure Plan (WAPC 1999) has been prepared to provide guidance and direction to future development in the area. The draft Structure Plan has identified indicative development areas, major road networks, major community facilities and a neighbourhood structure (Figure 1). The DEP has been involved in the development of the draft Structure Plan through membership on a Steering Committee associated with its development which was convened by the Ministry for Planning (MfP).

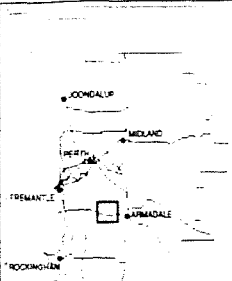
The draft Structure Plan identifies the numerous and significant environmental constraints and opportunities which occur in the locality. The draft Structure Plan seeks to coordinate and plan the development of the area cognisant of the environmental constraints, conservation, physical and social infrastructure, community and neighbourhood objectives. When finalised the Structure Plan will form the basis of subsequent amendments to the Metropolitan Region Scheme, local town planning schemes, subdivision and development.

## **3. Environmental Considerations**

### **3.1 Overview**

This section addresses environmental issues relevant to the draft Structure Plan, and the EPA's response and recommendations on these issues.

The EPA believes regional landuse planning can play a major role in natural resource management and the protection of environmental values. The EPA supports the need for structure planning in the area, provided it adequately addresses and resolves environmental issues and therefore provides certainty for protection of the environment and for those seeking development.



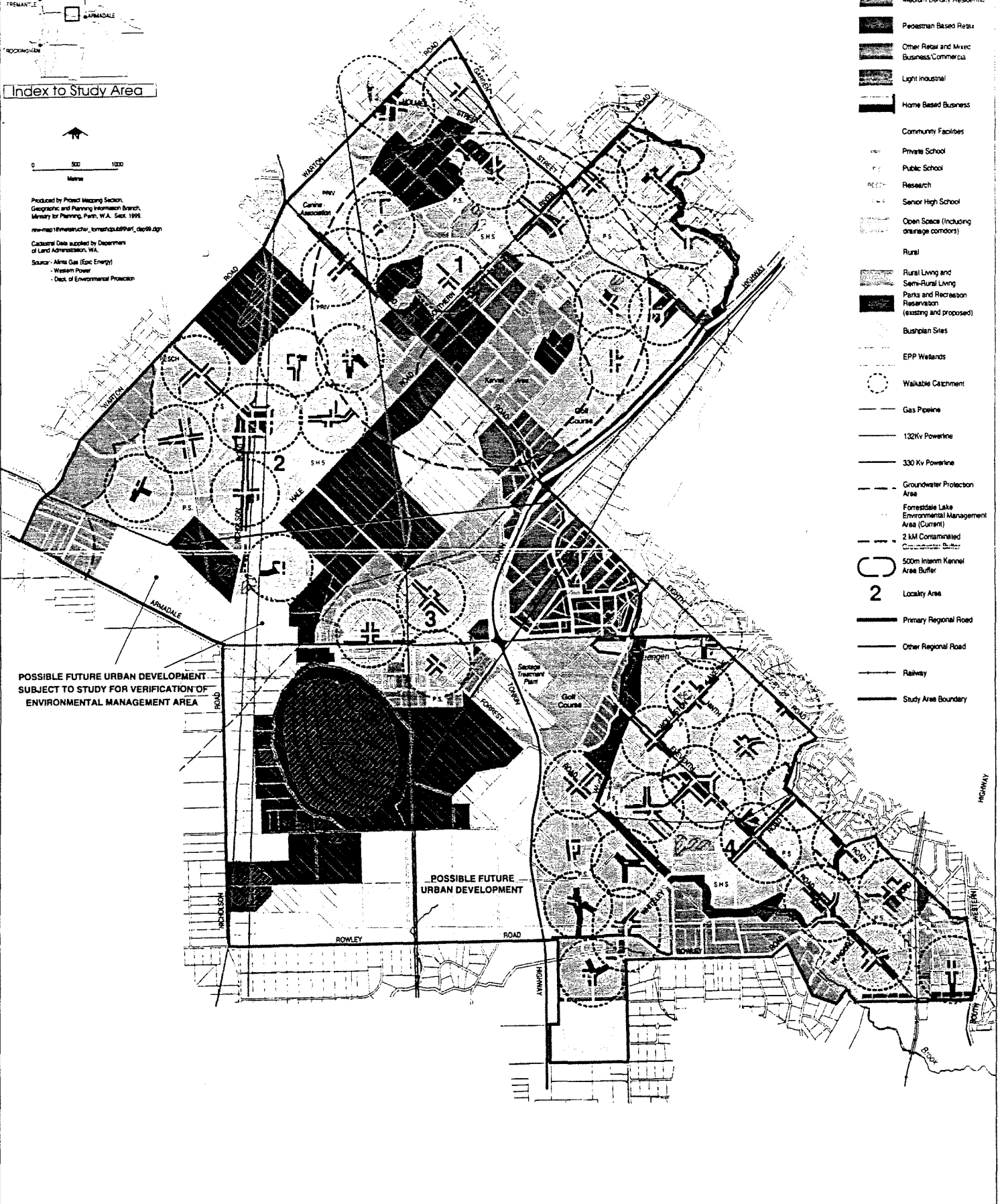
**Index to Study Area**



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Cadastral Data supplied by Department  
of Land Administration, WA.

