



# proposed services improvement plan

A review of the entire Transperth network has resulted in a proposed services improvement plan. This includes new features such as System 21 services and the Circle Route, as well as the Minilink concept.



### Features of the Plan

The table on page 67 summarises a comprehensive plan to improve and expand bus, train and ferry services throughout the Transperth operating area.

The proven recipe mentioned at the outset of this report, and the 11- point approach outlined in The Way Ahead are reflected in the Plan.

The table is divided into three parts: rolling stock, infrastructure and services. The attached area service maps show the proposed public transport route network for 2007.

Rolling stock for Transperth includes electric train sets, buses and ferries. Trains and ferries can be expected to operate for some 30 years before replacement is necessary. Buses, on the other hand, should ideally be taken out of heavy duty work after about 15 years.

Given the age of the current bus fleet and the fact that most Transperth buses are not accessible for people using wheelchairs, the Government has made a commitment to introduce easy-access, low-floor buses for the entire fleet by 2015. Therefore, over the next ten years, a substantial number of existing buses will be replaced. Among the many features of the new buses will be air-conditioning and personal security devices.

The Services Improvement Plan will require additional train sets and a substantial number of additional buses. The buses will vary in size from large (capacity of about 90 passengers), to standard (60), to mid-size (45) to mini-buses (12 to 25).

An extra, higher-speed ferry would also be required if the feasibility study for a service between Point Walter and Barrack Street shows a positive outcome.

An extensive range of infrastructure projects is proposed in the Plan. These include: the extension of the metro-rail network and the rapid bus transit network; an improvement program for existing train stations, bus stations, bus-train interchanges and ferry jetties; new suburban bus interchanges and Park 'n' Ride facilities; and a program of bus priority facilities.

Other supporting features, such as a bus stop improvement program, a new ticketing system and improved information modules, are described in earlier sections of this report and not repeated here.

Train services will be supplemented with the arrival of five new train sets in late 1998. This will allow some of the currently crowded two-car trains to be expanded to four-car trains. Also, Friday and Saturday late night services will become a permanent feature. It is anticipated that a further five train sets would be required within the ten-year period to accommodate the expected patronage increase on the existing lines.



A review of the entire bus route network has resulted in a proposed bus services improvement plan which includes exciting new features such as *System 21* services, and the Circle Route, as well as the Minilink concept. In addition to the Circle Route, this plan proposes other, much-improved inter-suburban services. Many of the radial and feeder routes will be more direct and faster. Improved service standards are proposed (see next sub-section) which prescribe, among other things, more frequent services, including evenings and weekends.

### Minilinks

These are community, rather than commuter services, catering primarily for people without access to a car. Typically, they provide a link to the local activity centre and to a nearby transit interchange. The route is generally short. Patronage, therefore, is such that a small vehicle can usually accommodate the demand. In turn, this will allow, in many cases, a more frequent and more customer-oriented service to be operated. For example, smaller vehicles can penetrate local streets which are not suitable for larger buses. The operation could also be on the basis of a fixed route inbound and a flexible route outbound. More specifically, the service going to the activity centre or transit interchange would run over a set route and could be hailed anywhere along the route (like a taxi). On the way back from the centre, the driver would select a flexible route (within certain limitations) to provide a closer-to-home service.

Some of the Minilink routes would require vehicles with no more than 12 seats, and this could provide an opportunity for the Taxi industry to operate the services on behalf of Transperth. For example, Restricted Peak Period Taxis could be used for weekday services, as these vehicles are currently working as taxis only on Friday and Saturday nights.

The Minilink concept would also provide an ideal opportunity for local governments to assume a greater involvement with local area services.

### Ferry services

The scope to greatly extend commuter ferry services (as distinct from tourist ferry services) is limited within the ten-year period of this plan.

River foreshore development in suburbs other than South Perth is generally of low density. Access to suburban jetties would have to be primarily through Park 'n' Ride, and obtaining local community support for foreshore Park 'n' Ride facilities would be difficult. Also, unlike Brisbane, for example, office development in central Perth is a good distance away from the river. Similarly, suburban activity centres are not located within easy reach of jetties.

There is no justification to introduce commuter ferry services in competition with existing rapid transit services (eg, Fremantle-to-Perth or Canning Bridge-to-Perth). And there are few potential ferry links where the travel time can be competitive with bus or train services. Furthermore, the frequency of ferry services which could be justified would not compare with those for bus or train services (the cost for a high-speed ferry is in the order of \$1 million).

A new ferry link with the greatest potential is seen to be between Point Walter and Barrack Street, possibly via a jetty near the University of Western Australia. A feasibility study is proposed.

### Estimated costs

The following is a preliminary estimate of the up-front capital costs of the Services Improvement Plan over the ten-year period from 1998 to 2007 and the additional annual operating costs in 2007:

#### Up-front capital costs

- |   |               |
|---|---------------|
| → Infrastructure (including support facilities) | \$470 million |
| → Rolling stock                                 | \$410 million |

#### Additional annual operating costs in 2007

- |  |              |
|--|--------------|
| → Services (excluding interest and depreciation) | \$90 million |
|--|--------------|

# Proposed services improvements



## 1. Rolling stock

### 1.1 Replacement

- Replacement of the bus fleet of 848 buses over the next 12 years
  - 133 buses by 1999
  - 260 buses of various sizes by 2002
  - 455 buses at an annual rate of 65 buses of various sizes

