

DEPT. OF  
& LANDS  
11 JUN 1986  
WESTERN AUSTRALIA

**ROADWORKS AND WETLANDS IN THE  
PERTH METROPOLITAN REGION :  
RECOMMENDATIONS FOR  
CONFLICT RESOLUTION**



Department of Conservation and Environment  
Perth, Western Australia

Bulletin 233 October 1985

THE IMPACT OF PROPOSED ROADS ON WETLANDS  
RECOMMENDATIONS FOR CONFLICT RESOLUTION

On 20th January, 1986 State Cabinet approved the release of this consultant's Report.

Cabinet resolved that decision-making authorities should have regard to the study and should consult the Department of Conservation and Environment during the planning stages, and before any decisions are made, concerning any planned works identified in this Report.

The primary purpose of this Report is as an information source.

Report to : The Director,  
Department of Conservation and Environment,  
BP House,  
1 Mount Street,  
PERTH W.A. 6000.

by : Le Provost, Semeniuk & Chalmer,  
Environmental Consultants,  
181 York Street,  
SUBIACO W.A. 6008

23 October 1985

LSC Ref : J074

Report No R096

**ROADWORKS AND WETLANDS IN THE  
PERTH METROPOLITAN REGION :  
RECOMMENDATIONS FOR CONFLICT RESOLUTION**

**Table of Contents**

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Background	1
	1.2 Objectives and Scope of Study	1
	1.3 Acknowledgements	2
<b>2</b>	<b>MAPPING OF WETLANDS</b>	<b>3</b>
	2.1 Introduction	3
	2.2 Available Wetland Mapping Data	3
	2.2.1 Map Scale	3
	2.2.2 The Preferred Wetland Map Base	4
<b>3</b>	<b>MAPPING OF PROPOSED ROADS</b>	<b>5</b>
	3.1 Introduction	5
	3.2 Road Planning in the Perth Metropolitan Region	6
<b>4</b>	<b>ZONES OF INTERSECTION BETWEEN ROADWORKS AND WETLANDS AND THE POTENTIAL IMPACT</b>	<b>9</b>
	4.1 Number of Potential Conflicts	9
	4.2 The Impact of Roadworks on Wetlands	10
<b>5</b>	<b>GUIDELINES FOR WETLAND ASSESSMENT</b>	<b>12</b>
	5.1 Existing Environmental Assessment Procedures	12
	5.2 Guidelines for Assessment of Conservation Value of Wetlands	13
	5.2.1 Wetland Classification	13
	5.2.2 Conservation Criteria	15
	5.2.3 The Development of a Procedure for Wetland Assessment	15
<b>6</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>18</b>
	6.1 Summary and Conclusions	18
	6.2 Recommendations	19
<b>7</b>	<b>REFERENCES</b>	<b>20</b>

List of Tables

<u>Table</u>		
1	Local Government Authorities in the Perth Metropolitan Region	21
2	Summary of Proposed Road Developments and Major Wetlands in Local Government Authority Areas in the Perth Metropolitan Region	22-49
3	Proposed Road Development in Local Government Authority Areas in the Perth Metropolitan Region	50-88
4	Road Reserves in or adjacent to Wetland Areas for which there are no current Construction Plans	89
5	Wetlands Recommended by Local Authorities for Further Study	90
6	Preliminary Classification of Wetland Types based on Shape, Size and Water Quality and their Occurrence in Relationship to the Geomorphic Elements of the Darling System	91
7	Draft Criteria for Assessing Conservation Value of a Wetland	92-93

List of Figures

<u>Figure</u>		
1	The Perth Metropolitan Region and boundaries of the ten Metropolitan Region Scheme maps (1:50,000)	94
2	Wetlands and future road construction in the Perth Metropolitan Region as shown on the MRS maps 1-10	95-105
3	Preliminary schematic diagram showing wetland types and their distribution across the Darling System according to C.A. Semeniuk (in prep.)	106
4	Flow chart for assessing the conservation value of a wetland	107
5	Histograms illustrating techniques for assessing the conservation value of a wetland utilising 15 criteria, each scored on a scale of 1-5	108

List of Appendices

Appendix

- 1 Wetlands-Roadworks Study : List of Organisations and Individuals Supplying Information
- 2 List of Organisations/Personnel to Whom Draft Guidelines for Assessing Wetland Conservation Value Were Forwarded for Comment

**ROADWORKS AND WETLANDS IN THE  
PERTH METROPOLITAN REGION :  
RECOMMENDATIONS FOR CONFLICT RESOLUTION**

**1 INTRODUCTION**

**1.1 BACKGROUND**

In late 1984 a public controversy arose over the construction of Farrington Road through Roe Swamp in Kardinya. This controversy and its subsequent resolution highlighted the existence of a number of inconsistencies or administrative and procedural problems in the general planning process for road construction in wetland areas.

In an attempt to avoid repetition of the Farrington Road controversy, the Government of Western Australia through the Department of Conservation and Environment (DCE), initiated a study to identify potential conflicts between future road works and wetlands in the Perth Metropolitan Region, and provide recommendations for their resolution.

In November 1984, LeProvost, Semeniuk & Chalmer, Environmental Consultants (LSC) were commissioned by DCE to undertake the study. The report on the findings of the study, entitled "The Impact of Proposed Roads on Wetlands in the Perth Metropolitan Region", was submitted to DCE in August, 1985. That report is a technical document which details the methodology, rationale of the approach adopted, results of the study, and justifies the recommendations.

This report summarises the results, conclusions and recommendations of that study to assist in public dissemination of the information collated.

**1.2 OBJECTIVES AND SCOPE OF STUDY**

The objectives of the study were:

- (i) to determine the number and locations of wetlands potentially at risk from proposed roadworks in the Perth Metropolitan Region; and
- (ii) to develop criteria for the assessment of the environmental significance and conservation value of these wetlands.

The approach adopted to achieve these objectives was:

(a) for Objective (i)

- . wetlands in the Perth Metropolitan Region were mapped at a scale of 1:50,000;
- . proposed roadworks were mapped at a scale of 1:50,000; and
- . the wetlands at risk from proposed roadworks were identified by overlaying these maps and noting where planned roads passed through or near wetlands.

(b) for Objective (ii)

- . literature on the classification and management of wetlands in Western Australia and elsewhere was reviewed;
- . a broad and systematic approach to classification of wetlands in the Perth Metropolitan Region was developed;
- . criteria for assessing the conservation value of wetlands were formulated;
- . community groups, Government Departments and persons having expertise in the field of wetland conservation and study were invited to comment on the overall approach and individual criteria for wetland assessment;
- . a procedure for the implementation of the wetland assessment was formulated.

### 1.3 ACKNOWLEDGEMENTS

The study was undertaken in liaison with Dr J.M. Arnold of the DCE.

The persons who provided information to the study are listed in Appendix 1. The persons who provided input to the review of wetland assessment criteria are listed in Appendix 2. In particular, the assistance of the Main Roads Department (MRD), Town Planning Department (TPD), and Local Government Authorities (LGAs) listed in Table 1 is acknowledged.

Production of wetland and roadwork map overlays was undertaken by DCE.

## **2 MAPPING OF WETLANDS**

### **2.1 INTRODUCTION**

In Western Australia wetlands have been defined as: "Areas of seasonally, intermittently or permanently waterlogged soils or inundated land, whether natural or otherwise, fresh or saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries" (Wetlands Advisory Committee, 1977).

This broad definition is not specific enough to allow for the precise mapping of most wetlands and their boundaries, as the frequency and periodicity of inundation, essential for mapping ephemeral wetlands, does not form part of the definition. In addition, the definition does not lend itself directly to traditional aerial photographic analysis, the technique generally used in drawing wetland boundaries on topographic maps. The presence of particular plant species or vegetation type dependent on a high water table such as reeds, samphires or paperbarks, or a lush growth of grasses in an otherwise sparsely vegetated area are usually used to delineate wetlands, although such features are not criteria of the definition.

To date there has been no attempt to map wetlands as defined by the Wetlands Advisory Committee (1977), either on a local or regional scale. The scope of this study does not allow for the commissioning of a new system of mapping even assuming that a satisfactory solution had been found for assigning boundaries to ephemeral wetlands. Consequently existing mapping which delineates wetlands, according to other definitions, has been adopted for the purposes of the study.

### **2.2 AVAILABLE WETLAND MAPPING DATA**

#### **2.2.1 Map Scale**

The most appropriate map scale for this project was considered to be that of the Metropolitan Region Scheme (MRS) maps, i.e. 1:50,000. The amount of information which can be incorporated into any map depends on the map scale and, to a lesser extent, on the number of different features to be mapped within a given area. The scale imposes a lower limit to the size of wetland which can be shown and consequently an arbitrary size limit is imposed. At a map scale of 1:50,000, the smallest wetland which can be shown would be approximately 50m in diameter. This size restriction however will apply mainly to isolated wetlands. Wetlands such as streams and linked wetlands are usually recorded by virtue of their linear nature despite frequently being only a few metres in width.

### **2.2.2 The Preferred Wetland Map Base**

A number of accessible map systems containing wetland information were examined to assess their suitability for use as wetland overlay maps. The 1:25,000 or 1:50,000 Topographic Map Series were considered the best currently available source of data for the purposes of this study. The two series can be assembled to provide a coverage of the Metropolitan Region.

The MRS maps (1:50,000) were selected as base maps on which to overlay the wetland and road maps. This series of ten maps covers the Perth Metropolitan Region (Fig. 1). The wetlands maps were brought to a common scale of 1:50,000 and the sheets restructured to utilise the same boundaries as the MRS maps. The information on wetlands was transferred onto clear overlays and then transposed onto the MRS base maps (Fig. 2).

The major named wetlands in each Local Government Authority (LGA) area in the Perth Metropolitan Region are listed in Table 2.

### 3 MAPPING OF PROPOSED ROADS

#### 3.1 INTRODUCTION

The responsibility for planning and construction of roads in the Perth Metropolitan Region is shared by the Metropolitan Region Planning Authority (MRPA), MRD, 26 LGAs (see Table 1) and private developers. There is no central source of information on road planning at all levels. In the absence of a single responsible agency, there are wide variations in the approach to road planning, and in the availability of maps of existing road reserves and proposed roads.

The MRPA is largely responsible for regional road planning, in conjunction with the MRD. Regional roads are shown on the MRPA map "Planning the Perth Metropolitan Region" (MRPA, 1982). These maps distinguish three categories of regional roads:

- . Controlled Access Highways
- . Other Major Highways
- . Important Regional Roads.

They show all roads reserved under the scheme including those already constructed and those reserved but not constructed. The maps do not distinguish between constructed and unconstructed roads, and the TPD does not keep up-to-date records of their state of construction. Most maps of unconstructed regional roads were obtained from the various construction authorities (MRD and LGAs). The MRD uses a different road classification - Declared Highways and Declared Main Roads. These categories largely correspond to controlled access highways and other major highways respectively.

Local road planning is largely the responsibility of LGAs, either directly or through their approval of subdivision and development plans. Other authorities, for example the MRD or the MRPA, become involved in some instances. Local roads, both constructed and unconstructed (but not all road plans) are marked on Town Planning Scheme maps at varying scales, on various land use maps, and in the Perth Metropolitan Street Directory.

Some LGAs have overall road plans, or area structure plans to guide future road development. Many LGAs respond to individual subdivision and development applications within the confines of their Town Planning Scheme zonings and MRPA Corridor Structure Plans. There are, at this stage, no definite road plans for many areas still to be developed, especially in the outer Metropolitan Area.

Subject to these considerations, the following information on roads has been obtained:

- i) Background information on road planning and construction, and its environmental impact and assessment (information from DCE).
- ii) Planning and environmental assessment procedures for main roads (information from MRD).
- iii) Planning and assessment procedures for regional roads (information from TPD).
- iv) Constructed declared highways and declared main roads (mapped at 1:50,000; information from MRD).
- v) Roads currently reserved on the MRS but not constructed which are likely to be MRD responsibility (mapped at 1:50,000; information from MRD).
- vi) Unconstructed, reserved important regional roads (mapped at 1:50,000; information from TPD and LGAs).

[Categories v) and vi) represent roads which are currently shown on the MRS but are not yet constructed.]

- vii) Amendments to the MRS currently in hand (mapped at 1:50,000; information from MRD).
- viii) Proposals currently under investigation for inclusion in the MRS (mapped on varying scales; information from MRD and TPD).
- ix) Corridor structure plans (mapped at 1:100,000; information from TPD).
- x) Major local road plans (reserves and proposals) for each LGA area (mapped at varying scales; information from LGAs).
- xi) Other land-use proposals, such as urban, special rural or industrial development, with implications for wetlands (mapped at varying scales, information from LGAs).

### **3.2 ROAD PLANNING IN THE PERTH METROPOLITAN REGION**

Road planning, both regional and local, is briefly summarised for each LGA area in Table 2. Table 3 lists road plans in more detail, including regional and local road plans, concept plans (which may include proposed roads not yet reserved or not yet subject to detailed alignment) and other developments (such as urban, industrial or special rural zones) in areas for which no detailed road plans are yet available. Table 3 also indicates which planned roads pass through or near wetland areas (see Section 4).

The listings of regional road plans are complete. Local road plans are relatively complete for most LGA areas, with the exception of the large outer shires of Wanneroo, Cockburn, Swan, Rockingham and Mundaring. For these latter areas, only major local road plans, for example district collector or distributor roads, and those known to pass near wetlands, are listed. Conceptual road plans and other developments are not complete listings, due to the variability in accessibility of this information. These listings reflect projects in advanced planning stages. Further concept plans for roads and urban and industrial development are published in the planning strategies for the four urban corridors of Perth's future development. Planned roads shown in the corridor plans are conceptual alignments only, and will be subject to rigorous assessment procedures prior to their inclusion in the MRS. A detailed analysis of the corridor plans for potential wetland interactions was beyond the scope of the present study, and would also be premature given the present stage of planning of the conceptual road alignments. However, road plans listed as priorities for implementation have been included in this study.

The road plans were mapped at a scale of 1:50,000. These maps were overlaid on the wetland maps for analysis of future impacts of roadworks on wetlands. The road plans were transposed with the wetland maps onto MRS base maps for the purposes of this report (Fig. 2).

Figure 2 shows all regional road plans (declared highways, declared main roads and important regional roads) in the Perth Metropolitan Region, including those roads reserved on the MRS but not yet constructed, and those roads indicated by the MRD as current amendments to the MRS or which are currently under investigation for inclusion into the MRS. Regional road listings in Table 3 have each been allocated a symbol which appears next to the road on the map (see key to Fig. 2). For example, A/R4 refers to the fourth regional road listed under the Shire of Armadale. Table 3 states the MRS map for the LGA area to facilitate location of the symbol when referring from the table to the map. To refer from the map to the table, the LGA abbreviation (the first part of the symbol) identifies the LGA in Table 3, and the number identifies the road in the listing under that area. A further symbol (see key to Fig. 2) highlights areas where planned regional roads pass through or near wetlands.

Local road plans are not mapped in Figure 2 because of the number involved and the difficulties of scale. However, local road plans have been reviewed and those roads which pass through or near a wetland are indicated by a symbol on the map (Fig. 2), the position of which indicates the approximate location of the roadwork/wetland overlap. As for regional roads, the symbols facilitate locating details of the proposed roadworks in Table 3.

Concept plans for roads which have not yet been subject to detailed planning of alignment or reservation are not mapped in Figure 2. Symbols indicate where they may pass through or near a wetland, and refer to listings in Table 3. These listings must be interpreted as conceptual only, and final alignments may differ.

Wetland areas zoned for future industrial, urban or special rural development, but for which no specific road plans are yet available, are also indicated in Figure 2 by symbols which are explained in Table 3.

#### 4 ZONES OF INTERSECTION BETWEEN ROADWORKS AND WETLANDS AND THE POTENTIAL IMPACT

##### 4.1 NUMBER OF POTENTIAL CONFLICTS

There are numerous roadworks proposed for construction over the next ten to twenty years in the Perth Metropolitan Region and all will have some impact on the surrounding environment.

It is not surprising that proposed roadworks may affect a large number of wetlands because wetlands and surrounding areas often provide natural low and comparatively flat ground for road alignment, and because these "unusable" landforms have survived as the only remaining undeveloped land in many areas.

The map of planned roads in conjunction with the wetland map (combined as Fig. 2) indicates where proposed roadworks pass through or near wetlands. This provides a guide to the location of possible future conflicts between roadworks and wetland conservation.

Figure 2 shows at least 180 locations where wetlands may be affected in some way by proposed roadworks. This number is a significant underestimate because specific road plans are not yet available for many areas zoned for future development. This applies especially to the outer Metropolitan Region, including the Shires of Wanneroo, Cockburn, Swan and Rockingham where many of the more natural surviving wetlands are to be found.

While the total number of potential impacts is high, the significance of the impact in each case will depend not only on the current status and conservation value of the wetland (see Section 5), but also on the final road alignment within the road reserve; any changes in planned alignment (especially for roads which are currently only concept plans); construction methods; and pre- and post-construction management (see Section 4.2).

Some of the potential roadwork-wetland intersections identified may represent minor impacts such as a road crossing a creek; about 20% involve roads crossing creeks or brooks (Table 3; Fig. 2). A further 30% involve roads planned through swamps or areas of seasonally inundated land. Many of these areas may already be totally degraded, or subject to alternative land uses including grazing, market gardens, filling and drainage.

Some of the roads listed in Table 3 and located in Figure 2 may never be built, because of changes in plans, or opposition to the project, because the road reserve is historic and there are no current plans for construction, or because local road plans have been superseded by overlying freeway reserves. This applies particularly to road reserves on the Swan and Canning River foreshores. The Swan River foreshore alone accounts for about 20%

of the total roadwork-wetland intersections identified. Table 4 lists road reserves passing through or near wetlands for which there are no current construction plans.

During the course of this study, some LGAs expressed concern about the need for assessment of wetlands in their areas and research towards their future management. Recommendations by LGAs on wetlands highlighted as worthy of research are listed in Table 5.

Thus while this study has identified the locations of planned roadwork-wetland intersections, not all of these would cause significant conflict between road construction and wetland conservation. Individual assessment of the areas of possible impact is vital to ensure that priority for conservation is given to those remaining wetlands which have a current or potential conservation value. Whilst such individual assessment was not within the scope of this study, a procedure for conducting the assessment is presented in Section 5.

#### 4.2 THE IMPACT OF ROADWORKS ON WETLANDS

Roadworks may affect wetlands in a number of ways and to varying degrees:

- . the road may directly intersect the wetland, necessitating the building of causeways or bridges, or the draining and filling of the wetland;
- . the road may directly intersect the wetland margin or interfere with adjoining hydrologic/physical factors that maintain the wetland;
- . the road may not directly intersect the wetland but by-products of roadworks and later traffic, and the road itself after construction may have an indirect effect on the wetland, e.g. disruption to fauna movement, increased runoff and seepage of contaminated water into the wetland.

In detail, the effects of road construction on wetlands can include the following:

- . Destruction of wetland vegetation
- . Filling-compaction and development of road embankments
- . Draining to ensure that the roadway cannot be flooded
- . Disruption to hydrology - interruption of water movement by the imposition of an embankment and/or drainage line (NB: in context of wetland systems)
- . Noise - initially due to construction activity and subsequently to traffic noise
- . Disruption to fauna habitats
- . Disruption to fauna and flora by altered water regime
- . Interruption to fauna movements (e.g. birds, tortoises)
- . Runoff water from road (pollution)

- . Spillage of liquid or chemicals in transport
- . Increased fire risk
- . Invasion by weeds
- . Aesthetic disruption
- . Increased access to wetland – including disturbance, littering, woodcutting, trail bike usage
- . Social considerations
  - how people perceive the roadworks/impact
  - disruption of access
- . Vehicle emissions, e.g.
  - lead
  - dust
  - carbon monoxide
  - nitrogen (oxides)
  - hydrocarbons
- . Increased management costs.

Any one road development in or adjacent to a wetland area is unlikely to produce all the effects listed above. The nature, degree and significance of the of impact will depend on both the road (e.g. alignment, construction methods, vehicle use, and management) and on the conservation value of the wetland.

## 5 GUIDELINES FOR WETLAND ASSESSMENT

### 5.1 EXISTING ENVIRONMENTAL ASSESSMENT PROCEDURES

Procedures for assessing the environmental impact of proposed roads have been documented by the MRD (1982) and DCE (1984). Assessment usually takes place in two phases: (i) assessment of road alignment; and (ii) detailed assessment at construction stage. This allows modifications to be made in:

- alignment of the road reserve;
- alignment of the road within the reserve;
- construction methods;
- management (pre- and post-construction).

For a **regional** road to be added to the MRS, a major amendment to the MRS is required. There is provision for environmental assessment in the planning, consultation and public review phases.

The MRD undertakes routine environmental assessment of road impacts prior to construction (MRD, 1982). An "environmental checklist" is completed and, on this basis, the project is classified into one of four categories:

- (a) No further action required;
- (b) Statement required by Division of MRD;
- (c) Report required;
- (d) Notice of Intent/Environmental Review and Management Programme required.

Assessment of proposed **local** roads is generally an individual matter for the LGA concerned, except in cases where the MRD is involved, as for example when Bicentennial or Commonwealth funds are used. In the past there has been no standard approach by LGAs to environmental assessment of planned local roads. Where major environmental effects could occur, the EPA may require the preparation of a Notice of Intent (NOI) or Environmental Review and Management Programme (ERMP).

In March 1985 the DCE, in conjunction with the MRD, released guidelines for environmental assessment of roadworks, and distributed these to Local Government Authorities with the aim of creating an awareness of the effects that road projects may have on the environment, and to enable assessment of the effects of individual projects (DCE, 1984). Measures to minimise negative effects are suggested, and there is a classification of projects into categories based on degree of environmental effects.

This assessment is essentially a self-appraisal process, but in the case of projects funded through the MRD, the MRD may conduct its own internal assessment. The guidelines suggest that projects with the potential for significant environmental impact should be

referred to the DCE but this is not a legislative requirement. Projects with major environmental effects require a NOI or ERMP to be submitted to the EPA.

None of the existing published guidelines provide criteria for assessing the value of a wetland. This is an important omission since the conservation value of a wetland is a major factor in impact assessment.

## 5.2 GUIDELINES FOR ASSESSMENT OF CONSERVATION VALUE OF WETLANDS

The development of guidelines to assess the conservation potential of wetlands resolves into three tasks.

- (i) A classification of wetland types upon which to base identification of resources at risk.
- (ii) The development of criteria to assess the conservation significance of these resources.
- (iii) The development of a procedure to implement the assessment of these criteria.

Each of the above tasks is detailed in the following sections.

### 5.2.1 Wetland Classification

Before assessing the conservation potential of a wetland system, it is necessary to determine the resources that the wetland contains, and which of these resources may be at risk. The resources potentially at risk in a wetland environment include, but are not limited to:

- (i) landform,
- (ii) vegetation,
- (iii) fauna,
- (iv) human or social uses.

Each of these resources needs to be categorised and described in such a way that their relative value can be compared between wetlands. In order to do this, there needs to be a general classification scheme for wetlands. To date, there have been several classifications of wetlands of the Swan Coastal Plain and the Darling System (System 6), notably by Riggert (1966) who identified wetland types used by avifauna, by Tingay and Tingay (1976) and the Wetlands Advisory Committee (1977) who developed limnological classifications, and by C.A. Semeniuk (in prep.) who uses geomorphic elements. All of these classifications are either too specific or incomplete to provide the general classification required

to specify all the resources at risk in a wetland. The classification required needs to start on a broad base and then to progress to specific resources.

While such a classification has not yet been developed, the geomorphic classification developed by C.A. Semeniuk (in prep.) does provide a basis on which to categorise the wetlands into broad geomorphic types based on:

- . geometry and bathymetry,
- . geomorphic setting, and
- . water characteristics.

Further categorisation uses the components of:

- . stratigraphy (geologic history) and geomorphic maintenance,
- . processes of water maintenance, and
- . soilwater/soil relationships.

The geometric elements of this classification are presented in Table 6 and Figure 3, and serve to illustrate:

- . the complexity of wetland types - in the Metropolitan Region there are at least 23 types;
- . that suites of wetlands can recur within the same geomorphic setting; and
- . that wetlands even within the same geomorphic setting can be diverse in origin.