Source: Alinta Gas (Epic Energy)  
- Western Power  
- Dept. of Environmental Protection



- LEGEND**
- Residential (including balance of P.C.S.)
  - Medium Density Residential
  - Pedestrian Based Retail
  - Other Retail and Mixed Business/Commercial
  - Light Industrial
  - Home Based Business
  - Community Facilities
  - Private School
  - Public School
  - Research
  - Senior High School
  - Open Space (Including drainage corridors)
  - Rural
  - Rural Living and Semi-Rural Living
  - Parks and Recreation Reservation (existing and proposed)
  - Bushplan Sites
  - EPP Wetlands
  - Walkable Catchment
  - Gas Pipeline
  - 132Kv Powerline
  - 330 Kv Powerline
  - Groundwater Protection Area
  - Forrestdale Lake Environmental Management Area (Current)
  - 2.3km Contaminated Groundwater Buffer
  - 500m Interm Kennel Area Buffer
  - Locality Area
  - Primary Regional Road
  - Other Regional Road
  - Railway
  - Study Area Boundary

Strategic planning should be based on sound environmental information, a detailed consideration of the impacts, (locally, regionally and cumulatively), consistency with approved policies and if necessary, propose detailed management measures which meet appropriate environmental objectives, accompanied by monitoring to ensure objectives are met. Plans should be developed which are sensitive to constraints and realise opportunities. This process should be undertaken in an integrated and coordinated fashion and be finalised before statutory planning (rezoning) and development occurs. The EPA appreciates that it is difficult to achieve this ideal. In reality there is always pressure for development, landowners can seek to subdivide their land at any time and in parts of the Southern River area zoning to Urban Deferred has already occurred before detailed consideration of environmental issues.

The EPA considers that there are some key environmental issues associated with the landuse proposals outlined in the draft Structure Plan which require further consideration and formulation of detailed management approaches prior to finalisation of the Structure Plan or its implementation through the planning legislation. These issues include:

- Drainage, nutrient and flood management ;
- Protection of wetlands, including Forrestdale Lake;
- Perth's Bushplan;
- Buffers between incompatible landuses; and
- Public health and safety.

### **3.2 Drainage, Nutrient and Flood Management**

The EPA considers that nutrient and drainage management and potential impacts on wetlands, groundwater and the Swan and Canning Rivers are critical issues which require considerable attention prior to changes in landuse within the area. It is crucial that changes in landuse will not lead to unacceptable impacts on groundwater resources, wetlands and the Swan and Canning Rivers. The EPA considers that a precautionary approach should be applied to these issues and that proposals for changes to landuse should not occur until it has been demonstrated that drainage and nutrients can be managed to acceptable levels.

A discussion paper prepared by Dr. Robert Gerritse for the Canning Catchment Coordinating Group Inc. entitled "*Nutrients, water quality and algal blooms in the Canning Catchment*" (June 1999) provides a clear indication that management of water and nutrients is a fundamental issue in relation to the draft Structure Plan.

Environmental objectives and targets for the Southern River catchment are documented in the Swan Canning Clean-up Program Action Plan (SCCP) and Environmental Protection (Swan Canning Rivers) Policy 1999.

In recognition of its contribution of nutrients to the Swan-Canning River system the Southern River is given considerable attention in SCCP. The SCCP has proposed first generation nutrient concentration targets for the Southern River which are considered necessary to manage the impact of nutrients in the Swan-Canning River system (see Table 1).

**Table 1: Water quality targets for the Southern River (Swan River Trust, 1999)**

Element	Current	5 year target	20 year target
Total Phosphorus (mg/L)	0.2	0.2	0.1
Total Nitrogen (mg/L)	1.5	2.0	1.0

The Southern River is the third highest contributor of phosphorus to the Swan-Canning River system accounting for 5.7 tonnes per annum (t/a), or 8% of the total load of phosphorus entering the Swan-Canning River system. The load of nitrogen attributed to the Southern River is also significant. Some 37t/a, or 2% of the total load of nitrogen entering the Swan-Canning River system is attributed to the Southern River (Donohue *et al*, 1994). Based on existing water data the river system is highly eutrophic and thus able to support large algae blooms (Gerritse 1999).

The draft Structure Plan proposes 4 residential precincts (2013 ha) which would ultimately accommodate 22,650 dwellings or approximately 56,000 people. The Structure Plan area covers approximately half of the gauged catchment of the Southern River catchment area (Acacia Springs Environmental 2000a). Currently most of the land is zoned rural and used for broad acre agriculture. Clearly, this intensification of landuse has the potential to significantly alter both nutrient inputs to the catchment and its hydrology. Additionally, large areas of the study area contain soils which are predominantly leachable sandy soils with very limited capacity to retain nutrient inputs from new residential areas. Recent work indicates that “phosphate inputs from new residential areas in the Southern River catchment could start affecting the Southern River in less than 10 years” (Gerritse 1999), increasing its existing high nutrient levels.

As a result of this potential for nutrient export, the DEP has liased closely with the Water and Rivers Commission (WRC) and Swan River Trust (SRT) in providing its advice on this issue to the EPA. Additionally, the DEP has commissioned broad scale modelling of likely nutrient export scenarios associated with changes in landuse (Acacia Springs Environmental 2000a).

This modelling used an existing spatial model which describes runoff quality for the Swan-Canning catchment which was developed as part of the National Pollutant Inventory (Acacia Springs Environmental 2000b). This model has been applied to the draft Structure Plan area using existing and proposed landuse to provide estimates of likely nutrient export from changes in landuse. It must be stressed that this work provides indicative values only and should be used as a decision support tool rather than being viewed as a definitive study, with results for nutrient export likely to be conservative.

This work has provided estimates of nutrient export for several scenarios within the study area as shown in Table 2 ( Acacia Springs Environmental 2000a).



