
APPENDIX 3
TRAFFIC AND TRANSPORT REPORT

East Baldivis District Structure Plan

TRAFFIC AND TRANSPORT REQUIREMENTS

Prepared for
RPS KOLTASZ SMITH

On behalf of
BALDIVIS EAST STAKEHOLDERS TEAM

Prepared by
Uloth and Associates
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TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
1.1 Study Objective	1
2. STUDY FINDINGS AND CONCLUSIONS	2
2.1 Existing Situation	2
2.2 Proposed District Structure Plan and Future Traffic Flows	2
2.2.1 Land Use and Traffic Generation	3
2.2.2 Future Traffic Forecasts	3
2.3 Public Transport Facilities	3
2.4 Future Road Hierarchy	4
2.4.1 Baldivis Road	4
2.4.2 Structure Plan Roads	4
2.5 Intersection Spacing Along Baldivis Road	4
3. RECOMMENDATIONS	6
TECHNICAL APPENDIX	
A.1 EXISTING TRAFFIC	A-2
A.2 PROPOSED STRUCTURE PLAN AND FUTURE TRAFFIC FLOWS	A-3
A.3 CURRENTLY PLANNED ROAD HIERARCHY AND FUTURE BUS ROUTES	A-4

LIST OF TABLES

	<u>Page</u>
TECHNICAL APPENDIX	
A.1 Proposed Land Use Data – East Baldivis District Structure Plan	A-3

LIST OF FIGURES

	<u>Follows Page</u>
1. Locality Plan – Proposed East Baldivis District Structure Plan	1
2. Recommended Roads and Intersections East Baldivis District Structure Plan (North of Zig Zag Road)	6
3. Recommended Roads and Intersections East Baldivis District Structure Plan (South of Zig Zag Road)	6
4. Resultant Future Road Hierarchy and Bus Route – East Baldivis District Structure Plan	6
5. Recommended Cross-Sections – Baldivis Road	6

TECHNICAL APPENDIX

A.1 Existing Weekday Traffic Flows – East Baldivis District Structure Plan	A-2
A.2 Proposed East Baldivis District Structure Plan	A-3
A.3 Long Term Development Traffic – East Baldivis District Structure Plan	A-3
A.4 Future Long Term Total Traffic East Baldivis Structure Plan - North of Zig Zag Road	A-3
A.5 Future Long Term Total Traffic East Baldivis Structure Plan - South of Zig Zag Road	A-3
A.6 Currently Proposed Road Hierarchy and Bus Routes North Baldivis Structure Plan	A-4

1. INTRODUCTION

The *East Baldivis District Structure Plan - Traffic and Transport Requirements* report was initially prepared by Uloth and Associates in February 2010, before being revised to reflect the updated Structure Plan in May 2011.

A key assumption in the preparation of that report was that the future intersection at Baldivis Road - Mundijong Road would be constructed as a 4-way intersection, controlled by either traffic signals or a roundabout. However, it has since been decided that Baldivis Road should be downgraded at Mundijong Road to a pair of staggered T-junctions, with Mundijong Road as the priority route.

Uloth and Associates has therefore again been commissioned by RPS Koltasz Smith, on behalf of the Baldivis East Stakeholders Team, to update the previously submitted Traffic and Transport Requirements report, to reflect this modification.

The Structure Plan area is located between Baldivis Road and Kwinana Freeway, from Millar Road at the northern end to Safety Bay Road at the southern end, as shown in the Locality Plan in Figure 1.

1.1 STUDY OBJECTIVE

The objective of this study is to update the Traffic and Transport Requirements report to reflect the proposed downgrading of Baldivis Road at Mundijong Road.



Locality Plan
PROPOSED EAST BALDVIS DISTRICT STRUCTURE PLAN

FIG.
1

2. STUDY FINDINGS AND CONCLUSIONS

The study findings and conclusions regarding the traffic and transport requirements for the proposed East Baldivis District Structure Plan are presented and discussed in this chapter. Additional information is provided within the Technical Appendix.

2.1 EXISTING SITUATION

- The existing road network in the vicinity of the proposed East Baldivis District Structure Plan is as shown in the Locality Plan in Figure 1. Baldivis Road south of Millar Road is a two-lane undivided rural road with an 80 kilometre per hour speed limit, reducing to 70 kilometres per hour just north of Zig Zag Road. Further south, between Pemberton Boulevard and Key Close, Baldivis Road has begun a conversion to an urban District Distributor road, with kerbs and street lighting, and a partial service road.
- Mundijong Road is a two-lane road extending east from Baldivis Road, with an interchange at Kwinana Freeway. Safety Bay Road is a four lane divided arterial road with a dual lane roundabout at its intersection with Baldivis Road and a signalised diamond interchange at Kwinana Freeway.
- Kerosene Lane, Eighty Road and Fifty Road are also 2-lane rural roads, extending west from Baldivis Road, while several new access roads to residential developments have also been constructed on the western side of Baldivis Road, at the southern end near Safety Bay Road.
- At present, Mundijong Road and Baldivis Road would be classified as District Distributor (A) roads within a Functional Road Hierarchy, while Kerosene Lane, and Eighty Road/Fifty Road could be District Distributor (B) roads. However, in the long term when the urban areas within the North and South Baldivis Structure Plans are fully developed, it is expected that the new Nairn Drive will be a District Distributor (A) road, together with the extension of Mundijong Road west of Baldivis Road, and that Baldivis Road, Kerosene Lane and Eighty Road/Fifty Road will all be downgraded.
- Figure A.1 in the Technical Appendix shows existing weekday traffic flows in the vicinity of the proposed structure plan, based on traffic counts carried out by Main Roads WA. It is important to note that Kwinana Freeway was extended south of Safety Bay Road in September 2009, so the traffic flows shown on Safety Bay Road and Baldivis Road south of Safety Bay Road have since reduced significantly.

2.2 PROPOSED DISTRICT STRUCTURE PLAN AND FUTURE TRAFFIC FLOWS

The proposed East Baldivis District Structure Plan is shown in Figure A.2 in the Technical Appendix.

The plan consists of two distinct precincts, being north and south of Mundijong Road. However, for analysis purposes the overall structure plan has been broken down into three areas, with the area south of Mundijong Road being split into 2, as indicated in the Locality Plan in Figure 1.

It is important to note in Figure A.2 that there is a cross-hatched area in the centre of the plan, identified as 'School Sites/Open Space Precinct'. This area will have an east-west road connection to Baldivis Road, although the specific location of this connection is yet to be finalised. For analysis purposes, this traffic report assumes the connection will be located at Zig Zag Road, forming a 4-way intersection (with a roundabout) at Monument Boulevard. However, the location could be modified without affecting the outcomes of this report, as long as minimum intersection spacing requirements along Baldivis Road are maintained.

It is also important to note that although not shown as part of the District Level road network, the traffic forecasts discussed below in Section 2.2.2 also assume a local road connection to Baldivis Road at Ingram Road.