While C.A. Semeniuk's categorisation provides a basis for identification of resources at risk, further categorisation needs to be carried out using criteria of vegetation, fauna and human use of the wetlands. This process has already been initiated in some of the studies described above (Riggert, 1966; Tingay & Tingay, 1976; Wetlands Advisory Committee, 1977).

However, it should be noted that all of the wetland classifications cited above illustrate the complexity of wetland types. For example, since vegetation responds to variations in habitat, wetlands of the same geomorphic type may contain quite different vegetation, in terms of structure and composition, because of locality, variable geomorphic history, vegetation history/dynamics, subtle variation in stratigraphy, soil and water relationships, and degree of human use and disturbance. Consequently, the following conclusions are important in any consideration of wetland conservation:

- (i) Wetlands of the Darling System (Swan Coastal Plain and Darling Plateau) are variable in type, origin and maintenance.
- (ii) A suite of wetlands in a given locality cannot necessarily be considered as representative of the region.

- (iii) Each geomorphic setting contains its own suite of inter-related wetlands.
- (iv) Even wetlands of the same geomorphic type vary in terms of habitat and hence the flora, fauna and human uses which they can support.
- (v) The current status of a wetland in terms of nature and degree of impact of human use will affect the value of that wetland as a representative of its type.

### **5.2.2 Conservation Criteria**

The previous section provided a basis for identifying the resources at risk in wetlands. Once those resources are identified, a rational approach to land management is to determine the value of the resources at risk. The assessment of the social and scientific value of any component is based on many criteria, the most significant of which include: (1) regional significance of the system - is it regionally widespread and common, or is it restricted to local areas? (2) are there unique landforms, biota or other natural features that are of state-wide, national or international status? and (3) are there important social, recreational, educational, scientific/research, or wildlife sanctuary/habitat resources? Criteria which can be used to answer these questions are listed in Table 7. These criteria take into account both the natural values and the current or potential uses of a wetland.

If all members of the community are to derive benefit from wetland systems it will be necessary to ensure that any proposed development or management of wetlands is compatible with the range of alternative potential uses of the resources. To this end, the criteria listed in Table 7 have identified in a preliminary fashion the range of potential conservation values of the resources of any given wetland. The significance of a wetland may be determined by giving a score to each of these criteria.

### **5.2.3 The Development of a Procedure for Wetland Assessment**

Any attempt to develop a procedure to implement this approach to wetland assessment must incorporate several factors:

- (i) For many wetlands there are insufficient data available for assessment.
- (ii) Many wetlands are already destroyed or severely altered such that those remaining must in general be viewed as significant. In 1966 it was estimated that nearly half of the wetlands of the Swan Coastal Plain had been destroyed through drainage and filling (Riggert, 1966). Development over the last 19 years has undoubtedly destroyed further

substantial areas of wetland. Thus the remaining wetlands acquire a greater conservation importance because of the depleted amount of wetland resources now available.

- (iii) There are conflicting demands for use of wetlands by social, government, developmental, educational and research groups.
- (iv) The perceived value judgement of a minority group needs to be appreciated, but has to be integrated and balanced. A scientific community, although a minority, may have information about a natural system such as to warrant its conservation even though the public is not aware of these values and do not necessarily share the same perspective. Equally, a minority group in a residential area may place importance on a wetland in their suburban area that the wider conservation bodies do not necessarily share. Both value judgements are valid, although they may need to be judged against community standards.
- (v) Many of the decisions of today will have impact on generations of the future and such decisions should not unduly pre-empt or predetermine the attitudes of and values of the future.
- (vi) Finally, although all the various criteria or values of wetlands listed in Table 7 are important, some may be given different priorities in certain circumstances. For example, if a wetland is one of only a few remaining as habitats for a rare or endangered species, then that criterion alone may determine the conservation value and future management of the wetland. Similarly, if there is a demonstrated need for more open-water areas for active recreation, then that criterion may rank high in determining a wetland's perceived value.

With these factors in mind, it is suggested that the following procedure for wetland assessment be adopted (Fig. 4):

- (1) Identify wetland.
- (2) Apply assessment criteria to the wetland (see Table 7). If insufficient information is available to form an assessment, then obtain additional information or data.
- (3) Apply a rating to each criterion. A rating of 1 = not significant; 2-4 = graded scale of moderate significance; 5 = high significance.
- (4) Construct a histogram of ratings values versus criterion (see Fig. 5).
- (5) Assess wetland on a preliminary basis using the histogram. This is amplified below.

The assessment of a wetland on the basis of the histogram rests on the premise that if one or more criteria has a significance score of greater than 2 then that wetland is moderately to highly significant to some component of the Perth Metropolitan community. A wetland which ranks highly on several criteria would clearly be of high conservation value, but a high rating on a single criterion would also assign a degree of significance to the wetland (see Fig. 5). The wetland in question would then undergo a thorough assessment to determine land management priorities. Analysis of the histogram in terms of which criteria contributed to the assessment of the wetland as significant (social/recreational values, natural or scientific values, educational/research values) could provide a basis for determining appropriate future management.

If all criteria are less than 2, then the wetland does not appear to be significant on the basis of the established criteria (see Fig. 5). However such a wetland might still be considered for rehabilitation if there is a perceived need for wetlands in any given area.

## 6 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 SUMMARY AND CONCLUSIONS

This study has identified over 180 localities in the Perth Metropolitan Region where future roadworks may intersect wetlands. This number will increase as further areas of the outer Metropolitan Region are developed.

While the number of areas of potential intersection is large, not all of these will result in significant impact or conflict with wetland conservation. Some of the planned roads may never be built and other intersections represent only a road crossing a small creek.

The significance of the impact of roadworks on a wetland will depend on a range of factors which include the alignment, construction methods, and pre- and post-construction management of the road, and conservation value of the wetland. Thus each situation where planned roads may intersect wetlands requires individual assessment. The assessment must incorporate evaluation of:-

- (i) the potential effects of the roadworks; and
- (ii) the existing and future conservation potential of the wetland.

The range of possible effects of roadworks on wetlands is identified in this report. The existing and future conservation potential of the affected wetlands is less readily determined on the basis of current knowledge.

Wetlands in southwestern Australia are a limited and important conservation resource. Many of the wetlands of the Swan Coastal Plain have already been destroyed through drainage and filling, and the proportion remaining in 1985 is not known. The surviving wetlands, because of their reduced number, assume an even greater conservation value. Further, there is a need to preserve a range of wetland types. The diversity of wetland types in the Perth Metropolitan Region is demonstrated by the geomorphic classification system proposed in this report, as well as by limnological classification systems. The variability of wetland types, and of their current uses and degree of alteration or degradation, means that wetlands cannot be treated as a single resource. As landform plays a large role in determining vegetation, fauna, and human uses, a geomorphic classification system is proposed as a basis for classifying the surviving wetlands.

In order to ensure that priority for conservation and management is given to those remaining wetlands with a current or potential conservation value, a systematic approach to assessing the resources of individual wetlands is required. An assessment

procedure based on both natural values and current or potential human uses of the wetland is proposed as a basis for assessing the limited remaining wetland resources to ensure appropriate future management as development proceeds.

## 6.2 RECOMMENDATIONS

It is therefore recommended that:

- . The wetlands identified in this study as potentially affected by roads and roadworks be individually assessed so that priority for conservation is given to those wetlands which have a current or potential conservation value.
- . During the task of assessment, the wetlands be critically evaluated in terms of regional setting, wetland classification, current conservation status and current usage.
- . Individual assessment of the areas where currently-planned roads may impact wetlands should identify where road realignment, or pre- or post-construction management is required to protect the integrity of the wetland areas.
- . A standard referral or assessment procedure be implemented to ensure that future road planning in areas for which there are currently no road plans includes the need for wetland conservation in all planning, construction and management stages.
- . A comprehensive mapping survey of wetlands in the Perth Metropolitan Region be undertaken to locate and assess the overall extent of the surviving wetland resources. This is a basic requirement for assessment of existing and future conservation potential.

## 7 REFERENCES

BOWMAN, M., CHAMBERS, M., DUNLOP, N., HART, L., HOGAN, T., LIEVENSE, D., & MAISEY, K. (1976): The Cockburn Wetlands - An Environmental Study. Unpublished report to Town of Cockburn.

DEPARTMENT OF CONSERVATION & ENVIRONMENT (1984): Environmental Assessment of Roadworks - Guidelines for Local Authorities. Dept Conserv. & Environ., West. Aust., Bull. No. 184: 12p.

ENVIRONMENTAL PROTECTION AUTHORITY (1983): Conservation Reserves for Western Australia as Recommended by the Environmental Protection Authority - 1983. The Darling System - System 6. Part II: Recommendations for Specific Localities. Dept Conserv. Environ. West. Aust., Report 13.

LePROVOST, SEMENIUK & CHALMER (1985): The Impact of Proposed Roads on Wetlands in the Perth Metropolitan Region. Unpubl. rept to Department of Conservation & Environment, West. Aust. (LSC Rept No. R083).

MAIN ROADS DEPARTMENT, WESTERN AUSTRALIA (1982): Environmental Assessment Manual. Urban Planning Section, December 1982 (draft).

METROPOLITAN REGION PLANNING AUTHORITY (1982): Planning the Perth Metropolitan Region. MRPA, Perth, Western Australia, August 1982.

RIGGERT, T.L. (1966): Wetlands of Western Australia, 1964-66. Department of Fisheries and Fauna West. Aust.

SEMENIUK, C.A. (in prep.): Wetlands of the Darling System, their classification from a geomorphic viewpoint.

TINGAY, A., & TINGAY, S.R. (1976): The Wetlands of System 6. A report prepared for the Environmental Protection Authority.

TRIVERS MORGAN PTY LTD, 1984: Midland Western Link Road Study, A Summary. Prepared for Metropolitan Region Planning Authority, Perth.

WETLANDS ADVISORY COMMITTEE (1977): Wetlands & Wetland Reserves from Moore River to Bunbury, Western Australia. Report to the Environmental Protection Authority, Perth, West. Aust.

TABLE 1

## LOCAL GOVERNMENT AUTHORITIES IN THE PERTH METROPOLITAN REGION

- . Armadale (Town Council)
- . Bassendean (Town Council)
- . Bayswater (City Council)
- . Belmont (City Council)
- . Canning (City Council)
- . Claremont (Town Council)
- . Cockburn (City Council)
- . Cottesloe (Town Council)
- . East Fremantle (Town Council)
- . Fremantle (City Council)
- . Gosnells (City Council)
- . Kalamunda (Shire Council)
- . Kwinana (Town Council)
- . Melville (City Council)
- . Mosman Park (Town Council)
- . Mundaring (Shire Council)
- . Nedlands (City Council)
- . Peppermint Grove (Shire Council)
- . Perth (City Council)
- . Rockingham (Shire Council)
- . Serpentine-Jarradale (Shire Council)
- . South Perth (City Council)
- . Stirling (City Council)
- . Subiaco (City Council)
- . Swan (Shire Council)
- . Wanneroo (Shire Council)

TABLE 2

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS  
AND MAJOR WETLANDS FOR EACH LOCAL GOVERNMENT AUTHORITY AREA  
IN THE PERTH METROPOLITAN REGION**

**LOCAL GOVERNMENT AUTHORITY**

Armadale

**ADDRESS**

Jull Street, Armadale, W.A. 6112

**TELEPHONE**

399 6666

**CONTACT PERSON**Mr John Adderley (Planning)  
Mr Greg Elsegood (Engineering)**DATE**

9.11.84

**TOWN PLANNING SCHEME**

TPS No. 2 (1983)

**COPIES OBTAINED**

No

**NOTES**

Structure plan of proposed development obtained (Armadale 1830-2000)

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roads

Beechboro-Gosnells Highway (now Tonkin Highway), Corfield-Spencer Road link, Garden Street link, Scenic Drive, Ranford Road

Local roads

See table 3.

Concept plansShown on Armadale 1830-2000 plan (see table 3).  
See also South East Corridor Strategy Plan.Subdivisions

Further subdivision of urban areas on Armadale 1830-2000 Structure Plan.

Northern Area (A14) already received TPB approval for structure plan for subdivision.

Southern Area not yet zoned urban. Structure plan to MRPA.

Future industrial area in wetland area.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Lake Forrestdale and associated wetlands (in ROS)

Wungong River (part of foreshore in ROS)

Wright Lake (owned by Council; in ROS. Could be developed for recreation - needs work done to develop management plan. Note - adjacent to proposed Beechboro-Gosnells Highway [now Tonkin Highway])

Lake Balannup (privately owned. Ranford Road goes through it - will be upgraded and extended to South Street).

Swamps in rural area to west of Shire. Future industrial area will require drainage.

Canning River (some foreshore in LOS. Most private ownership).

Neerigen Brook, tributaries of Wungong Brook, Wright Brook, Churchmans Brook, Carradine Brook, Stinten Creek, Stony Brook.

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Bassendean

**ADDRESS**

48 Old Perth Road, Bassendean, W.A. 6054

**TELEPHONE**

279 5022

**CONTACT PERSON**Mr Clarrie McCreed (Town Clerk)  
Mr Bob Milne (Engineer)**DATE**

6.11.84

**TOWN PLANNING SCHEME**

District Scheme No. 3

**COPIES OBTAINED**

Yes

**NOTES****SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

The Town of Bassendean is already highly developed. There are few road proposals.

Local roads

Area of vacant land, zoned industrial, to be subdivided (no plans at this stage).

Roads north of industrial area to be constructed (time scale not known).

Note: Roads running into Regional and Local Open Space on Swan River foreshore are reserves. The Local Authority has no intention of proceeding with them.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore and associated wetlands

Wetlands in Pickering Park and nearby Local Open Space, and in Regional and Local Open Space at Ashfield Flats (McDonald Park) may have value. Local Authority feels that there is an urgent need for study of these areas with a view to developing development and management plans (there is currently no management).

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Bayswater

**ADDRESS**

61 Broun Avenue, Morley, W.A. 6062

**TELEPHONE**

272 0622

**CONTACT PERSON**

Mr Greg Rowe (Deputy City Planner)  
 Mr Edwin Long (Deputy City Engineer)  
 Mr Peter Smith (CEP - reserve management)

**DATE**

4.11.84

**TOWN PLANNING SCHEME**

No.13

**COPIES OBTAINED**Examined (copies  
not available)**NOTES**

Town Planning Scheme 13  
 (District Zoning Scheme)  
 Land use maps (1:5,000,  
 north and south sheets)  
 show existing and reserved  
 roads (copy obtained)

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

The City of Bayswater is already highly developed. Almost all roads shown on the TPS are already constructed. Exceptions are those on the Swan River foreshore; although reserved, the Local Authority has no intention of constructing these.

Regional roads

The proposed Swan River Drive is shown on the TPS along the foreshore. The Local Authority has queried the need for this reservation.

Concept plans

Only three road projects are being considered which are not shown on TPS (See table 3).

- (1) Subdivision (single residential)
- (2) Extension north of Beechboro-Gosnells Highway (now Tonkin Highway)
- (3) Joining Garrett Road to Grand Promenade; upgrading Garrett Road

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River (foreshore covered by Regional Open Space reserve)

Wetlands on Swan River foreshore (see notes)

**NOTES**

Local Authority, with C.E.P., have employed Peter Smith to investigate development and management of a parcel of land on the Swan River foreshore which is currently owned by the Local Authority and zoned residential. Considered plans are bird sanctuary and golf course. A wetland area is involved.

**LOCAL GOVERNMENT AUTHORITY**

Belmont

**ADDRESS**

215 Wright Street, Cloverdale, W.A. 6105

**TELEPHONE**

478 0222

**CONTACT PERSON**Mr Adrian Oats (Planning)  
Mr Britt Payne (Engineering)**DATE**

6.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**No. 6  
No. 11 (in progress)

No

Street map obtained  
(extract from UBD)**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roadsBeechboro-Gosnells Highway (now Tonkin Highway)  
City Northern Bypass  
Redcliffe-Bushmead Highway  
Abernethy Road (upgrading)  
Esther Street  
Great Eastern Highway (upgrading)  
Orrong Road (upgrading)Local roads

Listed in table 3.

Note: regional and local road proposals on Swan River foreshore, Redcliffe

Subdivision

Redevelopment of area bounded by Beechboro-Gosnells Highway (now Tonkin Highway), Klem &amp; Epsom Streets

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**Swan River foreshore  
Tomato Lake  
Ornamental lake in Centenary Park  
Ornamental lake in Faulkner Park**NOTES**

Airport land - road reserves shown on this area are not under Local Authority control.

Tip site on Swan River foreshore (Golf St.) subject to management proposals for recreation.

**LOCAL GOVERNMENT AUTHORITY**

Canning

**ADDRESS**

1317 Albany Highway, Cannington, W.A. 6107

**TELEPHONE**

451 0606

**CONTACT PERSON**

Mr C. O'Neal

**DATE****TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**

TPS 16 (1973) (zoning scheme)

Yes

TPS Nos 17, 21, 23, 24, 25, 29, 30, 31, 33, 34 cover areas of City of Canning

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional

Roe Highway  
 Orrong Road  
 South Street  
 McDowell Street

Local

Streets on Swan River foreshore (see table 3) gazetted but no proposals for construction.

Streets in line of Spencer-Manning Road link proposal gazetted but not constructed.

Subdivisions

As per zonings in TPS (see table 3 and TPS 16)

Concept plans

Spencer-Manning Road link (subject of ERMP)  
 Adenia Road extension  
 (See also South East Corridor Strategy Plan)

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Canning River - ROS joint management plan being prepared by MRPA-Council, see concept plan (attached)

Swamp in industrial-zoned land between Sheffield Road and the railway line - Council officers concerned about its future conservation.

Bannister Creek - LOS and drainage - some natural areas

Compensating basins in LOS on Agincourt Drive (worth preserving)

Seasonal swamp on Roe Highway alignment

**NOTES**

Possible construction of cycleways at south end of Bull Creek and through wetland south of Canning River.

**LOCAL GOVERNMENT AUTHORITY**

Claremont

**ADDRESS**

308 Stirling Highway, Claremont, W.A. 6010

**TELEPHONE**

384 1377

**CONTACT PERSON**

Mr Ron Brooks (Town Planning)

**DATE**

9.11.84

**TOWN PLANNING SCHEME**

No.

**COPIES OBTAINED**

No

**NOTES****SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Local Authority area almost fully developed.

Leura Avenue to be realigned at Stirling Highway end.  
(Stirling Highway to be upgraded.)

Subdivision of John XXIII College property near Lake Claremont and on the Swan River foreshore for residential purposes.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore  
Lake Claremont

**NOTES**

Road shown on some maps through Lake Claremont has been closed.

**LOCAL GOVERNMENT AUTHORITY**

Cockburn

**ADDRESS**

9 Coleville Crescent, Spearwood, W.A. 6163

**TELEPHONE**

418 3311

**CONTACT PERSON**Mr Russell Candy  
Mr Keith Rimmer  
Mr Bob Jeans (Planner)**DATE**

22.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**

No

City of Cockburn map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roadsRoe Highway  
Cockburn Road-Rockingham Mandurah Highway  
Spearwood Avenue  
Yangebup Road  
Kwinana Freeway  
North Lake Road - Forrest RoadLocal roads

Information not available (See table 3). Will be planned according to development applications.

Subdivision and development

See South West Corridor Strategy Plan

Concept plansSouthern extension of Kwinana Freeway ) see South West Corridor Strategy Plan  
Southern extension of Coolbelup Avenue)**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Eastern and western chain - see Cockburn Wetlands Study

Manning Lake )  
Lake Coogee )  
North Lake Lake)  
Bibra Lake Lake) ROS  
Yangebup Lake )  
Kogolup Lake )  
Thompsons Lake )  
Banganup Lake )

Banjup Lake ) private ownership

Unnamed swamps )

**NOTES**

See attached.

**NOTES**

Wetlands in Spearwood, west of Rockingham road merit study in view of private ownership and future residential development.

See Cockburn Wetlands Study, System 6 report.

Submission from Coolbellup Community Association Inc. expressed concern about Roe Highway alignment and suggested alternative.

Submission from Yangebup Progress Association expressed concern about effects of realignment of Forrest Road on Little Rush Lake and industrial development near South Lake.

Submission from Wetlands Conservation Society expressed concern about Forrest and Yangebup Roads realignments and Roe Highway extension.

**LOCAL GOVERNMENT AUTHORITY**

Cottesloe

**ADDRESS**

Broome Street, Cottesloe, W.A. 6011

**TELEPHONE**

384 1566

**CONTACT PERSON**

Mr Malcolm Doig (Deputy Town Clerk)

**DATE**

14.11.84

**TOWN PLANNING SCHEME**

TPS No. 1

**COPIES OBTAINED**

No

**NOTES**

Street map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Area fully developed.

Regional roads  
West Coast Highway

Local

Almost all constructed as shown except as indicated in table 3.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

None (coast)

**NOTES**

Currently upgrading Curtin Avenue to 10 metre width. South from Servetus Street to Local Authority boundary, partly on reserve for West Coast Highway.

**LOCAL GOVERNMENT AUTHORITY**

East Fremantle

**ADDRESS**

Canning Highway, East Fremantle, W.A. 6158

**TELEPHONE**

339 1577

**CONTACT PERSON**

Mr Cowan

**DATE**

15.11.84

**TOWN PLANNING SCHEME**

No. 2

**COPIES OBTAINED**

No

**NOTES**

Street map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Area fully developed - no local road development or subdivision proposed

Regional

Southern approaches to Stirling Bridge from Leach Highway (MRD)  
(Fremantle Eastern Bypass) - also see Fremantle

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore - mostly in 'A' class reserve vested in Council and leased to sporting groups. Part of foreshore covered by road reserve (existing road).  
(No other wetlands).

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Fremantle

**ADDRESS**

William Street, Fremantle, W.A. 6160

**TELEPHONE**

335 6422

**CONTACT PERSON**

Mr Les Croxford

**DATE**

15.11.84

**TOWN PLANNING SCHEME**No. 2  
(3 in progress)**COPIES OBTAINED**

No

**NOTES**

Street map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Area almost fully developed - few road plans

Regional roadsFremantle Eastern Bypass  
Roe HighwayLocal

See table 3.

SubdivisionsLarge holdings of land still to be subdivided to ca 2,000m<sup>2</sup> industrial; some larger holdings in South Fremantle and Beaconsfield to be subdivided for residential purposes (small roads and cul de sacs)Concept plans

(see table 3)

Canning Highway deviation  
Parry Street**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore (managed by Council)

**NOTES**

Future development of facilities on the foreshore at Success Harbour may necessitate improved access to fishing boat harbour from Marine Terrace - possibly a road along the foreshore west of the railway line (no plans as yet)

**LOCAL GOVERNMENT AUTHORITY**

Gosnells

**ADDRESS**

Albany Highway, Gosnells, W.A. 6110

**TELEPHONE**

398 2233

**CONTACT PERSON**

Mr Keith Thomas (City Engineer)

**DATE**

16.11.84

**TOWN PLANNING SCHEME**

TPS 1

**COPIES OBTAINED**Copy of Concept  
for TPS 6 "City  
of Gosnells 2002"  
obtained**NOTES**City of Gosnells road map  
obtained**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roads

Roe Highway

Garden Street

Scenic Drive

Beechboro-Gosnells Highway (now Tonkin Highway)

(Ranford-Corfield-Spencer Road link - largely upgrading)

(Warton Road - largely upgrading)

Local roads

Roads in Canning Loc. 16 south of Garden Street extension.

Others as listed in table 3.

Subdivisions

Forrest Lakes (wetland area)

Huntingdale

Future subdivision of residential areas as shown on TPS 6

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Balannup Lake (boundary with Armadale) private (seasonal)

Mary Carroll Park - managed by Local Authority (fairly permanent)

Artificial lakes at Council Chambers, Hester Park and on banks of Canning  
River at Thornlie

Bickley Brook Reservoir

Canning River - note: pressure for further development of ROS needs study -  
could leave some areas natural

Woodlupine Brook

Yule Brook

Southern River (becomes Wungong)

Quarries at Bell's Dam, Barrington's quarry, Readymix quarry and claypits on  
Bickley Road**NOTES**

Roads in Canning Loc. 16 are private not gazetted roads.

**LOCAL GOVERNMENT AUTHORITY**

Kalamunda

**ADDRESS**

2 Railway Road, Kalamunda, W.A. 6076

**TELEPHONE**

293 2111

**CONTACT PERSON**

Mr Geoff Dutton (Engineer)

**DATE**

7.11.84

**TOWN PLANNING SCHEME**

No.