**Table 2: Estimated nutrient export.**

Scenario	Runoff (mm)	Runoff (% of rainfall)	TN export (t/yr)	TP export (t/yr)	TP export (kg/ha/yr)
Southern River Catchment	100	11	19.9	5.5	0.37
Structure Plan Area (existing landuse)	96	11	7.2	2.9	0.49
Structure Plan Area (proposed landuse)	170	19	10.9	1.8	0.29
Structure Plan Area (with full implementation of water sensitive urban design)	158	18	7.2	1.6	0.26
Structure Plan Area (with worst case breakthrough after 50-200 years)	214	24	108.1	14.8	2.4

These results indicate that the changes in landuse proposed within the Structure Plan area could lead to slight improvements in phosphorus export, particularly if full water sensitive urban design principles are applied to development. This potential for improvement is based on relatively lower nutrient inputs from urban development when compared to existing rural landuses. This potential improvement is however based on an assumption that a considerable proportion of the nutrients applied to the area following development remain “unavailable” within the soil profile. As mentioned previously, the sandy soils present within much of the study area have a very low capacity for nutrient retention, with the expectation that the “breakthrough” of applied nutrients could occur relatively quickly following development. The modelling performed has estimated that should this breakthrough scenario occur, that nutrient export could be particularly high and would have significant potential to worsen the nutrient status of the Swan-Canning system. While the potential for this worst case scenario is clear, it remains unknown at this point as to when and if such a scenario would occur.

The EPA considers that this work clearly highlights the need to carefully consider and manage drainage and nutrient export within the study area to ensure that this worst case scenario does not occur and that development is able to demonstrate that nutrient export from the area will be reduced to meet the targets set for the Swan-Canning system.

Advice on this issue has also been provided by the WRC and SRT. This advice highlights the importance of managing nutrient export and drainage associated with proposed landuse changes. Both agencies stress the need for the development of an integrated approach to drainage and nutrient management ahead of landuse changes within the Structure Plan area.

The EPA endorses this advice and the need for further investigations and analysis to be undertaken on the management of drainage and nutrient export from development. In particular, the EPA supports the development of a detailed drainage and nutrient management strategy for the study area prior to finalising landuse decisions. Such a strategy should

involve all key agencies and be completed as a pre-requisite to changes in zoning or landuse within the Structure Plan area. This strategy would need to develop criteria for nutrient export associated with development and include criteria both for surface and groundwater quality. Importantly, it would need to demonstrate that changes in landuse can be adequately managed to achieve targets for the Swan-Canning system. Detailed planning of local and regional drainage infrastructure needs to be undertaken, along with the formulation of design criteria and standards for development and subdivision design and management. Additionally, this work should lead to the formation of administrative and management frameworks for the implementation of drainage and nutrient management strategy and on-going management and review.

Unless properly managed, the landuse changes proposed within the area have the potential to further reduce water quality within the Southern River and Swan-Canning system, with development likely to be inconsistent with the objectives and targets in the SCCP and Swan Canning EPP which have been agreed to by the State Government.

Despite considerable attention over the last decade, there still appear to be considerable questions regarding likely the efficacy of current “best practice” measures to manage drainage and nutrient export from large scale urban development to acceptable levels over the longer term. Given the nature of the soils and hydrology of the Structure Plan area, it is therefore considered that an innovative and strategic approach to this issue will be necessary for the proposed landuse to be acceptable, with a likelihood that a combination of both “catchment management” and “engineering” measures will be required. This will also require the formulation and implementation of strategies for development, drainage and nutrient export which are tailored to the characteristics of the catchment. As result of this, the EPA considers that further work needs to be undertaken to demonstrate that the changes in landuse proposed in the draft Structure Plan can be adequately managed to meet the objectives and targets identified within the SCCP and Swan-Canning EPP before the Structure Plan is finalised.

### **3.2.1 Annual Average Maximum Groundwater Level (AAMGL)**

The determination of the historical AAMGL for the study area and the AAMGL which should be set in relation to future drainage management in the area is the subject of considerable discussion in the draft Structure Plan and associated appendices. The EPA recognises that there are significant implications associated with a variation in the AAMGL. A lower AAMGL, through sub-soil drainage, would mean significantly less fill is required to achieve adequate separation between buildings and groundwater. However, if the AAMGL is set at a lower level without adequate consideration the impact on wetlands and associated vegetation in the area could be significant. For example, drains in the Rockingham area designed to lower the groundwater level have impacted a critically endangered ecological community; *Community 19 -Sedgeland in Holocene dune swales* (EPA 1998c).

The WRC and DEP have advised that:

- the current AAMGL is based on the current dry cycle of 1974 and 1999. If data taken from 1920 onwards was included, including the wet period in the 1940s and 1960s then a conservative estimate of AAMGL would be approximately 0.5 metres higher;
- they do not support lowering of regional AAMGL, consistent with the philosophy of water sensitive design and the Middle Canning Catchment Water Resources Management Study; and

- they do not support or endorse the conclusions of the hydrological report prepared for the Ministry for Planning as part of the development of the draft Structure Plan.

The hydrological report by Jim Davies and Associates (1999) makes the following statement: *“A long period of agricultural activity has resulted in extensive clearing of natural vegetation with a consequent rise in water table, associated with a reduction in transpiration. It follows that many of the wetlands are experiencing higher water tables than previous centuries.”* While this scenario is likely to apply in certain parts of the Swan Coastal Plain, based on the flat low lying nature of the topography it is likely that the land has always been subject to flooding and surface flows/pooling, in that groundwater is and would have been at or near the surface in the winter months. Taking into account long term rainfall patterns there has been no evidence presented to indicate a significant rise in watertable. On this basis the EPA does not support the implied suggestion that lowering the AAMGL will return groundwater to pre-agricultural levels and in turn protect/enhance wetlands.