2.2.1 Land Use and Traffic Generation

- The overall District Structure Plan proposes a total of 4,150 residential lots, as indicated in Table A.1 in the Technical Appendix, with 1,310 lots in Area A, 1,510 lots in Area B and 1,330 lots in Area C. The plan also includes a primary school in each of the 3 Areas, plus a High School within Area 2.
- It is estimated that the residential developments could generate a total of 33,200 vehicle trips per day (based on 8 trips per dwelling). However, it is expected that the internal trips made to the Primary Schools will approximately balance with the trips drawn to the High School from outside the Structure Plan area. With no retail, business or leisure land uses proposed it is therefore estimated that 33,200 vehicle trips per day will be added to the external road network from the proposed Structure Plan area.

2.2.2 Future Traffic Forecasts

- In order to assign the anticipated traffic generation to the surrounding road network, the total traffic was broken down into various trip types and a separate external distribution of traffic was developed for each trip type, based on the location of surrounding attractions.
- With the proposed downgrading of Baldivis Road south of Mundijong Road due to the introduction of staggered junctions at this location, it is assumed that some north-south traffic previously assumed to use Baldivis Road will now be reassigned to use a proposed new road link between Kerosene Lane and Mundijong Road (approximately midway between Baldivis Road and Nairn Drive). It is also assumed that traffic travelling west from the Structure Plan area south of Mundijong Road will also use this new road.
- The resulting assignment of the overall development traffic is shown in Figure A.3 in the Technical Appendix.
- It can be seen in Figure A.3 that Mundijong Road west is expected to carry the highest proportion of Structure Plan traffic at 29 percent, followed by Kwinana Freeway north at 17 percent. Significant traffic flows from the Structure Plan area will also access the Baldivis Town Centre via the planned extension of the main street, as well as the North Baldivis Neighbourhood Centre via Fifty Road.
- Figures A.4 and A.5 in the Technical Appendix then show the anticipated total future traffic flows, combining the future structure plan development traffic with additional 'non-development' traffic as derived from Main Roads WA traffic forecasts for 2031 (as published in the January 2012 Baldivis Road Study Update).
- It can be seen in Figure A.4 that Baldivis Road is expected to carry between 13,000 and 16,000 vehicles per day south of Millar Road west, decreasing to 7,500 vehicles per day south of Mundijong Road.
- Figure A.5 then shows that traffic rises again to approximately 11,000 vehicles per day between Kerosene Lane and Fifty Road, and up to 14,600 vehicles per day near Safety Bay Road.
- It can also be seen in Figures A.4 and A.5 that the east-west section of several proposed Structure Plan access roads will carry in excess of 3,000 vehicles per day, with one road (Road 4, opposite Kerosene Lane) reaching 6,100 vehicles per day.

2.3 PUBLIC TRANSPORT FACILITIES

- There are currently no bus routes within the Baldivis Structure Plan areas, between Millar Road and Safety Bay Road. However, as residential development continues to occur, additional bus services will be introduced in this area.

- The ‘Baldivis Road Study Update - Traffic and Infrastructure Report’ of January 2012 identifies two future bus routes travelling north of Safety Bay Road through the North Baldivis and East Baldivis Structure Plan areas. Future Transperth Route number 568 is planned to service the area west of Baldivis Road (terminating at the Local Centre on Fifty Road) while Route 569 is planned to service the area east of Baldivis Road (terminating in the vicinity of Zig Zag Road), as shown in Figure A.6 in the Technical Appendix, with the potential for either of these Routes to extend north along Baldivis Road to Wellard Road.

2.4 FUTURE ROAD HIERARCHY

2.4.1 Baldivis Road

- Baldivis Road has previously been identified (as part of the North Baldivis Structure Plan) as a future Neighbourhood Connector, along with Kerosene Lane, Eighty Road and Fifty Road, following the construction of Nairn Drive and the extension of Mundijong Road as District Distributor (A) roads in the long term.
- However, with traffic flows increasing to as much as 16,000 vehicles per day with the proposed East Baldivis development, Baldivis Road will need to remain as a District Distributor (B) road (or an Integrator B under Liveable Neighbourhoods), with provision for a 2-lane boulevard treatment and allowance for extra widening for turn lanes at intersections.
- This could be accommodated within a road reserve width of 20 metres between intersections (where no turn lanes are required), but would need a minimum of 24 metres to accommodate a 6 metre median including right turn lanes at intersections. For Baldivis Road, this would require the inclusion of a 4 metre verge within the Tramway Reserve, as indicated in the recommended cross-section in Figure 5 in Chapter 3 Recommendations. However this does not include any provision for left turn lanes, which would have to be constructed within the Tramway Reserve if deemed to be necessary.

2.4.2 Structure Plan Roads

- The east-west structure plan roads with between 3,000 and 7,000 vehicles per day at their connections to Baldivis Road should be classified as Neighbourhood Connector A roads (with 22 to 23 metre road reserves) east of Baldivis Road. The remaining structure plan roads should all be classified Neighbourhood Connector B (with road reserves of 18 to 20 metres), since they either carry a bus route or they connect to Baldivis Road. The only exception is the north-south road (Road 1) within Area 1 to the north of Mundijong Road, which should be Access Street B (with a road reserve of 18 metres).
- Lower order roads (still to be determined at a more detailed subdivision stage) should then be identified as Access Streets B, C or D (with road reserves between 14 and 18 metres).
- The recommended future road hierarchy for the East Baldivis Structure Plan is shown in Figure 4 in Chapter 3 Recommendations.

2.5 INTERSECTION SPACING ALONG BALDIVIS ROAD

- With Baldivis Road as an Integrator B, it is recommended that it should be constructed as a 2 lane boulevard with a narrow median, but with provision to widen the median to accommodate right turn lanes at intersections.
- Liveable Neighbourhoods suggests that a minimum intersection spacing of 60 metres is appropriate for an Integrator B. However, taking into account safe intersection sight distance requirements (as

