



AGENDA INFRASTRUCTURE, PLANNING AND ENVIRONMENT COMMITTEE 12 NOVEMBER 2024

MEMBERSHIP: Councillors J Black, L Butler, S Chowdhury, J Cowley, M Dickerson, R Ivey, P Toynton, K Richardson, A Ryan, P Wells and M Wright.

The meeting is scheduled to commence at 5:30 PM.

ACKNOWLEDGEMENT OF COUNTRY:

“I would like to acknowledge the Wiradjuri People who are the Traditional Custodians of the Land. I would also like to pay respect to the Elders past and present of the Wiradjuri Nation and extend that respect to other Aboriginal peoples from other nations who are present”.

Page

IPEC24/48 ELECTION OF CHAIRPERSON (ID24/2019)

IPEC24/49 LEAVE OF ABSENCE (ID24/2004)

IPEC24/50 CONFLICTS OF INTEREST (ID24/2005)

In accordance with their Oath/Affirmation under the Act, and Council’s Code of Conduct, Councillors must disclose the nature of any pecuniary or non-pecuniary interest which may arise during the meeting, and manage such interests accordingly.

IPEC24/51 DEVELOPMENT ACTIVITY SUMMARY (ID24/1809)

The Committee had before it the report dated 24 October 2024 from the Manager Building and Development Services regarding Development Activity Summary.

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IPEC24/52 2025 NSW TOUCH FOOTBALL JUNIOR STATE CUP DUBBO (ID24/2012)

The Committee had before it the report dated 30 October 2024 from the Traffic Engineer regarding 2025 NSW Touch Football Junior State Cup Dubbo.

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IPEC24/53	DUBBO TRIATHLON CLUB 2024/2025 SUMMER TRIATHLON SERIES (ID24/2013)	20
	The Committee had before it the report dated 30 October 2024 from the Senior Traffic and Transport Engineer regarding Dubbo Triathlon Club 2024/2025 Summer Triathlon Series.	
IPEC24/54	DUBBO TRANSPORTATION STRATEGY - PROGRESS AND UPDATE REPORT (ID24/2017)	51
	The Committee had before it the report dated 31 October 2024 from the Manager Infrastructure Strategy and Design regarding Dubbo Transportation Strategy - Progress and Update Report.	
IPEC24/55	NAMING OF THOROUGHFARE ASSOCIATED WITH DEVELOPMENT APPLICATION D2017-460 - TENANDRA AND BARBIGAL STREETS, WONGARBAN (ID24/1936)	233
	The Committee had before it the report dated 23 October 2024 from the LIS and E-Services Coordinator regarding Naming of Thoroughfare associated with Development Application D2017-460 - Tenandra and Barbigal Streets, Wongarban.	



REPORT: Development Activity Summary

DIVISION: Development and Environment
REPORT DATE: 24 October 2024
TRIM REFERENCE: ID24/1809

EXECUTIVE SUMMARY

Purpose	Provide review and update	
Issue	<ul style="list-style-type: none">A monthly report is presented to Council which shows development activity.The report includes a statistical overview of the number and type of development approvals for the Dubbo Regional Local Government Area (LGA) on a monthly basis.The 'total number of dwellings' approved in September was 33, including 14 single dwellings and 19 'other' dwellings.The NSW Department of Planning, Housing and Infrastructure publishes 'League Table' data which includes development application processing times for all Councils. This report provides the latest monthly snapshot of Council's processing times for Development Applications.	
Reasoning	<ul style="list-style-type: none">Provide data relating to approved Development Applications.Provide specific statistics of the number of dwellings and other residential development approved.Provide comparative data for corresponding period.	
Financial Implications	Budget Area	There are no financial implications arising from this report.
Policy Implications	Policy Title	There are no policy implications arising from this report.

STRATEGIC DIRECTION

The Towards 2040 Community Strategic Plan is a vision for the development of the region out to the year 2040. The Plan includes six principal themes and a number of objectives and strategies. This report is aligned to:

Theme: 1 Housing

CSP Objective: 1.1 Housing meets the current and future needs of our community

Delivery Program Strategy: 1.1.1 A variety of housing types and densities are located close to appropriate services and facilities

Theme: 3 Economy

CSP Objective:	3.3 A strategic framework is in place to maximise the realisation of economic development opportunities for the region
Delivery Program Strategy:	3.3.1 Land is suitably zoned, sized and located to facilitate a variety of development and employment generating activities

RECOMMENDATION

That the report of the Manager Building and Development Services dated 24 October 2024 be noted.

Steven Jennings
Director Development and Environment

DQ
Manager Building and
Development Services

REPORT

1. Development Applications

Council is required to undertake the assessment and consideration of Development Applications and other associated approvals in accordance with the Environmental Planning and Assessment Act, 1979.

Council undertakes the assessment and consideration of Development Applications in accordance with Section 4.15 of the Environmental Planning and Assessment Act, 1979 and consults with community on Development Applications in accordance with Council's adopted Community Participation Plan.

The development approvals environment is regulated by the NSW State Government through a range of subsidiary acts and requirements in respect of:

- traffic and transport
- heritage
- infrastructure
- environment
- biodiversity
- impacts on agriculture
- impacts on water resources including groundwater (amongst others)

Council in the 2023/2024 financial year approved a total of 593 Development Applications.

2. Online Application Tracking

All Development Applications, Construction Certificates and Complying Development Certificates are tracked online and can be accessed at any time. A link to Council's Application Tracker is as follows: (<https://planning.dubbo.nsw.gov.au/Home/Disclaimer>).

Information available on Council's Application Tracker includes the following:

- All Development Applications, Construction Certificates and Complying Development Certificates submitted from 1 November 2015, including access to submitted plans and supporting documents as well as tracking details of the progress of an application.
- More limited information is provided for applications submitted from 1 January 2001 to 31 October 2015.
- Occupation certificates (where issued) are provided from 2010.

What information is not available:

- Application forms.
- Documentation associated with privately certified applications.
- Internal assessment reports.

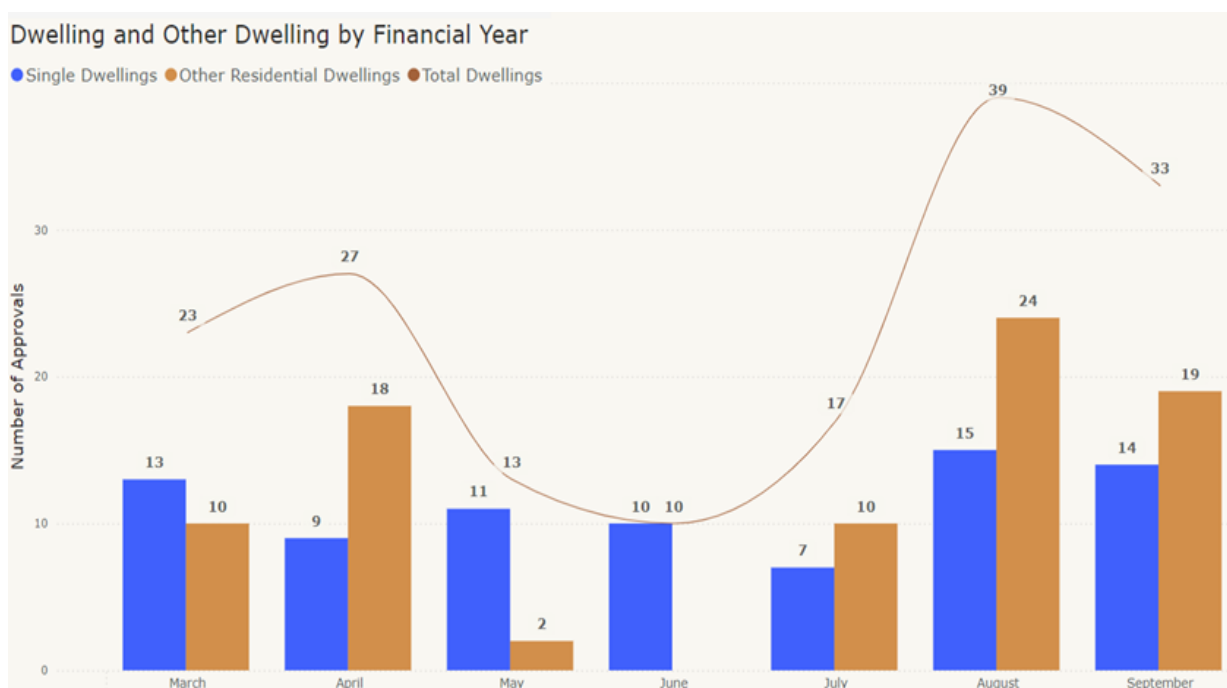
3. Development Activity Building Summary

Provided, for information, are the latest statistics (as at the time of production of this report) for Development Applications and Complying Development approvals for Council.

(a) Residential Activity Summary

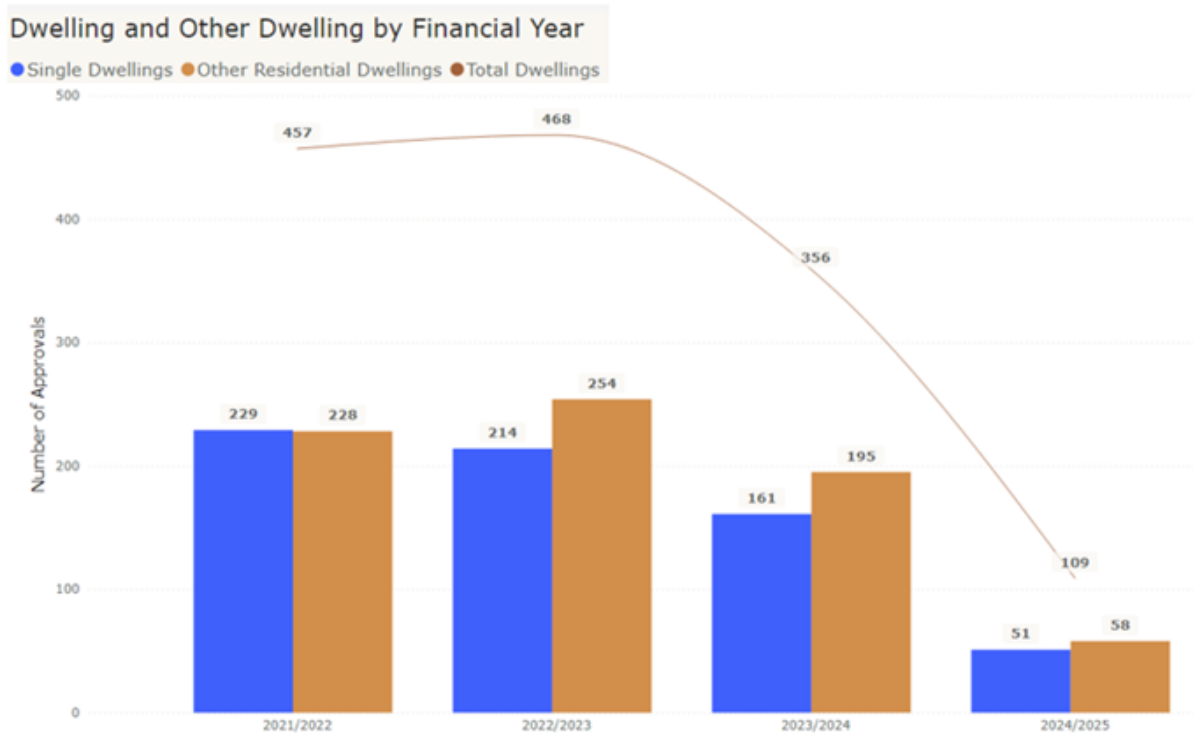
Dwellings and other residential developments approved most recently for September 2024, and for comparative purposes, the six (6) months prior are shown in Graph 1.

For consistency with land use definitions included in the Dubbo Regional Local Environmental Plan 2022, residential development has been separated into 'Single dwellings' (LEP definition of dwelling house) and 'Other residential development' (LEP definitions include dual occupancies, secondary dwellings, multi dwelling housing, seniors housing, shop top housing and residential flat buildings).



Graph 1: Residential Approvals Summary – April to September 2024

A summary of residential approvals for financial years 2021/2022, 2022/2023 and 2023/2024 are shown in Graph 2. The graph also includes the approval numbers for the financial year 2024/2025 to date.

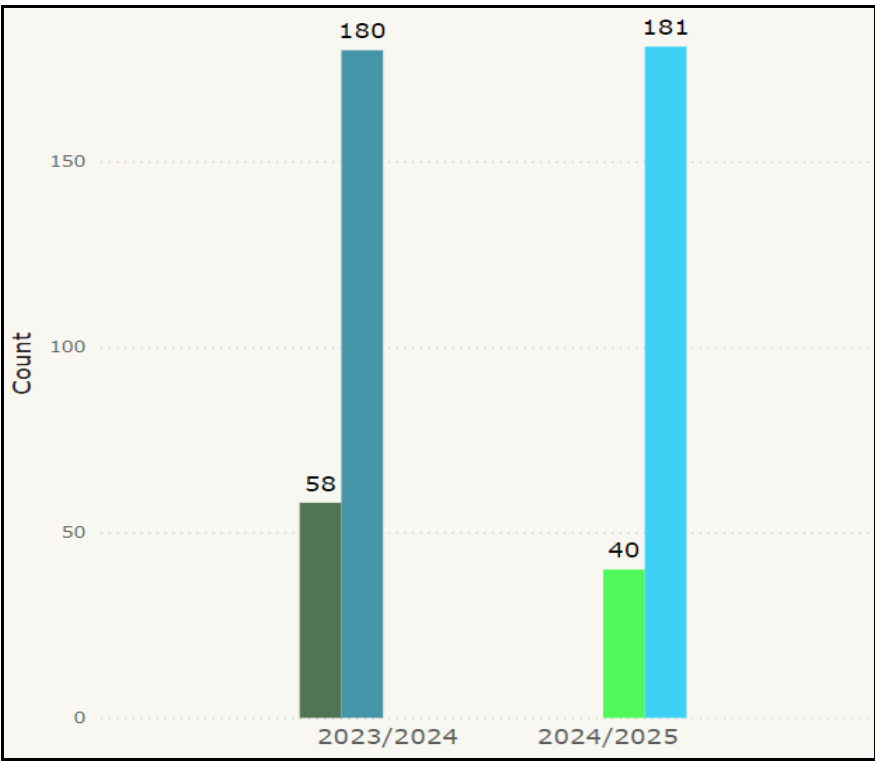


Graph 2: Residential Approvals Summary – Comparison of Financial Years

These figures include Development Applications approved by Private Certifying Authorities (in the form of Complying Development Certificates).

(b) Approved Development Applications

Graph 3 shows that Council approved a total of 40 Development Applications in the month of September this year. In addition, this graph also shows that Council approved a total of 58 Development Applications in September last year. This graph also shows the cumulative number of Development Applications approved for the current Financial Year.



Graph 3: Number of Approved Development Applications

In respect of the overall value of Development Applications approved, for the month of September in the 2023/2024 Financial Year the value was \$22,651,967. For the month of September for the current Financial Year, the value was \$20,034,793.

(c) Development Applications under Assessment

As of 5 November 2024, a total of 135 Development Applications are under consideration. This includes the following residential development:

- Single dwellings 14
- Dual Occupancy 16
- Secondary dwellings 2
- Other Residential development 2 (total of 9 units)

In addition, the following Development Applications are under consideration:

Number	Proposal	Address	Value
D22-210	650 lot residential subdivision	24R Sheraton Road, Dubbo	\$32M
D23-140	Mixed Use Development (Health Services Facilities)	40 Cobbora Road, Dubbo	\$30M
D23-647	571 lot residential subdivision	13L Narromine Road, Dubbo	\$15M
D24-96	Function Centre and Accommodation	Obley Road, Dubbo (Taronga Western Plains Zoo)	\$24M
D24 -360	Public Administration Building	130 Brisbane Street, Dubbo	\$29M

D24-407	Tourist and accommodation Visitor	29R Wellington Road, Dubbo	\$12M
D24-451	Backpackers Accommodation	268 Macquarie Street, Dubbo	\$476,000
D24-420	Dubbo Residential Rehabilitation Centre	58 Spears Drive, Dubbo	\$27M

3. Council League Table

The NSW State Government Department of Planning, Housing and Infrastructure has recently been providing development assessment data for all Local Government Areas. The data is obtained from the Planning Portal and is updated monthly.

The Council League tables show both lodgement days for Development Applications and average assessment days.

Council should lodge Development Applications for which it is the consent authority as soon as practical and within an average of:

- 14 days of submission between 1 July 2024 to 30 June 2025
- 7 days of submission from 1 July 2025 onwards.

Council should determine Development Applications for which it is the consent authority (including DAs determined by a local planning panel) as soon as practical and whichever is the lesser of council's previous financial year average, or within an average of:

- 115 days of lodgement between 1 July 2024 to 30 June 2025
- 105 days of lodgement between 1 July 2025 to 30 June 2026
- 95 days of lodgement between 1 July 2026 to 30 June 2027
- 85 days of lodgement from 1 July 2027 onwards.

The data displayed includes comparable inland regional cities and includes the following:

- Average assessment days;
- Total Development Applications assessed;
- Total development cost; and
- Lodgement days.

Regional Council	Average Assessment Days	DAs Assessed	Total Development Cost (million)	Lodgement Days
1. Dubbo	51	136	\$62.2	19
2. Armidale	51	41	\$9.8	10
3. Bathurst	74	88	\$30.9	4
4. Wagga Wagga	77	151	\$120.6	7
5. Albury	111	166	\$67.2	13
6. Orange	133	64	\$54.3	13
7. Tamworth	138	102	\$37.5	10



REPORT: 2025 NSW Touch Football Junior State Cup Dubbo

DIVISION: Infrastructure
REPORT DATE: 30 October 2024
TRIM REFERENCE: ID24/2012

EXECUTIVE SUMMARY

Purpose	Seek endorsement.	
Issue	This report details the traffic management requirements for the temporary road closure of the southern section of Bligh, South and lower Tamworth streets to facilitate the 2025 NSW Touch Football Junior State Cup to be held along the Macquarie River Sporting Precinct from 21 to 23 February 2025. Due to the success of the 2023 event, Council has been successful in securing the event for the next three years.	
Reasoning	<ul style="list-style-type: none">The Dubbo region has a proven record of hosting large scale events of State and National significance and has a passionate touch football community supported by the Dubbo Touch Association, boasting more than 1,700 members. The Association has a proven history of arranging and delivering events and have pledged resources and financial support for the 2025 NSW Touch Junior State Cup. The sporting precinct has an abundance of quality playing fields and associated facilities to be able to facilitate the expected number of teams and supporters, expected to be in the order of 10,000 participants.Roads Act 1993 and Roads (General) Regulation 2018.	
Financial Implications	Budget Area	Community, Culture and Places.
	Funding Source	Recreation and Open Spaces.
	Proposed Cost	In-kind contribution of \$45,000 for traffic management.
	Ongoing Costs	N/A
Policy Implications	Policy Title	There are no policy implications arising from this report.
	Impact on Policy	N/A

STRATEGIC DIRECTION

The Towards 2040 Community Strategic Plan is a vision for the development of the region out to the year 2040. The Plan includes six principle themes and a number of objectives and strategies. This report is aligned to:

Theme: 2 Infrastructure

CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.1 Traffic management facilities enhance the safety and efficiency of the road network
Theme:	2 Infrastructure
CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.2 The road network meets the needs of the community in terms of traffic capacity, functionality and economic and social connectivity
Theme:	2 Infrastructure
CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.5 Council works collaboratively with the government and stakeholders on transport-related issues

RECOMMENDATION TO THE LOCAL TRAFFIC COMMITTEE

That Council approval be granted for the implementation of the following temporary road closures to facilitate the 2025 NSW Touch Football Junior State Cup, to be held along the Macquarie River Sporting Precinct from 7 pm Thursday, 20 February to 7 pm Sunday, 23 February 2025, in accordance with Council's Traffic Guidance Scheme TM7603 as attached as Appendix 1 to the report:

- a. Bligh Street from Bultje Street to Macquarie Street;
- b. South Street from Bligh Street to Tamworth Street;
- c. Tamworth Street from Macquarie Street west to its conclusion;
- d. Tamworth Street between Macquarie Street and Brisbane Street; and
- e. Sandy Beach Road and Ian Drake Drive (authorised access only).

LOCAL TRAFFIC COMMITTEE CONSIDERATION

This matter was considered by the Local Traffic Committee at its meeting held on Monday 4 November 2024. The Committee had unanimous support in the adoption of the recommendation. Noting that NSW Police concurrence was received electronically.

RECOMMENDATION

That Council approval be granted for the implementation of the following temporary road closures to facilitate the 2025 NSW Touch Football Junior State Cup, to be held along the Macquarie River Sporting Precinct from 7 pm Thursday, 20 February to 7 pm Sunday, 23 February 2025, in accordance with Council's Traffic Guidance Scheme TM7603 as attached as Appendix 1 to the report:

- a. Bligh Street from Bultje Street to Macquarie Street;
- b. South Street from Bligh Street to Tamworth Street;
- c. Tamworth Street from Macquarie Street west to its conclusion;
- d. Tamworth Street between Macquarie Street and Brisbane Street; and
- e. Sandy Beach Road and Ian Drake Drive (authorised access only)

Chris Godfrey
Director Infrastructure

SR
Traffic Engineer

BACKGROUND

The NSW Touch Football Junior State Cup has been traditionally run in regional centres across the State. In 2022, Dubbo Regional Council submitted an application to host the 2023 Junior State Cup in Dubbo and was subsequently awarded the event. The event was an overwhelming success. As a consequence, and with further support from the Dubbo Touch Association, Council undertook to extend the City's hosting rights from one year to four years and was subsequently awarded to host the next three events.

Council has the capacity and proven ability to successfully host large-scale events such as the Junior State Cup. The Dubbo region's strength as a venue for sporting events is its central location and being accessible from all corners of the State.

The region has a passionate football community strongly supported by the Dubbo Touch Association with some 1,700 members and a proven history of arranging and delivering events. The association has also pledged resources and financial support for the event.

REPORT

The NSW Touch Football Junior State Cup event will be held along the Macquarie River Sporting Precinct, encompassing the Lady Cutler Ovals bounded by Bligh, South, Tamworth and Macquarie streets. There are an anticipated 10,000 participants who will access the sporting precinct over the three days. It is proposed to secure the precinct from the public for the duration of the event in order to remove unwarranted through-traffic along the venue's road network and enhance the expected high volume of pedestrian activity.

A Traffic Guidance Scheme TM7603 (**Appendix 1**) has been prepared to facilitate the expected influx of traffic to the venue and maximise the pedestrian safety within the playing fields and overall precinct.

There are numerous impacts identified to the locality as a consequence of the event including:

- Event and local traffic mix;
- Pedestrian safety within the precinct;
- CBD traffic and access congestion;
- Event parking;
- Resident access; and
- Commercial bus route.

In order to address the identified impacts, consideration was given to removing all vehicular access, with the exception of authorised event vehicles from the playing fields precinct. Bligh Street, South Street and Sandy Beach Road effectively severs the playing fields where there will be consistent pedestrian road crossing activity between fields, amenities and supporting services. Lower Tamworth Street, west of Macquarie Street, borders the southern boundary

of the playing fields and will be used for access to an event car parking area on the southern side of Tamworth Street.

Consideration was given to removing all traffic from within the playing fields and pedestrian active areas of the event precinct with the closing of Bligh Street south of Bultje Street to Macquarie Street, South Street, Sandy Beach Road and lower Tamworth Street (event parking access only). Authorised vehicles will access from the Bultje Street road closure, where windscreen identification cards will be checked in the closed section of Bligh Street south of Bultje Street prior to precinct access via Ian Drake Drive. There will be no public vehicle access to the event precinct, pedestrians will be permitted into the river corridor. Subject to the expected need for additional event parking, Ollie Robbins Oval will be the secondary car parking area.

To reduce the congestion and interaction of the event and local traffic, Macquarie Street between Tamworth and Cobra streets (Mitchell Highway), will be designated as 'Local Resident Access Only' to reduce unwarranted traffic in Macquarie Street. Access will be retained to all residents in Macquarie Street and surrounding streets. Cross traffic movements into Macquarie Street will be restricted at Tamworth Street. The western side of Macquarie Street, between Bligh and Cobra streets, will be barricaded to restrict parking in this location. The Mitchell Street intersection will remain open. Two temporary 'No Parking' zones will be established on the western side of Macquarie Street north and south of the closed Bligh Street intersection to enable set down and pickup activities to the event precinct. The Dubbo Buslines' new bus service now traverses along Macquarie and Brisbane streets to the CBD and no longer uses Macquarie Street between Brisbane and Cobra streets.

It is recognised that there will be expected traffic congestion in the CBD with the Bligh Street closure and in the local streets south of Cobra Street, with event traffic seeking on-street parking close to the venue. The dispersion of local traffic will be encouraged with the placement of variable message signs strategically located prior to and on event days in the CBD and South Dubbo advising the event, expected congestion and alternate routes to and from the CBD via Darling and Brisbane streets. Event parking traffic will be advised by the NSW Touch Football in the event package of the preferred route from south Macquarie Street to the lower Tamworth Street off street car park.

The NSW Touch Football Junior State Cup is a major event for Dubbo that will have some impact on the local road network in the vicinity of the Macquarie River Sporting Precinct, CBD and Macquarie, Brisbane and Darling streets local residential area. There will be expected traffic congestion being so close to the CBD during the teams am and pm block arrival and departure periods. However, am and pm block playing periods are designed to have teams play a series of games over a period, rather than a single game then leave the fields and return several times throughout the day. Being close to the CBD may also reduce the number of vehicle trips.

Traffic management has been considered to lessen the traffic impact with the development of a Traffic Guidance Scheme (Traffic Guidance Scheme TM7603, **Appendix 1**) to provide specific direction to visitors and local traffic on using designated roads for movement through

and around the precinct, CBD and south Dubbo. The temporary road closures will be in place from 7 pm Thursday, 20 February to 7 pm Sunday, 23 February 2025.

Consultation

- The Local Traffic Committee including representatives from NSW Police, the Local State Member of Parliament, TfNSW and Council will review and discuss the traffic management proposal for the event.
- Council’s Events and Communication Team will be preparing information for ongoing dissemination to all residents that may be affected by the event in advance of and prior to the event.

Resourcing Implications

- As Council is hosting the event, resources will be engaged across several divisions and functions of Council to facilitate the playing fields, associated assistance and services, communication, and traffic management.

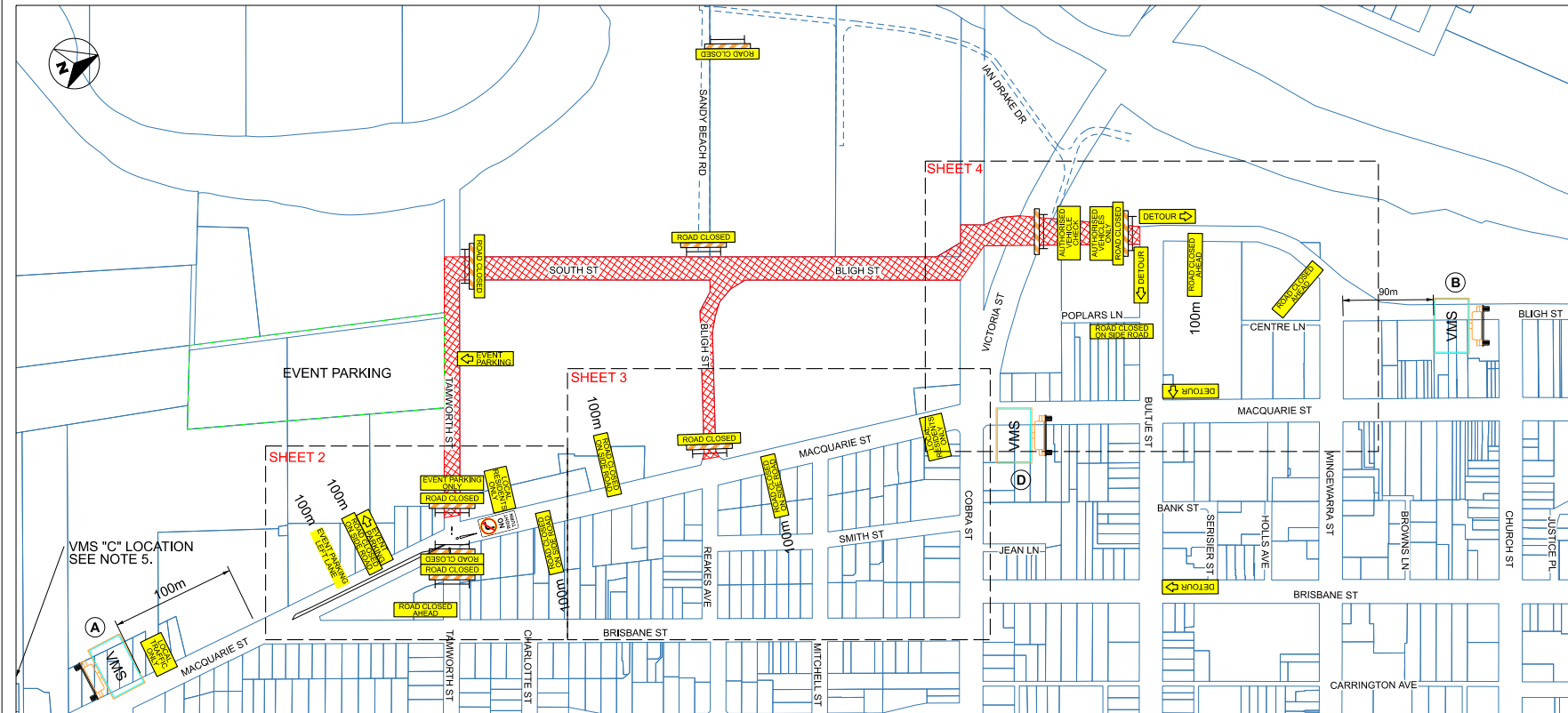
Total Financial Implications	Current year (\$)	Current year + 1 (\$)	Current year + 2 (\$)	Current year + 3 (\$)	Current year + 4 (\$)	Ongoing (\$)
a. Operating revenue	0	0	0	0	0	0
b. Operating expenses	45,000	0	0	0	0	0
c. Operating budget impact (a – b)	-45,000	0	0	0	0	0
d. Capital Expenditure	0	0	0	0	0	0
e. Total net impact (c – d)	-45,000	0	0	0	0	0

Table 1. Ongoing Financial Implications.

APPENDICES:

- [1](#) 2025 NSW Touch Football Junior State Cup - Traffic Management Plan

2025 NSW TOUCH JUNIOR CUP TRAFFIC GUIDANCE SCHEME

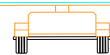


GENERAL NOTES :

1. ROAD CLOSURE FROM 7pm ON THE 20th FEBRUARY TO 7pm ON THE 23rd FEBRUARY 2025.
2. BLIGH STREET AND SOUTH STREET ACCESS IS TO BE CLOSED ONLY DURING THE EVENT.
3. VMS TO BE INSTALLED ON FRIDAY, 14th FEBRUARY 2025 PRIOR TO THE EVENT.
4. VMS MESSAGE TO BE DISPLAYED AS SHOWN PRE EVENT DAYS AND EVENT DAYS.
5. VMS C TO BE PLACED IN MACQUARIE STREET FACING NORTHBOUND TRAFFIC, 112m SOUTH OF DARLING STREET.

A - PRE EVENT

- ① SPECIAL EVENT
- ② 21 - 23 FEB
- ③ BLIGH ST CLOSED



A - EVENT DAYS

- ① CBD ACCESS
- ② VIA BRISBANE ST



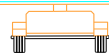
B - PRE EVENT

- ① SPECIAL EVENT
- ② 21 - 23 FEB
- ③ BLIGH ST CLOSED



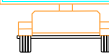
B - EVENT DAYS

- ① SPECIAL EVENT
- ② BLIGH ST CLOSED
- ③ AT BULTJE ST



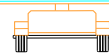
C - PRE EVENT

- ① SPECIAL EVENT
- ② 21 - 23 FEB
- ③ EXPECT DELAYS



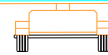
C - EVENT DAYS

- ① CBD ACCESS
- ② VIA DARLING ST



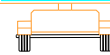
D - PRE EVENT

- ① SPECIAL EVENT
- ② 21 - 23 FEB
- ③ MACQUARIE ST



D - EVENT DAYS

- ① SPECIAL EVENT
- ② USE BRISBANE &
- ③ DARLING STS



VMS C LOCATION : SEE NOTE 5

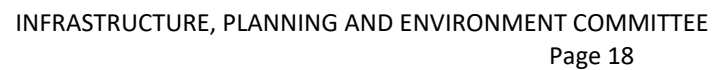
LEGEND

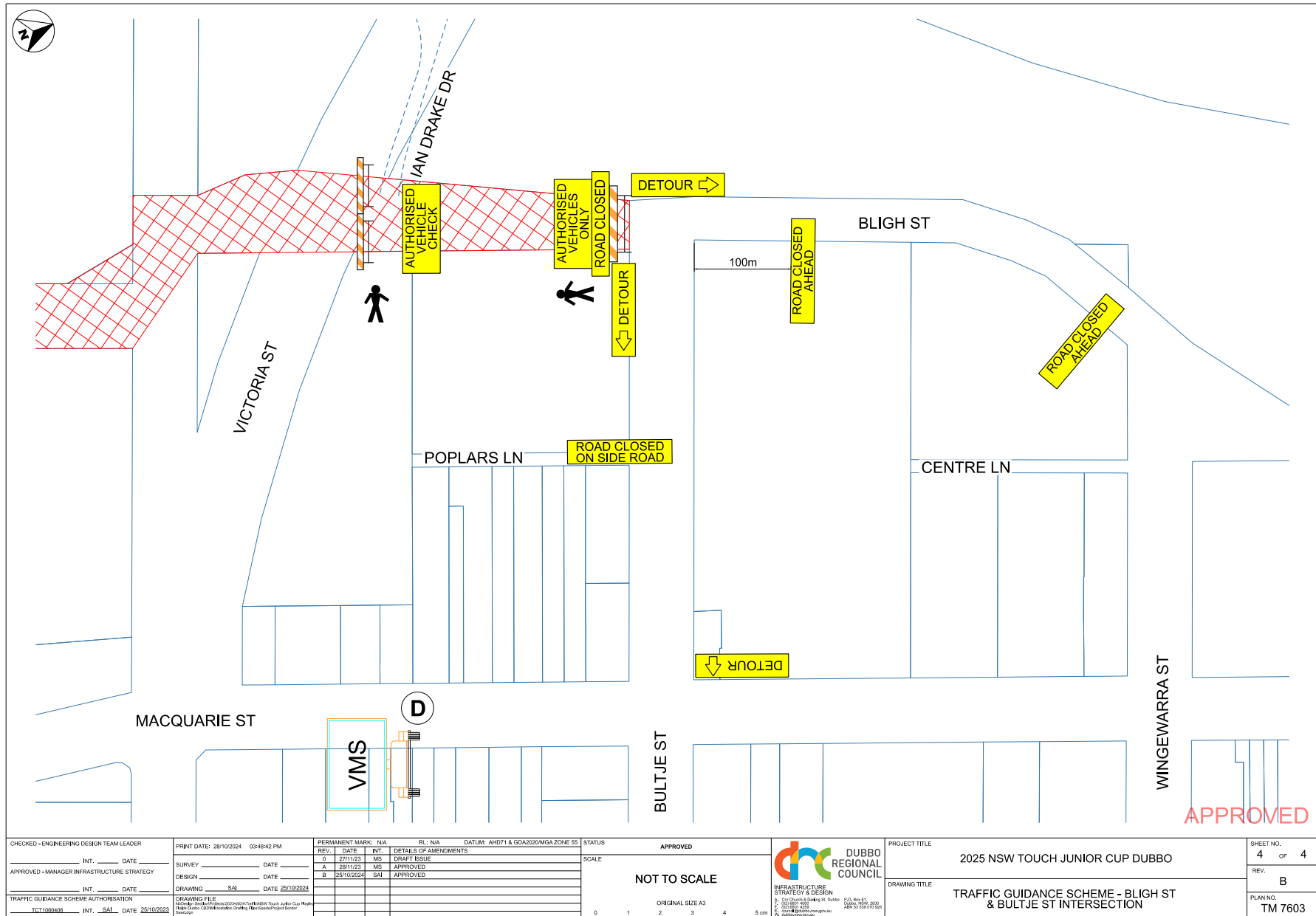
CLOSED ROADS

APPROVED

CHECKED - ENGINEERING DESIGN TEAM LEADER INT. DATE APPROVED - MANAGER INFRASTRUCTURE STRATEGY INT. DATE TRAFFIC GUIDANCE SCHEME AUTHORITY TCT1000408 INT. SAL. DATE 28/10/2023	PRINT DATE: 28/10/2024 03:46:42 PM SURVEY DATE DESIGN DATE DRAWING SAI DATE 28/10/2024 DRAWING FILE C:\Users\infrastructure\Documents\2025 NSW Touch Junior Cup Road Traffic Guidance Scheme\2025 NSW Touch Junior Cup Road Traffic Guidance Scheme.dwg	PERMANENT MARK: N/A RL: N/A DATUM: AHMD71 & GDA2020 MGA ZONE 55 STATUS REV. DATE INT. DETAILS OF AMENDMENTS 0 20/11/2023 MS DRAFT ISSUE A 28/11/2023 MS APPROVED B 28/10/2024 SAI APPROVED	SCALE NOT TO SCALE ORIGINAL SIZE A3 0 1 2 3 4 5 cm	APPROVED DUBBO REGIONAL COUNCIL INFRASTRUCTURE STRATEGY & DESIGN P.O. Box 550, Dubbo, NSW 2880 Tel: 02 9231 1111 Fax: 02 9231 1112 Email: info@dubbo.nsw.gov.au	PROJECT TITLE 2025 NSW TOUCH JUNIOR CUP DUBBO DRAWING TITLE TRAFFIC GUIDANCE SCHEME OVERVIEW	SHEET NO. 1 OF 4 REV. B PLAN NO. TM 7603
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REPORT: Dubbo Triathlon Club 2024/2025 Summer Triathlon Series

DIVISION: Infrastructure
REPORT DATE: 30 October 2024
TRIM REFERENCE: ID24/2013

EXECUTIVE SUMMARY

Purpose	<ul style="list-style-type: none">Seek endorsement.Fulfil legislated requirement/Compliance.	
Issue	<ul style="list-style-type: none">This report deals with the approval procedures required for bicycle (triathlon) races on public roads. The Dubbo Triathlon Club is seeking approval to conduct the triathlon race season for 2024/2025 with the cycle leg along Bligh Street, Macquarie Street and Old Dubbo Road.The event starts and finishes at Ollie Robbins Oval, comprising a Macquarie River swim, cycle ride along local roads and run along the river corridor. The cycle leg is categorised as a Class 2 event on public roads and will require NSW Police Force approval under Section 115 of the Road Transport Act 2013.	
Reasoning	<ul style="list-style-type: none">The Club's racing season runs between September 2024 and April 2025, inclusive of typical Club and inter-club events. On the cycle course, competitors are required to comply with the road rules and are not to ride in groups at any stage.The Club has submitted an Event and Traffic Management Plan, Risk Assessment, Traffic Control Plan, and additional supporting documentation as attached.The matter is referred to the Local Traffic Committee for its consideration. It is recommended that approval be granted to the Dubbo Triathlon Club to conduct its 2024/2025 racing season as proposed in accordance with the Event and Traffic Management Plan as conditioned by Council and the NSW Police Force.Roads Act 1993 and Roads (General) Regulation 2018.	
Financial Implications	Funding Source	There are no financial implications arising from this report.
Policy Implications	Policy Title	There are no policy implications arising from this report.

STRATEGIC DIRECTION

The Towards 2040 Community Strategic Plan is a vision for the development of the region out to the year 2040. The Plan includes six principal themes and a number of objectives and

strategies. This report is aligned to:

Theme:	2 Infrastructure
CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.1 Traffic management facilities enhance the safety and efficiency of the road network
Theme:	2 Infrastructure
CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.2 The road network meets the needs of the community in terms of traffic capacity, functionality and economic and social connectivity

RECOMMENDATION TO THE LOCAL TRAFFIC COMMITTEE

That the application of the Dubbo Triathlon Club be approved for the 2024/2025 season as conditioned by the NSW Police Service and the following conditions of Dubbo Regional Council:

1. Approval shall be for the use of Bligh Street, from Ollie Robins Oval south to Macquarie Street, Macquarie Street from Bligh Street to Hennessy Drive, Old Dubbo Road from Hennessy Drive south to the 4.5 and 9 kilometres turnaround locations and return on the nominated days, generally between 7 am to 1 pm, and at selected times for specific events in accordance with the Racing Schedule on 3 November 2024, 8 December 2024, 15 December 2024, 16 December 2024, 23 December 2024, 6 April 2024 (inter-club series race).
2. Submission of a Traffic Management Plan to Council for approval to be submitted a minimum of three weeks prior to the first event. All traffic control measures contained in the plan are to be in accordance with Australian Standard AS 1742.3 and the Roads and Maritime Services and NSW Guidelines for Bicycle Road Races and the Guide to Traffic Control at Worksites, prepared by an accredited person.
3. All traffic control, including the placement and removal of barricades and/or regulation of traffic, is to be carried out by traffic controllers appropriately trained in accordance with the requirements of Australian Standard AS 1742.3 and the Roads and Maritime Services accreditation requirements for Traffic Control Planners or Controllers as required.
4. All competitors shall comply with the Australian Road Rules for the cycle route.
5. All traffic advisory signs shall be placed in accordance with the approved Traffic Control Plan.
6. The NSW Police's consent and conditions for bicycle races permit under the NSW Roads Transport Act 2013, Section 115.
7. Council's Manager Corporate Governance must sight a copy of the public liability insurance policy for a minimum amount of \$20 million on which Dubbo Regional Council and NSW Police is specifically noted to be indemnified against any action resulting from the triathlon races.

8. The applicant is to submit to Council all the appropriate documentation required, accepting the above terms and conditions before a final approval is granted.

LOCAL TRAFFIC COMMITTEE CONSIDERATION

This matter was considered by the Local Traffic Committee at its meeting held on Monday 4 November 2024. The Committee had unanimous support in the adoption of the recommendation. Noting that NSW Police concurrence was received electronically.

RECOMMENDATION

That the application of the Dubbo Triathlon Club be approved for the 2024/2025 season as conditioned by the NSW Police Service and the following conditions of Dubbo Regional Council:

1. Approval shall be for the use of Bligh Street, from Ollie Robins Oval south to Macquarie Street, Macquarie Street from Bligh Street to Hennessy Drive, Old Dubbo Road from Hennessy Drive south to the 4.5 and 9 kilometres turnaround locations and return on the nominated days, generally between 7 am to 1 pm, and at selected times for specific events in accordance with the Racing Schedule on 3 November 2024, 8 December 2024, 15 December 2024, 16 December 2024, 23 December 2024, 6 April 2024 (inter-club series race).
2. Submission of a Traffic Management Plan to Council for approval to be submitted a minimum of three weeks prior to the first event. All traffic control measures contained in the plan are to be in accordance with Australian Standard AS 1742.3 and the Roads and Maritime Services and NSW Guidelines for Bicycle Road Races and the Guide to Traffic Control at Worksites, prepared by an accredited person.
3. All traffic control, including the placement and removal of barricades and/or regulation of traffic, is to be carried out by traffic controllers appropriately trained in accordance with the requirements of Australian Standard AS 1742.3 and the Roads and Maritime Services accreditation requirements for Traffic Control Planners or Controllers as required.
4. All competitors shall comply with the Australian Road Rules for the cycle route.
5. All traffic advisory signs shall be placed in accordance with the approved Traffic Control Plan.
6. The NSW Police's consent and conditions for bicycle races permit under the NSW Roads Transport Act 2013, Section 115.
7. Council's Manager Corporate Governance must sight a copy of the public liability insurance policy for a minimum amount of \$20 million on which Dubbo Regional Council and NSW Police is specifically noted to be indemnified against any action resulting from the triathlon races.
8. The applicant is to submit to Council all the appropriate documentation required, accepting the above terms and conditions before a final approval is granted.

Chris Godfrey
Director Infrastructure

DV
Senior Traffic and
Transport Engineer

BACKGROUND

The guidelines for 'Bicycle Road Races' provides a comprehensive overview of the approval process and the requirement of those bodies and cycling organisations. Approval is required from the NSW Police under the NSW Road Transport Act 2013 Section 115. Junior triathlon events will be held in the Dubbo Aquatic and Leisure Centre and adjoining Victoria Park and No 1 Oval.

An Event and Traffic Management Plan, as attached, has been submitted including Traffic Control Plan, Event Calendar, Risk Assessment and Public Liability Insurance, Police approval, season race schedule and course maps. The NSW Police are also to be included on the insurance as an interested party.

Bicycle Road Race

A bicycle road race, which forms part of a triathlon, may be categorised as a Class 1 or 2 event, the difference being that one impacts on the major traffic transport system and the other does not. The request by Dubbo Triathlon Club for the use of Bligh and Macquarie streets and Old Dubbo Road for the bicycle leg is categorised as a Class 2 event.

The bicycle leg of the triathlon is a time trial where there is no drafting or pack riding permitted. Club triathlon races are conducted on a Sunday morning generally from 8 am to 11 am, with some selected events at varying times as detailed in the racing schedule. The swim leg is undertaken in the Macquarie River, and run leg is an out and back course along the Macquarie River corridor south from Ollie Robbins Oval. If the Macquarie River is inaccessible the swim leg will be cancelled, with the event continuing as a run/ride format. The cycle leg commences at Ollie Robbins Oval, then south into Bligh Street, Macquarie Street, and along Old Dubbo Road to a turnaround at a 4.5 km (Short Course) and 9 km (Sprint Course). Following the swim leg, the athletes will transition to the bike leg that will require the bikes to be pushed to the eastern side of Bligh Street to commence the ride. Marshalls will be positioned to ensure safe road crossings.

Cyclists must undertake the road leg in accordance with the 'Australian Road Rules' with marshals provided at strategic locations to give directions to cyclists. 'Cyclists on Road' warning signs are strategically placed along the route and at intersections. The triathlon cycle leg is distinctively different from a normal cycle race, with no bunch start or sprint finish, and as such there is no considered requirement for traffic control. A Traffic Control Plan, prepared by Dubbo Traffic Control, details the requirements for the negotiation of the urban streets and rural road of the cycle leg. On return to Ollie Robbins Oval, cyclists will dismount and commence an out and back run course along the river corridor. Marshalls will be strategically located along the cycle course to raise awareness to both cyclists and motorists alike.

The approval to Dubbo Triathlon Club will be for a 12-month period, covering six triathlon races between November 2024 and April 2025. The nominated race dates are 3 November 2024, 8 December 2024, 15 December 2024, 16 December 2024, 23 March 2024 and 6 April 2024 (inter-club series race).

Conditions applicable to the triathlon and cycle leg of the event will be prepared in consultation with the NSW Police and Council, as considered necessary.

The Club has a history spanning many years of running safe and successful events and have recently increased their resources to enhance the road safety environment.

It is therefore recommended that Council approval be granted for the Dubbo Triathlon Club to conduct their 2024/2025 season races in Macquarie Street and Old Dubbo Road for the cycle leg, in accordance with the approved Event and Traffic Management Plan, and conditioned by the NSW Police and Council.

Consultation

- The Local Traffic Committee including representatives from NSW Police, the Local State Member of Parliament, TfNSW and Council will review and discuss the traffic management proposal for the event.

Resourcing Implications

- There are no financial implications to council as the organiser is responsible for all costs associated with the Dubbo Triathlon Seasons events.

APPENDICES:

- 1 [Dubbo Triathlon Races 2024/2025 - Certificate of Currency](#)
- 2 [Dubbo Triathlon Races 2024/2025 - Risk Assessment](#)
- 3 [Dubbo Triathlon Races 2024/2025 - Traffic Management Plan](#)
- 4 [Dubbo Triathlon Races 2024/2025 - Sprint and Super Sprint Bike Course Map](#)
- 5 [Dubbo Triathlon Races 2024/2025 - Run Course Map](#)
- 6 [Dubbo Triathlon Races 2024/2025 - Swim Map](#)
- 7 [Dubbo Triathlon Races 2024/2025 - Special Even Resources](#)
- 8 [Dubbo Triathlon Races 2024/2025 - Bligh and Macquarie Street Event - Traffic Management Plan](#)
- 9 [Dubbo Triathlon Races 2024/2025 - Bligh and Old Dubbo Road Event - Traffic Management Plan](#)
- 10 [Dubbo Triathlon Races 2024/2025 - Triathlon Club Event Times](#)



V-Insurance Group Pty Ltd
(AR No 432898) is an
Authorised Representative of
Willis Australia
ABN 90 000 321 237 AFSL No 240600
Level 25, 123 Pitt Street, Sydney NSW 2000

30 June 2024

To Whom It May Concern

CERTIFICATE OF INSURANCE

In our capacity as Insurance Broker to the Named Insured shown below, we confirm having arranged the following insurance, the details of which are correct as at the Issue Date:

Named Insured: AusTriathlon including all Affiliated Organisations including State and Territory Association, Affiliated Club, Officials, Accredited Coaches, Voluntary Workers, Members (including professional license holders), executives, and Race Directors and Event Organisers

Affiliated Club: Dubbo Triathlon Club

Class of Insurance: Primary Public and Products Liability

Insurer(s): RSA Underwriting Agencies

Policy Number: 502617

Limit of Liability:

Public Liability	\$20,000,000 any one occurrence
Products Liability:	\$20,000,000 any one occurrence and in the aggregate
Professional Liability:	\$20,000,000 any one occurrence and in the aggregate

Territorial Limits: Worldwide

Policy Period: 4.00pm, 30 June 2024 to 4pm, 30 June 2025

Interested Party/ies: Dubbo Regional Council
NSW Police

Noting the above as an interested party but limited to indemnity for the Personal Injury and/or Property Damage which arises solely as a result of the negligence by the named insured. This indemnity will not apply where the interested party is held or alleged to have its own independent liability arising from its own negligence, breach of contract, breach of any statute, or other act/omission. The indemnity provided is subject to the conditions, limits and exclusions of the policy.

For full details regarding coverage, please refer to the policy documentation.

In all instances, cover afforded is subject to the policy terms, conditions and exclusions. Any queries concerning this insurance arrangement should be addressed to this office.

Yours sincerely,

Rob Veale
Managing Director

Disclaimer:

This document has been prepared at the request of our client and does not represent an insurance policy, guarantee or warranty and cannot be relied upon as such. All coverage described is subject to the terms, conditions and limitations of the insurance policy and is issued as a matter of record only. This document does not alter or extend the coverage provided or assume continuity beyond the Expiry Date. It does not confer any rights under the insurance policy to any party. V-Insurance Group is under no obligation to inform any party if the insurance policy is cancelled, assigned or changed after the Issue Date.