### 1.2 Expansion

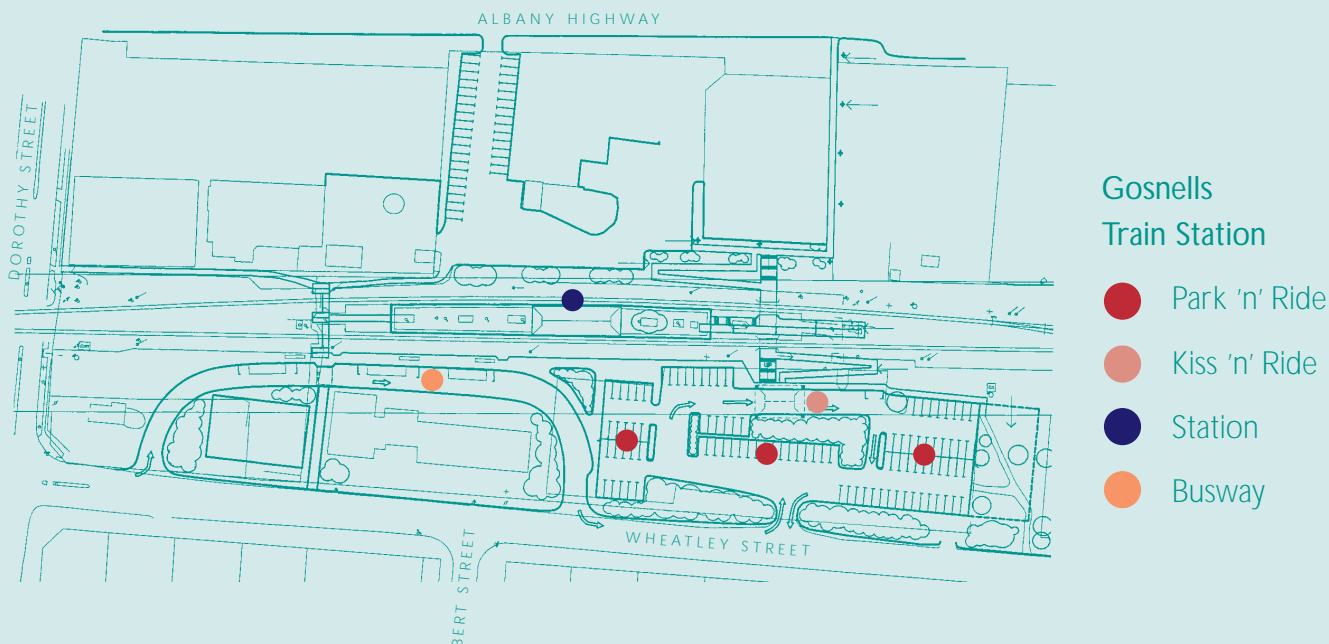
- Bus fleet expansion program
  - 20 buses a year, of various sizes (including mini-buses)
  - 6 additional CAT buses, including service expansion into East Perth
- Train rolling stock expansion program
  - Existing lines: 5 Electric Multiple Units (EMUs)  
A further 5 EMUs are likely to be required to allow for the expected increase in patronage and an extension to Bellevue
  - South West railway to Jandakot: 10 EMUs (subject to final determination in the Master Plan)
  - Northern Line to Clarkson: 1 EMU
- Ferry expansion program
  - New high-speed ferry for a service between Point Walter and Barrack Street via UWA, if found feasible, otherwise a back-up ferry for the South Perth service.



## 2. Infrastructure

### 2.1 Extensions of the Rapid Transit Network

- Two-directional Buslane on Kwinana Freeway to Murdoch, including widening of the Narrows Bridge, and later extension to Jandakot.
- Rockingham-to-Fremantle Transitway (via Kwinana and Cockburn) - a dedicated 34-kilometre two-directional bus rapid transit facility.
- South West Railway: Stage 1 - Perth-to-Jandakot including 5 new stations
- Perth-to-Morley Transitway, with Stage 1 envisaged as a high occupancy vehicle lane operating in the peak period
- Extension of the metro rail service from Currambine to Clarkson with a new bus/train interchange and Park 'n' Ride facility at Clarkson
- Extension of the metro rail service from Midland to Bellevue with a new Park 'n' Ride facility at Bellevue



## 2.2 Train Station Improvement Program

- New underground station at Subiaco
- New station at Hepburn Avenue including Park 'n' Ride
- Rebuild West Leederville Station as a special events station
- Toilet facilities at 13 main suburban stations
- Station upgrading, including requirements for people with disabilities

## 2.3 Improved bus-train interchanges

To provide more convenient transfer facilities for passengers. (See sample concept plan above)

- |                       |                      |
|-----------------------|----------------------|
| → Oats Street Station | → Bayswater Station  |
| → Maddington Station  | → Bassendean Station |
| → Fremantle Station   | → Midland Station    |
| → Gosnells Station    | → Maylands Station   |

## 2.4 New or improved suburban bus stations

- New en-route station near the Kwinana Hub Shopping Centre to replace the existing station located off Rockingham Road
- A new station at Curtin University (East Entrance) for the Circle Route and a number of terminating services
- Booragoon Station to be relocated and upgraded following the extension of the Garden City complex
- A new facility for Jandakot at the Thomsons Lake District Centre
- A new station in the proposed Transit Mall at Rockingham to replace the existing station
- The existing station at Mirrabooka to be replaced by an upgraded, more open, en-route facility
- A new bus interchange facility for Mandurah is envisaged with the introduction of local Transperth services

## 2.5 Additional Park 'n' Ride facilities for Limited Stop Bus Services

- At the northern fringe of Mandurah for improved Citylink service
- For System 21 services at:
 

- Rockingham	- Ballajura / Koondoola
- Kwinana	- Noranda / Morley
- Osborne Park	- High Wycombe

## 2.6 Bus priority measures

- Bus priority - primarily signal priority - at critical intersections along all *System 21* routes and the Circle Route
- Buslanes in Central Perth as part of the Central Area Access Plan
- Local-area intersection treatments to allow more direct bus routing, including a freight railway level crossing in Cockburn

## 3. Services

There will be a substantial increase in the level of service, almost doubling the current annual service kilometres to nearly 70 million by 2007.

### 3.1 Introduction of 14 *System 21* radial services

- Rockingham to Fremantle
- Landsdale to Perth
- Marangaroo to Perth
- Coolbellup to Perth
- Scarborough to Perth
- Canning Vale to Perth
- Rockingham to Perth
- East Ballajura to Perth, via Morley Interchange
- Merriwa to Joondalup Interchange
- Fremantle Interchange to Perth, via Canning Highway
- Alexander Heights to Perth
- Munster / Coogee to Perth
- Gosnells Station to Perth
- Kalamunda to Perth

### 3.2 Improved, more frequent inter-suburban bus services

- The Circle Route: Fremantle - Murdoch University - Curtin University - Oats Street Station - Belmont Forum - Domestic Airport - Bayswater Station - Morley Interchange - Stirling Station - University of Western Australia - Claremont - Fremantle
- Morley Interchange - Mirrabooka - Warwick Interchange
- Thomsons Lake Interchange - Spearwood - Fremantle
- Fremantle Interchange - Scarborough - Karrinyup - Warwick Interchange
- Belmont Forum - Bayswater - Morley Interchange
- Armadale Interchange - Thomsons Lake Interchange
- Fremantle Interchange - Booragoon - Cannington Interchange
- Midland Interchange - Forrestfield - Cannington Interchange - Curtin University

### 3.3 Introduction of Minilink services

- South-Eastern Suburbs
  - Armadale Interchange - Wungong
  - Canning Vale Prison - Ranford Station
  - Bentley Hospital - Cannington Carousel, via Cannington Interchange
  - Kelmscott Interchange - Panorama Drive
  - Maddington Station - Kenwick Station
  - Maddington Station - Dellar Road
  - Maddington Station - Gosnells Station, via Homestead Road
  - Cannington Carousel - Cannington Interchange - Beckenham
  - Cannington Carousel - Cannington Interchange - Queens Park
  - Maddington Station - Tullamore Avenue - Thornlie Interchange
  - Maddington Station - Fremantle Road - Gosnells Interchange
- Eastern Suburbs
  - Midland Interchange - South Guildford
  - Midland Interchange - Swan District Hospital
  - Kalamunda - Gooseberry Hill
  - Kalamunda - Villa Maria Homes
  - Bayswater - Maylands Station
- North-Eastern Suburbs
  - Mirrabooka Interchange - Australis Avenue
  - Alexander Heights - Warwick Interchange
  - Bayswater - Mount Lawley - Perth
  - Mirrabooka - Warwick Interchange
- North-Western Suburbs
  - Joondalup Interchange - Joondalup Industrial Area
  - Mindarie - Clarkson
  - North Beach - Karrinyup
  - Warwick Interchange - Warwick Grove
- Western Suburbs
  - Stirling - Karrinyup, via Huntriss Road
  - Moline Homes - North Beach Autumn Centre
  - Stirling Interchange - Innaloo - Glendalough Interchange
  - Karrinyup - Weaponess Road - Floreat Forum
- South-Western Suburbs
  - Rockingham - Cooloongup - District Hospital
  - Rockingham - Rockingham Beach
  - Rockingham - Safety Bay