**COPIES OBTAINED**

No

**NOTES**

Copy of street map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roads

Ring Road

Scenic Drive

Local roads

See table 3.

Concept plans

See table 3.

Development plans

Proposed subdivisions covered by TPS amendments or guidelines are indicated.

Note: TPS 12 (industrial) covers wetland area.

Much of the rural undeveloped land in Forrestfield and Wattle Grove could eventually be made Special Rural Zones.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Creeks on plateau and escarpment

Swamps in Forrestfield area

**NOTES**

Wetland area in ROS (A class reserve) vested in Kalamunda Shire Council. Suggested that it could be a valuable area if appropriately developed and managed. Shire would like to see studies on the wetland.

**LOCAL GOVERNMENT AUTHORITY**

Kwinana

**ADDRESS**

Gilmore Avenue, Kwinana, W.A. 6167

**TELEPHONE**

419 2222

**CONTACT PERSON**Mr David Porter  
Mr Doug Smith**DATE**

15.11.84

**TOWN PLANNING SCHEME**

TPS No. 2 (in prep.)

**COPIES OBTAINED**Yes  
(current TPS)**NOTES****SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional

Wellard Road

Fremantle-Rockingham Controlled Access Highway

Gilmore Avenue

Charles Street

Peel Highway

Local

See table 3.

Subdivisions

Balance of Parmelia/Orelia

Leda

Special Rural Zones

Concept plans

Kwinana Freeway extension south and see South West Corridor Strategy Plan and table 3.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**Wattleup Lake) private ownership  
Long Swamp )Sandy Lake ) private ownership (Alcoa)  
The Spectacles)

Swamps in Golf Course, Westrail Marshalling Yards and CSBP

**NOTES**

The Spectacles are worthy of preservation

**LOCAL AUTHORITY**

Melville

**ADDRESS**

Almondbury Road, Booragoon, W.A. 6154

**TELEPHONE**

364 5677

**CONTACT PERSON**

Mr Laurie Wills (Engineer)

Mr Bruce Guthrie (Parks)

**DATE**

19.11.84

**TOWN PLANNING SCHEME**

No. 2

**COPIES OBTAINED**

Yes

**NOTES****SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roads

Roe Highway

Kwinana Freeway

(South Street - upgrading to dual carriageway)

(North Lake Road - upgrading)

Subdivisions

Kardinya subdivision stage 2

Subdivision bounded by Farrington Road, Roe Highway and Kwinana Freeway

Subdivision between South Street and Roe Highway

Future subdivision of residential and urban deferred land as shown in TPS 2

Concept plans

Karel Avenue, Murdoch Drive

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Bull Creek foreshore and Bull Creek

Blue Gum Lake )

Booragoon Lake) management by Council

Piney Lake - management plan in preparation by MRPA (ROS) (subject of submission by Wetlands Conservation Society)

Swamp in Reserve 32863 - Council wants vesting for public recreation and parkland

Swan River foreshore - see System 6 (ROS)

Artificial lakes in Frederick Baldwin Reserve (drainage)

Swamp in Leeming subdivision

Swamps on Kwinana Freeway-South Street interchange

Hospital Swamp - site of proposed hospital corner South Street and Murdoch Drive (subject of submission by Wetlands Conservation Society)

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Mosman Park

**ADDRESS**

Bay View Terrace, Mosman Park, W.A. 6012

**TELEPHONE**

384 1633

**CONTACT PERSON**

Mr Doug Walker (Town Clerk)

**DATE**

14.11.84

**TOWN PLANNING SCHEME**

TPS No. 1

**COPIES OBTAINED**

No

**NOTES**

No map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Area almost fully developed.

Regional roads

West Coast Highway (concept only)

Local roads

No road development proposed

Subdivisions

Army land marked "North Fremantle Townsite" on TPS

Residential zoned land between McCabe Street and Swan River (adjoins ROS)

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore (ROS)

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Mundaring

**ADDRESS**

Great Eastern Highway, Mundaring, W.A. 6023

**TELEPHONE**

295 1400

**CONTACT PERSON**

Mr Keith Weymes

**DATE**

20.11.84

**TOWN PLANNING SCHEME**District Scheme No. 1  
(currently under review)**COPIES OBTAINED**

No

**NOTES**Structure plans (see notes  
below) - copies held by DCE**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roadsRoe Highway  
Scenic DriveLocal roads

Only district distributor roads noted on table. Other local roads too numerous to list individually, and proposals not firm (see notes below). Estimate 600-700 existing road reserves (named) and further 100 not named - predominantly built but no record of unconstructed road reserves. Several hundred road proposals - some not on structure plans, some shown on structure plans but alignment may vary (depends on landscape assessment at construction stage and on development applications).

Concept plans

See Eastern Corridor Strategy Plan (structure plans largely in accordance with Corridor Plan).

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**Lake Manarin  
Lake Leschenaultia  
Numerous creeks**NOTES**

Structure plans have been prepared to cover whole Shire area. These plans show concept plans for road development including district distributor roads, local distributor roads and access roads (do not distinguish between constructed and proposed). Alignments of proposed roads are approximate - plans will be reviewed and development proposals may not coincide with the structure plans.

**LOCAL GOVERNMENT AUTHORITY**

Nedlands

**ADDRESS**

Stirling Highway, Nedlands, W.A. 6009

**TELEPHONE**

386 2414

**CONTACT PERSON**

Mr Kerry Martin (Supt. of Works)

**DATE**

14.11.84

**TOWN PLANNING SCHEME**

No. 2

**COPIES OBTAINED**

No

**NOTES**

Street map of Nedlands, Claremont, Cottesloe, Peppermint Grove obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Local Authority area almost fully developed

Local

No further road development planned

Subdivisions

Swanbourne-Graylands hospital site to be subdivided for residential development by Urban Lands Council

Concept plans

Servetus Street extension to West Coast Highway

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**Swan River foreshore in ROS managed by Local Authority.  
Area near Sunset Hospital steep cliff; natural foreshore  
Remainder managed for recreation**NOTES**

Small section of Beatrice Road shown on map as extending into ROS on Swan River foreshore has been closed. (All other roads on river foreshore already constructed as shown).

**LOCAL GOVERNMENT AUTHORITY**

Peppermint Grove

**ADDRESS**

1 Leake Street, Peppermint Grove, W.A. 6011

**TELEPHONE**

384 0182

**CONTACT PERSON**

Mr Graham Partridge (Shire Clerk)

**DATE**

14.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**No. 2  
(No. 3 in progress)

No

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Shire almost fully developed.  
No major road proposals or future subdivisions.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore in ROS, managed by the Shire. Section of foreshore adjacent to Town of Claremont boundary is cliff - noted in System 6 report. This area is to remain as a natural foreshore area; the remainder is developed for recreation.

**NOTES**

\*\*

**LOCAL GOVERNMENT AUTHORITY**

Perth

**ADDRESS**

27 St George's Terrace, Perth, W.A. 6000

**TELEPHONE**

425 3333

**CONTACT PERSON**

Mr V. Klyne (Engineer)

**DATE**

19.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**City of Perth City Planning  
Scheme

Yes

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

City area almost fully developed except City Beach.

Regional roads

Stephenson Highway

City Northern Bypass

Burswood Highway

LocalLake Monger Drive - section between St Columbia's Avenue and Dodd Street -  
will not be built.

(See table 3)

Subdivisions/developments

Technology Park, Bentley.

Future subdivision of residential zoned areas in City Beach.

Concept plans

Extension of Underwood Avenue to West Coast Highway

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swan River foreshore (ROS)

Herdsman Lake

Lake Monger

Perry Lakes

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Rockingham

**ADDRESS**

Council Avenue, Rockingham, W.A. 6168

**TELEPHONE**

(095) 27 1111

**CONTACT PERSON**

Mr Paul Garnett (Shire Engineer)

**DATE**

6.12.84

**TOWN PLANNING SCHEME**

TPS No.1

**COPIES OBTAINED**

No

**NOTES**Map showing zonings obtained  
(1:25,000)**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roads

Fisher Street

Hawker Street

Garden Island Highway

Peel Highway (Kwinana-Rockingham-Mundijong connection)

Warnbro Sound Avenue - Forty Road

Leghorn Street - Dixon Street

Local roads

See table 3 for major local road proposals. The list is not complete. Further urban, industrial and Special Rural Zone development in areas shown in the South West Corridor Strategy Plan (Strategy 3) will involve future road development. Road planning will respond to future needs.

Concept plans

Kwinana Freeway; Sixty-eight Road Deviation and see South West Corridor Strategy Plan.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Bell Street Swamp (Rotary Park) managed by Council

Lake Cooloongup-Lake Walyungup - ROS (MRPA has concept plan for management but it has not been implemented)

Lake Richmond - ROS (compensating basin)

Wetland system running north-south, east of Mandurah Road - private ownership - could be incorporated in ROS in structure plan, or incorporated in residential development

Lake Beenyup - privately owned

Serpentine River and pools

ALCOA rehabilitated mined area and rehabilitated clay pits in northeast of Shire

(Southeast part of Shire very swampy)

**NOTES**

Anstey Swamp (south of Lake Walyungup to east of Mandurah Road) could be worth studying re future conservation (privately owned)

See System 6 recommendations.

**LOCAL GOVERNMENT AUTHORITY**

Serpentine

**ADDRESS**

Patterson Road, Mundijong, W.A. 6202

**TELEPHONE**

(095) 25 5255

**CONTACT PERSON**

Mr Richard Watson

**DATE**

21.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**

No.

No

Copy of MRD State of Construction map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Regional  
Peel Highway

Local  
 (See table 3)

Subdivisions  
 (See table 3) (SRZ policy being formulated).

Concept plans  
 See South East Corridor Strategy Plan (east of Shire in forest/catchment area)  
 Beechboro-Gosnells Highway (now Tonkin Highway)

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Serpentine River and tributaries  
 Wungong Brook  
 Beenyup Brook  
 Cardup Brook  
 Manjedal Brook  
 Medulla Brook  
 Karnup Brook  
 Karnet Brook  
 Dirk Brook  
 Derek Brook  
 Myara Brook  
 Yangedi Swamp  
 Unnamed swamps

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

South Perth

**ADDRESS**

Sandgate Street, South Perth, W.A. 6151

**TELEPHONE**

367 6422

**CONTACT PERSON**Mr Berkov  
Mr P. Bennetts (Town Clerk)**DATE**

16.11.84

**TOWN PLANNING SCHEME**

No. 5 in preparation

**COPIES OBTAINED**

Yes

**NOTES****SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Area almost fully developed.

Local roads and subdivisions

See table 3. (Note: Swan and Canning River foreshore development)

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**Swan River  
Canning River  
Waterford Lakes (associated with Canning River foreshore)  
McDougall Park  
Lakes in Collier Park Golf Course**NOTES**

Swan and Canning River foreshores subject to System 6 recommendations, nos M67, M66, M60.

Note: Development plan for Sir James Mitchell Park will involve some road construction on Swan River foreshore.

**LOCAL GOVERNMENT AUTHORITY**

Stirling

**ADDRESS**

Civic Place, Stirling, W.A. 6021

**TELEPHONE**

344 0044

**CONTACT PERSON**Mr Emerson Richardson  
Mr Larry Smith**DATE**

22.11.84

**TOWN PLANNING SCHEME**

TPS 37

**COPIES OBTAINED**

No

**NOTES**Copy of functional road  
classification plan obtained**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**RegionalNorthern Perimeter Highway  
Mitchell Freeway  
Stephenson Highway  
Swan River DriveLocalGrindelford Place  
Moondine DriveSubdivisions

Future areas as shown on T.P.S.

Concept plans

Marmion Avenue - MRS current amendment

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Lake Careniup - perimeter to be developed for residential purposes  
 Herdsman Lake - management plan  
 Little Carine Swamp - ROS  
 Big Carine Swamp - ROS  
 Lake Karrinyup - Golf Club  
 Lake Gwelup - ROS  
 Jackadder Lake  
 Star Swamp - management plan in preparation  
 Jones Street Swamp - semi-urban  
 Hamilton Street Swamp - to be drained for residential development (TPS 37)  
 Wishart Street Swamp - residential in long term  
 Swan River foreshore in Maylands

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Subiaco

**ADDRESS**

Rokeby Road, Subiaco, W.A. 6008

**TELEPHONE**

381 5000

**CONTACT PERSON**

Mr. J. McGeough, Town Clerk

**DATE**

13.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**

TPS 1 and 3  
 TPS 2 soon to be gazetted

No

No map obtained

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**

Local authority area almost completely developed (See table 3).

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Artificial wetlands in:  
 Mabel Talbot Reserve (in Jolimont) MWA/Council  
 Shenton Park Lake  
 Aberdare and Derby Road drainage sump

Swan River foreshore

**NOTES**

**LOCAL GOVERNMENT AUTHORITY**

Swan

**ADDRESS**

Great Northern Highway, Viveash, W.A. 6056

**TELEPHONE**

274 5133

**CONTACT PERSON**

Mr Eric Lumsden, Shire Planner

**DATE**

4.12.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**

District No. 9 Planning Scheme      Yes  
(in preparation)

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional roads

Roe Highway

Northern Perimeter Highway

Lord Street

Lloyd Street

Beechboro-Gosnells Highway (now Tonkin Highway)

Local roads

Information not available (local distributor roads only listed).

Note: Current rural land studies being undertaken by the Shire will result in policies for development, subdivision, land reservation, etc. This will include road rationalization and future uses of wetland areas, and will involve liaison with DCE. Road reserves currently shown, especially in West Bullsbrook area, will be reassessed and may not be constructed. Road planning information will be available by the end of 1985.

Concept plans and subdivisions

See Table 3, T.P.S. and Midland Western Road link study.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Swamps in Bullsbrook (privately owned) and State Forest 65.

Ellen Brook and tributaries (mostly in private ownership)

Swan River and tributaries (privately owned except through Walyunga National Park).

Hazelmere Lakes

Jane Brook

Bennett Brook

Note: Twin Swamps reserve for short-necked tortoise

**NOTES**

Shire planner believes Hazelmere Lakes merit investigation for preservation. Planning policy is to avoid road construction in wetland areas. Little road construction planned in near future (i.e. 1985) until road rationalization study is completed.

**LOCAL GOVERNMENT AUTHORITY**

Wanneroo

**ADDRESS**

Shenton Avenue, Joondalup, W.A. 6027

**TELEPHONE**

405 0333

**CONTACT PERSON**Mr Bob Ruscoe  
Mr Phil Thomson  
Mr Oscar Drescher**DATE**

23.11.84

**TOWN PLANNING SCHEME****COPIES OBTAINED****NOTES**

No.

No

Obtained:  
 NW corridor plan (1:50,000)  
 Shire of Wanneroo Regional  
 Plan (1:50,000)  
 Shire of Wanneroo Road Map and  
 rural sub. (4 sheets;  
 1:25,000) SRZ plans

**SUMMARY OF PROPOSED ROAD DEVELOPMENTS**Regional

Hepburn Avenue, Mirrabooka Avenue, Ocean Reef Road, Marmion Avenue, Connolly Avenue, Shenton Avenue, Moore Drive, Hodges Road, Eddystone Avenue, Mitchell Freeway

Local

Information on unconstructed local roads and road plans not available from Local Authority, too numerous to list completely. See table 3.

Subdivisions

See NW corridor plan for zonings in urban corridor. Eastern part of Shire is rural - development subject to individual applications (see plan of Special Rural Zones). Most of the wetlands are outside the urban corridor. Those in private ownership in eastern part of shire are usually set aside as part of conditions of subdivision if included in special rural zones. Applications for subdivision are considered as they arise - no SRZ policy.

Concept plans

See NW corridor structure plan.

**MAJOR WETLANDS IN LOCAL AUTHORITY AREA**

Eastern and western chains - see map "Shire of Wanneroo Environment Management Areas"

**NOTES**

See System 6 report.  
 Shire has formed a committee to look at management of wetlands.

TABLE 3

**PROPOSED ROAD DEVELOPMENT  
IN LOCAL GOVERNMENT AUTHORITY AREAS IN THE  
PERTH METROPOLITAN REGION**

ROAD PLANNING			LOCAL AUTHORITY: ARMADALE				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Regional Beechboro- Gosnells Highway (now Tonkin Highway)	Controlled access highway	Extension to Ranford Road (note - future extension beyond Ranford Rd planned but not marked on M.R.S. Could go through wetland area)	M.R.S.		Wright Lake crosses Southern River and subject to inundation	A/R 1	
Scenic Drive	Important regional road	From Canning Mills Road north	M.R.S.		Crosses Wright Brook and creeks	A/R 2	Through Regional Parkland. May not proceed
Corfield- Spencer Rd link	Important regional road	From Seaforth Road to City of Gosnells boundary	M.R.S.			A/R 3	
Garden St link	Important regional road	From Lake Rd to City of Gosnells boundary	M.R.S.		Crosses Wungong River	A/R 4	
Ranford Rd	Important regional road	Constructed - major upgrading and realignment	M.R.S.		Balannup Lake		

\* INDICATE IF SHOWN ON MET. REGION SCHEME,  
TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 7-8

ROAD PLANNING			LOCAL AUTHORITY: ARMADALE - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Local</u>							
Kargotich Road	Local	Rowley to Oxley Rd	T.P.S.		Inundated land	A/L 8	
Oxley Rd	Local	Section south of Forrestdale Lake	T.P.S.		Forrestdale Lake	A/L 1	
Mason Rd	Local	Extension to Nicholson Rd	T.P.S.		Land subject to		
Keane Rd	Local	From Acourt to Anstey Rd	T.P.S.		inundation	A/L 7	
? Ave	Local	Extension to Forrest Rd	T.P.S.		Wungong Brook	A/L 2	
Eleventh Rd	Local	Extension to Mill St	T.P.S.		Wungong Brook	A/L 3	
Kylie Rd	Local	From Mills Rd to Buchanan Rd	T.P.S.				
Towla Rd	Local	From Mills Rd to Coventry Rd	T.P.S.				
? Rd	Local	South from Chevin Rd	T.P.S.				
Robinson Rd	Local	South from Chevin Rd	T.P.S.				
? Rd	Local	Nicholson Rd to Ranford Rd	T.P.S.		Land subject to		
					inundation south of		
					Balannup Lake	A/L 9	
Reilly Rd	Local		T.P.S.				
Allen Rd	Local				Southern River,		
Keane Rd	Local				Wright Lake	A/L 4	
(part)	Local						
Lake Rd	Local				Forrestdale Lake	A/L 5	
Commercial Rd	Local	Not to be constructed			Forrestdale Lake	A/L 6	
Hilbert Rd	Local						
Bullockbush Rd	Local						
Old Albany Rd	Local				Churchman Brook	A/L10	

52

\* INDICATE IF SHOWN ON MET. REGION SCHEME, ROAD PLANNING SCHEME OTHER

ROAD PLANNING			LOCAL AUTHORITY: ARMADALE - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Concept Plans *</u>							
Beechboro-Gosnells Highway (now Tonkin Highway)	Controlled access highway	Extension south from Ranford Road	Armadale 1830-2000		Swamps and land subject to inundation	A/C 1	Structure plan only
Twelfth Rd	Important regional road	South to Nicholson Rd	Armadale 1830-2000		Yes	A/C 2	Structure plan only
Forrest Rd-Hopkinson Road Link	Important regional road		Armadale 1830-2000		Yes	A/C 3	Structure plan only
Wungong Rd	Important regional road	Southern extension	Armadale 1830-2000		Wungong Brook	A/C 4	Structure plan only
Forrest Rd	Important regional road	Extension to Albany Highway	-				
Croydon Rd-Bristol Rd link	Local	(1)	-				Concept only - plans not available so wetland conflicts not identified
Tourist Rd	Local	(3) Across Wungong Valley to Nettleton Rd	-				
	Local	(2), (4), (5) access roads to subdivision or Special Rural Zones in future	-				
	Local	(6)	-				
Clifton St-Connell Ave link	Local						
<u>Subdivisions</u>	Local	Urban and industrial areas still to be subdivided - see structure map	Armadale 1830-2000		Some wetland areas included	A/U 1 A/I 1	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See also South East Corridor Strategy Plan See M.R.S. Maps 7 and 8

ROAD PLANNING			LOCAL AUTHORITY: BASSENDEAN				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Local</u>							
Hamilton St ) Ashfield Pde ) Kitchener Rd ) Villiers St )	Local	Marked as roads on T.P.S. but Shire has no intention of constructing them. (Run through Regional Open Space)	T.P.S.	-	Swan River fore-shore	Bas/L1	
Berry Crt ) Hatton Crt ) Chapel Pl ) Collier Rd ) Fairford St ) Hanwell Way ) Standlake St ) Smythe Rd ) Chesterton Rd ) Somerton Rd ) Filkins St ) Drayton St ) Elsfield Way )	Local	To be constructed as shown on T.P.S. 3	T.P.S.	Unknown	-		Most in industrial area
Paul St ) Forfar ) Carnegie )	Local	Marked on T.P.S. Run through Local Open Space reserve - recreation (vested in Shire). Shire does not intend to construct them		-	Wetlands associated with Swan River fore-shore	Bas/L2	Wetlands need study for devel. of management plans

ROAD PLANNING			LOCAL AUTHORITY: BAYSWATER				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Swan River Drive	Controlled access highway	Along Swan River foreshore	M.R.S.		Swan River	Bay/R1	M.R.P.A. (not fav. by L.A.)
Beechboro-Gosnells Highway (now Tonkin Highway)	Controlled access highway	Extension north	M.R.S.		Swan River and creeks	Bay/R2	
<u>Local</u>							
Garrett Rd	Local	Join to Grand Promenade and upgrade Garrett Rd (and upgrade Bridge ??)	-		Swan River	Bay/L1	Confidential (under investigatn)
Brian Ave	Local	From Alfreda Ave to Ivanhoe St	T.P.S.				
Ashby Ave	Local	From Charnwood St to Crimea St	T.P.S.				
Thomas St	Local	From York to Arundel Sts	T.P.S.		-		
John St	) Local	Extensions	T.P.S.		-		Area covered by road reserve for Beechboro-Gosnells Freeway
Underwood St							
Wright St							
Flinders St							
Raymond Ave							
Turnbull St							
Stanuir St							
Leake St	) Local	Extensions towards Swan River	T.P.S.		-	Swan River )	No plans to construct these (in area covered by Freeway reserve)
William St							
Belmont Rd							
Wyatt Rd							
River Rd							
Constance St)							
Subdivision	Local roads	Subdivide (single residential) land between Beechboro-Gosnells Freeway, Lockridge High School, Benara Rd and Widgee Rd	-		-		Planned

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Map 5

ROAD PLANNING			LOCAL AUTHORITY: BELMONT				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Beechboro-Gosnells Highway (now Tonkin Highway)	Controlled access highway	Extension south	M.R.S.		Swan River and Creek	Be/R1	
Redcliffe-Bushmead Highway	Controlled access highway	Section from Swan River east through South Guildford	M.R.S.		Swan River and swamps	Be/R2	
Orrong Rd	Important Regional road	To be progressively widened to 38 metres	M.R.S.		-		Boundary between Perth City & Belmont On Local Authority boundary
City Northern Bypass	Controlled access highway	Section to Orrong Road	M.R.S.		Swan River	Be/R3	
Abernethy Rd	Important Regional rd	30 metre reserve - upgrading	M.R.S.				
Esther St	Important regional road	Abernethy Road to link up with Fairbrother Street	M.R.S.		-	Be/R4	Moves to remove from M.R.S.
GGt Eastern Highway	Other major highway	To be widened to 40 metres	M.R.S.				
<u>Subdivision</u>	Local	Subdivision (residential) bounded by Beechboro-Gosnells Highway, Klem and Epsom Sts	Not avail.		-		Planned
<u>Subdivision</u>	Local	Subdivision (residential) off Leach Highway (Kew Avenue)	T.P.S.	In progress	-		Planned

56

\* INDICATE IF SHOWN ON MET. REGION SCHEME,  
TOWN PLANNING SCHEME OTHER

ROAD PLANNING			LOCAL AUTHORITY: BELMONT - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Local							
The Esplanade	Local	Extension onto Swan River foreshore (see plans)	U.B.D.		Swan River foreshore	) Be/L1	In area affected by Redcliffe-Bushmead Highway (partly in R.O.S.). The Esplanade will not be constructed
Waterview Parade							
Locock St							
Central Ave							
Bulong Ave							
Coolgardie Ave							
Ben St							
Lilian Grove							
Northey St	Local	From Daly St to Swan River	U.B.D.		Swan River	Be/L2	In R.O.S. will not be constructed
Esther St	Local	From Knutsford Ave to Fisher St	U.B.D.		-		