V-Insurance Group Pty Ltd, Authorised Representative No. 432898, is an authorised representative of Willis Australia Limited ABN 90 000 321 237, AFSL No: 240600



RISK ASSESSMENT - RISK REGISTER AND PROPOSED CONTROLS

Title:	Club Race Risk Assessment
Purpose:	To document risk assessment to manage health and safety hazards and risks at Club triathlon events
Applicability:	Club race days held from November 2024 and April 2025
Responsibility:	Race Director and Dubbo Triathlon Club Committee
Related information:	Risk assessment accompanies sanctioning documentation lodged to NSW Roads and Maritime, Police, Dubbo Regional Council and Tri Australia
Approved by:	Dubbo Triathlon Club Committee
Date:	23rd October 2024
Updated by:	Mel Mertens
Date:	23rd October 2024

GENERAL RISKS:

Inherent risk (what can happen if no controls are put in place)	Likelihood	Consequence	Inherent Risk level	Controls to be implemented (Provide brief descriptions here, add more detail for the higher risks either in the main text or attach as a separate table)	Residual Risk level (after controls are in place)	Person(s) responsible	Brief Comments (e.g. monitoring methods)
COVID	<i>Unlikely</i>	<i>Minor</i>	<i>Moderate</i>	<ul style="list-style-type: none"> • COVID Protocols, • Do not turn up if feeling unwell 	<i>Low</i>	<i>Race Director</i>	
Facility Clash with another organisation	<i>Rare</i>	<i>Major</i>	<i>Moderate</i>	<ul style="list-style-type: none"> • Make sure we have approval from DRC • 	<i>Low</i>	<i>Race Director</i>	

SWIM COURSE:

Inherent risk (what can happen if no controls are put in place)	Likelihood	Consequence	Inherent Risk level	Controls to be implemented (Provide brief descriptions here, add more detail for the higher risks either in the main text or attach as a separate table)	Residual Risk level (after controls are in place)	Person(s) responsible	Brief Comments (e.g. monitoring methods)
Competitor injury from clashes between competitors	<i>Unlikely</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> Design wave starts at appropriate intervals to minimise congestion 	<i>Low</i>	<i>Race Director</i>	
Low Water Quality / pollution causing Infections to competitors or Exposure to Blue Green Algae toxins, Cold water	<i>Rare</i>	<i>Major</i>	<i>Moderate</i>	<ul style="list-style-type: none"> Monitor weekly reports for water quality status If red alert status at Dubbo cancel swim Assess water quality prior to race start and cancel swim leg if water quality is deemed unacceptable Temperature to be checked before race Wearing of Wetsuits enforced 	<i>Low</i>	<i>Race Director</i>	
Deterioration or debris in Water causing Competitor injury or drowning	<i>Rare</i>	<i>Major</i>	<i>Moderate</i>	<ul style="list-style-type: none"> Assess water conditions prior to race start Ensure water safety is sufficient for current conditions Consider redesign of swim course Cancel swim leg if water conditions are deemed unacceptable 	<i>Low</i>	<i>Race Director</i>	
Deterioration in Atmospheric Conditions, Cold/hot/storm/wind	<i>Possible</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> Assess atmospheric conditions prior to and during the swim leg Consider delaying the race start or cancelling the swim leg if conditions are unacceptable 	<i>Low</i>	<i>Race Director</i>	

				<ul style="list-style-type: none"> ● If conditions deteriorate during the race, implement the Emergency Response Plan to evacuate the swim course 			
Fast flowing water causing Competitors to be unable to maintain position at start and possibility of missing swim exit	<i>Possible</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> ● Assess water flow rate (use ML released from Burrundong Dam as guide) and if too fast cancel swim leg 	<i>Low</i>	<i>Race Director</i>	
Vessel enters course causing Competitor interference or injury	<i>Possible</i>	<i>Moderate</i>	<i>Moderate</i>	<ul style="list-style-type: none"> ● Assess at race start, only start if race if course is clear ● If necessary during race, Race Director implement the Emergency Response Plan to evacuate the swim course 	<i>Low</i>	<i>Race Director</i>	

BIKE COURSE:

Inherent risk (what can happen if no controls are put in place)	Likelihood	Consequence	Inherent Risk level	Controls to be implemented (Provide brief descriptions here, add more detail for the higher risks either in the main text or attach as a separate table)	Residual Risk level (after controls are in place)	Person(s) responsible	Brief Comments (e.g. monitoring methods)
Competitor injury due to Struck by vehicle	<i>Possible</i>	Major	<i>Catastrophic</i>	<ul style="list-style-type: none"> ● Remind competitors that they are responsible for their safety on course ● Remind competitors that they must give way to traffic at all times ● Make drivers aware of event in progress by placing warning signage ● marshals located at high risk locations, as described in the Traffic Management Plan 	<i>Moderate</i>	<i>Race Director</i>	
Competitor injury due to faulty equipment / Bike Condition	<i>Possible</i>	Major	<i>High</i>	<ul style="list-style-type: none"> ● Remind competitors that they are responsible for the safety of their own equipment ● Provide an opportunity for Technical Officials to inspect competitors' equipment and fastening of helmets 	<i>Moderate</i>	<i>Race Director</i>	
Competitor injury due to collision with another competitor Competitors gain an unfair advantage due to drafting Large Competitor Numbers	<i>Unlikely</i>	Major	<i>High</i>	<ul style="list-style-type: none"> ● Design wave starts at appropriate intervals to minimise congestion ● Technical Officials will be present on course in the form of tail and lead vehicles 	<i>Low</i>	<i>Race Director</i>	

Competitor injury due to collisions with spectators Competitor injury due to collisions with other road users Course layout	<i>Unlikely</i>	<i>Moderate</i>	<i>Moderate</i>	<ul style="list-style-type: none"> ● Signage, barriers and marshals located at high risk locations, as described in the Traffic Management Plan 	<i>Low</i>	<i>Race Director</i>	
Competitor injury due to Poor road conditions	<i>Unlikely</i>	<i>Moderate</i>	<i>Moderate</i>	<ul style="list-style-type: none"> ● Assess road conditions prior to race start ● Consider redesign of bike course ● Advise competitors of any hazards on the bike course ● Marshals, signage, ambulances located at high risk locations as described in the Traffic Management 	<i>Low</i>	<i>Race Director</i>	
Competitor injury due to High winds, torrential rain other environmental factors	<i>Possible</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> ● Assess atmospheric conditions prior to and during the bike leg ● Consider delaying the race start or cancelling the bike leg if conditions are unacceptable ● If conditions deteriorate during the race, implement the Emergency Response Plan to evacuate the bike course 	<i>Low</i>	<i>Race Director</i>	

RUN COURSE:

Inherent risk (what can happen if no controls are put in place)	Likelihood	Consequence	Inherent Risk level	Controls to be implemented (Provide brief descriptions here, add more detail for the higher risks either in the main text or attach as a separate table)	Residual Risk level (after controls are in place)	Person(s) responsible	Brief Comments (e.g. monitoring methods)
Competitor sickness due to infection from a volunteer	<i>unlikely</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> ● Ensure that all volunteers wear hygienic gloves when dealing with food and drinks 	<i>Low</i>	<i>Race Director</i>	
Competitor injury due to dehydration, exhaustion, Competitor Fitness	<i>Possible</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> ● Ensure sufficient aid stations on the run course ● Pre-race advice to competitors to ensure sufficient hydration throughout the race ● Access to medical assistance at the completion of the race 	<i>Low</i>	<i>Race Director</i>	
Competitor injury due to high winds, lightning or extreme heat	<i>Possible</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> ● Assess atmospheric conditions prior to and during the race ● Consider delaying the race start if conditions are unacceptable. ● If conditions deteriorate during the race, implement the Emergency Response Plan to evacuate the run course ● Consider locating additional aid stations if heat is extreme 	<i>Low</i>	<i>Race Director</i>	
Competitor injury due to a collision with a competitor on the bike	<i>Possible</i>	<i>Minor</i>	<i>Low</i>	<ul style="list-style-type: none"> ● Ensure a safe separation between the bike course and the run course 	<i>Low</i>	<i>Race Director</i>	

7

Aquatic Activity Operational Plan Template

course							
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Appendix 1: the qualitative measures of likelihood

LEVEL	DESCRIPTOR	LIKELIHOOD
A	Almost certain	Is expected to occur during this event
B	Likely	Will probably occur during this event
C	Possible	Might occur at some time (perhaps every 2-3 years)
D	Unlikely	Could occur at some time (perhaps every 4-10 years)
E	Rare	May occur only in exceptional circumstances (in more than 10 years)

Appendix 2: the qualitative measures of consequence or impact

LEVEL	DESCRIPTOR	MOST LIKELY CONSEQUENCE IF THE RISK OCCURRED
5	Catastrophic	One or more fatalities, or multiple significant injuries with extended hospitalisation, or wide spread inconvenience to the public over protracted period, or likely to appear as front page media reports, or cost of damage over \$1M, or significant unrecoverable damage to the environment
4	Major	Significant injuries (requiring hospital treatment), or major inconvenience to the public, or definitely appear in media, or cost of damage \$100K - \$1M, or environmental impact that is unconfined and requires long term recovery/residual damage
3	Moderate	One significant injury (requiring hospital treatment), or moderate inconvenience to the public, or would probably appear in media, or cost of damage \$10K - \$100K, or environmental impact that is confined with medium term recovery
2	Minor	Small number of minor injuries requiring first aid treatment, or some inconvenience to the public, or may appear in media, or cost of damage \$1K - \$10K, or environmental impact locally confined with short term recovery
1	Insignificant	One injury requiring first aid treatment, or cost of damage up to \$1K, or environmental impact locally confined and promptly reversible

Appendix 3: The risk level using the Probability Matrix

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (almost certain)	Moderate risk	Moderate risk	High risk	Extreme risk	Extreme risk
B (likely)	Low risk	Moderate risk	High risk	Extreme risk	Extreme risk
C (possible)	Low risk	Low risk	Moderate risk	High risk	Extreme risk
D (unlikely)	Low risk	Low risk	Moderate risk	High risk	High risk
E (rare)	Low risk	Low risk	Low risk	Moderate risk	High risk

KEY:

Extreme risk	Attention required before applying for licence
High risk	Attention needed, preferably before applying for licence, certainly before event
Moderate risk	Requires constant vigilance during event
Low risk	Requires monitoring during event



TRAFFIC MANAGEMENT PLAN

2024/25 RACE SEASON

BIKE COURSE –SPRINT DISTANCE AND SHORT COURSE

Pre-Race

- An assessment of road conditions will be undertaken prior to any race and signage displayed
- If road conditions are deemed unsafe, the Race Director cancel the bike leg
- The Race Director will conduct a pre-race participants briefing, including identification of bike start and finish point, identification of hazards e.g. road crossing and intersections
- Participants will be reminded that regular road rules will apply during the bike leg

Road Signage Installation

- Only Signage that meets Section 40 of Road Safety and Traffic Management guidelines, will be used
- Set out by at least two people with an ITCP qualification prior to the race briefing
- Signs will be laid out as per approved Traffic Control Plan (TCP)
- Additional “way finding” Club branded guidance signage can be added to the course at the discretion of the race director

Escort Vehicles (As per Police approval)

- Two Escort vehicles (Tail and Lead) Must be provided to create a positive awareness of the presence of participants on the road
- Escort vehicles will not stop or obstruct traffic
- Escort vehicles will travel with head and tail lamps on
- Lead Escort vehicle will be positioned ahead of the leading participant and is not to be overtaken by participants
- Tail Escort vehicles will be positioned approx. 300m behind the last participant
- Escort vehicles will be fitted with a flashing amber light on the highest point of the roof
- Escort vehicles will display signage in accordance with Section 40 of Road Safety and Traffic Management guidelines
 - Lead –“Caution cyclists following”,
 - Tail – “Caution Cyclists ahead”

Bike Marshal duties (Road Safety Team)

- As part of conditions of road use the Dubbo Triathlon Club will provide four road marshals for a regular Sprint distance, and three marshals for a Super Sprint Distance.
- The Dubbo Triathlon Club at no stage during its events will stop or control motor vehicles, unless in possession of an approved Traffic Control plan and the qualifications to do so
- The road marshals' major job is to make bicycle riders aware of motor vehicles movements on the road and traffic conditions
- Marshals will wear fluoro vests that are clearly visible to road users; they may also have flags or slow batons to warn riders of coming motor vehicle traffic
- All marshals will carry a two way radio, and back up mobile phones to make emergency calls if accidents/injuries occur
- Marshals will be located as per the approved TCP at the Bligh Street commencement of the bike ride, at the intersection of Bligh Street and Macquarie Street, and at the two turn around point of the bike leg
- Dubbo Triathlon Club will make sure all races are conducted to set out guidelines as provided that enable safe and incident free races to all parties affected
- In the absence of a nominated Medical Director, the Race Director will be responsible for managing the first response to illness or injury

Race Procedure

During the triathlon event the only time road ways are used is during the bike leg. Swimming and running legs do not require use of the road.

- At conclusion of the swim leg competitors will put on helmets and collect bicycles at transition
- They will then make their way from Ollie Robbins Oval through the gap in the fence on the eastern side of the oval and across Bligh Street pushing their bikes
- This area will south of the construction area of the intersection of Church Street and Bligh Street
- Race marshals will direct cyclist only across the road and not at any time traffic
- They will get on bikes on the eastern side of Bligh Street and ride under NSW Police Guidelines
- They will move along Bligh Street, and make a right turn into Macquarie Street
- They will follow Macquarie Street out of town limits where it becomes the Old Dubbo Road
- They will turn at a distance of approximately 4.5 km (short course) or 9 km (sprint course) from start and return to transition area at Ollie Robins Oval
- They will then commence the run leg which is along the Macquarie River walking trail which at no time crosses on to roads
- Bike legs riders cannot ride in groups at any stage and will be riding singularly at all times – drafting is not permitted as per Triathlon Australia rules

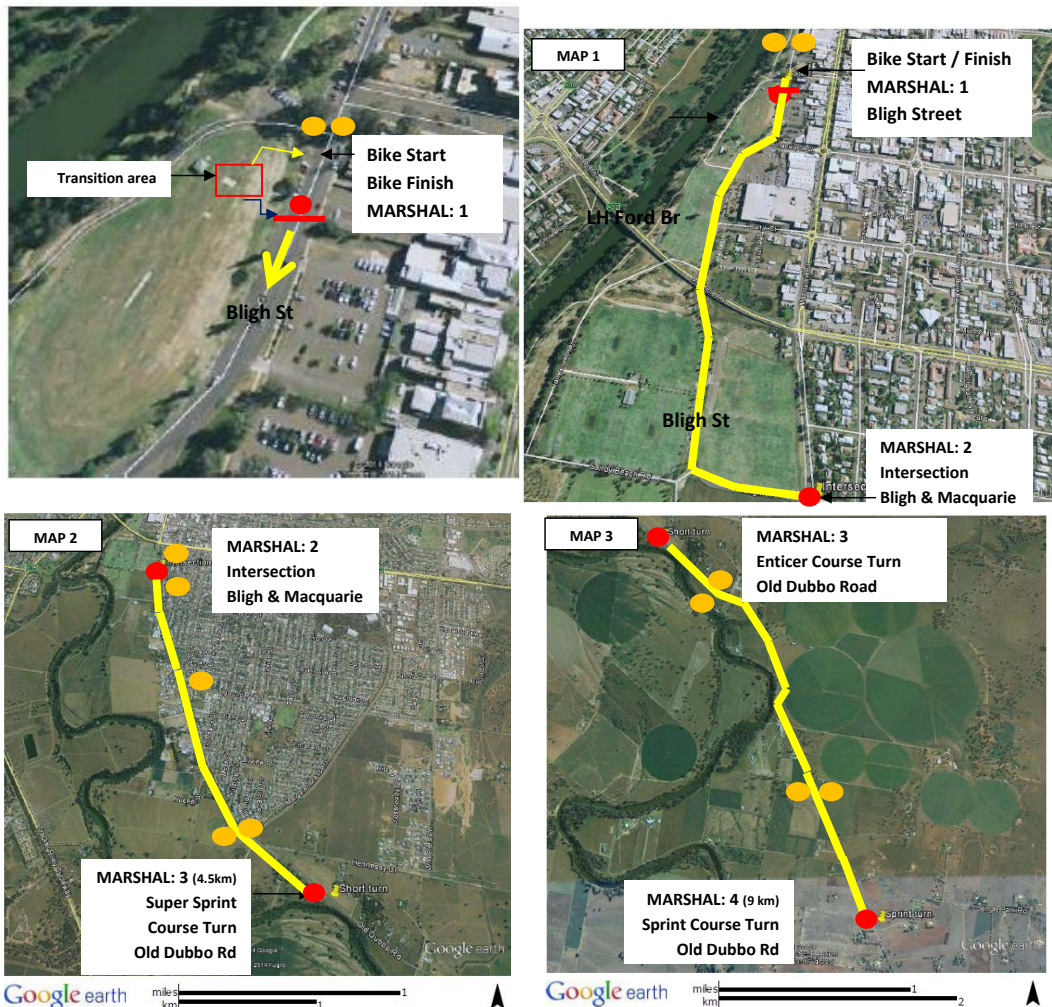
Attachments to accompany this plan:

- Bike course map
- Traffic Control plan (TCP – designed by Dubbo Traffic Control)
- Police approval, once received
- Council Approval, once received



SPRINT and SUPER SPRINT BIKE COURSE MAP

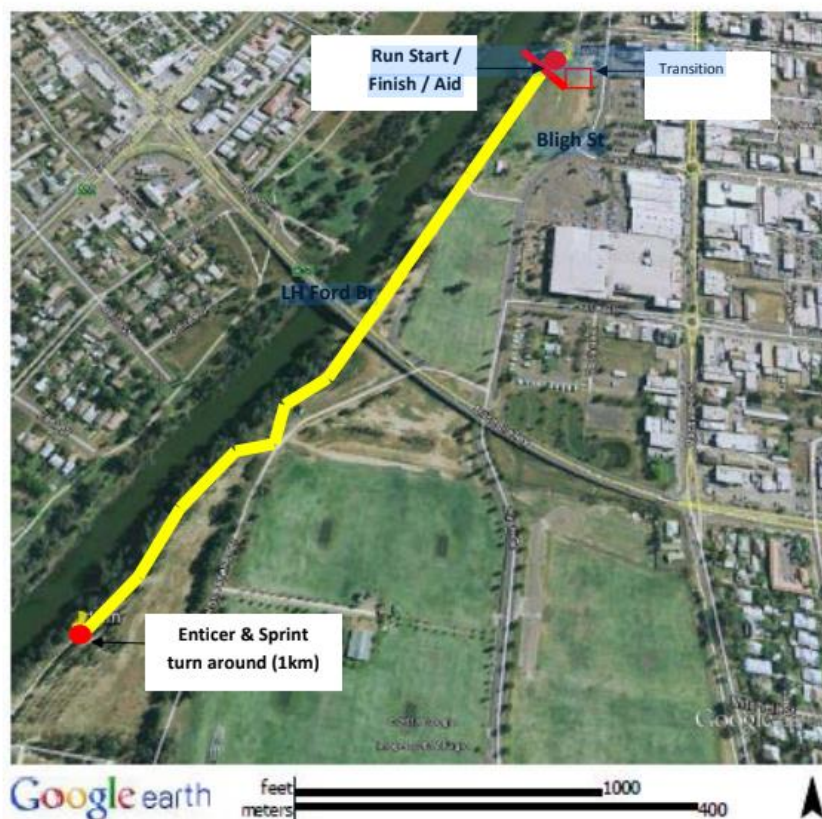
BIKE COURSE –SUPER SPRINT (9km) and SPRINT (18km)



Notes:

- * Race director to conduct pre-race safety inspection of the course and participant's race briefing
- * Signage on roads including "Cyclists ahead" and "Caution triathlon in process"
- * Bike legs are out and back starting at Bligh St adjacent to transition area on Ollie Robbins oval

RUN COURSE – ENTICER (2km), and SPRINT (4km)

**Notes:**

- * Race director to conduct pre-race safety inspection of the course and participant's briefing
- * Enticer course is out and back on mixture of bitumen and gravel surfaces
- * Sprint course is 2 laps of short course on mixture of bitumen and gravel surfaces
- * Run start and finish adjacent to transition area at Ollie Robbins Oval
- * Drink and aid station is adjacent to start / finish line therefore at 2 km intervals (1km for mini)



-

**APPLICATION – SPECIAL EVENT
RESOURCES**

**Special Event Transport Management Plan
Template**



PO Box 81 Phone: 6801 4000
DUBBO 2830 Fax: 6801 4259
E-mail: council@dubbo.nsw.gov.au

Note: Refer to Chapter 7 of the Guide for a complete description of the Transport Management Plan

1. EVENT SUMMARY

1.1 Event Details

Event name: Dubbo Triathlon Club 2024/2025 Summer Triathlon Series
Event location: Macquarie River, Ollie Robbins Oval, Bligh Street, Macquarie St, Old Dubbo Road Dubbo
Event date: See attached Event start time: 8am : Event finish time: 11pm
Event setup start time: 7am Event pack down finish time: 12pm
Event is ☐ off-street ☒ on-street moving ☒ on-street non-moving ☒ held regularly throughout the year (calendar)

1.2 Event Organiser

Title: Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Other ☐
Surname: Mertens
Given name/s: Melissa
Event management company name (if applicable): _____
Postal address: 62 Dalton Street Dubbo
Business phone: 0425090833
E-mail: Dubbotriathlonclub@gmail.com

Police: Phone: 68831681 E-mail: donl1mic@police.nsw.gov. Mobile: _____
Council: Phone: 68014930 E-mail: Dennis.valentine@dubbo.nsw Mobile: 0418244350
Roads and Maritime Services (if Class 1 – regional NSW and Class 2 event) Phone: _____ E-mail: _____ Mobile: _____

Note: The event organiser is the person or organisation in whose name the Public Liability Insurance is taken out.

1.3 Brief description of the event (one paragraph)

Dubbo Triathlon Club Plan to facilitate regular events from December 2024 - April 2025 as part of the our Triathlon Summer series calendar. Events comprise of a Swim in the Macquarie River, a Cycle along Council local Roads (Bligh St and Old Dubbo Rd), and finis with a run along the Macquarie River Foreshore.

2. RISK MANAGEMENT - TRAFFIC

Class 1	Class 2	Class 3	2.1	Occupational Health and Safety – Traffic Control
				X Risk assessment plan/s attached.
			2.2	Public Liability Insurance
				x Public liability insurance arranged. Certificate of currency attached.
Class 1	Class 2	Class 3	2.3	Police
				<input type="checkbox"/> Police written approval obtained.
			2.4	Fire Brigades and Ambulance
				<input type="checkbox"/> Fire brigades notified. <input type="checkbox"/> Ambulance notified.

3. TRAFFIC AND TRANSPORT MANAGEMENT

Class 1	Class 2	Class 3	3.1	The route or location
				<input checked="" type="checkbox"/> Map attached.
			3.2	Parking
				<input type="checkbox"/> Parking organised – details attached.
				<input checked="" type="checkbox"/> Parking not required.
			3.3	Construction, traffic calming and traffic generating developments
				<input type="checkbox"/> Plans to maximise impact of construction activities, traffic calming devices or traffic generating developments attached.
				<input type="checkbox"/> There are no construction activities, traffic calming devices or traffic generating developments at the location/route or on the detour routes.
			3.4	Trusts, authorities or Government enterprises
				<input checked="" type="checkbox"/> This event uses a facility managed by a trust, authority or enterprise; written approval attached.
Class 1	Class 2	Class 3		<input type="checkbox"/> This event does not use a facility managed by a trust, authority or enterprise.
			3.5	Impact on/of public transport
				<input type="checkbox"/> Public transport plans created – details attached.
				<input checked="" type="checkbox"/> Public transport not impacted or will not impact event.
			3.6	Reopening roads after moving events
				<input type="checkbox"/> This is a moving event – details attached.
				<input checked="" type="checkbox"/> This is a non-moving event.
			3.7	Traffic management requirements unique to this event
				<input checked="" type="checkbox"/> Description of unique traffic management requirements attached.
				<input type="checkbox"/> There are no unique traffic requirements for this event.
Class 1	Class 2	Class 3	3.8	Contingency plans
				<input type="checkbox"/> Contingency plans attached.
			3.9	Heavy vehicle impacts
				<input type="checkbox"/> Impacts heavy vehicles – RMS/TMC to manage.
				<input checked="" type="checkbox"/> Does not impact heavy vehicles.
			3.10	Special event clearways
				<input type="checkbox"/> Special event clearways required – RMS/TMC to manage
				<input checked="" type="checkbox"/> Special event clearways not required

4. MINIMISING IMPACT ON NON-EVENT COMMUNITY AND EMERGENCY SERVICES

Class 1	Class 2	Class 3	4.1 Access for local residents, businesses, hospitals and emergency vehicles
			<input type="checkbox"/> Plans to minimise impact on non-event community attached. <input checked="" type="checkbox"/> This event does not impact the non-event community either on the main route (or location) or detour routes.
			4.2 Advertise traffic management arrangements
			<input type="checkbox"/> Road closures or restrictions – advertising medium and copy of proposed advertisements attached. <input type="checkbox"/> No road closures or restrictions but special event clearways in place – advertising medium and copy of proposed advertisement attached. <input checked="" type="checkbox"/> No road closures, restrictions or special event clearways – advertising not required.
			4.3 Special event warning signs
			<input type="checkbox"/> Special event information signs are described in the Traffic Control Plan/s. <input checked="" type="checkbox"/> This event does not require special event warning signs.
			4.4 Permanent variable message signs
			<input type="checkbox"/> Messages, locations and times attached. <input checked="" type="checkbox"/> This event does not use permanent variable message signs.
			4.5 Portable variable message signs
			<input type="checkbox"/> The proposed messages and locations for portable VMS are attached. <input checked="" type="checkbox"/> This event does not use portable VMS.

5. PRIVACY NOTICE

The 'Personal Information' contained in the completed Transport Management Plan (TMP) may be collected and held by the NSW Police, the NSW Roads and Maritime Services (RMS), or Local Government.

I declare that the details in this application are true and complete. I understand that:

- ☐ The 'personal information' is being collected for submission of the TMP for the event described in Section 1 of this document.
- ☐ I must supply the information under the Road Transport Legislation (as defined in the *Road Transport (General) Act 1999*) and the *Roads Act 1993*.
- ☐ Failure to supply full details and to sign or confirm this declaration can result in the event not proceeding.
- ☐ The 'personal information' being supplied is either my own or I have the approval of the person concerned to produce his/her 'personal information'.
- ☐ The 'personal information' held the Police, RMS/TMC or Local Government may be disclosed inside and outside of NSW to event managers or any other person or organisation required to manage or provide resources to conduct the event or to any business, road user or resident who may be impacted by the event.
- ☐ The person to whom the 'personal information' relates has a right to access or correct it in accordance with the provisions of the relevant privacy legislation.

6. APPROVAL

TMP Approved by: Dubbo Traffic Control Event Organiser Date: _____

7. AUTHORISATION TO *REGULATE TRAFFIC

Council's traffic management requirements have been met. Regulation of traffic is therefore authorised for all non-classified roads described in the risk management plans attached to this TMP.

Regulation of traffic authorised by: Dubbo Regional Council Date: _____

The RMS/TMC's traffic management requirements have been met. Regulation of traffic is therefore authorised for all classified roads described in the risk management plans attached to the TMP.

Regulation of traffic authorised by: _____ RMS/TMC Date: _____

*Regulate traffic' means restrict or prohibit the passage along a road of persons, vehicles or animals (Roads Act, 1993). Council and RMS/TMC require traffic to be regulated as described in the risk management plans with the layouts installed under the direction of a qualified person.

SPECIAL EVENT GUIDE						
Special Event Planning & Resource Matrix						
Event Class	Description	Features	Examples	Lead Times for Agency Approval	Police Fees	Council Fees
1	<p>A Class 1 Event:</p> <ul style="list-style-type: none"> Impacts major traffic & transport systems; disrupts the non-event community over a wide area requires the involvement of Police or more Councils and the RMS/TMC; requires detailed Transport Management Plan requires advertising the event's traffic aspects to a wide audience 	<ul style="list-style-type: none"> A Class 1 event may: <ul style="list-style-type: none"> be conducted on road or in its own venue involve trucks and authorities when using facilities managed by them involve Transport Management Centre involve the NSW Train, Sydney Trains and State Transit; involve the Light Rail, Ferries and Port to Port Transport involve private bus and coach organisations impact the road transport industry require RMS/TMC; to provide Special Event Clearways require RMS/TMC; to provide heavy vehicle decouplers require the RMS to adjust traffic signals require RMS/TMC; to manage Variable Message Signs depending on the nature of the event, involve the Police "User Pay" policy A Class 2 event may: <ul style="list-style-type: none"> be conducted on road or in its own venue involve trucks and authorities when using facilities managed by them involve the NSW Train, Sydney Trains and State Transit; involve the Light Rail, Ferries and Port to Port Transport involve private bus and coach organisations impact the road transport industry require RMS/TMC; to provide Special Event Clearways require RMS/TMC; to provide heavy vehicle decouplers require the RMS to adjust traffic signals require RMS/TMC; to manage Variable Message Signs depending on the nature of the event, involve the Police "User Pay" policy 	<p>For example:</p> <ul style="list-style-type: none"> an event that affects a principal transport route in Sydney or an event that affects a principal transport route through a country town or a bicycle race that involves the Sydney Harbour Bridge 	<p>Minimum 4 months from first approach to Council to proposed start date</p> <p>6 months for vehicle races</p>	<p>Charges apply where "it is deemed" the services are specifically for the benefit of those attending the event and not for the benefit of the public at large</p>	<p>As described in Council's Special Events Policy</p> <p>Asset rentals refer to Council</p> <p>RMS/TMC provides quote</p> <p>Asset rentals refer to RMS/TMC</p>
2	<p>A Class 2 Event:</p> <ul style="list-style-type: none"> Impacts local traffic and transport systems but does not impact major traffic & transport systems; disrupts the non-event community over a wide area requires the involvement of Police and Local Council Requires a detailed Transport Management Plan Requires advertising the event's traffic aspect to the local community 	<ul style="list-style-type: none"> A Class 2 event may: <ul style="list-style-type: none"> be conducted on road or in its own venue involve trucks and authorities when using facilities managed by them involve the NSW Train, Sydney Trains and State Transit; involve the Light Rail, Ferries and Port to Port Transport involve private bus and coach organisations impact the road transport industry require RMS/TMC; to provide Special Event Clearways require RMS/TMC; to provide heavy vehicle decouplers require the RMS to adjust traffic signals require RMS/TMC; to manage Variable Message Signs depending on the nature of the event, involve the Police "User Pay" policy A Class 3 event: <ul style="list-style-type: none"> disrupts local or major traffic & transport systems disrupts the non-event community in the immediate area only requires Local Council and Police consent is conducted on street in a very low traffic area such as a dead-end or cul-de-sac requires Police agreement that event qualified as Class 3 is never used for vehicle races 	<p>For example:</p> <ul style="list-style-type: none"> an event that affects a principal transport route in a town or shopping centre but does not impact a principal transport route or highway a motor rally on local country roads 	<p>Minimum 3 months for vehicle races</p>	<p>Charges apply where "it is deemed" the services are specifically for the benefit of those organising and/or attending the event and not for the benefit of the public at large</p>	<p>As described in Council's Special Events Policy</p> <p>Asset rentals refer to Council</p>
3	<p>A Class 3 Event:</p> <ul style="list-style-type: none"> disrupts local or major traffic & transport systems disrupts the non-event community in the immediate area only requires Local Council and Police consent is conducted on street in a very low traffic area such as a dead-end or cul-de-sac requires Police agreement that event qualified as Class 3 is never used for vehicle races 	<ul style="list-style-type: none"> A Class 3 event: <ul style="list-style-type: none"> disrupts local or major traffic & transport systems disrupts the non-event community in the immediate area only requires Local Council and Police consent is conducted on street in a very low traffic area such as a dead-end or cul-de-sac requires Police agreement that event qualified as Class 3 is never used for vehicle races A Class 4 Event: <ul style="list-style-type: none"> is not a protest or demonstration is always an on-street event does not require RMS/TMC or Council consent does not require advertising the event's traffic aspect to the community does not require a Transport Management Plan does not require the involvement of other Government Agencies 	<p>For example:</p> <ul style="list-style-type: none"> a small ANZAC Day march in a country town a small parade conducted under Police escort 	<p>Minimum 6 weeks</p>	<p>Charges apply where "it is deemed" the services are specifically for the benefit of those organising and/or attending the event and not for the benefit of the public at large</p>	<p>As described in Council's Special Events Policy</p> <p>Asset rentals refer to Council</p>
4	<p>A Class 4 Event:</p> <ul style="list-style-type: none"> is not a protest or demonstration is always an on-street event does not require RMS/TMC or Council consent does not require advertising the event's traffic aspect to the community does not require a Transport Management Plan does not require the involvement of other Government Agencies 	<ul style="list-style-type: none"> A Class 4 event may: <ul style="list-style-type: none"> be conducted on classified or unclassified roads cause zero to considerable disruption to the non-event community cross Police Local Area Command (LAC) cross Local Government Areas (LGAs) require Council or RMS/TMC to advise when requested by Police depending on the nature of the event, involve the Police "User Pay" policy 	<p>For example:</p> <ul style="list-style-type: none"> a small ANZAC Day march in a country town a small parade conducted under Police escort 	<p>Minimum 1 month</p>	<p>Charges apply where "it is deemed" the services are specifically for the benefit of those organising and/or attending the event and not for the benefit of the public at large</p>	<p>As described in Council's Special Events Policy</p> <p>Asset rentals refer to Council</p>

Special Event Guide

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Event Class	Transport Management Plan	Risk Management Plan (Traffic Control) under OHAS Act 2000	Advisive Transport Management Arrangements	Liability Insurance	Special Event Clearance, Heavy Vehicle Detector	Public Transport	Emergency Vehicle & Local Access	Parking	Contingency Planning
1	TMP model recommended	Traffic control layouts drawn up by a qualified person and installed under the guidance of a qualified person recommended	28 days for all events that require regulation of traffic or where special event clearways in operation Not required where there is no regulation of traffic	Required with Council, TMC & Police (if police user Pays in force) M&S must Certificate of currency required	RMS arranges if required M&S provides quote	Promote where practicable	Required. Refer to TMP	May be required Need to consider parking for disabled persons	Recommended
2	TMP model recommended	Traffic control layouts drawn up by a qualified person and installed under the guidance of a qualified person recommended	28 days for all events that require regulation of traffic or where special event clearways in operation Not required where there is no regulation of traffic	Required with Council & Police (if police user Pays in force) named on policy Certificate of currency required		Promote where practicable	Required. Refer to TMP	May be required Need to consider parking for disabled persons	Recommended
3	TMP model recommended	Traffic control layouts drawn up by a qualified person and installed under the guidance of a qualified person recommended	28 days for all events that require regulation of traffic or where special event clearways in operation Not required where there is no regulation of traffic	Required with Council & Police (if police user Pays in force) named on policy Certificate of currency required			Required. Refer to TMP		
4				Required with Council & Police (if police user Pays in force) named on policy Certificate of currency required			Required. Refer to TMP		

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Schedule 1 Form – Notice of Intention to Hold a Public Assembly
 Taken from NSW Police website:
https://www.police.nsw.gov.au/data/assets/pdf_file/0007/275560/Notice_of_intention_to_Hold_a_Public_Assembly.pdf

Summary Offences Act 1988
 To the Commissioner of Police

1 I,
Name

of
Address

on behalf of
Organisation

notify the Commissioner of Police that on the
Day

of
Month/Year

it is intended to hold:

either:

(a) a public assembly, not being a procession, of approximately
Number persons which will assemble

at
Place

at approximatelyam/pm
Time

and disperse at approximatelyam/pm
Time

or

(b) a public assembly, being a procession of approximately
Number

persons which will assemble at
Place

at approximatelyam/pm
Time

and at approximatelyam/pm the procession will

commence and shall proceed

.....

Specify route, any stopping places and the approximate duration of any stop; and the approximate time of termination. A diagram may be attached.

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2 The purpose of the proposed assembly is.....

.....

.....

State purpose:

3 The following special characteristics associated with the assembly would be useful for the Commissioner of Police to be aware of in regulating the flow of traffic or in regulating the assembly:

* (i) There will be (number) of vehicles and/or* floats involved and their type and dimensions are as follows:

.....

.....

* (ii) There will be (number) of bands, musicians, entertainers etc entertaining or addressing the assembly

* (iii) The following number and type of animals will be involved in the assembly

.....

.....

* (iv) Other special characteristics of the proposed assembly are as follows:

.....

.....

4 I take responsibility for organising and conducting the proposed public assembly.

5 Notices for the purposes of the *Summary Offences Act 1988* may be served on me at the following:

Address:

.....

..... Post Code.....

Telephone:

Signed:

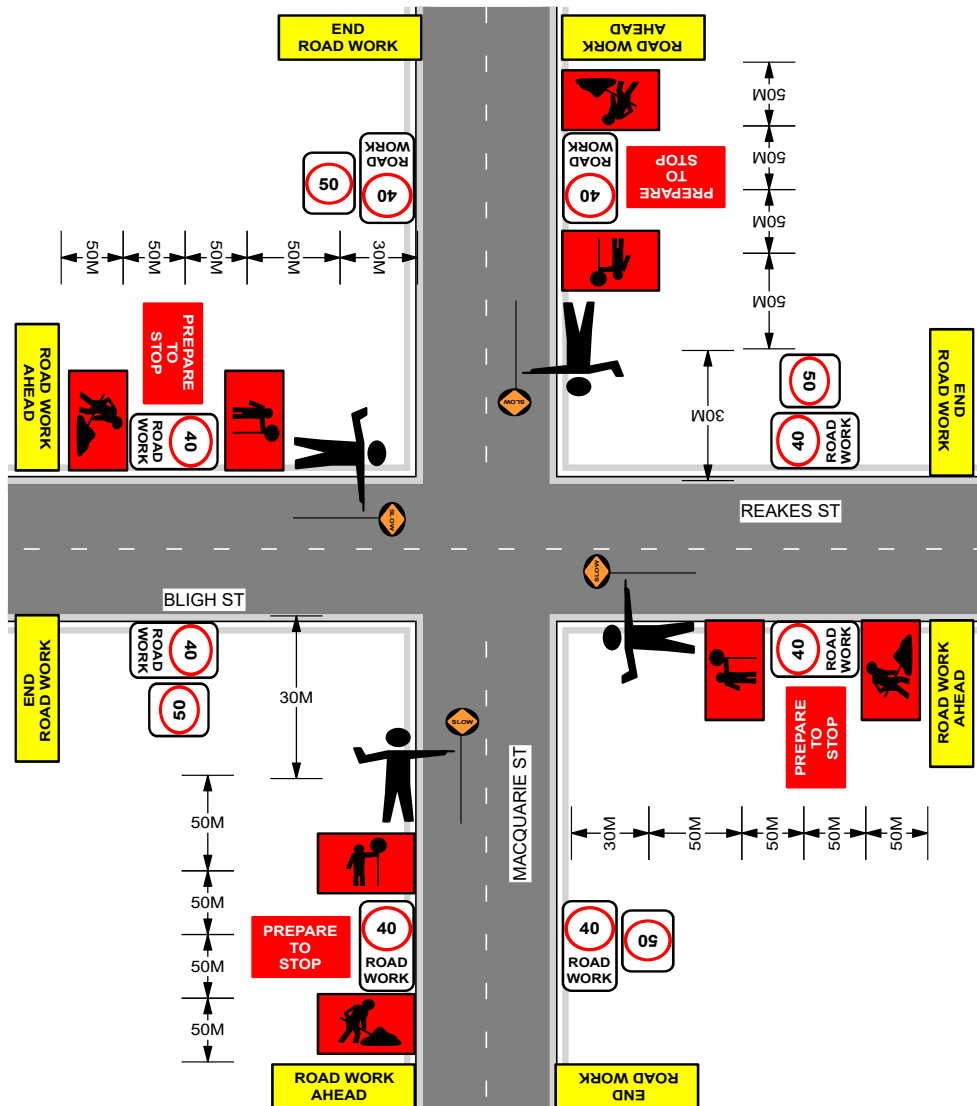
Capacity/Title:

Date:

Delete as applicable

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BLIGH & MACQUARIE ST EVENT 091024

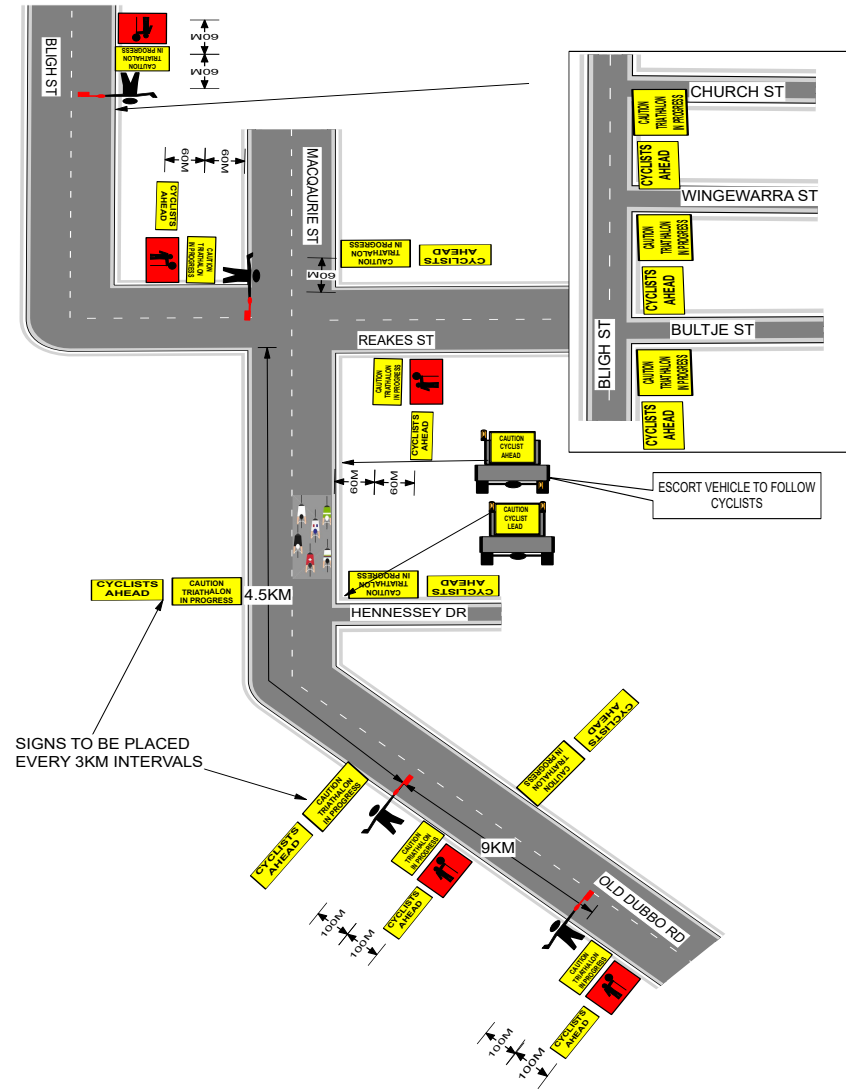


Date: 09/10/24 Project: TRIATHLON CONTRACTOR: DUBBO TRIATHLON CLUB
 REF TCP: n/a TCP: DUBBO-DTC-OLD DUBBO RD- 091024 APPROVED BY:
 AUTHOR: TRENT MCKEOWN CERTIFICATE No: TCT0074294 SCALE: NOT TO SCALE. Copyright ©

Comments:



BLIGH & OLD DUBBO RD TRIATHALON 091024



Date: 09/10/24 Project: TRIATHLON CONTRACTOR: DUBBO TRIATHLON CLUB
 REF TCP: n/a TCP: DUBBO-DTC-OLD DUBBO RD- 091024 APPROVED BY:
 AUTHOR: TRENT MCKEOWN CERTIFICATE No: TCT0074294 SCALE: NOT TO SCALE. Copyright ©

Comments:



Community and Recreation
Multiple Event List Report

Reporting Event Date Range: 31/07/2024 - 30/04/2025

<u>Start Date/Time</u>	<u>End Date/Time</u>	<u>Event Name</u>	
Sun	Sun	Sport	<i>Confirmed</i>
03/11/2024 07:00 AM	03/11/2024 01:00 PM	[71944] Dubbo Triathlon Club Competition	
Ollie Robbins Oval		Sun 03/11/2024 07:00 AM - Sun 03/11/2024 01:00 PM	
Tracker Riley Walkway		Sun 03/11/2024 07:00 AM - Sun 03/11/2024 01:00 PM	
Sun	Sun	Sport	<i>Confirmed</i>
08/12/2024 07:00 AM	08/12/2024 01:00 PM	[71945] Dubbo Triathlon Club Competition	
Ollie Robbins Oval		Sun 08/12/2024 07:00 AM - Sun 08/12/2024 01:00 PM	
Tracker Riley Walkway		Sun 08/12/2024 07:00 AM - Sun 08/12/2024 01:00 PM	
Sun	Sun	Sport	<i>Confirmed</i>
15/12/2024 07:00 AM	15/12/2024 01:00 PM	[71946] Dubbo Triathlon Club Competition	
Ollie Robbins Oval		Sun 15/12/2024 07:00 AM - Sun 15/12/2024 01:00 PM	
Tracker Riley Walkway		Sun 15/12/2024 07:00 AM - Sun 15/12/2024 01:00 PM	
Sun	Sun	Sport	<i>Confirmed</i>
16/02/2025 07:00 AM	16/02/2025 01:00 PM	[71947] Dubbo Triathlon Club Competition	
Ollie Robbins Oval		Sun 16/02/2025 07:00 AM - Sun 16/02/2025 01:00 PM	
Tracker Riley Walkway		Sun 16/02/2025 07:00 AM - Sun 16/02/2025 01:00 PM	
Sun	Sun	Sport	<i>Confirmed</i>
23/03/2025 07:00 AM	23/03/2025 01:00 PM	[71948] Dubbo Triathlon Club Competition	
Ollie Robbins Oval		Sun 23/03/2025 07:00 AM - Sun 23/03/2025 01:00 PM	
Tracker Riley Walkway		Sun 23/03/2025 07:00 AM - Sun 23/03/2025 01:00 PM	
Sun	Sun	Sport	<i>Confirmed</i>
06/04/2025 07:00 AM	06/04/2025 01:00 PM	[71949] Dubbo Triathlon Club Competition	
Ollie Robbins Oval		Sun 06/04/2025 07:00 AM - Sun 06/04/2025 01:00 PM	
Tracker Riley Walkway		Sun 06/04/2025 07:00 AM - Sun 06/04/2025 01:00 PM	

Total Events: 6	REPORT BALANCE:	\$0.00	\$0.00	\$0.00	\$0.00
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REPORT: Dubbo Transportation Strategy - Progress and Update Report

DIVISION: Infrastructure
REPORT DATE: 31 October 2024
TRIM REFERENCE: ID24/2017

EXECUTIVE SUMMARY

Purpose	Strategic Project Update.	
Issue	<ul style="list-style-type: none"> Council adopted the Dubbo Transportation Strategy 2020 at its Ordinary Meeting of 25 October 2021. The Strategy identifies strategic road requirements to accommodate future growth and is supported by a design and construction program for roads, footpaths, and cycle ways. Projects identified in the Dubbo Transportation Strategy 2020 are being further developed and implemented in the following areas of Dubbo: <ul style="list-style-type: none"> North-west Urban Release Area: <ul style="list-style-type: none"> Northern Macquarie-Wambuul River bridge crossing. River Street West (spine road). Central-west Urban Release Area: <ul style="list-style-type: none"> River Street West (spine road). Western Distributor Road, including an overpass over the Main Western railway corridor. South-west Urban Release Area: <ul style="list-style-type: none"> South Bridge Project. South-east Urban Release Area: <ul style="list-style-type: none"> Southern Distributor Road. Adoption of Heavy Haulage Route. Update to the Dubbo Strategic Traffic Model (applies to the whole Dubbo urban area). 	
Reasoning	<ul style="list-style-type: none"> The Dubbo Transportation Strategy 2020 will help Council facilitate an ongoing supply and mix of roads, footpaths, and cycle ways to accommodate the future growth in Dubbo. 	
Financial Implications	Budget Area	There are no financial implications arising from this report. Funding strategies for works are considered separately.
Policy Implications	Policy Title	There are no policy implications arising from this report. Developer Contributions police required updating in line with works schedules.

STRATEGIC DIRECTION

The Towards 2040 Community Strategic Plan is a vision for the development of the region out to the year 2040. The Plan includes six principal themes and a number of objectives and strategies. This report is aligned to:

Theme:	2 Infrastructure
CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.2 The road network meets the needs of the community in terms of traffic capacity, functionality and economic and social connectivity
Theme:	4 Leadership
CSP Objective:	4.1 Council provides transparent, fair and accountable leadership and governance
Delivery Program Strategy:	4.1.1 Council encourages and facilitates two-way communication with and between stakeholders and the community

RECOMMENDATION

That the report of the Manager Infrastructure Strategy and Design be noted.

Chris Godfrey
Director Infrastructure

MJ
Manager Infrastructure
Strategy and Design

BACKGROUND

The *Dubbo City Transportation Strategy to 2045* (attached as **Appendix 1**) was originally adopted by the former Dubbo City Council in November 2012 and precedes the current *Dubbo Transportation Strategy 2020*, adopted by Dubbo Regional Council in October 2021 (attached as **Appendix 2**). The former *Dubbo City Transportation Strategy to 2045* was prepared by the former Dubbo City Council to set the strategic direction for augmentation and further development of the Dubbo Road network to 2045, ensuring the projected population growth and accompanying commercial and industrial development in Dubbo was supported by a suitable road network.

The previous Strategy prepared by Dubbo City Council was underpinned by findings of the *Dubbo City Planning and Transportation Strategy 2036* prepared by Stapleton Transportation and Planning Pty Ltd (STAP) in 2009. This background study undertook a particularly detailed assessment of the traffic needs of Dubbo and provided the basis for the future road network.

In response to the changing transportation environment in Dubbo, including the announcement by the NSW Government in respect to the Newell Highway Bypass and River Street Bridge project, the Strategy was reviewed in 2021 and was adopted by Council at its Ordinary Meeting of 25 October 2021.

The *Dubbo Transportation Strategy 2020* responded to:

- The announcement by the NSW Government in 2013 in respect to the proposed duplication of the LH Ford Bridge, ultimately morphing into the Newell Highway Bypass and River Street Bridge project.
- The need for a new Development Contributions Plan for roads.
- Ensure that the strategic road network takes into account the recent changes in growth and demographic trends in Dubbo.

The purpose of the *Dubbo Transportation Strategy 2020* was to identify strategic road and transport requirements that support future growth in the city of Dubbo and ensure that transport systems meet the needs of the community well into the future.

The high-level objectives of the *Dubbo Transportation Strategy 2020* were to:

- Maintain Dubbo as a 10-minute city.
- Resolve current and projected congestion issues on the existing Macquarie-Wambuul River bridge crossings and the central Dubbo Road network, such as Cobra Street.
- Provide flexibility for movement without concentrating traffic.
- Continue to provide a high level of amenity for access throughout Dubbo, including future growth areas.
- Encourage and support truck movements by progressively developing freightways.
- Facilitate the growth and development of new urban release areas in south-east, south-west, central-west and north-west Dubbo.
- New infrastructure meets the needs of community and is affordable.

Previous Resolutions of Council

25 October 2021 Ordinary Council Meeting	<i>In Part</i> 2. <i>That the report entitled Dubbo Transportation Strategy 2020, prepared by Stapleton Transportation and Planning Pty Ltd be formally adopted as the new Transportation Strategy for Dubbo.</i>
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REPORT

Implementation of the Transportation Strategy

(a) North-west Urban Release Area

The North-west Development Control Masterplan was presented to Council and adopted at the 28 September 2023 Ordinary Council Meeting, the layout of which is shown in **Figure 1** below. Council also secured funding under the Housing Support Programme Stream 1 to prepare infrastructure and planning strategies for multiple urban release areas in Dubbo, including the North-west Precinct, work that will facilitate further development of this precinct in the future.



Northern Macquarie-Wambuul River bridge crossing and access to North-west Precinct.

The Transportation Strategy identifies the need for a northern bridge crossing of the Macquarie-Wambuul River to support the additional traffic generation from the North-west Precinct. The Newell Highway Bypass and River Street Bridge project, the location of which is

identified by the orange line in **Figure 1** above, satisfies this need, and is currently being constructed by Transport for NSW (TfNSW). To facilitate access to the North-West Precinct, Council obtained approval from TfNSW for an intersection on the Newell Highway, the location of which is identified by the intersection of the yellow and orange lines shown in **Figure 1** above. Council delivered the civil design for the Newell Highway intersection, and TfNSW are currently managing the construction on Council's behalf.

North-west and Central-west spine road (River Street West)

Another key project identified by the Transportation Strategy is the need for a spine road connecting both the North-west and Central-west urban release precincts to the River Street Bridge. The alignment of this spine road, also known as River Street West, is indicated by the yellow line in **Figure 1** above and continues into the Central-west Precinct, south of the Mitchell Highway.

In February 2023, Council was successful in obtaining \$9.23 million under the Accelerated Infrastructure Fund Round 3 to design and construct Stage 1 River Street West, ultimately connecting Bunglegumbie Road to the new Newell Highway alignment. The construction of this road provides the North-west Precinct with a second major access and will unlock a significant amount of future housing within the area. Council delivered the civil design plans for this project, with the contract for construction awarded to Maas Civil Pty Ltd. Early works for this project are now underway.

(b) Central-west Urban Release Area

The layout and structure of the Central-west Urban Release Area is covered under the Clearmont Rise Development Control Plan, which was adopted by Council in September 2023. The layout of the proposed development, including alignment of key roads is shown in **Figure 2** below.



Figure 2 – Central-West Precinct masterplan.

Council has worked extensively with the developer of Clearmont Rise to ensure key road alignments and corridors in the Central-west Precinct align with the key objectives of the Dubbo Transportation Strategy.

North-west and Central-west spine road (River Street West)

The Transportation Strategy identifies the need for a spine road connecting both the North-west and Central-west urban release precincts to the River Street Bridge. For the Central-west Precinct, the alignment of the spine road is indicated by the orange line in **Figure 2** above. The spine road crosses the Mitchell Highway at the intersection of Westview Street and continues through the North-west Precinct. The successful delivery of this road requires the acquisition of a road corridor through existing TAFE NSW land. Council has commenced discussions with TAFE NSW regarding the need for acquisition of this road corridor.

Western Distributor Road

The Dubbo Transportation Strategy identifies the need for a high-level distributor road, the alignment of which should generally follow the urban edge of West Dubbo. The distributor road enables future re-routing of heavy freight vehicles away from the city centre, as well as efficient distribution of West Dubbo traffic to the four future Macquarie-Wambuul River crossings. Whilst the project has historically been a long-term project for Dubbo, rapid growth and strong developer interest in West Dubbo has necessitated the finalisation of an alignment and corridor in areas where development is occurring.

Council has worked with the developer of Clearmont Rise to secure the alignment and corridor for the Western Distributor Road along the western edge of Clearmont Rise Estate, indicated by the yellow line in **Figure 2** above. The Western Distributor will intersect the Mitchell Highway at Richardson Road, and Minore Road at Chapmans Road.

The design of a rail overpass where the Western Distributor crosses the Main Western Railway corridor is also being developed by Council. The design of the overpass will enable Council to finalise the dimensions of the required corridor for the Western Distributor between the Main Western Railway corridor and Minore Road before further housing is developed in the area.

(c) South-west Urban Release Area

The South-west Urban Release Area is the third urban release area in West Dubbo. The land is generally defined by Joira, Minore, Buddens, Rifle Range and Blackbutt roads.

The location of the South-west Urban Release Area is shown in **Figure 3** below.



Figure 3 – South-west Urban Release Area.

South Bridge Project

The June 1998 *Dubbo Expanded Urban Area Traffic Management and Road Contribution Study*, prepared by PPK Environment and Infrastructure on behalf of Dubbo City Council, identified that to facilitate the growth of the south-western sector of Dubbo, a bridge crossing the Macquarie-Wambuul River would be required south of the existing LH Ford Bridge. The *Dubbo Transportation Strategy 2020* reinforces the need for additional river crossings to support population growth with the development of a peripheral road network and distribution of traffic around the city, reducing the demand on the highway corridors.

On 23 August 2019, Council received \$100,000 from the NSW Government for the investigation of a southern Macquarie-Wambuu River bridge crossing in Dubbo. Council engaged GHD to undertake a strategic concept design and options report, the *Dubbo South New Bridge Strategic Concept Design Report*. Four concept designs and alignments were developed, including costings. **Figure 4** below summarises the four alignments and their locations.

Council engaged Balmoral Group Australia to prepare a detailed Strategic Business Case, the *New South Dubbo Bridge Strategic Business Case*, and assist with the development of an online survey and community engagement strategy to gain feedback from the public on the four concept designs and alignments.

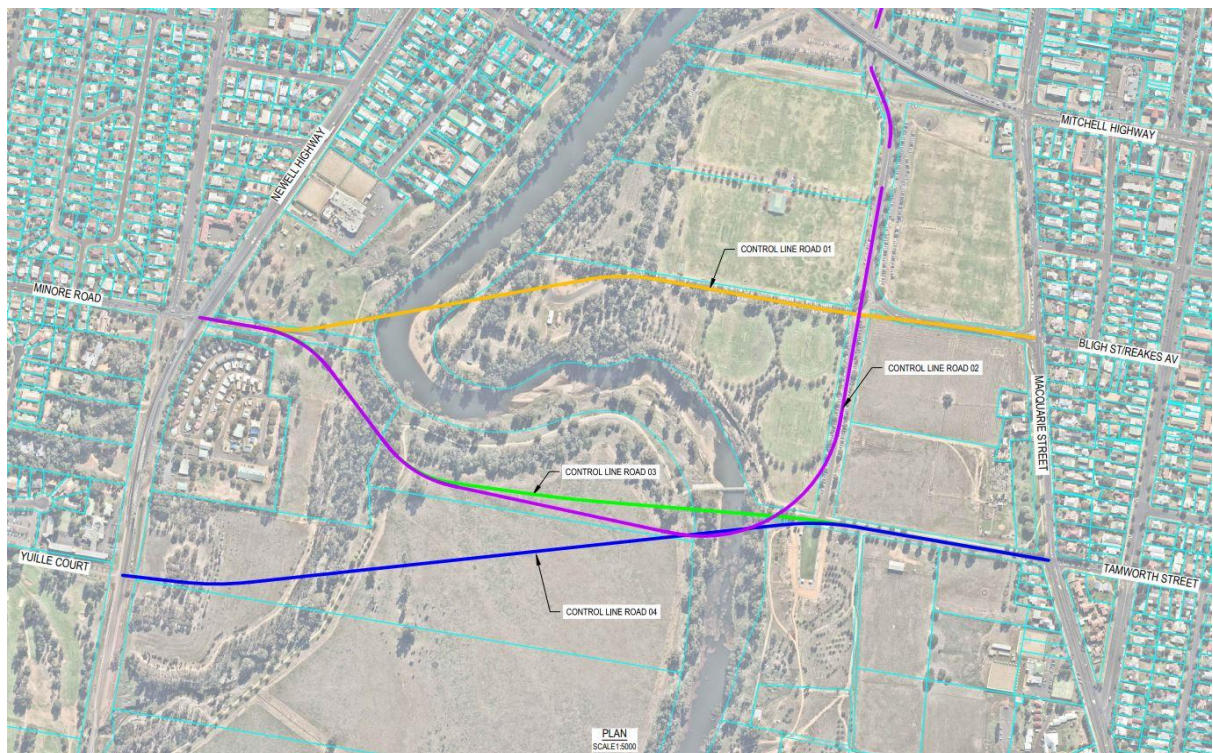


Figure 4 – Four concept alignment options for the South Bridge.

At its September 2023 Ordinary Meeting, Council resolved to pursue two preferred bridge and approach road alignments and prepare a detailed business case for both options. In reference to **Figure 4**, the green and blue alignments were selected as preferred options, with their individual alignments shown in **Figures 5** and **6** below. The yellow and magenta options were eliminated due to their impact on the environment and community sporting facilities, as well as the cost and complexity of construction.



Figure 5 – Green alignment: Minore Road to Tamworth Street.

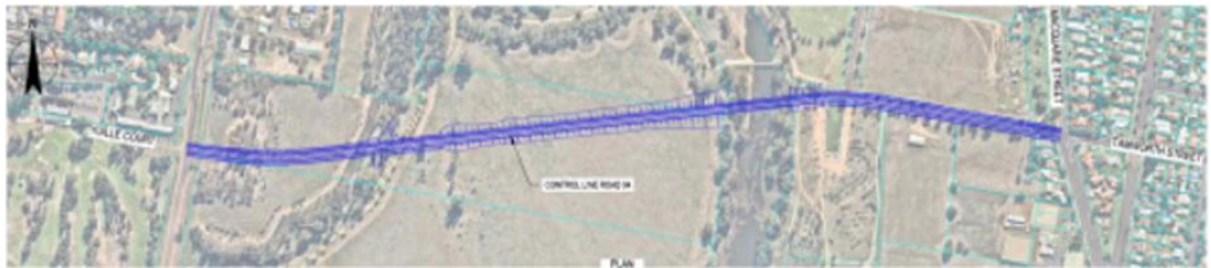


Figure 6 – Blue alignment: Dubbo Golf Club Driveway to Tamworth Street.

In response to community feedback, Council staff have identified several key tasks that need to be undertaken prior to the development of a detailed business case. These tasks include:

- Additional traffic modelling to further develop understanding of the impact the project may have on existing road networks.
- Development of design options for receiving roads, including Macquarie and Bligh streets to distribute traffic effectively and safely into the Dubbo CBD and South-east Dubbo. This work is in direct response to community feedback concerning traffic impacts on the amenity and safety of the Lady Cutler Oval sporting precinct, and adjacent Tracker Riley Cycleway.
- Development of designs for highway intersections in conjunction with TfNSW.
- Development of designs for the Macquarie Street Tamworth Street intersection.
- Undertaking of Aboriginal heritage and biodiversity studies for both alignment options to ensure impacts are considered in the detailed business case.