### 3.4 Improved line-haul and feeder bus services

- Simplification of the route network, making principal routes more direct and operating them at all times, thus substantially reducing the number of supplementary routes.
- Introducing many new services to developing areas (see attached area service maps).
- Introducing a network of local Transperth services in Mandurah.
- Much-improved service frequencies, especially during off-peak periods and weekends.
- Introduction of 'memory' timetables with frequency based on exact multiples of an hour (eg, 5, 10, 15, 20 and 30 minutes), making services easier to use.
- Introduction of systematic, easy-to-understand route numbering.

## Service standards - proposed targets

### Service Coverage

Within the Transperth Urban Services Area (TUSA), at least 95% of residents should be located within 500 metres of a regular public transport service. The distance is measured 'as the crow flies' from the line of the route, making allowance for major barriers such as rivers, railways, freeways, etc.

In urban-zoned residential areas with residential densities of R20 or higher (ie, at least 20 home-units per hectare), the service coverage target should ensure that at least 90% of households are within 500 metres walking distance of a bus stop or train station. This will enable most residents of these areas to gain access to a regular service for travel to the City or to a nearby major centre, at most times, without change of vehicle. Excluded from this coverage target would be households in residential estates which are not conducive to public transport access. Outside TUSA, there should be no service coverage target for regular public transport (as distinct from school special services). Instead, service provision should be based on cost-effectiveness.

### Directness of service

Rapid Transit and *System 21* services should be designed so that routes to the major activity centre (ie, Central Perth or the Strategic Regional Centre) do not deviate from the shortest road distance by more than 10%.

Alternatively, if the route is less direct, the in-vehicle travel time by bus or train during peak periods should not be more than 10% longer than the corresponding travel time by car.

Regular Transit services designed to cater for commuters should be routed so that the distance travelled by at least 80% of potential passengers does not exceed 1.2 times the shortest road distance between their home and the City or their nearest Strategic Regional Centre, whichever is the nearer and is served by the route.

For Community Links, the directness criteria should be far less onerous, as the services would focus more on area coverage. Nevertheless, any service for which 80% of potential passengers would have to deviate from the shortest road distance, by more than 50%, to travel to the designated activity centre or transit interchange, should be avoided. An exception to this standard is a short route with a total travel time of no more than 15 minutes.

### Maximum average headways and operating times

The maximum average headways (frequencies) which should be achieved for the various types of service are shown below, together with the minimum operating times.

## Maximum Average Headways in Minutes

Type of service (a)	Metro Rail	System 21	Line Haul	Inter-Suburban	Direct Feeder	Standard Community Link	Minilink
<b>Service Period</b>							
Pre-peak (b)	15	15	30	30	30	-	-
Peak (c)	10	10	15	15	15	30	30
Interpeak (d)	15	15	30	30	30	60	60
Evenings: Mon/Sat (e)	30	30	60	-	60	-	-
Saturday day time (f)	15	30	30	60	60	-	-
Sunday / Pub.holiday (g)	30	60	60	-	60	-	-

(a) See page 17 for explanation of type of service. Services outside TUSA (developmental and semi-rural) will be provided as demand justifies.

(b) Weekday services arriving in the City between 6.30am and 7.30am.

(c) Services arriving in the City from 7.30am to 9.00am and departing from 4.30pm to 6.00pm.

(d) Services between 9.01am and 4.29pm both directions, and the peak contra-flow direction.

(e) From 6.01pm to midnight, and at 1am, 2am and 3am Saturday and Sunday early morning for train and *System 21* services.

(f) From 7.00am to 6.00pm.

(g) Services arriving in the City from 8.45am and departing until 7.00pm (midnight for train and *System 21*).



## Connections with other services

Transferring from one public transport vehicle to another (eg, bus-to-train or bus-to-bus) is perceived by most travellers as a nuisance and is associated with time delays, inconvenience and anxiety. In a low-density environment such as metropolitan Perth, it is inevitable that a good proportion of patrons will have to transfer, for example, from a feeder service to a main line service. It is essential, therefore, that high standards are set at transfer points, both in terms of facilities and information provided and service integration.

## Reliability and punctuality

Reliability is the term used to describe the extent of scheduled services actually operated. If the timetable indicates that there are, say 300 services a week on a particular route and, if in one week, six of these services were cancelled because of operational problems, the service reliability on the route for that week would be 98%.

A more sophisticated measure would relate reliability to the number of passengers affected by a cancellation and to the seriousness of the impact. On bus services, for example, a cancellation during peak periods is likely to affect more passengers, while during the off-peak there would be a greater impact on passengers because of the lower frequency of service.

Reliability can be affected by various factors, including short-term staff shortages (eg, due to illness), vehicle shortages (eg, due to maintenance problems or unexpected repairs), accidents or severe traffic delays on a previous service trip. For these reasons, it is unrealistic and inappropriate (on financial grounds) to set a 100% reliability target and instead it should be set at best practice reliability standards, averaging out at 99%. This applies to bus, train and ferry services.

Separate punctuality targets for late running need to be set for the different types of services, because of the traffic impacts. These should be developed in consultation with service operators, based on the best practice standards, and should apply at nominated timing points along each route. Early departures at any of the timing points must not be allowed.

## Performance Standards - Cost-Effectiveness

Here, the strategic issue is raised as to when a service, or service improvement, can be justified.

Clearly, the service coverage standards set out above are desirable minimum standards to ensure basic accessibility, not a high level of accessibility. Diluting these minimum standards, therefore, is unlikely to be acceptable and would not be practical in many cases because of the limited suitability of the road network.

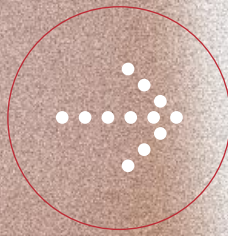
With inevitable limitations on available resources, compromises in service standards are more likely to be made in the areas of frequencies and operating hours, and in the timing of the introduction of a new or extended service.

Realistically, the proposed targets on headways and operating times can only be introduced gradually over time. Thus, the question of an objective priority ranking arises, and it is here that the concept of cost-effectiveness is relevant.