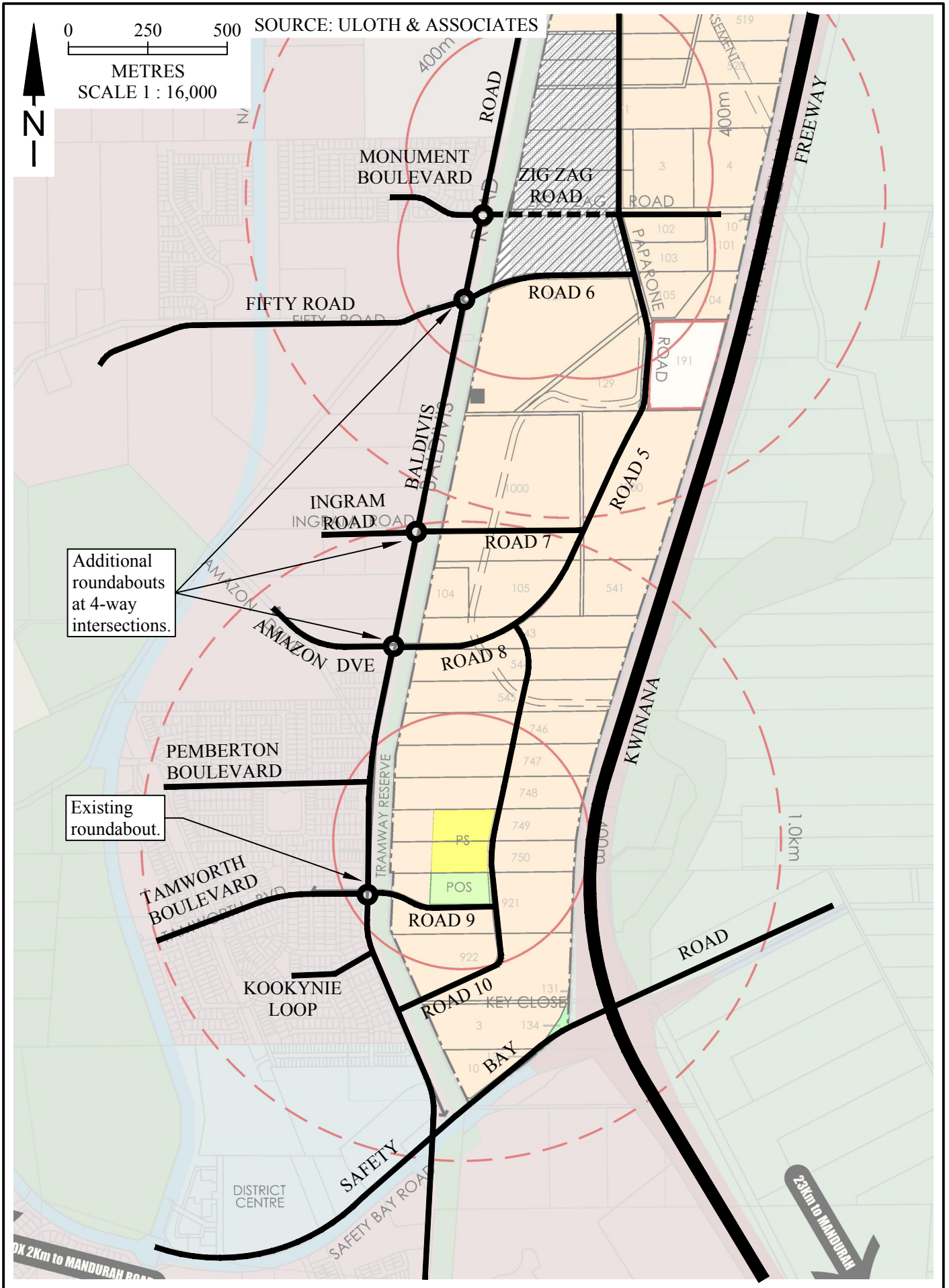
specified by Austroads), it is recommended that an intersection spacing of 60 metres should only be used for a junction restricted to left-in/left-out movements, and spacing between median openings should be at least 115 metres for 60 kilometres per hour, 150 metres for 70 kilometres per hour or 180 metres for 80 kilometres.

- All of the proposed access roads for the East Baldivis Structure Plan satisfy these minimum intersection spacing requirements. A number of roundabouts will also be required as part of the Structure Plan development, as shown in Figures 2 and 3 in Chapter 3 Recommendations.

3. RECOMMENDATIONS

The recommended road network and intersections for the proposed East Baldivis District Structure Plan are shown in Figures 2 and 3, as follows:

- It is recommended to install roundabouts at the following locations along Baldivis Road, as indicated in Figures 2 and 3:
 - Kerosene Lane/Road 4
 - Monument Boulevard/ Zig Zag Road
 - Fifty Road/Road 6
 - Ingram Road/Road 7
 - Amazon Drive/Road 8
- It is recommended to also make provision for an additional roundabout at Road 3, as indicated in Figure 2, in order to accommodate the existing access to Rockingham Regional Memorial Park.
- It is recommended to classify Baldivis Road as a District Distributor B (or Integrator B under Liveable Neighbourhoods), as shown in Figure 4.
- It is therefore recommended to construct Baldivis Road as a 2-lane divided boulevard in the long term, with cross-sections as shown in Figure 5.
- It can be seen in Figure 5 that the recommended cross-section can be accommodated within the existing 20 metre road reserve in mid-block sections where no turning lanes are required. However, at intersections with right turn lanes it is recommended that the 4 metre verge be incorporated within the adjacent Tramway Reserve. (If left turn lanes are also deemed necessary, then these would have to be constructed within the Tramway reserve).
- It is recommended that buses should be accommodated along Baldivis Road north of Kerosene Lane, with suitable pedestrian links from the Structure Plan Area, as indicated in Figure 4. Buses should then continue through the middle of the Structure Plan Area from Road 4 to Road 10, as also shown in Figure 4.
- It is recommended that 4 of the east-west roads accessing the proposed Structure Plan development off Baldivis Road should be classified as Neighbourhood Connector A roads under Liveable Neighbourhoods (with road reserves of 22 to 23 metres), in order to accommodate the anticipated traffic flows. These roads are Roads 3, 4, 6 and 7 in Figure 4.
- All other Structure Plan roads south of Mundijong Road should be classified as Neighbourhood Connector B roads (with 20 metre reserves), since they either carry the proposed Bus Route or they connect to Baldivis Road.
- The extension of Road 1 through the Structure Plan north of Mundijong Road should be classified as Access Street B (with a road reserve of 16 to 18 metres), since it has traffic flows of less than 3,000 vehicles per day and no Bus Route.