(d) South-east Urban Release Area

The South-east Residential Urban Release Area has experienced the majority of residential growth over the last five years and is projected to maintain a similar level of growth until at least 2035.

The location of the South-east Urban Release Area is shown in **Figure 7** below.

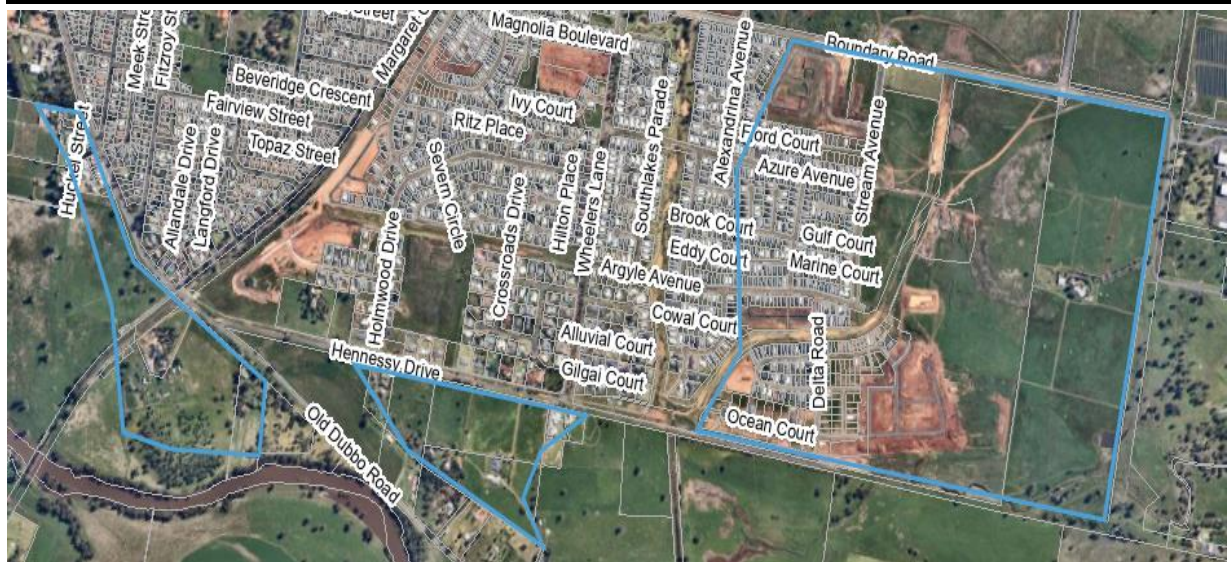


Figure 7 – South-east Urban Release Area.

Southern Distributor Road

The Transportation Strategy identifies the need for a fourth crossing of the Macquarie-Wambuuil River (South Bridge), allowing traffic from West Dubbo to travel to the Dubbo CBD, the Sheraton Road school precinct, and Blueridge Estate. Successful traffic utilisation of South Bridge, including its objective to feed traffic into South-East Dubbo, relies on the implementation of the Southern Distributor Road. The alignment of the Southern Distributor Road can be seen in **Figure 8** below, indicated predominately by the yellow lines.

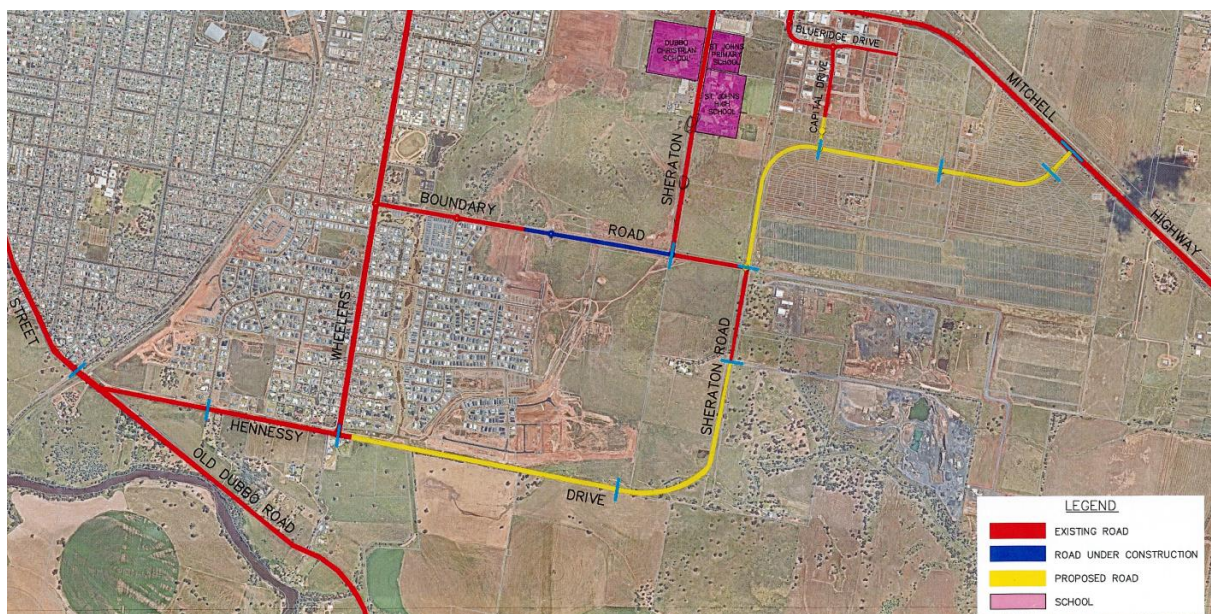


Figure 8 – Southern Distributor Road alignment (yellow line).

Council has undertaken significant strategic planning activities towards realisation of the Southern Distributor, including the development of designs and costings, as well as the identification and acquisition of road reserves. Council recently secured a road corridor for

the Southern Distributor along the southern edge of Southlakes Estate, the alignment of which is shown in **Figure 9** below. Council is also proceeding with the acquisition of a road corridor through Blueridge Estate, intersecting with the Mitchell Highway.



Figure 9 – Southern Distributor Road corridor acquisition area (blue shading).

South-East Dubbo Primary Haulage Route

There are three heavy industry developments currently located on Sheraton Road, including the South Keswick Quarry, Holcim Quarry, and South Keswick Concrete Works, the locations of which are identified in **Figure 10** below. Due to safety concerns associated with the presence of heavy vehicles on Sheraton Road and their mixing with school traffic, Council considered several interim and long-term haulage route solutions, summarised by different coloured alignments in **Figure 10** below.

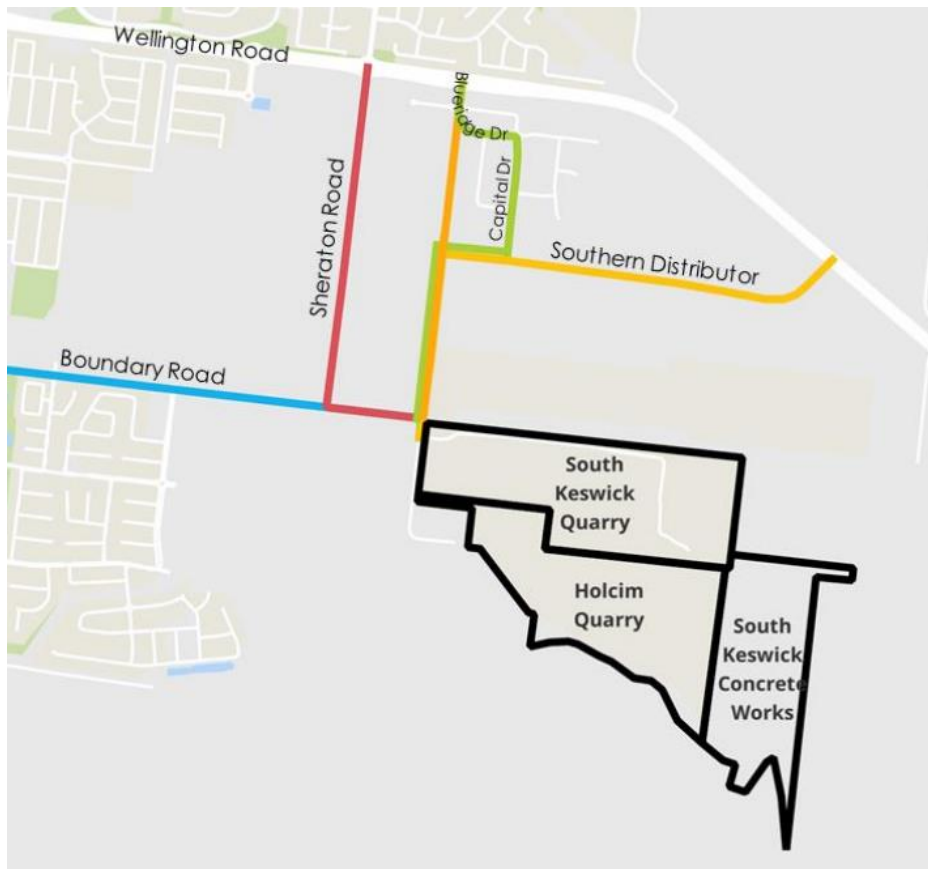


Figure 10 – Alignment options considered for heavy haulage route.

To assist Council in making an informed decision, several technical studies and reports were prepared by Council for the different haulage routes considered, including a high level multicriteria assessment of each option and two road safety audits.

At the 25 July 2024 Ordinary Meeting, Council resolved to adopt the Southern Distributor Road corridor through Blueridge Estate as the long-term haulage route. As funding is not currently available to deliver the full extent of the Southern Distributor, Council adopted Sheraton Road (between Boundary and Wellington roads) as the interim primary haulage route for the three heavy industry developments, outside of peak school drop-off and pick-up times. To enforce the restriction of truck movements on Sheraton Road during school peak traffic times, Council is currently developing a signage scheme to prohibit truck movements on Sheraton Road during school peak hours.

Update of the Dubbo Strategic Traffic Model

The Dubbo Strategic Traffic Model is the most important tool underpinning the Transportation Strategy and has a direct influence on the objectives and outcomes proposed by the Strategy.

Traffic modelling is used to evaluate how roads will perform as the city grows. The model calculates the trips made between generators (typically households) and attractors (typically workplaces) and determines what route cars will typically take on the road network to get to their destination. The model will also assess the road network and its capacity to accommodate the traffic generated.

Traffic modelling can also account for growth of the city and assess the performance of a future road network to support an increasing population, making it a crucial tool for undertaking land-use and transportation planning projects. Previous Dubbo transportation strategies have relied upon outputs from a traffic modelling software called TRACKS, which was used extensively in the 1990s as modelling software for the Illawarra region, Coffs Harbour, New Zealand and in parts of Sydney.

With recent developer interest in West Dubbo, and the anticipated impact it will have on State roads, there has been extensive discussion between TfNSW and Council regarding the modelling approach and software utilised to inform requirements and timings of transport infrastructure to enable further development. As TRACKS is not widely used by the transport industry (including TfNSW), it was determined that the model needed redevelopment in a new software package that is more widely used and supported.

For the reasons outlined above, Council engaged a consultant to redevelop the Dubbo Strategic Traffic Model in Vissum, a traffic modelling software that is supported by both TfNSW and Council. The base strategic model is currently being developed and new traffic counts were recently captured for Dubbo, allowing the model to be calibrated for the current year. The model redevelopment and recalibration will allow Council to accurately predict the timing of future network deficiencies and the need for new infrastructure, as Dubbo

experiences further growth. The new strategic traffic model will also be a key tool for the further development of strategic projects including South Bridge and the Western Distributor.

Resourcing Implications

There are no financial implications arising from this report.

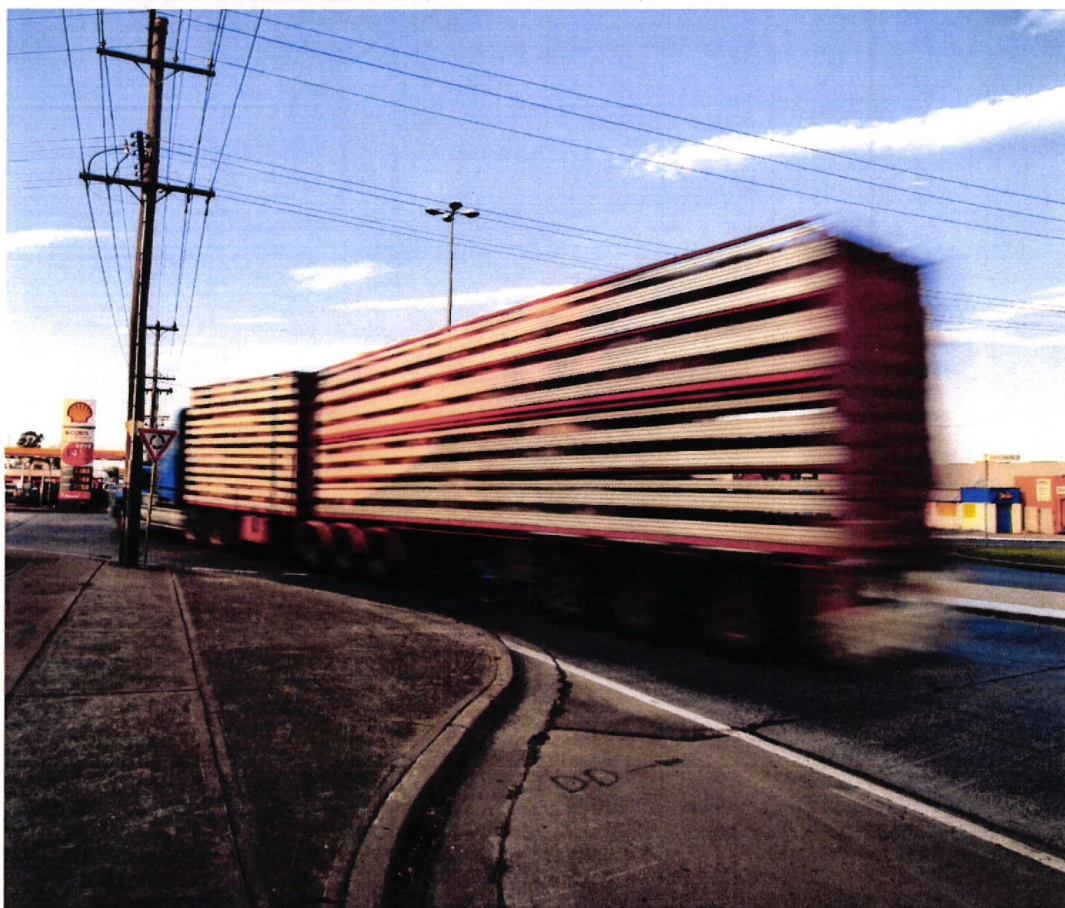
Next Steps

- A report will be provided to Council on a yearly basis detailing further implementation of the Dubbo Transport Strategy.

APPENDICES:

- 1 [↓](#) Dubbo Transportation Strategy to 2045
- 2 [↓](#) Dubbo Transportation Strategy 2020

Technical Services



Dubbo Road Transportation Strategy to 2045

www.dubbo.nsw.gov.au

Report

SUBJECT: Dubbo's Road Transportation Strategy To 2036 And Beyond

DATE: 12 April 2012

FILE: TM 1.1 – 12/967

Background

In 2008 consultants Stapleton Transportation and Planning Pty Ltd completed a study for Council entitled the DUBBO CITY PLANNING AND TRANSPORTATION STRATEGY 2036. The “base year” used in the Study was 2006 for which both population and traffic flow data were readily available during its preparation in 2007/2008.

The Stapleton Study has been presented previously to Council in terms of its “Planning component.” It was used during 2009 and 2010 as input to the drafting of Council’s new Local Environmental Plan (recently gazetted). This new report summarises and firms up the “transportation”, or “engineering” components of the study into a ROAD TRANSPORTATION STRATEGY TO 2036 AND BEYOND, with projections out to 2046 also forming part of the content.

The study contained herein relates ONLY to the Dubbo urban area itself. None of the highways or local roads beyond the Dubbo built-up area are anywhere near their capacity in terms of traffic flows, and Council’s existing Road Network Function Plan remains a suitable vehicle for documenting and formulating the strategic issues involved in their traffic management.

Description of the Present Road Network

The Dubbo City road network consists of 1,266 km of both sealed and unsealed road in a rural and urban environment over which Council has total asset management responsibility. Council also has a maintenance agreement with Roads and Maritime Services in respect of specified State and National Roads totalling 51.54 km in length.

COUNCIL ROAD ASSET

LOCAL ROADS

Urban Roads (Sealed)	255 km
Urban ‘Highway’ Outside Traffic Lanes	15 km
Rural Sealed Roads	478 km
Rural Unsealed Roads	<u>453 km</u>
Sub Total	1,203 km

REGIONAL ROADS

Mendooran Road	50.00 km
Narromine – Eumungerie Road	11.63 km
Thompson Street (Whylandra - Victoria)	<u>1.12 km</u>
Sub Total	62.75 km
TOTAL	1,265.75 km

RTA ROAD ASSET

STATE ROADS

Golden Highway	39.17 km
Mitchell Highway	7.01 km

NATIONAL ROADS

Newell Highway	<u>5.36 km</u>
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TOTAL	51.54 km
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Council's road assets (including bridges, footpaths and cycleways) had a replacement cost of \$897.8 million as at 30 June 2011, and a written down carrying value of \$730.0 million when accumulated depreciation was removed. These road assets constitute 50.1% of Council's balance sheet at fair value, and 50.3% at depreciated carrying value.

Current Capital Investment Strategy

The current capital investment strategy for the Dubbo road network is detailed in Section 7 of the Road Network Function Plan 2011/2012. This Section is reproduced in full as Appendix 1 to this report.

The current strategy is rigorously devised based on around 20 relevant factors grouped under "economic", "social" and "technical" headings. In summary the factors considered when devising the capital works program adopted in the Council Delivery Plan are:

A. Economic Factors

1. Road Function
 - Defined public roads only
 - Hierarchy (arterial, sub-arterial, collector, local)
 - Transport Function (truck routes, road trains, B doubles, school bus routes)

2. Corporate Planning and Economic Development
 - Examples include upgrading road train routes and access intersections to Industrial Candidate Areas.
3. Maintenance History
 - High maintenance costs in a road segment may mean it is more economically efficient to rebuild it than keep investing high maintenance dollars.
4. Funding Availability
 - Some Government funding sources are crucial, regular components of Council's road funding mix (eg: Federal Assistance Grants and Roads to Recovery) and able to be spent at Council's discretion.
 - Some grant programs are tied to particular roads or projects, and may need Council funding input as well to make projects viable (eg: RTA REPAIR Program and Federal Blackspot Program).

B. Social Factors

- Council's long term aim is to have no rural property more than 7 kilometres from the extremities of the sealed network.
- Another long term aim is to have all but the most lightly trafficked rural roads sealed within a 50 year timeframe from 2001, ie by 2050.
- Complaints, reports and enquiries are received from the public, Councillors and staff, and responded to in accordance with the adopted customer service levels.
- The Rural Consultative Working Party may raise either strategic or reactive matters, and is used as a sounding board for existing or proposed rural road strategies.

C. Technical Factors

1. Asset Management
 - Preservation versus extension.
 - Regular condition assessment.
 - Management of a Pavement Management System (PMS)

- Maintenance of a comprehensive Asset Management Plan using the industry-standard IPWEA NAMS Plus template.
2. Risk Management
- Road Safety Audits are regularly undertaken.
 - A deficiency rectification program is maintained within the Function Plan
 - There are Maintenance Service Levels and Intervention Levels documented within Council's broader defined Defined Asset Management Plan (DAMP).

For clarity and for planning purposes, the Function Plan separates out certain classes of capital works so as to be sure that ALL sections of the asset base receive due consideration without exception or oversight. These different classes of work are:

- Urban road construction and reconstruction
- Unsealed shoulder construction (urban)
- Kerb and gutter construction and reconstruction
- Unsealed laneways
- Buildings (Cyril Flood Rotunda)
- Bus shelters
- Rural road construction and reconstruction
- Seal extension
- Bridge renewals
- Railway level crossings
- Village roads

Previous Strategic Road Development Studies

The two strategic road strategy studies that preceded the 2008 Stapleton study were undertaken in 1991 and 1998 by TEC and PPK respectively. These studies had recommended the upgrading of identified truck routes, the creation of major intersections at ICA's 1, 2 and 4, and the connection of Wheelers Lane and Yarrandale Road via the racecourse, all of which have since been implemented.

The Stapleton Study – “Dubbo City Planning and Transportation Strategy 2036”

The 2008 Stapleton Study sets an excellent strategic framework for the future of Dubbo's urban road network. The full Study is attached as Appendix 2, but the key technical content has been extracted for clarity and continues immediately below.

This Strategic Plan is based on the completion of 7,500 additional dwellings in Dubbo. The population forecast is based on this development occurring over a 30 year period; an additional 250 dwellings per year. This population will be housed in three sectors (Refer to Figure 1.1), the South East Sector [SE], the South West Sector [SW] and the North West Sector [NW]. Refer to Section 5 for Population and Employment.

Figure 1.1 Expansion of Population and Employment



1.4 FIVE NEW ELEMENTS

This strategy is set around five elements that can be ingeniously worked together so that each element has synergies that add social, economic and ecological benefits.

1.4.1 Extension along the Macquarie River Front - Refer to Figure 1.2

The first element in the plan is the extension of the City Centre across the Macquarie River extending controlled activity along the Macquarie River Front. This will be the focus for tourism, recreation; a means of using the space of the flood plain to enhance “the Oasis”.

The demand for *Community Businesses* (defined as commercial, health, further education and accommodation) will support the expansion of the River Front from Thompson Street north to the old Sewerage Works (now demolished).

The flood plain accommodates the quieter of two parallel pathway systems; the second is developed north from Stonehaven Avenue for pedestrian movement between hotels and accommodation, in much the same manner as Gap Street in Alice Springs.

The concept of the River Front is to extend the City to the west bank, opening up the west to Whylandra Street and the redevelopment of properties east of Whylandra Street and extending north.

Figure 1.2 Extension across the Macquarie River



1.4.2 The Freightway - Refer Figure 1.3

The second element in the plan is for a **complete ring of truck routes** to carry trucks to the warehousing, freight and distribution centres to the north and west of the City. Built over the next 40 years, it is a fundamental part of the social and economic plan for Dubbo.

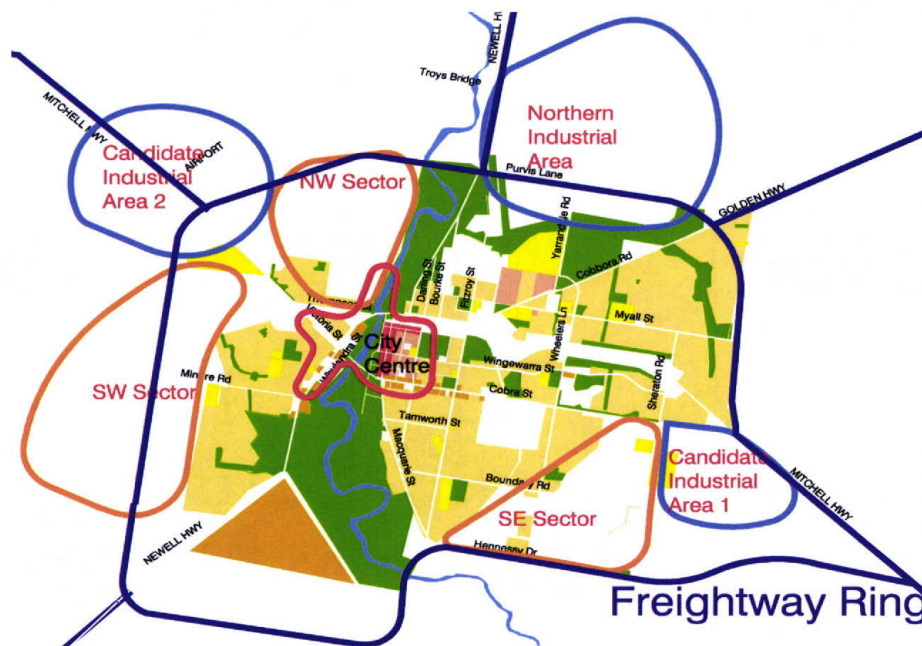
It will avoid the need to widen roads within the City thereby allowing them to operate without complex turn restrictions - there are some minor exceptions to this that are discussed in Section 9.

It will, over time, remove trucks from streets that have active frontages (such as Victoria Street) thereby increasing the social amenity of the Inner City streets and improving the ambience for visitors and the local residents.

And it will declare Dubbo as a City which takes freight seriously and provides the best access for B-Double and Road Trains.

Most sections of *The Freightway* can operate at 80km/h and in some cases 100km/h.

Figure 1.3 The Freightway Ring



1.4.3 The Green Ring - Refer Figure 1.4

One of the salient, and often missed, attributes of Dubbo is its greenness and how it settles into the river valley surrounded by quite prominent hills.

It is recognised that the riparian flora is protected to a greater extent by the flood plain and the woodlands need more protection.

The third element of the plan, the *Green Ring*, helps achieve this.

It is proposed to establish a **Green Ring** of vegetation, a 100m wide and 24 km long, that is embedded within Dubbo's urban fabric.

A complete **Green Ring**, with tentacles into the rural areas, will allow flora and fauna to migrate through the City and encourage biodiversity, even as the City grows beyond the 40 year limits.

Large sections of *The Green Ring* are in place, albeit not all 100m in width.

The Green Ring passes through two prominent hills overlooking the town that can become part of its allure for local users.

All roads crossing *The Green Ring* will be designed to remind drivers of local habitats; places where State Highways cross into the City will become prominent Gates in announcing the green credentials of the City.

The Freightway is located outside *The Green Ring*.

The completed 24 km circuit will include a shared bike/walking track, referred to as *The Ring*.

Figure 1.4 The Green Ring



1.4.4 Fourth and Fifth Elements

The fourth and fifth elements of Stapleton's plan are town planning principles to do with a nominal "Business Ring" with a radius of 2.5 kms centred on the CBD, and the concept of neighbourhood "Places" which he develops at some length in Chapter 2. However these elements are not so crucial to the engineering of a Road Transportation Strategy.

3 TRANSPORTATION PRINCIPLES

3.1 THE THREE ALTERNATIVE NETWORKS

The underlying principle for the provision of transport networks in Dubbo is to maintain the easy access currently enjoyed by the residents of Dubbo. This can be achieved without changing the amenity of the streets themselves; the main principle is to spread demand to additional low key links.

Movement in Dubbo has been structured around the provision of three alternate networks, a road network; a public transport network; and, a bike/walk network. This reinforces the principle that the City is providing for alternative lifestyles.

Each network will have a strong presence: -

- the presence of public transport strengthened by a strong central transfer; stops that include community facilities; and, the opportunity to allow buses to stop at any point along residential streets outside peak periods;
- the bike/walk network will be strengthened by segregated paths passing throughout the neighbourhoods; and
- the roads will be strengthened by a consistency of style for different driving environments.

The three networks are part of the City's strategy for sustainability, providing the City with the resilience to survive economic changes, helping to reduce carbon emissions and being a major attraction for new residents seeking alternative lifestyles.

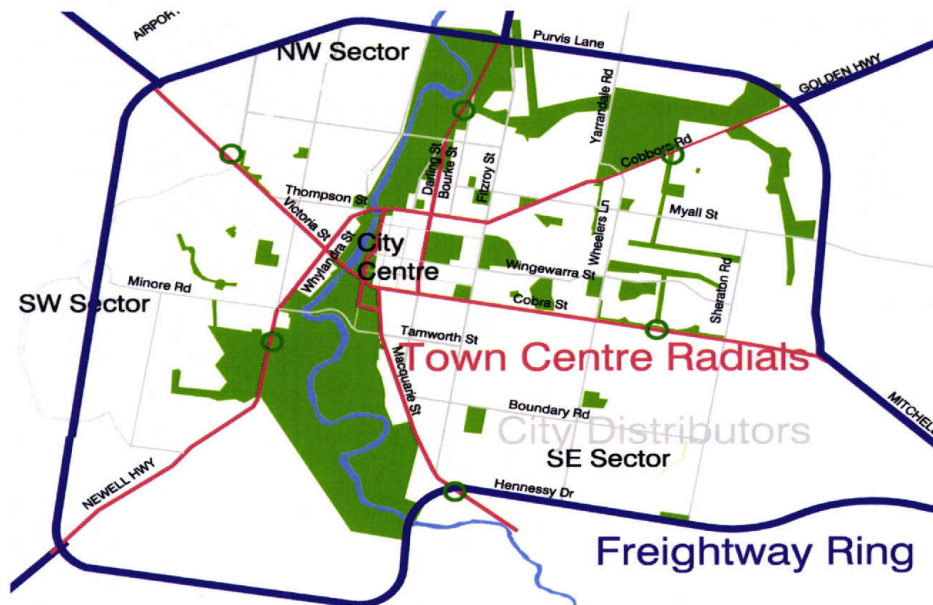
3.4 ROAD NETWORKS

The road designs are based on the principles that Dubbo:

- is and should remain a ten minute city,
- is and should develop as a freight distribution truck city, and
- should continue and expand as a living city offering different opportunities for the residents and attracting new residents.

This has been interpreted into three network concepts illustrated in Figure 3.3.

Figure 3.3 Three Road Networks



3.4.1 Road Network 1 The Freightway - outer ring

An outer ring truck route has been considered by engineers for a number of years to make Dubbo an attractive place for the warehousing, trucking and the distribution industries.

The outer location is being reinforced by the new rail freight terminal that will primarily serve the abattoir located five kilometres north of the city centre. The new freight centre will also attract other freight movements including rural sector produce to Sydney, Melbourne and Brisbane. It is understood that this rail freight head will not be connected to the proposed inland freight railway line that will pass close to Dubbo but have a more direct and therefore faster alignment.

The outer location is intended to minimise interference with town traffic and therefore minimise gear changes for truck drivers. This will attract drivers who will travel a little further, but a little easier, to reach their destinations.

The Freightway generally follows existing road alignments and can therefore be implemented relatively easily. See Section 7 for Program.

The alignment is generally set slightly more towards the city centre than away from it thereby

providing some attraction for city traffic. The reason for this is two-fold: firstly, the volume of through truck traffic is relatively low and does not justify a fully fledged bypass; and secondly, using the road for some circulating city traffic very conveniently reduces the volumes within the city centre by a few hundred here, a few hundred there. The total impact of this alignment probably reduces the city grid system by over 30,000 vehicles per day. This concept is used extensively in Germany.

The aim of diverting traffic from the City streets is to avoid any additional four lane roads within in the town centre, in particular, Cobra Street to the LH Ford Bridge.

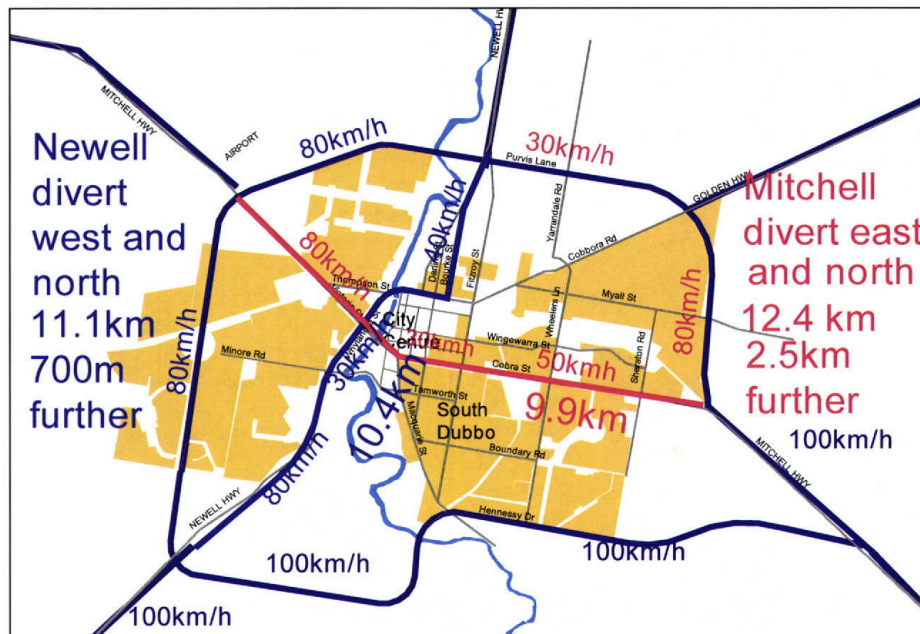
The concept is that over time freight traffic on the Newell Highway will be diverted to the west of the town centre, and later, traffic using the Mitchell Highway will divert north through Purvis Lane. The intersection of *The Freightway* and the Newell Highway in the north is an ideal location for a Truck Stop that will further encourage drivers to use *The Freightway*.

The first priority is to serve the abattoir and the new freight centre to be located north of the abattoir off Yarrandale Road.

The traffic flows on *The Freightway* are not intended to be high and the combined flows of local and truck traffic can be accommodated in two traffic lanes.

Figure 3.4 Illustrates how, when completed, Truck Drivers will have a better choice to use *The Freightway*.

Figure 3.4 Travel Times Along Freightway



The Freightway will

- Provide more direct access to the northern industrial areas from the Newell south, and the Mitchell - east and west.
- Be only 2.5km longer than the Mitchell highway for those making through trips, with possibly a time saving of a few minutes as well as less hassle - 6 intersections vs. 9 through the City.
- Be only 700m longer than the Newell Highway for those making through trips, with a time saving of a few minutes as well as less hassle - 5 intersections vs. 10 through the City.
- It will 3.2 km longer for those drivers on the Golden Highway, perhaps not quicker than Whylandra Street.

Modelling traffic with demand projections every ten years has resulted in a program whereby the progressive introduction of *The Freightway* will maintain the existing traffic conditions in the City at all times. (See Section 7 and 8)

The Freightway is a fundamental part of keeping Dubbo as a ten minute and convenient City.

3.4.2 Road Network 2 State Highways to the Centre.

Development since the 1960's has successfully segregated activities; the State Highways coming

into town are uninterrupted and generally segregated from adjoining land activities. High speeds can be maintained to within 2 or 3 kilometres of the City Centre. Similarly the more recent residential areas have generally been successfully quarantined from conflicts, but not necessarily integrated with Places.

In the older parts of Dubbo, those set out before the 1960's, there are conflicts between adjoining land uses and between traffic and land uses fronting streets.

The Freightway will address the desire to circulate around the City quickly and efficiently and will provide access to all industrial, warehousing, and transport destinations.

This provides an ideal opportunity to review the function of roads within the City. The State Highways will continue to bring tourists directly into the City Centre rather than using *The Freightway*.

Maintaining direct access to the City centre is a fundamental part of maintaining Dubbo as an attractive, convenient City for visitors. This is a typical well defined hierarchy used in Europe and North America where the "old roads" lead to the "Centrum" and the bypasses take the through traffic. The old roads change in character as they approach the City Centre and transept from a rural environment progressively through outer suburban, then inner suburban, then City conditions. Visitors know they have arrived in town when the pavement activities are buzzing.

This arrival occurs in Dubbo at Victoria St, Erskine St, Cobra St near Macquarie St and Whylandra St. The urban design of these locations needs to stress the arrival in the City and attract tourists to think they will have a look around.

3.4.3 Road Network 3 Distribution Grid

It is proposed that the distribution of City traffic will be accommodated using a grid of roads that will serve cross City and City movement. These roads are intended to move residents quickly and safely around town whilst not offering an attractive way for trucks who will use *The Freightway*.

The purpose of *The Distribution Grid* is two fold:

- (i) **to spread traffic** and have no major concentrations of traffic. Concentrations tend to result in large intersection designs which not only create delays for traffic in terms of longer signal phasing but also become barriers to pedestrian movement both as a source of noise and possibility of difficulty of crossing the streets; and
- (ii) **to limit traffic** flows so they are consistent with adjoining land activities, creating both economic opportunities, for say, activities requiring some level of exposure to passing traffic; and traffic environments that are consistent with those activities. Another synergy is to bring a little more traffic along a road in a residential area and then locate some activities that are consistent with residential living but happy to be located on a slightly busier street.

Hence, *The Distribution Grid* is one of the key design elements of the city.

There is another urban model; develop major generators outside the city, do not provide alternatives to the central strategies, create very busy streets and chase away the customers to the edge of the city. This is not recommended.

Increases in traffic demand will be accommodated by *The Freightway* and additional links in the *The Distribution Grid* that will progressively and significantly reduce traffic that would otherwise be to the detriment of the City Centre.

In this way Tourists and residents will be continuing to travel in the central area with no appreciable change in conditions over the years and this will allow the street environments to complement tourist activities.

4 ROAD SYSTEMS

4.1 MAXIMUM TRAFFIC FLOWS

There is a certain amount of chicken and egg situation about designing a road system suitable for local environments.

Traffic in Dubbo operates well and flows relatively easily. There are few major issues and these are being addressed as and when the need arises.

This analysis follows the course of what street environments could be achieved given the future traffic flows and then describes street profiles that could achieve these environments.

The analysis uses the modelling results and considers a range of three traffic flows.

The traffic ranges measure how streets could function and how it might change in the future, in effect to give a warning of changes along the existing roads in Dubbo that might or might not be acceptable: -

Streets with a flow of less than 6,000 vehicles per day [vpd] are easily adaptable to pedestrians and turning traffic and are described as a **Connector**

Flows of 6,000 - 11,000 vpd require some form of management, such as a median island, to provide the optimum conditions for turning traffic and pedestrians and are described as a **Distributor**.

Flows of greater than 11,000 – 15,000 vpd, can be accommodated in one lane per direction turning lanes but pedestrian movement must be channelled to specific crossings. These are described as **Sub Arterial Roads**.

There are few streets in Dubbo with flows in excess of 15,000 vpd and they are generally segregated **Arterial Roads** usually with access limitations to buildings.

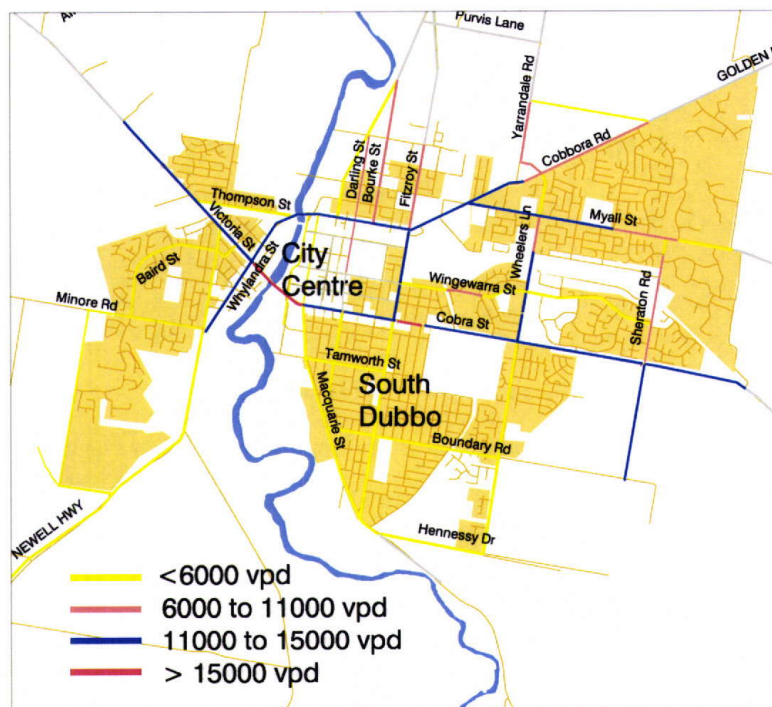
Section 4.4 illustrates which streets currently fall within the three ranges. Section 4.6 examines which of these will change in the future.

4.2 PERFORMANCE OF EXISTING ROADS

The performance of existing roads and future roads has been reviewed as a measure of the opportunity for the management of the function of Streets.

Figure 4.1 illustrates the ranges in traffic flow for 2006 that are described below.

Figure 4.1 Traffic Flows in 2006



Considering firstly the State Highways, parts of each have volumes in the range of 11,000 to 5,000 vpd therefore being defined as *Sub Arterial Roads* for the purposes of this study.

- The Mitchell Highway (Cobra Street) is one of the busier roads in Dubbo operating as a Sub Arterial Road except for a small section near the RAAF base and across the LH Ford Bridge where it is busier.
- The Newell Highway is operating as a Sub Arterial Road from Minore Road in the south to Fitzroy Street.
- The Golden Highway (Cobbora Road) is operating as a Sub Arterial Road north to Wheelers Lane.

Streets operating in this volume range indicate that pedestrian access across the street may be an issue. In the case of Cobra Street the pedestrian access is managed well by partial median. The other sections of State Highway generally do not pass through areas requiring high pedestrian amenity.

The sections of streets in **Residential Neighbourhoods** that are also operating as **Sub Arterial Roads** with more than 11,000 vpd include: -

- parts of Wheelers Lane, north of the Mitchell Highway;
- Myall Street; and
- a short section of Fitzroy Street.

These results highlight the lack of north south connectivity discussed in Section 4.3.

There is a small anomaly in the graduation of streets with Sheraton Road south of the Mitchell Highway showing up as having a flow in excess of 11,000 vpd. This section of Sheraton Road is a cul-de-sac serving three large schools and therefore carrying a large volume of traffic during two short periods of the day. The result of amalgamating these peak period flows describes Sheraton Road as a **Sub Arterial** with issues of pedestrian access and this is a good reminder of the issues on this section of Sheraton Road.

Sections of street in residential areas operating in the range of 6,000 - 11,000 vpd (Distributor Roads) include: -

- Wingewarra Street in a short section directly north of Apex Oval - again this is because of the lack of connectivity in this area which is restricted to two east west routes;
- Sheraton Road, north of the Mitchell Highway; and
- parts of North Dubbo.

The residential composition of North Dubbo is generally unaffected by these higher flows which are mostly in sections of streets with warehousing, distribution and car sale uses. The future of North Dubbo is under consideration by Council and the concept of a Regional Business Centre is included in this Strategy. This will not address the protection of, or future of, the historic precinct north of Erskine Street.

The majority of streets in Dubbo carry less than 6,000 vpd with traffic operating very smoothly and pedestrian movement unconstrained by the traffic.

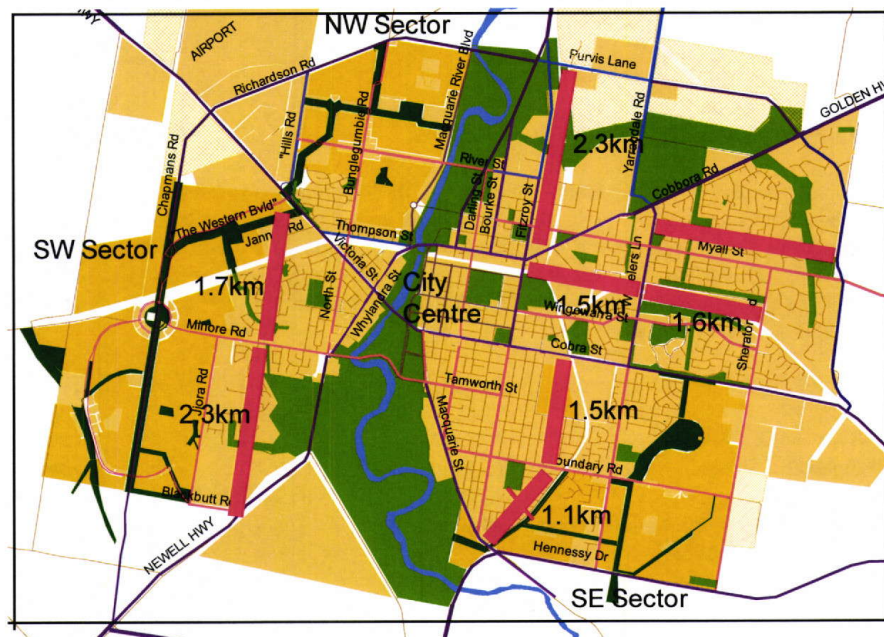
All roads south of Cobra Street (with the exception of Sheraton Road at the school site) and in the western part of Dubbo are operating with less than 6,000 vpd and can be defined as **Connectors**.

In conclusion, the streets of Dubbo are well managed and the flows can be managed to suit local conditions.

4.3 ANALYSIS OF EXISTING CONNECTIVITY

The connectivity of the existing road network is summarised in Figure 4.2 which shows some of the barriers to traffic movement that exist in Dubbo and the analysis considers whether these have any impact on the existing traffic conditions.

Figure 4.2 Connectivity and Discontinuity



4.3.1 The North East

An evaluation of an existing grid highlights the value of such a grid. Traffic delays are currently experienced along Cobbara Road and, to a lesser extent, crossing the Macquarie River.

In the north east, traffic is funnelled into Cobbara Road via three rail crossings over three kilometres, including Fitzroy Street, Wheelers Lane and Sheraton Road (see figure 4.2). This is an important movement between the residential areas and the industrial areas to the north of the City. The limited alternatives are exacerbated by the termination of Sheraton Road at Myall Street which, in effect, reduces traffic to two north south routes crossing through the existing town. This reduction to two crossings forces more traffic along Fitzroy Street and even this is exacerbated further by the 2.3 kilometre barrier created by the Institutional Precinct, including the hospital, TAFE and Universities. Many drivers must use Cobbara Road to cut across to, say, Bourke Street, and hence there is additional traffic in the area.

There are no easy answers to the barriers in the North East.

- o The Eastern Section of the Outer Ring Road is too far east to be of much use by local

traffic.

- One more crossing of the railway line near Welchman Street will lead to more traffic to the constraint of Cobbora Road but would reduce traffic slightly in Wheelers Lane.
- Unfortunately an agreement between the major players in the Institutional Precinct a few years ago precludes the extension of River Street through to Cobbora Road which would offer one more link through the area.
- The extension of Myall Street across the railway line is included in the plan adding one street through this barrier. Whilst this is shown to work for the next 40 years, it does raise an interesting point about the needs for the next generation.

4.3.2 The South East

In the South East a barrier has been created by the Molong Railway line south of Cobra Street. This 1.5 kilometre barrier is less important today but will become more noticeable with the development in the SE sector, as will the Wheelers Lane and Fitzroy Street links from the south east to the industrial area. One further crossing has been included south of Boundary Road. This will connect one new residential area of 400 lots and there is the possibility that the rail line will be re-established as a freight line.

4.3.3 The South West

Of more concern are the two long barriers already created to confine access to the South West. Currently Minore Road is the only access to this area and its existing residential frontage adjacent to Whylandra Street limits its future use as a Sub Arterial Road. These two gaps consist of 2.3 kilometres south of Minore Road, practically to the edge of urban development, and another 1.7 kilometres between Minore Road and Jannali Road.

Ideally traffic is distributed by roads every 800 or so metres and there should be three roads in four kilometres not one. This has been addressed, to some extent, by the linking of the western areas across the railway line to the Mitchell Highway north of Jannali Road along the "Western Boulevard". This is not ideal and will lead to some difficulties in the early stages of development when the cost of the bigger road will not be appreciated.

4.3.4 The Macquarie River

The more obvious barrier to movement in Dubbo has traditionally been the river which has two crossings to the City Centre. Some movement is made at Troy Bridge north of the City towards the abattoir but this is limited to lighter vehicles and not part of the proposed truck route. The issue of limited river crossings can at least be addressed by making additional crossings, albeit they may be expensive.

However, the other barriers which are described above are more permanent because they go through urban infrastructure which is very difficult to open up once closed.

Two elements of the Strategic Plan address connectivity and spreading traffic.

- The **Freightway** will remove trucks from the City Centre.
- The **Distribution Grid** is designed specifically to spread traffic away from focal points creating the opportunity for the Functional Road Hierarchy to work throughout Dubbo.

The Road Network has been described in Section 3. A summary of the operating conditions on existing roads is described below using the same terminology as that used to describe the existing traffic conditions in Section 4.2 above.

4.4 FUTURE ROAD FLOWS

4.4.1 Existing Streets

The modelling for 2036 has been used to compare future with existing traffic.

This is to indicate the sections where traffic flows are likely to vary.

The following difference in road operations will occur by 2036 (Refer to Figure 4.3 for numbering):

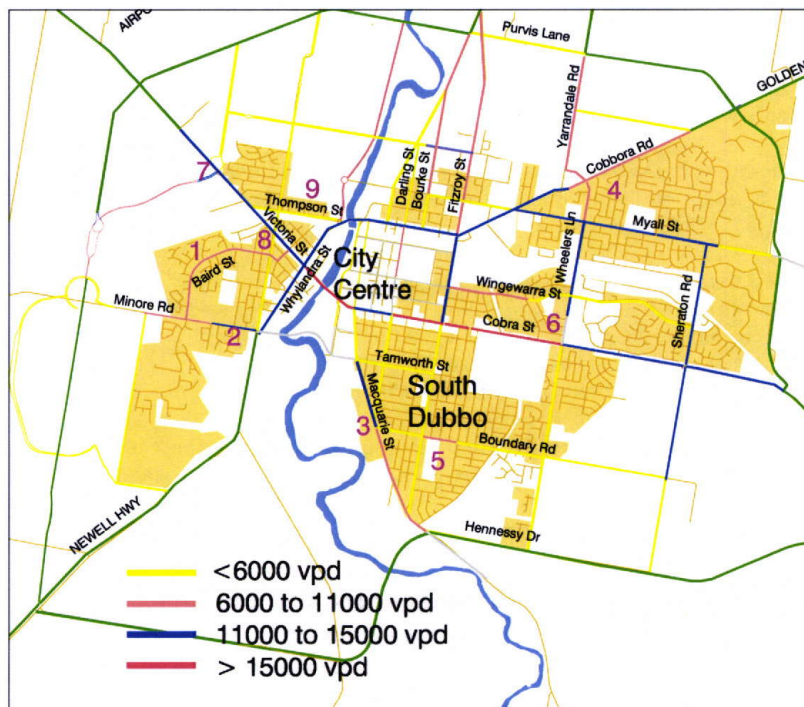
1. Baird Drive will change from a **Neighbourhood Connector** to a **Neighbourhood Distributor**. This is a serious downgrading of a residential street and is a direct result of the lack of connectivity built into the local road network. Further traffic management will be required in Baird Drive.
2. Minore Road east of Joira Road will change to a **Neighbourhood Distributor** and to a **Sub Arterial** as it approaches the Newell Highway (see Figure 4.3.)

This is the result of the lack of connectivity to serve the western part of Dubbo.

It should also be noted that the new “Western Boulevard” from the Mitchell Highway to the railway bridge at Chapmans Road will need to be designed as a **Sub Arterial**. This can be designed accordingly but is likely to be costly during the early stages of residential development from the Mitchell Highway.

3. Macquarie Street, south of Tamworth Street, is currently carrying less than 6,000 vpd including rural traffic to the south of the city and hence local residents are not cut off from the River Front. The volume in Macquarie Street is expected to increase to **Sub Arterial** volumes north of Boundary Road and to a **Neighbourhood Distributor** north of Hennessy Road. This is the result of development in the South East Sector.

Figure 4.3 2036 Projected Flows



4. In the North East: -

- Myall Street changes in its character to the west of Cobbora Road extending as a **Sub Arterial** to east of Sheraton Road.
- Similarly Sheraton Road north of Cobra Street changes from a Neighbourhood Distributor to a **Sub Arterial**.
- Part of Wheelers Lane north of Wingewarra Street will also change in character from a **Neighbourhood Distributor** to **Sub Arterial**.

All three streets are designed to accommodate this sort of volume of traffic.

However, it does indicate that the argument for putting too little connectivity, which cannot be changed in this case, will show up in the future.

It also puts a good case forward for the construction of the Eastern Bypass to allow

some traffic to avoid these streets.

5. The only street in South Dubbo, apart from Macquarie Street, to change status is Boundary Road where the flow is predicted to exceed 6,000 vpd in a short section approaching Fitzroy Street. This is not a particularly serious volume deficiency and can be managed, but this anomaly highlights how the potential connection across the RAAF base would have avoided such a hiccup.

It also indicates how further connectivity to Boundary Road further east could have a detrimental effect on the environment in South Dubbo. No such connections are proposed in the Strategy.

6. Cobra Street is already carrying 11,000 to 15,000 vpd along most of its length with parts of it exceeding this *Sub Arterial* limit. It is generally designed to accommodate this flow, including upgrading of the intersection with Fitzroy Street. Pedestrian movement is also well accommodated. More management of pedestrian accessibility will be required between Darling Street and Wheelers Lane.

The important point of this analysis is that the section near the City Centre between Darling Street and Macquarie Street does not increase over the Distributor status and, thus, is suitable for the location of motels and the increased pedestrian activity that is expected in this section.

The results of the traffic modelling strongly support the argument that Cobra Street should not be upgraded.

Handling the pedestrian activity in this heavy traffic is quite satisfactory with median treatments which can be extended the length of the street to the Orana Mall.

7. The Mitchell Highway continuing west of Thompson Street is also extending as a high capacity link but this runs through a suitable environment to support such a road and is not of any concern.
8. Victoria Street through West Dubbo is also expected to exceed the *Sub Arterial* limit but this can be handled by median treatments that will be very suitable for this retail area.

In some ways this will be the only “busy” main street, very similar to roads in Orange and Sydney.

9. Thompson Street will change to a *Business Distributor* by 2036 but this is not of concern as the road is designed for these volumes.

Again the interesting point about this analysis is that most areas of South Dubbo do not change from their current status by 2036. One of the concerns of connecting Minore Road to

the extension of Tamworth Street as a bridge link was the possibility that traffic would filter through South Dubbo. This is shown not to occur at all and is not a concern for the future.

In summary, the new roads can all be designed as low-key connector roads (with one exception) and the condition of some existing streets will deteriorate.

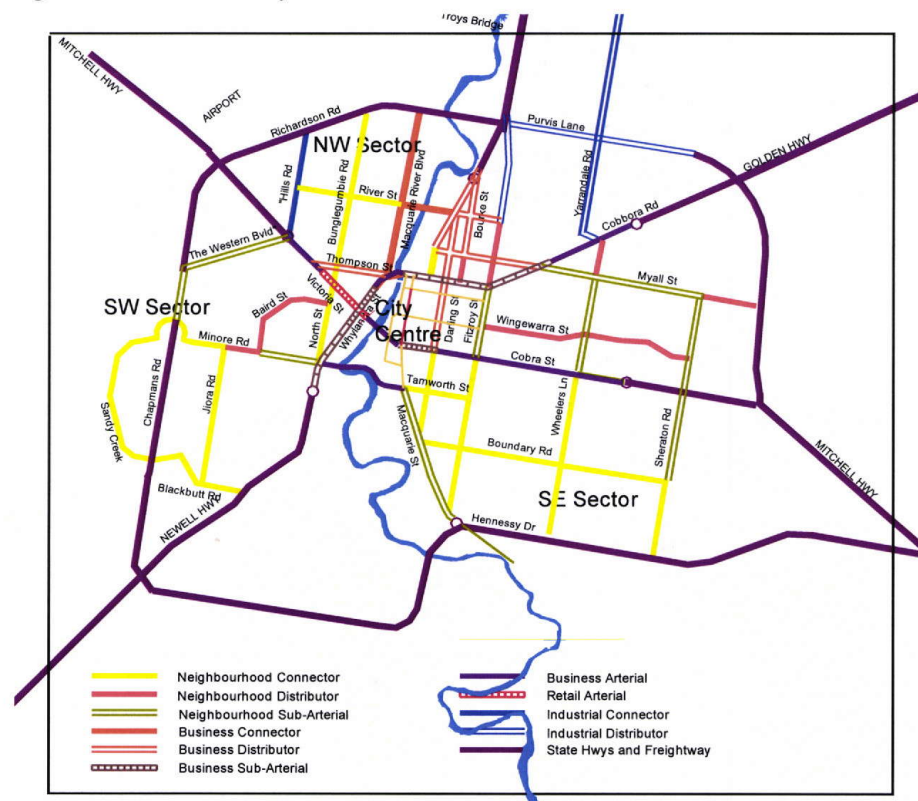
4.5 ROAD HIERARCHY

Using a grid follows very traditional transport concepts, indeed from Roman times, that have recently been adopted in the development of the SW and NW Sectors in Sydney, the development of Perth and recent developments in Brisbane.

The Road Hierarchy is an interpretation of standards used in WA, SA, QLD and VIC and applied in planning the SW Sector and the NW Sector of urban expansion in Sydney.

The principle for the proposed Road Hierarchy is to adopt road profiles that meet the amenity of users in the different Land Activities.