The EPA concurs with the advice of WRC and DEP and, in principle, does not support a lowering of the AAMGL by sub-soil drainage.

The EPA also considers that further analysis of the implications of development on local and regional groundwater hydrology, wetlands and flood management is required as part of the establishment of a comprehensive drainage and nutrient management strategy for the area.

### **3.2.2 Implementation Committee and Technical Review Committee (TRC)**

The EPA has been advised of concerns regarding the lack of clarity of roles and responsibilities of land developers, local authorities and State government agencies in respect of drainage and nutrient management from urban development. Because of the critical nature of this issue for development in the Structure Plan area, it is important that the various roles and responsibilities are clearly established as part of the preparation of a comprehensive drainage and nutrient management strategy for the area. Based on experience at the South Jandakot and Ellenbrook urban areas, consideration should be given to establishing a separate Implementation Committee and a Technical Review Committee.

The Implementation Committee could coordinate development and implementation of the strategy including on-ground monitoring and coordination of responsibilities, with the Technical Committee providing peer review on acceptable criteria, adequacy of monitoring and performance of the strategy in achieving the established criteria.

The Implementation Committee could also ensure that individual developments comply with the strategy requirements, and guide bodies regarding funding requirements, common works and on-going monitoring.

### **3.3 Wetlands**

In preparing the draft Structure Plan, the WAPC commissioned an evaluation of wetland conservation issues within the study area (Muir 1999). This work sought to identify wetlands of higher conservation value within the area and develop approaches for their conservation and management.

The EPA recognises that the draft Structure Plan has accepted the high conservation category wetlands as determined by the Middle Canning Catchment Study (Evangelisti *et al*, 1995), draft Perth’s Bushplan (Western Australian Government, 1998) and Hill *et al* (1996). More recent examination of the boundaries of these wetlands has however highlighted discrepancies between different datasets as well as possible errors in wetland classification.

Additionally, wetlands of lesser conservation value appear to have been assessed in an arbitrary manner where a value judgement was made as to whether they should be restored, approved for development, or some intermediate use. As a result, the WRC and DEP have advised that they do not fully concur with the conclusions of the draft Structure Plan's wetland study report (Muir 1999).

The EPA considers that the evaluation of wetlands and consideration of future development should be conducted in a manner that is consistent with EPA Bulletin 686 (EPA 1993) and accepted by the WRC. Bulletin 686 provides detailed guidance on how to determine the management category of a wetland from which the management objectives can be determined. These management objectives should then be reflected in any proposal for landuse that may affect the wetlands.

The EPA recommends that further assessment and evaluation of wetlands within the study area should be undertaken as part of more detailed planning required ahead of landuse changes within the study area. Subject to accepted re-delineation and re-evaluation, the EPA considers that all Conservation category sumpland and dampland wetlands, and their buffer, should be protected and managed for conservation purposes. These wetlands and their buffer should not be used for drainage purposes or be encroached by roads.

A key wetland protection issue relates to the future widening of Ranford Road which currently crosses Balannup Lake. The Structure Plan proposes the retention and upgrading of Ranford Road in the vicinity of Balannup Lake (Figure 2). Several alternative alignments for the road in the vicinity of this lake have been considered by the MfP in an attempt to reduce the impacts of the existing alignment on the lake. Unfortunately, these alternative alignments adversely affect adjacent Bushplan sites and are not considered environmentally acceptable. The EPA advises that it does not support the proposed alternative alignments for Ranford Road, nor does it support the further widening of the road in the vicinity of Balannup Lake. The EPA considers that other alternative alignments which have less impact on Balannup Lake should be investigated. Should no practical alternative alignment exist, the EPA advises that any upgrading of Ranford Road would require a particularly sensitive approach to construction, including the likelihood of bridging.

While the draft Structure Plan is aimed at a broad level of planning, some of the proposed Parks and Recreation reserves do not appear to include an adequate dry land buffer component around wetlands. The EPA recommends a minimum of 50 metres or 1 mAHD, whichever is largest. The paper "Guidelines for design of effective buffers for wetlands on the Swan Coastal Plain" Davies P.M. and Lane J.A.K. (1995) should also be used to assist in establishing appropriate wetland buffers. The determination of appropriate buffers should occur as part of detailed planning.

There is also an important need to provide buffers which recognise the potential health and amenity impacts of nuisance insects such as midge and mosquitoes which may be associated with some wetlands. The EPA supports the draft Structure Plan recommendation of a dense vegetation buffer of at least 200 metres around wetlands with the potential to provide habitat for midge and mosquitoes. Additional buffers between wetlands with known midge problems such as Forrestdale Lake are however recommended. Experience in the City of Cockburn has shown that a buffer of between 500-1000 metres is required between midge-infested wetlands and sensitive development in order to minimise amenity impacts.