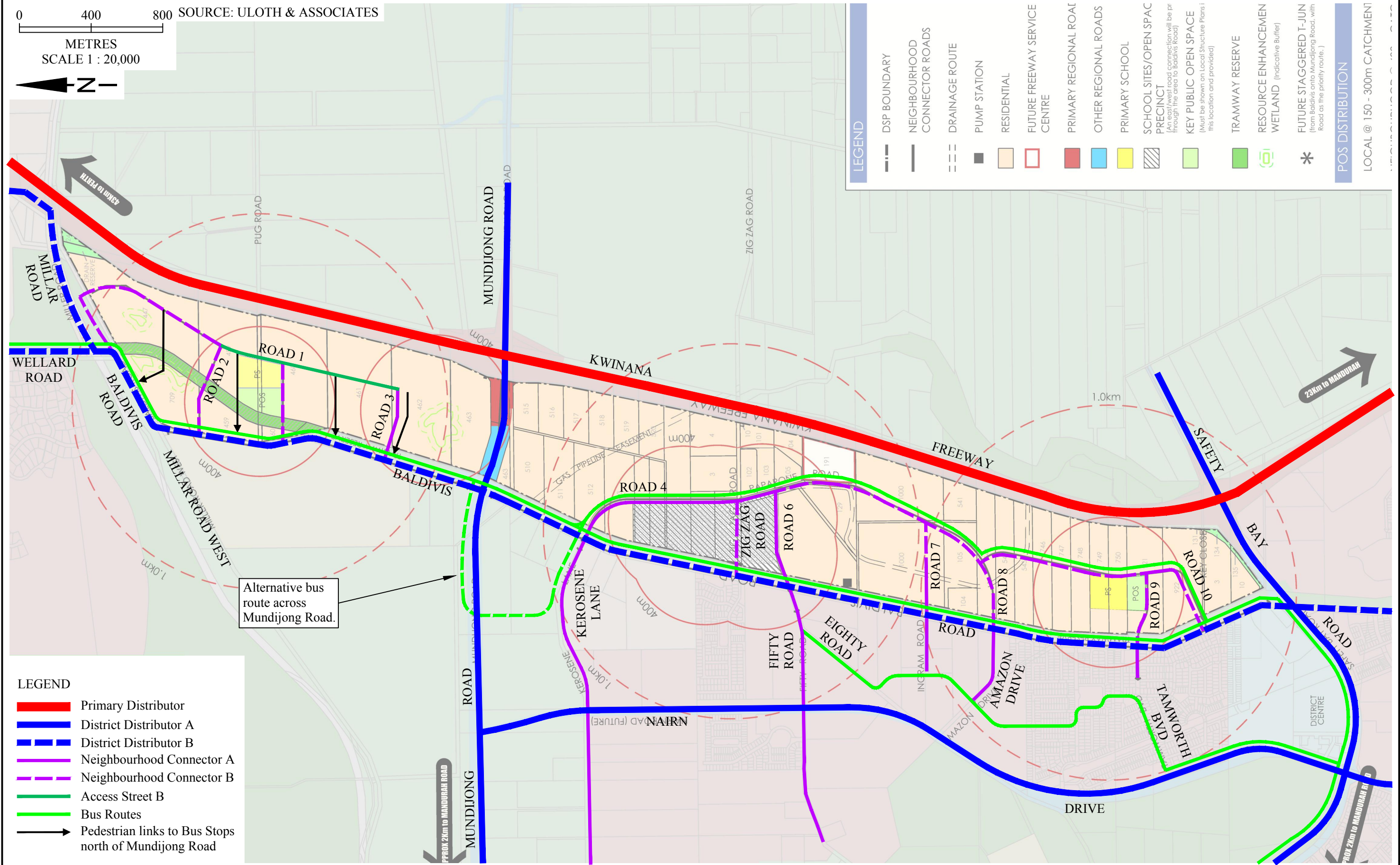


Recommended Roads and Intersections
EAST BALDIVIS STRUCTURE PLAN - SOUTH OF ZIG ZAG ROAD

FIG. 3

0 400 800 SOURCE: ULOTH & ASSOCIATES

METRES
SCALE 1 : 20,000



LEGEND

- DSP BOUNDARY
- NEIGHBOURHOOD CONNECTOR ROADS
- DRAINAGE ROUTE
- PUMP STATION
- RESIDENTIAL
- FUTURE FREEWAY SERVICE CENTRE
- PRIMARY REGIONAL ROAD
- OTHER REGIONAL ROADS
- PRIMARY SCHOOL
- SCHOOL SITES/OPEN SPACE
- PRECINCT (An elevated road connection will be provided through the area to Baldyvis Road)
- KEY PUBLIC OPEN SPACE (Must be shown on Local Structure Plans at this location and provided)
- TRAMWAY RESERVE
- RESOURCE ENHANCEMENT
- WETLAND (Indicative Buffer)
- FUTURE STAGGERED T-JUN (from Baldyvis onto Mundijong Road, with Road as the priority route.)

POS DISTRIBUTION

LOCAL @ 150 - 300m CATCHMENT

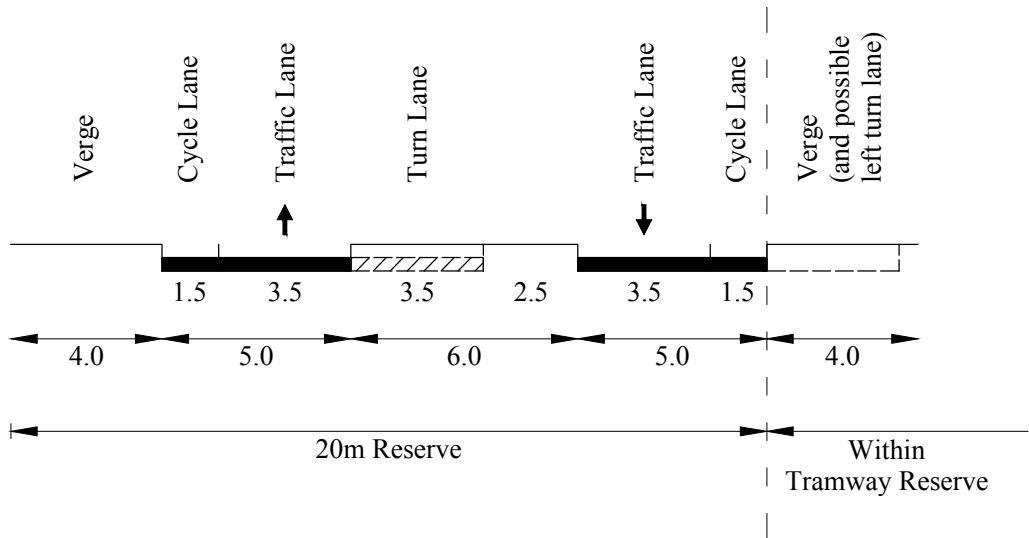
LEGEND

- Primary Distributor
- District Distributor A
- District Distributor B
- Neighbourhood Connector A
- Neighbourhood Connector B
- Access Street B
- Bus Routes
- Pedestrian links to Bus Stops north of Mundijong Road

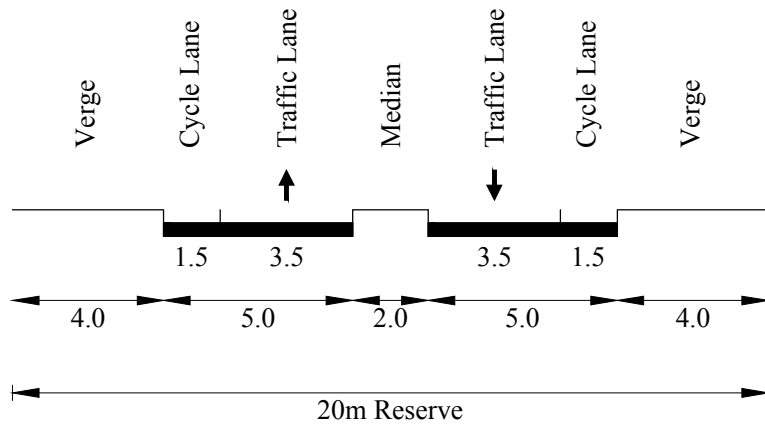
Alternative bus route across Mundijong Road.