Figure 4.4 Road Hierarchy



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The maximum traffic flows in the proposed Road Hierarchy are set to let traffic operate at a convenient level of service and to create suitable permeability for pedestrian movement.

The success of the new roads in distributing traffic across central Dubbo simplifies the Road Hierarchy. In effect, nearly all new streets can be built in the same manner with two traffic lanes and two parking lanes and access to properties that vary with the volume of traffic using the street.

In practice, developers and future Councils will wish to vary the street designs. This Strategic Plan should therefore define the Hierarchy in such a way as to offer that flexibility whilst maintaining the safety and convenience of all users.

The principles for determining suitable street profiles are the combination of access and amenity; convenience for all users.

Two levels of decision-making are proposed:

- (i) choosing the Width of the Right of Way; and
- (ii) choosing the profile of the street in the Right of Way.

The Width of the Right of Way is required for planning purposes: -

- o 20m for Connectors;
- o 25m for Distributors and Sub Arterials;
- o 30m for Arterial Road;
- o The Right of Way for Local Streets will vary with conditions.

The following sections discuss the Road Hierarchy in more detail.

4.5.1 Local Streets

Local Streets will often carry less than 500 vpd and generally less than 1,000 vpd.

Flows of greater than 3,500 vpd require two traffic lanes and two parking lanes and are referred to as **Connectors**.

Local Streets are intended for use by local traffic, bikes, pedestrians moving about the neighbourhood, the occasional delivery vehicle and parking which occasionally is intensive.

The location of **Local Streets** has not been defined in the Strategic Plan except for the requirement to link a bus route across residential areas between **Connectors**.

The lower order Local Streets need only be 7.5m wide to accommodate these demands; these are referred to as Option 2 in Table 4.5.1. Some developers prefer to use a more traditional street 12.6m in width. The speed in such streets needs to be restrained either by the length of the block

or other means. Placing landscape, trees and bushes in small blocks in the parking lane can reduce speed in local streets.

Some **Local Streets** will be required to carry bus services. The speed of buses should also be restrained, preferably by visual rather than physical means. Bus routes can be accommodated in a 9.4m Neighbourhood Street (9.8m for frequent bus services.)

The Local Street dimensions are described in Table 4.5.1; **Neighbourhood Street** for residential areas, **Business Street** for Business areas, and **Industrial Street** for Industrial areas.

4.5.1 LOCAL STREETS

ENVIRONMENT	ROAD HIERARCHY				
	NEIGHBOURHOOD			BUSINESS	INDUSTRIAL
	Residential	Community Business	Small Light Industry	Regional Business	Regional Industry
DESIGN CRITERIA	School Children	Elderly & vulnerable		Fit Adult	Traffic predominant
LOCAL STREET	Neighbourhood Street			Business Street	Industrial Street
Flow Range	<3500 vpd	Only from Connector	Only from Connector	<3500 vpd	<3500 vpd
Target Speed	35km/h			45km/h	50km/h
Reserve	17m			17m	17m
Traffic Lane	5.4m (5.8m)			2.9x2	10.6m
Bike Lane	None			1.4X2	None
Parking Lane	2.0m			2.0X2	None
Carriageway	9.4m(9.8)m			12.6m	10.6m
Access	From Street			Driveways 50m or Rear Lane	From Street
Option	<1000 vpd 7.5m				

The **Business Street** is the traditional 12.6m carriageway marked with a parking lane and bike lane and two narrow traffic lanes, designed to slow traffic.

The preferred **Industrial Street** is slightly narrower (10.6m) than the traditional carriageway with two 5.1m traffic lanes and no parking. The higher speed of the traffic precludes use by bikes. Off street bikeways are required through Industrial Areas, some of which are described in Section 3.

4.5.2 Connectors

In Dubbo, flows greater than 3,500 vpd are defined as part of the Grid Network. The **Connectors** are designed to carry up to 6,000 vpd. The design is intended to accommodate traffic, including buses, parking and, in residential areas, to allow pedestrians to cross at will. An example of such a design is Grangewood Drive. A street carrying more than 6,000 vpd in a residential area should have a median to assist pedestrians crossing the road and is described as a **Distributor**.

All new roads in the residential areas of Dubbo will carry less than 6,000 vpd and therefore can be designed as **Connectors**.

Table 4.5.2 describes the **Connectors** under the same Land Use environments that are used in the Land Use Strategy.

4.5.2 CONNECTORS

	ROAD HIERARCHY				
	NEIGHBOURHOOD			BUSINESS	INDUSTRIAL
ENVIRONMENT	Residential	Community Business	Small Light Industry	Regional Business	Regional Industry
DESIGN CRITERIA	School Children	Elderly & vulnerable		Fit Adult	Traffic predominant
CONNECTOR	Neighbourhood Connector			Business Connector	Industrial Connector
Flow Range	3500 - 6000 vpd	See Business	See Industrial	3500 - 6000 vpd	3500 - 6000 vpd
Target Speed	45km/h	35km/h	45km/h	35km/h	50km/h
Reserve	20m			20m	20m
Traffic Lane	2.9x2			2.9x2	4.9X2
Bike Lane	1.4X2			1.4X2	1.4X2
Parking Lane	2.0X2			2.0X2	None
Carriageway	12.6m			12.6m	12.6m
Access	From Street or	Rear Lane	Street and Rear Ln	Rear Lane	From Street

The **Neighbourhood Connector** includes a parking lane (2.0m), bike lane (1.4m) and traffic lane (2.9m) in each direction (12.6m overall bitumen). Occasional planting is desirable in the parking lane.

This **Neighbourhood Connector** can be accommodated in a 20m reserve.

The same road profile can also be used for the (Regional) **Business Connector**. There are no new Business Connectors in the Dubbo Strategic Plan. If there were, they would require rear lane access thereby allowing space for customer parking on the Connector.

The **Industrial Connector** varies from Business and Neighbourhood Connectors because they are used by trucks that need more space for manoeuvring. Hence, parking is excluded from **Industrial Connectors** and the **Industrial Distributor**. And since speed and pedestrian safety for children is less of a priority in industrial areas, there is no need for physical means of speed controls.

The **Industrial Connector** is also 12.6m in width with two wide traffic lanes and, since no parking is required two bike lanes can be included by the kerb.

Some developers may wish to build more luxurious roads, such as St Andrews Drive, and any design is suitable provided that the needs of pedestrians, bikes and buses are all met. St Andrews Drive is built to standards similar to a **Neighbourhood Distributor**, which that is described next.

4.5.3 Distributor Avenues

The flow range for Distributors is 6,000 - 11,000 vpd. No roads are projected to operate in the flow range in the new areas of Dubbo and therefore no distributors are required in Dubbo. However, the design of “Avenue” may be preferred for streets with lesser volumes.

4.5.3 DISTRIBUTOR

	ROAD HIERARCHY				
	NEIGHBOURHOOD			BUSINESS	INDUSTRIAL
ENVIRONMENT	Residential	Community Business	Small Light Industry	Regional Business	Regional Industry
DESIGN CRITERIA	School Children	Elderly & vulnerable		Fit Adult	Traffic predominant
DISTRIBUTOR	Neighbourhood Distributor			Business Distributor	Industrial Distributor
Flow Range	6000 - 11000 vpd	See Business	Not compatible	6000 - 11000 vpd	6000 - 11000 vpd
Target Speed	45km/h			45km/h	50km/h
Reserve	25m			25m	25m
	(Avenue)			(Avenue)	Turning lane
Traffic Lane	2.9x2			2.9x2	4X3
Bike Lane	1.4X2			1.4X2	1.4X2
Parking Lane	2.0X2			2.0X2	None
Carriageway	2X6.3m			2X6.3m	14.8m
Median	Min 3.1m			Min 3.1m	Turning lane
Access	<9000 vpd Street			50m min /Rear Ln	From Street

The “Avenue” profile has the same parking (2.0m), bike (1.4m) and traffic (2.9m) lanes as a Connector; this will maintain the operating speed to 45km/h. The Distributors have a central median to use as a pedestrian refuge.

The *Neighbourhood Distributor* is the same as the *Business Distributor* with the exception that the *Business Distributor* requires access from a rear lane or driveways at intervals of not less than 50m to enhance the pedestrian environment. Median crossings are not desirable and hence driveways can only be entered as left in left out, except for access to major carparks.

The *Neighbourhood Distributor* should also include rear lane or service road access when the flow exceeds 9,000 vpd because it is difficult to reverse out of a small residential driveway into a higher flow of traffic.

The *Industrial Distributor* is similar to parts of Cobra Street - two traffic lanes and a wide turning lane allowing access into adjacent industrial properties.

4.5.4 Sub Arterial Avenues and Boulevards

The only new street which will attract more than 11,000 vpd is the Western Boulevard between the Mitchell Highway and the Western Freightway.

This demand is unsuited for simple pedestrian access and pedestrians should be restricted to fixed crossings (similar to Sheraton Road).

Two design profiles are available in this range, the Avenue, as described for a Distributor, and the Boulevard.

The *Neighbourhood Avenue* - a Sub Arterial Road - has the same profile as a Neighbourhood Distributor with the exception that the environment is not suited for young pedestrians and rear lane access is required for traffic access to residential properties. Pedestrians must be “directed” towards safer crossings; this can be achieved by heavy planting or physical means in the median.

(Another option to handle this flow of traffic near a residential area is to locate a Neighbourhood Avenue on the edge of the residential development where no pedestrian movement is likely to occur. This is not easy in the case of the SW Sector.)

Similarly a *Business Avenue* carrying more than 11,000 vpd needs marked pedestrian crossings. In intensive areas, such as retail strips, a crossing is desirable every 80m, elsewhere the crossings should be located every 150m.

A Boulevard performs the same function as an Avenue but traffic access to properties can be made from the service lane rather than a rear lane.

The dimensions of a Boulevard are described in Table 4.5.4. which also includes an *Industrial Boulevard*, a profile that could be used for sections of **the Freightway**.

In the case of the Western Boulevard, the limit of 11,000 vpd is only exceeded in the first section from the Mitchell Highway by 2036. However, further residential expansion to the west will continue to place more traffic on this route. Hence, it should be designed as a *Neighbourhood Sub Arterial* and properties should be accessed by a rear lane or service lane.

The design of the *Neighbourhood Boulevard* is similar to the Distributor with a parking lane (2.0m), bike lane (1.4m), traffic lane (2.9m) and median for through traffic. Residents facing the Western Boulevard will have driveways to Service Roads. The service road (5.5m) will be separated from the through road by a 3.5m separator.

The *Industrial Boulevard* is designed to allow trucks to access properties from the Service Road; the two through lanes do not need to be separated by a median.

4.5.4 SUB-ARTERIAL

	ROAD HIERARCHY				
	NEIGHBOURHOOD			BUSINESS	INDUSTRIAL
ENVIRONMENT	Residential	Community Business	Small Light Industry	Regional Business	Regional Industry
DESIGN CRITERIA	School Children	Elderly & vulnerable		Fit Adult	Traffic predominant
SUB-ARTERIAL					
Flow Range	11 - 15000 vpd	Not compatible	Not compatible	11 - 15000 vpd	11 - 15000 vpd
Target Speed	45km/h			45km/h	50km/h
	Neighbourhood Avenue			Business Avenue	
Reserve	25m			25m	
Traffic Lane	2.9x2			2.9x2	
Bike Lane	1.4X2			1.4X2	
Parking Lane	2.0X2			2.0X2	
Carriageway	2X6.3m			2X6.3m	
Median	Min 3.1m			Min 3.1m	
Pedestrians	Pedstrn barrier			80m Crossings	
Access	Rear Lane or			50m or Rear Ln	
Option	Neighbourhood Boulevard			Business Boulevard	Industrial Boulevard
Reserve	30m			30m	30m
Traffic Lane	2.9X2			2.9X2	4X2
Bike Lane	1.4X2			1.4X2	None
Service Rd	5.5X2			5.5X2	7.5X2
Carriageway	19.6m overall			19.6m overall	23.0m overall
Median	Min 3.1m			Min 3.1m	Optional
Separator	Min 3.5m			Min 3.5m	Min 3.5m
Pedestrians	Pedstrn barrier			80m Crossings	At intersections
Access	Service Rd			50m min /Rear Ln	Service Rd

4.5.5 Arterials

The range of flow for **Arterial Roads** for application in Dubbo is 15,000 - 21,000 vpd. State Highways are also Arterial Roads with rural characteristics and flows in the range of 3,500 to 8,000. These roads conform to RTA standards.

Traffic will exceed 15,000 vpd on Victoria Street in West Dubbo by 2036. This is defined as a **Retail Arterial** and the profile is described in Table 4.5.5. The design combines a wide bike lane with a parking lane allowing vehicles to manoeuvre into a parking space without blocking passing traffic.

4.5.5 ARTERIAL

	ROAD HIERARCHY				
ENVIRONMENT	NEIGHBOURHOOD			BUSINESS	INDUSTRIAL
	Residential	Community Business	Small Light Industry	Regional Business	Regional Industry
DESIGN CRITERIA	School Children	Elderly & vulnerable		Fit Adult	Traffic predominant
ARTERIAL					
Flow Range	15 - 21000 vpd	15 - 21000 vpd		15 - 21000 vpd	3500 - 8000 vpd
Target Speed		35km/h		50km/h	80 to 100km/h
Reserve	Not Compatible	Retail Arterial		Business Arterial	Arterial Road
Traffic Lane		33m		30m	30m
Bike Lane		2.9mx2		3.1mx2	See RTA
Parking Lane		2.4mx2		Separate	Separate
Carriageway		2.1mx2		4.1mx2	
Median		14.8m		14.4m	
Footpaths		Min 4.5m		Min 4.5m	
Pedestrians		Min 5.0m		Min 5.5m incl bike	
Access		80m Crossings		80m Crossings	Signalised
		Rear Lane		Rear Lane	No access

Other **Arterial Roads** operating with more than 15,000 vpd can be designed either as **Business Arterials** with a wide parking lane(4.1m) and traffic lane (3.1m) and separated bike tracks or, in the case of busier State Highways, as two-lane through road with no parking designed in accordance with RTA standards.

4.6 SUMMARY

In summary, with the exception of the Western Boulevard, all new streets in Dubbo can be built as:

- (i) Local Streets – see profiles;
- (ii) Connectors – the design of connectors varies for residential and community businesses, developers may chose to use; or
- (iii) Avenues.

The high volume streets that are not State Highways or the Freightway in Dubbo can be treated as:

- (iv) Inside the Regional Ring – Boulevards;
- (v) Outside the Ring – State Highways; or
- (vi) The Freightway – design to be determined.

Figure 4.4 illustrates the classification of street sections in the Road Hierarchy; these are listed in

TABLE 4.4.4 STREET CLASSIFICATION

LOOK UP CLASSIFICATION		LOOK UP STREET NAME	
CLASSIFICATION	STREET SECTION	STREET NAME	CLASSIFICATION
Neighbourhood Connectors	Blackbutt Road	Baird Street	Neighbourhood Distributor
	Boundary Road	Blackbutt Road	Neighbourhood Connector
	Bunglegum Road	Boundary Road	Neighbourhood Connector
	Darling Street (south)	Bourke Street	Business Connector
	Jiora Street	Bourke Street (North Dubbo)	Neighbourhood Distributor
	Minore Road (west)	Bunglegum Road	Neighbourhood Connector
	North Street	Cobbora Street (south)	Business Sub-Arterial
	River Street	Cobra Street (City)	Business Sub-Arterial
	Sandy Creek	Cobra Street (east)	Business Arterial
	Sheraton Road (south)	Darling Street (north)	Business Connector
	Tamworth Street	Darling Street (south)	Neighbourhood Connector
	Wheeler Lane (south)	Eastern Freightway	Rural Arterial
	Macquarie River Boulevard	Erskine Street	Business Sub-Arterial
	River Street Bridge	Fitzroy Street (City)	Neighbourhood Sub-Arterial
Business Connectors	Hills Road	Fitzroy Street (North)	Industrial Distributor
Industrial Connectors	Baird Street	Fitzroy Road (North Dubbo)	Neighbourhood Distributor
Neighbourhood Distributors	Bourke Street (North Dubbo)	Golden Highway	Rural Arterial
	Fitzroy Road (North Dubbo)	Hills Road	Industrial Connector
Business Distributors	Myall Street (east)	Jiora Street	Neighbourhood Connector
	Wingwarra Street	Macquarie River Boulevard	Business Connector
	Bourke Street	Minore Road (east)	Neighbourhood Sub-Arterial
	Darling Street (north)	Minore Road (west)	Neighbourhood Connector
	Myall Street (North Dubbo)	Mitchell Highway (east and west)	Rural Arterial
Industrial Distributors	River Street (North Dubbo)	Myall Street (east)	Neighbourhood Distributor
	Thompson Street	Myall Street (East)	Neighbourhood Sub-Arterial
	Fitzroy Street (North)	Myall Street (North Dubbo)	Business Connector
	Purvis Lane	Newell Highway (north and south)	Rural Arterial
	Yarrandale Road	North Street	Neighbourhood Connector
Neighbourhood Sub-Arterials	Fitzroy Street (City)	Purvis Lane	Industrial Distributor
	Minore Road (east)	Richardson Road	Industrial Sub-Arterial
	Myall Street (East)	River Street	Neighbourhood Connector
	Sheraton Road (north)	River Street (North Dubbo)	Business Connector
	Western Boulevard	River Street Bridge	Business Connector
Business Sub-Arterials	Wheeler Lane (Centre)	Sandy Creek	Neighbourhood Connector
	Cobbora Street (south)	Sheraton Road (north)	Neighbourhood Sub-Arterial
	Cobra Street (City)	Sheraton Road (south)	Neighbourhood Connector
	Erskine Street	Southern Freightway	Rural Arterial
	Whylandra Street	Tamworth Street	Neighbourhood Connector
Retail Arterials	Tamworth Street Bridge	Tamworth Street Bridge	Business Sub-Arterial
	Victoria Street	Thompson Street	Business Connector
Business Arterials	Cobra Street (east)	Victoria Street	Retail Arterial
Industrial Sub-Arterials	Richardson Road	Western Boulevard	Neighbourhood Sub-Arterial
Rural Arterials	Eastern Freightway	Western Freightway	Rural Arterial
	Golden Highway	Wheeler Lane (Centre)	Neighbourhood Sub-Arterial
	Mitchell Highway (east and west)	Wheeler Lane (south)	Neighbourhood Connector
	Newell Highway (north and south)	Whylandra Street	Business Sub-Arterial
	Southern Freightway	Wingwarra Street	Neighbourhood Distributor
	Western Freightway	Yarrandale Road	Industrial Distributor

5.1 RESIDENTIAL EXPANSION

Residential development in Dubbo is planned in three sectors, the **South East Sector**, the **North West Sector** and the **South West Sector**.

The density of existing residential areas is approximately 7.8 dwellings per hectare; this is a gross figure including roads, schools and local community facilities including open space.

Should development continue at this density, the three sectors could accommodate 10,500 dwellings, sufficient until about 2050.

TABLE 5.2 RESIDENTIAL EXPANSION AFTER 2036

A		TOTAL NEW LOTS		Total Lots (used in the Model)							
				2016		2026		2036			
South East Dubbo Keswick South of Boundary Rd South West Dubbo Minore Rd North Joira Rd Jannali Rd Sandy Creek North West Dubbo TOTAL		Percent Total Development						2046 <			

The development will generally proceed from closer to the city, including the first sections of the North West Sector, continuing with development in Minore Road and Boundary Road in the South East Sector. The South East Sector will continue to fill and be at 89% capacity by 2036.

It has been assumed that half of the capacity of the North West Sector will be occupied by 2036.

Development in the South West Sector will be contained mostly to the east of Chapmans Road until 2036. This avoids the cost of utilities including new head works in Sandy Creek to the west of Chapmans Road. Development to the west will start in 2026 and will continue thereafter.

The need to consider further development fronts after 2036 is illustrated by the extension of the forecasts per area for the period 2036 to 2046. (Shown in red on Table 5.2.)

Development in the decade 2036 to 2046 can continue to be divided reasonably evenly between Sandy Creek in the SW Sector and the NW Sector (43% and 27% respectively). Should development continue to be expanding at a similar rate of 250 lots per annum in 2046 then the rural land west of Sandy Creek will need to accommodate a growing proportion of demand. This will have implications on access to the City and the City is likely to look in other directions for continuing growth.

7 ROAD CONSTRUCTION PROGRAM

Road Strategy is focused on maintaining the same level of service for drivers in Dubbo as they experience today to 2036 and beyond. This is an ambitious objective and one of the conditions that will set aside Dubbo as having different a lifestyle to other Regional Cities.

The program is based on the results of modelling future traffic demand, described in Section 8, and maintaining free flowing traffic on all major streets. The Road Construction Program will maintain traffic at Level of Service C or better in all parts of the network, meaning delays will be unnoticeable to visitors and acceptable to local residents.

The Road Construction Program is achievable because the additional road network relies on using roads that are built as part of local development.

The main costs that are not part of local development are parts of The Freightway and, in particular, the new crossings of the Macquarie River. Ideally the entire Freightway should be built as a State Highway. Apart from the fact that the Freightway will be a highly legible and efficient means of moving freight and commerce, the construction of it will be offset by the alternative which would be to upgrade the State Highways passing through the City.

The Road Construction Program is summarised in Table 7.1.

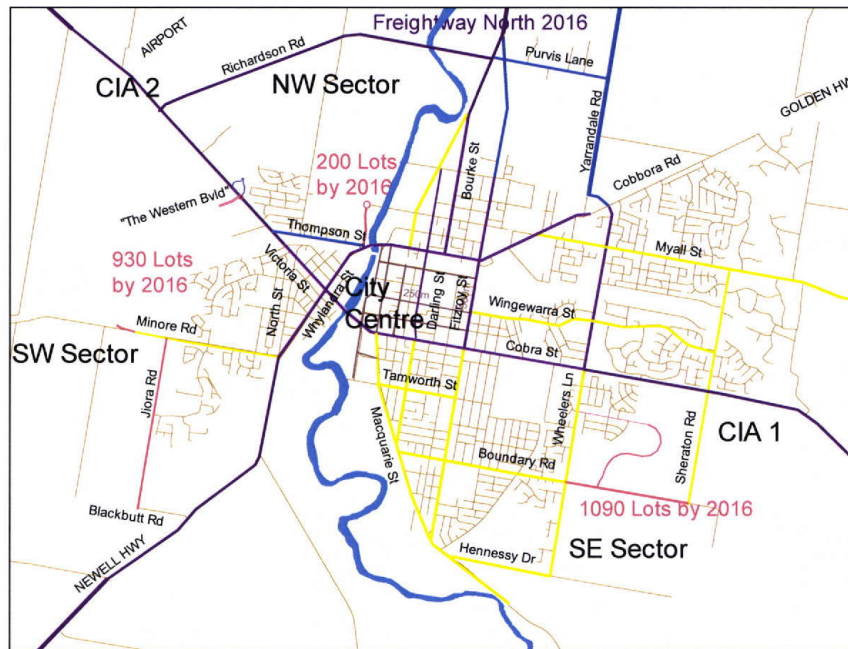
TABLE 7.1 ROAD PROGRAM			
YEAR	STREET NAME	CLASSIFICATION	FUNDING
2016	Boundary Road	Neighbourhood Connector	Development
2016	Jiora Street	Neighbourhood Connector	Development
2016	Macquarie River Boulevard	Business Connector	Development
2016	Northern Freightway	Industrial Sub-Arterial	2 lane + Bridge (RTA)
2026	Bunglegumie Road	Neighbourhood Connector	Development
2026	Minore Road (west)	Neighbourhood Connector	Development
2026	North Street	Neighbourhood Connector	Rail Crossing
2026	River Street	Neighbourhood Connector	Development
2026	Sheraton Road (south)	Neighbourhood Connector	Development
2026	Tamworth Street Bridge	Business Sub-Arterial	2 lane + Bridge
2026	Western Boulevard	Neighbourhood Sub-Arterial	Development
2036	Blackbutt Road	Neighbourhood Connector	2 Lane
2036	Eastern Freightway	Rural Arterial	2 Lane
2036	Hills Road	Industrial Connector	Development
2036	Myall Street (east)	Neighbourhood Distributor	Rail Crossing
2036	River Street Bridge	Business Connector	Bridge
2036	Sandy Creek	Neighbourhood Connector	Development
2036	Southern Freightway Stage 1	Rural Arterial	2 Lane
2036	Western Freightway	Rural Arterial	2 Lane

7.1 Construction by 2016

The Road Construction Program for 2016 is illustrated in Figure 7.1 and includes two existing road alignments and one new alignment that must be built as part of local development. If the development is delayed the roads will not be built. These roads are: -

- upgrade of Jiora Road in the SW Sector;
- the construction of Boundary Road in the SE Sector; and
- the commencement of the “Macquarie River Boulevard” opening up development in the NW Sector.

The Freightway should be commenced by 2016 with the Northern Freightway providing direct access to the abattoir and including a new bridge on the alignment of Purvis Lane. The Northern Freightway consists of the extension of Richardson Road to the alignment of Purvis Lane. This can be built as a two lane road with set backs to allow Regional Industrial development to occur at a later date.

Figure 7.1 2016 Road Network

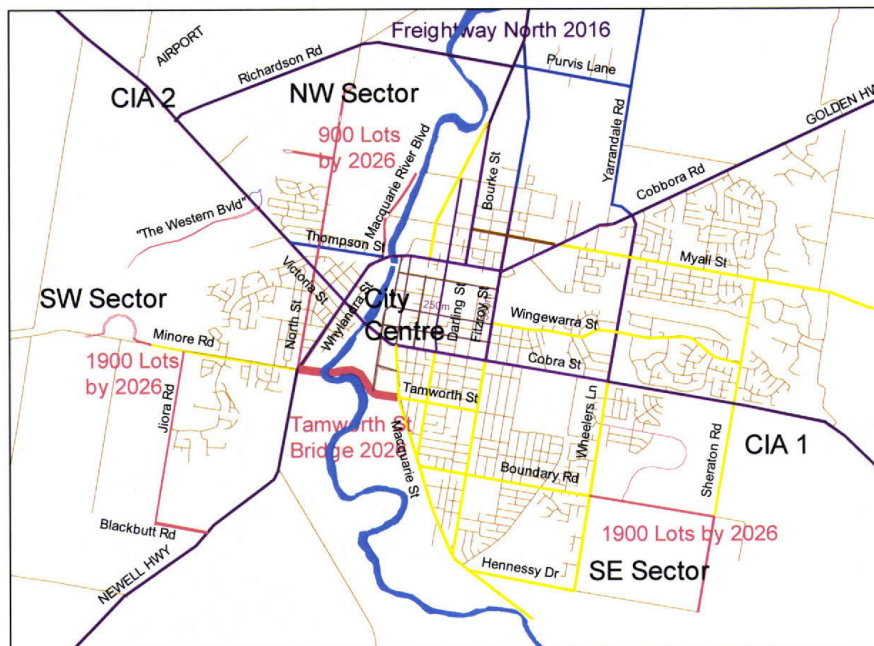
7.2 Construction by 2026

The Road Construction Program for 2026 is illustrated in Figure 7.2.

The projected residential development by 2026 will include the construction of four Neighbourhood Connectors as part of development. These include: -

- The start of upgrading Bunglegumbie Road in the NW Sector;
- River Street extended from Bunglegumbie Road in the NW Sector;
- Minore Road extended to Minore Hill in the SW Sector; and
- Sheraton Road extended to Hennessy Road in the SE Sector.

Figure 7.2 2026 Road Network



The linking of North Street across the rail line at West Dubbo is also included in the 2026 program as a connection between the NW Sector and Victoria Street.

Another road constructed as part of local development during this period will be the Western Boulevard from Mitchell Highway to Chapmans Road. Whilst its status as a Neighbourhood Sub Arterial is rather onerous on the developer, the actual design is not overwhelming and can form an integral part of the residential environment.

The main cost item included in the 2026 schedule is the Tamworth Street Bridge. This will relieve pressure to widen the LH Ford Bridge which, if widened, would in turn require upgrading of the Whylandra/Victoria intersection. This would be contrary to the urban design outcomes sought for West Dubbo. Whilst the Tamworth Street Bridge is not in the long term going to be part of the State Highway network, because Stage 2 of the Southern Freightway will take traffic out of the City Centre, it will provide an alternative to a State Highway for over 20 years.

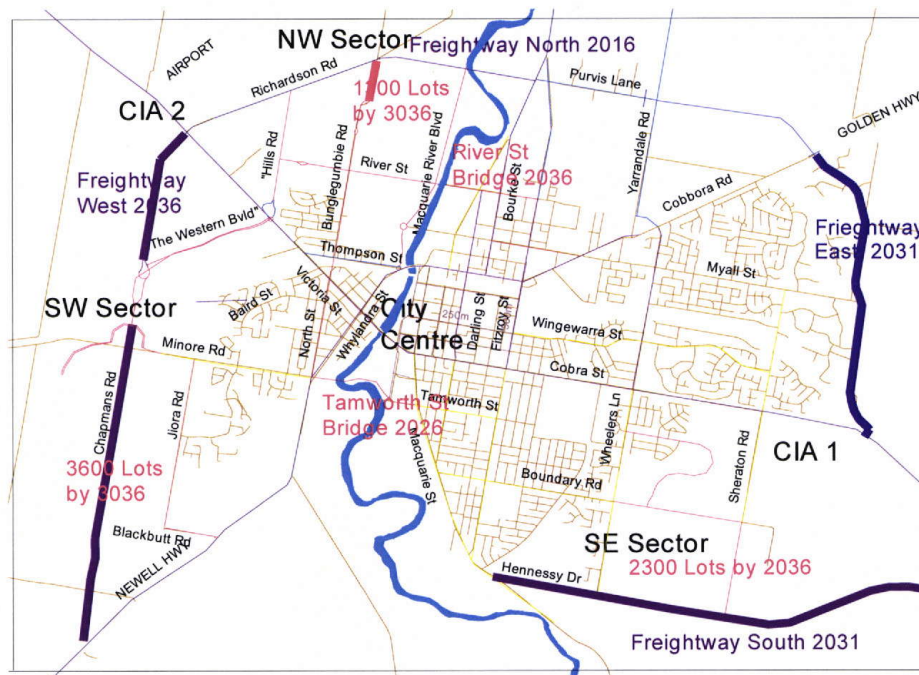
7.3 Construction by 2036

The Road Construction Program for 2036 is illustrated in Figure 7.3.

The projected residential development by 2036 will include the extension of a number of Neighbourhood Connectors and the construction of two Neighbourhood Connectors as part of development.

- The “Sandy Creek” Boulevard will be part of development in the SW Sector.
- The “Hills Road” in the NW Sector which is intended to serve light Industrial mixed use development.

Figure 7.3 2036 Road Network



An essential part of residential development will be the completion of the River Street extension across the Macquarie River. This low level bridge will take pressure off Erskine Street and reduce the distance travelled between the employment areas of North Dubbo, the NW Sector and even the SW Sector. This is a fundamental part of the City grid - the source of funding is less obvious than other roads.

Also included in the program is the reconnection of Myall Street between Fitzroy Street and Cobbora Road beside the hospital. This section of the network should be connected at the convenience of the Base Hospital possibly during some upgrading and is needed by 2036.

The completion of the back road from the SW Sector to the Newell Highway via Blackbutt Road rates a mention in the 2036 program but may be required earlier.

The main need for road construction in 20 to 30 years will be completing the Freightway. These sections include: -

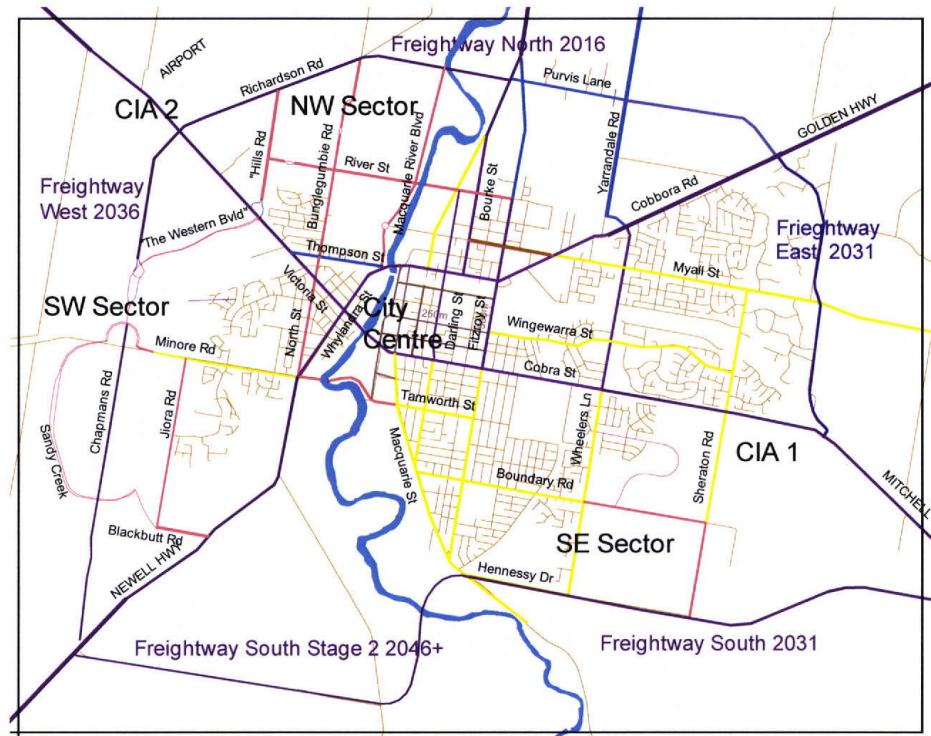
- The Eastern Freightway - the alignment of which has been reserved and can be completed at a reasonably low cost. This could be brought forward in the program.
- The Western Freightway which also has an alignment reserved (Chapmans Road). The major cost item will be the bridge across the Railway. This will be an essential part of the road network required to serve the SW Sector by 2036. This will be part of a strategic State road network.
- The Southern Freightway Stage 1 from the Mitchell Highway to Hennessy Road will provide some relief to Cobra Street by offering an alternate access to the SW Sector and South Dubbo. With the completion of Stage 2 to the Newell Highway some time after 2026, this will become part of the State Highway.

7.4 Construction after 2036

The Strategic Road Network not included for construction prior to 2036 is illustrated in Figure 7.4.

This includes Stage 2 of the Southern Freightway linking Hennessy Road to the Newell Highway south of the Zoo - the modelling suggests this is not required until after 2036; the residents of Macquarie Street between the Tamworth Street Bridge and Hennessy Road will demand its construction when truck drivers start diverting from Cobra Street in noticeable numbers. This may not occur for decades.

Also in the 2036+ plan is the completion of the grid network in the NW Sector with "Hill Road" and the "Macquarie River Boulevard" linking through to the Northern Freightway. The programming of these links will be dictated by the development program, which it has been noted, could be faster in the NW Sector than the figures used in this analysis.

Figure 7.4 2046 Plus Road Network

7.5 Summary

The Road Construction Program will be subject to further debate; this analysis summarises how Dubbo could maintain its good travel conditions into the future. This seems eminently possible and desirable in spite of peak oil. Dubbo is a trading City and needs its Freightways brought out of the City. The other two new bridges at Tamworth Street and River Street will be part of a transportation network with or without the use of cars as we know them.

8 MODELLING

8.1 SCOPE OF WORK

The transport strategy consisted of the following analysis: -

- To prepare a road strategy for Dubbo to meet the demand generated by a growing economy and a growing population into the year 2036.
- Estimate the travel demand.
- To model traffic flows using a traffic model called TRACKS. TRACKS is owned and was operated by Gabites Porter of Christchurch, New Zealand.
- To prepare a strategy for building new infrastructure in ten year periods starting in 2016 with subsequent staging in 2026 and 2036.

The underlying assumptions of the analysis are that Dubbo will grow at a rate that has been predicted by Council and which was discussed in detail in Section 2 (see full Stapleton Report, Appendix 2). It is also assumed that public transport will become more effective in Dubbo as demand allows more services to operate; this was discussed in Section 3. Nevertheless it is assumed that car travel will continue to be the mode of choice irrespective of the price of fuel.

8.2 THE ROLE OF MODELLING

Modelling is used to evaluate how roads will perform in the future. The same modelling can be used for evaluating public transport impacts and other more detailed analysis. For the case of Dubbo, the model has been used solely to look at road transport, freight and private vehicles.

The model calculates the trips made between generators, which are generally houses, and attractors, which are generally work places. There is also movement between work places where, for example, somebody will travel from a shop to another shop or from a warehouse to a shop. These are also included in the model and are described as non-home based trips.

The base year travel was taken as 2006. The reason for this is that it complies with the Bureau of Statistics' census data which is a good starting point for any form of modelling analysis. This is also the reason the years 2016, 2026 and 2036 were selected for future analysis.

Traffic for the base year was first estimated using typical traffic generation figures taken from similar situations. TRACKS has plenty of data and has been used in the Illawarra Region, in Coffs Harbour, throughout New Zealand and in parts of Sydney.

The modellers did find some surprises from their office in New Zealand when they found a large volume of midday traffic on the traffic counts that was not explained easily by the normal trip generation that they had used in their first estimates. This, of course, comes as one of the benefits of Dubbo where people drive home for lunch. This is one of the reasons why the trip generation rate per household in Dubbo is higher than that on the coast.

The first estimate of travel generated for the base year 2006 was then compared with actual travel data, the number of vehicles counted travelling along various roads in Dubbo. These counts were conducted by Dubbo City Council. Adjustments were made to the trip generations and to the movement between places until the model calibrates with, is the same as) measured conditions. Once this calibration is complete, the model can then be used confidently to project future demands based on future population and employment.

The model is used to estimate traffic in the morning peak hour, the evening peak hour and the midday travel.

8.3 2006 MODEL

The model started with assumed trip generations for 2006 and these were used to simulate existing conditions and then reviewed against the reality of actual counts.

The 2006 model correctly identified that Cobbora Road is close to capacity, as is the LH Ford Bridge. This analysis is verified by the fact that work is currently underway (2008) at the intersection of Yarrandale Road and Cobbora Road to resolve issues of traffic congestion near to the University.

Most other sections of road were found to be operating below the standard level of congestion which has been selected for Dubbo. The standard adopted for Dubbo is described in the transport analysis as "*Level of Service C*". This is a very high standard of service creating minor delays at intersections, in the range to 22 seconds. Coastal towns are now designed to lower standards, Level of Service D or even E being acceptable in the centre of towns.

8.4 FUTURE LAND USES

The future land uses are described in Section 5. In summary, the planning strategy is based on an assumption that the number of households will rise by 250 dwellings per year for the foreseeable future.

Employment forecasts have been prepared to meet the demand from the number of workers that will be generated from these additional households.

Suitable figures have been applied to the average household size, which is decreasing over time, and the number of employees per household, which is also decreasing.

The employment is distributed to existing and future employment areas. These are fully described in Section 5. For the purposes of modelling, it is assumed that each of the assigned areas for each type of employment will grow pro rata to the population growth. This assumption is made based on the need for flexibility to develop Dubbo over time. The details of how each area will develop cannot and should not be defined at this point.

The future housing has been allocated to three development areas: the South East, from Keswick continuing south across Boundary Road; the South West, continuing south and west from

Minore Road; and the North West, continuing north and east of the Rosewood Estate on the western side of the Macquarie River (described further in Sections 5 and 6). It is assumed that housing will be available on all of these fronts, providing a range of housing opportunities for both newcomers and those moving to new accommodation within Dubbo.

It should be noted that currently a significant proportion of new housing on the south western part of Dubbo is being generated by those moving from the inner parts of Dubbo. This is having the effect of reducing the household size in the inner area of Dubbo, in the same way as in many other communities in New South Wales.

Early Modelling

In the first set of modelling, the distribution of future housing demand prior to 2036 was focused on the south east and the south west. This analysis concluded that some of the **Connectors** required in the North West Sector to carry traffic between the south west and the north would be required before the development had occurred along them; in particular the extension of River Street through the North West Sector. This is not a practical solution, it is better to build roads as part of development and to use the roads to service development.

Final Modelling

A second set of modelling was authorised by Council to look at bringing forward development in the North West Sector. This is logical for a number of reasons, not least the fact that the North West Sector is much closer to the Town Centre and therefore development in this area minimises travel. The North West Sector is also well located to bring forward new upmarket employment and serve it with the new residential development adjacent to the employment. This synergy is described more in Section 2.

The modelling results which are used in this report are based on this adjusted planning scenario.

8.5 NETWORK BUILDING

The principle in choosing the Road Network was “load” the future travel demand (trips between places) onto a road network, see which sections incurred delays and add new roads until the traffic conditions were acceptable. Then move to the next decade.

The worst case scenario of future travel was created by “loading” the 2036 travel demand onto the 2006 road network. This gives a picture of what conditions would be like if nothing was done and development continued as predicted. This is not a realistic scenario since if delays became the norm in Dubbo then businesses and people would not be attracted to Dubbo and the forecasted demand would not be realised; nevertheless, the Do Nothing analysis shows where traffic demand would be if the roads were good enough to take the load.

The basic concept for the Freightway had been laid down before this study commenced and had merit as a strategic move to reinforce Dubbo as a regional freight centre. The expansion of the Abattoir and new Freight Centre near the Abattoir were major factors in the establishment of the

Northern Freightway. The centre for freight on the Mitchell Highway at Richardson Road was the logic behind the Western Freightway. The Eastern Freightway was a logical means of crossing from the Mitchell Highway to the trucking and freight industries in North Dubbo without the constant need to increase capacity on existing roads running through the existing City and therefore with limited capacity for change.

The second logic for the future road network for Dubbo was mending and extending the Grid and this includes two new crossings of the Macquarie River,

- River Street, connecting existing and future development in the north, and
- Tamworth Street, connecting existing and future development in the south.

The logic was that both these connections would take some traffic out of the City Centre thereby maintaining it as the urban centre and allowing expansion to the west of the river.

Here modelling proves invaluable; answering such questions as what will be the impact of a new bridge to Tamworth Street and will this lead to a flood of traffic through South Dubbo? (No, the traffic using the new Bridge mostly turns into Macquarie Street or the City Centre.)

Adding new roads causes small changes in demand throughout the existing streets and does not generally lead to major changes on any one street.

The modelling process was therefore: -

1. Load the 2016 traffic demand onto the 2006 Network.
2. Note places where congestion would occur and add roads to remove that congestion to create a 2016 Network.
3. Load the 2026 traffic demand onto the 2016 Network.
4. Note places where congestion would occur and add roads to remove that congestion to create a 2026 Network.
5. Load the 2036 traffic demand onto the 2026 Network.
6. Note places where congestion would occur and add roads to remove that congestion to create a 2036 Network.
7. One further iteration was conducted of loading an estimated 2046 traffic demand onto the 2036 Network.

The conclusions continuously referred back to Cobra Street as is discussed below.

8.6 MODELLING ANALYSIS

The analysis is reported in two forms; Table 8.1 lists the traffic flows reported from the model summarised into screen lines, cuts across the map; Appendix A contains diagrams showing where Level of Service C is reported for each of the modelled years.

8.6.1 2036 Do Nothing and Road Strategy

Table 8.1 lists daily traffic flows on three screen lines in 2006, 2036, with no improvements to roads, and 2036, with the recommended strategy.

The existing traffic flows and conditions have been described in Sections 3 and 4.

Screen Line 1 River Crossings

Currently some 31,500 vpd cross the Macquarie River at the two crossings. Traffic is expected to increase by 96% by 2036.

The Do Nothing modelling shows the increase would be predominantly at Serisier Bridge, this partly reflecting the difference in the capacity of the Serisier Bridge and the LH Ford Bridge.

The 2036 Strategy accommodates the increased flow with the three new crossings - little increase in the flow using Serisier Bridge and an equal flow on the LH Ford Bridge. The flow on the LH Ford Bridge can be handled but only by limiting access to Macquarie Street to left in - left out. These flows will vary and can possibly be more balanced with the capacity of the bridges by rearrangements in the City Centre.

Screen Line 2 Eastern Screen Line

The Eastern Screen Line cuts a north south line from the University to Hennessy Road.

Traffic on this Screen Line is expected to increase by 58%. The highest increases are expected at the northern and southern ends of the screen line indicating that proposals to spread traffic have been very successful. Nevertheless, traffic on the main roads in the City will rise by between 26% and 37%. The road strategy still results in the pedestrian amenity decreasing in most streets but, as has been stated earlier, this can be handled because of the generous design of the existing carriageways.

Screen Line 3 East West Screen Line

The East West screen line follows the rail line from Minore Hill to south Bunninyong Road.

Traffic on this Screen Line is expected to increase by 60%. The proposed connectivity maintains most streets at the present amenity, indeed the flow on Whylandra Street near Thomson Street is expected to reduce a little and this is consistent with the plan to improve pedestrian amenity through West Dubbo. In the Do Nothing case, the traffic on Whylandra Street would be twice as much as the proposed strategy requiring major upgrading of the intersection with Victoria Street which would be contrary to the proposed improvement of pedestrian amenity in West Dubbo.

Flows in the City Centre are slightly higher than existing flows indicating the increased demand for the City is not met with additional through traffic and the strategy has been successful. Further work on the City Centre can proceed with an aim to improving and extending pedestrian amenity.






The lack of connectivity in east Dubbo shows up by the increase in traffic on Wheelers Lane and Sheraton Road and pedestrian amenity will decrease in both streets. Street management can, however, support the traffic safely.

Note how the flow of traffic using North Street in West Dubbo will allow it to be designed as a Connector with full pedestrian access even with its connection to Bunglegumbie Road.

TABLE 8.1 SCREEN LINES 2006, 2036 Do Nothing Strategy

	2006 Base Vpd	2036 Do Nothing Vpd		2036 Strategy Vpd
1 River Crossings				
Northern Freightway				7290
River Street				2890
Serisier Bridge	16080	34170	213%	19840
LH Ford Bridge	15610	27890	179%	20290
Tamworth St Bridge				11750
			196%	
2 Eastern Screen Line				
Purvis Lane	2550	7670	301%	8620
Yarrandale Road	2630	8260	314%	8210
Cobbora Road	9640	12310	128%	11580
Myall Street	10450	13750	132%	13810
Wingewarra Street	8030	10120	126%	8950
Cobra Street	14730	20120	137%	17380
Boundary @ Fitzroy	3550	8040	226%	7860
Hennessy Road	530	2230		5850
			158%	
3 East West Screen Line				
Chapmans Road Rail Bridge		5580		8230
Victoria Street	9630	17110	178%	17600
North Street		0		4410
Whylandra at Thompson	10380	18900	182%	9720
Bligh (City)	5080	9520	187%	6850
Macquarie (City)	4450	4780		5050
Darling Street	5130	8430	164%	7100
Fitzroy Street	11490	13330	116%	11790
Wheelers Lane	9770	13350	137%	12750

Sheraton Road	8010	10440	130%	11100
Eastern Freightway			160%	

LEGEND	
	Connector 3,500 – 6,000 vpd
	Distributor 6,000 – 11,000 vpd
	Sub Arterial 11,000 – 15,000 vpd
	Arterial 15,000 – 21,000 vpd
	Arterial > 21,000 vpd

8.6.2 2016 Network Evaluation

Table 8.2 lists daily traffic flows on three screen lines in 2006 and 2016.

The Level of Service analysis also shows that without amendments Cobra Street will be operating at over Level of Service C for part of its length. The Road Strategy reduces the Level of Service in Cobra Street to close to Level of Service C. This process is repeated in the analysis of each decade.

New roads included in the network are the Northern Freightway and the rail bridge at Chapmans Road. It is unlikely that the Western Boulevard will be completed from Mitchell Highway to Chapmans Road by 2016. If it were completed, then the model suggests it would be used by 2,500, a reasonable flow but not one that requires the construction of a road which is not part of residential development. The 2,500 vpd will continue to use Minore Road.

It is estimated that the Northern Freightway will be carrying just over 4,000 vpd by 2016, a reasonable flow that keeps traffic out of the City Centre.

The most noticeable feature of the 2016 traffic figures is the change in pedestrian amenity on many existing roads; Myall Street, Cobra Street, Victoria Street, Whylandra Street, and Wheelers Lane, will each need remedial measures to maintain pedestrian and bike accessibility over the next few years. The only good message coming out of this message is that the conditions do not get much harder through to 2026.

TABLE 8.2 SCREEN LINES 2006 and 2016

	2006 Base Vpd	2016A Northern Bypass % from 2006 Vpd	
1 River Crossings			
Northern Freightway		4020	
River Street		0	
Serisier Bridge	16080	18680	116%
LH Ford Bridge	15610	18950	121%
Tamworth St Bridge		0	
			131%
2 Eastern Screen Line			
Purvis Lane	2550	5550	
Yarrandale Road	2630	5390	
Cobbora Road	9640	10450	
Myall Street	10450	11860	
Wingewarra Street	8030	8460	
Cobra Street	14730	16500	112%
Boundary @ Fitzroy	3550	6210	
Hennessy Road	530	410	
			126%
3 East West Screen Line			
Chapmans Road Rail Bridge		2510	
Victoria Street	9630	12150	126%
North Street		0	
Whylandra at Thompson	10380	12180	117%
Bligh (City)	5080	6320	124%
Macquarie (City)	4450	4810	108%
Darling Street	5130	6160	120%
Fitzroy Street	11490	11960	104%
Wheelers Lane	9770	11510	118%
Sheraton Road	8010	8870	111%
Eastern Freightway			
			121%

LEGEND		
	Connector	3,500 – 6,000 vpd
	Distributor	6,000 – 11,000 vpd
	Sub Arterial	11,000 – 15,000 vpd
	Arterial	15,000 – 21,000 vpd
	Arterial	> 21,000 vpd

8.6.3 2026 Network Evaluation

Table 8.3 lists daily traffic flows on three screen lines in 2016 and 2026.

Again the Road Strategy maintains Cobra Street at Level of Service C.

The major new road in the network is the Tamworth Street Bridge which opens with a flow of nearly 10,000 vpd.


The positive impact of this road can be noted by the reduction of traffic in the vicinity, including Victoria Street, Whylandra Street at Thompson Street, Bligh Street, and Darling Street and the two crossings to the City.

Following on from the comment for 2016, there are no further reductions in pedestrian amenity on any Neighbourhood or Business streets between 2016 and 2026.

Traffic in Purvis Lane and Yarrandale Road is estimated to increase by 32% between 2016 and 2026.

TABLE 8.3 SCREEN LINES 2016 and 2026

	2016	2026 On 2016	2026 Tamworth Bridge	% From 2016
1 River Crossings				
Northern Freightway	4020	5870	5920	147%
River Street	0	0	0	
Serisier Bridge	18680	22010	20440	109%
LH Ford Bridge	18950	25180	17220	91%
Tamworth St Bridge	0	0	9850	
				128%

2 Eastern Screen Line				
Purvis Lane	5550	7130	7310	132%
Yarrandale Road	5390	6890	7110	132%
Cobbora Road	10450	10790	11040	106%
Myall Street	11860	13100	12640	107%
Wingewarra Street	8460	9460	8890	105%
Cobra Street	16500	18070	18260	111%
Boundary @ Fitzroy	6210	7760	7650	123%
Hennessy Road	410	510	830	202%
				113%
3 East West Screen Line				
Chapmans Road Rail Bridge	2510	5430	5710	227%
Victoria Street	12150	17680	14780	122%
North Street	0	0	0	
Whylandra at Thompson	12180	13170	11700	96%
Bligh (City)	6320	8060	6320	100%
Macquarie (City)	4810	4960	4790	100%
Darling Street	6160	7090	6640	108%
Fitzroy Street	11960	11880	11930	100%
Whealers Lane	11510	12110	12440	108%
Sheraton Road	8870	10110	10160	115%
Eastern Freightway				111%
LEGEND				
		Connector	3,500 – 6,000 vpd	
		Distributor	6,000 – 11,000 vpd	
		Sub Arterial	11,000 – 15,000 vpd	
		Arterial	15,000 – 21,000 vpd	
		Arterial	> 21,000 vpd	

8.6.4 2036 Network Evaluation

Table 8.4 lists daily traffic flows on three screen lines in 2026 and 2036.

And once again the Road Strategy brings down the Level of Service along Cobra Street to Level of Service C and without the Strategy the Level of Service drops below C.


The major new road in the network in 2036 is the new bridge across the Macquarie River at River Street. This opens with a flow of about 2,900 vpd with a corresponding reduction in the traffic using the Serisier Bridge.

Rapid development in the SW Sector will increase the use of the Rail bridge at Chapmans Road by 44% and some of this traffic will still use Victoria Street, 1,800 vpd less with the River Street crossing completed.

And the Northern Freightway will also carry 23% more traffic in the decade between 2026 and 2036, complementing the River Street crossing.

TABLE 8.4 SCREEN LINES 2026 and 2036

	2026	2036 on 2026	2036 Strategy	% From 2026
	Vpd	Vpd	Vpd	
1 River Crossings				
Northern Freightway	5920	7900	7290	123%
River Street	0	0	2890	
Serisier Bridge	20440	22250	19840	97%
LH Ford Bridge	17220	20100	20290	118%
Tamworth St Bridge	9850	11800	11750	119%
				116%
2 Eastern Screen Line				
Purvis Lane	7310	8630	8620	118%
Yarrandale Road	7110	8230	8210	115%
Cobbora Road	11040	11510	11580	105%
Myall Street	12640	13760	13810	109%
Wingewarra Street	8890	8950	8950	101%
Cobra Street	18260	17370	17380	95%
Boundary @ Fitzroy	7650	7850	7860	103%
Hennessy Road	830	5850	5850	705%
				112%

3 East West Screen Line				
Chapmans Road Rail Bridge	5710	8330	8230	144%
Victoria Street	14780	19290	17600	119%
North Street	0	0	4410	
Whylandra at Thompson	11700	12030	9720	83%
Bligh (City)	6320	6960	6850	108%
Macquarie (City)	4790	4840	5050	105%
Darling Street	6640	7210	7100	107%
Fitzroy Street	11930	11890	11790	99%
Wheelers Lane	12440	12780	12750	102%
Sheraton Road	10160	11100	11100	109%
Eastern Freightway				112%
LEGEND				
		Connector	3,500 – 6,000 vpd	
		Distributor	6,000 – 11,000 vpd	
		Sub	11,000 – 15,000 vpd	
		Arterial		
		Arterial	15,000 – 21,000 vpd	
		Arterial	> 21,000 vpd	

8.6.5 2046 Network Evaluation

The traffic estimates for 2046 are not made with the detailed land use patterns that have been used for the earlier decades. Additional population has been allocated in line with the discussion in Section 5 but employment has been spread as a simple pro-rata increase to the numbers allocated in 2036 figures (No estimates were made of the land take or likely direction of employment in 2046.)

The traffic figures are nevertheless of interest and listed in Table 8.5.

The river crossings continue to increase with the River Street crossing taking the highest percent of growth and the Serisier Bridge passing the 21,000 vpd mark, which it can carry but which may not be suited to the needs of the City Centre.

Purvis Lane increases by 48% in the decade, the Chapmans Road Rail Bridge by 86% (resulting from the intensive development of Sandy Creek.)






The results of the modelling on other streets listed in the screen lines are quite flat in the period, indeed some flows are shown to decrease slightly. These figures tend to show the inaccuracies that creep into modelling if it is not done carefully rather than the hope that flows will reduce in key places such as Victoria Street.

The overall impression for 2046 is that the grid system will continue to serve Dubbo well and

there will be no surprises in the next 50 years of growth. Cars? Well they will still be around in some form, perhaps the MG midget will be back on hydrogen.

TABLE 8.5 SCREEN LINES 2.36 and 2046

	2036	2046	%
	Vpd	Vpd	From 2036 Vpd
1 River Crossings			
Northern Freightway	7290	9900	136%
River Street	2890	4300	149%
Serisier Bridge	19840	22850	115%
LH Ford Bridge	20290	20870	103%
Tamworth St Bridge	11750	14180	121%
			116%
2 Eastern Screen Line			
Purvis Lane	8620	12740	148%
Yarrandale Road	8210	9120	111%
Cobbora Road	11580	12410	107%
Myall Street	13810	14800	107%
Wingewarra Street	8950	8250	92%
Cobra Street	17380	17740	102%
Boundary @ Fitzroy	7860	7290	93%
Hennessy Road	5850	7140	122%
			108%
3 East West Screen Line			
Chapmans Road Rail Bridge	8230	15330	186%
Victoria Street	17600	16730	95%
North Street	4410	4950	112%
Whylandra at Thompson	9720	11810	122%
Bligh (City)	6850	7980	116%
Macquarie (City)	5050	5020	99%
Darling Street	7100	7300	103%
Fitzroy Street	11790	11830	100%
Wheelers Lane	12750	13100	103%
Sheraton Road	11100	10640	96%
Eastern Freightway			142%

LEGEND	
	Connector 3,500 – 6,000 vpd
	Distributor 6,000 – 11,000 vpd
	Sub Arterial 11,000 – 15,000 vpd
	Arterial 15,000 – 21,000 vpd
	Arterial > 21,000 vpd

A 2012 Perspective on Future Dwelling Numbers

A key input to any strategic planning exercise is the number of future dwellings that need to be catered for. In traffic engineering it is the number of dwellings which best correlates with the number of vehicle movements per day or per hour rather than the population.