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: CANNING				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Roe Highway	Controlled access highway	Extension south	M.R.S.		Canning River and tributaries. Inundated land.	Ca/R1	
Orrong Rd	Controlled access highway	Extension	M.R.S.		Creek	Ca/R2	
South St	Important regional road	Extension Bannister Rd south	M.R.S.	Under construction	Inundated land and swamps	Ca/R3	
McDowell St	Important regional road	Section through Kewdale Freight Terminal	M.R.S.			Ca/R4	
<u>Local</u>							
Rupert Cockram Greenfield Mason River	) Local	No proposals for construction	T.P.S.	-	Canning River )	Ca/L1	In line of proposed Spencer-Manning Rd link
Adenia Rd	) Local	Extension to Riverton Drive	T.P.S.	-	Canning River	Ca/L2	

58

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: CANNING - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Wharf Bacon Queens Pk Lake Tce Narrow Peninsula Surrey Duff	) ) ) ) ) ) ) ) )	Local Road reserves on river foreshore - no proposals for their construction	T.P.S.	-	Canning River foreshore	Ca/L3	
<u>Subdivisions</u>							
Bounded by Metcalf Rd & Keslake Rd	Local	Current subdivision of land zoned residential under T.P.S.	T.P.S.	In progress			
Watts Rd Surrey Rd & Bywater Way, Wilson	Local	Current application for subdivision. Zoned residential in T.P.S.	-		Seasonal lake adj. to Canning	Ca/U1	59
Canning Vale Special Rural Zone	Local	Guided development under T.P.S. 31	T.P.S. 31		Subject to inundation	Ca/SR21	
<u>Concept *</u> <u>Plans</u>							
Spencer- Manning Rd link	Important regional road	Under investigation. Subject of E.R.M.P.	-		Canning River	Ca/C1	

\* INDICATE IF SHOWN ON MET. REGION SCHEME,  
TOWN PLANNING SCHEME, OTHER

\* See also South East Corridor Strategy Plans  
See M.R.S. Maps 5-7

ROAD PLANNING			LOCAL AUTHORITY: CLAREMONT				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Subdivision</u>							
John XXIII College	Local	Subdivision of Playing Fields (zoned Residential) near Lake Claremont and Koolyangarra site (zoned R30-R60) on river foreshore.			Lake Claremont	C1/U1	
					Swan River foreshore (Freshwater Bay)	C1/U2	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: COCKBURN				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Rockingham-Mandurah Highway	Controlled access highway	From Roe Highway south	M.R.S.		Lake Coogee and swamps	Co/R1	
Roe Highway	Controlled access highway		M.R.S.		Between North Lake and Bibra. Roe Swamp Hope Road Swamp	Co/R2	See System 6 Submission from Wetlands Conservation Society
Kwinana Freeway	Controlled access highway	Extension south to Yangebup Rd (subject to realignment)	M.R.S.			Co/R3	
Yangebup Rd	Important regional road	Cockburn to Forrest Rd Realignment	M.R.S.		Swamp north of Kogolup Lake and Lake Coogee	Co/R4	Submission from Wetlands Conservation Society
Spearwood Ave	Important regional road	West to Cockburn Rd and south to east-west link road (two sections)	M.R.S.			Co/R5	
North Lake Rd	Important regional road	Section south of Bibra Lake to Forrest Rd (section between Forrest Rd and Yangebup Rd under review)	M.R.S.		Lake Yangebup )	Co/R6	
Forrest Rd	Important	Realignment	M.R.S.		South Lake )		Submission from Wetlands Conservation Society
<u>Local Roads</u>		Information not available from Local Authority. Local road construction in response to future development plans submitted to Council.					

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 5 and 7

ROAD PLANNING			LOCAL AUTHORITY: COCKBURN - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Subdivisions and Developments</u>							
Industrial	Local	Future and existing industrial development on land to west of Cockburn Rd south of Russell Rd	-				
Spearwood-residential	Local	Residential land between Rockingham and Cockburn Rd - future residential development.			Swamps	Co/U1	Swamps need study
Industrial	Local	Future industrial development of land between Phoenix Rd, Forrest Rd and Stock Rd					
East Bibra	Local	Current residential subdivision.		Current			
Yangebup	Local	Future residential sub. of land to south of Yangebup Rd (S.H.C.) west of current Yangebup subdivision (U.L.C.)	-				
Special Rural Zones	Local	In east of Local Authority Area - existing and proposed special rural subdivisions.			Swamps	Co/SRZ1	
<u>Concept Plans *</u>							
Kwinana Freeway	Controlled Access Hwy	Extension south.		Proposed amendment to MRS	Creeks and swamps	Co/C1	See MRPA report Perth-Bunbury route, Roe Highway to Thomas Rd

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See South-West Corridor Strategy Plan See M.R.S. Maps 5 and 7

ROAD PLANNING			LOCAL AUTHORITY: COTTESLOE				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
West Coast Highway	Important regional road		M.R.S.	?		Cot/R1	
<u>Local</u>							
Brixton St	Local	Extension from Jarrad St to Stirling Highway	T.P.S. ?	-	-		No plans to construct
Cable St	Local	On railway reserve	T.P.S. ?	-	-		No plans to construct

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: EAST FREMANTLE				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Fremantle Eastern Bypass	Controlled access highway	Southern approaches to Stirling Bridge	M.R.S.		Swan River	EF/R1	See also Fremantle

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: FREMANTLE				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Fremantle Eastern Bypass	Controlled access highway	Extension from Stirling Bridge south to Leach Highway, and south.	M.R.S.		Swan River	F/R1	Also in East Fremantle. Council is opposed to southern extension past Leach Highway
Roe Highway	Controlled access	Extension to Marine Terrace	M.R.S.			F/R2	Council opposed
<u>Local</u>							
Mather Rd	Local	From Annie to Lefroy Rd	T.P.S.	-	-		Unlikely to be built
Edmund St	Local	Extension	T.P.S.	?	-		
Robinson St	Local	Has been closed - land sold for residential subdivision	T.P.S.	-	-		
<u>Subdivisions</u>	Local	Future subdivisions of large holdings in O'Connor (industrial) and parts of South Fremantle and Beaconsfield (residential)	-	?	-		No plans
<u>Concept Plans</u>							
Parry St	Local	Extension	T.P.S. (yet to be gazetted)	In progress			
Canning Highway (see notes)		Deviation	-				Concept only

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Map 5

ROAD PLANNING			LOCAL AUTHORITY: GOSNELLS				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Roe Highway	Controlled access highway	Welshpool Rd south	M.R.S.		Woodlupine Brook and creeks	G/R1	
Beechboro -Gosnells Highway (now Tonkin Highway)	Controlled access highway	Extension	M.R.S.		Canning River and creeks	G/R2	
Garden St	Important regional road	Extension	M.R.S.		Swamps	G/R3	
Scenic Drive	Important regional road	Around Scarp from Armadale to Kalamunda	M.R.S.		Bickley Brook Reservoir	G/R4	Darling Scarp
Ranford Rd Corfield-Spencer		Largely upgrading; section to be constructed from Eileen St to Shire boundary	M.R.S.			G/R5	
Warton Rd		Largely upgrading			Swamps	G/R6	
<u>Local</u>							
Roads in Canning Loc. 16	Private	Many sections not constructed and some are unlikely to be on alignment shown	T.P.S.		Southern River	G/L1	
-----							
Brook Rd Boundary Rd Brock St Cockram Rd Perry Rd Mills Rd	Local	Parts not constructed	T.P.S.		Creek Creek ) Creek )	G/L3	
<u>Subdivisions</u>		Future subdivision in industrial and residentially zoned areas as per T.P.S. 6 Industrial area Forest Lakes Subdivision	- none as yet		Bickley Brook Forest Lakes, Swamps	G/I1 G/U1	

Concept Plans\*

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See South East Corridor Strategy Plan

See M.R.S. Map 5

ROAD PLANNING			LOCAL AUTHORITY: KALAMUNDA				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Ring Road	Important regional road	Canning Rd connecting to Kalamunda Rd	M.R.S.	? 10 years	-	Ka/R1	
Scenic Drive	Important regional road	Along Darling escarpment	M.R.S.	May not proceed	Creeks	Ka/R2	Escarpment Council not in favour of construction
<u>Concept Plans</u>							
Lewis Rd	Planned (not yet gazetted)	Connect Lewis Rd to Stanhope Rd					
Watsonia Rd	Planned (not yet gazetted)	Subdivision being developed by owner		Near future			
Maida Vale Rd	Planned (not yet gazetted)	Deviation of Maida Vale Rd to join Hawtin Rd		10 years			
Wittenoom Rd	Planned (not yet gazetted)	Connect Redcliffe-Bushmead Highway to Wittenoom Rd				Ka/C1	
<u>Subdivisions</u>							
	Local	Residential sub. off Pomeroy Rd (T.P.S. guided development)					
	Local	Industrial development T.P.S. 12		1984-1985	Swamps	Ka/I1	
	Local	Residential development Maida Vale T.P.S. 10					

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: KALAMUNDA - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Local: <u>Note</u> - some road reserves in orchard areas and on scarp will not be constructed. These have not been listed here.							
Brook Rd		Gosnells boundary to Crystal Brook Rd			Swamps	Ka/L1	
Arthur Rd		to Bruce Rd					
Dawson Ave		to Sultana Rd					
Hawk Valley Cres.		to Bridle Drive					
Brewer Rd		to Sultana Rd (not reserved)			Creek	Ka/L2	
Huntley St		Section					
Warlingham Dr		Section					
Keane St		to Rooth Rd (not reserved)					
Edward Rd		Possible construction					
Francis Rd		Possible construction					
Trott Rd		to Glyde Rd					
Annetts Rd		to Television Rd					
Weston Rd		Possible extension					
Television Rd		Section					
Francais Rd		Possible construction					
Elson Rd		Possible construction					
Dodd Rd		Possible construction (gravel)					
Mitchell Rd		Possible construction					
Empire Ave		Possible extension to Canning Rd					
Wall Rd		Possible construction					

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: KWINANA				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Wellard Rd	Important regional road	Upgrading to dual carriageway and altered alignment (amendment to M.R.S.)	M.R.S.			Kw/R1	
Fremantle-Rockingham	Controlled access highway	Runs south through Kwinana Note: alignment of southern section will be altered by Leda Interim Policy	M.R.S.			Kw/R2	Council not in favour
Charles St	Important regional road	Patterson Rd to Kwinana Beach part unconstructed	M.R.S.			Kw/R3	
Gilmore Ave	Important regional road	Extension south.	T.P.S./M.R.S.		Swamp	Kw/R4	Note: Imp. Regional Roads in Leda Plan will have different alignment
	Important regional road	Link Cockburn Road and proposed Fremantle Rockingham Highway	M.R.S.			Kw/R5	
Peel Hwy	Controlled access highway	Kwinana to Mundijong (subject to realignment)	M.R.S.		Creeks	Kw/R6	
<u>Local</u>							
McLoughlin Rd	Local	Will be built but not on alignment currently shown - will be shown in T.P.S. 2	T.P.S.				
Postans Rd	Local	From Hope Valley Rd to Thomas Rd	T.P.S.				
Woolcott Rd	Local	To S.R.Z 10 and 11	T.P.S.		Unnamed swamp	Kw/L1	
Treeby Rd	Local	Extension to Thomas St	T.P.S.		Unnamed swamp	Kw/L2	
Orton Rd	Local	Extension to Casuarina Rd	T.P.S.		Unnamed swamp	Kw/L3	Not found
<u>Subdivisions</u>							
Orelia/ Parmelia	Local	Balance of residential development (S.H.C.)	-	Planning stages			

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Map 7

ROAD PLANNING			LOCAL AUTHORITY: KWINANA - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Leda	Local	Development by U.L.C.	Leda Interim Policy		See System 6 report	Kw/U1	
Special Rural Zones 10 and 11	Local	S.R.Z.	T.P.S.2		Swamps	Kw/SRZ1	
Special Rural Zone	Local	Future subdivision of Lot 54 for S.R.Z.	-		Swamps	Kw/SRZ2	
<u>Concept * Plans</u>							
Kwinana Freeway	Controlled access highway	Extension south - concept only.	South West Corridor		Swamps and creeks	Kw/C3	
Cockburn Rd	?	Deviation around Mt Brown to Rockingham Rd	-				See Cockburn Wetlands report
Henry St	Local	Extension to Hope Valley Rd	-				
Lee Rd	Local	Extension north to Wattleup Rd and south to Rockingham Rd	-				
Banksia	Local	Realignment			Subject to inundation	Kw/C1	
Mortimer Rd	Local	Extension to Coyle Rd	-		Swamps	Kw/C2	Runs through Flora and Fauna Reserve
Challenger Rd	Local	Extension to Mortimer Rd	-				

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

(See also South West Corridor Strategy Plan)  
See M.R.S. Map 7

ROAD PLANNING			LOCAL AUTHORITY: MELVILLE				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Roe Highway	Controlled access highway	Southern extension of Roe Highway cuts through southeast corner of local authority area					
Kwinana Freeway	Controlled access highway	Extension from South St to southern boundary of local authority	M.R.S.		Swamps	Me/R2	
South St	Important regional road	Upgrading to dual carriageway Karel Ave to eastern boundary	M.R.S.				
North Lake Rd	Important regional road	Upgrading to dual carriageway from Leach Highway south	M.R.S.				
<u>Subdivisions</u>							
Subdivisions	Local	Kardinya Stage 2 U.W.A. land T & C subdivision	T.P.S.2 T.P.S.2 T.P.S.2	Current Current Current			
		U.L.C. adjacent to Kwinana Freeway	T.P.S.2	Current			
	Local	Proposed future subdivision of land zoned residential and urban deferred in T.P.S.2	No plans yet		-		
<u>Concepts</u>							
Karel Ave	Local	Completion to dual carriageway from South St to Farrington Rd and future extension to Roe Highway	Alignment established				
Murdoch Dr		Dual carriageway and construction south from Farrington Rd	Alignment established				

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: MOSMAN PARK				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Concept Plans</u>							
West Coast Highway	Important regional road	South to Stirling Bridge				MP/R1	
<u>Subdivisions</u>							
Subdivision	Local	Subdivision of land owned by Army, marked North Fremantle Townsite on T.P.S.	T.P.S. 1		-		
Subdivision	Local	Subdivision of land zoned residential between McCabe St and Swan River	T.P.S. 1		Swan River foreshore	MP/U1	Adjoins R.O.S.

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: MUNDARING				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u> Roe Highway	Controlled access highway	Small part of extension north of Great Eastern Highway.	M.R.S.			Mu/R1	
Scenic Drive	Important regional road	Extension from Park Rd into John Forrest National Park	M.R.S.		Jane Brook and creeks	Mu/R2	Unlikely to be built
<u>Local</u> Farrell Rd	Local (District distributor)	Extension between Morrison Rd and Great Eastern Highway	Structure Plan				
Burkenshaw Dr	Local (District distributor)	Extension	Structure Plan		Nyaania Creek	Mu/L1	23
Brooking Rd	Local (District distributor)	Extension			Jane Brook	Mu/L2	
Sexton St	Local (District distributor)	Extension to Great Eastern Highway	Structure Plan				
Alice Rd	Local (District distributor)		Structure Plan				
<u>Concept Plans *</u> Gt Eastern Highway	Major highway	Realignment (See Eastern Corridor Strategy Plan)	-	Current proposal			
Hills Link Rd					Jane Brook?	Mu/C1	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See also Eastern Corridor Strategy Plan See M.R.S. Maps 4, 5 and 6

ROAD PLANNING			LOCAL AUTHORITY: NEDLANDS				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Concept Plans</u>							
West Coast Highway		Northern extension of Servetus St to West Coast Highway (not shown on current M.R.S.)	Concept		-		
<u>Subdivision</u>	Local	Urban Lands Council proposes residential subdivision of Swanbourne-Graylands hospital site	-		-		

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: PERTH				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Stephenson Highway	Controlled access highway	West Coast Highway to Mitchell Freeway	M.R.S.		Perry Lakes Herdsman Lake	P/R1	
Burswood Highway	Controlled access highway	Burswood Park to Great Eastern Highway	M.R.S.		Swan River	P/R2	
City Northern Bypass	Controlled access highway	From Burswood Bridge to Mitchell Freeway	M.R.S.			P/R3	
<u>Local</u>							
Lake Monger Drive	Local	Extension from St. Columbia's Ave to Dodd St will not be built	T.P.S.	-	Lake Monger	P/L1	
Truro P1 Tintagel P1	Local Local	City Beach City Beach	T.P.S. and Street Map		-		
<u>Concept Plans</u>							
Underwood Ave	Important regional road	Extension of Underwood Ave to proposed West Coast Highway	-		Lake	-	P/C1 Was deleted from MRS to be re-gazetted on new alignmt
<u>Subdivisions</u>							
City Beach	Local	Future subdivision of residential zoned land marked on attached map	-				
Technology Park	Local	Bentley	-				

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Map 5

ROAD PLANNING			LOCAL AUTHORITY: ROCKINGHAM				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Peel Highway Kwinana-Mundijong	Important regional road/ Controlled access highway	Connects Kwinana-Rockingham-Mundijong. Note: Alignment will differ from that shown on current M.R.S.	M.R.S.		?	R/R1	
Garden Island Highway	Controlled access highway	Mandurah Rd to Garden Island causeway. Runs through R.O.S. north of Lake Coo loongup and south-west of Lake Richmond. Unconstructed Ennis Ave to Mandurah Rd and Rae Rd to Mangles Bay	M.R.S.		Swamps to north of Lake Coo loongup Lake Richmond	R/R2	
Fisher St	Important regional road	Garden Island Highway to Railway reserve	M.R.S.		Lake Richmond	R/R3	
Hawker St	Important regional road	Garden Island Highway to Rae Rd	M.R.S.			R/R4	
Leghorn St -Dixon St	Important regional road	Ennis Ave to Fisher St section from Read St to Fisher St to be taken off M.R.S.	M.R.S.			R/R5	
Warnbro Sound Ave -Forty Rd	Important regional road	Extension south of Warnbro subdivision (from Halcome St) Note: Alignment will differ from that shown on current M.R.S.	M.R.S.			R/R6	
	Important regional road	Ennis Ave to Warnbro Sound Ave	M.R.S.			R/R7	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 7 and 9

ROAD PLANNING				LOCAL AUTHORITY: ROCKINGHAM - continued			
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
Local Secret Harbour	Local	Access road to Secret Harbour Development	Secret Harbour plans (held by Shire)	Current	Wetlands	R/L1	
? Rd	Local	Council Ave to Patterson Rd	Zoning map				
Warnbro Sound Ave	Local	Part	Zoning map				
Young Rd	Local	Part	Zoning map				
Stakehill Rd	Local	Part	Zoning map				
Jarvis Rd	Local	Part	Zoning map		Wetlands	R/L2	
Stock Route Rd	Local	Through proposed S.R.Z.	Zoning map		Wetlands	R/L3	
		<p>Note: This list is incomplete. See Street Guide - many of the unconstructed roads shown may not be built (e.g. Burma Rd, Haines St, Telephone Lane, roads in proposed Kwinana Freeway alignment; (future local road planning will respond to need, in accordance with development of S.W. Corridor).</p>					
<u>Subdivisions</u>							
North of	)	Further subdivision					
Port Kennedy	)		-				
Secret Harbour	)		-				
Peelhurst	)	and road	-				
Singleton	)		-				
Waikiki	)		-				
Warnbro	)	development	-				
Safety Bay	)		-				
Lake Richmond	)		Street Guide	Current	Lake Richmond	R/U1	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 7 and 9

ROAD PLANNING			LOCAL AUTHORITY: ROCKINGHAM - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Concept Plans *</u>							
Sixty-eight Road diversion	?	Ennis Ave to Baldivis Rd			Lake Walyungup	R/C1	
Kwinana Freeway	Controlled access highway	Southern extension	S.W. corridor plan and M.R.P.A. plans		Inundated land ass. with Sepentine River	R/C2	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See also South West Corridor: Strategy Plan See M.R.S. Maps 7 and 9

ROAD PLANNING			LOCAL AUTHORITY: SERPENTINE				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u> Peel Hwy	Controlled access hwy	Kwinana to Mundijong (subject to realignment)	M.R.S.		Creeks	Se/R1	
<u>Concept *</u> Beechboro Gosnells Highway (now Tonkin Highway)	Controlled access	To Thomas Road and eventually to Mundijong (concept).	M.R.S.				
<u>Local</u> Yangetti Rd Henderson Rd Jarrah Rd Lowlands Rd Rowe Rd Fisher Rd Atlains Rd Hart Rd Jolly Rd Casuarina Rd Taylor Rd Rowley Rd Bucher Rd Wedgetail Dr Nettleton Rd Chestnut Rd Summerfield Rd Scott Rd Selkirk Rd (and some unnamed roads)	Local	Sections not constructed	M.R.D.**		Dirk Brook Serpentine River	Se/L1 Se/L2	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See also South East Corridor Strategy Plan  
 \*\* M.R.D. State of construction map - Advance Planning Section.

See M.R.S. Map 9

ROAD PLANNING			LOCAL AUTHORITY: SERPENTINE - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES

Subdivisions

Bounded by South West Hwy, Thomas Rd, Mundijong Rd and Hopkinson Rd	Urban development
--	-------------------

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See also South East Corridor Strategy Plan  
 \*\* M.R.D. State of construction map  
 - Advance Planning Section.

See M.R.S. Map 9

ROAD PLANNING			LOCAL AUTHORITY: SOUTH PERTH		WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL			
<u>Local</u>							
Salter Pt Reserve	Local	Road to service WAIT Bowling Club and Salter Point Sea Scouts via Elderfield Rd and associated Waterford subdivision	-		Canning River foreshore	SP/L1	Plans in association with Waterford subdivision - see attached detailed plan
Hope Ave	Local	Between Salter Point Pde and Elderfield Rd (gravel at present) to be removed	T.P.S.		Canning River foreshore		
Elderfield Rd	Local	South to Canning River (gravel at present)	T.P.S.		Canning River foreshore		
Douglas Ave	Local	Extension to Coode St (now gravel)	T.P.S.		Swan River foreshore	SP/L2	
Bickley Cres	Local	Road shown on T.P.S. through Neil McDougal Park will not be constructed	T.P.S.	-	Neil McDougal Park	SP/L3	
Murray Rd	Local	Section from Thelma to Jackson Rd to be constructed. Jackson to Henley may not be constructed	T.P.S.				
<u>Subdivisions</u>							
Waterford	Local	Subdivision of Waterford sub. on Canning River foreshore. Some under construction - further stages yet to be approve	In planning - construction stages	Under construction	Canning River Waterford Lakes	SP/U1	See System 6
Clontarf land	Local	Possible future subdivision	- No plans as yet		Canning River foreshore	SP/U2	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

Note: System 6 PEC covers area road development could intrude into wetland areas. See attached letter from Council.  
See MRS Map 5

ROAD PLANNING			LOCAL AUTHORITY: STIRLING				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Northern Perimeter Highway Mitchell Freeway	Controlled access highway	North Beach Rd east	M.R.S.		Big Carine Swamp	St/R1	
Stephenson Highway	"	Northern extension	M.R.S.			St/R2	
Swan River Drive	"	Extension north to Mitchell Freeway	M.R.S.		Herdsman Lake and swamps	St/R3	
	"	Along Swan River foreshore	M.R.S.		Swan River foreshore	St/R4	
<u>Local</u>							
Grindleford Place	Local	To join Karrinyup Road	T.P.S37?	Current applic. for bicentennial road funds	Jones St Swamp	St/L1	
Moondine Drive	Local	Around Herdsman Lake foreshore to Powis St	Stirling Functional Road Classification Plan		Herdsman Lake	St/L2	
Selby St	Local	Shown on plan passing through middle of Herdsman Lake - not to be constructed on that alignment	"		Herdsman Lake	St/L3	
<u>Concept Plans</u>							
Marmion Ave		Extension to West Coast Highway	?	Current amendment to M.R.S.			
<u>Subdivisions**</u>							
Hamilton St Swamp	Local	As shown in T.P.S.37	T.P.S.37		Hamilton St Swamp	St/UI	
Mirraboopa Subdivision and Regional Centre	Local	Studies incomplete	-		-		

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\*\* Note: Other areas will be subdivided for urban development in the future. These are indicated on the "functional road classification plan" attached and delineated in Town Planning Scheme 37.  
See M.R.S. Maps 5 and 3

ROAD PLANNING			LOCAL AUTHORITY: SUBIACO				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>		No proposals					
<u>Local</u>	Local	Roads shown on TPS2 in Railway lease land near Subiaco Station will not be developed	T.P.S.2		-		
<u>Concept</u>	Hay St	Upgrading to dual carriageway west of railway line to Troy Tce. Link to Roberts Road as a one-way pair road system	-		-		Proposal only - not shown on M.R.S.