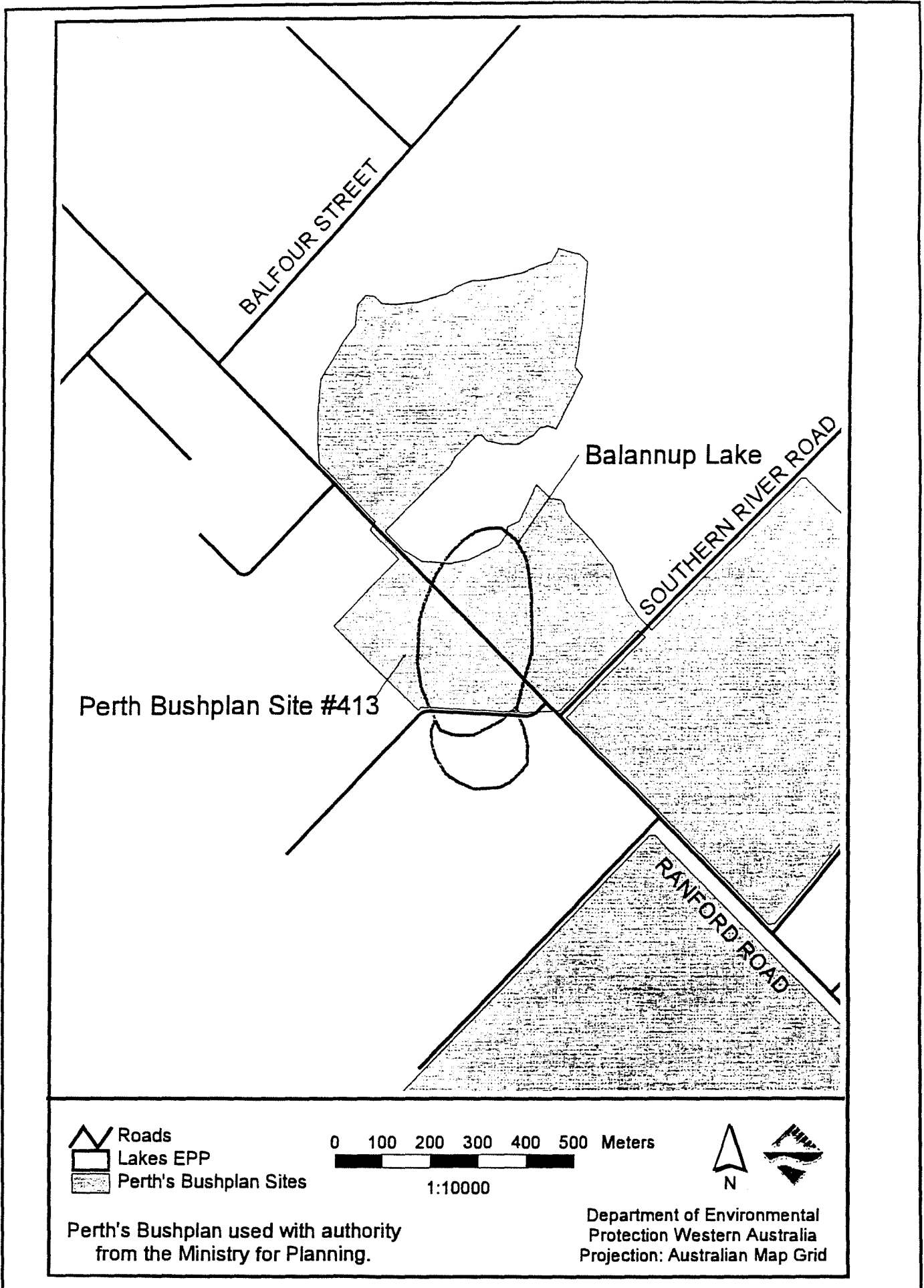


Figure 2. Ranford Road in the vicinity of Balannup Lake.

### **3.3.1 Watercourses**

The draft Structure Plan makes numerous references to multiple use corridors along wetlands and proposes a nominal 100 metre width. The Middle Canning Catchment Study states that these may vary from 30 metres to up to 200 metres. The WRC has advised that multiple use corridors should be based on biophysical criteria rather than reducing the width of the corridor near degraded or modified areas. Further, they recommend that the existing riparian vegetation zone of Southern River and Wungong Brook be extended, revegetated and major weeds removed. The Upper Canning Southern Wungong Catchment team are actively restoring reaches of Southern River and Wungong Brook with the Study area. River restoration, including the conversion of trapezoidal drains back to broadly functioning waterways will widen the floodplain.

The EPA supports the advice of the WRC and believes that ecologically viable, vegetated and physically functional multiple use corridors are essential to:

- minimise soil erosion, nutrient loss and weed invasion;
- increase stream vegetation cover, reducing water temperatures and increasing dissolved oxygen levels, which are important for improving habitat diversity and improving water quality;
- decompose organic matter;
- remove nutrients through oxidation and biological uptake; and
- provide linkages between area of conservation value and provide habitat for a wide range of terrestrial and aquatic native species, which will in turn add to the amenity of the area.

There is a need to carefully consider existing watercourses, in particular, tributaries of the Southern River and Wungong Brook, and their use as multiple use corridors and to include requirements for restoration, revegetation and reservation of an appropriate corridor width. These corridors need to incorporate the watercourse, floodplain, riparian, intermediate and dry land zone. The EPA recommends that multiple use corridor widths should be determined and agreed at the local structure planning stage.

### **3.3.2 Environmental Management Areas**

The draft Structure Plan discusses the “verification” of the Environmental Management Area (EMA) for Forrestdale Lake, a Ramsar wetland. The DEP and WRC have advised that they consider the currently established boundary, using groundwater capture zone modelling, is appropriate to define Lake Forrestdale’s groundwater catchment. The WRC has provided advice to Ministry for Planning indicating the requirements needed to be undertaken, before the WRC would consider altering the EMA.

The EPA advises there it would not support any change to the current EMA boundary without adequate scientific investigation and does not support urban development within the EMA (EPA 1998a).

The EMA for Balannup Lake is not depicted on the draft Structure Plan. This should be corrected and proposed development managed to be consistent with the objective for this EMA which is to “ensure that changes to water quality and water levels in the wetland do not lead to unacceptable impacts” (EPA 1998a).

### 3.4 Perth's Bushplan

Draft Perth's Bushplan was released in 1998 for public comment and is in the process of being finalised. The EPA considers that the draft Structure Plan can provide a strategic mechanism to implement Bushplan in the area.