Resultant Future Road Hierarchy and Bus Route
EAST BALDIVIS DISTRICT STRUCTURE PLAN

FIG. 4



AT 3-WAY JUNCTIONS (WITH TURN LANES)



REDUCED WIDTH FOR MIDBLOCK SECTIONS

Recommended Cross-Sections

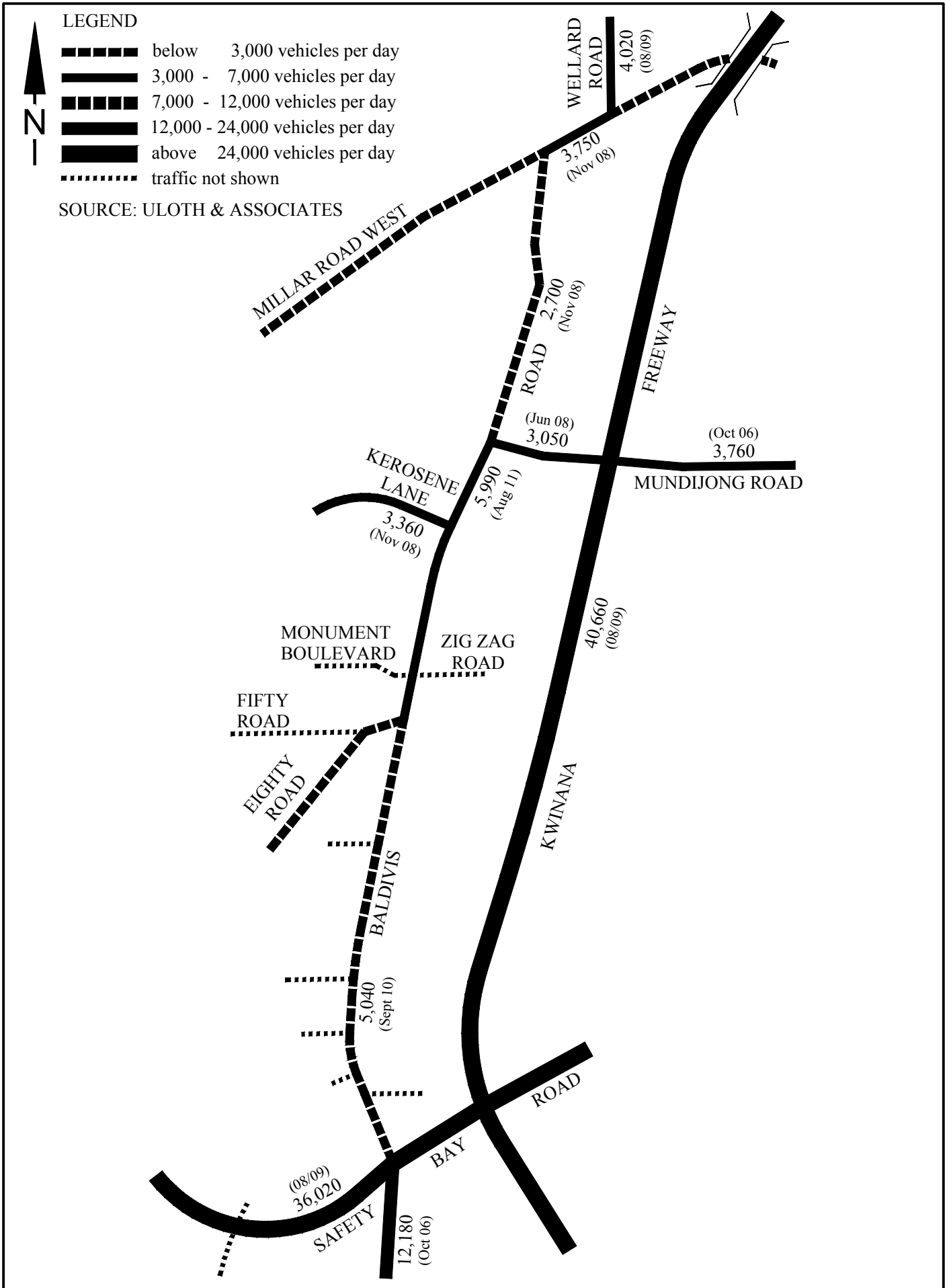
BALDIVIS ROAD

TECHNICAL APPENDIX

The Technical Appendix documents existing traffic flows, together with the proposed East Baldivis District Structure Plan, the proposed future land use data and the corresponding future traffic flows.

A.1 EXISTING TRAFFIC

Figure A.1 shows existing weekday traffic flows in the vicinity of the proposed structure plan, as provided by Main Roads WA. However, it is important to note that some of the traffic counts shown were carried out prior to the extension of Kwinana Freeway south of Safety Bay Road in September 2009.



Existing Weekday Traffic Flows
 PROPOSED EAST BALDIVIS DISTRICT STRUCTURE PLAN

FIG.
 A.1

A.2 PROPOSED STRUCTURE PLAN AND FUTURE TRAFFIC FLOWS

Figure A.2 shows the proposed East Baldivis Structure Plan as prepared by RPS Koltasz Smith, while Table A.1 shows the anticipated future land use.

Figure A.3 shows the assignment of the Structure Plan development traffic flows to the surrounding road network, while Figures A.4 and A.5 show the total future traffic flows both north and south of Zig Zag Road, respectively.

TABLE A.1
PROPOSED LAND USE DATA
EAST BALDIVIS DISTRICT STRUCTURE PLAN

AREA	PROPOSED LAND USE	
	Residential Lots	Other
A	1,310 Lots	1 Primary School
B	1,510 Lots	1 Primary School 1 High School
C	1,330 Lots	1 Primary School
Total	4,150 Lots	3 Primary Schools 1 High School

Source: RPS Koltasz Smith

Note:

1. Further investigation of the Resource Enhancement Wetland & Buffers to be undertaken as part of the preparation of Local Structure Plans.
2. Further investigation of the Noise Attenuation along Mundijong Road to be undertaken as part of the preparation of Local Structure Plans.
3. Further investigation of the Dampier to Bunbury pipeline buffer to be undertaken as part of the preparation of Local Structure Plans.
4. Bush Fire Strategy shall be prepared as part of the preparation of Local Structure Plans.