Conceptually, the greater the cost-effectiveness of a service improvement, the higher the priority to introduce the improvement. Alternatively, if the cost-effectiveness of a service falls below a certain level, the service may have to be rationalised. How then should cost-effectiveness be measured?

The first part of the equation, the operating cost of a service change, can readily be estimated on the basis of a change in service kilometres and a known rate per service kilometre which is dependent on the requirement for additional vehicles and the type of vehicle. If the change relates to a new or extended service, as distinct from an increase in frequency, additional infrastructure costs may be necessary.

















To measure the effectiveness of a service is more difficult. It is not simply a question of the total number of passengers carried or the revenue collected in relation to the cost. The former does not take into account the length of the journey, or the type of passenger, if this is indeed a consideration. The latter creates problems because revenue cannot be allocated directly to individual services (because of free transfers), and would put a lower value on concession travellers. Further work is required.



## Proposed Action Plan: Services Improvement Plan

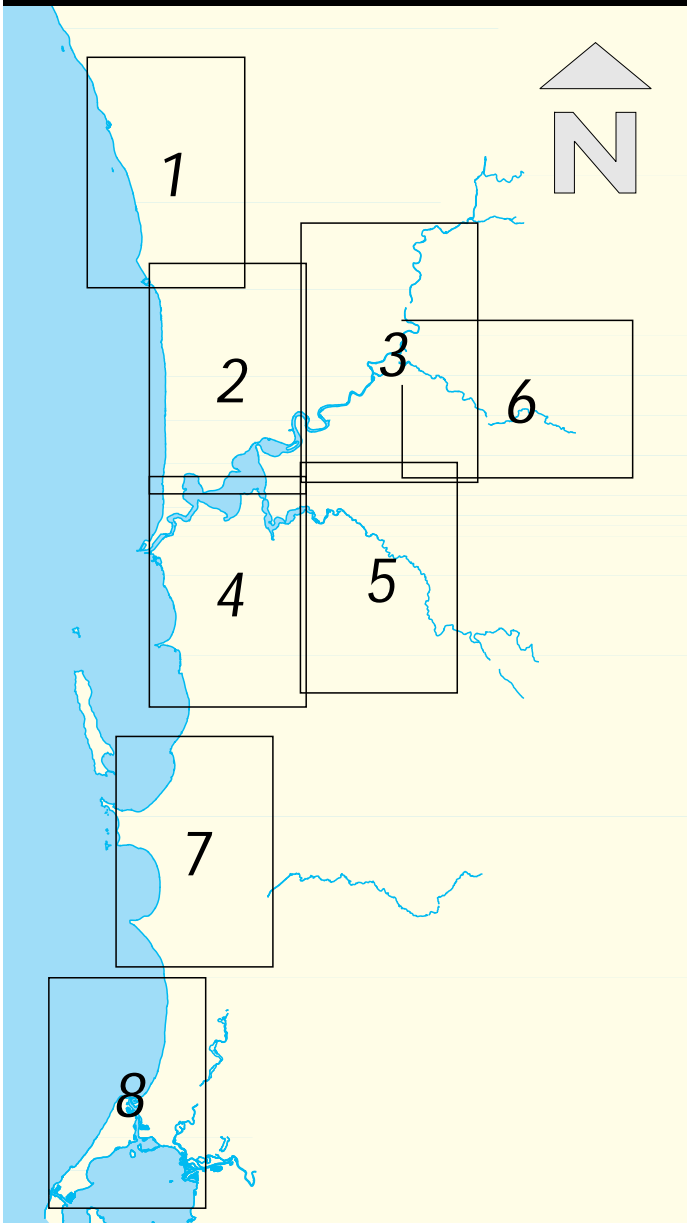
1. Continuously refine the proposed service route network, shown on the attached maps, through an on-going process of consultation with stakeholders' representatives.
2. Prepare a staging plan to gradually implement the 2007 service route network with a minimum of upheaval for existing passengers.
3. Develop and implement as appropriate, a more logical bus route numbering system.
4. Seek community and government support for appropriate targets for service standards, including area coverage, directness, frequency, operating hours, connections, reliability and punctuality.
5. Develop, with the help of stakeholders, cost-effectiveness criteria for the provision of services.
6. Develop and seek government support for a funding strategy to implement the Services Improvement Plan in a timely manner.

# Area Service Maps

	Railway		Bus - Train Interchange
	Bus Transitway		Train Station
	System 21		Bus - Bus Interchange
	Major Linehaul Services		Ferry Jetty
	Circle Route		Transitway Station
	Cross suburban		Park 'n' Ride for Bus System
	Minilink		Shopping Centre
	Semi-rural		
	All other routes		

## Sheet Index

## Sheet Layout



1. Joondalup Area
2. Central Area, Western and Northern Suburbs
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5. South-Eastern Corridor
6. The Hills Area
7. Rockingham Area
8. Mandurah
9. Transperth Urban Services Area (TUSA)

### Legend

Maps do not include special services such as school specials, free Central Area Transit (CAT) Service, the Fremantle Clipper and the Sunset Coaster.