3

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: SWAN				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Lord St	Important regional road	Northern extension. Reserved on MRS but alignment will be changed.	M.R.S.		Bennett Brook	Sw/R1	
Lloyd St	Important regional road	Northern extension to proposed northern perimeter highway	M.R.S.		Blackadder Creek	Sw/R2	
Northern Perimeter Highway	Controlled access highway		M.R.S.		Creeks	Sw/R3	
Roe Highway	Controlled access highway	Extension north from Great Eastern Highway to Northern Perimeter Highway.	M.R.S.		Creek	Sw/R4	
Beechboro-Gosnells Highway (now Tonkin Highway)	Controlled access highway	Extension north to northern Perimeter Highway and further (concept)	M.R.S.		Creeks	Sw/R5	
<u>Local</u>							
Rutland Rd	Local	Construction of district distributor road.					
Coast Rd	Local	Construction of district distributor road.					(not located on map)
Kirby Rd	Local	Construction of district distributor road.			Wetlands	Sw/L1	
<u>Concept Plans</u>							
Vale Rd	Important regional road	Connect Amherst Rd, Midland to Wittenoom Rd, Kalamunda.			Hazelmere Lakes	Sw/C1	
Midland Western Link Rd		Morley Drive to Morrison Rd (new bridge across Swan River)	Held by M.R.P.A.	1995-2000	Swan River Bennet Brook and swamp	Sw/C2	See MRPA report - Midland Western Link Road study

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

ROAD PLANNING			LOCAL AUTHORITY: SWAN - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
	<u>Developments</u>	See District Planning Scheme No.9 for proposed zonings.					
	Malaga Industrial Area	Subject of MRPA study	M.R.P.A.		Creeks and Swamps	Sw/I1	

\* INDICATE IF SHOWN ON MET. REGION SCHEME,  
TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 5 and 3

ROAD PLANNING			LOCAL AUTHORITY: WANNEROO				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Regional</u>							
Hodges Drive	Important regional road	Ocean Reef Rd to Marmion Ave	M.R.S.			W/R1	
Eddystone Ave	"	Joondalup Drive to Ocean Reef Rd	M.R.S.			W/R2	
Mitchell Freeway	Controlled access highway	Northern extension	M.R.S.			W/R3	
Hepburn Ave	"	Wanneroo Rd to northern end of Beechboro-Gosnells Freeway	M.R.S.		Creeks	W/R4	∞
Mirrabooka Ave	"	Extension north to Hepburn Ave	M.R.S.			W/R5	
?	"	Gnangara Rd to Whitfords Ave	M.R.S.			W/R6	May not be constructed
Ocean Reef Rd	"	Hodges Drive to Burns Beach Rd	M.R.S.			W/R7	
Marmion Ave	"	Extension north from Hodges Rd	M.R.S.			W/R8	Alignment will differ
Connolly Ave	"	Extension north from Shenton Ave	M.R.S.			W/R9	
Shenton Ave	"	Marmion Ave to Joondalup Drive	M.R.S.			W/R10	
Moore Drive	"	Ocean Reef Rd to Hodges Drive	M.R.S.			W/R11	
?	"	Burns Beach Rd to northern end of Joondalup Drive	M.R.S.			W/R12	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 1 and 3

ROAD PLANNING			LOCAL AUTHORITY: WANNEROO - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Subdivisions</u>							
Special Rural Zone	Local	SRZ including parts of Badgerup and Little Badgerup swamps may include road across southern end of Little Badgerup	Held by Local Authority	Current	Badgerup and Little Badgerup swamps	W/SR21	
Special Rural Zone	Local	Gnangara S.R.Z. (approved plan) proposes roads which pass close to wetlands to the west of Lake Gnangara	Metropolitan Street Directory		Wetlands to west of Lake Gnangara	W/U1	
Special Residential Zone	Local	Residential subdivision and roads	Supplied by Shire		Lake Joondalup	W/U1	
Special Residential Zone	Local	Residential subdivision and roads	Supplied by Shire		Lake Goollelal	W/U2	
		Information incomplete (some marked on road maps)	Street Guide and Shire Road Map (1:25,000)				
<u>Local</u>							
Unnamed road	Local	Scenic Drive to Lake Island in Lake Joondalup. No plans for construction			Lake Joondalup	W/L1	
Hawkins Rd	Local	Extension north			Lake Joondalup	W/L2	
Rousset Rd	Local	Extension north			Swamps	W/L3	
Estrel Rd	Local	Benmuni to Badgerup Rd			Badgerup Lake	W/L4	

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

See M.R.S. Maps 1 and 3

ROAD PLANNING			LOCAL AUTHORITY: WANNEROO - continued				
ROAD	CLASS OF ROAD	PROPOSAL	PLAN *	TIMESCALE OF PROPOSAL	WETLAND AREAS INVOLVED	MAP REFERENCE	NOTES
<u>Concept Plans *</u>							
Eastern Highway	Controlled access highway	Planning stages	T.P.D. SP182		Will pass close to many wetlands in eastern lake chain	W/C1	Not mapped on overlay
Mitchell Freeway	"	Northern extension	N.W. Corridor Structure Plan		Pipidiny Swamp	W/C2	
Ocean Reef Road	Important regional road	Wanneroo Rd to Gngangara Rd	"		Wetland on north-west corner of Gngangara and Sydney Roads	W/C3	
Marmion Ave	"	Northern extension	"	"			Roads north of Burns Beach are
Connolly Ave	"						dedicated road reserves but not shown in M.R.S.yet

88

\* INDICATE IF SHOWN ON MET. REGION SCHEME, TOWN PLANNING SCHEME, OTHER

\* See also North West Corridor Strategy Plan  
 \*\* (There are many major roads on structure plan, several of which pass close to Nowergup Lake and Pipidiny Swamp.)  
 See M.R.S. Maps 1 and 3

TABLE 4

**ROAD RESERVES IN OR ADJACENT TO WETLAND AREAS FOR WHICH  
THERE ARE NO CURRENT CONSTRUCTION PLANS**

ROAD	LOCAL AUTHORITY	WETLAND	COMMENTS
Lake Rd Commercial Rd	Armadale	Forrestdale Lake	
Hamilton St Ashfield Pde Kitchener Rd Villiers St	Bassendean	Swan River foreshore	Road reserves in ROS
Paul St Torfar St Carnegie St	Bassendean	Wetlands associated with Swan River foreshore	Road reserves in recreation reserve vested in Local
Leake St William St Belmont Rd Wyatt Rd River Rd Constance St	Bayswater	Swan River foreshore	
The Esplanade Waterview Pde Locock St Central Ave Bulong Ave Coolgardie Ave Ben St Lilian Grove	Belmont	Swan River foreshore	In ROS and reserve for Redcliffe-Bushmead Highway  (The Esplanade will not be constructed)
Rupert Rd Cockram Rd Greenfield Rd Mason Rd River Rd	Canning	Canning River foreshore	In line of proposed Spencer-Manning Road link
Wharf Rd Bacon Rd Queens Park Rd Lake Tce Narrow Rd Peninsula Rd Surrey Rd Duff Rd	Canning	Canning River foreshore	
Selby St	Stirling	Herdsmen Lake	Shown on maps as a result of old "paper" subdivision. Will not be constructed on this alignment

TABLE 5

## WETLANDS RECOMMENDED BY LOCAL GOVERNMENT AUTHORITIES FOR FURTHER STUDY

WETLAND	LOCAL AUTHORITY AREA	CURRENT STATUS	RECOMMENDATION
Wright Lake	Armadale	ROS owned by Council (adjacent to proposed Beechboro-Gosnells Freeway)	Requires study for the development of a management plan, including recreational use
Wetlands in Pickering Park ) and nearby Local Open Space ) Wetlands at Ashfield Flats ) (McDonald Park) )	Bassendean	ROS	Require study with a view to developing management plans
Swamp in industrial land between Sheffield Street and railway line	Canning	Industrial zone	Requires measure to ensure future conservation
Swamps in Spearwood, west of Rockingham Road	Cockburn	Private ownership - future residential development	Require study with a view to future conservation
Canning River foreshore	Gosnells	ROS	Pressure for further recreational development. Requires study with a view to maintaining some areas in a more natural state
Wetland in reserve adjacent to golf course	Kalamunda	ROS/A-class Reserve	Requires study for development and management of reserve
The Spectacles	Kwinana	Private ownership	Ensure future preservation
Anstey Swamp (south of Lake Walyungup)	Rockingham	Private ownership	Requires study for future conservation
Wetland chain east of Mandurah Road	Rockingham	Private ownership - future residential development	Requires study to ensure appropriate zoning and use in context of future urban development
Hazelmere Lakes	Swan	Private ownership	Require study to ensure future conservation

TABLE 6

PRELIMINARY CLASSIFICATION OF WETLAND TYPES\*<sup>+</sup>  
 BASED ON SHAPE, SIZE AND WATER QUALITY AND THEIR OCCURRENCE IN RELATIONSHIP TO THE GEOMORPHIC ELEMENTS OF THE DARLING SYSTEM  
 (after C.A. Semeniuk, in prep.)

GEOMORPHIC ELEMENTS	MESOSCOPIC WETLANDS (5-50KM <sup>2</sup> )		MACROSCOPIC WETLANDS (1-5km <sup>2</sup> )					MESOSCOPIC WETLANDS (less than 1km <sup>2</sup> )				
	ELLIPTICAL	SINUOUS	IRREGULAR	CIRCULAR- ELLIPTICAL	LINEAR	CHANNEL	FLAT	IRREGULAR	CIRCULAR- ELLIPTICAL	LINEAR	CHANNEL	FLAT
QUINDALUP								1 <sub>g</sub>	2 <sub>g</sub> & 3	4		
QUINDALUP/SPEARWOOD CONTACT	5								2			
SPEARWOOD			6 <sub>g</sub>	7 <sub>g</sub>	8 <sub>g</sub>			9 <sub>g</sub>	10 <sub>g</sub>			
SPEARWOOD/BASSEDEAN CONTACT	11			7				9 <sub>g</sub>	10 <sub>g</sub>			
BASSEDEAN				7				9 <sub>g</sub>	10 <sub>g</sub>	4 <sub>g</sub>	12 <sub>g</sub>	
PINJARRA PLAIN		13				14	15				16	17
DARLING PLATEAU		18			19	14		9	10	20	16 & 21	
ESTUARY							22				16	23

\* 1, 2, 3 indicates Type 1, Type 2, Type 3 etc.; \* see also Figure 3; g indicates intergradation between any of the two wetlands within a geomorphic system e.g. with the Quindalup System Type 1 intergrades with Type 2.

TABLE 7

## DRAFT CRITERIA FOR ASSESSING CONSERVATION VALUE OF A WETLAND

- (1) Is the wetland type regionally widespread or is it restricted in distribution? If the latter, then it may warrant conservation. (If the former, it may still be significant for conservation purposes - see below).

Having identified why a given wetland is regionally significant and thus requires conservation and management, it would then be necessary to identify the range of conservation values which apply to specific resources within the wetland. To do this, one needs to resolve the various other conservation criteria listed below. These criteria would require input from a range of natural history scientists but would mainly draw on the experience of geomorphologists and biologists.

- (2) Is the wetland important as a productive area upon which depend such commercial endeavours as fisheries (e.g. in coastal areas mangroves function as nursery areas for fisheries)?

For terrestrial wetlands of the Swan Coastal Plain this may not be relevant but may be relevant for the estuarine flats adjoining the Swan River system.

- (3) Is the wetland important to maintain the quality of human or animal and plant life (e.g. vegetation to arrest soil erosion)?

For wetlands on the Swan Coastal Plain and Darling Plateau this aspect would involve water quality relevant for the resident animal/plant population, maintenance of habitats for the migratory, nomadic or resident wildlife, and natural recharge/discharge processes.

- (4) Does the wetland have important ecological or geological features of national or international significance (comparable to the significance of the Shark Bay stromatolites, Pinnacles at Cervantes)?

For wetlands this includes landforms, vegetation assemblages and other examples of regionally unique ecological and geological features. Some wetlands in Western Australia have international significance under the Ramsar Treaty.

- (5) Is the wetland important in providing pristine environments or habitats (or system of these units) which are a research resource (comparable to the corals of the Ningaloo Reef; terrestrial vegetation of the Mitchell Plateau; strandplain of the Gascoyne delta)?

For wetlands this includes the range of interactions between landforms and habitats, the evolution of landforms, stratigraphic history of wetlands, ecological relationship between the above and population dynamics of various species of flora, aquatic fauna and other vertebrate fauna such as tortoises, avifauna.

- (6) Could the wetland function as an important pristine to semi-pristine or even altered environment for use by primary, secondary or tertiary educationalists because of scientific features and accessibility (e.g. geological localities for illustrating earth science principles, wetland localities for illustrating ecological principles)?

For wetlands this would include any of the suite of landforms, their associated biota, interdependence and evolution.

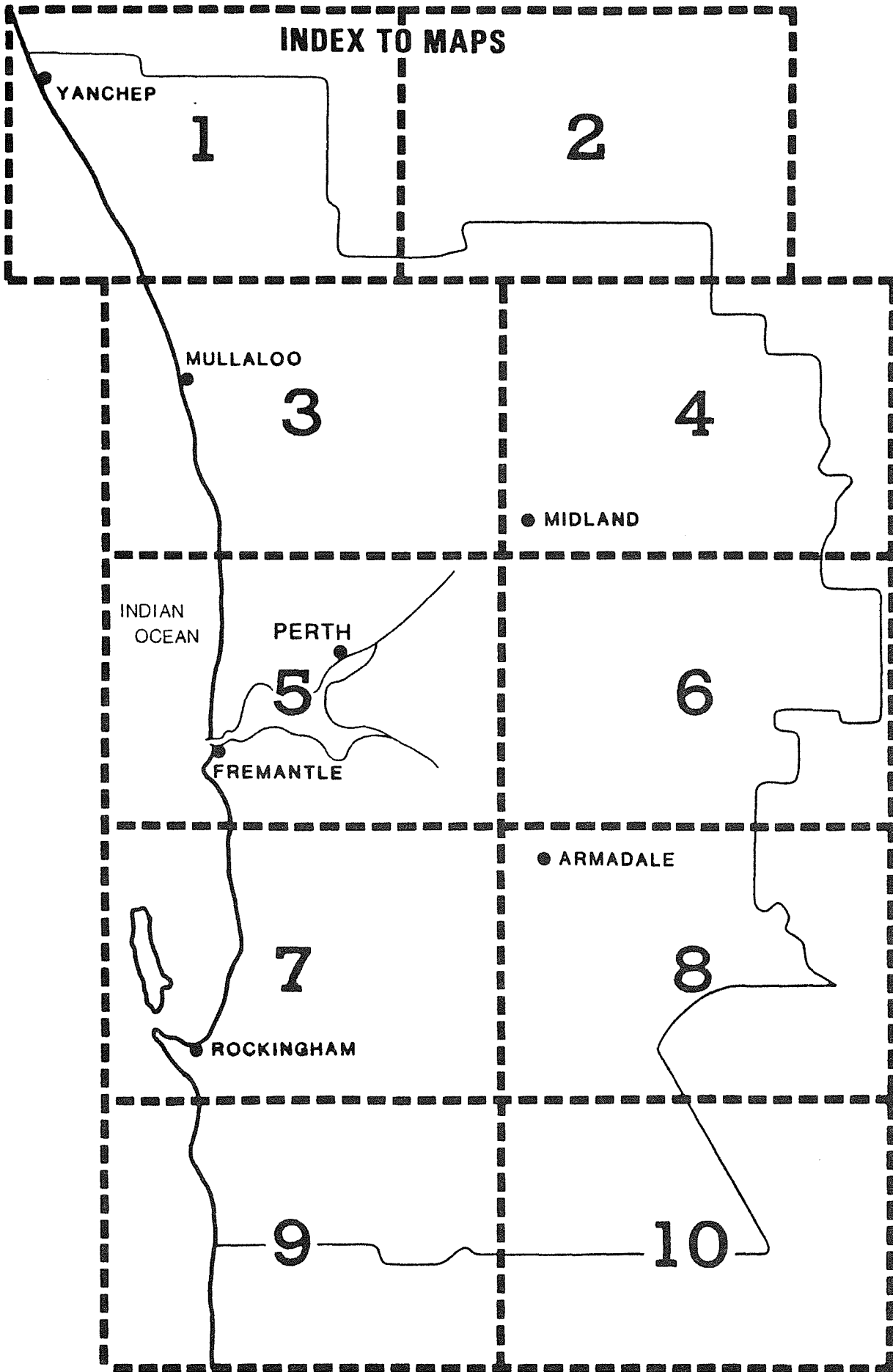


Figure 1: The Perth Metropolitan Region and boundaries of the ten Metropolitan Region Scheme maps (1:50,000).

# KEY

- Important regional roads
- - - - - Possible highways and main roads } roads shown on MRS — not constructed
- - - - - Amendments to MRS currently in hand
- - - - - Routes under investigation for inclusion into MRS

Symbols e.g. A/L1 Local roads, (unconstructed), concept plans for roads, and other land use development plans in or near wetlands

## KEY TO SYMBOLS:

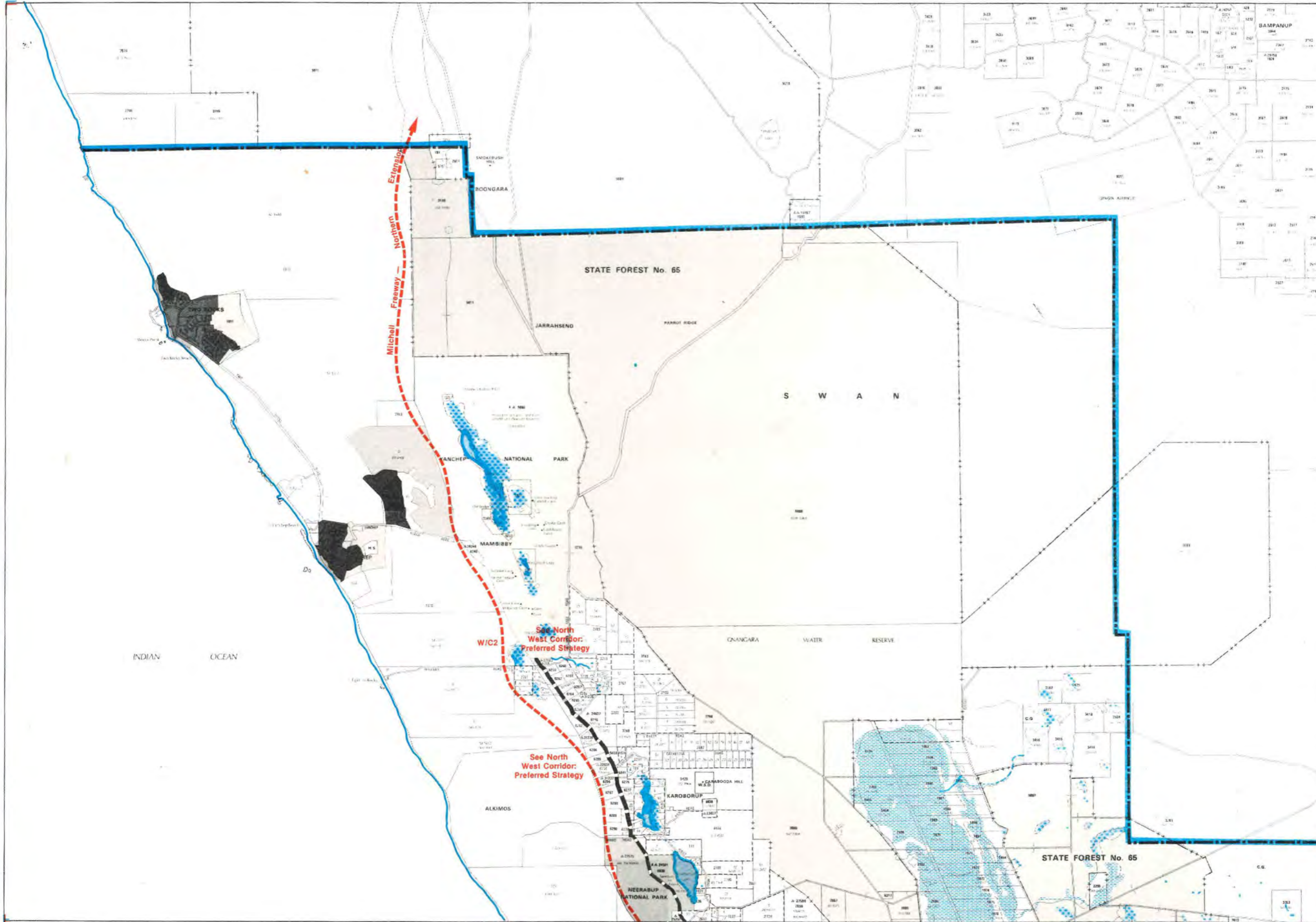
A	Armadale	Ka	Kalamunda	St	Stirling
Bas	Bassendean	Kw	Kwinana	Su	Subiaco
Bay	Bayswater	Me	Melville	Sw	Swan
Be	Belmont	MP	Mosman Park	W	Wanneroo
Ca	Canning	Mu	Mundaring	L	Local road plan
Cl	Claremont	N	Nedlands	R	Regional road plan
Co	Cockburn	P	Perth	C	Conceptual road plan
Cot	Cottesloe	PG	Peppermint Grove	Srz	Proposed special rural zone
E F	East Fremantle	R	Rockingham	U	Proposed urban development
F	Fremantle	Se	Serpentine	I	Proposed industrial development
G	Gosnells	SP	South Perth		

e.g. Ca/R2 refers to a regional road plan in Canning. (For details see tables in study report).

- ★ Subject to realignment.
- Planned regional roads in or near wetlands

Source of information: Main Roads Department  
Town Planning Department  
and Local Authorities.

Figure 2: Wetlands and future road construction in the Perth Metropolitan Region (set of ten maps on MRS base maps, 1:50,000).



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS**
  - PARKS & RECREATION
  - RAILWAYS
  - PORT INSTALLATIONS
  - STATE FORESTS
  - WATER CATCHMENTS
  - CIVIC & CULTURAL
  - WATERWAYS
- ROADS**
  - CONVEYANCE ROADS
  - LOCAL ROADS
  - STATE ROADS
- PUBLIC PURPOSES**
  - HOSPITAL
  - SCHOOL
  - UNIVERSITY
  - LIBRARY
  - POST OFFICE
  - STATE LABOR EXCHANGE
  - SPRINKLING
  - WATER SUPPLY
  - SEWERAGE & DRAINAGE BOARD
  - PARISH

- ZONES**
  - URBAN
  - URBAN DEFERRED
  - CENTRAL CITY AREA
  - INDUSTRIAL
  - SPECIAL INDUSTRIAL
  - RURAL
  - PRIVATE RECREATION

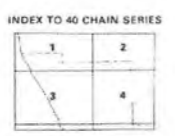
**NOTE:**

1. This sheet is one of a series of sheets which form a map of the Metropolitan Region Scheme. It is subject to the Metropolitan Region Scheme Act 1961 and any amendments of that Act as at 1st September 1985.
2. This sheet has been corrected from errors in earlier editions.
3. Areas 11 and 12 are unimproved parts of about 3.5 square metres and 1.5 square metres.



NUMBER **1**

METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.