Between 1991 and 2006 the number of persons per dwelling in Dubbo (or more precisely), the area encompassed by the former Dubbo Urban LEP, fell from 2.87 persons to 2.58 persons. This is as near enough to an average 0.1 persons per dwelling every five years.

A comparable figure for 2011 is not yet available because the 2011 Census results have yet to be published. However based on the trend between 1991 and 1996 it is probable that the 2011 figure will be in the vicinity of 2.5 persons per dwelling.

There is a general consensus amongst demographers that dwelling occupancy rates will continue to decline over time, to perhaps 2.0 persons per dwelling or less. This is driven by a number of social and demographic trends, such as an increasing number of one person “widow” or “widower” households as the average life expectancy of the community increases; increasing average wealth; a growing trend for people to marry later and have fewer children, the move to smaller “inner city” multiple occupancy dwellings in lieu of detached suburban housing, and the prosperity for younger generation people to live alone and interact more widely using electronic social media.

For the analysis of future dwelling numbers used in the report I have therefore assumed a linear trend of household size reduction of 0.1 persons per household over each five year period out to 2036, as follows:

2011	2.5	persons per household
2016	2.4	persons per household
2021	2.3	persons per household
2026	2.2	persons per household
2031	2.1	persons per household
2036	2.0	persons per household

Very recently, Council engaged Bernard Salt, of KPMG Pty Ltd, to undertake an independent assessment of the “Population Outlook for Dubbo City Council”. This report was delivered to Council in February 2012 and publicly launched by Mr Salt himself, in Dubbo, on 11 April 2012. The report contained “Low”, “Moderate” and “High Scenarios” for Dubbo’s future

population growth, with the “most likely” scenario being the “Moderate” one.

Based on these three scenarios, and assuming the household sizes listed above, it is possible to calculate the number of new households that will develop in Dubbo in 5 year increments out to 2036. These numbers are tabulated below. Because the Stapleton Report used as its base the 2006 Census population figures and projected forward 30 years to 2036, 2006 is used as the base for this tabulation as well. Given the assumptions made the future dwelling numbers have been rounded up or down to the nearest one hundred.

Year	House hold Size	“Low” Pop ⁿ	“Low” Pop ⁿ Growth	“Low” Dwell Growth	“Mod” Pop ⁿ	“Mod” Pop ⁿ Growth	“Mod” Dwell Growth	“High” Pop ⁿ	“High” Pop ⁿ Growth	“High” Dwell Growth
2006	2.58	39618	-	39618	-	-	-	39618	-	-
2011	2.5	42050	2432	1000	42170	2552	1000	42290	2672	1100
2016	2.4	43590	3972	1700	44240	4622	1900	44890	5272	2200
2021	2.3	44820	5202	2300	46235	6617	2900	47650	8032	3500
2026	2.2	45850	6232	2800	48150	8532	3900	50450	10832	4900
2031	2.1	46470	6852	3300	49945	10327	4900	53420	13802	6600
2036	2.0	46670	7052	3500	51545	11927	6000	56420	16802	8400
2046	2.0	46870	7252	3600	54940	15322	7700	62390	22772	11400

*Figures for 2046 are projections from KPMG’s analysis out to 2036 made by Dubbo City Council staff, but they are consistent with it.

It is important to note that Stapleton’s 2008 Report made the assumption, supported by Dubbo City Council staff at the time, that 7500 new dwellings were to be accommodated in Dubbo’s growth areas between 2006 and 2036. It now transpires (2012) that the projection of new dwelling numbers in that period, based on Bernard Salt’s “Moderate” growth scenario, may actually be lower at 6000. Under this “Moderate” growth scenario the 7500 new dwellings analysed by Stapleton would be reached in 2045 rather than 2036.

On the other hand the KPMG “High” growth scenario would see more than 7500 new dwellings created by 2036 (8400). In that scenario the Stapleton analysis results would become relevant in 2034, a couple of years “early”. With the benefit of hindsight, the 7500 new dwellings assumption used in the Stapleton Report actually represents a scenario not quite two-thirds if the way between the KPMG’s “Moderate” and “High” scenarios.

Based on the above, I am happy to continue to make use of the results and recommendations of the “Dubbo City Planning and Transportation Strategy 2036” by Chris Stapleton on the basis that the timing of its recommendations may need to be deferred by approximately five years to account for more recent projections of population growth which are only about 80 percent as high as was assumed therein. And should Dubbo’s growth continue to be as strong as it was for the period 2006 to 2010, for significant parts of the next 25 years, then the real growth of the City would match the Stapleton’s Reports assumptions.

Community Demand For A Second Flood Free River Crossing

The need for an additional high level bridge across the Macquarie River at Dubbo was graphically illustrated during December 2010 when for two weeks the Serisier Bridge was submerged and all cross-river traffic was restricted to the LH Ford Bridge. During this time Council spent in excess of \$1 million on round-the-clock traffic control at intersections leading onto the LH Ford Bridge, whilst the delay costs to local residents and businesses amounted to tens of millions of dollars as 35,000 vehicles queued daily for up to an hour at times to make the crossing from east to west or vice versa. On top of this was the delay to interstate highway traffic on the Newell and Mitchell Highways with further significant delay costs imposed on travellers and freight operators alike as they made their way slowly through Dubbo.

December 2010 was, thankfully, a once-off event which has not repeated itself in 2011 or 2012. However there is no guarantee that multiple floods will not occur in Dubbo in any one year, such as happened in 1950 (8 floods), 1952 (3 floods), 1956 (5 floods) or 1990 (2 floods). Were the Serisier Bridge to be inundated during multiple floods for several months out of a future year the economic cost of traffic delays would be horrendous at a local, regional, State and National level. One issue peculiar to Dubbo is the existence of a flood mitigation airspace at Burrendong Dam on the river above Dubbo, which certainly mitigates floods, but also extends them by virtue of the stored water having to be released relatively quickly once the peak of the flood has passed. This more or less guarantees that the Serisier Bridge will be closed for two weeks at a time in major floods even though the peak of the flood may have only lasted one week.

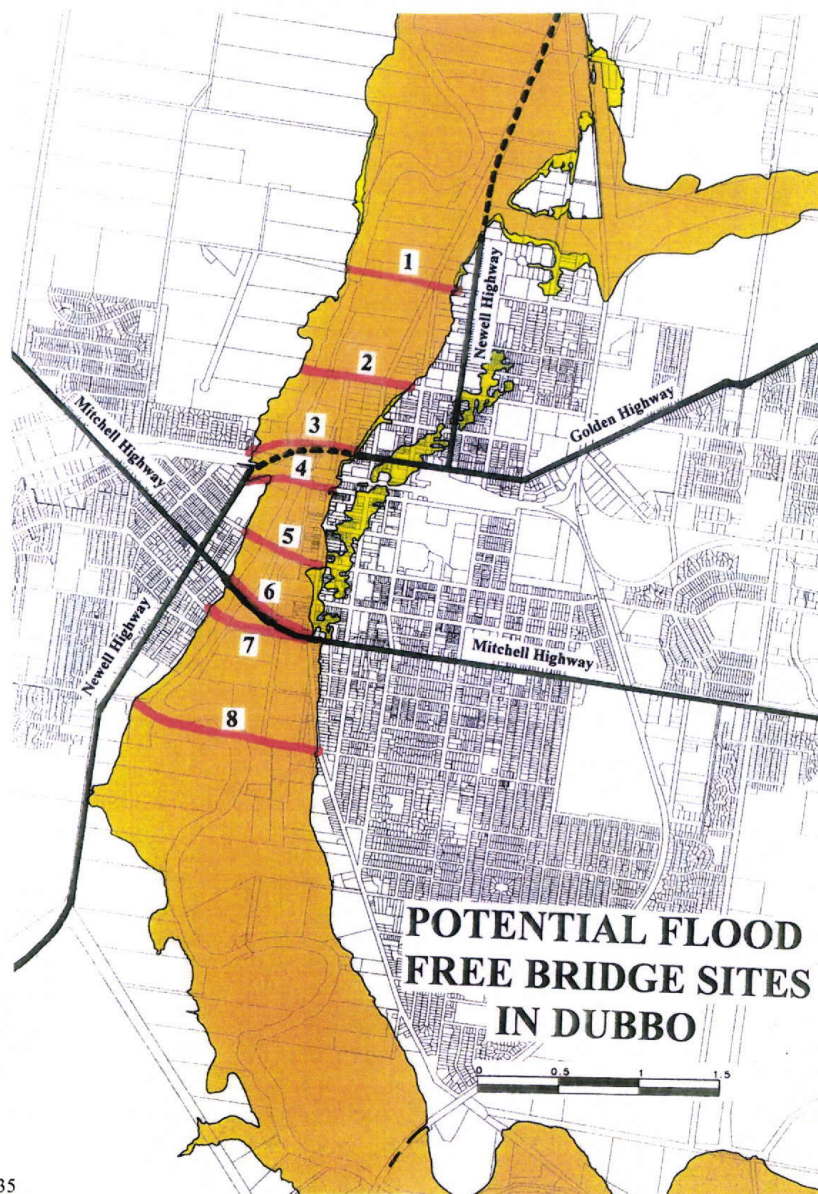
A second high level crossing at Dubbo is essential for the long term economic prosperity of the Orana Region. As West Dubbo continues to expand traffic delays and traffic control costs will continue to escalate during each successive flood event. What were delays of one hour in 2010 will become delays of two hours in future floods. Access to Dubbo's regional services will be severely restricted during these events, as well as significant delays for highway traffic attempting to transit the region. Such a bridge deserves to be a major regional priority for these reasons.

Confusion Between a Third Bridge and Second Flood Free One

Many people mistakenly confuse the need for a "third river crossing" for Dubbo with the need for a new "flood free crossing". The two are NOT the same, however, as is explained below.

A "flood free" bridge over the Macquarie River at Dubbo is a much longer elevated structure than a bank level bridge like the Serisier Bridge. The Serisier Bridge is 80 metres long, the LH Ford Bridge is 600 metres long. The reason for this lies in the shape of the floodplain through Dubbo. The true "floodplain" that people recognise as such is the flat land located along Bligh Street occupied by sporting ovals, carparks and walking tracks. It is the land easily inundated by frequent floods such as the 1 in 20 year and 1 in 30 year floods which were experienced most recently in 1990 and 2010.

The land people usually identify as “flood free” is generally defined as being above the 1 in 100 year flood level. In Dubbo it is roughly the level of Macquarie Street in the CBD. A flood of this height has not been seen since the Dubbo flood of record in 1955. Although land higher than that is still in reality part of the flood plain for even larger foods, this level is often adopted in statutory town plans as the arbitrary dividing line between “flood free” and “flood liable” land.



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The map on the previous page shows the 1 in 100 year floodplain through Dubbo. On it are shown in red ALL the feasible locations for a new bridge to be built which would be “flood free” (ie, not inundated in floods smaller than the 1 in 100 year flood). The locations chosen are all somewhere near the CBD for obvious economic and social reasons – a bridge too far “out of town” would simply be an expensive white elephant 99.95% of the time when the river is not flooding.

The locations suggested are:

1. Opposite River Street in North Dubbo
2. Opposite Myall Street in North Dubbo
3. Immediately downstream of the Serisier Bridge linking Erskine and Thompson Streets.
4. Opposite Talbragar Street linking across to Whylandra Street above flood level.
5. Alfred Street to Wingewarra Street in the CBD.
6. Duplication of the LH Ford Bridge (immediately upstream or downstream would both be feasible).
7. Cobra Street to East Street (a quasi duplication of the LH Ford Bridge).
8. Minore Road to Tamworth Street.

When assessing and comparing options a number of attributes are important.

- a) Does the location facilitate its use by Mitchell and Newell Highway traffic during flood events?
- b) Are both ends of the bridge in locations where traffic will be relatively free flowing?
- c) Is it too far out of the way to attract high traffic volumes in “normal times”?
- d) Is it adjacent to an existing highway and perhaps able to attract State or Federal Government funding, or on a local road relatively remote from a highway?
- e) Is it longer, and therefore more expensive to build, than other options?
- f) Will local residents be more adversely affected than with other options?

In my opinion, and taking points (a) to (f) into account, the most practical and cost-effective option for a second high level bridge in Dubbo free of 1 in 100 year flooding will be Option 6, duplication of the LH Ford Bridge between Victoria Street in the west and Cobra Street in the east. The intention would be to convert both lanes of the existing LH Ford Bridge to one way traffic and dedicate both lanes of the new bridge to one way traffic flow in the opposite direction. During flood events it may still be necessary, using traffic management, to alternate during morning and afternoon peak periods with a three lane/one lane directional split, but this would still be a major improvement on what happened in December 2010.

What Are The Likely Costs of a Second Flood Free Bridge?

Unfortunately a duplication of the LH Ford Bridge as recommended is BEYOND THE FINANCIAL CAPABILITY of Dubbo City Council to fund. A reasonable feasibility estimate for such a duplication was recently sought and obtained from a local consultancy firm, and a sum of \$40 million is a realistic budget figure. It is for this reason that Council has already began lobbying through Regional Development Australia and both Members of Parliament representing Dubbo for this project to be made a REGIONAL PRIORITY PROJECT in order to attract both State and Federal grant funding. Better still it could simply be made a Government project to augment the flood free cross-river capacity of the Mitchell Highway through Dubbo in the interests of the broader State and Federal economies, in the knowledge that the Newell Highway would also be diverted across it during flood events.

Meeting the Predicted Need For A Third AND A Fourth River Crossing in Dubbo

As indicated at the beginning of the previous section, many people fail to separate the need for a third (and fourth) crossing of the Macquarie River in Dubbo in traffic growth grounds from the need for a second flood free crossing. The two are very different however.

Dubbo Council could typically build six or seven low level bridges (bank to bank structures like the Serisier or Troy Bridges) for the \$40 million a duplication of the L H Ford Bridge would cost. It is for this absolutely pragmatic reason that Dubbo's third and fourth river crossings will almost certainly be "low level" bridges, designed to flood at around the level of the 1 in 10 to 1 in 15 year flood frequency. This renders them economical to build and usable for 99.95% of the time, but when they are flooded the traffic delays experienced in December 2010, or worse, are inevitable.

Stapleton's Study recommends that two additional bridges be built by 2026 – the Purvis Lane Bridge on the Freightway North (2016) and the Tamworth Street Bridge (2026). However the Study is very clear that the Purvis Lane Bridge and Freightway North would only be built first of development of the North West residential sector was underway concurrently to fund the construction and create an immediate demand for it.

At the present time, however, development of this sector does not appear to be imminent. Although the Bunglegumbie Sewage Treatment Plant has been closed and demolished there are as yet no plans to develop the site that it was on for subdivision. This renders Mr Stapleton's recommended timing and prioritisation of Dubbo's third and fourth river crossing academic.

In the event, my preference and recommendation is for the third river crossing to be at Tamworth Street as has been the intention at staff level for the past 15 years. I would follow this with the Purvis Lane crossing even if it had to be part of a "Green Field" construction of the Freightway North by Council ahead of development in the ongoing North West Sector. Given the delay factor of five years or so inherent in the Stapleton Report (as discussed above with respect to future dwelling numbers), I am recommending that the Tamworth Street Bridge be in use by 2021, meaning that its pre-construction would need to be seriously underway by at least 2018. The Purvis Lane Bridge should still be built by 2026 if possible so that construction deadlines for the Freightway as a whole can be met to ensure that the redistribution of traffic from the centre of the City to the periphery assumed to occur by Mr Stapleton does in fact occur.

Are the Current Queuing Delays In Whylandra Street Evidence That A Third River Crossing is Needed Immediately

The answer to this question is “NO”. A third bridge is certainly needed in the medium term (8 to 10 years), but the queuing problem presently being experienced during the morning peak in Whylandra Street is not an “extra bridge” problem. It is the roundabout at Victoria Street which either needs re-building as a full two lane roundabout or replacement with traffic signals, not bridge capacity which is causing the congestion at present, although delays are not yet serious enough to warrant immediate action in either solution.

Despite some statements by members of the public that they are “waiting ½ hour just to get down to the roundabout” this is not true. Observations taken over several mornings by Technical Services Division Staff show that whilst the queue may extend back past Baird Street for the order of half an hour (8.15 to 8.45 am typically), individual vehicles seeking to turn right onto the L H Ford Bridge were being held up for a maximum period of 3 to 4 minutes. Whilst this is reasonably inconvenient by Dubbo standards, it is not indicative of a problem which needs immediate solution.

The RTA (now RMS) always expected to have to go back to traffic lights when they demolished the last set of lights and built the roundabout in 1990. There is plenty of room to develop a new four lane set of traffic signals which would favour the Newell over the Mitchell Highway and allow trucks through the intersection without having to cut off all other vehicles in the process. Alternatively a two lane roundabout could be installed although this would be more difficult to build because it would require the acquisition by the RMS of some adjacent private property to do so, but that would be an effective solution as well.

This queuing problem has already been raised formally and informally with the RMS. As the intersection and both highways are the responsibility of the RMS it is appropriate that they should be solving level of service problems like those beginning to manifest themselves in Whylandra Street, and not the Council.

The traffic flows across the L H Ford Bridge are not yet at peak lane capacity which would warrant the “immediate” construction of a third bridge across the Macquarie River. Congestion presently being experienced is due to intersection capacity constraints, not bridge capacity constraints. However the construction of a third bridge, planned to join Minore Road in the west and Tamworth/Bligh streets in the east, would certainly alleviate peak hour congestion at the intersection as well as giving additional cross-river capacity, but will be a more expensive proposition to contemplate than the simpler prospect of modifying the Whylandra/Victoria street intersection. In realistic terms we are much more likely to be able to get short term action on the intersection modifications happening than being able to design, fund and build a third bridge in the space of only two to three years.

In a 10 year timeframe traffic flows could be expected to increase 20 to 25% over current flows. By then congestion delays would be much less acceptable than now. In the meantime some eastbound traffic will redistribute itself to favour the Serisier Bridge over the L H Ford Bridge,

an option available now to all local motorists wishing to avoid the right turn out of Whylandra Street onto the L H Ford Bridge, so I would anticipate that in 10 years time the right turning flows may have only increased by 15 to 20%. Nevertheless this is still a significant increase and confirms that 10 years is a reasonable upper bound timeframe for seeking to have our third bridge crossing in place.

Does Dubbo Urgently Need a Ring Road To Take Highway Traffic Around The City?

The answer to this question is also “NO”. The Stapleton Study is very clear on this point (Section 3.4.1) when discussing the proposed freightway:

“... firstly, the volume of through truck traffic is relatively low and does not justify a fully fledged bypass; and secondly, using the road for some circulating city traffic very conveniently reduces the volumes within the city centre by a few hundred here, a few hundred there. The total impact of this alignment probably reduces the city grid system by over 30,000 vehicles per day. The concept is used extensively in Germany.

The aim of diverting traffic from the City streets is to avoid any additional four lane roads within the town centre, in particular, Cobra Street to the L H Ford Bridge.

The concept is that over time freight traffic on the Newell Highway will be diverted to the west of the town centre, and later, traffic using the Mitchell Highway will divert north through Purvis Lane. The intersection of *The Freightway* and the Newell Highway in the north is an ideal location for a Truck Stop that will further encourage drivers to use *The Freightway*.

The first priority is to serve the abattoir and the new freight centre (now built) to be located north of the abattoir off Yarrandale Road.

The traffic flows on *The Freightway* are not intended to be high and the combined flows of local and truck traffic can be accommodated in two traffic lanes.”

The Freightway is thus an important part of Dubbo’s future strategic road network, but it is not an urgent priority for externally sourced grant funding aimed at solving some “diabolical” existing traffic problems. If grant funding is to be sought, much better to concentrate on a duplication of the L H Ford Bridge to create a second flood free crossing of the Macquarie River through Dubbo.

Bypasses are useful for some localities with a long history of highway traffic passing up and down the main street in conflict with local shopping and other commercial traffic. The examples which spring to mind are places like Parkes, Orange, Tamworth, Tenterfield, Armidale, Goulburn, Bulahdelah, Wyong and Taree. These towns and cities had diabolical traffic problems which needed solving, and a highway bypass, in whole or part, was the answer.

Dubbo is not in that category. We are in the fortunate category of those towns where the

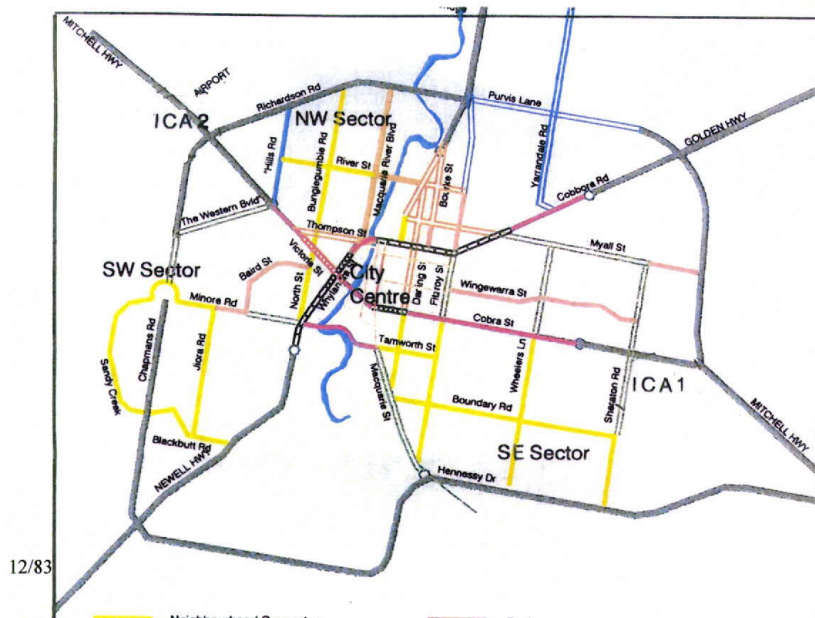
highway never quite went down the main street, but was typically a block or two away from the CBD shopping centre. Towns in this category which spring to mind are Bathurst, Lithgow, Grafton, Gilgandra, Narrabri and Port Macquarie. These towns have not needed multi-million dollar by-passes because the highway's location in town was often a benefit to traffic flow rather than a hindrance, and certainly maintained economic activity within the existing built-up area rather than on its periphery, or even in another town entirely.

So, whilst I support wholeheartedly the concept of a Freightway circling Dubbo as described above by Mr Stapleton which will, over time, become a bypass for highway traffic, it is NOT an urgent priority to be built in one go straightaway. Mr Stapleton envisaged it being started by 2016 but taking another 30 years before the final, lower priority legs would be in place. He did not envisage the full Western Freightway taking the Newell Highway north and south of the City to be in place before 2036, and this is because most of Dubbo's "internal" truck movements are concentrated very much in the northwest, north and northeast of Dubbo. The major need for Dubbo's traffic as opposed to highway traffic, is the Northern Freightway legs of Purvis Lane and Richardson Road, and it is the completion of these legs which will have the largest impact of any of the Freightway legs to be built.

Dubbo's Road Transportation Strategy To 2036 and Beyond

Taking all of the above into account, Dubbo's Road Transportation Strategy to account for population and traffic growth to 2036 and beyond is summarised in Figure 4.4 of the Stapleton Report, as reproduced below. Although the Stapleton map is generally to scale it is stylised to a degree and does not show some key topographical constraints such as railways and the full extent of the Macquarie River south of the City Centre. For this reason it is important to also refer to a "Physical Location Map of the Future Road Layout" to more accurately orient yourself as to the true location of the new links in the network in particular. This map is also reproduced below.

Fig 4.4 Road Hierarchy





The key element and principles of the new Strategy are as follows:

1. Dubbo is and should remain a ten minute city for as long as possible . Dubbo has a good road network now with a low accident rate by comparison with other regional cities in NSW. The aim of the Strategy is to maintain this level of accessibility and safety.
2. Dubbo is and should develop as a freight distribution truck city – the Freightway Ring is a key means of achieving this.
3. Progressive construction of the Freightway Ring is designed to avoid the need for developing any additional four lane roads within the City Centre. Enough traffic is diverted over time onto this peripheral roadway such that traffic flows in the City Centre are maintained more or less at current levels for as long as possible.
4. Maintaining direct access to the City Centre along the key radial routes represented by the Newell, Mitchell and Golden Highways is a fundamental part of maintaining Dubbo as an attractive, convenient City for visitors. We are not looking to divert all highway traffic onto a bypass.
5. The distribution of City traffic will continue to be accommodated using the grid of roads that currently exist. This grid will: -
 - (i) Speed traffic so as to avoid major concentrations of traffic that lead to delays at intersections and create barriers to pedestrian movement, and
 - (ii) Limit traffic flows to those consistent with adjoining landuse activities.

Although this desire to maintain the status quo may be viewed as a “non strategy” the distribution grid of roads is in fact a key design element of both the City and the road network going forward.
6. The Macquarie River is a major barrier to future connectivity, and four new low level bridges are planned over the next 40 years.
 - (i) Tamworth Street - nominally 2021

- (ii) Purvis Lane - nominally 2026
- (iii) River Street - nominally 2036
- (iv) Dundullimal (South Dubbo) - nominally 2051

7. The railway lines through Dubbo are major barriers to future connectivity, and Mr Stapleton has recommended the reopening of two previously closed crossings:

- (i) Brisbane Street – for better accessibility to the CBD - no timeframe given.
- (ii) Myall Street near the hospital – nominally by 2036, in conjunction with the fifth river crossing to be constructed at River Street.

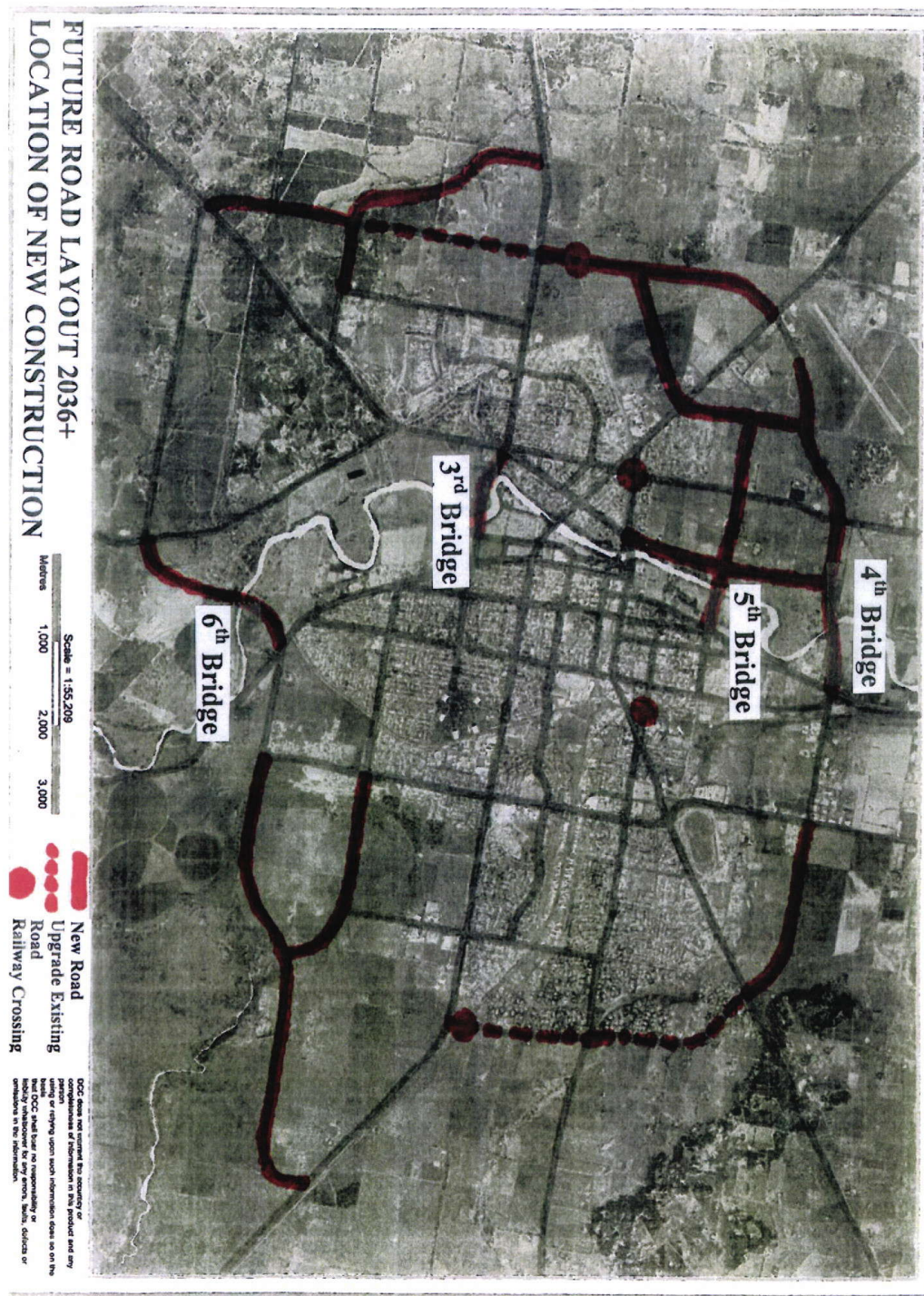
The Stapleton Study also recommends two new railway crossings:

- (i) The Chapmans Road railway overpass on the Western Freightway – nominally 2036
- (ii) A new level crossing in West Dubbo at North Street to link traffic more directly across Bunglegumbie Road – nominally 2026.

In my review of the Stapleton Study I have also identified the need for the existing crossing at South Buninyong Road to be relocated about 250 metres to the west of its current location as part of the Eastern Freightway construction. This will provide a more direct and safer connection to the Mitchell Highway, one that will also be able to accommodate road trains and B Doubles, and is nominally required by 2031.

- 8. Obviously a number of new roads will be required to be built over the next 40 years. Figure 4.4 shows on it 137 kilometres of strategic roads. Of these, however, only 33 kilometres (24%) are new roads on Greenfield alignments, and further 6.5 kilometres (4.7%) are existing roads likely to require moderate upgrading to perform new, higher order roles in the network. Taken from a 40 year perspective, therefore, the road network upgrading required is seen as quite achievable. The locations of these new roads and bridges are highlighted on the following map.
- 9. Some future road construction will involve new intersections at existing roads eg Wheelers Lane/Boundary Road, Purvis Lane/Yarrandale Road, Buninyong/South Buninyong/Whitewood Roads, Thompson Street and the future Macquarie River Boulevard and these will need to be allowed for in budgets for these “new” road projects.

10. A second flood free crossing of the Macquarie River at Dubbo is an urgent priority for Dubbo, the Orana Region, the State and the Commonwealth, but Dubbo City Council does not have the financial resources required to bring it to fruition. Council will therefore lobby both other levels of Government in an effort to make it happen.



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Future Construction Program

Taking the principles above into account, the following is a “first draft” Future Construction Program designed to implement the Road Transportation Strategy to 2036 and Beyond documented herewith. It has been modified from the Stapleton “original” as necessary to take into account the slower population growth now predicted compared to that assumed in 2008, and the lack of progress as yet on planning of the “North West Sector” centred on the old Bunglegumbie Sewage Treatment Plant site. Both were discussed in some detail in the report.

<u>Year</u>	<u>Project</u>	<u>Estimate</u>
2016	Boundary Road (Wheelers Lane to Keswick Parkway South- 0.3 kms)	\$1,900,000
2018	Boundary Road (Keswick Parkway South to Sheraton Road – 1.3 kms)	\$2,300,000
2021	Tamworth Street Bridge + 1.0 kms of two lane sub-arterial	\$8,000,000
2026	Purvis Lane Bridge + 2.0 kms of two lane sub-arterial	\$10,000,000
2028	Extend Richardson Road to Bunglegumbie Road (2.1 kms)	\$3,000,000
2031	North Street Railway Crossing	\$2,000,000
2031	Extend Boundary Road to Southern Freightway + Construction 2.5 kms of Southern Freightway	\$6,000,000
2031	Western Boulevard construction (1.8 kms) including Mitchell Highway Intersection	\$5,000,000
2034	Purvis Lane (Yarrandale Road to Golden Highway – 2.2 kms)	\$4,000,000
2036	Blackbutt Road (Chapmans Road to Joira Road – 0.8 kms)	\$1,800,000
2036	River Street Bridge + 1.6 kms of two lane connector to Bunglegumbie Road	\$7,000,000
2036	Re-open Myall Street Railway Crossing	\$2,000,000
2038	Extend River Street to Hills Road (0.9 kms) and construct Hills Road (Mitchell Highway to Richardson Road – 1.5 kms)	\$4,000,000
2038	Eastern Freightway (upgrade of Bunninyong/South Bunninyong Roads, new railway crossing + new highway intersection – 3.6 kms)	\$7,000,000
2038	Construction Macquarie River Boulevard (Thompson Street to River Street – 1.2 kms)	\$3,000,000
2041	Chapmans Road extension north to Mitchell Highway – 3.1 kms	\$10,000,000
2042	Upgrade Chapmans Road (Minore Road to Blackbutt Road – 2.25 kms)	\$2,000,000
2042	Construct Macquarie River Boulevard (River Street to Purvis Lane – 1.2 kms)	\$2,000,000
2045	Southern Freightway (Camp Road to Hennessy Road – 2.3 kms)	\$9,000,000
2046+	Complete Western Freightway (Blackbutt Road to Newell Highway – 1.9 kms)	\$5,000,000
2046+	Complete Southern Freightway (Boundary Road to Mitchell Highway East – 3.1 kms)	\$7,000,000
2046+	Construct Sandy Creek Road (Chapmans Road to Minore Road – 2.7 kms)	\$5,000,000
		\$108,000,000

The capital expenditure listed above equates to \$2.7 million per annum over the next 40 years. In reality some of the expenditure items listed will be undertaken by subdivision developers as integral parts of their development. In other cases it may be possible to negotiate contributions

towards projects which provide mutual benefit between Council (the community) and particular developments. Some items will attract Section 94 Contributions or their equivalent ongoing.

Nevertheless it is probable that at least the majority of these sums will have to be found by Council from rates and charges or borrowings. For some 10 years now I have been advising Council that in addition to the road infrastructure backlog amount, the Council would be needing to fund in the order of \$2.5 million p.a. ongoing to fund "improvement" works, and this is now clearly borne out by the list of capital works detailed above.

Where To From Here?

This report sets out the strategy required to be followed in order for Council to meet the demands of increased traffic as Dubbo continues to grow out to 2036 and beyond. In that time Dubbo will grow by nearly 12,000 people from the 2006 base used by Mr Stapleton for his modelling and 6,000 new dwellings will need to be accommodated and serviced by way of four new river crossings, a 32.5 km Freightway ring road and several other connector and distributor roads.

At this stage the planning of individual roads and intersections has been at a "high level" to ensure that the big picture connectivity of the road network will be sound. As can be seen from the list of capital works the first of the strategic projects is not scheduled for completion until 2016.

Starting now, therefore, it is important that detailed alignments be determined for the 33 kms of new "Greenfield" roadways that form the bulk of the Road Transportation Strategy To 2036. My staff will need to be laying out reasonably detailed concept plans for all of these roads so that negotiations can begin with affected private landowners to acquire road reserves well ahead of when construction is required. In some cases where existing road reserves are involved it is probable that widenings will be required, and these too need to be determined now even if they end up being acquired by dedication as part of a future subdivision of land.

Funding will be a key issue. Whilst the demand for finance for these new works is quite significant the infrastructure backlog which continues to grow each year is even more significant (by a factor of 3 or 4 times) and will compete directly with the need for these growth-related projects to the potential detriment of Council's ability to properly service new release areas.

This report is not the vehicle to "solve" the funding issues of the \$108 million worth of projects identified. This report sets out the necessary strategy and how it has been derived. Although \$108 million is not a trivial sum of money, nor is it in any way unachievable. Council's existing road asset base already has a fair replacement value of \$897 million as per the balance sheet of 30 June 2011 and it is reasonable to expect of that the asset should rise in value in real terms by 12% over the next 30 to 40 years when growth-related strategic infrastructure as is proposed is added to the stock.

Looked at another way, \$2.7 million per annum is a reasonably modest addition to the current road expenditure budget of \$17 million per annum. If Council is to meet the increasing demand for this most basic of services it provides, then somehow the funding must be found to build the

requisite infrastructure.

It is recommended, therefore, that the Director Organisational Services be requested to include the financial ramifications of this report in his future analysis of how best to meet the financing demands created by this, the Percy Allen Report, and all of the other pressures currently impinging on Council's ability to make ends meet.

Technical Services



Dubbo City Council Infrastructure Strategy 2036

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DUBBO
CITY COUNCIL

REPORT: LEP 2011 - Council Infrastructure Strategies to Facilitate Growth to 2036

AUTHOR: Director Technical Services
REPORT DATE: 22 May 2012
FILE: SL 5.8

EXECUTIVE SUMMARY

Council's newly adopted Local Environmental Plan (LEP) – 2011 has created large areas beyond the edges of the urban area to accommodate predicted population growth, expected to be about 9,500 people by 2036. Taking into account the continuing reduction in the number of people living in each dwelling, this population growth and the redistribution of population from existing parts of the City will generate the need for an extra 6100 dwellings on the periphery.

The growth will largely be in the Southeast and Southwest Sectors of the City, but also to a smaller extent in the Northwest and Northeast Sectors. This report summarises the manner in which Council infrastructure in the form of Roads, Water Supply, Sewerage and Stormwater Drainage will be developed to cater for the growth, and confirms that plans are in hand to make this so.

The 6100 new dwellings proposed will easily fit inside the Freightway ring road proposed in Council's "Road Transportation Strategy To 2036 and Beyond". Through good planning over many years Council services are well placed to be expanded to meet the increased and more geographically expanded demand.

The road improvements required are detailed in the Road Transportation Strategy document. Water supply is already assured by the remote location of existing reservoirs on hills considerably higher than the new release areas. Normal augmentation including additional reservoirs in West Dubbo will suffice to service the growth. The two gravity-reliant services of Sewerage and Stormwater Drainage will not be moving into any new catchments, and planned extensions are relatively straightforward. Water treatment capacity is already sufficient, and sewage treatment capacity is already programmed to be increased over the next two years.

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FINANCIAL IMPLICATIONS

There are no immediate financial implications as a result of this report. However over the next 20 to 25 years, Council expenditure of some \$194 million will be required to ensure basic infrastructure is in place to cater for the population growth anticipated in that time frame. The components of this amount are:

- Roads \$54 million
- Water Supply \$80 million
- Sewerage \$55 million
- Stormwater Drainage \$5 million

Noting, however, that the latter figure (Stormwater) is known to be an under-estimate at this time.

Whilst these numbers appear, and are, large, anticipated revenues and normal financial planning procedures should be able to allow these necessary investments to be made. However, at this time it is still unclear how Roads and Stormwater Drainage improvements will be funded in the medium and long term given the infrastructure backlog issue highlighted in the Percy Allen Report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

1. That the contents of the report of the Director Technical Services be noted.
2. That the Director Technical Services and Director Organisational Services develop further strategies to address the long term financing requirements of the Roads and Stormwater Drainage infrastructure required to cater for Dubbo's urban growth to 2036, and beyond.

Stewart McLeod
Director Technical Services

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BACKGROUND

In 2011 Dubbo's new Local Environmental Plan (LEP) – 2011 was gazetted after several years of development. The LEP was developed in full consultation with myself and my Division to ensure that services would be available. This report is designed to document that servicing strategy and to assure all stakeholders that suitable plans are in train to match the growth expected during the life of the 2011 LEP and beyond.

REPORT

On 11 April this year, Bernard Salt was in Dubbo to launch KPMG's assessment of Dubbo's most likely population growth projections to the year 2036. The result is that the City can expect to experience population growth of 9,500 people by that date.

Dubbo's dwelling occupancy rate currently sits at 2.5 persons per dwelling. It has been dropping at approximately 0.1 persons per dwelling each five years over the past 20 years. KPMG has indicated in separate advice that occupancy rates will continue to decline, but probably not as quickly, and that by 2036 the average occupancy rate will have dropped to 2.25 persons per dwelling. On this basis, the number of new dwellings required by 2036 will have two components to it – the 4,220 new dwellings that 9,500 extra people will generate, plus the redistribution of 10% of the existing population ($0.25/2.5 \times 42,000 = 4,200$ people) out of existing dwellings into 1,870 new dwellings, giving a total increase to be catered for of 6,090 new dwellings (say 6,100).

Advice from the Director Environmental Services indicates that 6,100 new dwellings will easily fit inside the footprint of Council's current servicing envelope. In West Dubbo, this means urban development need not/will not extend beyond the eastern watershed of Sandy Creek, or in East Dubbo beyond Equus, Yarrawonga and Blue Ridge Estate (ICA 1). This will ensure efficient servicing practices can be maintained for the next 25 years. The detail of that servicing strategy is as follows.

ROAD NETWORK

Dubbo's road network is in "good shape" to be expanded to cater for the growth predicted above. A separate detailed report has set out "Dubbo's Transportation Strategy To 2036 And Beyond", based on a study completed in 2009 by Stapleton Transportation and Planning Pty Ltd.

The Transportation Strategy aims to:

- Maintain Dubbo as a ten minute City;
- Encourage and support truck movements by progressively developing a Freightway ring road; and
- Maintain highway access from all five approaches into the City centre.

The Transportation Strategy intends to:

- Develop progressively a 32.5 km Freightway ring road formed at various locations by Richardson Road, Purvis Lane, Buninyong Road, South Buninyong Road, Lidscomb Road, Hennessy Road, Camp Road and Chapmans Road.

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- Maintain Dubbo's successful grid pattern of roads to spread traffic flows out and limit concentrations of traffic consistent with adjoining landuse activities, whilst at the same time catering for 7,500 new dwellings expected to be created by about 2045 (6,100 by 2036).
- Build a third bridge by 2019 (at Tamworth Street), a fourth bridge by 2026 (opposite Purvis Lane), a fifth bridge by 2036 (at River Street) and a sixth bridge by 2051 (linking Miriam and Dundullimal).
- Build 33 kilometres of new Greenfield connectors, distributors and sub-arterials over the next 40 years, and upgrade another 6.5 kilometres of existing roads.
- Lobby other levels of Government to fund the duplication of the LH Ford Bridge in order to double the flood free river crossing capacity through Dubbo. At \$30 million estimated cost, this infrastructure item is beyond the reasonable capacity of Dubbo City Council to fund.

Fig 4.4 Road Hierarchy



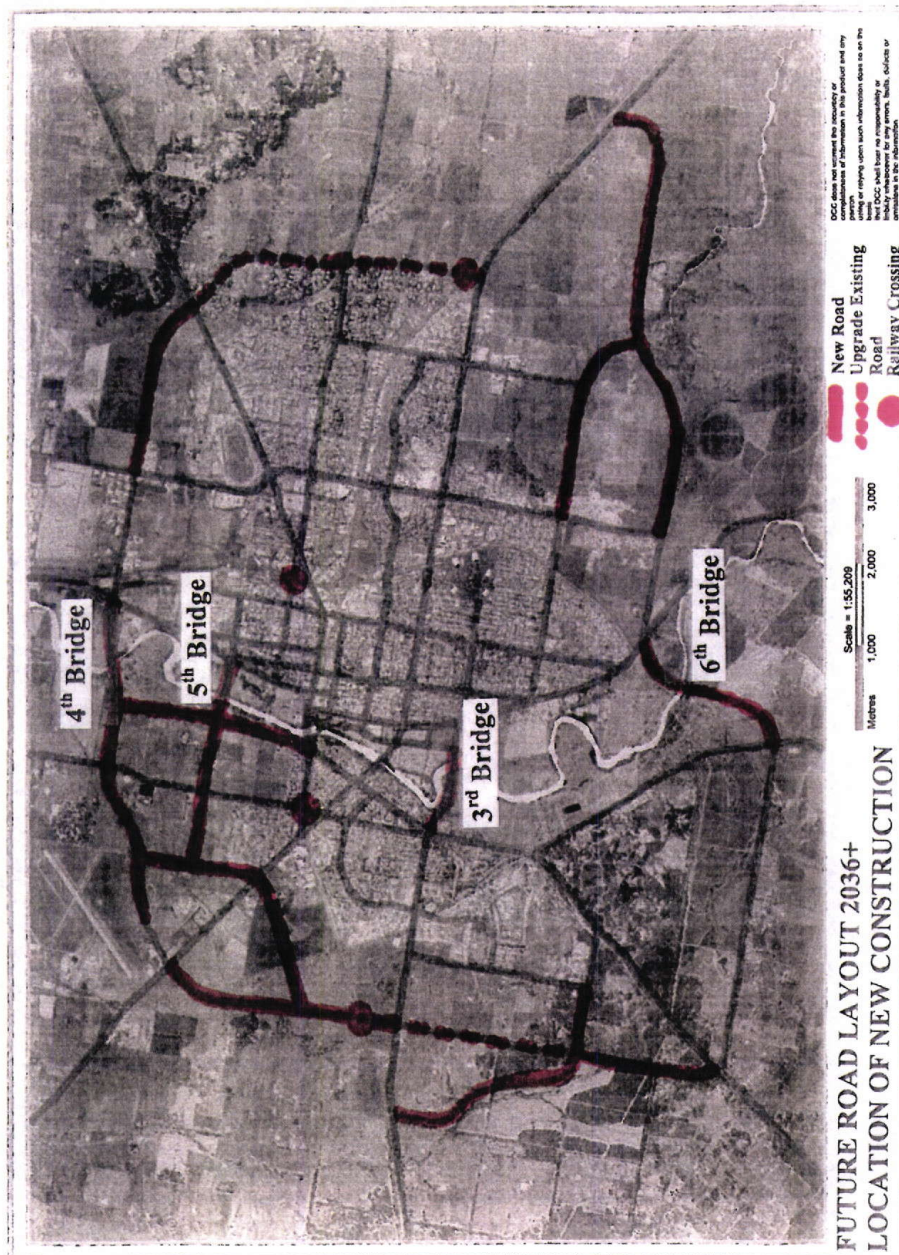
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The funding requirements for these works are summarised below.

<u>Year</u>	<u>Project</u>	<u>Estimate</u>
2016	Boundary Road (Wheelers Lane to Keswick Parkway South- 0.3 kms)	\$1,900,000
2018	Boundary Road (Keswick Parkway South to Sheraton Road – 1.3 kms)	\$2,300,000
2019	Tamworth Street Bridge + 1.0 kms of two lane sub-arterial	\$8,000,000
2026	Purvis Lane Bridge + 2.0 kms of two lane sub-arterial	\$10,000,000
2028	Extend Richardson Road to Bunglegumby Road (2.1 kms)	\$3,000,000
2031	North Street Railway Crossing	\$2,000,000
2031	Extend Boundary Road to Southern Freightway + Construction 2.5 kms of Southern Freightway	\$6,000,000
2031	Western Boulevard construction (1.8 kms) including Mitchell Highway Intersection	\$5,000,000
2034	Purvis Lane (Yarrandale Road to Golden Highway – 2.2 kms)	\$5,000,000
2036	Blackbutt Road (Chapmans Road to Joira Road – 0.8 kms)	\$1,800,000
2036	River Street Bridge + 1.6 kms of two lane connector to Bunglegumby Road	\$7,000,000
2036	Re-open Myall Street Railway Crossing	\$2,000,000
2038	Extend River Street to Hills Road (0.9 kms) and construct Hills Road (Mitchell Highway to Richardson Road – 1.5 kms)	\$5,000,000
2038	Eastern Freightway (upgrade of Bunninyong/South Bunninyong Roads, new railway crossing + new highway intersection – 3.6 kms)	\$7,000,000
2038	Construction Macquarie River Boulevard (Thompson Street to River Street – 1.2 kms)	\$3,000,000
2041	Chapmans Road extension north to Mitchell Highway – 3.1 kms	\$10,000,000
2042	Upgrade Chapmans Road (Minore Road to Blackbutt Road – 2.25 kms)	\$2,000,000
2042	Construct Macquarie River Boulevard (River Street to Purvis Lane – 1.2 kms)	\$2,000,000
2045	Southern Freightway (Camp Road to Hennessy Road – 2.3 kms)	\$9,000,000
2046+	Complete Western Freightway (Blackbutt Road to Newell Highway – 1.9 kms)	\$5,000,000
2046+	Complete Southern Freightway (Boundary Road to Mitchell Highway East – 3.1 kms)	\$7,000,000
2046+	Construct Sandy Creek Road (Chapmans Road to Minore Road – 2.7 kms)	\$5,000,000
		\$110,000,000

It should be noted that the progressive expenditure to 2036 is \$54 million, an average of \$2.16 million per annum over 25 years.

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WATER SUPPLY SYSTEM

In broad terms, Dubbo's water supply system is in "good shape" to cater for the growth of the City by 9,500 people over the next 25 years. The following summarises the situation with respect to Water Supply Services:

1. Dubbo's existing service reservoirs are strategically located on high ground so as to supply water to all areas of growth out to, and beyond, 2036. The Southeast and Northeast Sectors are served by reservoirs at Eulomogo, Buninyong, Myall Street and Yarrandale Road. The Northwest and Southwest Sectors are served by reservoirs at Rifle Range Road and Bourke Hill. No major change to servicing strategy is required, or contemplated, as a result of the Dubbo LEP 2011.
2. In terms of water sources, the City's existing licences for river and groundwater are capable of supplying predicted demand for the next 15 years. At that stage, however, it is proposed to be developing, or have developed, a new borefield to the southwest of the urban area to cater for both increasing growth-related demand AND provide a greater measure of drought security to the City than currently exists. Major expenditure on borefield development has been proposed in 2016/17, 2017/18, 2018/19 and 2019/20.
3. In terms of treatment capacity, the John Gilbert Water Treatment Plant was upgraded in 2006/07 to meet increased demand at that time. It is not expected to need further major upgrading in treatment capacity for at least the next 20 years, but a major upgrade in clear water storage at the plant is proposed in 2013/14. This 10-15 megalitre storage will allow the plant to be run at higher capacity for fewer hours during the day with consequent savings in labour costs and electricity tariffs able to be made. This will also significantly enhance the security of supply to the City during peak demand, or in break-down or pipe burst situations. It will also lengthen the time window in which planned maintenance at the plant can be undertaken.
4. In terms of reservoir storage capacity, it will be necessary within the 25 year planning horizon under consideration to construct extra reservoirs in West Dubbo. Three new reservoirs are proposed, in addition to the Rifle Range Reservoir for which contracts have just been let. These new reservoirs will be built at Bourke Hill (nominally 2016), Minore Road (nominally 2022) and Sappa Bulga (nominally 2030). It will also be necessary to replace and upgrade two existing reservoirs at the Newtown complex, nominally in 2019 and 2022.

No additional reservoir storage is proposed in East or North Dubbo.

5. In terms of trunk pipelines, it will be necessary to progressively extend new pipelines to service new reservoirs and increase water supply to Industrial Candidate Areas 1 and 2 as they develop. Major pipelines will be constructed as follows:

• Obley Road/ Newell Highway	2012/14
• Erskine Street/Myall Street Reservoir	Progressively in 2016/17 and 2019/20
• Additional river crossings at JGWTP	2021/22 and 2022/23

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• Airport Water Supply Upgrades	2012/13 and 2014/15
• LH Ford Bridge PS/Bourke Hill Reservoir	2016/17 and 2017/18
• Sheraton Road/Eulomogo Reservoir	2014/15 and 2015/16
• Newell Highway/Rifle Range Reservoir	2018/19 and 2019/20
• Rifle Range/Bourke Hill Reservoirs	2018/19
• ICA 1 Upgrade	2021/22 and 2022/23
• ICA 2 Upgrade	2024/25
• Significant Network Upgrades	2023 though to 2031

6. In terms of reticulation upgrades within individual supply zones, these have not yet been addressed in detail and in many ways cannot be assessed until detailed subdivision layouts have been agreed upon. More and more Council is having to step in to contribute to larger diameter water mains at the “front end” of subdivisions so that developments beyond the “back end” of same can receive adequate supply. On occasions, this happens retrospectively at considerable cost to Council. In some locations, Council mandates a larger diameter main through a subdivision so we can cross-feed between zones during emergencies, and often a contribution must be made.
7. The most significant backlog works are the supply of water to Eumungerie in 2013/14 and 2014/15, and the South Dubbo Weir upgrade works tentatively scheduled for 2014/15. Neither of these works are legitimately a charge on new development. \$4,360,000 is budgeted for Eumungerie and \$4,000,000 for the weir.

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The funding requirements for these works are summarised below. It should be noted these only extend out to 2032/33 in accordance with the 2012/13 Strategic Business Plan.

<u>YEAR</u>	<u>PROJECT</u>	<u>ESTIMATE</u>
Source Works		
2012/2016	High Security Licence Purchase	\$2,000,000
2014/2015	South Weir Rock Fill	\$4,400,000
2016/2020	Additional Bores and Pipelines	\$13,400,000
	Sub Total	\$19,800,000
Treatment Plant		
2013/2014	15 ML Storage at JGWTP	\$3,000,000
2013/2014	Clearwater Tank 1	\$1,000,000
	Sub Total	\$4,000,000
Reservoirs		
2012/2013	Rifle Range Reservoir 2	\$3,300,000
2015/2016	Bourke Hill Reservoir	\$2,900,000
2017/2022	Newtown Reservoirs Upgrade	\$13,074,000
2021/2022	Minore Rd Reservoir	\$2,880,000
2022/2023	Newtown Reservoir 5 (standpipe)	\$100,000
	Sub Total	\$22,254,000
Trunk Pipelines		
2013/2014	Obley Road/ Newell Highway	\$1,833,000
2013/2014	West Dubbo WPS To Bourke Hill Res.	\$324,000
2014/2016	Airport Water Supply Upgrade	\$600,000
2014/2016	Sheraton / Eulomogo Reservoirs	\$2,856,000
2016/2020	Erskine to Myall Street Reservoir	\$598,635
2018/2019	Rifle Range Res to Bourke Hill Res.	\$2,290,000
2018/2020	Newell Hwy / Rifle Range Reservoirs	\$3,097,000
2021/2022	River Crossing/Obley Road	\$579,000
2021/2023	ICA1 Upgrade	\$1,099,000
2024/2025	ICA2 Upgrade	\$551,000
2031/2032	Macquarie River	\$600,000
2017/2033	On-going significant network pipelines for growth	\$55,720,000
	Sub Total	\$70,147,635
	TOTAL	\$116,201,635

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SEWERAGE SYSTEM

In broad terms, Dubbo's sewerage system is in "good shape" to cater for the growth of the City by 9,500 people over the next 25 years. The following summarises the situation with respect to Sewerage Services:

1. In strategic terms, Dubbo's existing sewerage collection system is capable of servicing all areas of growth out to 2036 with relatively minor augmentation. In East Dubbo, gravity sewerage can be extended in the subcatchments feeding down to existing pump stations at Troy Gully, Keswick (Hennessy Road) and Miriam. The southern parts of ICA 1 will require a sewage pump station (SPS) to be built by the developer (not Council) in due course, but the early stages of subdivision are able to drain to the Keswick SPS. In Southwest Dubbo, all new development to 2036 will be contained within the Golf Links Creek Subcatchment, and can be serviced by a combination of the existing Cootha SPS and the proposed Minore Road SPS (see below). In Northwest Dubbo, the subcatchment east from Bourke Hill and north from Thompson Street, all drains by gravity to an existing, purpose-built gravity trunk sewer running along the 1 in 100 year flood line of the Macquarie River to the existing Bunglegumbie SPS. ICA 2 is already serviced by a SPS constructed in 2011, and this is planned to be augmented over time as the ICA develops.
2. In terms of sewage collection, all new areas of proposed development drain to existing sewerage catchments, or else are planned by preference to be served by pressure sewerage (eg Moffatt Industrial Estate, ICA 2 Industrial Estate). However one new SPS, just off Minore Road near the Golf Course, is planned to be built by Council during the next 25 years, in 2016/17. There will also be upgrades required of some existing pump stations (Erskine Street, Cootha, Camp Road); new rising mains from the Cootha and Minore Road SPS's; and gravity sewer upgrades required in West Dubbo and along the Railway Sewer (Sewer R) in East Dubbo.
3. There are also environmental protection works proposed which will be partly triggered by increased load from new development. These include overflow storages at Erskine Street SPS, Cootha SPS and at various locations in the gravity reticulation network where Council's adopted overflow recurrence interval in wet weather events of 1 in 5 years is not yet met.
4. In terms of treatment capacity, the current Dubbo Sewage Treatment Plant (STP) at Boothenba Road is not capable of meeting demand for growth in the next 25 years. For this reason, a major upgrade is already in the design phase with a projected construction period during 2013 and 2014. A further upgrade has been allowed for some components of the plant, and refurbishment at Greengrove Effluent Management Facility in 2024/25. Financially these will be the pareto items in Council's forward program of sewerage augmentation works.