While the final boundaries are still to be determined the EPA understands that the majority of Bushplan site within the structure plan area will be protected via reservation or inclusion in open space. Of the remaining sites not protected in this manner, the draft Structure plan allows for these to be addressed through a combination of a guided scheme approach to negotiated planning solutions for sites already zoned urban, urban deferred or industrial, and via complementary mechanisms for those with rural zonings.

Subject to agreement on final boundaries, the EPA considers that the draft Structure Plan provides an acceptable approach to the protection of Bushplan sites within the area. The process for implementation of the protection of Bushplan sites should occur through the finalisation of the Structure Plan and Perth's Bushplan and prior to rezoning and subdivision. Both documents should establish a framework to ensure the sites are protected and managed for conservation purposes. In particular, the EPA commends the WAPC on the approach taken to the protection of sites already zoned for development through the proposed guided scheme approach.

The EPA notes the draft Structure Plan proposes drainage into Bushplan site 262. This proposition is inconsistent with the Middle Canning Catchment Study and the EPA advises it does not generally support the inclusion of drainage basins and drains within or through Bushplan sites.

#### 3.4.1 Fauna

The total structure planning area is large (7,000 ha) and contains important wetlands, vegetation and native fauna. The EPA is concerned that analysis of fauna consists of one sentence in the draft Structure Plan, it reads: "*No significant fauna are characterised within the Study Area. It is understood that fauna species have been progressively removed or forced from the area due to agricultural pursuits.*". This statement is incorrect. The WRC has advised that 72 bird species have been recorded (23 listed under treaties), numerous amphibians, mammals, reptiles and insects.

The EPA recommends that detailed fauna assessments be undertaken as part of more detailed levels of planning to ensure that development and subdivision is cognisant and sensitive to the protection of native fauna. There is also a need to outline details of management measures to deal with issues such as habitat protection, fauna relocation, prevention of road kills and non-native animal control. These measures could include subdivision design, provision of fauna corridors and location of public open space.

### 3.5 Buffers between incompatible landuses

Buffers are recognised in the draft Structure Plan as a means to separate incompatible land uses. In this regard the draft Structure Plan states: "*the buffers will affect the way in which adjacent land is dealt when a change of land use or development occurs*". However, the Plan then goes on to say (pg. 81 7.7.4): "*These buffers must be removed to release surrounding land for alternative activities*" and "*Development is dependent upon removal of many physical and legal constraints in the area and a coordinated approach to servicing land. A 'frontal' development pattern is recommended to facilitate economic and efficient development.*". The EPA would not support an approach which leads to incompatibility

between residential and other landuses which may lead to on-going problems relating to health and amenity. The EPA recommends that the final Structure Plan clearly recognise the need for the separation of incompatible landuses, consistent with protecting the health and amenity of residents.

The EPA's Draft Guidance Statement No. 3 for 'Industrial - Residential Buffer Areas (Separation Distances)' (EPA 1998b) provides recommended buffers for a number of landuses. This Draft Policy is also referred to by the DEP when attaching conditions to Licences and Works Approvals issued under Part V of the Environmental Protection Act (1986).

It is recommended that buffer requirements in the draft Structure Plan are reviewed to ensure consistency with those in the EPA's Draft Guidance Statement No. 3.

A key issue relating to landuse compatibility relates to development in the vicinity of the existing kennel areas in Southern River and Forrestdale. These kennel areas have been in existence for considerable periods of time. The Structure plan contemplates residential development within the vicinity of these kennel areas which has the potential to lead to future conflicts due to noise emissions from kennels. In recognition of this potential conflict, the DEP has commissioned studies to assess the extent of buffers required around kennel areas, as well as management measures which could be implemented to reduce the likelihood of landuse conflict (ERM 1999, 2000).

This work indicates that under the most critical climatic and temporal conditions, noise levels associated with the kennel areas meet the Environmental Protection (Noise) Regulations 1997 at a distance of 1000 metres, while the Regulations are exceeded by approximately 9 dB(A) at 500 metres from the kennel areas. This work has suggested that an approach to the management of landuse in the vicinity of the kennel areas would be to restrict development to non noise sensitive uses within 500 metres of kennel areas, with the use of a "special control zone" between 500 metres to 1000 metres within which residential development could occur subject to measures which reduce noise emissions from kennels as well as the controls on the design and construction of residences. This approach is supported by a literature review which indicates that buffers in the vicinity of 500 metres are used elsewhere to manage landuse conflicts associated with kennel areas.

The application of this approach would require kennel operators to implement noise reduction measures such as improved construction and management controls in order to reduce the level of noise emissions. This would need to be coupled with strict acoustic controls on the construction of new kennels and expansion of existing facilities as well as controls on the design and construction of residences within this special control area. The type of controls on housing construction would include the incorporation of appropriate noise control measures within the design of housing and the use of construction materials which reduce noise impacts on the advice of an acoustic consultant. This approach would be expected to reduce noise levels within residential areas to at or close to allowable levels. Additionally, the use of memorials or other similar measures to alert purchasers of properties of the potential noise impacts from kennels within this special control area is also suggested. It should be noted however that such an approach may not result in kennels being able to fully comply with the requirements of the Environmental Protection (Noise) Regulations and would place pressure on kennel owners to reduce noise emissions from their premises. The corollary to this is that landowners constrained from developing their land due to a larger buffer are effectively providing a means of pollution control for kennel operators.



In view of the need to provide a balanced outcome in relation to this issue, the EPA considers that the use of the “special control area” approach which allows residential development within 500-1000 metres of the kennel areas is acceptable provided that it is combined with suitable controls on housing design and construction in conjunction with controls on kennels to reduce off-site noise impacts. The EPA further advises that the implementation of these measures should be the responsibility of the relevant local authorities and the WAPC.