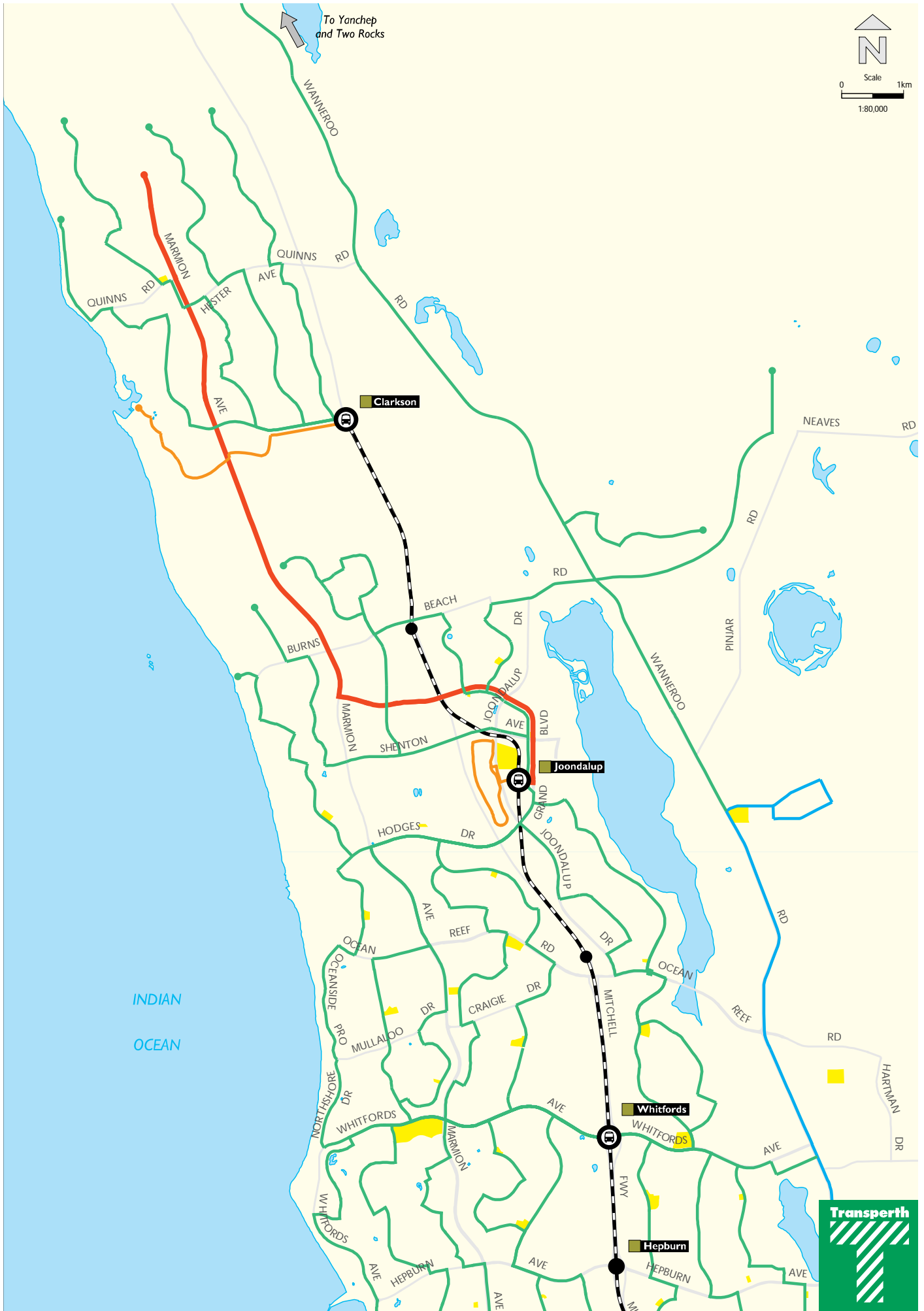
Digital cartography by:

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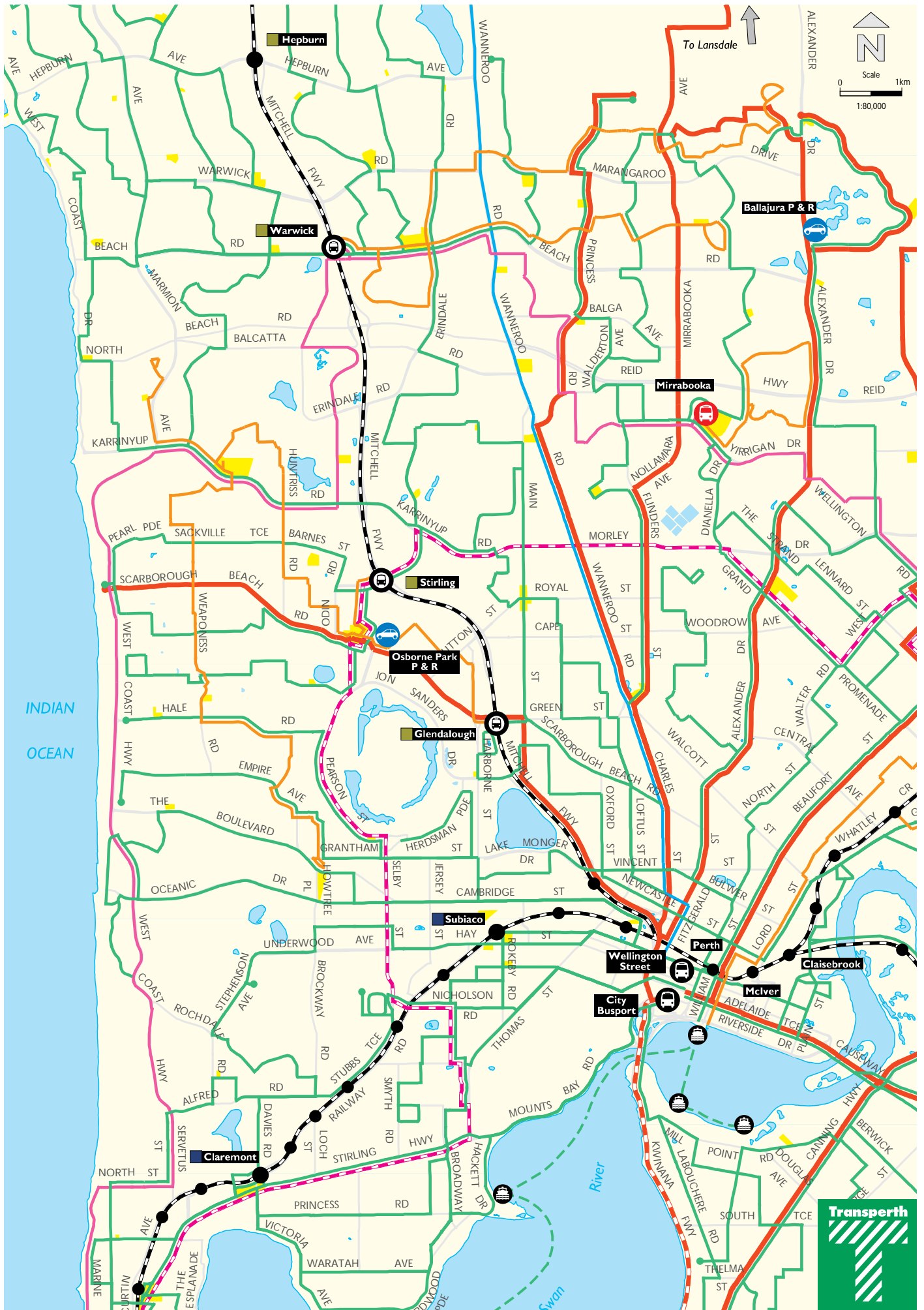