**METROPOLITAN REGION SCHEME MAP**

**FUTURE ROAD CONSTRUCTION (SEE KEY)**

- Important regional roads
- Possible highways and main roads
- Amendments to MRS currently in hand
- Routes under investigation for inclusion in MRS
- Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
- ★ Subject to realignment
- Planned regional roads in or near wetlands



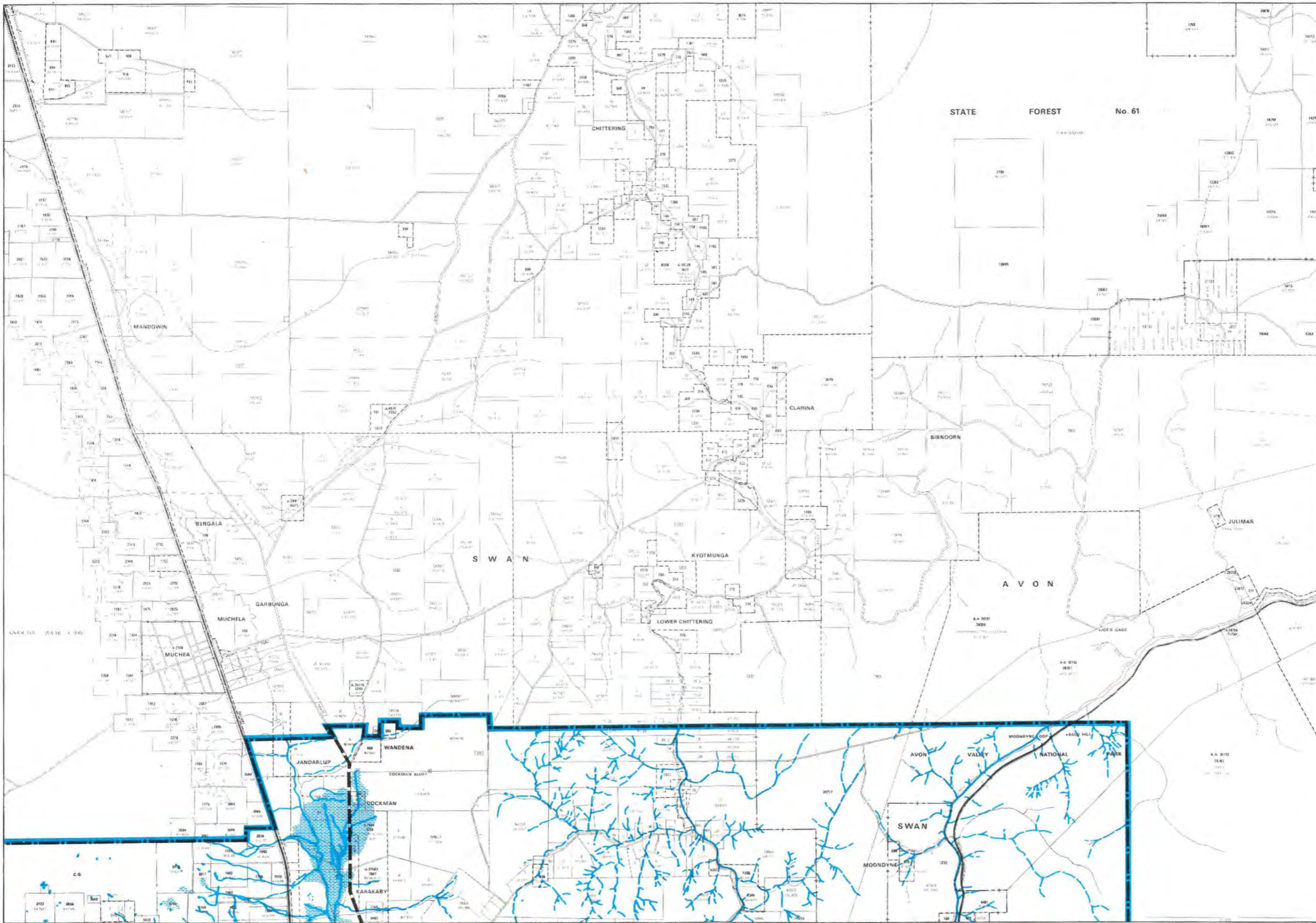
**WETLANDS**

- Lakes, Streams and Drains
- Perennial
- Intermittent
- Mainly dry
- Subject to inundation
- Swamps
- Perennial
- Intermittent
- Wetlands not classified due to scale

Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1976-1979), (reduced to 1:50,000).  
Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Region Scheme Map 4.



AREAS SHOWN ON THIS MAP ARE IN HECTARES  
THIS PLAN WAS PREPARED BY THE CARTOGRAPHIC SECTION, TOWN PLANNING DEPARTMENT, PERTH, WESTERN AUSTRALIA  
A. G. YOUNG CHIEF DRAFTERMAN



**LEGEND**

SCHEME BOUNDARY

**RESERVED LANDS**

- PARKS & RECREATION
- RESTRICTED PUBLIC ACCESS
- RAILWAYS
- PORT INSTALLATIONS
- STATE FORESTS
- WATER CATCHMENTS
- CIVIC & CULTURAL
- WATERWAYS
- ROADS
  - CONTROLLED ACCESS HIGHWAYS
  - OTHER MAJOR HIGHWAYS
  - IMMEDIATE REGIONAL ROADS
- PUBLIC PURPOSES
  - DESIGNED AS FOLLOWS
  - HOSPITAL
  - HIGH SCHOOL
  - TECHNICAL SCHOOL
  - CAR PARK
  - INDUSTRY
  - GOVERNMENT/ALTH GOVERNMENT
  - STATE SUPPLY COMMISSION
  - SPECIAL USER
  - METROPOLITAN WATER SUPPLY
  - SEWERAGE & DRAINAGE BOARD
  - PRISON

**ZONES**

- URBAN
- URBAN DEFERRED
- CENTRAL CITY AREA
- INDUSTRIAL
- SPECIAL INDUSTRIAL
- RURAL
- PRIVATE RECREATION

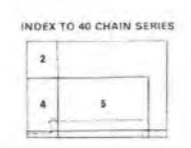
**NOTE:**

1. This sheet is one of twelve sheets forming a grid of the Metropolitan Region Scheme Map as adopted on the 20th October 1963 and incorporates all amendments of the scheme map to 12th September 1984.
2. This sheet has been considered from aerial photography and ground visits.
3. Sheets 11 and 12 are all-inclusive of parts of sheet 1, showing Parks and Forests.



NUMBER **2**

METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.

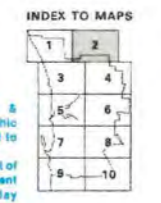
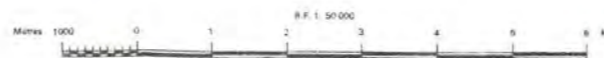


**METROPOLITAN REGION SCHEME MAP**

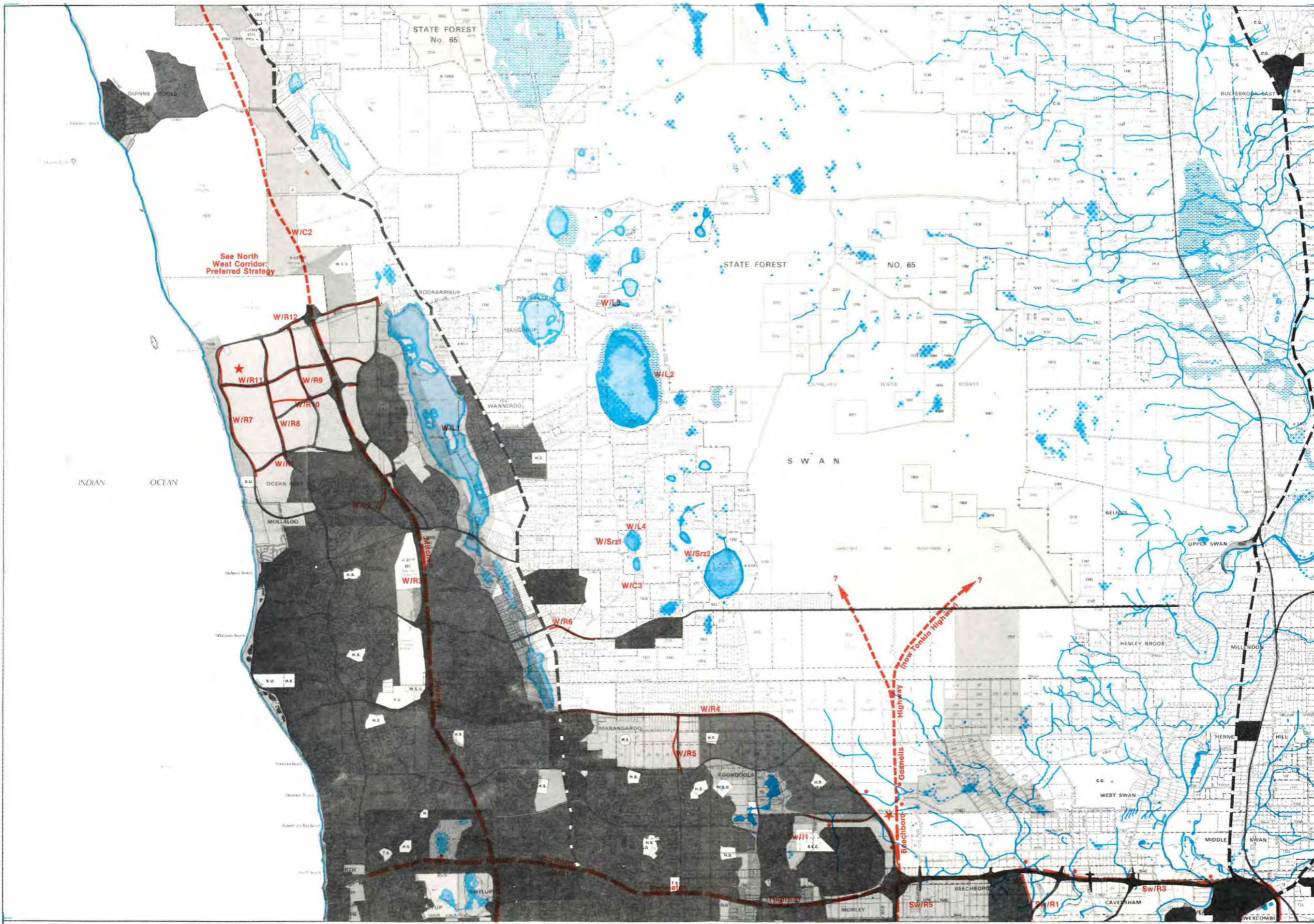
- WETLANDS**
- Lakes, Streams and Drains
  - Perennial
  - Intermittent
  - Mainly dry
  - Subject to inundation

- Swamps
- Perennial
- Intermittent
- Wetlands not classified due to scale

Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1976-1979), (reduced to 1:50,000).  
Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Regional Scheme Map 4.



AREAS SHOWN ON THIS MAP ARE IN HECTARES  
THIS PLAN WAS PREPARED BY THE CARTOGRAPHIC SECTION, TOWN PLANNING DEPARTMENT, PERTH, WESTERN AUSTRALIA  
A. G. YOUNG CHIEF DRAFTSMAN



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS**
  - PARKS & RECREATION
  - RAILWAYS
  - PORT INSTALLATIONS
  - STATE FORESTS
  - WATER CATCHMENTS
  - CIVIC & CULTURAL
  - WATERWAYS
  - ROADS
    - CONTROLLED ACCESS HIGHWAY
    - OTHER MAJOR HIGHWAYS
    - IMPROVED RIGID ROAD
  - PUBLIC PURPOSES
    - DEVELOPED AS FOLLOWS
      - HOSPITAL
      - HIGH SCHOOL
      - TECHNICAL SCHOOL
      - CAR PARK
      - UNIVERSITY
      - COMMONWEALTH GOVERNMENT
      - STATE TENDER CONSTRUCTION
      - SPECIAL USES
      - METROPOLITAN ENGINEERING
      - SEWERAGE & CATCHMENTS
      - INDUSTRIAL

- ZONES**
  - URBAN
  - URBAN DEFERRED
  - CENTRAL CITY AREA
  - INDUSTRIAL
  - SPECIAL INDUSTRIAL
  - RURAL
  - PRIVATE RECREATION

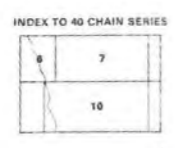
**NOTE:**

1. This plan is a series of technical drawings forming a part of the Metropolitan Region Scheme Map as prepared on the 20th October 1983 and incorporated in amendments of the scheme plan to the February 1987.
2. In a later map been collected from original to specific technical drawings.
3. Sheets 11 and 12 are metropolitan plans of parts of sheet 10 showing Parks and Reserves.



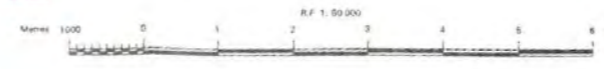
NUMBER **3**

**METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.**



**METROPOLITAN REGION SCHEME MAP**

- FUTURE ROAD CONSTRUCTION (SEE KEY)**
- Important regional roads
  - Possible highways and main roads — roads shown on MRS—not constructed
  - Amendments to MRS currently in hand
  - Routes under investigation for inclusion in to MRS
  - Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
  - ★ Subject to realignment
  - Planned regional roads in or near wetlands

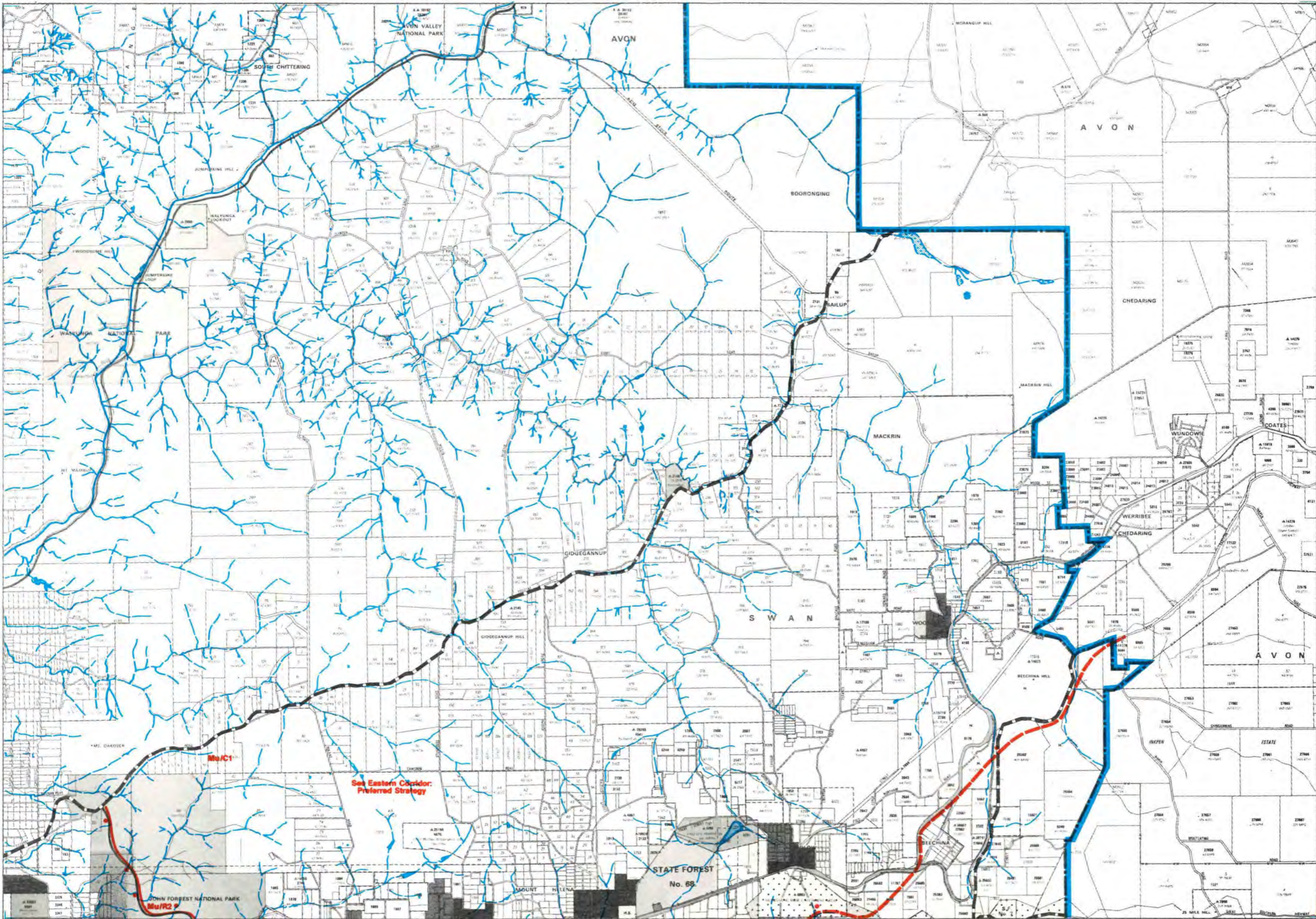


- WETLANDS**
- Lakes, Streams and Drains.
    - Perennial
    - Intermittent
    - Mainly dry
    - Subject to inundation
  - Swamps.
    - Perennial
    - Intermittent
    - Wetlands not classified due to scale

Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1976-1979), (reduced to 1:50,000).  
Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Region Scheme Map 4.



AREAS SHOWN ON THIS MAP ARE IN HECTARES  
THIS PLAN WAS PREPARED BY THE CARTOGRAPHIC SECTION, TOWN PLANNING DEPARTMENT, PERTH, WESTERN AUSTRALIA  
A. G. YOUNG CHIEF DRAFTSMAN



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS**
  - PARKS & RECREATION
    - RESTRICTED PUBLIC ACCESS
  - RAILWAYS
  - PORT INSTALLATIONS
  - STATE FORESTS
  - WATER CATCHMENTS
  - CIVIC & CULTURAL
  - WATERWAYS
  - ROADS
    - CONTROLLED ACCESS HIGHWAYS
    - OTHER MAJOR HIGHWAYS
    - IMPORTANT REGIONAL ROADS
  - PUBLIC PURPOSES**
    - DEDICATED AS FIELDS
    - HOSPITAL
    - HIGH SCHOOL
    - TECHNICAL SCHOOL
    - CAR PARK
    - UNIVERSITY
    - COMMONWEALTH GOVERNMENT
    - STATE ENERGY COMMISSION
    - SPECIAL USES
    - METROPOLITAN WATER SUPPLY
    - SEWERAGE & DRAINAGE BOARD
    - PRISON

- ZONES**
  - URBAN
  - URBAN DEFERRED
  - CENTRAL CITY AREA
  - INDUSTRIAL
  - SPECIAL INDUSTRIAL
  - RURAL
  - PRIVATE RECREATION

**NOTE:**

1. This sheet is one of twelve which form a copy of the Metropolitan Region Scheme Map as adopted on the 30th October 1982 and incorporates all amendments of the scheme map to 15th September 1988.
2. This series has been compiled from Imperial to metric metric scales.
3. Sheets 11 and 12 are continuations of parts of sheet 6 showing Perms and Franchises.



NUMBER **4**

METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.

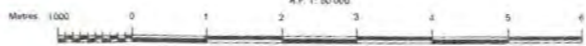
INDEX TO 40 CHAIN SERIES

8	9
11	12

**METROPOLITAN REGION SCHEME MAP**

**FUTURE ROAD CONSTRUCTION (SEE KEY)**

- Important regional roads
- Possible highways and main roads roads shown on MRS—not constructed
- Amendments to MRS currently in hand
- Routes under investigation for inclusion in to MRS
- Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
- ★ Subject to realignment
- Planned regional roads in or near wetlands



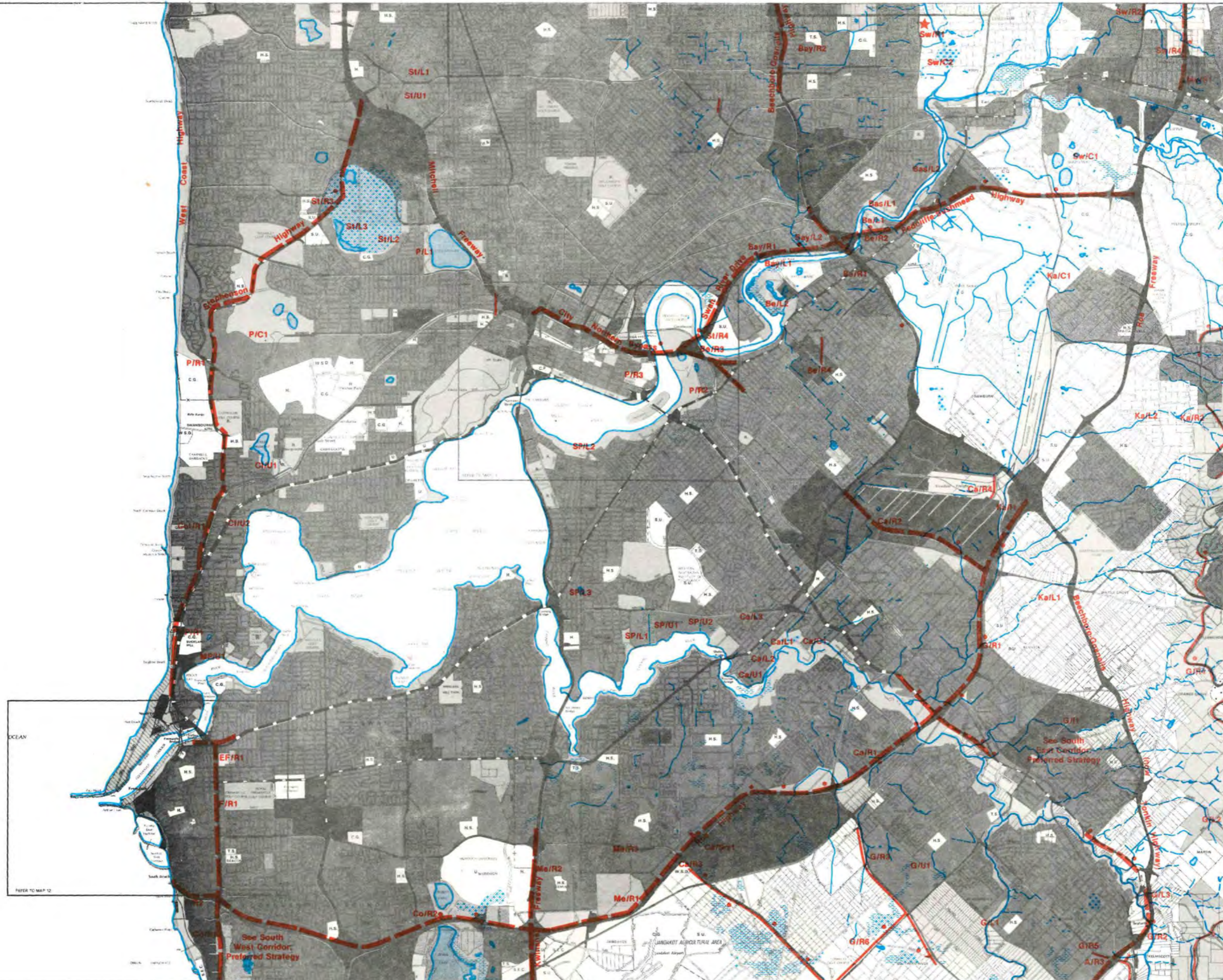
- WETLANDS**
- Lakes, Streams and Drains.
    - Perennial
    - Intermittent
    - Mainly dry
    - Subject to inundation
  - Swamps.
    - Perennial
    - Intermittent
    - Wetlands not classified due to scale

Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1976-1979), reduced to 1:50,000.  
Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Regional Scheme Map 4.

INDEX TO MAPS

1	2
3	4
5	6
7	8
9	10

AREAS SHOWN ON THIS MAP ARE IN HECTARES  
THIS PLAN WAS PREPARED BY THE CARTOGRAPHIC SECTION, TOWN PLANNING DEPARTMENT, PERTH, WESTERN AUSTRALIA  
A. G. YOUNG CHIEF DRAFTSMAN



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS
  - PARKS & RECREATION
  - RAILWAYS
  - PORT INSTALLATIONS
  - STATE FORESTS
  - WATER CATCHMENTS
  - CIVIC & CULTURAL
  - WATERWAYS
  - ROADS
    - SURFACE TO SLOTTED HIGHWAYS
    - STREET VEHICLE HIGHWAYS
    - CONVENTIONAL REGIONAL ROADS
- PUBLIC PURPOSES
  - RESERVED FOR FUTURE
  - RESERVE
  - TRUCK EXHAUST
  - TRUCK STOP/SHED
  - CAR PARK
  - SUPERMARKET
  - NEW/RECONSTRUCTED GOVERNMENT
  - STATE/TERMINAL/STATION
  - SPECIAL USES
  - STREETS/ROADS/VEHICLE/STOPS
  - SEWERAGE & DRAINAGE/ROADS
  - PROBES
- ZONES
  - URBAN
  - URBAN DEFERRED
  - CENTRAL CITY AREA
  - INDUSTRIAL
  - SPECIAL INDUSTRIAL
  - RURAL
  - PRIVATE RECREATION

**NOTE**

1. This map is one of a set of 12 which depicts the zones and reserved lands of the Metropolitan Region Scheme as at 30th October 1983 and incorporates an amendment to the scheme map to 1st September 1984.
2. This map has been corrected from original to standard metric values.
3. Maps 11 and 12 are arrangements of parts of map 5 showing Perth and Fremantle.