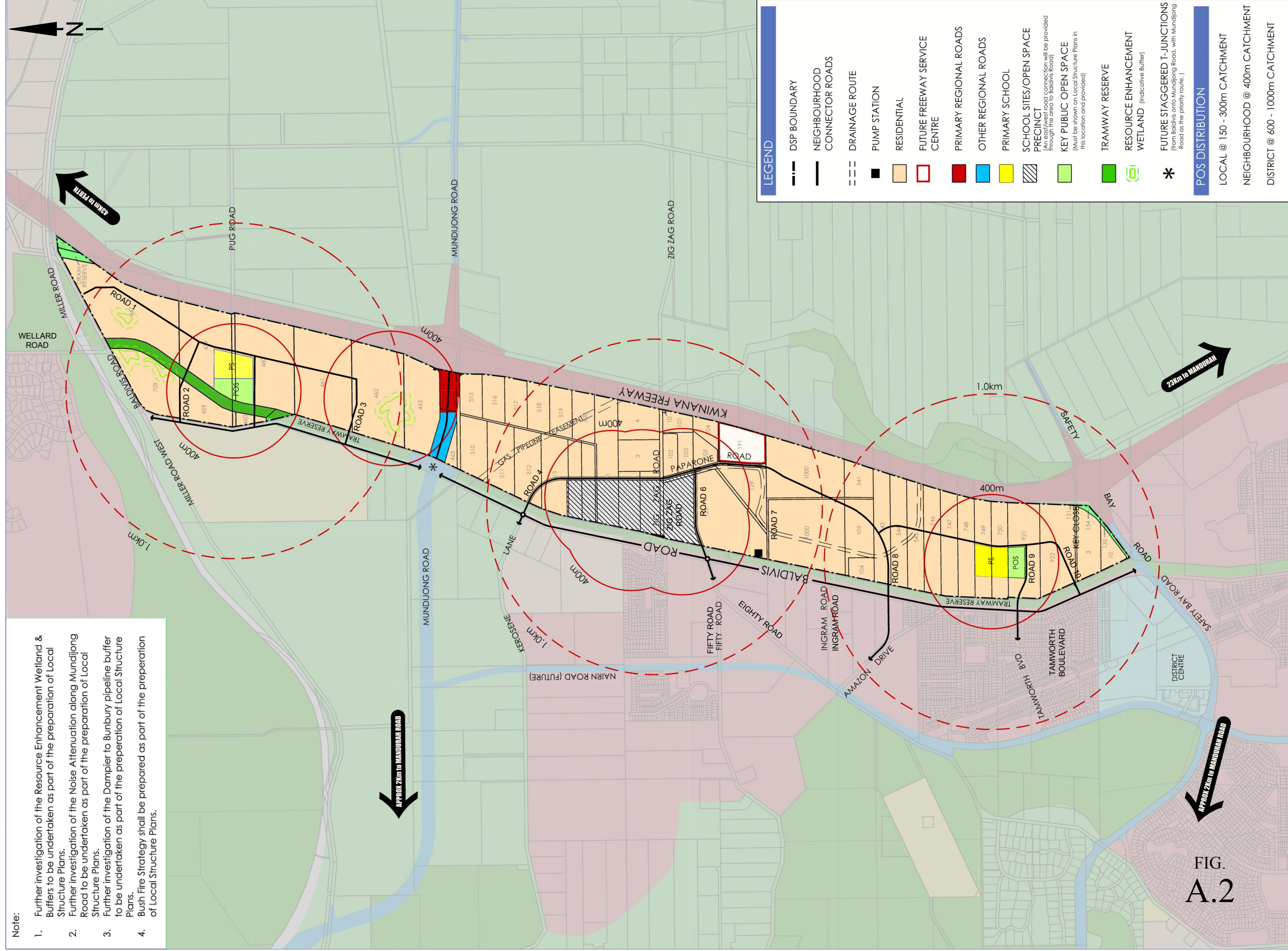
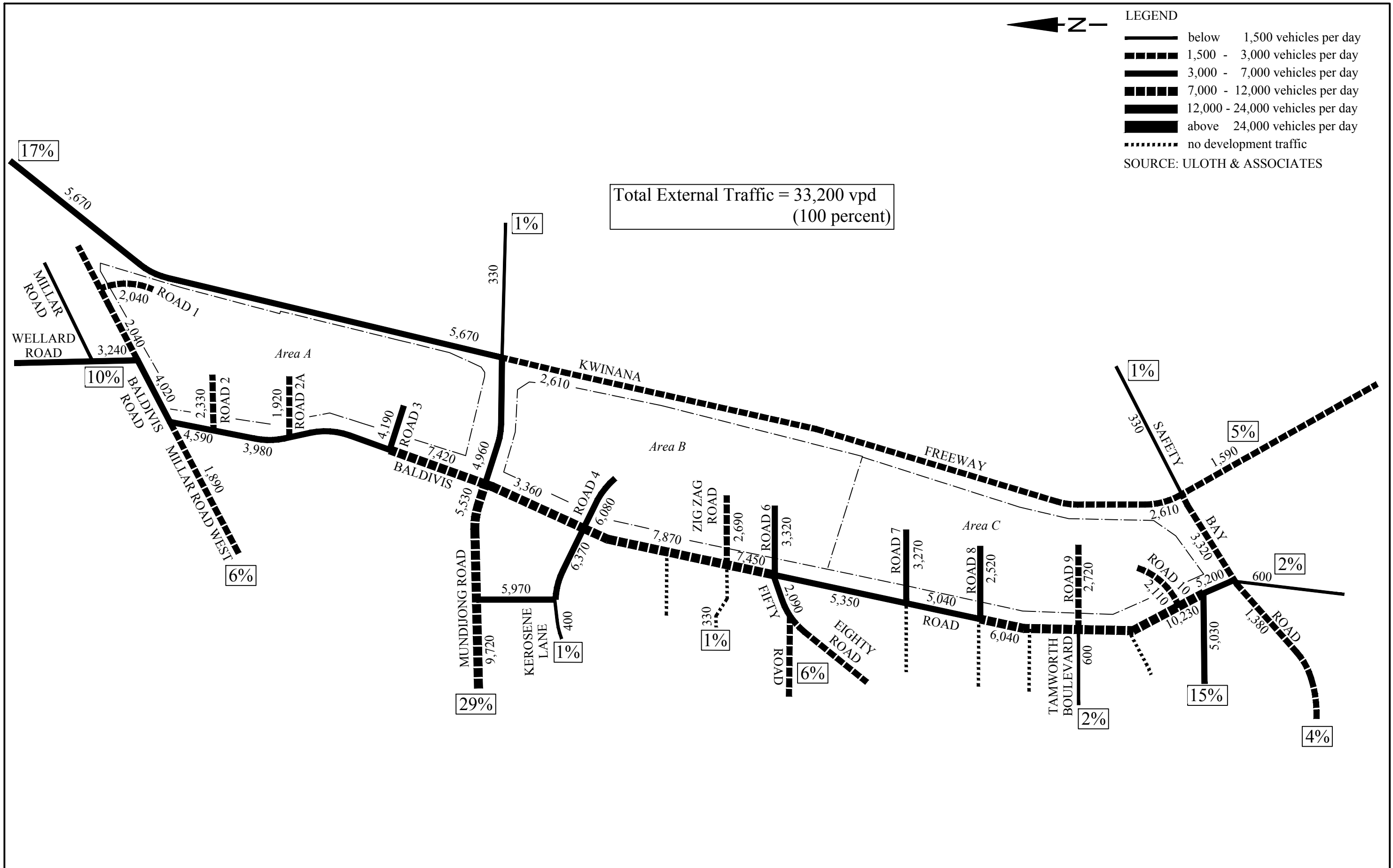
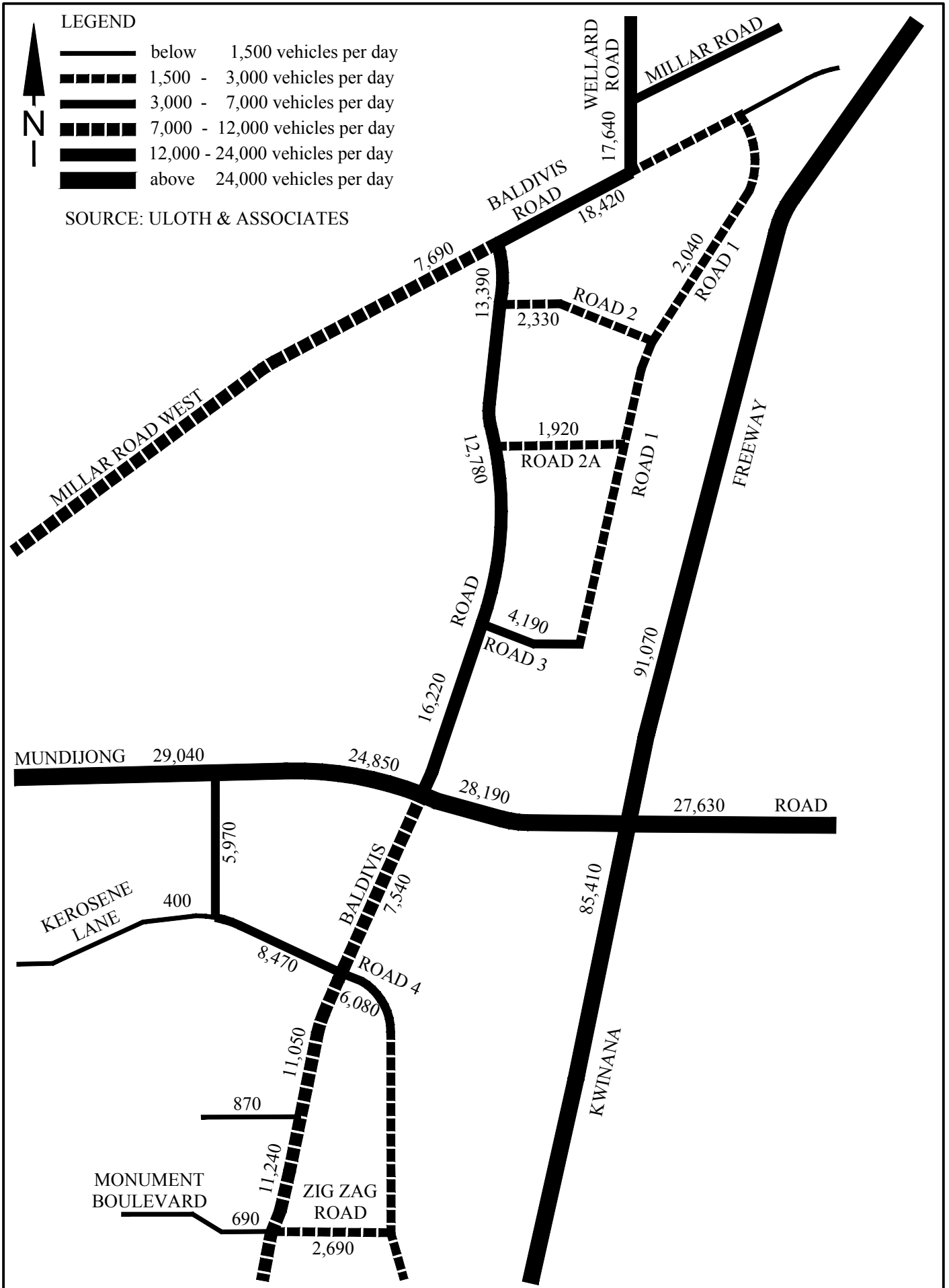