The impact of noise from major roads should also be carefully considered and addressed at the local and district planning level.

### **3.6 Public health and safety**

The EPA has identified acceptable criteria for Individual Risk of Fatality as it relates to five main types of land use in its interim Guidance Statement No 2 for ‘Risk Assessment and Management: Off-site Individual Risk from Hazardous Industrial Plant’ (EPA 1998d). In residential areas a risk level of one in a million or less fatalities per annum is considered so small as to be acceptable.

To meet this criteria, an acceptable separation distance to residential development is as follows:

- CMS (WANG) pipeline alone - 32 metres each side of the centre line of the pipeline;
- EPIC (Alinta Gas) pipeline alone - 45 metres each side of the centre line of the pipeline; and
- CMS and EPIC pipelines together - 60 metres each side of the centre line of the pipeline.

These distances are subject to the existence of protective measures for the pipeline, as outlined in the EPA Draft Guidance ‘Achieving EPA Risk Criteria for development in proximity to existing and proposed High Pressure Gas Transmission Pipelines’ (EPA 2000). Required setbacks for sensitive landuses or places where large numbers of people may congregate (eg. schools, hospitals or shopping centres) are double these distances.

It is recommended that the high pressure gas transmission pipelines are clearly identified in the final Structure Plan and adequate management procedures are incorporated to ensure the EPA objectives for public health and safety would be achieved.

The former Southern River liquid waste disposal facility is also located within the structure plan area (Figure 3). This site which is situated on Southern River Road, has resulted in off site groundwater contamination. The remediation of the site and management of the contaminated groundwater plume has been the subject of formal assessment by the EPA and setting of Ministerial conditions (EPA 1997). The City of Gosnells, which is the owner of the site is committed to complying with these conditions, which include requirements relating to the placement of restrictions on groundwater use in the vicinity of the site. The DEP is continuing to liase with the City of Gosnells in the management of this issue.

While the site and adjacent land is proposed for industrial and open space uses under the draft Structure Plan, nearby land to the west and north of the site which may be affected by the groundwater plume is proposed for urban development. This will necessitate controls to be applied to groundwater use and drainage associated with proposed landuses in the vicinity of the site. The nature of these controls and areas to which they are applied will need to be determined in consultation with the DEP. The Structure Plan should highlight the potential for landuse controls to be applied in the vicinity of the site.

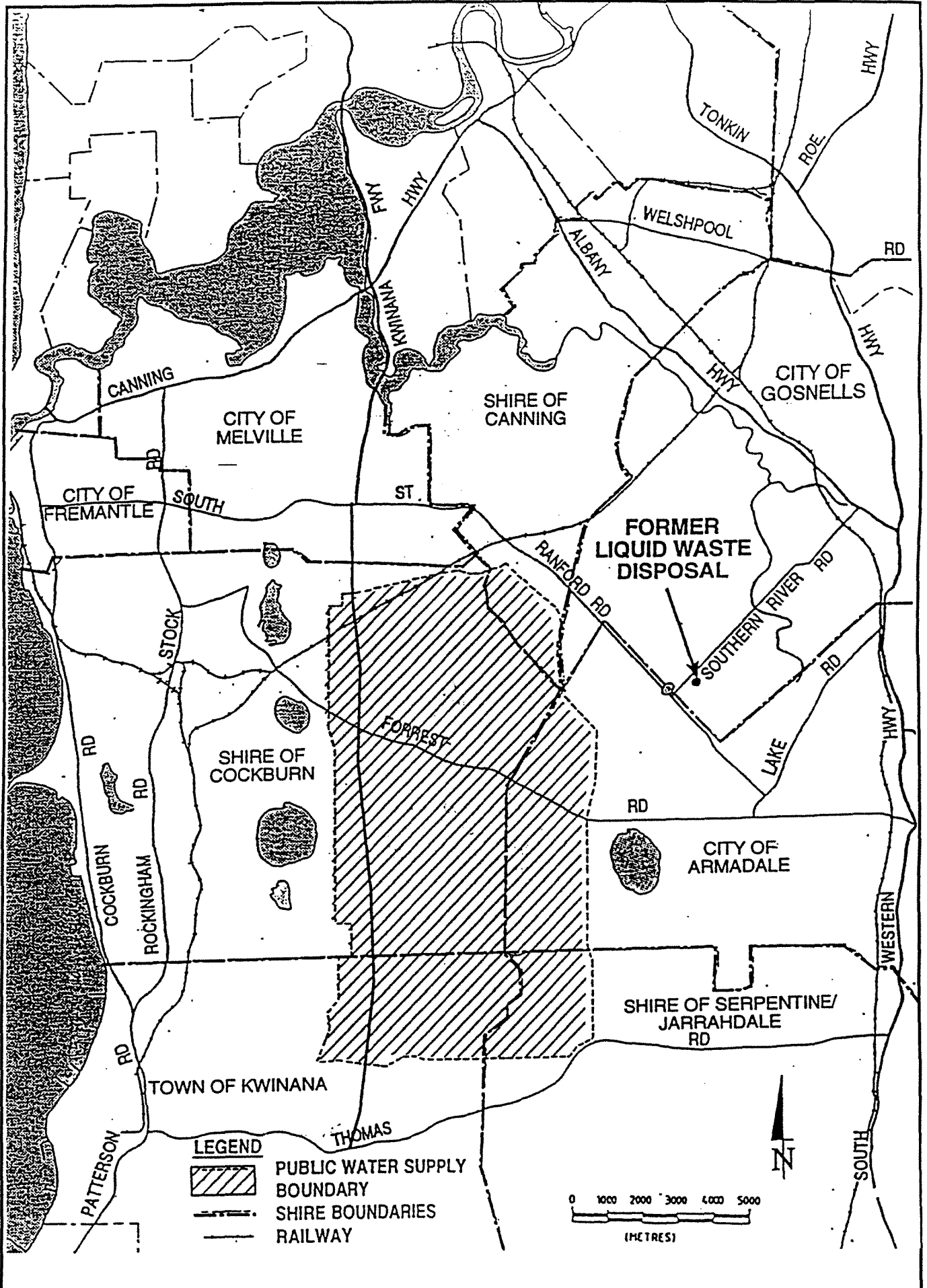


Figure 3. Location of former liquid waste disposal facility.