NUMBER **5**

THE METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.

INDEX TO 1:25,000 SERIES

15	16
19	20

**METROPOLITAN REGION SCHEME MAP**

**FUTURE ROAD CONSTRUCTION (SEE KEY)**

- Important regional roads
- Possible highways and main roads
- Amendments to MRS currently in hand
- Routes under investigation for inclusion in to MRS
- Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
- ★ Subject to realignment
- Planned regional roads in or near wetlands

**WETLANDS**

- Lakes, Streams and Drains.
- Perennial
- Intermittent
- Mainly dry
- Subject to inundation
- Swamps.
- Perennial
- Intermittent
- Wetlands not classified due to scale

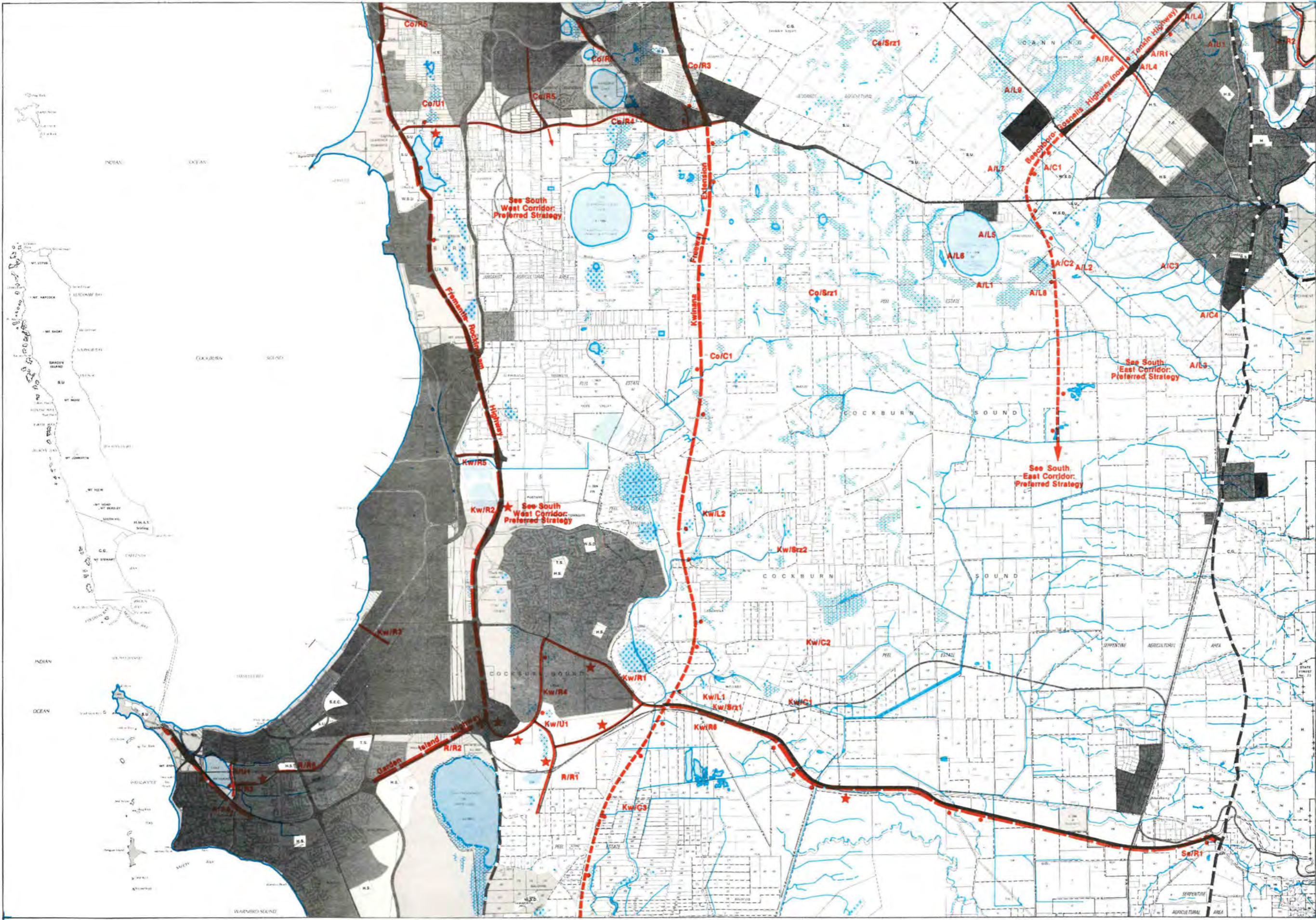
Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1976-1979), (reduced to 1:50,000).  
 Produced by the Department of Conservation and Environment February 1983 to overlay Metropolitan Regional Scheme Map 4.

INDEX TO MAPS

1	2
3	4
5	6
7	8
9	10

This map is based on the Australian Map Grid which is derived from the standard rectangular grid system.  
 Projected on the Universal Transverse Mercator Projection Zone 50 with horizontal datum the Australian Geoid 1984.  
 Produced by the Cartographic Section, Town Planning Department, Perth, Western Australia.  
 A. G. Young Chief Draftsman





**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS
  - PARKS & RECREATION
  - RAILWAYS
  - PORT INSTALLATIONS
  - STATE FORESTS
  - WATER CATCHMENTS
  - CIVIC & CULTURAL
  - WATERWAYS
  - ROADS
- PUBLIC PURPOSES
  - DEVELOPED AREAS
  - HOSPITALS
  - WATERWORKS
  - TELEPHONE EXCHANGES
  - CAR PARKS
  - LIBRARIES
  - COMMERCIAL GOVERNMENT
  - STATE EMERGENCY COMPENSATION
  - POWER LINES
  - WATERWAYS (WATER SUPPLY)
  - CONCRETE & DRINKING WATER
  - PARKS
- ZONES
  - URBAN
  - URBAN DEFERRED
  - CENTRAL CITY AREA
  - INDUSTRIAL
  - SPECIAL INDUSTRIAL
  - RURAL
  - PRIVATE RECREATION

**NOTE:**

- This map is one of a set of 12 which identify the zones and reservations of the Metropolitan Region Scheme as adopted on 28th October 1981 and incorporates all amendments to the scheme made to 31st September 1986.
- This system has been converted from imperial to standard metric units.
- Maps 11 and 12 are enlargements of parts of maps showing Perth and Fremantle.



NUMBER **7**

THE METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.

INDEX TO 1:25,000 SERIES

23	24
27	28

**METROPOLITAN REGION SCHEME MAP**

**FUTURE ROAD CONSTRUCTION (SEE KEY)**

- Important regional roads
- Possible highways and main roads
- Amendments to MRS currently in hand
- Routes under investigation for inclusion in MRS
- Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
- ★ Subject to realignment
- Planned regional roads in or near wetlands

**WETLANDS**

- Lakes, Streams and Drains.
  - Perennial
  - Intermittent
  - Mainly dry
  - Subject to inundation
- Swamps.
  - Perennial
  - Intermittent
  - Wetlands not classified due to scale

Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1970-1979), reduced to 1:50,000. Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Region Scheme Map 4.

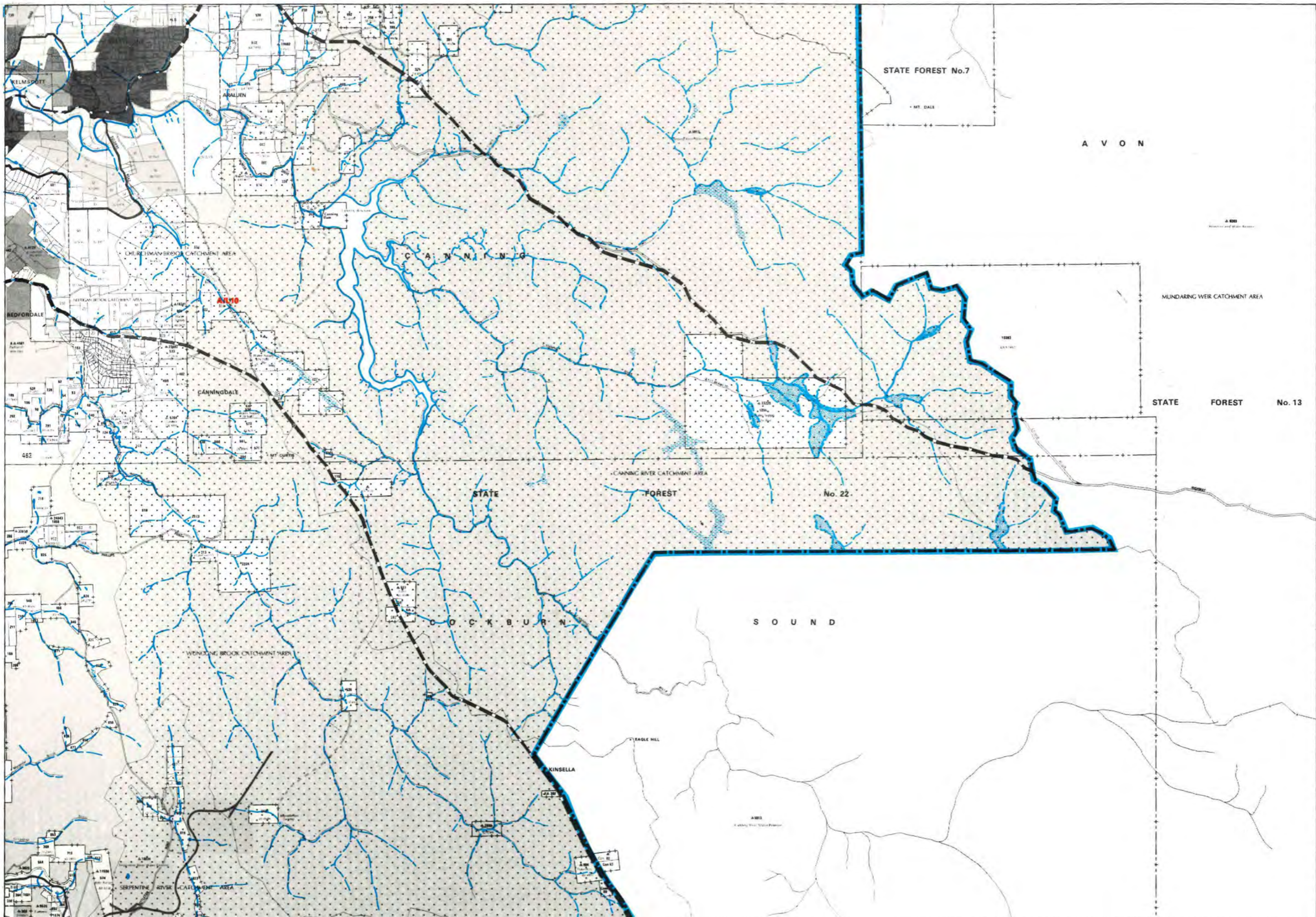
INDEX TO MAPS

1	2
3	4
5	6
7	8
9	10

This map is based on the Australian Map Grid with a deviation from the standard rectangular sheet system.

Produced by the Cartographic Section, Town Planning Department, Perth, Western Australia.

A. C. Young  
000223



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS**
- PARKS & RECREATION
- RESTRICTED PUBLIC ACCESS
- RAILWAYS
- PORT INSTALLATIONS
- STATE FORESTS
- WATER CATCHMENTS
- CIVIC & CULTURAL
- WATERWAYS
- ROADS
  - CONTROLLED ACCESS HIGHWAYS
  - OTHER MAJOR HIGHWAYS
  - IMPORTANT REGIONAL ROADS
- PUBLIC PURPOSES**
- DENOTED AS FOLLOWS
  - HOSPITAL
  - HIGH SCHOOL
  - TECHNICAL SCHOOL
  - CAR PARK
  - UNIVERSITY
  - COMMONWEALTH GOVERNMENT
  - STATE ENERGY COMMISSION
  - SPECIAL USES
  - METROPOLITAN WATER SUPPLY
  - SEWERAGE & DRAINAGE BOARD
  - PRISON
- ZONES**
- URBAN
- URBAN DEFERRED
- CENTRAL CITY AREA
- INDUSTRIAL
- SPECIAL INDUSTRIAL
- RURAL
- PRIVATE RECREATION

**NOTE:**

1. This sheet is one of a series which form a copy of the Metropolitan Region Scheme Map as adopted on the 20th October 1962 and incorporate all amendments of the scheme map to 15th September 1988.
2. This series has been converted from imperial to standard metric values.
3. Sheets 11 and 12 are enlargements of parts of sheet 8 showing Perth and Fremantle.



NUMBER **8**

**METROPOLITAN  
REGION  
PLANNING  
AUTHORITY,  
PERTH, W.A.**

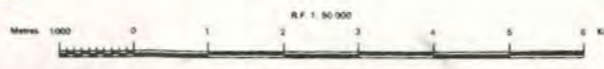
INDEX TO 40 CHAIN SERIES

20	21
24	

**METROPOLITAN REGION SCHEME MAP**

**FUTURE ROAD CONSTRUCTION (SEE KEY)**

- Important regional roads
- Possible highways and main roads roads shown on MRS—not constructed
- Amendments to MRS currently in hand
- Routes under investigation for inclusion in to MRS
- Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
- Subject to realignment
- Planned regional roads in or near wetlands



**WETLANDS**

- Lakes, Streams and Drains.
- Perennial
- Intermittent
- Mainly dry
- Subject to inundation

**Swamps.**

- Perennial
- Intermittent
- Wetlands not classified due to scale

Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1876-1879), (reduced to 1:50,000).  
Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Region Scheme Map 4.

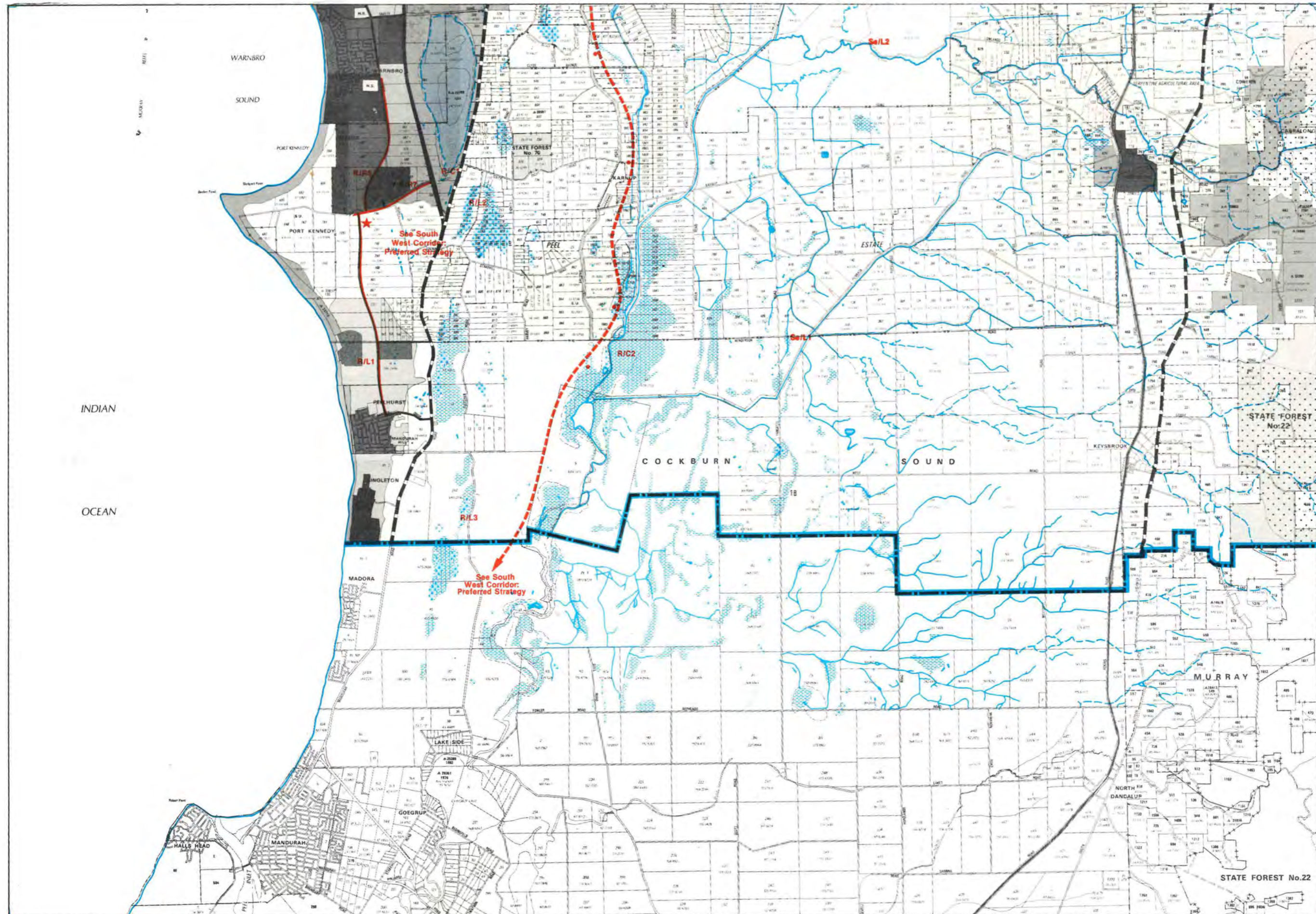
INDEX TO MAPS

1	2
3	4
5	6
7	8
9	10

AREAS SHOWN ON THIS MAP ARE IN HECTARES

THIS PLAN WAS PREPARED BY THE CARTOGRAPHIC SECTION, TOWN PLANNING DEPARTMENT, PERTH, WESTERN AUSTRALIA

A. G. YOUNG CHIEF DRAFTSMAN



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS**
- PARKS & RECREATION
- RESTRICTED PUBLIC ACCESS
- RAILWAYS
- PORT INSTALLATIONS
- STATE FORESTS
- WATER CATCHMENTS
- CIVIC & CULTURAL
- WATERWAYS
- ROADS - CONTROLLED ACCESS HIGHWAYS
- OTHER MAJOR HIGHWAYS
- IMPORTANT REGIONAL ROADS
- PUBLIC PURPOSES**
- DENOTED AS FOLLOWS
- HOSPITAL
- HIGH SCHOOL
- TECHNICAL SCHOOL
- CAR PARK
- UNIVERSITY
- COMMONWEALTH GOVERNMENT
- STATE ENERGY COMMISSION
- SPECIAL USES
- METROPOLITAN WATER SUPPLY
- SEWERAGE & DRAINAGE BOARD
- PRISON
- ZONES**
- URBAN
- URBAN DEFERRED
- CENTRAL CITY AREA
- INDUSTRIAL
- SPECIAL INDUSTRIAL
- RURAL
- PRIVATE RECREATION

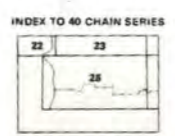
**NOTE:**

1. This sheet is one of twelve which form a copy of the Metropolitan Region Scheme Map as adopted on the 20th October 1983 and incorporates all amendments of the scheme up to 10th September 1988.
2. The series has been converted from imperial to standard metric values.
3. Sheets 11 and 12 are enlargements of parts of sheet 5 showing Perth and Fremantle.



NUMBER **9**

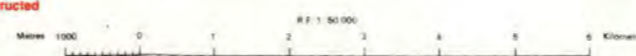
**METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.**



**METROPOLITAN REGION SCHEME MAP**

**FUTURE ROAD CONSTRUCTION (SEE KEY)**

- Important regional roads
- Possible highways and main roads
- roads shown on MRS—not constructed
- Amendments to MRS currently in hand
- Routes under investigation for inclusion in MRS
- Symbols e.g. A/L 1 Local roads in or near wetlands — not constructed
- Subject to realignment
- Planned regional roads in or near wetlands



**WETLANDS**

- Lakes, Streams and Drains.
- Perennial
- Intermittent
- Mainly dry
- Subject to inundation

**Swamps**

- Perennial
- Intermittent
- Wetlands not classified due to scale

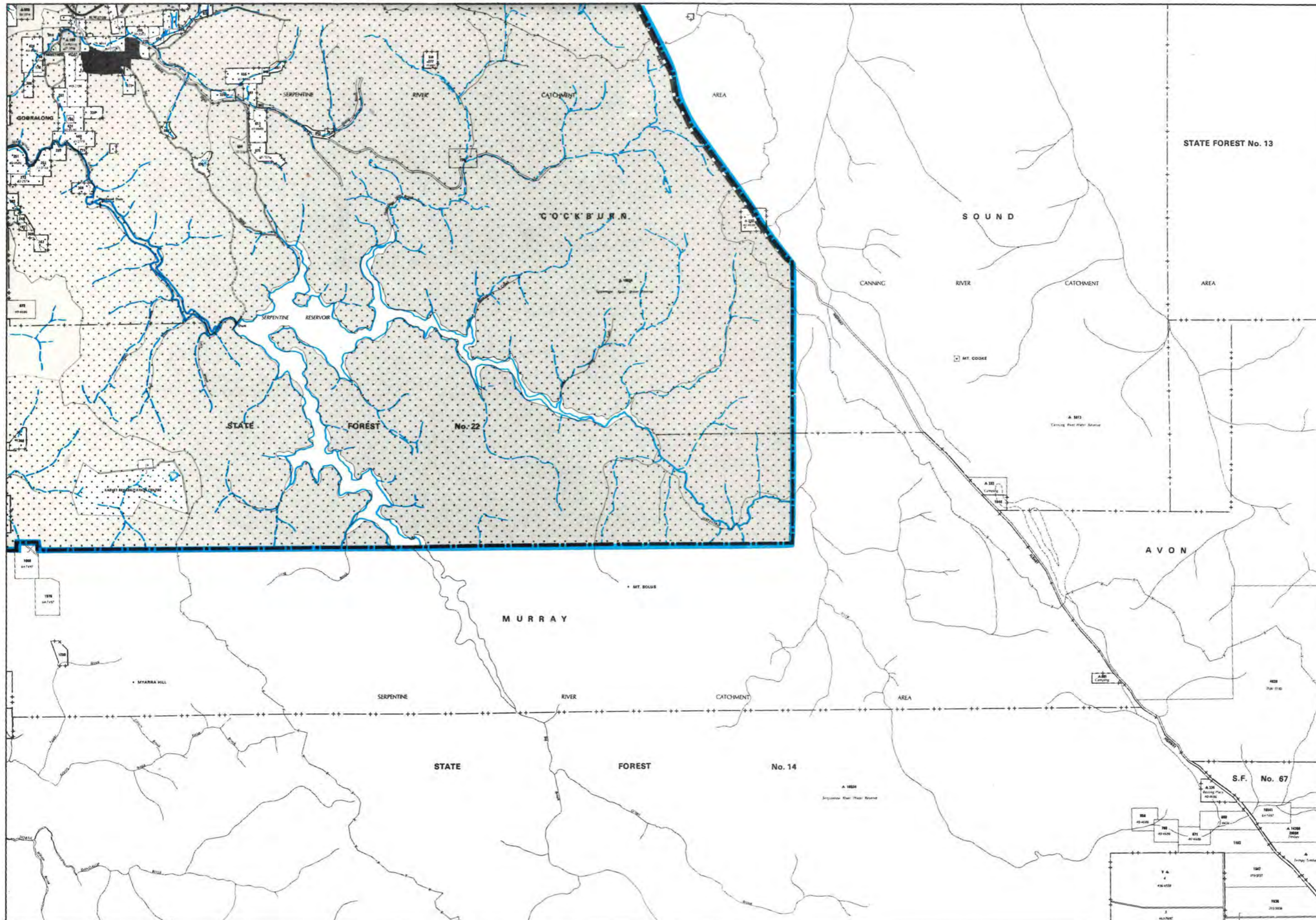
Source: Compiled from Lands & Surveys 1:25,000 topographic maps (1976-1979), reduced to 1:50,000.  
Produced by the Department of Conservation and Environment February 1985 to overlay Metropolitan Regional Scheme Map 4.