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The funding requirements for these works are summarised below. It should be noted these only extend out to 2032/33 in accordance with the 2012/13 Strategic Business Plan.

<u>YEAR</u>	<u>PROJECT</u>	<u>ESTIMATE</u>
2012/2015	Dubbo STP Major Upgrade Stage 1	\$22,819,600
2023/2024	Dubbo STP Major Upgrade Stage 2	\$12,059,520
2012/2015	Erskine St SPS, Rising Main and Overflow Storage Upgrade	\$2,976,864
2013/2017	Upgrade Sewer R Stage's 1 to 4 (Margaret Crescent)	\$2,010,000
2016/2017	Upgrade Sewer R - Dubbo Christian School to St Johns College	\$409,728
2014/2015	Upgrade Sewer R - Keswick Parkway/Dubbo Christian School	\$747,648
2012/2014	Upgrade Sewer R - Wheelers Ln (Eumung/Keswick Parkway)	\$334,752
2015/2016	Gipps Street Upgrade	\$1,480,000
2015/2016	Keswick Upgrade	\$1,570,000
2015/2016	Tamworth Street Upgrade	\$1,342,000
2016/2018	Cootha SPS and Rising Main Upgrade	\$2,735,040
2018/2019	Cootha SPS Overflow Storage	\$2,905,056
2014/2017	Minore Road SPS and Rising Main	\$1,137,312
2016/2017	West Dubbo Catchment C	\$926,112
2018/2019	ICA1 Sewerage	\$811,008
2019/2020	ICA1 Pump Station	\$2,000,000
2018/2021	Camp Road SPS Upgrade	\$640,464
2018/2020	Camp Road SPS Rising Main	\$1,032,768
Ongoing	Future Augmentation for Growth	\$2,000,000
TOTAL		\$59,937,872

STORMWATER DRAINAGE SYSTEM

In broad terms, the future stormwater drainage schemes required to cater for the growth of the City by 9,500 people over the next 25 years are either partly built and well-defined in conceptual terms, or have been thought through to a sufficient level to conclude that they present no great challenges to future development. The following summarises the situation with respect to Stormwater Drainage Services:

1. In strategic terms, development has already commenced in the majority of catchments where growth is expected to occur. Most development is expected to occur in the Southeast where the Keswick Drainage Scheme is already partly built, and in the Southwest where the Golf Links Creek Drainage Scheme is already partly built. In the Northeast, where there are only small pockets of land still to develop the Troy Creek Drainage Scheme is already partly constructed, and only in the Northwest and the far south (Dubbo Residential Estate) are there catchments where no drainage construction has yet commenced.
2. In the Southeast Sector, all of the land to be developed is located within the footprint of the Keswick Drainage Scheme. Easements and drainage reserves for this Scheme have been progressively acquired by Council for more than 25 years. Construction of some elements has already occurred, and both conceptual and detailed design is well-advanced on the remainder. Outlet works between Hennessy Road and Old Dubbo

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Road were completed between 1987 and 1992. Egret Park was built in 1998/1999. Southlands Developments have now modified Council's original trunk drainage design and commenced construction to their own requirements. The attached plans and tables from Cardnos, Council's long-standing partner in the design and development of the Keswick Drainage Scheme, illustrate the form that the finalised scheme will take over the next decade or two.

Figure 2.1 Study Area



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6.1 DESCRIPTION OF SCHEME

The proposed flood retardation scheme was initially based in Scheme 1B [Willing and Partners, May 1995] but then modified to take into account:

- Council's purchase of land for the Hennessy Basin on the south side of Hennessy Road, which was previously proposed for the north of Hennessy Road,
- The part development of the South Lakes Estate, and the Blue Ridge Estate,
- Construction of a linear retarding basin downstream of the Blue Ridge Estate,
- Re-location of the Boundary Road Basin site from the south to the north of Boundary Road,
- Identification of a potential endangered Ecological Community north of the Egret Basin,
- Construction of an electricity sub-station on Boundary Road downstream of the Egret Basin, and
- Option plans developed for the Keswick Estate by Insight.

The difference between the current proposed scheme and Scheme 1B are summarised below:

1. The siltation pond has been incorporated into the Central Lake.
2. The number of sporting ovals has been reduced from three in Scheme 1B to two.
3. The Central Lake has been enlarged and moved north to avoid a potential endangered ecological community (EEC) east of Durum Circuit.
4. The Parkway Basin that was previously located east of the Egret Basin (formerly McGovern Basin) in Scheme 1B has been relocated south so that the embankment will align with Boundary Road.
5. Basins A1 and A2 east of Sheraton Road in Scheme 1B have been eliminated and replaced by the Blue Ridge Basin.
6. The Boundary Road Basin has been relocated from the south side of Boundary Road to north of Boundary Road in the current scheme.
7. Hennessy Basin has been relocated from the north of Hennessy Road to the south of Hennessy Road and will now allow high flows in the Eastern Floodway to bypass the Basin.

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Table 6.3 Comparison of Scheme 1B [1995] and Current Scheme

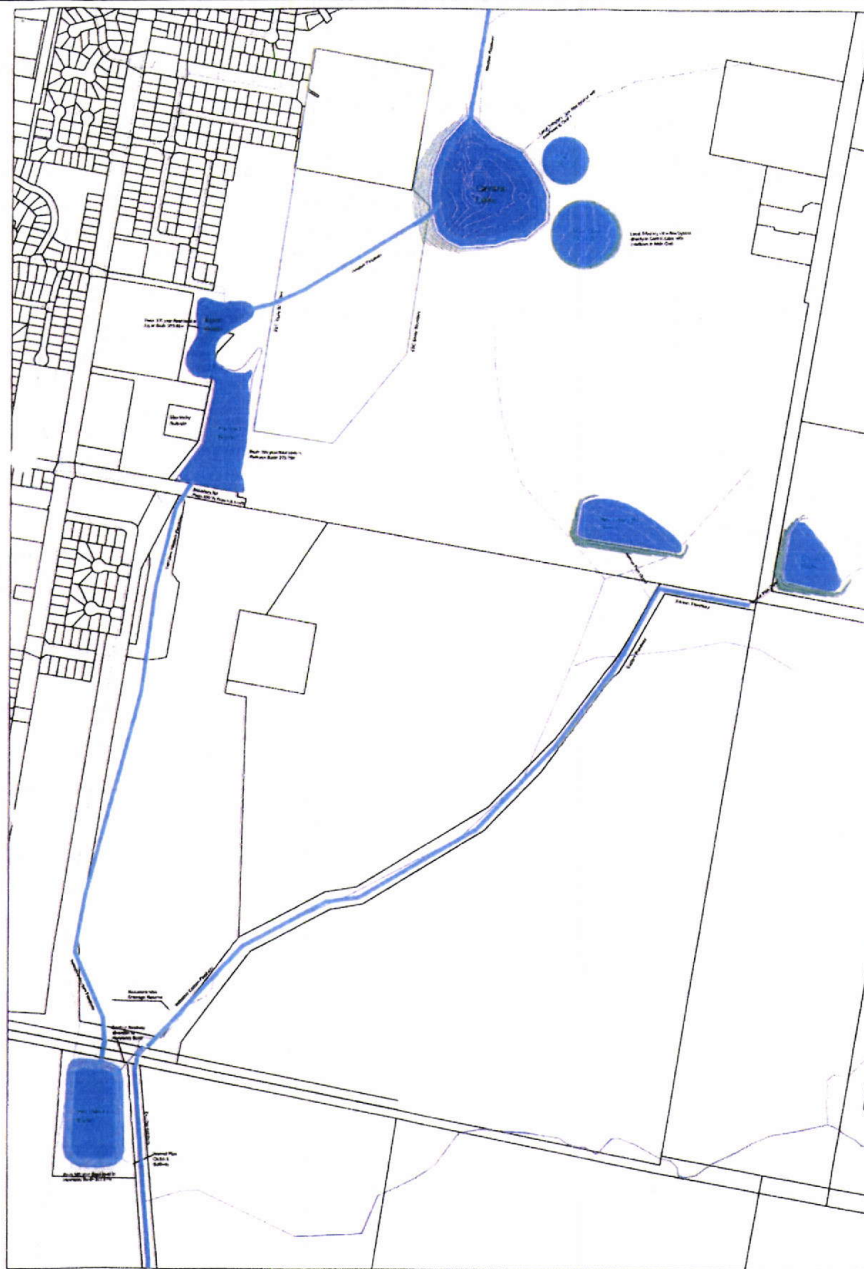
	Scheme 1B [1995]		Current Scheme	
	Volume [ML]	Depth [m]	Volume [ML]	Depth [m]
Basin A1	5.29	1.0	None	
Basin A2 ¹	20.2	1.47	7.14	2.89
Sheraton Basin	18.3	2.3	31.37	3.09
Boundary Basin	15.5	2.0	15.43	1.94
Main [Oval] Basin	47.4	1.55	11.87	0.71
Oval 1 Basin	16.2	1.42	5.49	0.63
Central Lake	39.5	1.23	88.46	1.93 ²
Egret Basin	15.0	1.75	14.36	1.31 ³
Parkway Basin	57.7	3.1	44.11	2.79
Hennessy Basin	174.4	3.8	73.12	3.09

1. Blue Ridge Basin

2. Central Lake flood storage depth above normal lake water level [Lake maximum 1.5m deep]

3. Egret Basin flood storage depth above normal lake water level.

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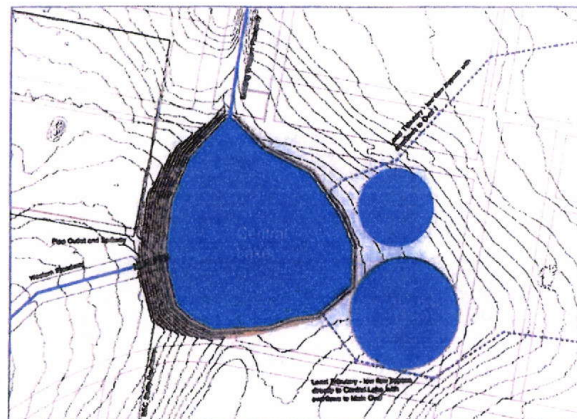
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Table 6.2 Flood Retarding Basin Design Characteristics and Estimated Performance

	Floor Elev.	Normal Outlet	Spillway	Storage Volume	Top Water Level	Depth of Water [m]	Area at TWL
Oval 1	290.0m	1 x 900Ø RCP @ 288.0m AHD	5m wide @ 290.0m	5.49ML	290.63	0.63	0.95ha
Main Oval	290.0m	1 x 1800Ø RCP @ 288.11m AHD	10m wide @ 290.0m	11.87ML	290.71	0.71	1.80ha
Central Lake	285.0m	1 x 1050 dia RCP @ 286.5	10m wide @ 288.5m	88.46ML	288.43	1.93 > lake level	5.40ha
Egret Basin	< 278.5m	-	279.0m	14.36ML	279.82	1.31 > lake level	1.35ha
Parkway Basin	277.0m	2x 975 dia RCP @ 275.535m	280.0m	44.11ML	279.79	2.79	2.66ha
Hennessy Basin	261.1m	1 x 1200 dia RCP @ 261.1 1 x 1200 dia RCP @ 262.4	264.0m	73.12ML	264.19	3.09	3.04 ha
Blue Ridge Basin	300.0m	1 x 450 dia RCP @ 300.00m	302.00m	7.14ML	302.89	2.89	0.74
Sheraton Basin	287.5m	1 x 750 ØRCP @ 287.5m 1x 1200ØRCP @ 288.5m	10m wide @ 291.0m	31.37ML	290.59	3.09	2.11ha
Boundary Road Basin	282.5m	1 x 600Ø RCP @ 282.5m 1 x 600ØRCP @ 283.5m	10m wide @ 284.5m	15.43ML	284.44	1.94	1.60ha

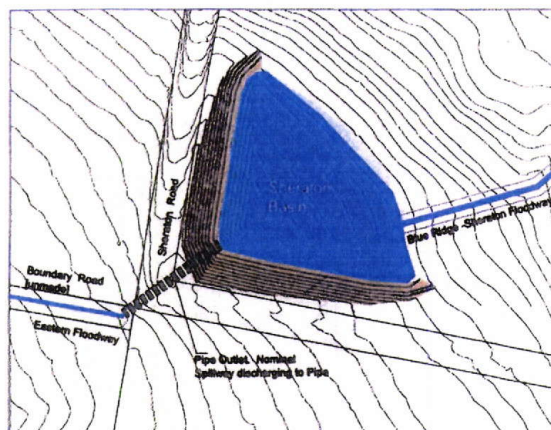
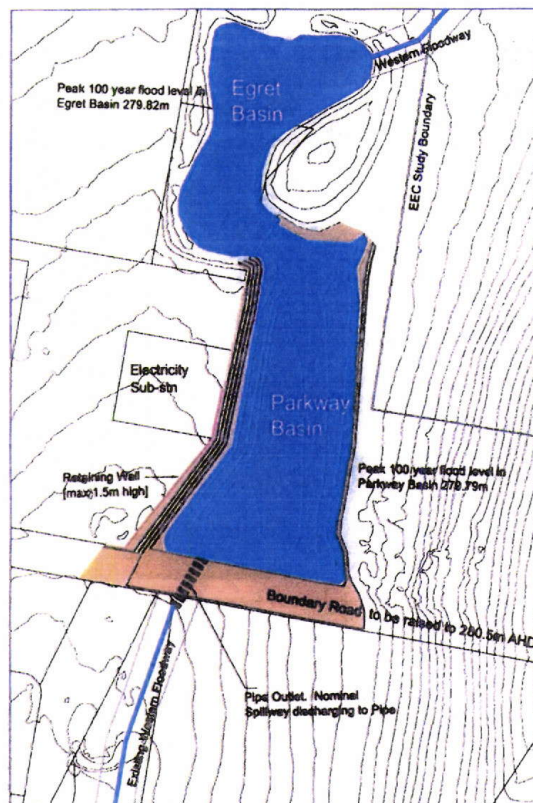
Figure 6.2 Central Lake and Recreation Oval Basins – Conceptual Plan



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Figure 6.3 Egret and Parkway Basins – Conceptual Plan



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Figure 6.5 Boundary Basin – Conceptual Plan

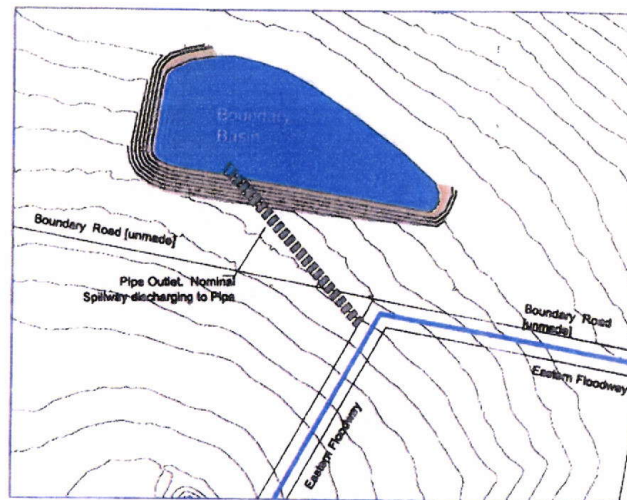
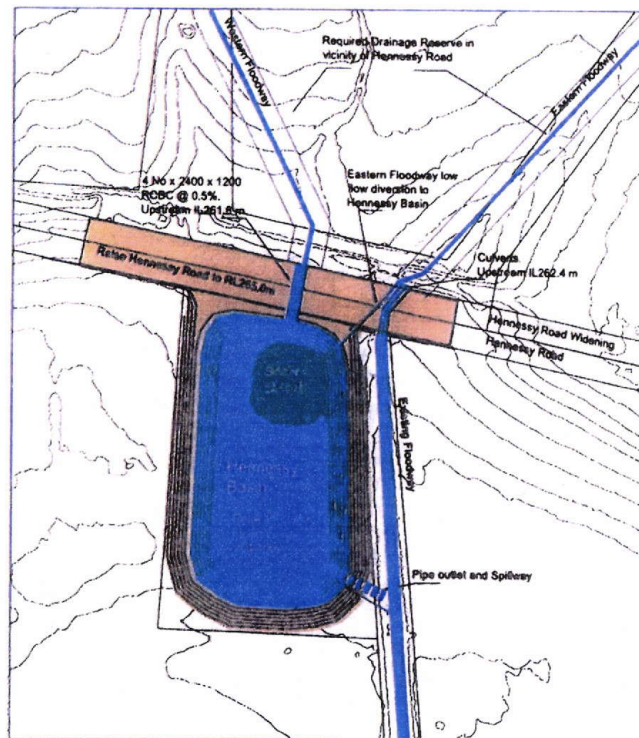


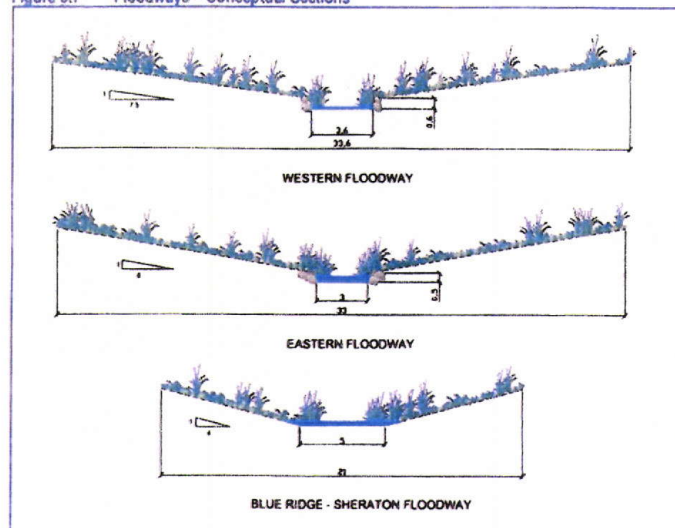
Figure 6.6 Hennessy Basin – Conceptual Plan



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Figure 6.7 Floodways – Conceptual Sections



3. In the Southwest Sector, all of the land is located within the footprint of the Golf Links Creek Drainage Scheme. The bottom (downstream) end, which is usually the most challenging part of a drainage scheme, has already been constructed by the relevant developers, and broad scale conceptual sizing of components further upstream is available in a report undertaken for Council by a consultant back in 2000. Key extracts from that report are attached below. West of Joira Road, for example, three retarding basins and channel formalisation similar to the Delroy South works already undertaken are proposed on the line of Golf links Creek itself; plus a fourth basin on a smaller watercourse closer to Minore Road. There is another basin proposed directly south of the Golf Course itself, and another north of minore Road as Delroy Park Estate continues to develop to the west. All of these will be constructed by developers as subdivisions expand to the west of Joira Road and south of the Golf Course.
4. In the Northeast Sector, most land drains to Troy Gully in which some reaches have constructed infrastructure and others have conceptual plans in place or underway. Some sections (reaches) of Troy Creek have already been constructed, some are designed in detail awaiting construction, and others are still having conceptual designs prepared. Nevertheless, no creek-side land has yet been stopped from development because the Troy Creek Drainage Scheme is incomplete, and such will continue to be the case for the next 25 years.
5. In the Northwest Sector, the conceptual sizing of components was undertaken by a consultant for Council in 2000. Although Council has had no approaches from any landowners in this area seeking to subdivide, three main water courses were identified in 2000, and retarding basins at seven locations have been conceptually sized. It would be expected that formalised channels similar to Delroy South would be included as key components of any such subdivision in future. Key extracts from the consultant's report are attached below.

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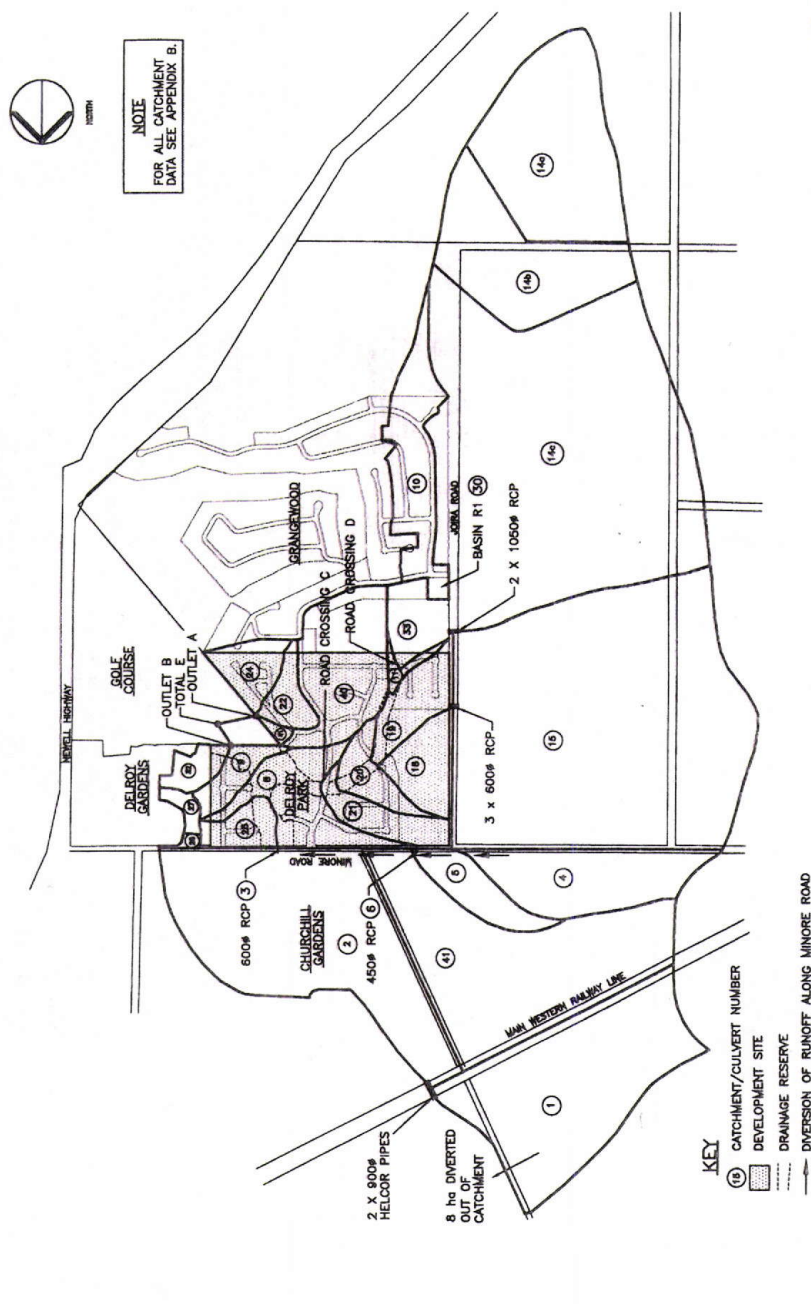


FIGURE 11
Delroy Park Catchment Plan and Drainage Details

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8.6 TRUNK STORMWATER SUMMARY

The various works to be constructed to service the West Dubbo Urban Release Area in accordance with the trunk stormwater strategy outlined in this report is summarised below:

Bunglegumbie Catchment

- 450mm diameter low flow pipes 3,700m
- Grated junction pits 61
- Open swale drainage channel 3,700
- Road crossings 1
- Retarding basins with piped outlets 6
- Constructed wetlands 1

West Dubbo Single Catchment (Draining to Jannali Road)

- Retarding basin with piped outlet 1

Golf Links Creek Catchment

- 450mm diameter low flow pipes 3,000m
- Grated junction pits 50
- Open swale drainage channel 3,000m
- Road crossings 4
- Retarding basins with piped outlets 9
- Constructed wetlands 2

TABLE 8.14 BUNGLEGUMBIE CATCHMENTS BASIN SUMMARY						
Basin	Volume at Spill Level m ³	Primary Outlet	Weir (length @ basin height)	Basin Performance 100 year ARI Flows		
				Inflow m ³ /s	Outflow m ³ /s	Peak Level
B2 (B2)	16,000	3x1200 @ 0m	30 m @ 1.6	15.0	11.5	1.73
B3 (B3)	7,700	5x1200 @ 0m	20 m @ 1.1	12.7	11.8	1.21
B4 (B4)	17,600	4x1200 @ 0m	20 m @ 1.1	10.5	8.0	1.14
B5 (B5)	9,100	4x1200 @ 0m	20 m @ 1.3	9.5	9.1	1.29
B6 (B6)	5,600	1x900 @ 0m	10 m @ 1.4	5.2	1.7	1.44
B7 (B7)	15,600	2x1200 @ 0m	25 m @ 1.3	8.5	4.5	1.30
Critical storm duration = 60 minutes (1) value in brackets indicates the RAFTS-XP node						

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TABLE 8.16 BUNGLEGUMBIE CATCHMENTS ROAD CROSSINGS	
Location	Proposed Structure
Bunglegumbie Road (d/s basin B4)	Basin B4 (4x1200)
Proposed road north (d/s basin B5)	Basin B5 (4x1200)
Proposed road centre (d/s basin B6)	Basin B6 (1x900)
Proposed road south (d/s basin B2)	Basin B2 (3x1200)

TABLE 8.10 GOLF LINKS CREEK BASIN SUMMARY						
Basin	Volume at Spill Level m ³	Primary Outlet	Weir (length @ basin height)	Basin Performance 100 year ARI Flows		
				Inflow m ³ /s	Outflow m ³ /s	Peak Level
GLC1 (15)	26,400	4x450mm @ 0m 3x750mm @ 1.6m	30 m @ 2.6	15.0	5.2	2.63
GLC2 (14a)	9,800	1x825 @ 0m	30 m @ 2.8	3.2	2.0	2.5
GLC3 (14b)	11,500	2x525mm @ 0m 3x600mm @ 1.6m	30 m @ 2.45	4.7	3.4	2.46
GLC4 (14c)	36,000	3x500mm @ 0m 4x675mm @ 1.8m	30 m @ 3.3	18.2	7.0	3.34
GLC5 (4)	5,200	2x375mm @ 0m	20 m @ 1.7	2.8	0.9	1.66
GLC6 (basin)	22,000	2x450mm @ 0m	30 m @ 2.5	9.3	2.7	2.59
GLC7 (1)	7,500	2x450mm @ 0m	30 m @ 1.5	5.7	2.8	0.56
GLC8 (field)	7,300	5x750 @ 0m	30 m @ 0.7	10.0	8.4	0.91
GLC9 (G1u/s)	38,000	3x1200 @ 0m	30 m @ 2.2	18.5	12.7	2.27
Critical storm duration = 120 minutes (1) value in brackets indicates the RAFTS-XP node						

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TABLE 8.12 GOLF LINKS CREEK CATCHMENT ROAD CROSSINGS	
Location	Proposed Structure
Blackbutt Road	1 x 825 mmØ RCP
Joirra Road (d/s of GLC4)	3 x 1200 mmØ RCP
Joirra Road (d/s of GLC1)	2 x 1200 mmØ RCP
Minore Road	4 x 1200 mmØ RCP

TABLE 8.18 SINGLE WEST DUBBO CATCHMENT BASIN SUMMARY						
Basin	Volume at Spill Level m ³	Primary Outlet	Weir (length @ basin height)	Basin Performance 100 year ARI Flows		
				Inflow m ³ /s	Outflow m ³ /s	Peak Level
WD1 (WD1)	7,500	1 x 1050	15 m @ 1.5	10.0	3.1	1.6
Critical storm duration = 60 minutes (1) value in brackets indicates the RAFTS-XP node						

6. The Dubbo Residential Estate in South Dubbo will construct a self-contained drainage scheme as part of its development. The developers have already acquired the necessary easement on behalf of Council to permit their run-off to legally cross private land to the Old Dubbo Road, and then the Macquarie River beyond.

At this stage, Council's Stormwater Drainage Function Plan documents the following funding commitments towards these works. In reality, more funds will be required. Additional financial planning will need to be undertaken before any new S.94 Contributions Plan is prepared.

<u>Year</u>	<u>Project</u>	<u>Estimate</u>
2012/13	Troy Gully Scheme (1)	\$100,000
2022/23	Troy Gully Scheme (2)	\$170,000
2023/24	Troy Gully Scheme (3)	\$175,000
2012/13	Keswick Scheme (1)	\$250,000
2014/15	Keswick Scheme (2)	\$390,000
2026/27	West Dubbo Schemes (1)	\$960,000
2027/28	West Dubbo Schemes (2)	\$1,000,000
2028/29	West Dubbo Schemes (3)	\$1,040,000
2029/30	West Dubbo Schemes (4)	\$1,080,000
		\$5,165,000

This amount of expenditure over the next 30 years is not adequate to meet Council's actual commitments to trunk drainage.

SUMMARY

Growth in the Dubbo urban area by 6100 additional dwellings is predicted by 2036. Council plans are in hand to extend its road network, water supply system, sewerage system and

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stormwater drainage system to cater for this growth. The report above describes the extensions proposed and includes estimates of cost for same. A total spend of \$194 million is expected:

• Roads	\$54 million
• Water Supply	\$80 million
• Sewerage	\$55 million
• Stormwater Drainage	<u>\$5 million*</u>
	\$194 million

* The figure for Stormwater Drainage is considered to be too low at this stage.



DUBBO TRANSPORTATION STRATEGY 2020

Prepared for Dubbo Regional Council

May 2020

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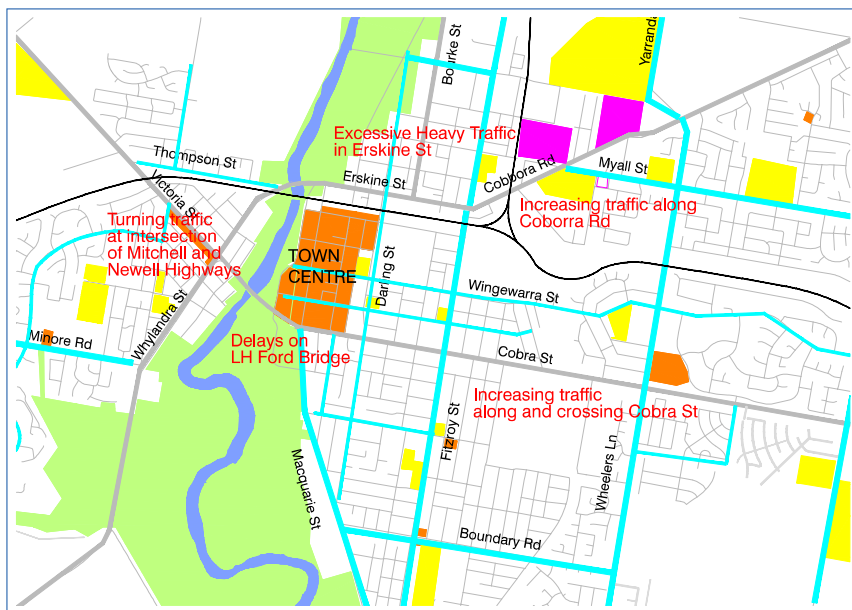
1. SCOPE OF WORK

1.1. Goals

1.1.1. Resolving Current Transport Issues

Dubbo is losing its 10 minute city feel where most trips can be made in under 10 minutes. Just a few delays can make the journey feel much longer. Whilst the rapidly growing changes in traffic conditions are observed throughout Dubbo, including crossing Cobra Street from South Dubbo or entering the Emile Serisier Bridge from Thompson Street, the main issues are associated with the highways.

Figure 1.1 Current Transport Issues



The major current transport issues are:

- Overcrowding on the LH Ford Bridge.
- Excessive heavy vehicle movement in Erskine Street.
- Turning of heavy vehicles and all traffic at the intersection of the Mitchell Highway and Newell Highway in West Dubbo.
- Increasing traffic volumes on Cobra Street.

2020 DUBBO TRANSPORTATION STRATEGY**1.1.2. Responding to State Investment for North Bridge**

The State Government is funding the construction of a second high level bridge, partly in response to the growing level of delays in Dubbo, more specifically to improving trucks manoeuvring through the city streets and as a State policy to upgrade the Newell Highway for operations during flood events, at least until the 1 in 20 year flood event (that is expected to increase in frequency). Council has the opportunity to benefit from this investment. This bridge is referred to as North Bridge.

1.1.3. Optimising Public and Private Investment

Development in Dubbo has always been encouraged and supported by Council. This includes Council having a robust developer contribution system that is both fair and equitable. There is an opportunity to direct these funds to facilitate current and future development in an efficient manner.

1.1.4. Maintain Quality of Life for 20,000 New Residents

The population of Dubbo has been increasing consistently over many years; this analysis is based on this increase continuing.

One of the primary attractions to Dubbo is its lifestyle, everything available at short notice using a high quality public realm. This is attracting younger people who grew up in Dubbo to return to the quality of life they remember. One element is the quality of the City Centre both in the facilities provided and in the public realm. Part of this is a general lack of intrusive traffic for, whilst the highways are busy, they have been generally free from congestion and therefore less pollution, and Macquarie Street has its own relaxed pace.

New transport infrastructure must support growth without decreasing amenity.

1.1.5. Maintain Dubbo as a Competitive Community

Another major attraction to Dubbo is job opportunities. Commercial investment is encouraged by a cohesive approach to location, amenity, accessibility and cost. This has been recognised by the development of Enterprise Zones. The East Dubbo area also has access to the Blueridge Business Park and bulky goods retailing.

Transport infrastructure needs to enhance commercial development.

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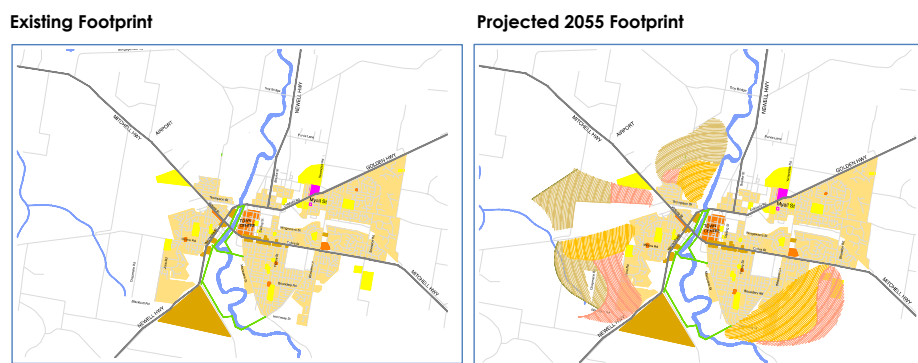
1.2. Scale of Development

The growth in population is a fixed input to this study. Residential development will occur in four Sectors.

The footprint for existing development is located predominantly on the eastern side of the Macquarie River. The eastern side will be fully built out in the next 10 to 20 years (excluding rural residential). Land is available for development to the west that is close to the City Centre. This will continue to deliver the efficient 10 minute city. Further details on the staging of development are discussed in Section 2.

The analysis of transport infrastructure is generally based on a detailed 10 year plan, when most variables can be estimated accurately; a 20 year plan that supports the continuing trends in population and employment; and a 35 year horizon with the main purpose being to measure the ongoing role of projects built in the first 20 years. This is relevant to major infrastructure. For example; a new bridge should accommodate the projected traffic flow for 35 years either by additional traffic lanes that are built on at the time, or plans to provide a second bridge during this period. This optimises public investment.

Figure 1.2 Existing and Future Footprints



1.3. Information Gathered – Outline of Work Conducted

The analysis of future transport infrastructure starts with an analysis of existing issues and data for future population and employment. The construction of new roads encourages development and hence the order of construction tends to lead to further development. Prospective new links are considered and then evaluated using the transport model. The model estimates trip generation from the residential and employment land uses, predicts a demand between areas, and assigns the journeys to the shortest time through the network. The process for modelling, including how it is calibrated to local conditions, is described further in Section 6. The model has the advantage of providing a logic to the initial concepts and placing them in priority with other potential projects. The patterns of movement are discussed in

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Section 3 and indicate when links will be required. The type of roads required impacts on cost; these are described in Section 4. Different scenarios are considered for each time period, these and the conclusions are discussed in Section 5.

Firstly, in Section 2 below, is a discussion on how the goals can be directed to shape the expansion of Dubbo. These topics have been guided by a number of internal workshops where different skills have been applied to direct the value of the study.

2. DIRECTIONS

2.1. Priority for North Bridge

The construction of North Bridge and its associated infrastructure is a priority for the State Government.

The works include (See Figure 2.1):

1. A new high level bridge in the alignment of River Street.
2. A flood free river side connection road on the western bank of the Macquarie River.
3. Realignment of the intersection of the Emile Serisier Bridge and Thompson Street with Whylandra Street to provide flood free access to the new bridge via Thompson Street.
4. Reconfiguration of the intersection of the Mitchell Highway and Newell Highway in West Dubbo to facilitate the turning of trucks in all directions and to accommodate future demand.

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Figure 2.1 North Bridge and Highway Works



2.1.1 Flood Free Route

The primary purpose of the North Bridge for the State of NSW is the provision of a second high level bridge operating during flood events. Recent flood events have resulted in chaos and extensive delays on the LH Ford Bridge. Unfortunately, the Newell Highway north of River Street (Bourke Street) and Fitzroy Street are flood affected beyond a 1 in 20 year event. Therefore, whilst a second bridge will reduce congestion during flood events (when just 2 of the 3 bridges will be operating), without further changes to the network traffic, the Newell Highway will be forced to return to Erskine Street and thence use Yarrandale Road to access the north at Troy Crossing. This issue has been considered with a proposed opening of River Street through to Yarrandale Road during flood events; this is discussed further in Section 5.2.4. This connection does not form part of the North Bridge construction project.

2.1.2 Integration with Prime Development Area

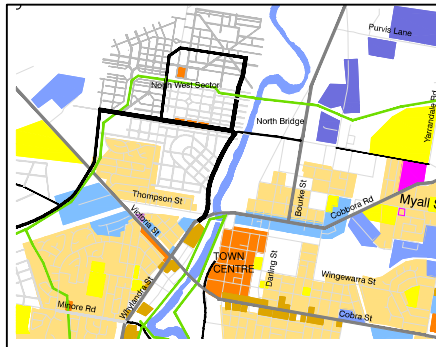
Another major issue to address is that the western side of North Bridge emerges in the centre of the primary riverside development area of the City. This area has been identified for development for over 20 years by Dubbo Regional Council. Figure 2.2 (a) illustrates an indicative road network for the Northwest Sector drawn up in the Dubbo City Planning and Transportation Strategy 2036 Structure Plan. The diversion of the Newell Highway from Erskine Street will also continue to pass directly (Figure 2.2 (b)) through West Dubbo,

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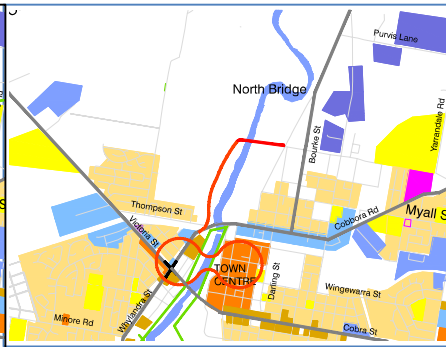
also identified in the Dubbo City Planning and Transportation Strategy 2036 Structure Plan as the next stage of development for the city Centre, required as the western parts of Dubbo expand.

Figure 2.2 Opportunity for Prime Development

a) Indicative Development of Northwest Sector

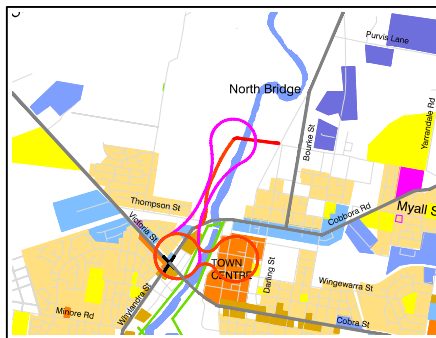


b) Indicative Twin Development of City Centre

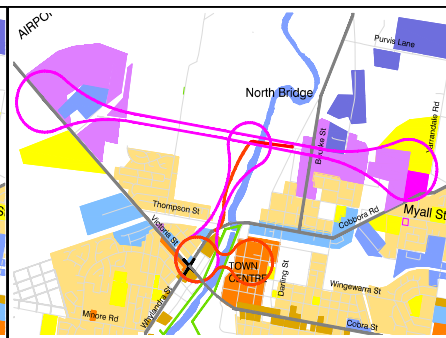


The Dubbo City Planning and Transportation Strategy 2036 Structure Plan also identified (Figure 2.2 (c)) as a prime development corridor of the 'Riverside Boulevard'. This was identified to accommodate prime commercial development, which could include; hotels, accommodation, high end offices and health care; all set in front of residential estates with River Street West as a local centre. This was planned on the premise that highway traffic would, at some point be diverted to a Northern Bypass from Troy Crossing connecting to a Western Bypass at the Mitchell Highway and then continuing south to re-join the Newell Highway south of the Zoo. This was the Dubbo City Planning and Transportation Strategy 2036 plan and has been amended during the preparation of this strategy in response to the consequences of the North Bridge proposal.

c) Riverside Commercial Opportunity



d) Twin Enterprise Zones



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The most recent incentive for attracting employment to Dubbo has been the twin enterprise zones near the Dubbo City Regional Airport and the Dubbo Base Hospital that will also impact on the State Government plan for a Highway connection using North Bridge. This is discussed further in Section 2.3.3.


2.1.3 Need for Long Term Resolution of Traffic Intrusion

The relocation of the Newell Highway to the proposed route still leaves the question of how to reduce the impact of the city traffic on highway traffic in the long term.

2.2. Future Population

2.2.1 Development Trends and Population

The basic predictor for this study has been the ongoing increase in the number of houses built in Dubbo.

TABLE 2.1 HOUSEHOLDS AND POPULATION PROJECTION					
		Projected Development	Households	Persons per household	Population
Recent Trend	2015 - 2020 	(1250)	14796	2.56	37878
10 Year Contribution Plan	2020 - 2025	1250	16046	2.53	40667
	2025 - 2030	1250	17296	2.51	43397
20 Year Rolling Plan	2030 - 2040	2500	19796	2.46	48676
35 Year Project Life	2040 - 2055	3050	22846	2.41	55052

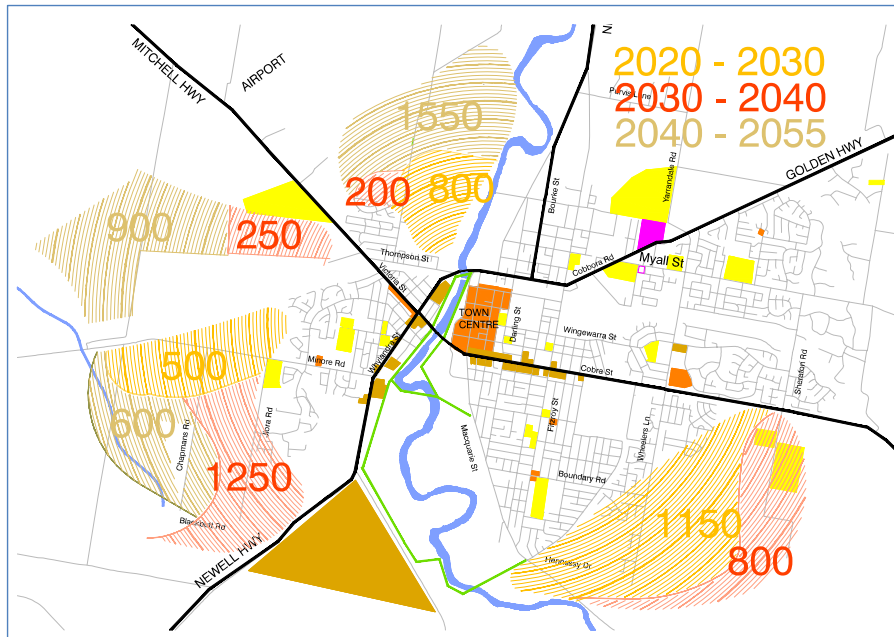
It has been assumed that the rate of 250 new households per year will be maintained into the future. No further discussion of this occurs within this report. There is an underlying statistic (Australian Bureau of Statistics or ABS) that household size is decreasing in Dubbo and throughout Australia, brought on by factors including an ageing population and more single parents. This statistic is relevant to the number of employees and therefore the journey to work. (See Section 2.3).

2.2.2 Distribution of Future Residential Development

The precise location of new development is not required for modelling because it will be served by only a few roads. Hence although the exact areas of each new estate have been identified, they are shown in Figure 2.3 as hatching per decade.

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Figure 2.3 Residential Staging by Decade



Note that Table 2.2 summarises the information in Figure 2.3.

Development is expected to continue to be concentrated in the South Eastern Sector in the next five years with 60% of new housing, and 20% in the South Western and North Western Sectors. In the following five years the completion of North Bridge is expected to concentrate 44% of new housing in the North Western Sector, whilst still maintaining 36% in the South Eastern Sector. No development is expected in the South Western Sector in the next 10 years with only Delroy Estate being completed adjacent to Minore Road in addition to some rural residential estates. The total development for 2020 is 1,200 in the South Eastern Sector, 800 in the North Western Sector, and 500 in the South Western Sector that will be subject to a new roads Section 7.11 (formerly Section 94) Contributions Scheme

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		SECTORS			
		SE	NW	SW	CWc
Recent Trend					
2015 - 2020	1250	750	50	450	0
		60%	4%	36%	0%
Total Households		Proposed Distribution			
PROJECTION					
2020 - 2025	1250	750	250	250	0
		60%	20%	20%	0%
2025 - 2030	1250	450	550	250	0
		36%	44%	20%	0%
2030 - 2040	2500	800	200	1250	250
		32%	8%	50%	10%
2040 - 2055	3050	0	1550	600	900
		0%	51%	20%	30%

The capacity of the South Eastern Sector is expected to be complete with 800 dwellings built in the period 2030 – 2040. The concentration of development during this period is expected to be in the South Western Sector, mostly along Joira Road and Chapmans Road. The South Western Sector will accommodate its first estates.

Development is expected to be contained mostly within a 5km radius of the City Centre during the next 15 years until 2055. The majority of new housing, 51%, occurring in the North Western Sector, and a further 30% in the Central Western Sector, possibly low density lifestyle development. Only 3,050 new houses have been allocated into the sectors in the 2040 – 2055 period, this is 700 short of the 250 new households per year used in this analysis. The reason for this is an assumption that increased density of housing in existing areas will have become a trend by this stage, due in part to the smaller household size and retirement housing. Funding for transport upgrades in existing areas is considered separately.

2.2.3 Capacity of Sectors

The physical limitations to development are a factor in the direction of development, as is connectivity.

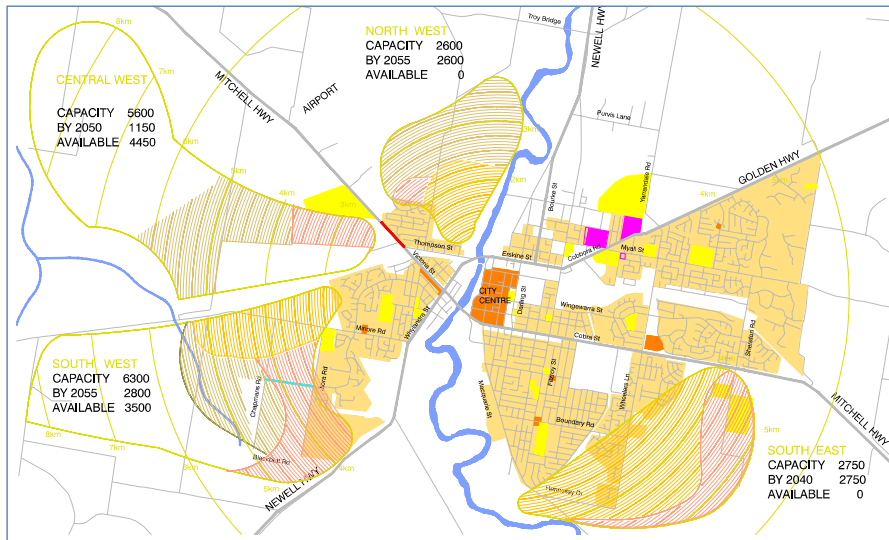
It is anticipated that the South Eastern Sector and the North Western Sector will be built out within the next 35 years with 2,750 new dwellings in the South Eastern Sector and 2,600 in the North Western Sector.

Suitable land is available to expand West Dubbo in the Central Western and the South Western Sectors. An arbitrary boundary has been drawn at Whylandra Creek. Taking out land that would most likely be assessed as natural open space, the capacity of these sectors is between 5,500 to 6,500 dwellings, the difference being the density of housing. For the purposes of examining the transport infrastructure needs (in the modelling), 1,150 dwellings have been allocated to the Central Western Sector from 2030 to 2055, all served by new roads and 1,850 in the South Western Sector, most served by existing roads (with

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upgrades applied). This perhaps illustrates how development tends to follow the line of least resistance, and how good planning can 'direct' efficient outcomes.

Figure 2.4 Capacity of Each Sector



2.3 Future Employment

2.3.1 Changes in Employment

As previously discussed, household size is changing, as is the number of employees per household. These trends (ABS) determine the future number of employees per household.

Table 2.3 shows the combined impact of both trends with 8,050 new households, increasing the population by 17,174 from 2.56 persons per household to 2.41. In contrast, the workforce is expected to increase by only 6,413, with the rate of employment decreasing from 1.18 to 1.04 employed persons per household. These factors drive the location of employment and therefore traffic movement.

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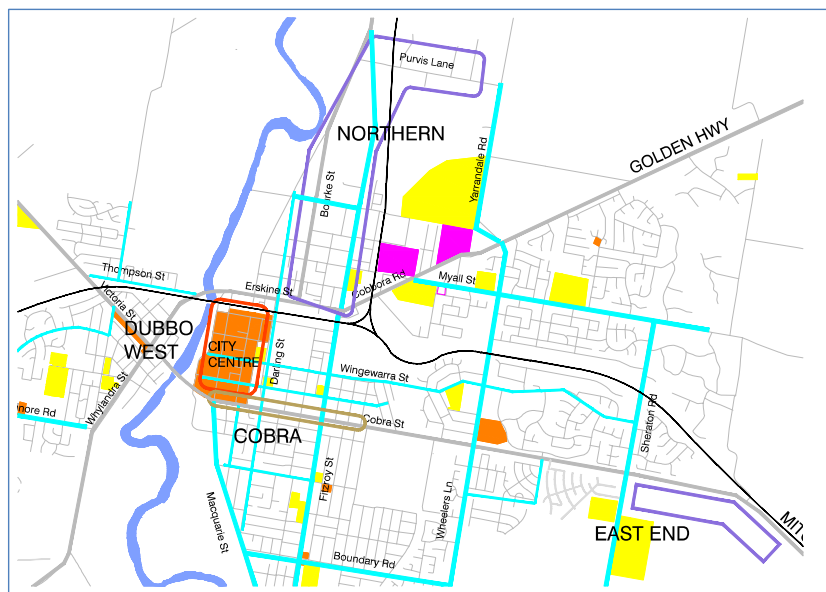
TABLE 2.3 POPULATION AND EMPLOYMENT TRENDS							
	2020 Verified	2025	2030	2040	2055	CHANGE 2020- 2050	
HOUSEHOLDS	14796	1250 16046	1250 17296	2500 19796	3050 22846	8050	
Trend in Pop/hh	2.56	2.53	2.51	2.46	2.41	2.13	
POPULATION	37878	2789 40667	2730 43397	5279 48676	6376 55052	17174	
Trend in % in Work	0.46	0.46	0.45	0.44	0.43		
EMPLOYMENT	17424	1096 18520	1045 19565	1941 21506	2331 23837	6413	
Employee/hh	1.18	1.15	1.13	1.09	1.04		

2.3.2 Existing Hubs

Currently, 55% of all employment takes place in the existing Hubs; the City Centre, the Northern Manufacturing Area, West Dubbo, the Cobra Street Accommodation Strip, plus the East End (Table 3.1). A further 22% of employment is located in developing Hubs, including 18% in the Health and Education Hub near the Dubbo Base Hospital.

These currently focus traffic movement.

Figure 2.5 Employment Hubs



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Employment is changing and this impacts on the growth of Hubs. Many categories used in ABS data, have different trip generation characteristics. Retail generates a high daily demand per employee/area; finance tends to be based in the City Centre, community is spread throughout the town including homework and health, manufacturing is generally located in zones but also has a proportion spread throughout the town, and 'other' is also multi-located.

Table 2.4 summarises the changes in employment projected to occur in Dubbo and this corresponds to the total employment (including external commuters) (Source: Dubbo Regional Council).

	Ret	Fin	Com	Man	Other	Total	
2019	3088	1802	8875	2681	3378	20011	
% Total	15%	9%	44%	13%	17%		
2025	3210	1931	9893	2976	3406	21615	108%
% Total	15%	9%	46%	14%	16%		
increase	122	129	1018	295	28	1604	
2030	3241	2051	10771	3128	3503	22993	106%
% Total	14%	9%	47%	14%	15%		
increase	153	249	1896	447	125	2982	
2040	3270	2249	12100	3635	3542	25196	110%
% Total	13%	9%	48%	14%	14%		
increase	182	447	3225	954	164	5185	
2055	3319	2481	13627	4033	3967	27927	111%
% Total	12%	9%	49%	14%	14%		
increase	231	679	4752	1352	589	7916	
Overall Change	7%	38%	54%	50%	17%	40%	140%

Whilst the proportion of retail employment is projected to decrease from 15% to 12%, there is still a small increase in the total number employed in retail (7%), thanks to the increased population. Hence, the vitality of the City Centre will be retained. In addition, financial services are expected to increase by 38% in line with the population. Employment in community services and manufacturing are predicted to have the greatest increases of 54% (4,752 employees) and 50% (1,352) employees respectively.

These factors will change the patterns of demand and have a strong bearing on how to plan the future.

2.3.3 The Enterprise Axis

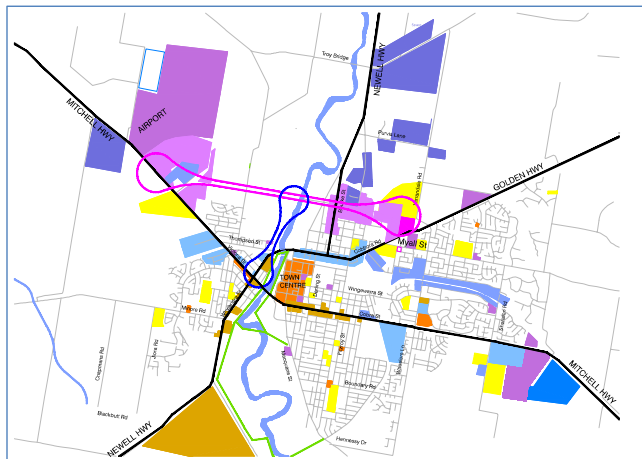
Referring to the statistics above, in anticipation of changes to future employment, Dubbo Regional Council has been actively planning for two Enterprise Zones; the Health and Education Precinct is currently the subject of a Master Plan. The Airport Precinct is also the subject of detailed future planning.

The sheer strength of these two expanding Hubs suggests an Enterprise Axis. This conveniently follows River Street and the new North Bridge river crossing.

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This East West axis strengthens the previously discussed Riverside Boulevard (Section 2.1.2) as the confluence of two highly strategic employment initiatives. This focuses on the intersection at the western side of North Bridge and the Riverside Boulevard. It is noted that Transport for NSW (TfNSW) is not providing an intersection at this location as part of the North Bridge project at this time.

Figure 2.6 The Enterprise Axis



This mutual attraction is perfect for development but not so easy to reconcile with the TfNSW objective for a free flowing Newell Highway sharing part of the East West axis and the Riverside Boulevard. Dubbo Regional Council cannot afford to lose the opportunity to coordinate with TfNSW in designing the public realm for the mutual benefit of employment for the City and ease of passage for the Highway. This can be achieved.