#### **4. Future role of the EPA**

The EPA has a statutory role when it considers referrals (scheme amendments, subdivisions and development proposals), pursuant to Section 38 and 48A of the EP Act. Currently, only limited portions of the structure plan area are suitably zoned under the MRS and local authority town planning schemes for development in line with the draft Structure Plan. The majority of the area is zoned rural or urban deferred under the MRS, with local zones being largely rural. The rezoning of this land for more intensive uses under both the MRS and local schemes will need to be undertaken to allow the implementation of the landuse changes

proposed in the draft Structure Plan. Relatively long timeframes are associated with rezoning processes, with the likelihood that much of the land within the area would not be suitably zoned for several years even if rezonings were initiated immediately.

The rezoning of land within the area to facilitate development will require referral to the EPA under Section 48A of the EP Act. Additionally, subdivision proposals for existing zoned land not previously assessed by the EPA may be referred by the WAPC under Section 38 of the Act. Until the development of agreed measures and mechanisms for the key environmental issues, in particular, nutrient export and drainage have been adequately completed, the EPA recommends that scheme amendments and subdivisions based on the draft Structure Plan, are not initiated.

To formally assess numerous individual rezonings or subdivisions would be ad-hoc and incremental, particularly given the regional/catchment nature of the issues. Further, it would require a substantial commitment of resources and time. The EPA considers that individual development-based environmental impact assessment under Part IV of the EP Act should not be seen as the mechanism to address and resolve outstanding strategic regional/catchment issues.

In the late 70's similar issues and concerns faced the Peel-Harvey estuary, as now face the Swan-Canning River system. The causes of water quality decline were investigated over many years. There was pressure for special rural/residential, urban development and intensive horticulture. Given a lack of information and certainty regarding potential impacts and manageability, and in the absence of a clear government policy, the EPA formally assessed numerous proposals in the early 90's. It became clear that formally assessing individual proposals would not protect a whole catchment and was not an efficient use of departmental resources. As a result an EPP under the Environmental Protection Act (Parliament of Western Australia 1992b) and Statement of Planning Policy under the Town Planning and Development Act (WAPC 1992), were formulated.

In relation to the Swan-Canning River system, an EPP is in place and it will need to be demonstrated that development proposed within the catchment is consistent with the objectives and targets of the EPP (Parliament of Western Australia 1992b).

The demonstration of the ability of development to be consistent with these objectives should be an integral part of the planning process. Therefore, until the issues have been resolved to the EPAs satisfaction and unless a proposal is clearly minor and does not involve the key environmental issues, the EPA is unlikely to consider proposals for landuse change to be environmentally acceptable.

## 5. Summary of EPA Advice

There are several critical environmental issues which require further attention before the landuse changes proposed in the draft Structure Plan can be considered acceptable. These issues are significant, particularly those relating to the impacts of the proposed development on nutrient export and hydrology. Consequently, the EPA considers that it will be necessary to demonstrate that the landuse change proposed can be suitably managed to meet EPA and State Government objectives prior to the implementation of the Structure Plan.

The EPA is concerned that the draft Structure Plan has and will raise expectations amongst landowners and the general community. Already a number of local town planning scheme amendments and outline development plans have cited the draft Structure Plan as a basis for justification. Consistent with the discussion outlined previously, until it is demonstrated that the key environmental issues relating to nutrients and hydrology can be adequately managed, the EPA advises the WAPC to defer the initiation of rezonings and other actions associated with the implementation of the Structure Plan.

In particular, before finalising the Structure Plan, the EPA recommends that the following issues are satisfactorily resolved:

- demonstration that the proposed landuse changes can be managed to meet the objectives and targets for the Swan-Canning system;
- demonstration that the landuse changes can be managed to avoid adverse impacts on wetlands, watercourses and the Swan-Canning system due to changes in hydrology;
- the satisfactory completion of an overall drainage, nutrient and hydrological strategy for the area and establishment of acceptable implementation mechanisms; and
- finalisation and agreement on Bushplan site boundaries.

In addition to this, the EPA recommends that a number of other issues are addressed as part of the finalisation of the Structure Plan or through more detailed planning which is required to be undertaken in the implementation of the Structure Plan. These issues include the following:

- further assessment, evaluation and deliniation of conservation category wetlands;
- identification and protection of wetland buffers;
- review of the alignment of Ranford Road in the vicinity of Balannup Lake;
- provision of an adequate midge buffer in the vicinity of Forrestdale Lake;
- determination of multiple corridor widths;
- management and restoration of watercourses;
- provision of suitable separation distances between incompatible landuses;
- management of landuse in the vicinity of the two kennel areas;
- assessment and management of native fauna;
- identification of high pressure gas pipelines and management of landuse in the vicinity of these;
- management of landuse in the vicinity of the former Southern River liquid waste disposal facility; and
- identification and recognition of the Balannup Lake EMA.

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