AREAS SHOWN ON THIS MAP ARE IN HECTARES

THIS PLAN WAS PREPARED BY THE  
TOWN PLANNING DEPARTMENT  
PERTH, WESTERN AUSTRALIA

A. G. YOUNG CHIEF DRAFTSMAN



**LEGEND**

- SCHEME BOUNDARY
- RESERVED LANDS**
- PARKS & RECREATION
- RESTRICTED PUBLIC ACCESS
- RAILWAYS
- PORT INSTALLATIONS
- STATE FORESTS
- WATER CATCHMENTS
- CIVIC & CULTURAL
- WATERWAYS
- ROADS - CONTROLLED ACCESS HIGHWAYS
- OTHER MAJOR HIGHWAYS
- IMPORTANT REGIONAL ROADS
- PUBLIC PURPOSES**
- DENOTED AS FOLLOWS
- HOSPITAL
- HIGH SCHOOL
- TECHNICAL SCHOOL
- CAR PARK
- UNIVERSITY
- COMMONWEALTH GOVERNMENT
- STATE ENERGY COMMISSION
- SPECIAL USES
- METROPOLITAN WATER SUPPLY
- SEWERAGE & DRAINAGE BOARD
- PRISON

- ZONES**
- URBAN
- URBAN DEFERRED
- CENTRAL CITY AREA
- INDUSTRIAL
- SPECIAL INDUSTRIAL
- RURAL
- PRIVATE RECREATION

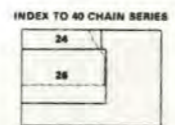
**NOTE:**

1. This sheet is one of twelve which form a copy of the Metropolitan Region Scheme Map as advised on the 30th October 1983 and incorporates all amendments of the scheme map to the 30th September 1984.
2. This series has been converted from imperial to standard metric values.
3. Sheets 11 and 12 are arrangements of parts of sheet 5 showing Perth and Fremantle.



NUMBER **10**

**METROPOLITAN REGION PLANNING AUTHORITY, PERTH, W.A.**



**METROPOLITAN REGION SCHEME MAP**

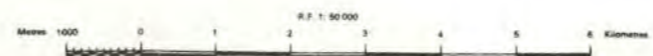
**WETLANDS**

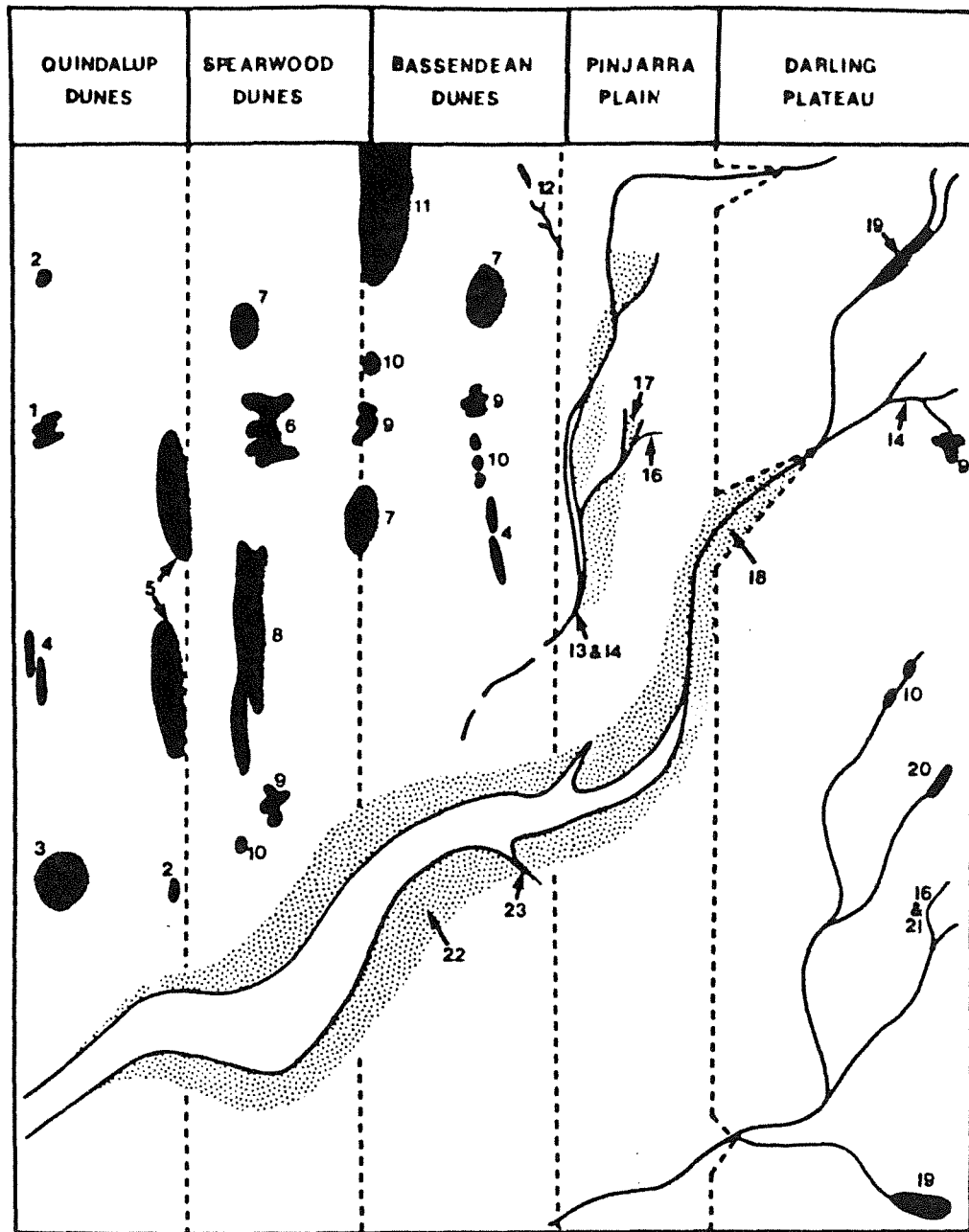
*ewemps*

Source: Compiled from Land & Survey's 1:25,000 topographic maps (1975-1978), (reduced to 1:40,000).






AREAS SHOWN ON THIS MAP ARE IN HECTARES  
THIS PLAN WAS PREPARED BY THE CARTOGRAPHIC SECTION, TOWN PLANNING DEPARTMENT, PERTH WESTERN AUSTRALIA  
A. G. YOUNG CHIEF DRAFTSMAN





LEGEND TO BROAD WETLAND TYPES

-  Irregular
  -  Circular-ellipsoidal
  -  Linear
- } Permanent to seasonal lakes & wetlands, megascopic, macroscopic to mesoscopic in scale.

 Channels, megascopic, macroscopic to mesoscopic in scale.

 Flats

Figure 3: Preliminary schematic diagram showing wetland types and their distribution across the Darling System according to C.A. Semeniuk (in prep.).

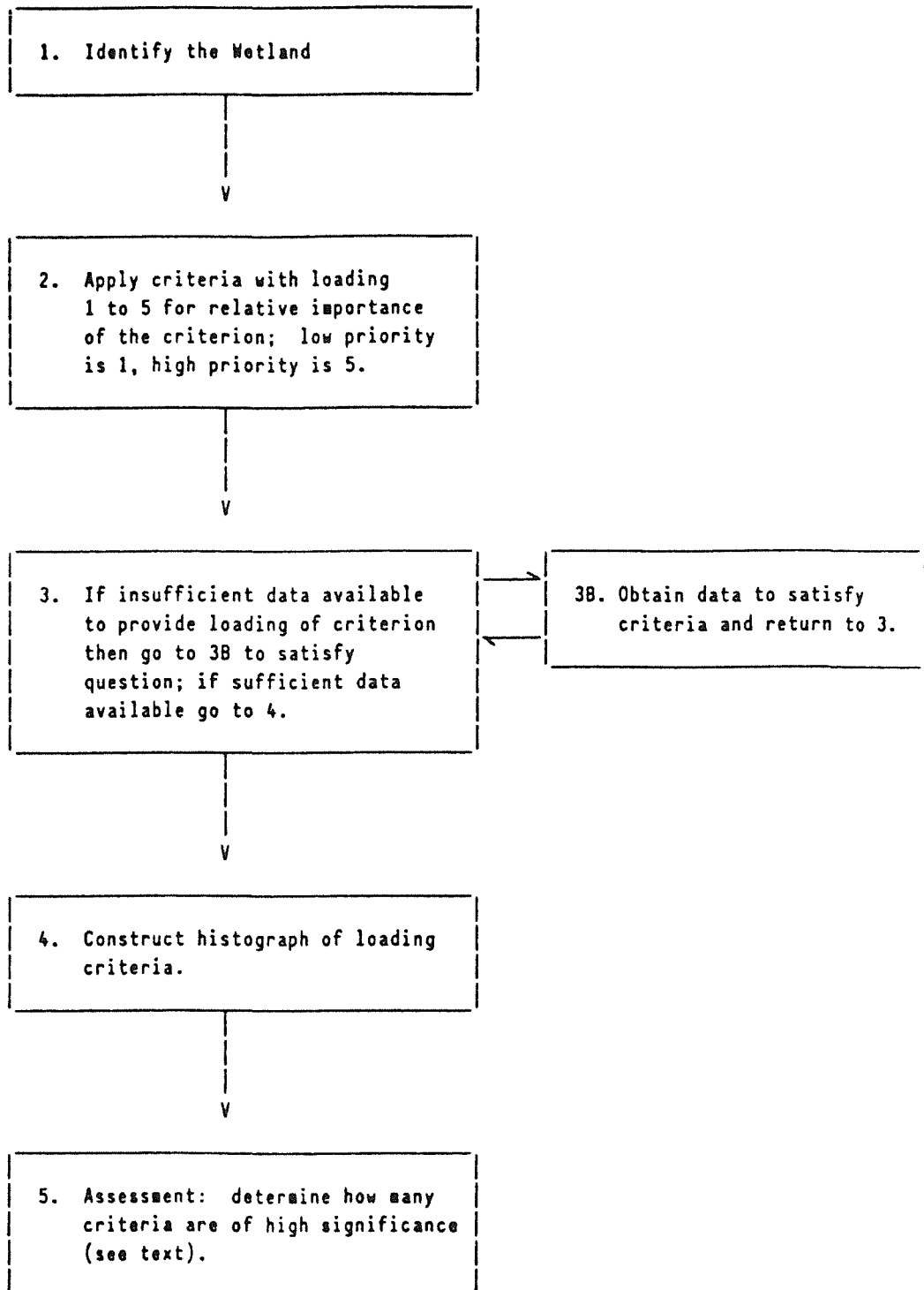


Figure 4: Flow chart for assessing the conservation value of a wetland.

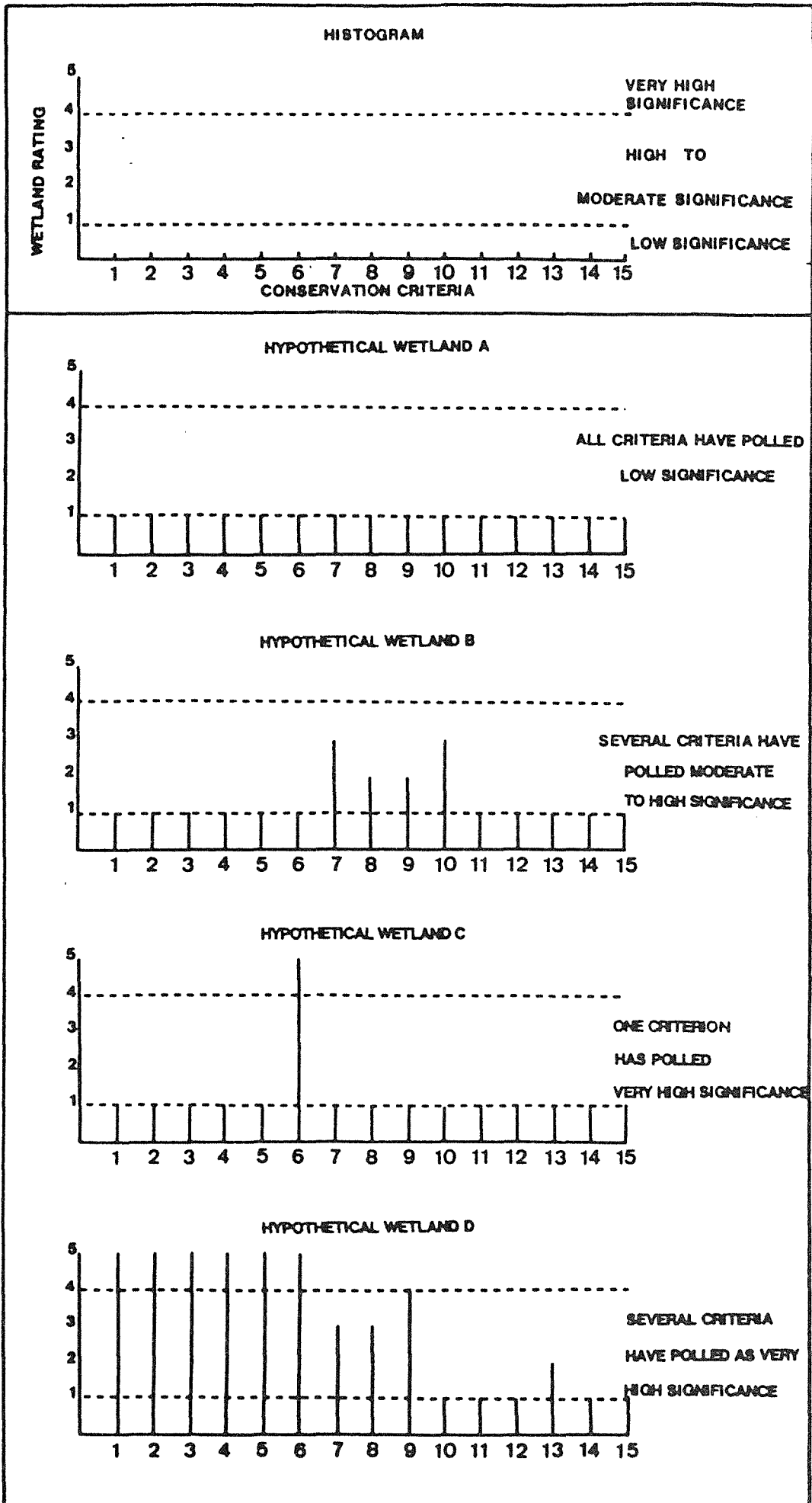


Figure 5: Histograms illustrating techniques for assessing the conservation value of a wetland utilizing 15 criteria, each scored on a scale of 1-5.

APPENDIX 1

WETLANDS-ROADWORKS STUDY

LIST OF ORGANISATIONS AND INDIVIDUALS SUPPLYING INFORMATION

**LIST OF ORGANISATIONS AND INDIVIDUALS SUPPLYING INFORMATION**

<b>DEPARTMENT OR ORGANISATION</b>	<b>CONTACT PERSON</b>	<b>DATE FIRST CONTACTED</b>
Department of Conservation and Environment	Dr Jenny Arnold	23.10.84
	Mr Paul Holmes	23.10.84
	Mr Peter Skitmore	23.10.84
	Mr Norman Orr	24.10.84
	Mr Bill Carr	24.10.84
	Ms Sally Robinson	22.10.84
Town Planning Department	Mr Lloyd Graham (Commissioner for Town Planning)	1.11.84 (telephone)
	Mr Mike Pearson	2.11.84
	Mr Ian MacRae	2.11.84
	Mr Alan Keil	2.11.84
	Mr Dave Everill	31.10.84
	Mr Jim Singleton	31.10.84
Main Roads Department	Mr Mofflin (Deputy Commissioner for Main Roads)	30.10.84 (telephone)
	Mr George Hackett	1.11.84
	Mr Kevin Gale	1.11.84
<b>LOCAL GOVERNMENT AUTHORITIES</b>	<b>CONTACT PERSON</b>	<b>DATE FIRST CONTACTED</b>
Armadale	Mr John Adderley	9.11.84
	Mr Greg Elsegood	9.11.84
Bassendean	Mr Clarrie McCreed	6.11.84
	Mr Bob Milne	6.11.84
Bayswater	Mr Greg Rowe	4.11.84
	Mr Edwin Long	4.11.84
Belmont	Mr Adrian Oats	6.11.84
	Mr Britt Payne	6.11.84
Canning	Mr Chris O'Neal	
Claremont	Mr Ron Brooks	9.11.84
Cockburn	Mr Russell Candy	22.11.84
	Mr Keith Rimmer	22.11.84
	Mr Bob Jeans	22.11.84

LOCAL GOVERNMENT AUTHORITIES	CONTACT PERSON	DATE FIRST CONTACTED
Cottesloe	Mr Malcolm Doig	14.11.84
East Fremantle	Mr Cowan	15.11.84
Fremantle	Mr Les Croxford	15.11.84
Gosnells	Mr Keith Thomas	16.11.84
Kalamunda	Mr Geoff Dutton	7.11.84
Kwinana	Mr David Porter Mr Doug Smith	15.11.84 15.11.84
Melville	Mr Laurie Wills Mr Bruce Guthrie	19.11.84 19.11.84
Mosman Park	Mr Doug Walker	14.11.84
Mundaring	Mr Keith Weymes	20.11.84
Nedlands	Mr Kerry Martin	14.11.84
Peppermint Grove	Mr Graham Partridge	14.11.84
Perth	Mr V Klyne	19.11.84
Rockingham	Mr Paul Garnett	6.12.84
Serpentine	Mr Richard Watson	21.11.84
South Perth	Mr Berkov Mr P Bennetts	16.11.84 16.11.84
Stirling	Mr Emerson Richardson Mr Larry Smith	22.11.84 22.11.84
Subiaco	Mr J McGeough	13.11.84
Swan	Mr Eric Lumsden	4.12.84
Wanneroo	Mr Bob Ruscoe Mr Phil Thomson Mr Oscar Drescher	23.11.84 23.11.84 23.11.84

APPENDIX 2

LIST OF ORGANISATIONS/PERSONNEL  
TO WHOM DRAFT GUIDELINES FOR  
ASSESSING WETLAND CONSERVATION VALUE  
WERE FORWARDED FOR COMMENT

LIST OF ORGANISATIONS/PERSONNEL TO WHOM DRAFT GUIDELINES FOR ASSESSING  
WETLAND CONSERVATION VALUE WERE FORWARDED FOR COMMENT

<p>Prof. A. McComb, Botany Department, University of Western Australia, NEDLANDS WA 6009</p> <p>Mr Barry Carbon, c/- Alcoa of Australia Ltd, Marlton Street, BOORAGOON WA 6154</p> <p>Dr John Bailey, Conservation Council of W.A. Inc, 794 Hay Street, PERTH WA 6000</p> <p>The Director, Department of Agriculture, Jarrah Road, SOUTH PERTH WA 6151</p> <p>Mr J.A.K. Lane, Department of Fisheries &amp; Wildlife, Wildlife Research Centre, Ocean Reef Road, WOODVALE WA 6026</p> <p>Mr Grant Pearson, Department of Fisheries &amp; Wildlife, Wildlife Research Centre, Ocean Reef Road, WOODVALE WA 6062</p> <p>The Director, Department of Youth, Sport &amp; Recreation, Perry Lakes Stadium, WEMBLEY WA 6014</p> <p>The Director, Forest Department 50 Hayman Road, SOUTH PERTH WA 6151</p> <p>Dr A. Allen, Hydrology Branch, Geological Survey of Western Australia, 66 Adelaide Terrace, PERTH WA 6000</p> <p>Dr Malcolm Hollick, c/- Department of Civil Engineering, University of Western Australia, NEDLANDS WA 6009</p> <p>Dr P. Wycherley, Kings Park Board, Kings Park and Botanic Gardens, WEST PERTH WA 6005</p> <p>Mr R. Becu, Metropolitan Water Authority, 629 Newcastle Street, LEEDERVILLE WA 6007</p> <p>Mr M. Caldwell Metropolitan Water Authority, 629 Newcastle Street, LEEDERVILLE WA 6007</p> <p>Mr B. Muir, National Parks Authority of W.A., Hackett Drive, NEDLANDS WA 6009</p> <p>Mr R. May, National Parks Authority of W.A., Hackett Drive, NEDLANDS WA 6009</p>	<p>Dr Peter Newman, c/- Dept of Environmental &amp; Life Sciences, Murdoch University, South Street, MURDOCH WA 6150</p> <p>Dr Barbara Porter, c/- Department of Environmental &amp; Life Sciences, Murdoch University, South Street, MURDOCH WA 6150</p> <p>Dr T. Riggert, Riggert Consulting Ecologists Pty Ltd 64 Canning Highway, VICTORIA PARK WA 6100</p> <p>Mr Roger Jaensch, Royal Australasian Ornithologists Union, Suite 30, Rowleys Centre, 15 Ogilvie Street, CANNING BRIDGE WA 6153</p> <p>Mr R. Atkins, Swan River Management Authority, 184 St George's Terrace, PERTH WA 6000</p> <p>Dr A. Tingay, Kensitt Street, STONEVILLE WA 6554</p> <p>Mr J. Singleton, Town Planning Department, Oakleigh House, 22 St George's Terrace, PERTH WA 6000</p> <p>The Director, Western Australian Herbarium, Jarrah Road, SOUTH PERTH WA 6151</p> <p>Dr N. Marchant, Western Australian Herbarium, Jarrah Road, SOUTH PERTH WA 6151</p> <p>The Director, Western Australian Museum, Francis Street, PERTH WA 6000</p> <p>The Secretary, W.A. Naturalists Club (Inc.), 794 Hay Street, WEST PERTH WA 6005</p> <p>Prof. P. Jennings, Wetlands Conservation Society, c/- 14 Stone Court, KARDINYA WA 6163</p> <p>Dr D. Edwards, Zoology Department, University of Western Australia, NEDLANDS WA 6009</p> <p>Mr B. Clay, c/- Zoology Department, University of Western Australia, NEDLANDS WA 6009</p>
--	--

TABLE 7 (cont'd)

[Note: In Western Australia, there is inadequate reservation for scientific/educational purposes of the various types of wetland types which occur within or close to the Metropolitan Area. These areas are under intense pressure for recreational and other development. This trend has been identified by numerous authors and must be expected to continue to grow as population pressures increase.]

- (7) Does the wetland function as the habitat of rare and endangered species?

For example, Bullsbrook swamps for the Short-necked Tortoise.

- (8) Does the wetland function as an important regional wildlife sanctuary, even if the flora/fauna are not rare or endangered?

For wetlands this would include those areas that provide water, refuge or breeding grounds for a variety of reptiles, avifauna, mammals, etc.

- (9) Is the wetland important as either a seasonal or temporary habitat or breeding ground of large numbers of migratory or nomadic animals, particularly waterbirds?

For wetlands in general this factor is likely to be important.

- (10) Can the wetland function as a semi-pristine to pristine area or wilderness for use by naturalists, bush-walkers, etc. (e.g. Kakadu National Park in the Northern Territory or Herdsman Lake in the Perth Metropolitan Area)?

Wetlands close to the population centre of Perth have special value to naturalists, professional ornithologists, amateur bird observers, outdoor enthusiasts, etc.

- (11) Does the wetland have importance from the point of view of aesthetics?

Well-vegetated and/or water-filled wetlands provide a contrast to the adjacent, heavily-developed residential areas.

- (12) Does the wetland have importance as an historic or actively-utilised Aboriginal heritage site?

There are some recorded Aboriginal sites at wetlands and therefore this factor has to be assessed for each site.

- (13) Does the wetland have value for active water-based recreation?

There is increasing pressure for use of wetlands for boating and other water sports, including duck hunting.

- (14) Does the wetland regardless of whether it is pristine or degraded, constitute part of a linked natural system, either physical or biological (biological: in terms of usage by waterbirds particularly migrating or nomadic species) such that its destruction or alternate use would result in disturbance/alteration to adjoining wetlands?

- (15) Does the wetland have social values evidenced by community concern for its conservation, regardless of scientific values?