FIG. A.2



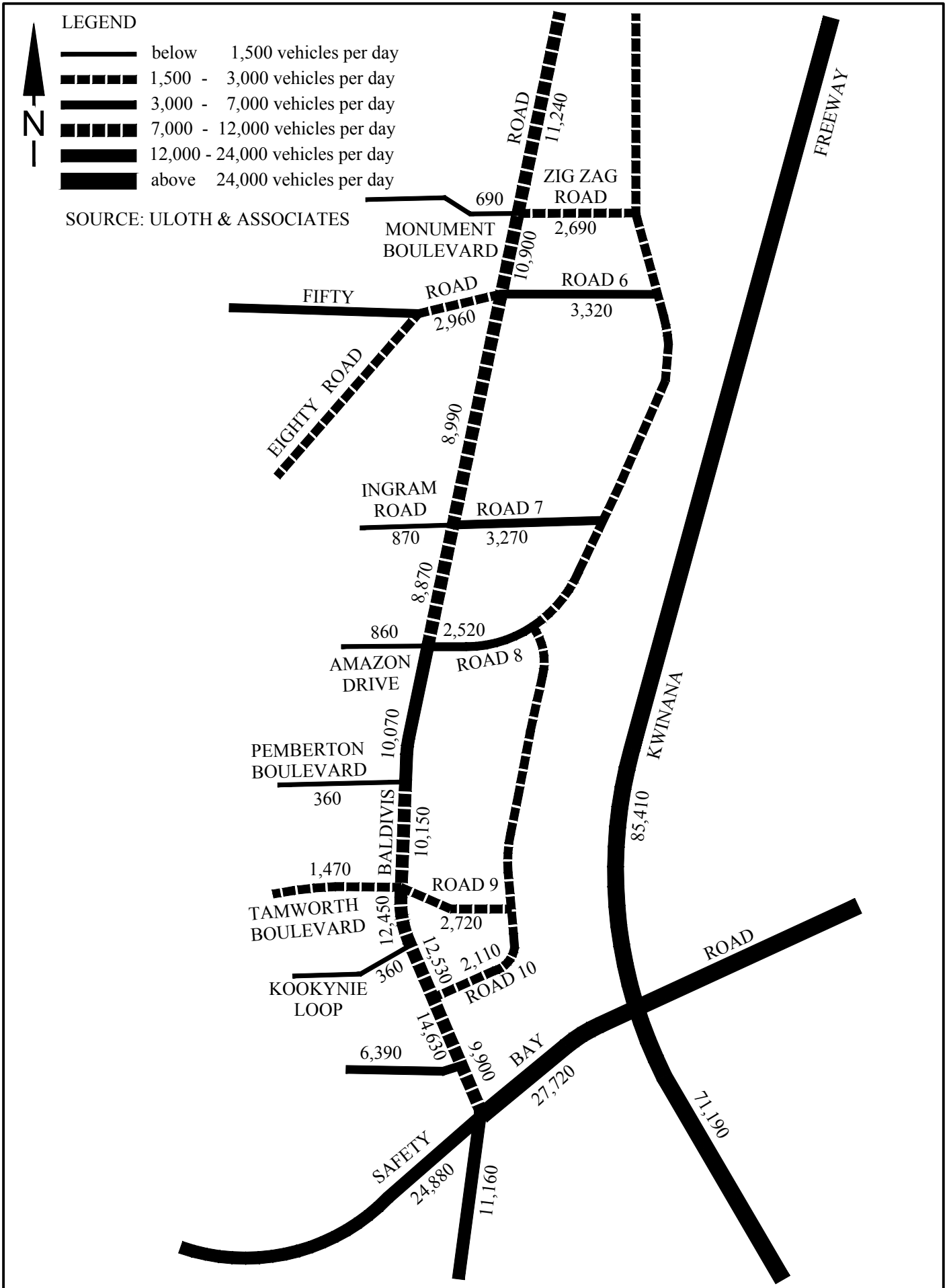
Long Term Development Traffic
EAST BALDIVIS DISTRICT STRUCTURE PLAN