# Sheet 1. Joondalup Area

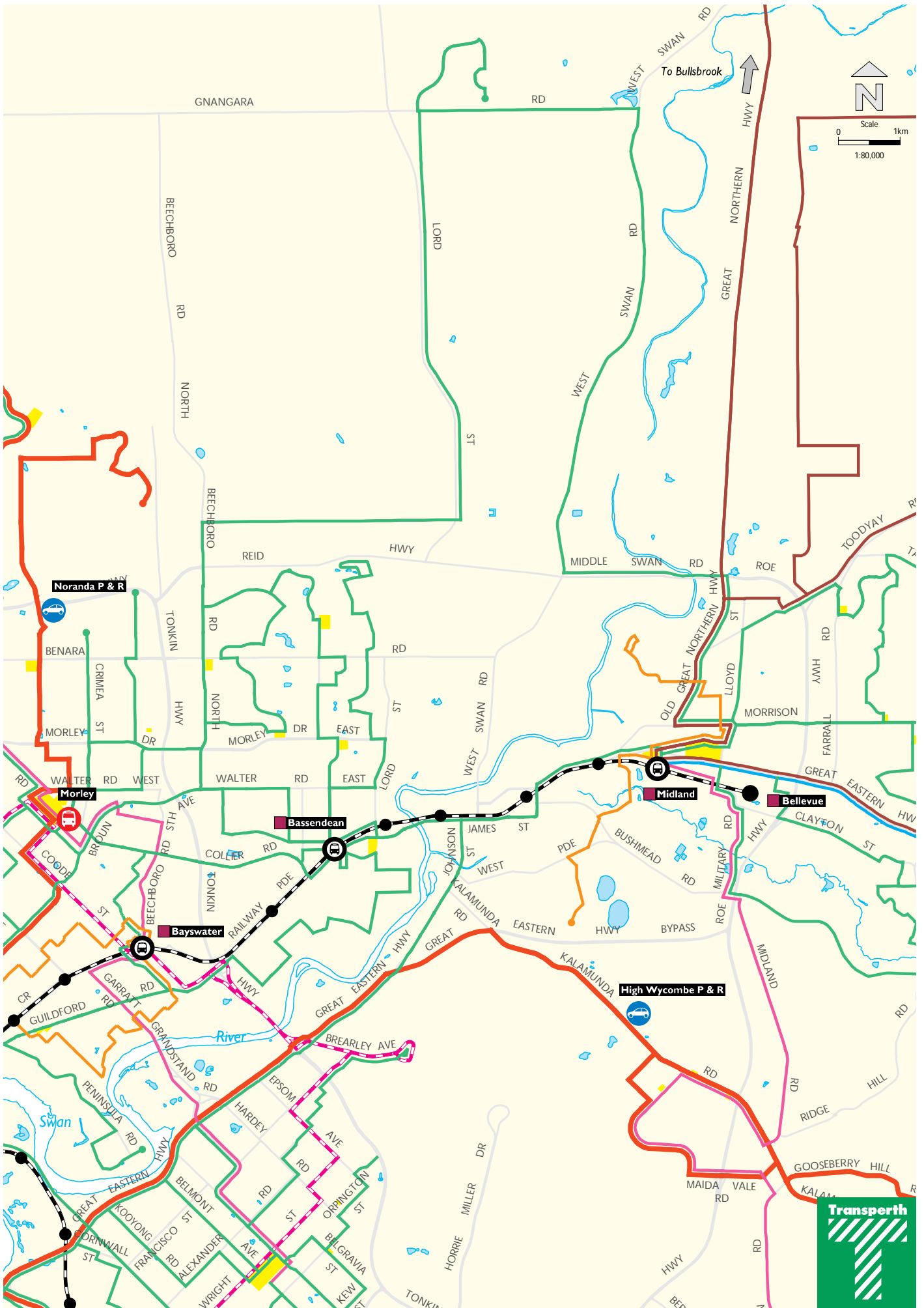




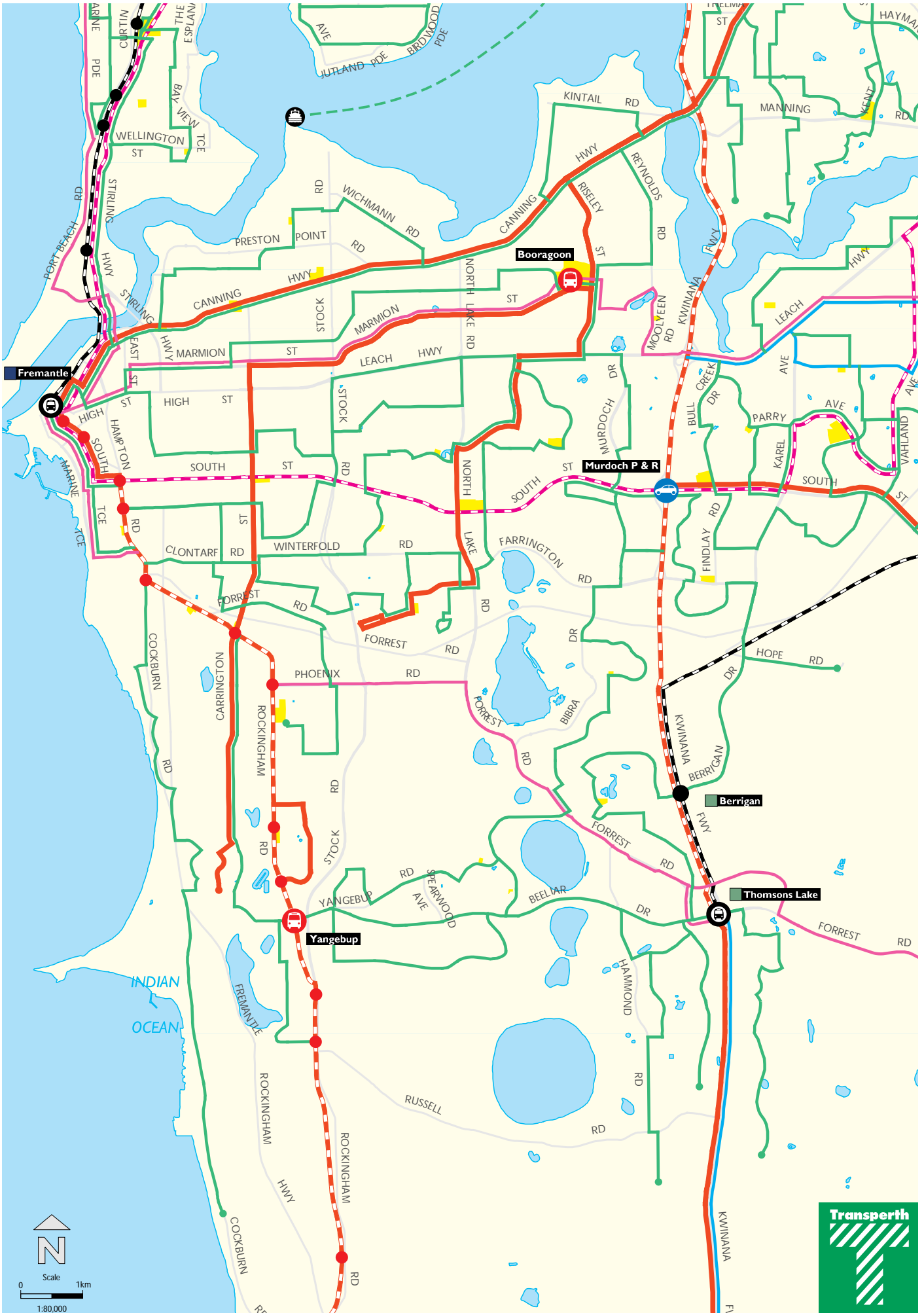
# Sheet 2. Central Area, Western and Northern Suburbs