2.4 Strategic Roads

The design of roads suitable for their future role in the transport network efficiently is a key objective of the study, and in particular the development of a new Developer Contributions Plan for Roads.

Four fundamental directions dictate the design of strategic roads for Dubbo, discussed further below.

2.4.1 Maintain Flexibility of Movement

The secret of success in Dubbo for the, until recently, lack of congestion has been the flexibility offered by the grid network of roads that serve the City. This provides intuitive flexibility, with some road users choosing their traditional route from A to B, while others thinking of avoiding a short delay.

2020 DUBBO TRANSPORTATION STRATEGY**2.4.2 Maintain Amenity**

The grid network, with a few notable exceptions, provides roads with a maximum flow of 600 vehicles per hour or less (many less). This is a threshold to amenity; relatively easy to cross; relatively easy to be polite and let the slow cross at ease; relatively, but not perfectly quiet. Many of course choose to live in the even quieter local streets and only need to travel a short distance to join the grid network.

2.4.3 Enhanced Quality Of Life

The ease of movement allows residents to maintain a high quality of life, there is very little thought given to 'getting there' on time or easily. This is an ideal condition for transport that is recognised by many returning residents.

2.4.4 Provide an Efficient Transport Network

It could be said that most strategic roads are initially under designed and then regretted a few years later. The Dubbo grid network has kept on delivering convenient movement with little need for upgrades.

The challenge for the upgraded street designs (Section 4) is to continue this legacy and anticipate future trends.

2.5 Natural Assets**2.5.1 Macquarie River**

Dubbo was settled along the Macquarie River and the flood plain provides the setting for recreational open space. The proposed Riverside Boulevard extends this opportunity. Unfortunately, Macquarie Street does not address the open space riverfront through the City.

2.5.2 Vistas/Lookouts

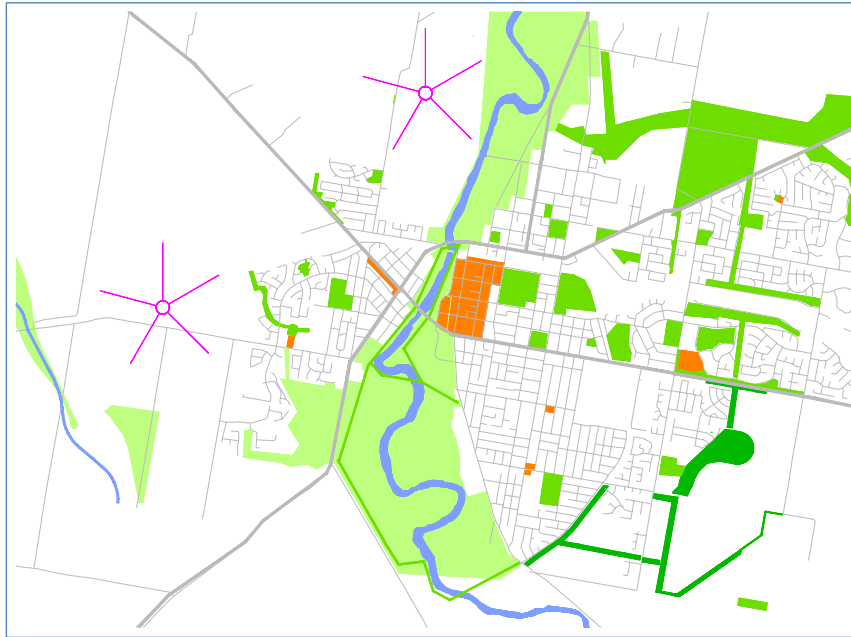
Less well known are the vistas from the ridge to the west of the Macquarie River, shown in Figure 2.7. These can lead urban development as lookouts or other community focus points and are utilised in the Active Transport Plan (Section 2.6.1). A third potential lookout has also been identified at the drive-in cinema site in West Dubbo and this features later in the discussion.

2.5.3 Connectivity of Open Space

The existing urban area contains many areas of recreational open space. The previous Strategic Plan identified some existing linear connections in eastern parts of Dubbo and adopted plans to extend this as a continuous ring around Dubbo (Figure 2.8). This network is suitable for Active Transport.

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Figure 2.7 Natural Features



2.6 Future Transport Modes

2.6.1 Active Transport

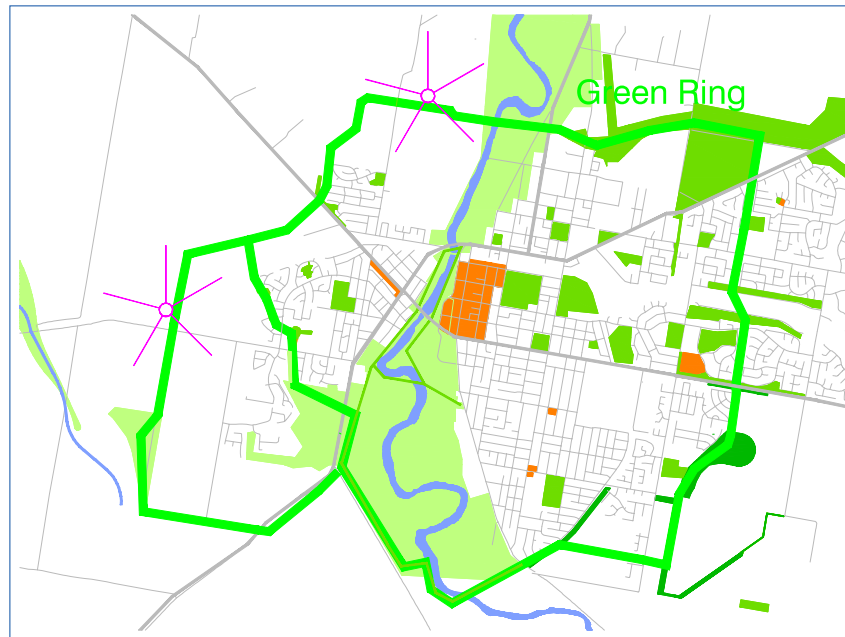
Active Transport networks are being developed in Dubbo. With the exception of paths along the Macquarie River, these are predominantly on-road facilities following bike lanes or quiet streets.

Recent developments in electronics have led to an upsurge of new micro vehicles ranging from electric assisted bicycles to boards and scooters. Mobility scooters are also undergoing changes in range and capability and are seen as a transport mode for deliveries and car replacements.

These vehicles are permitted to use cycleways and will become part of the mainstream movement. This will alter the balance and priority given to the Green Ring and its extension. Works on this network have been included in this Strategic Transport Plan. This follows on from previous Transport Strategies.

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Figure 2.8 Green Ring

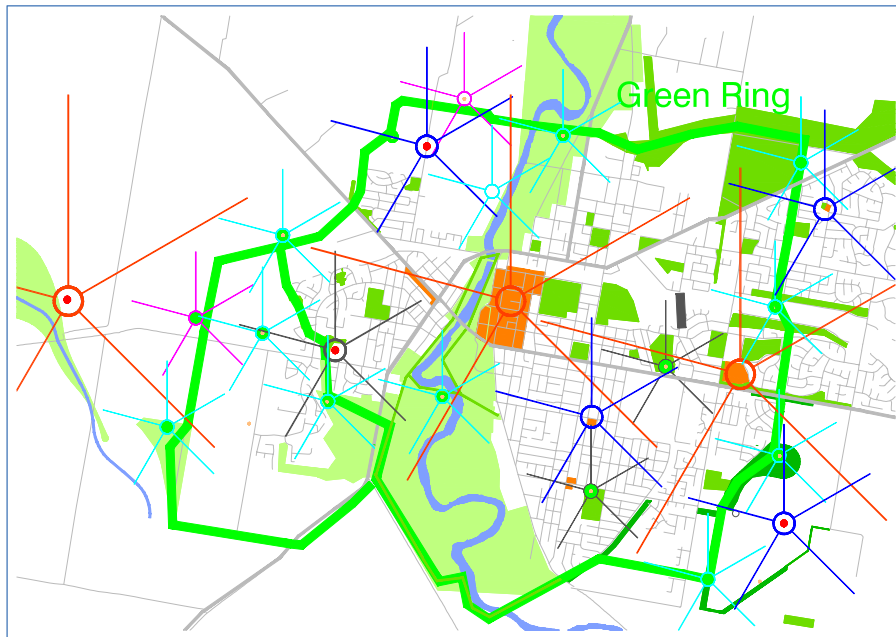


These electric powered vehicles are also using footpaths to the detriment of more vulnerable pedestrians, including the mobility limited and parents with small children.

Figure 2.9 illustrates the need for local connectivity. This intrusion is not the subject of this report but needs to be addressed as part of a future hierarchy of integrated networks.

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Figure 2.9 Active Transport Connectivity



2.6.2 Autonomous Vehicles

The introduction of larger electric powered vehicles is also on the agenda. All new vehicles have some form of driver assistance and are becoming to some degree 'autonomous'. This will have no impact on traffic operations in Dubbo in the short-term. Driver advisories for congestion are already assisting in rural highways in Europe and the United States but again will have no impact in Dubbo.

The next generation of autonomous vehicles are aiming to have surveillance to protect pedestrians as well create efficient traffic platoons. This application will not be in general operation for at least 20 years although some truck operations may become more autonomous earlier.

Nevertheless, the Transport Strategy can address the possibilities for autonomous vehicle operations in new areas and this has been considered in Section 4.

2020 DUBBO TRANSPORTATION STRATEGY**2.6.3 Public Transport**

Public transport will continue to provide a service to bring residents from the residential areas into the City Centre, schools, and to work and recreation throughout Dubbo. The route system is efficiently designed for this role with all services focusing on Macquarie Street and providing the opportunity to transfer to every other service and therefore move throughout Dubbo.

A detailed review of the existing function of public transport is not required for this study.

Given the time lag for the introduction of autonomous vehicles, public transport will continue its important role in accessibility.

All street styles are capable of accommodating bus services.

2.6.4 Electric Vehicles and Noise

One goal is the reduction of noise and the intrusion of highway traffic in Dubbo and hopes for a bypass to the west of the City.

During the course of this work, it has become apparent that further State investment on a Bypass is unlikely to be justified even in the long term (35 years plus).

The introduction of electric powered heavy vehicles, to start with in towns, will reduce noise as well as pollution, and this will achieve some of the goals to remediate intrusion. This is further discussed in Section 4.

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3. TRANSPORT PATTERNS

The modelling calculates the three shortest routes through an average of ten road sections between each of the 280 zone pairs, (2.3 million digits of information). The intention of this Section is to illustrate how traffic is manipulated through the existing and future roads. Firstly, to disperse current congestion and secondly, to spread traffic throughout the network and in particular to show how new links contribute to the dispersal of traffic. This is summarised numerically in Section 6.

3.1. Current Patterns**3.1.1. Traffic Conditions**

Results from the modelling include diagrams that measure sections of road under 'stress'. This is calculated by measuring the 'Level of Service or LoS' of street sections and intersections. This is a standard measure of traffic congestion, progressing from excellent to complete stand still.

The associated diagrams are colour coded. Circles (there are none in Figure 3.1) indicate where an Intersection may require attention, and bars indicate where the street 'link' itself may require attention. The links are less critical than the Intersections because the measure is an indication of the lack of opportunity to pass that is more suited to rural conditions than urban streets. It could be argued that some 'bars'/congestion in streets busy with pedestrian activity are a sign of good traffic management.

The output from the modelling is an indicator of the urgency of creating the alternative, with emphasis on alternative rather than necessarily upgrading the location in stress. For example; in traditional engineering a blocked main street can sometimes be resolved by a new bypass.

The diagrams of 'stress' are used in the analysis for future networks in Section 5, and need to be considered in that light.

Referring to the formal LoS terminology and its impact on travel in Dubbo:

- Green – LoS D – warns of the need for attention in the near future.
- Blue – LoS E – requires an alternative to be designed.
- Orange – LoS F – should not be reached because the alternative should be in place.

Many Dubbo residents are intolerant of delays and indeed the free flow traffic conditions are an attraction to living in the 10 minute City of Dubbo. A lower tolerance is more applicable in Dubbo where LoS C (that is not illustrated in the associated diagrams) is a sign that some Dubbo drivers are finding conditions unacceptable and might seek an alternative way to avoid the intersection.

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This analysis consistently shows Cobra Street with Green sections and not moving to Blue. This is because the Strategy consistently aims to marginally reduce traffic on Cobra Street. The question of how much time difference is summarised in Section 6 with measurements of the time taken to move along Cobra Street from near Wheelers Lane to near Macquarie Street and is in the order of 5 to 7 seconds on a 6 minute trip. This is considered within a tolerable range of changing conditions.

Figure 3.1(a) shows the working analysis of existing conditions and indicates stressed conditions on the LH Ford Bridge, in Coborra Road at the railway crossing, both being difficult to avoid and along short sections of Cobra Street (It is considered that the LH Ford Bridge experiences unacceptable queuing for a short period in the morning peak). Because these areas of congestion occur for a short time period, they are subsequently not reflected in this analysis but recognised in the Strategy.

The same delays occur if nothing were done in 2025 (Figure 3.1.(b)), with Coborra Road moving to unacceptable delays, requiring an alternative and with the LH Ford Bridge being stressed in both directions during the morning peak (this by the way with the intersection of Whylanda Street and Victoria Street upgraded) Note that Figure 3.1.(b) has some new local links added (in the South Eastern Sector and others that are not being used at this time).

Figure 3.1. a) 2019 Level of Service b) 2025 No Minimum Level of Service



As a planning tool, this representation shows how efforts must be made to move a small proportion of existing traffic off Cobra Street and confirms that conditions on the LH Ford Bridge are deteriorating rapidly.

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3.2. Patterns Of Growth

3.2.1. Employment

The main attractors for all journeys are the employment Hub. The future proportion of travel to each Hub will change as employment changes (Section 2.3.2). At first the net result does not appear to be substantial. For example, whilst the existing Hubs are expected to have an overall increase of 26% (Table 3.1) the proportion of total employment in the existing Hubs is expected to reduce from 55% in 2020 (Table 3.1) to 50% by 2050. This is relevant to the City Centre, where the total number of employees is projected to grow by 26%, but the proportion of the total employment reduces from 22% to 20%.

These changes in the existing Hubs are small and manageable, however the new Hubs have an estimated increase of 75% in employment.

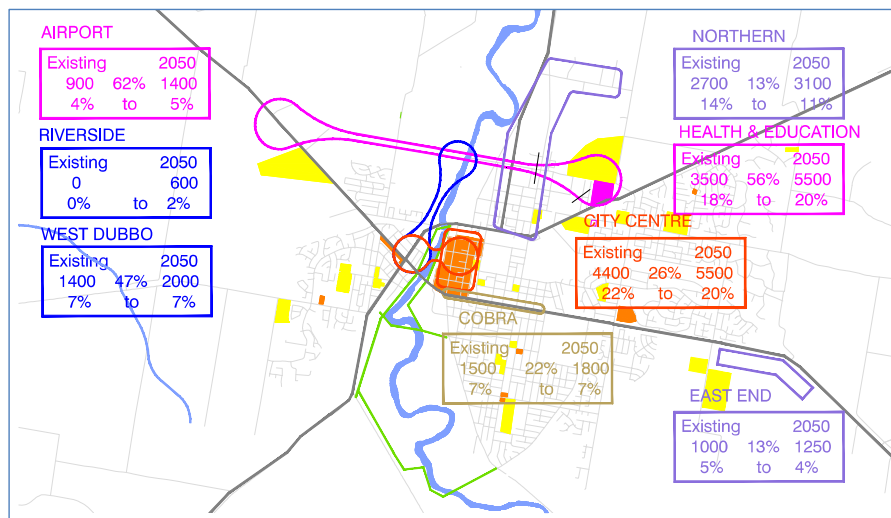
Considering the pattern of journeys, 2,000 additional trips need to be accommodated to the Health and Education Precinct, nearly half as much as the current employment in the City Centre. The Airport Precinct will have 1,000 additional trips, the same as the City Centre, with a further 1,000 to Cobra Street and West Dubbo combined. See Table 3.1 for concise estimates and Figure 3.2 for areas of the City.

	2019 (Calibration)		2025		2030		2040		2050		Change 2020 - 2050
		% Tot		% Tot		% Tot		% Tot		% Tot	
EXISTING HUBS											
1 City Centre	4399	22%	4689	22%	4945	22%	5291	21%	5635	20%	128%
2 Dubbo West	1363	7%	1614	7%	1736	8%	1952	8%	2041	7%	150%
3 Cobra	1477	7%	1544	7%	1624	7%	1718	7%	1836	7%	124%
4 North	2706	14%	2734	13%	2811	12%	2909	12%	3121	11%	115%
5 East End	1083	5%	1136	5%	1168	5%	1198	5%	1234	4%	114%
	11028	55%	11717	54%	12284	53%	13067	52%	13866	50%	126%
NEW HUBS											
6 Heath & Education Precinct	3509	18%	4133	19%	4536	20%	5037	20%	5617	20%	160%
7 Riverside Precinct	0	0%	27	0%	37	0%	245	1%	609	2%	
8 Airport Precinct	885	4%	930	4%	1071	5%	1267	5%	1457	5%	165%
	4395	22%	5091	24%	5644	25%	6549	26%	7683	28%	175%
SUBURBAN											
	4588	23%	4808	22%	5065	22%	5579	22%	6378	23%	139%
Total	20011		21615		22993		25196		27927		140%

This pattern shows how the River Street axis will accommodate the same numeric change as the central areas, a clear need for more accessibility to the northern parts of Dubbo. The additional employment in the City Centre and Cobra Street will also attract more demand to the LH Ford Bridge and some other demands need to be dispersed. (2055 projections are used in the modelling and are not illustrated here).

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Figure 3.2 Employment Hubs



3.2.2. New Residents

Figures 3 (a) to (d) illustrate the directional split of journey to work from each residential Sector, the light green bars showing demand using new facilities, the base colour showing demand on existing roads.

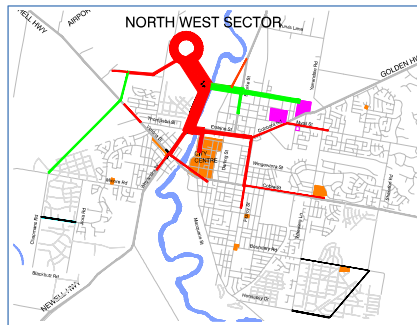
This 'pre-analysis' before the modelling continues to indicate the usefulness of new strategic infrastructure; in particular North Bridge and South Bridge but also crossing the railway line at Chapmans Road (referred to below as Main Western Railway). This summary was then used to make first calculations of the potential scale of demand on new facilities to indicate the number of new links required.

Demand from the North Western Sector will concentrate on the riverside to the Emile Serisier Bridge with a proportion using North Bridge and practically no traffic on the LH Ford Bridge.

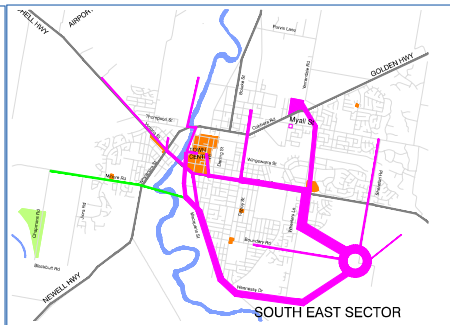
Demand from the South Eastern Sector primarily uses existing roads (for the journey to work). The scale of this additional traffic needs to be considered at this stage. For example; Figure 3.1 (b) indicates a strong demand using Hennessy Drive and the southern part of Macquarie Street. This represents 261 peak hour trips in 2030 from the South Eastern Sector, (Table 3.3 (a)) with (a surprising) 180 peak hour trips as contraflow from other new development. Cumulatively, this is less than 600 vehicles per hour, and therefore within the environmental goal for the neighbourhood grid. Demand increases later (Table 3.3. (b)) to a maximum of 10,000 vehicles per day in 2055.

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Figure 3. a) Demand from NW Sector



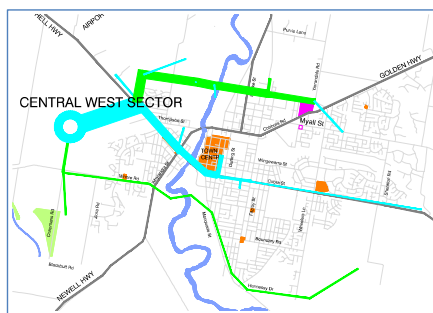
b) Demand from SW Sector



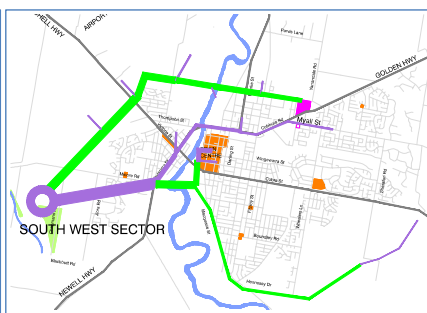
In conclusion, the connection to South Bridge via Macquarie Street south is suitable in the foreseeable future and no other option, such as the Southern Bypass (Refer to Figure 5.7.1) needs be considered for 10 years.

As a point of clarification, whilst there may be concern over the accuracy, figures estimated for 20 or 35 years will be reviewed regularly and other options will be considered at the time. This analysis gives a sense of direction.

Figure 3. c) Demand from CW Sector



d) Demand from SW Sector



Demand from the Central Western Sector concentrates on North Bridge and the LH Ford Bridge, indicating that some existing traffic must be diverted from this access and hence South Bridge is required.

Demand from the South Western Sector concentrates on South Bridge. Further, a new bridge over the railway at Chapmans Road will spread traffic across West Dubbo and onto North Bridge. When combined, these will successfully reduce impacts on Cobra Street and through West Dubbo. Traffic from the existing parts of the South West will predominantly use South Bridge, this is not reflected in these figures.

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Again, before starting the modelling, it is apparent that North Bridge will be well used by Dubbo traffic by 2030. The figure of 6,000 vehicles per day (vpd) (Referring to Table 3.2 (a)) is higher than the demand from the new development of South Bridge, at 4,000 vpd. See Section 6 for modelled results.

TABLE 3.2A 2030 INDICATIVE USE OF NEW MAJOR INFRASTRUCTURE									
DEMAND FOR 2030 BY NEW DEVELOPMENT ONLY; EXISTING TRAFFIC WILL ALSO DIVERT TO NEW FACILITIES									
MAJOR NEW INFRASTRUCTURE	PEAK TRAFFIC GENERATION						TOTAL DAILY TRAFFIC 0.1		
	NW Sector		SE Sector		CW Sector			SWSector	
	Total Gen	800 Additional Traffic	Total Gen	1450 Additional Traffic	Total Gen	0 Additional Traffic		Total Gen	700 Additional Traffic
	Estimated % using		Estimated % using		Estimated % using		Estimated % using		
North Bridge	40%	320	0%	0	40%	0	40%	280	6000
South Bridge	0%	0	8%	116	12%	0	41%	287	4030
Bligh St	0%	0	10%	145	0%	0	22%	154	2990
Hennessy	10%	80	18%	261	15%	0	15%	105	4460
Western Railway	2%	16	2%	29	3%	0	2%	14	590

Taking these initial estimates to 2055 indicates that North Bridge will be stressed (18,000 vpd, similar to current flows on the LH Ford Bridge), South Bridge will be relatively small from newly generated traffic (4,000 vpd), Hennessy Drive, as mentioned above will be close to capacity for a Residential Grid Road, and a bridge over the Railway in the South West off Chapmans Road should be working well (15,000 vpd).

TABLE 3.2B 2055 INDICATIVE USE OF NEW MAJOR INFRASTRUCTURE									
DEMAND FOR 2055 BY NEW DEVELOPMENT ONLY; EXISTING TRAFFIC WILL ALSO DIVERT TO NEW FACILITIES									
MAJOR NEW INFRASTRUCTURE	PEAK TRAFFIC GENERATION								
	NW Sector		SE Sector		CW Sector		SWSector		TOTAL DAILY TRAFFIC
	Estimated % using	Cumulative Additional	Estimated % using	Cumulative Additional	Estimated % using	Cumulative Additional	Estimated % using	Cumulative Additional	
North Bridge	36%	702	0%	0	31%	357	31%	760	18180
South Bridge	0%	0	15%	338	8%	92	32%	784	12135
Bligh St	0%	0	10%	225	0%	0	10%	245	4700
Hennessy	5%	98	25%	563	8%	92	11%	270	10215
Western Railway	8%	156	7%	158	16%	184	41%	1005	15020

These patterns will form from residential development.

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3.2.3. Scale of External Traffic and Heavy Vehicles

The third pattern of movement is external traffic. This often dominates public discussion but is a small proportion of total traffic movement and is essential to the economy as Dubbo is the regional centre for 120,000 residents.

Through-traffic forms approximately 20% of external traffic (Table 3.3). Regional traffic is considered in two types: commuters and other regional traffic. Currently, of the total regional traffic, 50% is journey to work commuter traffic and 50% are regional visitors; shopping, business, school recreation etc.

	2019 Survey	Applied Annual Increase	2025	2030	2040	2055
Through traffic	2460	103%	1.16 2852	1.16 3306	1.34 4443	1.56 6922
Commuter	5174	Varies	1.13 5847	1.1 6431	1.08 6946	1.07 7432
Regional Movement	5271	101%	1.03 5404	1.03 5540	1.05 5824	1.08 6276
TOTAL EXTERNAL	12905		14103 109%	15278 118%	17213 133%	20631 160%

Through-traffic is expected to increase on the existing trend of 3% per year. Regional movement is expected to increase in line with the anticipated small increase in population, generally 1% per year.

Commuting from rural areas has increased over the last decade and is expected to continue in line with changing types of employment in Dubbo.

Considering the total increase in employment, the resident employees in the Dubbo study area (ABS) are currently made up of 87% internal residents and 13% regional commuters. This is not expected to vary in the future.

ORIGIN OF EMPLOYEES	2020	2025	2030	2040	2055
Internal Resident	17424 87%	18520 86%	19565 86%	21506 86%	23837 87%
External Commuters	2587 13%	2923 14%	3216 14%	3473 14%	3716 13%
Total	20011	21443	22781	24979	27553

External traffic will increase faster than internal traffic (60% and 40% respectively). This will not have an impact on traffic in Dubbo in the foreseeable future.

In conclusion to this Section, the Transport Strategy has been a response to the current pattern that centralises demand, the movement of employment more to the north and the centroid of population moving more to the west and little change in the proportion of external traffic.

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4. ROADS FOR THE FUTURE

The purpose of this Section is to establish suitable sections for new transport infrastructure that can be costed for use in the Developer Contributions Plan and to make estimates of future infrastructure programs.

The actual traffic requirements, traffic lanes, parking, footpaths and landscape are based on typical Arterial Roads. The traditional Dubbo Suburban Road is included as a comparison for costing and amenity. The design originated with the need to accommodate trucks and turning traffic and evolved to accommodate pedestrian amenity with central refuges. Streets include Cobra Street and Fitzroy Street, and tended to spread to older grid roads.

Unit-cost Prices have been provided by Dubbo Regional Council. They include the cost (Table 4.2) per square metre of pavement, parking lanes, footpaths, bridges, lineal metre of footpaths, and cubic metre for earthworks (earthworks are only estimated for flood plains). Acquisition costs are not included.

Based on these costs, the typical existing Dubbo Suburban Road with a 14m wide heavy duty pavement and 4.2m wide parking pavement costs in the order of \$4,000 per metre length.

Five situations have been considered.

1 Residential Grid - a typical grid road within a neighbourhood.

Many new links will have similar characteristics to the existing layout of the grid roads in Dubbo; frontage housing and low volumes of predominantly local traffic. Whilst the traditional streets are very attractive, and part of the Dubbo identity, more recent Suburban roads, such as Boundary Road have been built to the standards of more typical metropolitan streets with 6m of pavement plus two parking lanes (Table 4.1 Costing Infrastructure).

The reserve width is reduced to 15m.

These are primarily internal suburban streets and cost \$2,000 per metre length; half of the traditional street style.

2 Urban Edge - located at the edge of residential development and requiring one residential service road and a separate carriageway for other traffic (note, not through-traffic but simply other local traffic). The per-metre cost of this profile is still a moderate \$2,800.

The reserve width is maintained at 22m.

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The use of Urban Edge street is recommended at a number of locations, either at the edge of development or where there is a strong linear barrier to development. For example; Hennessy Drive could eventually (and not in the 35 year horizon) become part of the Southern Bypass and is situated on the edge of the floodplain (Hennessy Drive is already designed using this profile).

TABLE 4.1 COSTING OF INFRASTRUCTURE

UNIT PRICES		Unit Price						
Pavement/drainage	\$/m2	\$220						
Parking Pavement	\$/m2	\$120						
Kerbs	\$/m	\$75						
Footpaths Width	\$/m2	\$90						
Bridge Water	\$/m2	\$6,000						
Bridge Land	\$/m2	\$4,800						
Earthworks	\$/m3	\$2,106						
OPTIONS FOR ROAD SECTIONS								
			Width	Pavement	Light	Footpath	Kerbs	TOTAL
					Pavement			Per m
EXISTING ARTERIALS			m	m	m	m	m	
Central turning	Quantity	22	14	4	3	2		
and pedestrian refuge	\$		\$3,080	\$480	\$270	\$150	\$3,980	
1 RESIDENTIAL GRID								
No Regional Traffic	Quantity	15	6	4	0	2		
or wider footpaths/verges	\$		\$1,320	\$480	\$0	\$150	\$1,950	
2 URBAN EDGE								
Local and passing traffic	Quantity	22	10.5	2	0	3		
	\$		\$2,310	\$240	\$0	\$225	\$2,775	
3 SEGREGATED ARTERIAL								
Limited pedestrian access	Quantity	19	13	0	0	2		
	\$		\$2,860	\$0	\$0	\$150	\$3,010	
4 COMMERCIAL INTEGRATOR								
Three carriageways	Quantity	33	17	4	0	4		
	\$		\$3,740	\$480	\$0	\$300	\$4,520	
5 RESIDENTIAL INTEGRATOR								
5.1 Stage 1 Single carriageway	Quantity	33	5.5	0	1.5	2		
	\$		\$1,210	\$0	\$135	\$150	\$1,495	
5.2 Stage 2 Two Carriageways	Quantity	33	5.5	0	1.5	2		
	\$		1210	0	135	150	\$1,495	
5.3 Three Carriageways	Quantity	30	8	10	3	2		
	\$		1760	1200	270	150	\$3,380	

- 3 Segregated Arterial** - crossing floodplains or permanently outside the Urban Expansion (e.g. under airport flight path).

A number of links are built across floodplains or outside the future urban areas. Operating at a higher speed, they require larger carriageways. Given the higher speed, and given that a Greenway network is

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included in the costing of infrastructure, it is desirable to segregate pedestrians from these roads and hence there are no footpaths. The per-metre cost reflects the wider carriageway at \$3,000.

- 4 Commercial Integrator** - passing through mixed development requiring service roads accommodating heavy vehicles and a central carriageway for passing traffic.

This situation was identified in the previous Strategic Transport Plan (River Street west). This is the most flexible means of bringing high volumes of traffic through a commercial area. The 33m width (Table 4.2 Road Design Options) allows for landscaping and therefore provides an attractive street environment.

The per-metre cost of \$4,500 reflects the stronger carriageways.

- 5 Residential Integrator** - also with the potential for three carriageways but passing through residential development where Service Roads can be used to accommodate local traffic and not requiring heavy duty use (southern part of Wheelers Lane).

The Residential Integrator can be staged to suit development. This provides the ultimate in flexibility, particularly if the future role of the link is not settled, as is the case for the 20 to 35 year plan.

Stage 1; Residential development on one side of the reserve requiring one Service Road. At a cost of \$1,500 per-metre length, this is the least cost for a Strategic Road. But because this style is built in stages, the Service Road is built for heavy duty use and to a width of 5.5m.

Stage 2; Residential development on the second side of the reserve requiring a second Service Road. Suitable when there is still no certainty on the future use of the central carriageway.

Stage 3; Build the three carriageways concurrently with two light duty Service Roads. The per-metre cost of \$3,400 is less than adding the central carriageway to two heavy duty service roads and less than the Commercial Integrator (\$4,520).

Also, note the specification requires space for an 8m central carriageway, not the 7m for a Commercial Integrator. Also, light duty Service Roads can always be upgraded if the need arises in the future.

In conclusion, using a series of sections that offer flexibility for future transport demands can make substantial savings to the alternative of simply adopting to continue to use the current grid road Section and furthermore provide a more sustainable long term transport network.

	Width
1. TRADITIONAL DUBRO GRID Central turning and pedestrian refuge	
2. RESIDENTIAL GRID Could include Avenue Median or wider footpaths/verges	
3. URBAN EDGE Twin carriageway	
3. SEGREGATED ARTERIAL No pedestrian access	
4. COMMERCIAL INTEGRATOR 2 Service roads	
5. SUBURBAN INTEGRATOR 5.1 Single carriageway	
5.2 Two Carriageways Additional carriageway	
5.3 Three Carriageways All 3 carriageways	

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5. CONCLUSIONS

It should be noted that the conclusions are based on an assumed location of development. This is known with some accuracy in the short term but becomes progressively less certain as the timeline expands. The location of the residential grid will normally only occur when development is underway. The order might change but the intent is the same, i.e. the network is connected and must be maintained.

5.1. Reference to Modelling

The conclusions reached in this study are assisted by the modelling of journeys predicted to be made in the future from varying employment and population areas. A more thorough list of network performance is given in Section 6.

This Section concentrates on conclusions of the future physical form of Dubbo.

5.2. 2020 to 2030 - 10 Year Investment Program**5.2.1. Program**

Table 5.2.1 lists the projects that are required to accommodate traffic by 2030. This is displayed in three parts, Current Commitments, mostly concerning North Bridge, a 0 to 5 year project list, requiring immediate action, and 5 to 10 year project list, some of which requiring major design.

Entries in Blue and Green are the list requiring approval for the purposes of calculating developer contributions, Black is either TfNSW or Council funding, Orange is an estimate for the upgrade of existing streets. The style of road is described in Section 4.1. See Figure 5.2.1 for the location of these projects.

Selecting some projects for further analysis:

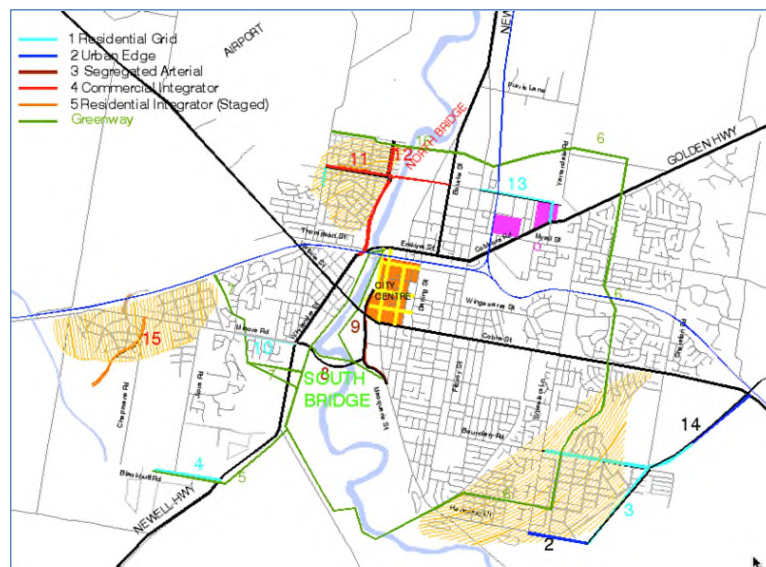
Project 1A – Riverside Boulevard Stage 1 – This road must be designed to accommodate the prime commercial opportunity for the Boulevard. The total cost of the Commercial Integrator has been ascribed to the TfNSW. Negotiation might require that Council fund Service Lanes but such lanes need access to the central carriageway. Council must also negotiate with TfNSW and come to an agreement on how to access the North Western Sector and extend River Street further to the west, towards Bunglegumbie Road and beyond.

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TABLE 5.2.1 0 - 10 YEAR (2020 - 2030) TRANSPORT INFRASTRUCTURE PROGRAM							
CURRENT COMMITMENTS							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
1A	Riverside Boulevard Stage 1	Strategic Network	4	60km/h	Commercial Integrator	Passes through prime Macquarie River frontage. TfNSW funded.	-
1B	Whylandra Street Victoria Street	Strategic Network	Upgrade		Intersection	TfNSW funded.	-
1C	North Bridge	Strategic Network	3	80km/h	Segregated Arterial	TfNSW funded.	-
UP1	Boundary Road Extension Stage 2	Residential Grid	1	50km/h	Only Local Traffic	Under construction.	-
0 to 5 Years 2020 - 2025							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
2	Macquarie Street Hennessy Drive Upgrade	Future Strategic Option	2	60km/h	Urban Edge	Minor upgrade to Macquarie Street.	\$ 2,969,000.00
3	Sheraton Road Extension to Hennessy Drive	Residential Grid	1	50km/h	Only Local Traffic		\$ 4,298,000.00
4	Blackbutt Road Extension Stage 1	Residential Grid	1	60km/h	No Access		\$ 1,950,000.00
UP2	Existing Street Upgrades					Item cost potential - Bligh Street circulation.	\$ 2,000,000.00
5	Greenway - Blackbutt Road Link					Start of Budden Creek loop.	\$ 322,000.00
6	Greenway - South Eastern Loop					Required for South Eastern Sector (over 10 years).	\$ 2,689,000.00
7	Greenway - Delroy Loop						\$ 663,000.00
5 to 10 Years 2025 - 2030							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
8	South Bridge (Low Level Bridge)	Strategic Network	3	80km/h	Segregated Arterial	No footpaths provided. Use existing pedestrian bridge instead.	\$ 17,930,000.00
9	Bligh Street Link	Strategic Network	3	70km/h	Segregated Arterial	Footpaths within playing fields.	\$ 5,076,000.00
10	Minore Road Widening	Existing Street Upgrade	Upgrade	50km/h	Special Case	Access to existing properties.	\$ 1,950,000.00
11	River Street West	Strategic Network	4	60km/h	Commercial Integrator	Passes through commercial.	\$ 5,005,000.00
12	Riverside Boulevard Stage 2	Strategic Network	4	60km/h	Commercial Integrator	Passes through commercial.	\$ 2,189,000.00
13	River Street East	Residential Grid	1	50km/h		Passes through active area (Health and Education Precinct). Also provides flood management.	\$ 2,340,000.00
14	Blueridge Link Road	Residential Grid	1	50km/h		Part with access, part without access.	\$ 3,900,000.00
15	Champan Road Diversion	Future Strategic Option	5.1	60km/h	Residential Integrator Stage 1	Option for 3 carriageways as Type 4.	\$ 1,271,000.00
UP3	Existing Street Upgrades					Cobbora Road railway crossing.	\$ 2,000,000.00
16	Greenway - North West Stage 1					River crossing.	\$ 835,000.00

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Figure 5.2.1 2030 - 10 Year Infrastructure Plan



Project 2 – Macquarie Street Hennessy Drive Upgrade – Minor works for traffic management in Macquarie Street and Urban Edge in Hennessy Drive.

Project 3 – Sheraton Road Extension to Hennessy Drive – A perfect example of cooperation to achieve the best connectivity involving the developer, with payment from Developer Contributions.

Project 4 – Blackbutf Road Extension Stage 1 – Illustrates how if the link is not built at the time of development, it will become impossible in the future. Lost opportunities have included a Grangewood Estate connection to the Newell Highway that could have located the Southern Bypass to the north of the Zoo and relieved demand on Minore Road. Together with Stage 2, this forms a part of the South Western Grid.

Project 8 – South Bridge (Low Level Bridge) – South Bridge has been held in the 2020 – 2030 construction program because of the deterioration of traffic amenity even with North Bridge completed. See Section 5.3 for details.

Project 9 – Bligh Street Link – Strengthening of Bligh Street to distribute traffic to the City Centre car parks has been in planning for many years with a number of iterations. The conclusion to connect Bligh Street to South Bridge and thence to Macquarie Street South is fundamental to creating a stable traffic network that can accommodate traffic until at least 2055. See Wingewarra Street Bridge, Table 5.7.1)

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Project 10 – Minore Road Widening – Upgrading of Minore Road for two through lanes per direction is also as a result of the lack of east west connectivity from the South Western Sector to the Newell Highway. Baird Drive has taken much of the additional traffic over the last 15 years from both Delroy and Grangewood subdivisions and is reaching its design capacity. The loss of amenity along Minore Road has been slowly growing as traffic has increased.

Project 11 – River Street West – River Street West and Project – 12 Riverside Boulevard Stage 2 emphasise the manner in which the North Western Sector will develop quickly and connect with North Bridge. River Street West is also an expensive Commercial Integrator but its role grows in the next few decades. This intersection is identified as the next step in the strategic planning process (Section 5.8).

Project 13 – River Street East – Also has long-term strategic impacts. At this time, it is required to give access to the Health and Education Precinct. It is designed to have high pedestrian amenity and therefore low traffic capacity, particularly the link through the precinct to Cobbora Road.

Project 14 – Blueridge Link Road – Blueridge Business Park is currently only served by the Mitchell Highway and access from Sheraton Road is inappropriate. The Dubbo City Planning and Transportation Strategy 2036 relied on the expensive Southern Bypass (See Project 43 Table 5.7.1). The lack of external traffic growth precluded this option in the foreseeable future although there are local demands that will be relieved by this link, plus it will be beneficial to the development of the Blueridge Business Park employment Hub.

Project 15 – Chapmans Road Diversion – Chapmans Road was previously identified as part of the 'Western Bypass'. Environmental constraints have required that the alignment in the south be relocated to the west. This needs to be established with development south of Minore Road (assumed to occur in this period). This forms part of a strategic road linking the South West and Central West Sectors.

The estimate for upgrading existing streets (\$4 million excluding Project 13 – River Street East) include works at the railway crossing on Cobbora Road. Other works have not been identified and will tend to follow developments. It is noted that the upgrade of Bligh Street as part of South Bridge will probably trigger the opportunity to make changes to circulation in the City Centre.

5.2.2. Greenways

As discussed in Section 2.5.3, in 2007 Council adopted the construction of a Green Ring for Active Transport that circled the City Centre (Figure 2.8). Active transport networks can also be by small electric powered micro vehicles and in effect are becoming more viable as a transport network. The Dubbo City Planning and Transportation Strategy 2036 concentrated on the Green Ring passing through the South Eastern Sector and Delroy Estate. The Greenways are an extension to the Green Ring, bringing active transport close to all new residents.

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The cost of this network, be it a community cost or a transport mode, is included in this analysis.

Projects for the period 2020 to 2030 include:

Project 5 – Greenway – Blackbutt Road Link – This is the first of the projects that add to the Greenways as development occurs, in the same manner as the residential grid, in this case Project 4 – Blackbutt Road Extension Stage 1. This section of the Greenway extending from the front of the Zoo follows roads, something generally avoided but in this case the most efficient way to bring these and future residents to the west into the main network. This is the start of the Buddens Creek Loop.

Project 6 – Greenway – South Eastern Loop – The South Eastern Loop was intended (in the Dubbo City Planning and Transportation Strategy 2036) to become an attraction for new residents in the South East and to bring the benefits of Active Transport through the existing areas of east Dubbo. Project 6 includes the entire construction of the Green Ring through the South Eastern Sector and up to Troy Creek.

Project 7 – Greenway – Delroy Loop – The Delroy Loop is also part of the original Green Ring, linking development at the top of Minore Road back to the River. This involves negotiation with the Dubbo Golf Course to use the northern edge of the course from the existing path to Yuille Court.

Project 16 - Greenway – North West Stage 1 – Takes the Green Ring over the Macquarie River near Devils Hole Reserve and into the development of the North Western Sector.

5.2.3. Costing for Section 7.11 and Upgrading Existing Networks

TABLE 5.2.2 0 - 10 YEAR TRANSPORT INFRASTRUCTURE COST		
2020 - 2030		
0 - 5 Years 2020 - 2025		100,000's
	Road Infrastructure in new areas	\$9,217
	Dubbo Greenway Infrastructure	\$2,330
	Existing Network Upgrades	\$2,000
5 - 10 Years 2025 - 2030		
	Road Infrastructure in new areas	\$11,094
	Dubbo Greenway Infrastructure	\$2,180
	Existing Network Upgrades	\$4,340
	Internal Funding	\$24,956
Total 2020 - 2030	Road Infrastructure in new areas	\$20,311
	Dubbo Greenway Infrastructure	\$4,509
2500 Dwellings	Cost Per dwelling (For \$94)	\$9,928
	Existing Network Upgrades	\$6,340
	Internal Funding	\$24,956

The total cost of Roads (Blue text) and Greenways (Green text) in new areas in the period of 2020 – 2030 is estimated at \$24,840,400. This cost has been derived from the additional movement generated by 2,500 new houses. The cost per dwelling in new areas is \$9,928. (Table 5.2.2.) This is applicable Section 7.11.

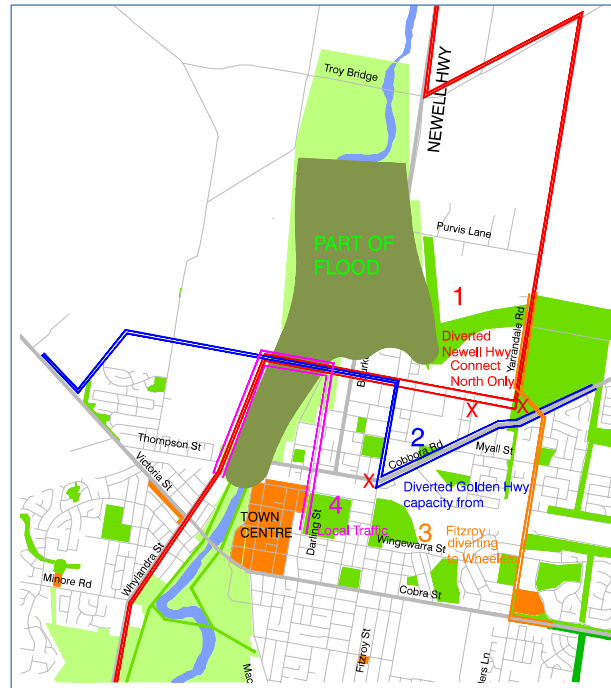
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In addition, it is expected that \$6.34 million will be required to upgrade existing roads; and \$50 million will be required for South Bridge and its approaches.

5.2.4. Flood Management.

In respect of the proposed North Bridge, the northern parts of Bourke Street, Darling Street and Fitzroy Street are flood affected in a 1 in 20 year event.

Figure 5.2.2 Indicative Traffic Management during Flood.



Three 'groups' of traffic will use North Bridge during a flood event, a forth will relocate to Yarrandale Road.

- 1 Highway Traffic from the north must use Yarrandale Road and can be given some priority by having a right turn access into River Street, available only during flood events. The left turn from Yarrandale Road would be prohibited to give advantage to highway traffic. Similarly, a left turn into Yarrandale Road would be provided but not a right turn.
- 2 This would limit intrusion into the Health and Education Precinct, albeit heavy vehicles. Further limitation would be extended but prohibiting movement between River Street and Caroline

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Street, thereby requiring that Cobbora Road traffic comes down to Fitzroy Street, which does not continue north. Hence, Cobbora Road would access River Street from Fitzroy Street and with access via River Street West could access the Mitchell Highway.

- 3 In the meantime, traffic normally using Fitzroy Street to travel north could be advised to divert to Wheelers Lane, crossing Cobbora Road in what should be a congestion free intersection.
- 4 City Traffic normally using the Emile Serisier Bridge, inundated by flood water, would seek to avoid the congestion at the LH Ford Bridge by continuing to North Bridge, and then returning into North Dubbo via Bourke Street or Darling Street, and possibly to avoid queuing on North Bridge, not Brisbane Street. The Cobbora Road traffic would be encouraged to continue to Fitzroy Street by limiting access into Erskine Street, thereby simplifying the right turn from Cobbora Road. It may also be necessary to limit access from Fitzroy Street south into Cobbora Road.

5.3. 2025 – The 5 Year Priority

5.3.1. South Bridge as a 5 Year Priority

The existing 2018 traffic conditions (Figure 3.1) indicate Cobra Street, the LH Ford Bridge, and Cobbora Road being under stress.

Without any action development between 2020 and 2025 (1,250 dwelling in new areas) traffic conditions would deteriorate to stress both directions of traffic on the LH Ford Bridge, and Cobbora Road would reach unacceptable delays. (Figure 3.1). An alternative is required.

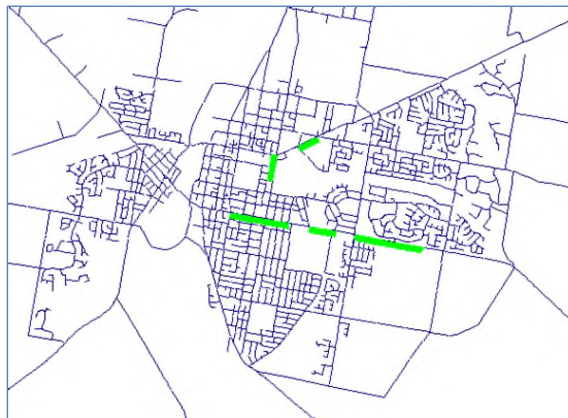
Figure 5.3.1 Stressed Traffic Conditions – 2025 am Peak North Bridge Only



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The traffic conditions are not improved by the completion of North Bridge (Figure 5.3.1). A reduction in demand on Cobbora Road (diversion to River Street) brings some relief, but new stress at Thompson Street even with a generously designed intersection, and similar conditions on Cobra Street and for both directions of the LH Ford Bridge.

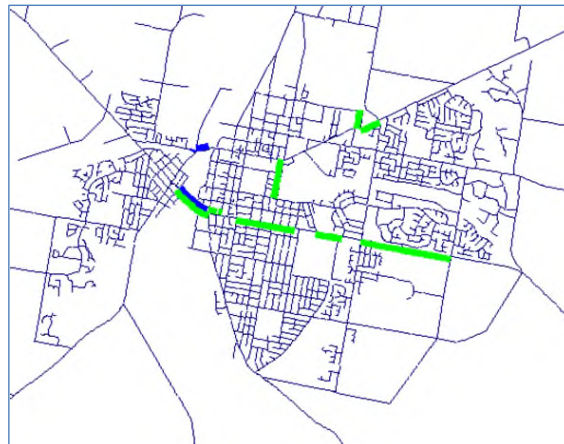
Figure 5.3.2 Stressed Traffic Conditions – 2025 am Peak Both Bridges



With North Bridge and South Bridge completed in 2025, the stressed sections of Cobra Street, Fitzroy Street and Cobbora Road settle down and do not experience any further stress in the long term (Figures 5.4.2 and 5.5.2).

But it is the costs and savings achieved, Sections 5.4 and 5.5; and how this expenditure provides for the future, Section 5.6, that justify expenditure and explains the logic. Before the hard economic facts, the 'perception' of traffic conditions is view through 'Stressed Conditions' continues below.

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Figure 5.3.3 Stressed Traffic Conditions – 2030 am Base No Improvements

Just in case justification for building a new crossing urgently is required, Figure 5.3.3 illustrates stressed streets in 2030. With the eastbound direction of the LH Ford and Emile Serisier Bridges both requiring action to be taken.

Figure 5.3.4 Stressed Traffic Conditions – 2030 am Peak Both Bridges

Whereas with both bridges built, the 2030 conditions show similar conditions to 2025 with pressure building in the Health and Education Precinct (Cobbora Road).

This is addressed for 2040 but returns as an issue in 2050 (See Section 5.4.2).

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5.4. 2030 to 2040 – 20 Year Investment Program

New residential growth is expected to occur mostly in the South West (1,250 dwellings) and the South East (800 dwellings), with small developments in the Central West (250 dwellings) and North West (200 dwellings). Infrastructure for the South East is complete with the 10 to 20 year program of works concentrating mostly on a strategic link in the Central West (Projects 22 and 23) and residential grid roads in new development. The strategic link successfully spreads the newly generated traffic away from the LH Ford Bridge and across to North Bridge.

TABLE 5.4.1 10 - 20 YEAR (2030 - 2040) TRANSPORT INFRASTRUCTURE PROGRAM							
10 to 15 Years 2030 - 2040							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
17	Grangewood Drive Extension Stage 1	Residential Grid	1	50km/h	Only Local Traffic		\$ 1,658,000.00
UP4	Existing Street Upgrades					Item cost potential - City circulation.	\$ 2,000,000.00
18	Greenway - Chapmans Road					Opening forest.	\$ 550,000.00
15 to 20 Years 2035 - 2040							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
20	River Street West Extension Stage 1	Strategic Network	4	60km/h	Commercial Integrator	Could have access to school.	\$ 4,140,000.00
21	Mitchell Highway Upgrade	Strategic Network	Upgrade	60km/h	Existing		\$ 3,000,000.00
22	Central West Spine Road Stage 1	Future Strategic Option	2	60km/h	Urban Edge		\$ 6,132,000.00
23	River Street West Extension Stage 2	Future Strategic Option	2	60km/h	Urban	Draws traffic to North Bridge.	\$ 2,414,000.00
24	Central West Link Road Stage 1	Residential Grid	1	50km/h	Only Local Traffic		\$ 2,438,000.00
25	Keswick Collector Roads	Residential Grid	1	50km/h	Only Local Traffic		\$ 3,900,000.00
UP5	Existing Street Upgrades						\$ 2,000,000.00
26	Greenway - Central West Stage 1						\$ 844,000.00
27	Greenway - Main Western Railway Crossing						\$ 280,000.00

Table 5.4.1 lists the projects that are required to accommodate traffic by 2040. This is displayed in two parts, a 10 to 15 year list, requiring budgeting in the next few years, and a 15 to 20 year list where no action is required, unless of course development occurs ahead of the schedule used in this analysis.

Entries in Blue and Green in the list are potential for a future Section 7.11 plan, Orange is an estimate for the upgrade of existing streets. The style of street is described in Section 4.1. See Figure 5.4.1 for the location of these projects.

Selecting some projects for more comment:

Project 17 – Grangewood Drive Extension Stage 1 – The extension of Grangewood Drive is part of the residential grid and not expected to increase traffic on the existing road. This route is expected to serve a future school but not in this stage of construction.

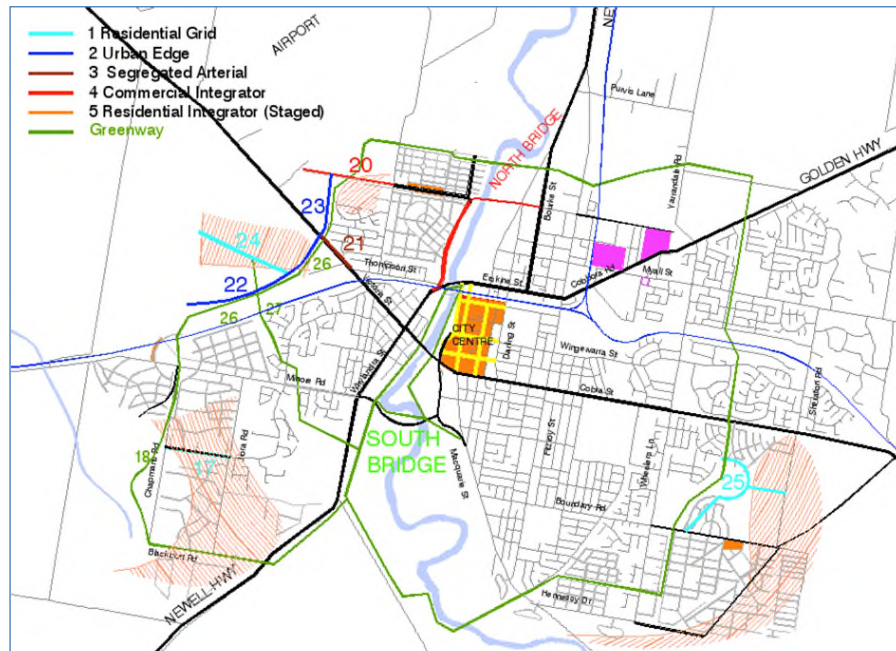
Project 18 – Greenway – Chapmans Road – Also in the same area, this extension of the Greenway needs to be planned and will open up the remnant forest to be set aside near Chapmans Road.

Project 19 – Chapmans Road Main Western Railway Crossing – A link off Chapmans Road over the railway to the Central West Sector (and Project 22) has been delayed until after 2040, mostly as a cost saving

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measure but also because it does not carry sufficient traffic to impact on West Dubbo. Nevertheless, it would advantageous to 'set' the travel pattern between the South West and River Street.