FIG.
A.3



Future Long Term Total Traffic
 EAST BALDIVIS STRUCTURE PLAN - NORTH OF ZIG ZAG ROAD

FIG. A.4



Future Long Term Total Traffic
 EAST BALDIVIS STRUCTURE PLAN - SOUTH OF ZIG ZAG ROAD

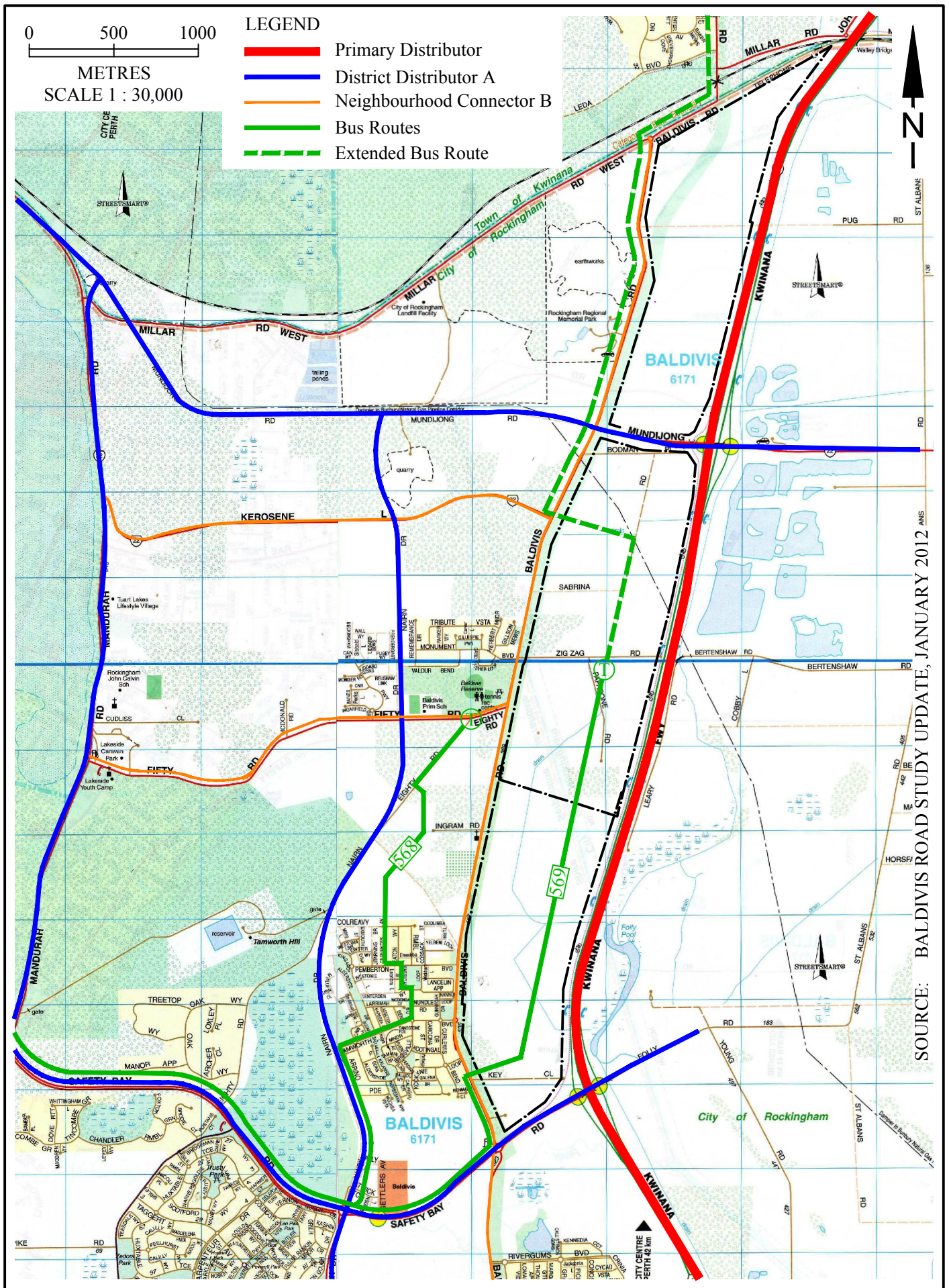
FIG. A.5

A.3 CURRENTLY PLANNED ROAD HIERARCHY AND FUTURE BUS ROUTES

Figure A.6 shows the currently planned road hierarchy and future bus routes for the North Baldivis and East Baldivis Structure Plan Areas, as documented in the January 2012 'Baldivis Road Study Update - Traffic and Infrastructure Report'.

It can be seen in Figure A.6 that Baldivis Road is currently planned to be a Neighbourhood Connector, along with Kerosene Lane, Fifty Road and Eighty Road.

It can also be seen that 2 Bus Routes are expected to serve the area, with future Transperth Service 568 to operate west of Baldivis Road and future service 569 to operate east of Baldivis Road, between Safety Bay Road and Fifty Road, with the recommendation to extend either service 568 or 569 north of Fifty Road to Wellard Road through the Structure Plan Area.



Currently Proposed Road Hierarchy and Bus Routes - NORTH BALDIVIS STRUCTURE PLAN

FIG. A.6