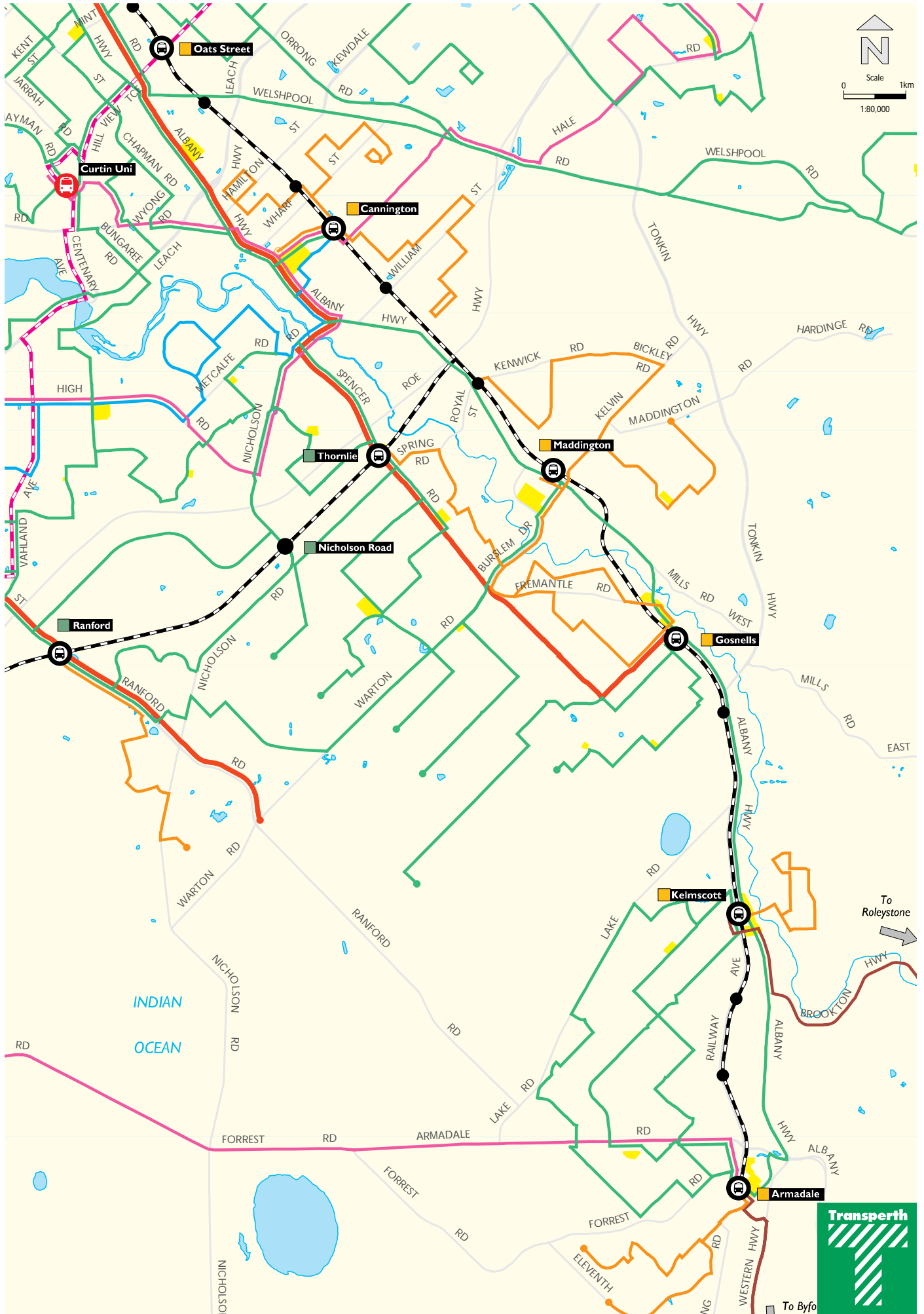
# Sheet 3. North-Eastern Suburbs



# Sheet 4. South-Western Suburbs

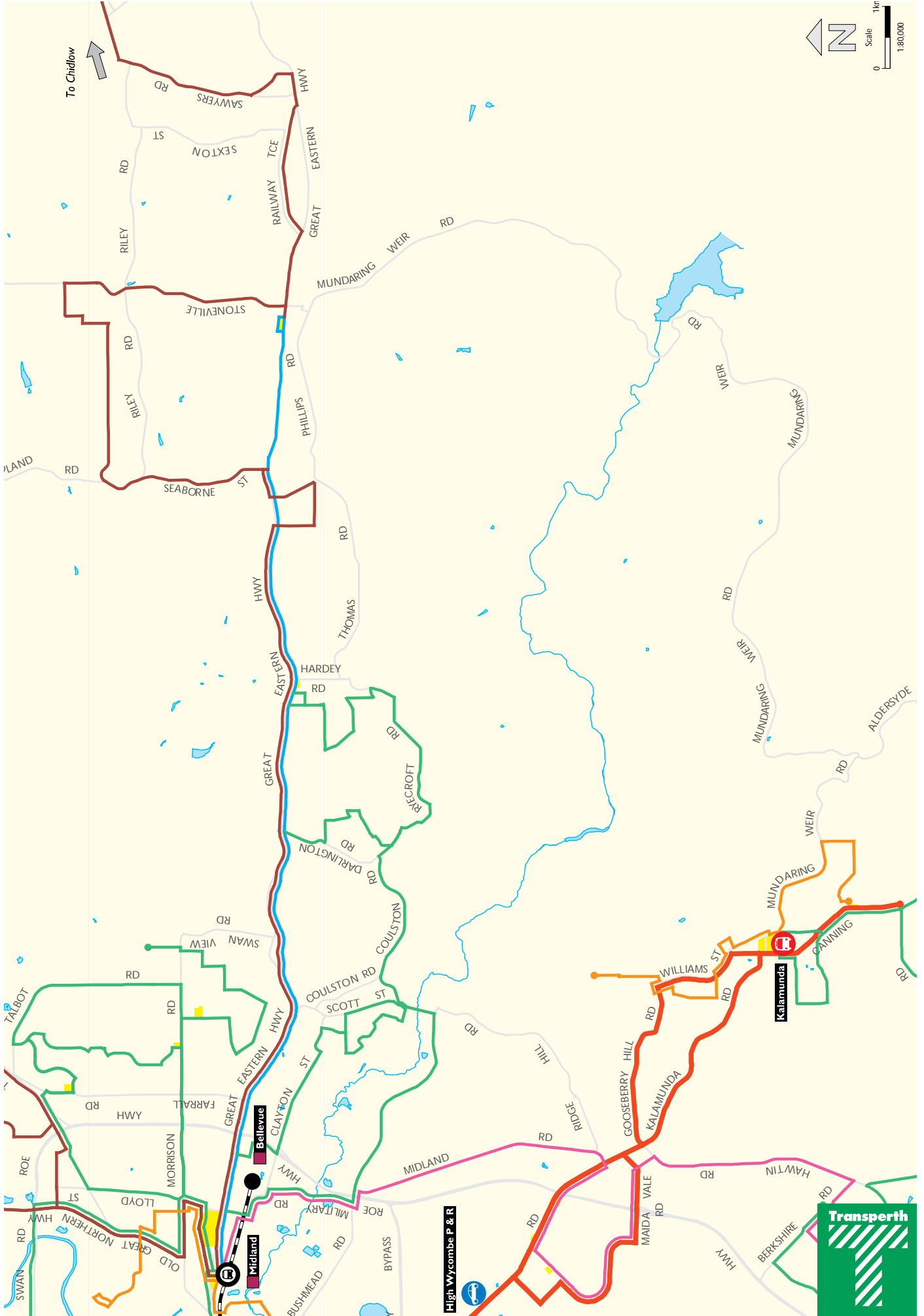


# Sheet 5. South-Eastern Corridor

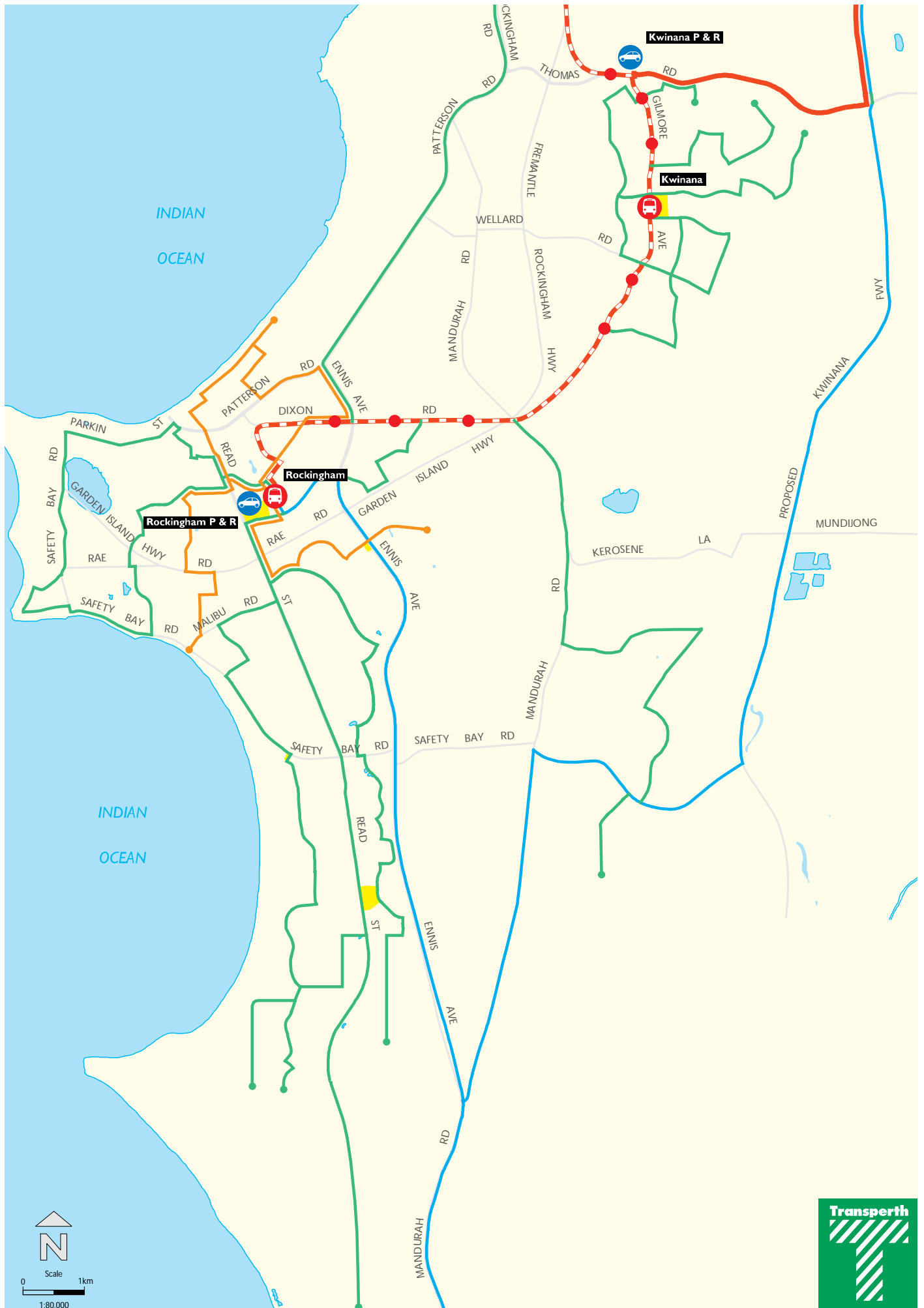




# Sheet 6. The Hills Area



# Sheet 7. Rockingham Area



# Sheet 8. Mandurah



# Sheet 9. Transperth Urban Services Area (TUSA)

- 1998 Approximate Boundary
  - 2007 Proposed Boundary
- By 2007, TUSA will also include part of Mandurah Urban Area

## Metropolitan Region Scheme, Perth, Western Australia

- |  |   |  |
|--|---|--|
| <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> Controlled Access and Other Major Highways | <span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span> Parks and Recreation | <span style="display: inline-block; width: 20px; height: 10px; background-color: orange;"></span> Urban                  |
| <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> Important Regional Roads                  | <span style="display: inline-block; width: 20px; height: 10px; background-color: lightgrey;"></span> Railways         | <span style="display: inline-block; width: 20px; height: 10px; background-color: peachpuff;"></span> Urban Deferred      |
|  | <span style="display: inline-block; width: 20px; height: 10px; background-color: grey;"></span> Port Installations    | <span style="display: inline-block; width: 20px; height: 10px; background-color: cyan;"></span> Central City Area        |
|  | <span style="display: inline-block; width: 20px; height: 10px; background-color: yellow;"></span> State Forests       | <span style="display: inline-block; width: 20px; height: 10px; background-color: purple;"></span> Industrial             |
|  | <span style="display: inline-block; width: 20px; height: 10px; background-color: orange;"></span> Civic and Cultural  | <span style="display: inline-block; width: 20px; height: 10px; background-color: darkpurple;"></span> Special Industrial |
|  | <span style="display: inline-block; width: 20px; height: 10px; background-color: lightblue;"></span> Waterways        | <span style="display: inline-block; width: 20px; height: 10px; background-color: lightgreen;"></span> Rural              |
|  | <span style="display: inline-block; width: 20px; height: 10px; background-color: yellow;"></span> Public Purposes     | <span style="display: inline-block; width: 20px; height: 10px; background-color: green;"></span> Private Recreation      |

Produced by the Land Information Branch, Ministry for Planning, Western Australia. MRS Zones and Reservations amended to 16 May 1997. (Note: This map does not show all details of the Metropolitan Region Scheme. It is a simplification only).