Figure 5.4.1 2040 – 10 to 20 Year Infrastructure



Project 20 – River Street West Extension Stage 1 – The extension of River Street is required to access the Central West Spine Road (Projects 22 and 23). It is likely to serve a future school.

Project 21 – Mitchell Highway Upgrade – Upgrading of the Mitchell Highway has been allocated to new residential development (item cost \$3 million). This could perhaps be allocated to non-residential development with the cost saving going towards Project 19 (\$4.8 million). As can be seen from this discussion, there will be alternatives to discuss in 5 years.

Project 22 – Central West Spine Road Stage 1 – The Central West Spine Road is a strategic road. This section through the Central West from the Mitchell Highway to Rosedale Road has been 'located' so that it is paralleled with Project 26 – Greenway Central West Stage 1. Master planning could indicate other more environmentally sensitive options. Also, the alignment may not actually be contained within the development assumed to be occurring in this area. Hence Project 24 is possibly longer than will be required at the time.

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Project 23 – River Street West Extension Stage 2 – A separate project extending the Central West Spine Road to River Street. This could be the subject of a detailed land use plan including the intersection at the Mitchell Highway and the potential 'lookout' at the drive-in cinema.

Project 24 – Central West Link Road Stage 1 – This Project illustrates how the residential grid itself forms a connective network in the same way as the existing residential grid in Dubbo.

Project 25 – Keswick Collector Roads – The Keswick Collectors have been 'on the plan' for about 20 years and are strategically orientated to disperse traffic from Keswick Estate without putting pressure on any one of the access roads.

Project 26 – Greenway – Central West Stage 1 – The aforementioned Green Ring is almost completed.

Project 27 – Greenway – Main Western Railway Crossing – Is the last Greenway connection for the Delroy Loop.

The upgrading of existing streets are again not specifically identified. It could be anticipated that circulation is again subject to change as the benefits of Bligh Street are recognised throughout the City. The growing employment in the Health and Education Precinct plus some levels of stress could trigger a circulation plan for this area.

Figure 5.4.2 Stressed Traffic Conditions 2040 am Peak



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The measures taken to move traffic north and south across the new Western Sectors has taken pressure off the three river crossings.

Meanwhile, the slow growth in demand from the South Eastern and Eastern Sectors maintains the levels of stress in Cobra Street and Fitzroy Street but does not overload these links, indicating that previous infrastructure has set up a long term solution. Stress around the Dubbo Base Hospital continues.

TABLE 5.4.2 10 - 20 YEAR TRANSPORT INFRASTRUCTURE COST 2030 - 2040			
	Road Infrastructure in new areas	100,000's \$23,681	
	Dubbo Greenway Infrastructure	\$1,674	
2500 Dwellings	Cost Per Dwelling		\$10,142
	Existing Network Upgrades	\$4,000	

The estimated cost for all works attributed to dwellings in new areas for this decade is \$25,355,000, or \$10,142 per dwelling.

Costs for upgrading existing streets, possibly in the City and Heath and Education Precinct are not known, but nominated as \$4 million. Interestingly, the existing intersections throughout the City are not reporting an additional delays. This may not be the case for individual developments however.

5.5. 2040 to 2055 – 35 Year Investment Horizon

The pattern for new development between 2040 and 2055 (20 to 35 years) is entirely to the west and it is assumed that development will keep as close as possible to the City Centre. Hence; the North West is built out with 1,550 new dwellings; the first major expansion occurs in the Central West (900 dwellings); and a slow continuation in the South West (600 dwellings).

New links are orientated to continue the dispersal of traffic after the year 2055 and start to concentrate demand on new employment and activity Hubs, possibly along a linear extension of River Street. This of course will be reviewed in, say, 2025 when 2055 on will be the new 20 year plan.

The program includes:

Project 19 – Chapmans Road Main Western Railway Crossing – Reallocated from the 2030 2040 projects.

Project 37 – Southern Link Road Stage 2 – Including the second Main Western Railway crossing between the South Western and Central Western Sectors.

Projects 28 and 35 – Grangewood Drive Extension and **Blackbutt Road Extension Stage 2** – Further extensions of Grangewood Drive and Blackbutt Road.

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Project 29 – Central West Link Road Stage 2 – Continuation of the Central West Link Road.

Projects 30 and 31 – Northern City Access Road and Riverside Boulevard Stage 3 – Both projects with the North Western Sector.

Projects 36 and 38 – Southern Link Road Stage 1 and Northern Link Road Stage 1 – Creating a continuous connection between Blackbutt Road and the Central West Link Road.

TABLE 5.5.1 20 - 35 YEAR (2040 - 2055) TRANSPORT INFRASTRUCTURE PROGRAM							
20 to 25 Years 2040 - 2045							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
19	Chapmans Road Main Western Railway Crossing	Future Strategic Option	5.1	60km/h	Residential Integrator Stage 2	Provision of railway bridge crossing.	\$ 4,764,000.00
28	Grangewood Drive Extension	Residential Grid	1	50km/h	Only Local Traffic		\$ 1,950,000.00
29	Central West Link Road Stage 2	Future Strategic Option	5.1	60km/h	Residential Integrator Stage 1	Option for 3 carriageways as Type 4.	\$ 2,243,000.00
30	Northern City Access Road	Residential Grid	1	50km/h	Only Local Traffic		\$ 3,900,000.00
31	Riverside Boulevard Stage 3	Future Strategic Option	2	60km/h	Urban Edge		\$ 5,106,000.00
UP6	Interenal Street Upgrades					Item cost not identified.	\$ 2,000,000.00
32	Greenway - North West Stage 2					Green Ring complete.	\$ 238,000.00
33	Greenway - Central West Loop						\$ 550,000.00
34	Greenway - Central West Railway Link						\$ 544,000.00
25 to 35 Years 2045 - 2055							
Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
35	Blackbutt Road Extension Stage 2	Residential Grid	1	50km/h	Only Local Traffic	Draws traffic away from Minore Road.	\$ 975,000.00
36	Southern Link Road Stage 1	Future Strategic Option	5.1	60km/h	Residential Integrator Stage 1	Option for 3 carriageways as Type 4.	\$ 1,944,000.00
37	Southern Link Road Stage 2	Future Strategic Option	5.1	60km/h	Residential Integrator Stage 1	Increases significance after 2050.	\$ 2,990,000.00
38	Northern Link Road Stage 1					Increases significance after 2050.	\$ 4,186,000.00
UP7	Internal Street Upgrades					Item cost not identified.	\$ 4,000,000.00
39	Greenway - Buddens Creek						\$ 669,000.00

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Figure 5.5.2 Stressed Traffic Conditions 2055 am Peak



The modelling reports stress in the usual places on Cobra Street, and a critical situation in Caroline Street (Heath and Education Precinct).

Stress also returns to the LH Ford Bridge and occurs for the first time on North Bridge.

These two signs indicate a fifth Macquarie River crossing will be required on or around 2055; 30 years after South Bridge and North Bridge have been built.

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Figure 5.5.1 2055 – 35 Year Infrastructure

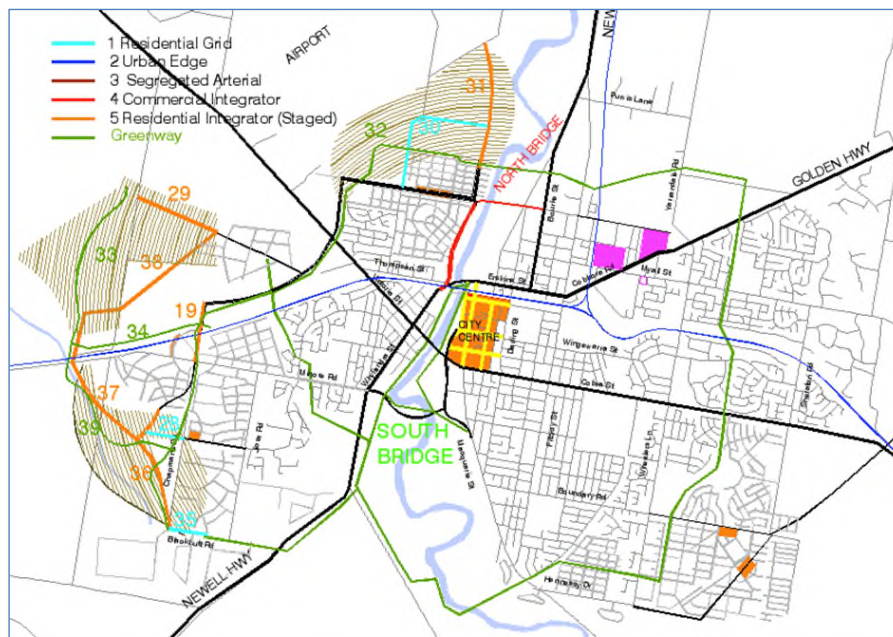


TABLE 5.5.2 20 - 35 YEAR TRANSPORT INFRASTRUCTURE COST 2040 - 2055		
	Road Infrastructure in new areas	100,000's
	Dubbo Greenway Infrastructure	\$28,056
3050 Dwellings	Cost Per Dwelling	\$9,855
	Existing Network Upgrades	Not Known

The estimated cost per new dwelling in the 20 to 35 year period (Table 5.5.2) indicates a level of investment per dwelling of \$9,855, almost exactly the same as the 2020 – 2030 estimate. These figures include Greenway costs.

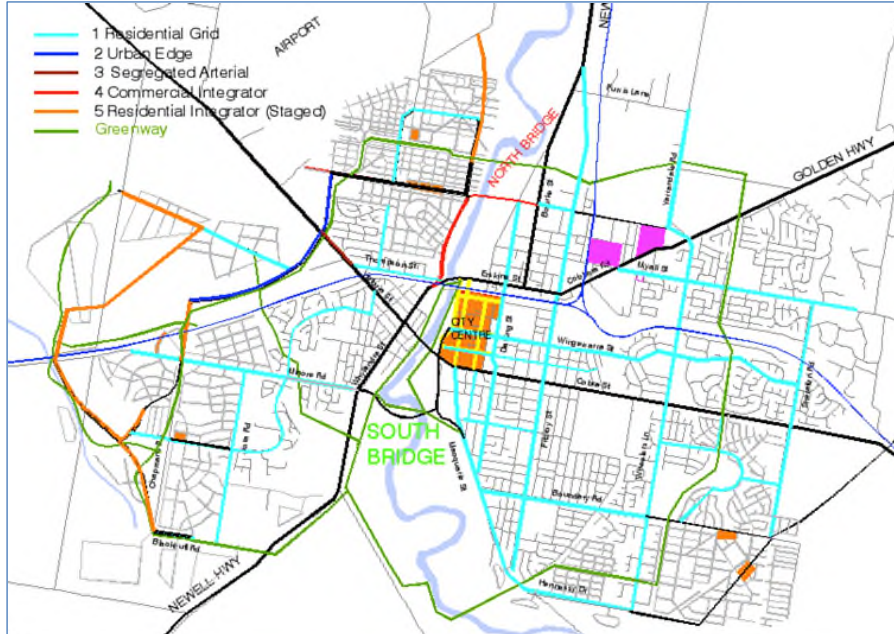
We can confidently conclude that the modelling has confirmed the rate of new infrastructure required by a time period over the next 35 years, subject to changes in the scale of development or possibly the location of development. For example; additional development in the South East might force consideration of a new, highly costly Southern Bypass that has not been considered for this or the previous Strategic Transport Plan.

This development scenario concludes with a Road Hierarchy (Figure 5.5.3) that look similar to the existing road hierarchy, consisting of extensive new residential grid road and an expanding strategic network.

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This scenario is extended to long-term development (Section 5.7).

Figure 5.5.3 The 2055 Road Hierarchy



The second reality check is to summarise infrastructure costs per time period (Table 5.5.3). They are balanced.

	Total Cost of Infrastructure	RMS Funded	Existing Rd Upgrades	Council Funding	Construction in new Areas		Houses built	Cost per New Dwelling
					Greenways	Roads		
2020 - 2030	\$124,807,280	\$68,690,880	\$6,340,000	\$24,956,000	\$4,509,000	\$20,311,400	2500	\$9,928
2030 - 2040	\$29,355,000	0	\$4,000,000	0	\$1,674,400	\$23,680,600	2500	\$10,142
2040 - 2055	\$36,056,600	0	\$6,000,000	0	\$2,000,500	\$28,056,100	3050	\$9,855
CW and SW	\$102,301,500	Potential	\$16,395,500	\$0	\$5,754,000	\$80,152,000	8050	\$10,672

The Central Western and South Western Figures are derived later in Section 5.6.

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5.6. Goals Achieved

The report started by setting out the aims of the transport network.

In response these proposals:

Allow for the population to increase by 17,000 new residents whilst:

- Maintaining the 10 minute City.
- Resolving current issues on the LH Ford Bridge.
- Continuing to provide the high level of amenity for access throughout Dubbo.
- Providing the flexibility for movement without concentrating traffic.
- Providing new residents with the same level of amenity as the existing areas.
- Avoiding increasing the capacity of Cobra Street to maintain it as a mixed commercial residential street.
- Keeping the cost of new infrastructure to within \$10,000 per new dwelling.

5.7. Towards 100,000

The final question is how the 2055 proposal will fit into the continuing extension of the residential areas. Figure 2.4 shows how development in the next 35 years will fill the South Eastern and North Western Sectors to capacity and that there will be capacity for a further 8,000 dwellings at the current density of development in the South West and Central West. Estimates get a bit open ended in this time frame, and are certainly not suitable for conclusive modelling. The more important planning question is; will the form of infrastructure accommodate additional population after 2055?

The following exercise looks at urban form and, as a reality check, costs the infrastructure and the indicative cost per new dwelling in the same manner as the analysis to 2055.

Continuity defines how roads are used. In a perfect grid, everyone tries to go by the shortest route but tend also to avoid make turns, particularly right turns. A grid network tends to concentrate demand at the centre of the network. The concept for Dubbo is to create two series of roads that offer direct no-turn paths over long distances. One is the traditional grid system serving the City Centre and a second series of roads are orientated to draw demand away from the City Centre. Figure 5.7.1 illustrates these.

The traditional grid for the City Centre includes:

- 1 The southern edge of the Mitchell Highway.
- 2 The northern edge from Thompson Street to Cobbora Road.
- 3 The eastern edge of Fitzroy Street to the Mitchell Highway.
- 4 The western edge of Whylandra Street.

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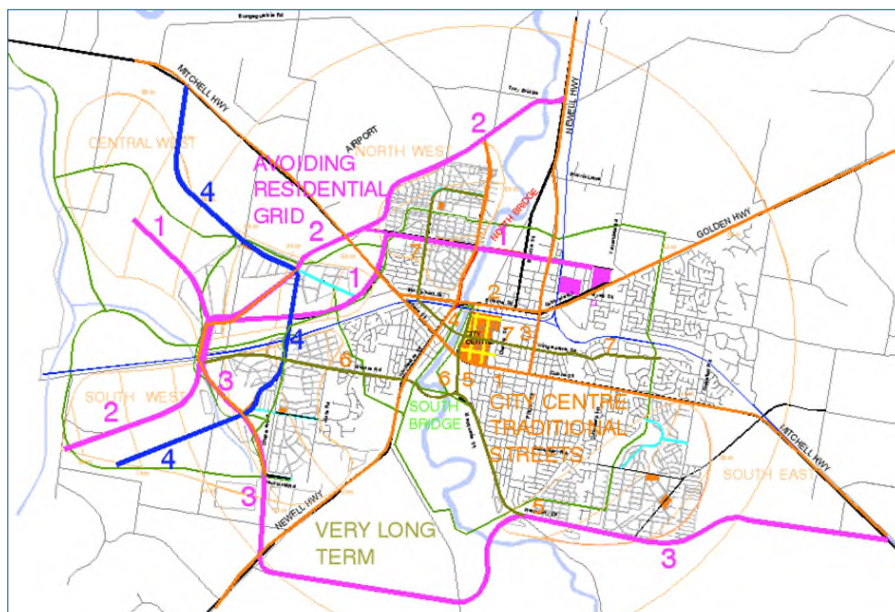
Using any of these streets leads to the opportunity to make one turn into the circulation road in the City Centre.

Three additional roads have been added to increase the capacity of access to the City Centre:

- 1 Bligh Street with direct no-turn access from the South East.
- 2 South Bridge with direct no-turn access from Minore Road and the South West.
- 3 And or around 2055, a bridge at Wingewarra Street across the Macquarie River providing a secondary direct link from Wingewarra Street, possibly through West Dubbo and via Bumblegum Road to the North West.

In conclusion, the City access network provides a substantially increased capacity, well beyond that needed for the growth of the City. This relieves some capacity on the existing roads for additional trips.

Figure 5.7.1 Long term Strategy



The second series of long roads all originate in the Western Sectors. Four long streets, preferably designed with different identities, aim to draw traffic away from the residential grid.

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These new continuous roads are:

- 1 The River Street axis, with a change of orientation to the south west and without a turn.
- 2 The Northern Link Road, orientated to the north and continues north possibly onto the Northern Bypass.
- 3 The Southern Link Road, orientates to the south at the Newell Highway and possibly onto the Southern Bypass.

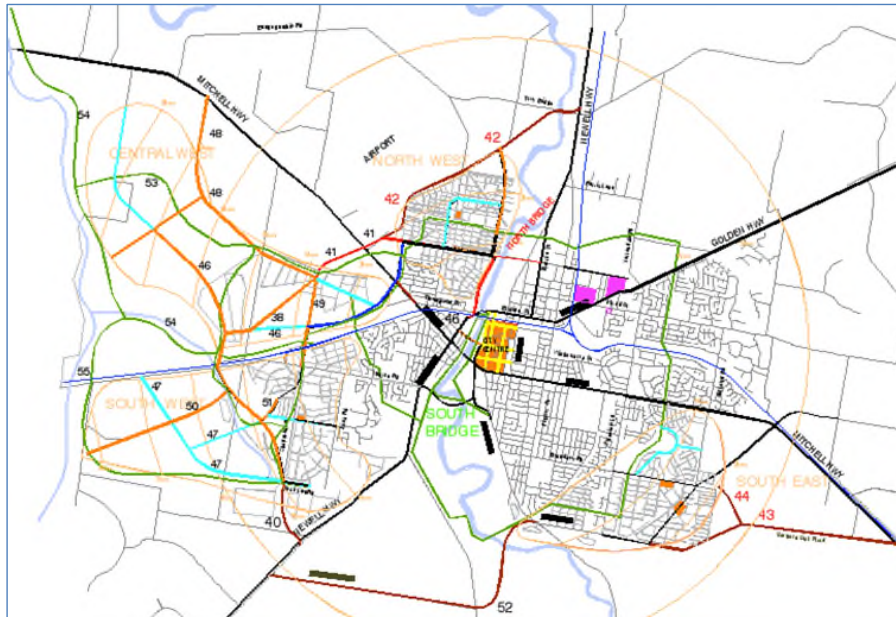
These three roads have been focused on the Main Western Railway crossing between the Central Western and South Western Sectors. This could vary, but it indicates how a powerful position could be created for a future activity centre.

- 4 The Chapmans Loop, a continuous street between the Central West and the South West providing legibility and accessing Roads 1, 2 and 3 along the way.

This is only an exercise but in the final part of this analysis, this concept was costed using the same road styles as earlier work (Figure 5.7.2).

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Figure 5.7.2 Indicative Long Term Projects



The 2055 demand indicates that the 'Bypasses', Projects 42, 43 and 52 may only have a marginal benefit and are not viable. Whereas some of the third carriageways of already constructed Integrators in the South West and Central West (Project 56), might be required.

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Project	Name	Purpose	Design	Style	Design Description	Comment	Cost
37	Expansion of South West Link Road	Future Strategic Option	5.2	60km/h	Residential Integrator Stage 2	Option for central carriageway.	\$ 3,588,000.00
38	Expansion of Central West Link Road	Future Strategic Option	5.2	60km/h	Residential Integrator Stage 2	Option for central carriageway.	\$ 3,588,000.00
40	Southern Link Road Stage 3	Strategic Network	3	80km/h	Segregated Arterial	Connects to Southern Bypass.	\$ 4,324,000.00
41	Northern Link Road Stage 2	Future Strategic Option	5.2	60km/h	Residential Integrator Stage 2	Second connection to River Street.	\$ 2,392,000.00
42	Northern Link Road Stage 3	Strategic Network	HOLD	100km/h	Segregated Arterial	Option for Newell Highway.	\$30,217,000.00
43	Southern Bypass Stage 1	Strategic Network	HOLD	100km/h	Segregated Arterial	Option for Mitchell Highway.	\$ 9,750,000.00
44	Boundary Road Extension Stage 3	Residential Grid	HOLD	50km/h	Segregated Arterial	Alternative to Blueridge Link Road.	\$ 1,658,000.00
45	Wingewarra Street Bridge	Strategic Network		40km/h	Slow Street in City	Could reduce traffic on Cobra Street.	\$16,396,000.00
46	Central West Spine Road Stage 2	Future Strategic Option	5.2	60km/h	Residential Integrator Stage 2	Option for central carriageway.	\$11,063,000.00
47	South Western Residential Grid	Residential Grid	1	50km/h	Only Local Traffic		\$ 7,027,000.00
48	Central West Link Road Stage 3	Future Strategic Option	5.2	60km/h	Residential Integrator Stage 2	Option for central carriageway.	\$10,764,000.00
49	Chapmans Road Northern Extension	Residential Grid	1	50km/h	Only Local Traffic	Provision of second railway bridge crossing.	\$ 4,020,000.00
50	Northern Link Road Stage 4	Residential Grid	1	50km/h	Only Local Traffic		\$ 8,580,000.00
51	Chapmans Road Southern Extension	Future Strategic Option	5.1	60km/h	Residential Integrator Stage 2	Option for central carriageway.	\$ 748,000.00
52	Southern Bypass Stage 2	Strategic Network	HOLD	100km/h	Segregated Arterial	Alternative to Mitchell Highway.	\$51,605,000.00
53	Greenway - Central West Spine					Cross rivers connection complete.	\$ 1,910,000.00
54	Greenway - Whylandra Creek Stage 1					Central Western loop complete.	\$ 2,344,000.00
55	Greenway - Whylandra Creek Stage 2					South Western loop complete.	\$ 1,500,000.00
56	South and Central Western Integrators	Strategic Network	5.3	80km/h	Add Third Carriageway	Selection in South and Central Western Sectors (project number not shown in Figure 5.7.2)	\$24,066,000.00

Whilst the analysis is of no consequence for the conclusions reached for 2055, it is reassuring to note that the cost per new dwelling remains around \$10,000, indicating a viable extension of the investment until 2055 (Figure 5.7.2). And a project such as the Wingewarra Street Bridge would cost a further \$2,000 per dwelling. Of course, this will be attributed to upgrading the existing areas and not new development (Figure 5.7.3).

Conclusion - South Bridge provides a stable network that can grow without further intervention until 2055.

				100,000's
8050 Dwellings	Road Infrastructure in new areas		\$80,152	
	Dubbo Greenway Infrastructure		\$5,754	
	Cost Per Dwelling			\$10,672
	Strategic Network (See HOLD)		\$43,535	\$5,408

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TABLE 5.6.3 FLEXIBILITY FOR ADDITIONAL PROJECTS	
2055 Plus	
	100,000's
8050 Dwelling Completed	
A	
Include Wingewarra Crossing 2040 - Ultimate (More likely to be internal)	
Wingewarra	\$16,396
Additional Cost per Dwelling	\$2,037
Current Plan	\$10,672
Total	\$12,708
Additional	19%

5.8. Next Steps

The short-term conclusion from the long-term form for Dubbo is that the decision to build North Bridge has strengthened three Enterprise Zones. The Health and Education Precinct, the Airport Precinct, and the Riverside Precinct. These need to be enhanced by legible, purpose built, uniquely identifiable, road connections.

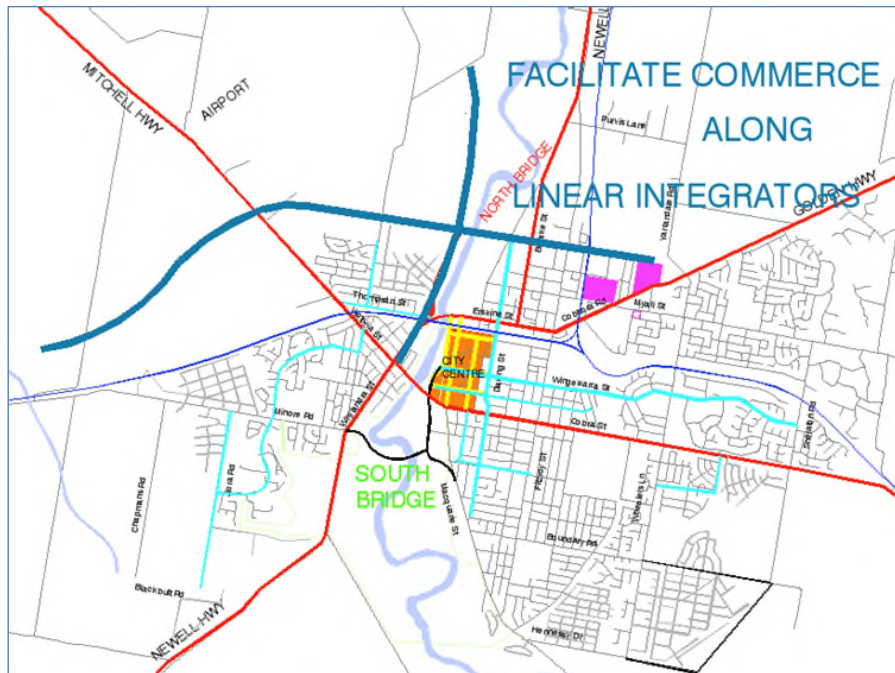
The River Street commercial axis will inevitably extend across the Mitchell Highway.

The next step is to identify how this axis will work in the short-term whilst North Bridge is being constructed; in the medium term as the North Western Sector develops and the axis becomes a Commercial Integrator; and in the long term as it extends and will become a recognisable commercial focus.

Conclusion – This alignment needs to be protected now. As does the Riverside Boulevard.

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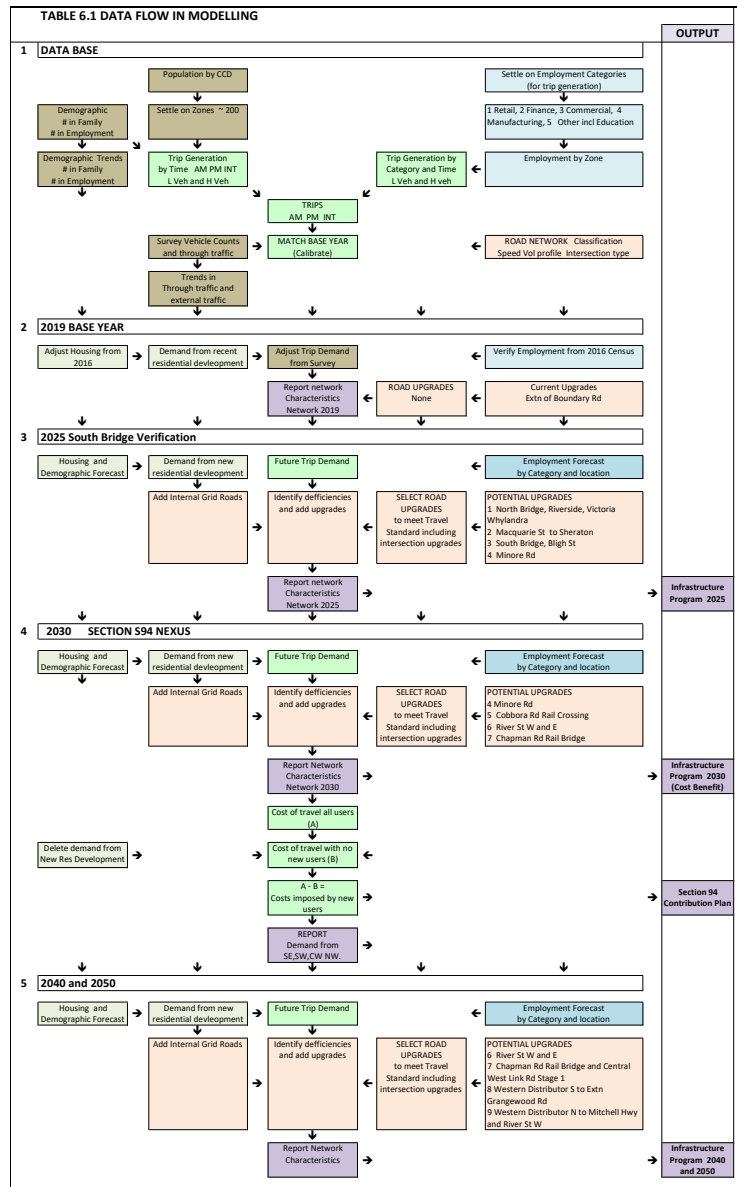
Figure 5.8 Key Links to Protect



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6. DATA ANALYSIS

6.1. Modelling Process



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6.2. Transport Task

In the following tables, reference letters have been attached to each Network; for example, D/C means results from D divided by results from C. The recommended Network for each time period is in **red text**.

Selected results are listed in Tables 6.2, 6.3, 6.4 and 6.5. How the transport task will change is described below and summarised in Table 6.2.

NETWORK		TABLE 6.2 TRANSPORT TASK							
		VEHICLE TRIPS			TOTAL DISTANCE ALL TRIPS			TOTAL TIME	
		DAILY TRIPS	TRIPS per PERSON	AM Peak Trips	DAILY Veh Kms	AM PEAK Veh Kms	DISTANCE per TRIP km	ALL TRIPS DAILY Veh Mins	AM PEAK Veh Mins
2018 Base	A	177,999	4.79	18,657	810,330	89,337	4.91	1,086,495	119,444
2025 Do Minimum	B	194,014 109%	4.77 99.6%	20,961 112%	950,960 117%	106,646 119%	4.90 100%	1,292,071 119%	146,467 123%
2025 Base - No Bridges	C	194,014		20,961	949,688 117%	106,383 119%	4.89 100%	1,289,163 119%	145,817 122%
2025 North Bridge only	D	194,014		20,961	946,272 117%	106,137 119%	4.88 99%	1,286,166 118%	144,904 121%
2025 Both Bridges	E	194,014		20,961	945,713 117%	106,023 119%	4.87 99%	1,268,503 117%	142,513 119%
2030 Base - No Bridges	F	205,758 116%	4.74 99.0%	22,452 120%	1,015,400 125%	114,477 128%	4.93 101%	1,382,881 127%	157,134 132%
2030 North Bridge only	G	205,758		22,452	1,012,111 125%	113,900 127%	4.92	1,377,087 127%	155,908 131%
2030 Both Bridges	H	205,758		22,452	1,014,462 125%	115,684 129%	4.93 100%	1,362,291 125%	155,974 131%
2040 Both Bridges	I	221,363 124%	4.55 94.9%	24,569 132%	1,128,163 139%	128,595 144%	5.10 104%	1,521,805 140%	174,824 146%
2055 Both Bridges	J	244,075 137%	4.43 92.6%	27,246 146%	1,260,177 156%	145,172 162%	5.16 105%	1,716,290 158%	200,731 168%

6.2.1. Daily and Peak Hour Trips

Currently on average, each person in Dubbo makes 4.79 trips per day; a total of 165,000 trips by residents per day in Dubbo. A further 12,900 trips are made in and through Dubbo by external traffic (Table 6.7). Note the figures used in the text are rounded for ease of reading, the actual results from the model are contained in the tables. Of these, 18,600 trips are made in the peak hour.

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The number of trips made per person is reducing due to demographics and therefore the number of trips to be handled by the transport network does not rise in direct proportion to population. Daily trips are expected to rise by 37% to 244,000 trips per day in 2055. The varying proportions in the type of employment are altering the proportion of trip made in the morning peak hour. Demand in the peak period is expected to rise by 46% to 27,200 trips per hour.

6.2.2. Distance Travelled on Network

The gradually increasing size of Dubbo is increasing the distance travelled per trip; it is currently 4.91km per trip and is expected to rise to 5.16km per trip by 2055. Hence the total vehicle kilometres will rise by 56% in the period to 2055 and by 62% in the peak period.

This is the basic input to the model.

6.2.3. Time Spent on Network

Output from the model finds that the number of minutes travelled per day will increase from 1.1 million minutes to 1.7 million minutes, a 58% increase in time. The rise is consistent through the years. Morning peak hour travel will increase by 68%. This is due to more trips to accommodate and not as a result of congestion.

6.3. Network Performance

A selection of Performance Indicators are described below and listed in Table 6.3.

6.3.1. Minutes per Trip

Dubbo is described as the 10 minute City and the current average trip time is 6.58 minutes. Thinking of a distribution of trips, the majority of journeys are indeed less than 10 minutes.

This is an ideal performance indicator for the future networks.

The output from the model shows the average time hardly varying through to 2030 as demand increases by 25%. The average time increases (by a mere) 18 seconds (4%) by 2040, mostly as a result of the greater area of development. The same applies to 2055 when most development is occurring 5 to 6km west of the City Centre and the average time increases 7% to 7.03 minutes.

Conclusion – the Land Use and Transport Strategy are successful.

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NETWORK		TABLE 6.3 NETWORK PERFORMANCE							
		Ref	MINUTES	Difference	COBRA St		AVERAGE SPEED		
			per TRIP Min	from 2018 Sec	Time Min	Difference from 2018 Sec	AM Peak kmph	Day Period kmph	PM Peak kmph
2018 Base	A	6.58			6.93		44.9	44.7	44.7
2025 Do Minimum	B	6.66 101%	4.7	▼	7.08 102%	9	43.7 97%	44.3 99%	44.1 99%
2025 Base - No Bridges ,	C	6.64	3.8	▼	7.00 101%	4.2	43.8	44.3	44.1
2025 North Bridge only	D	6.63	2.9	▼	7.01 101%	4.8	43.9	44.3	43.8
2025 Both Bridges ,	E	6.54 99%	-2.6	▼	6.98 101%	3	44.6 99%	44.8 100%	44.7 100%
2030 Base - No Bridges	F	6.72	8.4	▼	7.06 102%	7.8	43.7	44.2	44.0
2030 North Bridge only	G	6.69	6.7	▼	7.03 101%	6	43.8	44.2	44.0
2030 Both Bridges	H	6.62 101%	2.4	▼	7.03 101%	6	44.5 99%	44.7 100%	44.7 100%
2040 Both Bridges	I	6.87 104%	17.6	▼	7.05 102%	7.2	44.1 98%	44.6 100%	44.3 99%
2055 Both Bridges	J	7.03 107%	27.0	▼	7.13 103%	12	43.4 97%	44.3 99%	43.9 98%

6.3.2. Time on Cobra Street

Of more local concern to some would be the 'Green Bars' seen consistently along Cobra Street. A specific measurement was taken from a point near Wheelers Lane along Cobra Street to a point near Macquarie Street (This includes some time getting to and from Cobra Street). The current time during the morning peak is 6.93 minutes. Without further action but with the increased population, the time would increase by 2% by 2030 but with both bridges in operation, the time increases by 1% or 6 seconds. This shows the sensitivity of the model to very small changes in traffic conditions, as reported in the 'Stressed Sections' diagrams.

And even when many parts of the road network will be operating with some difficulty in 2055, the increase in time along Cobra Street is only expected to be 3% or 12 seconds, well below the average increase in time throughout Dubbo (17 seconds).

Conclusion – the Strategy to draw traffic away from Cobra Street is successful.

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6.3.3. Average Operating Speed

On a broader scale, the average speed of trips indicate the overall condition of travel in Dubbo. Currently, is it 44.9 km/h in the morning peak and 44.7 km/h in the afternoon peak and during the day. This is a very comfortable average speed that would be envied by most small towns let alone large metropolitan areas. The little to no difference between peak, and off-peak average speed is also a selling point to the amenity of Dubbo.

These average speeds are not expected to vary by more than 1% to 3 %, an almost immeasurable difference that could be attributed to minor causes.

Conclusion – the amenity to move about Dubbo easily is not being compromised by development.

6.4. Costs and Savings

NETWORK		TABLE 6.4 INVESTMENT PERFORMANCE				
		COST			SAVING	
		Annual Cost				
		Vehicle \$	Time \$	Total \$		
	Ref				From	Annual \$
2018 Base	A	\$73,150,000	\$128,160,000	\$201,310,000		
2025 Do Minimum	B	\$85,840,000	\$152,410,000	\$238,250,000	Base 2025	
				118%		
2025 Base - No Bridges	C	\$85,730,000	\$152,070,000	\$237,800,000	No Bridges	
,				118%	B - C	\$450,000
2025 North Bridge only	D	\$85,420,000	\$151,720,000	\$237,140,000	North Bridge Only	
				118%	D - C	\$660,000
2025 Both Bridges	E	\$85,370,000	\$149,630,000	\$235,000,000	Addition for South Bridge	
,				117%	E - D	\$2,140,000
2030 Base - No Bridges	F	\$91,660,000	\$163,120,000	\$254,780,000	Base 2030	
				127%		
2030 North Bridge only	G	\$91,360,000	\$162,440,000	\$253,800,000	North Bridge Only	
				126%	F - G	\$980,000
2030 Both Bridges	H	\$91,580,000	\$160,700,000	\$252,280,000	Addition for South Bridge	
				125%	H - G	\$1,520,000
2040 Both Bridges	I	\$101,840,000	\$179,510,000	\$281,350,000		
				140%		
2055 Both Bridges	J	\$113,760,000	\$202,450,000	\$316,210,000		
				157%		

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6.4.1. Vehicle Costs and Time Costs

The cost estimates use 2016 ABS data of 30.09 cents/km for vehicle operating costs and 39.22 cents per minute for the value of time when travelling. These are average figures that should be equally applicable in Dubbo.

Due to the stability of the length of travel time and the distance travelled, the cost of travel in Dubbo will increase at near to the same rate as the number of trips increases (This is somewhat different to a typical cost/benefit discussion for metropolitan infrastructure where travel time-saving are usually dominant).

The travel cost savings are calculated from the small time savings between schemes (networks). Hence, for 2025, the costs of C, the No Bridges network that does have all other grid road against B, the do-minimum where traffic is simply loaded onto the existing network, show a saving of \$450,000 per annum.

Conclusion – the residential grid roads have an economic benefit and are not uni-functional local distributor roads.

6.5. Traffic Flows

The model reports the hourly and daily flows between each intersection for every street in the Networks (Figure 3.1 indicates the density of streets included in the Model). Those streets that help explain the analysis are listed in Table 6.5 and are more simply described in the text below. Existing residential streets are not listed when they generally follow a pattern of little or no change or changes in flows of streets in new areas that are simply proportional to new development.

Green	Identified in the Stress Diagrams (described earlier).
Light Orange	Warning conditions; could be coming critical and action is needed.
Darker Orange	Double warning.
Olive green	Flow decreased.
Blue	Large increase in time period.
Red Text	Recommended scheme.

Five groups of results have been selected for their relationship to each other.

6.5.1. Traffic Crossing Macquarie River

The demand for crossing the Macquarie River sets the timing for new crossings. But the location of a new crossing needs to attract demand from the crossings that are congested.

Currently 36,800 vehicles per day (VpD) cross the Macquarie River; 19,500 or 53% using the LH Ford Bridge; and 17,300 using the Emile Serisier Bridge.

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The completion of North Bridge by 2025 will only attract 10% of crossing traffic, mostly from the Emile Serisier Bridge (down to 38%), with only a 1% difference at the LH Ford Bridge.

South Bridge on the other hand, would attract 18% of crossing traffic in 2025 and 2030 reducing demand on the LH Ford Bridge to 40%. Daily traffic on the LH Ford Bridge would reduce to 17,700 VpD and stress free in 2030 (Network H).

By 2040, the road configuration in the west, combined with additional employment along the Enterprise Axis, has drawn 15% of demand to North Bridge and 24% to South Bridge. The total demand has lifted from 36,800 VpD, existing to 57,800 VpD that is conveniently spread over the 4 crossings. The LH Ford Bridge is operating at the same demand as currently and therefore starting to experience stress (even though this is not showing up in the statistics) (Figure 5.4.2).

The further concentration of development in the Central West and North West through to 2055 will increase the proportion of crossing on North Bridge to 18% and a reduction in the proportion elsewhere (LH Ford Bridge from 34% to 31%, Emile Serisier Bridge 28% to 27%, and South Bridge 24% to 23%. Both the LH Ford Bridge (21,000 VpD) and North Bridge (12,500 VpD) are under stress (Figure 5.5.2). But with the LH Ford Bridge having slightly less demand than 2025 without South Bridge.

Conclusion – the Strategy maximises the use of new infrastructure.

It is also evident from these figures that a new crossing in the central part of the City, a continuation of Wingewarra Street, would reduce traffic on the LH Ford Bridge and Cobra Street around 2055. And, combined with a link through West Dubbo to the North West Sector (Figure 5.7.1), could possibly take just enough pressure off River Street at Cobbora Road to ease demand on North Bridge.

Other features of the statistics are that if nothing were to be done by 2030, the LH Ford Bridge would be operating at High Stress, requiring immediate attention. Whereas with North Bridge and South Bridge, the LH Ford Bridge will be carrying 9% less traffic than today.

6.5.2. South End

The South End group addresses the sensitivity of traffic intrusion into South Dubbo.

The intention of the new connectivity is to draw a small part of the demand generated in the South Eastern Sector from Boundary Road into Hennessy Drive and thence the southern part of Macquarie Street, the historic entry into Dubbo.

Boundary Road is currently carrying more than twice the demand on Hennessy Drive (counted in Survey).

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Between 2018 and 2030, traffic is expected to double on Hennessy Drive (107%), close to the current flow in Boundary Road, and traffic in Boundary Road is expected to grow by 42%.

Conclusion - the orientation of streets in the South East to Hennessy Drive shows that the upgrade of Bligh Street to Macquarie Street south will be successful.

Traffic on Bligh Street, without the traffic from South Bridge, is expected to grow by over 100 %. (Network G). The addition of South Bridge will add a further 100% of current traffic, all located away from residential areas.

Referring to the recommended network for 2030 (Network H), traffic is expected to increase in the next 12 years by 108% on Hennessy Drive and 45% on Boundary Road, both remaining well within their environment and carrying capacity. The demand will increase gradually after 2030 on these two streets.

Demand on Bligh Street will continue to absorb the increase in traffic between the South West and the City Centre, 29% between 2030 and 2040, and 12% thereafter.

The figures in Network D and Network E illustrate the proportion of movements between South Bridge, Macquarie Street south, Bligh Street and South Dubbo, that will continue to have access south of Tamworth Street.

Without South Bridge, 780 vehicles per hour (vph) are using Boundary Road to enter South Dubbo and 495 vph are using Hennessy Drive. Of these, 450 vph are using Bligh Street, some from both origins, some from South Dubbo itself.

With the addition of South Bridge, the volumes on Boundary Road hardly change (810 vph from 780 vph) and do not change in Hennessy Drive (495 vph). The demand on Bligh Street increases by 380 to 830 vph.

Traffic volumes on the link between South Bridge and Macquarie Street south are estimated at 715 vph. This comprises traffic accessing South Bridge or Bligh Street by residents in South Dubbo, and traffic from Hennessy Drive and Boundary Road.

With a maximum of 495 vph from Hennessy Drive and a change of only 25 vph in Boundary Road, the conclusion is that $715 - 495 - 25 = 195$ trips accessing South Bridge originate in South Dubbo. Some, maybe half, may originate north of Cobra Street and north of Fitzroy Street. This is balanced by the outgoing flows, indicating some locals would find Cobra Street easier for some destinations not used today.

In summary, currently South Dubbo accommodates (Network A) some 800 though trips per hour; with the development of the South East, this will increase to 1,300 vph without the construction of South Bridge and increase by as little as a further 100 vph with South Bridge built and connected as proposed.

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Conclusion – South Dubbo will gain more convenient access via South Bridge than it will experience from additional through-traffic.

6.5.3. West End

The West End group in Table 6.5 indicates how the roads in West Dubbo will perform.

The intent of the Strategy was to draw traffic generated in the three Western Sectors away from this area, thereby allowing commercial development to occur. There are two elements to this area, the Mitchell Highway and south along the Newell Highway.

The manner in which traffic has been drawn away from key congestion is demonstrably noted on the Mitchell Highway where the increase at West Dubbo is consistently less than the increase in total demand.

This dispersal of traffic is also achieved on the Mitchell Highway at Thompson Street where the need to widened the section from Thompson Street to Westview Street is averted until 2040. This is in spite of a spike in growth west of Westview Street (31% by 2030 and a further 18% by 2040) due to the development of the Airport Precinct. Traffic is dispersed to River Street and North Bridge.

Demand for the Riverside Boulevard north of Thompson Street starts at some 4,700 VpD in 2025, mostly generated by development in the North West and grows in proportion to this Sector, 16% in the decade 2030 to 2040 and 30% following, still well within the capacity of this road.

Conclusion - if it were not for its use by Highway traffic, the design of the Riverside Boulevard could be moderated to one more suited to the riverside.

Predictions of traffic on the Newell Highway will vary greatly depending on the construction of strategic infrastructure. Without South Bridge, demand south of Victoria Street will increase 28% in the next few years, responding to development in the South West. With the addition of South Bridge, demand in 2030 will drop by 16% from 14,800 VpD to 12,400 VpD, without South Bridge 19,000 VpD. This will grow back in 2040 to 15,400 and possibly 17,200 in 2055, all very doable for 4 lanes, albeit possibly carrying highway traffic through an active commercial area.

Further south beyond Minore Road, the Newell Highway is the only route serving development from the southern parts of the South West to access South Bridge or any other parts of Dubbo, hence demand will grow in line with development.

The key contributor in accommodating the growth of the South West is Minore Road. This is the only access suitable for east west movement south of Victoria Street and the Main Western Railway Line. Traffic is expected to increase by 55% in the next 12 years (2030).

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The 2030 demand of 9,100 VpD can hardly be handled by two lanes.

Minore Road will provide direct access to South Bridge and hence will experience an increase of 71% in the decade 2030 to 2040, the highest increase on any road and a further 23% before 2055. By this time, the demand is expected to be 19,100 VpD (Currently 5,900 VpD), a similar demand currently in Cobbora Road. It can carry this demand in 4 lanes but amenity will be seriously affected.

Conclusion – Minore Road is the only route to serve the expansion and the increase in demand requires it to be 4 lanes. This move has been avoided for all other existing streets in Dubbo.

Conclusion – The design of the upgrade must address pedestrian movement, particularly schools in the area.

Minore Road will also serve development west of Chapmans Road, and this can be handled with a lower key residential grid road, with other links taking the bulk of the load.

6.5.4. North End

There is less certainty and more opportunity in the North End where the Health and Education Precinct will provide a focus for additional employment, attracting trips from all directions.

The impact of North Bridge and extension of River Street is indicated by the 60% increase in 2025 (Network D) and also reflected by the decreases in Cobbora Road, Bourke Street and Fitzroy Street north of Erskine Street; a transfer of 2,700 VpD. Bourke Street and Fitzroy Street are two streets that are predicted to carry less traffic in 2055 than in 2018. At the same time, demand on River Street continues to increase until the Link to Cobbora Road (Caroline Street) exceeds capacity in 2055 (not shown in Table 6.5) and River Street is also stressed (9,800 VpD 2055). (Triggers for capacity vary with the style of street; 9,000 VpD is on the edge for an active retail street.)

This also explains why the intersection of Fitzroy Street and Erskine Street does not have as ongoing issue, and why the volume in Fitzroy Street south of Erskine Street can increase slightly without further issues.

Conclusion - further management options should be available in and around North End and will become essential in the long term. Perhaps a short-term solution could solve long-term issues.

6.5.5. East End

Finally, East End describes how the existing grid changes.

Wingewarra Street is a 'second levell Residential Grid carrying a respectable 10,000 VpD that parallels and is complementary to Cobra Street, offering a direct line into the City Centre for its local residents.

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Increases are gradual and below average, indicating a balanced existing network, (and no growth in the locality).

Cobra Street has similar growth which, given that it is the most direct path serving the expansion of the South East, indicates that newly generated traffic is successfully dispersed (Hennessy Drive in South End). Nevertheless, Cobra Street will experience a slower speed than most other streets in Dubbo, (Table 6.3). The actual increase in the peak hour volume is small currently, 1,852 vph (two way) to 2,027 vph in 2025, an additional 180 vehicles per hour does not trigger an increase in stress. A further increase of 100 vph between 2030 and 2040 also has no impact. You might think the model is assuming driving will become more tolerant or skilled or autonomous, but the same measure of stress has been applied for the future. The peak hour flow for 2055 is predicted as 2,219 vph, 20% greater than today. The reason there is no change is that the time (Table 6.3) is only 3% greater than today, or an increase of 12 seconds. This does not register as a failure but is a reminder that travel conditions do not change in direct proportion to demand.

The same small changes are predicted in Fitzroy Street south of Erskine Street that also reports a low level of stress through to 2055. The demand changes between 2025 and 2030 (1,698 to 1,834 vph) but is stable thereafter.

A lesson that leaving something alone that just works is often the answer. This rule has been the approach for the Dubbo Transportation Strategy; optimise the network, don't overspend, and don't concentrate only on traffic flow, but also amenity.

Conclusion – assuming travel modes are similar to today, residents moving around in 35 years' time will be experiencing similar conditions to today's easy ways. A fine legacy for transport planning.

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TABLE 6.5 SUMMARY OF TRAFFIC FLOWS																					
Group	Section of Street	2018				2025				2030				2040				2055			
		Network A		Network C		Network D		Network E		Network F		Network G		Network H		Network I		Network J			
		Daily	AM Peak	Daily	AM Peak	Daily	AM Peak	Daily	AM Peak	Daily	AM Peak	Daily	AM Peak	Daily	AM Peak	Daily	AM Peak	Daily	AM Peak		
RIVER CROSSING																					
	LH Ford Bridge	19510	1948	21787	2119	22610	116%	2278	17662	1693	23718	2320	22980	118%	2218	17690	91%	1641	2075	106%	2104
	Emile Senior Bridge	17283	1888	21683	2452	16389	96%	1726	13908	1524	19870	2128	19990	93%	1651	13135	76%	681	1846	117%	2048
	North Bridge					4332	574		4231	569			5296	679		5322		820	12464	168%	1686
	South Bridge								7679	799						8115		820	13762	170%	1484
	Total Crossing River	36793	3846	43470	4571	43331	4578	43540	43588	4448	44266	4548	44266	4550	47763	44962	4550	4550	57807	6274	67763
SOUTH END																					
	Hennessy East of Margaret	2269	285	4137	494	4110	181%	496	4109	494	4470	541	4705	207%	564	4711	108%	563	5043	107%	616
	Boundary East of Margaret	4938	529	7191	818	6952	141%	785	7109	811	7163	805	6992	142%	781	7163	145%	799	7545	108%	849
	South Bridge at Macquarie St								7253	715						7619		744	9530	123%	1006
	Bligh St south of Bulgie St	2697	149	5700	450	5694	211%	451	9647	826	5979	486	6049	224%	495	10313	182%	893	13259	128%	1206
WEST END																					
	Mitchell Hwy west of Whylandra St	13100	1381	14656	1266	15142	116%	1483	14481	1387	15311	1475	14885	1405	1485	13957	107%	1294	15358	110%	1528
	Mitchell Hwy west of Thomson St	13906	1518	16039	1796	16113	116%	1806	16130	1812	16295	1841	15650	1758	15678	131%	1360	16295	116%	1598	
	Mitchell Hwy west of Westview St	8311	1003	9706	1211	9729	117%	1209	9743	1215	10580	1322	10847	1337	10868	113%	1360	12688	110%	1607	
	Riverside North of Thompson					4688	117%	625	4643	620	1830	218	4812	559	4979	568	747	574	110%	868	
	Newell Hwy south of Victoria	14784	1593	19394	2200	18964	128%	2117	12288	1452	18932	2075	18975	128%	2084	12411	84%	1413	15348	108%	1808
	Newell Hwy south of Minore	5751	629	6969	765	6969	121%	765	6969	765	7727	813	7727	813	7727	134%	1043	8864	115%	942	
	Minore Rd	5874	672	7259	827	7252	123%	828	8286	932	7673	888	7673	888	888	7127	133%	1043	1097	173%	1810
NORTH END																					
	Cobbora Rd south of White St	19730	2208	22748	2549	19220	97%	2123	19186	2122	20374	2326	20297	2287	20285	2065	155%	2281	21307	105%	2398
	River St East of Fitzroy	4579	480	5103	498	7332	160%	871	7330	871	6887	780	6729	808	6723	147%	809	8288	123%	996	
	Bourke North of Erskine	4810	470	5557	622	2387	59%	238	2390	238	3498	365	3172	298	3116	65%	296	3247	104%	314	
	Fitzroy St North of Erskine	8166	904	10109	1139	5580	88%	661	5582	661	5818	711	6572	783	6560	80%	782	6840	100%	808	
EAST END																					
	Cobra St east of Fitzroy	19046	1852	20873	2063	20642	108%	2047	20430	2011	21137	2086	21099	2082	20935	110%	2057	21028	104%	2153	
	Mitchell Hwy east of Sheraton Rd	8937	862	9124	886	9231	103%	893	9229	893	10575	1075	10572	1074	10572	118%	1074	10028	98%	1019	
	Wingewarra east of Fitzroy	10075	826	12159	1067	10326	102%	887	10277	877	10830	946	11151	961	11081	102%	949	11358	102%	1006	
	Fitzroy South of Erskine	16894	1703	18655	1890	16500	88%	1696	16524	1700	17295	1815	17811	1836	17764	105%	1834	18007	100%	1823	

2020 DUBBO TRANSPORTATION STRATEGY

6.6. Surveys

The study commenced with a large survey of existing traffic, required to estimate external traffic and to calibrate the model of internal traffic. The proportion of through-traffic was surveyed using number plate recognition at entry/exit points to the study area.

The survey separated traffic into heavy vehicles, multiple axles, and light vehicles.

Full results of this survey have been lodged with Council.

Table 6.6 summarises the results of the number plate recognition survey for through-traffic. The Newell Highway south has the highest proportion of through-traffic at 23%. This was matched with 13% of through-traffic at the northern entry of the Newell Highway (13%). The difference in through-traffic reflects the proportion of regional residents living north and south of Dubbo. The proportion of through-traffic on other Highways also reflects the importance of regional access, only 4% of traffic on the Golden Highway is through-traffic, 5% on the Mitchell Highway to the west and 7% on the Mitchell Highway to the east. These figures are consistent with regional population.

EXTERNAL ROAD	TOTAL TRAFFIC			THROUGH TRAFFIC (1) Heavy Vehicles					(2) Light Vehicles				(3) TOTAL	
	Total Daily Traffic	Peak AM	PM	Heavy Vehicles	% Thru Daily Survey	Night Total	% Night	Heavy daily Through	Light Vehicles	Small Trucks	% Thru Daily Survey	Light Daily Through	Total Daily Through	% Daily Total
1 Mitchell Hwy Bumblegum W	2881	384	219	172	10%	19	11%	34	2424	285	4%	100	134	5%
2 Newell Hwy Troy Crossing	3201	183	307	455	33%	117	26%	227	2505	241	7%	195	422	13%
3 Golden Highway Mayfield Rd	1427	91	147	93	17%	18	19%	31	1205	129	2%	25	55	4%
4 Mitchell Hwy Eulomoga	3818	525	270	195	11%	60	31%	75	3366	257	5%	183	257	7%
5 Newell Hwy Camp St	1578	111	83	359	49%	100	28%	227	1087	132	11%	135	361	23%
	1294	1026		1274		314		593	10587	1044		637	1230	
	12905	10%	8%	10%		2%		5%	82%	8%			10%	
				681	To from Dubbo	%	48%	10994	To from Dubbo	52%				
				53%	% Non Through	Total Thru Trips		95%	% Non Through	Total Thru Trips				

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REPORT: Naming of Thoroughfare associated with Development Application D2017-460 - Tenandra and Barbical Streets, Wongarban

DIVISION: Development and Environment
REPORT DATE: 23 October 2024
TRIM REFERENCE: ID24/1936

EXECUTIVE SUMMARY

Purpose	<ul style="list-style-type: none">Seek endorsementFulfil legislated requirement	
Issue	<ul style="list-style-type: none">Naming of the newly constructed public road adjoining Lots 184 and 186 DP754321 and Lot 1 DP1257721, Tenandra and Barbical Streets, Wongarban.	
Reasoning	<ul style="list-style-type: none">Council has received a request from Imrie, Astley and Associates to name a public road located in Wongarban. The public road has been constructed as part of Development Consent D2017-460 Part 4, which was for a subdivision of the land.Section 162 of the Roads Act 1993 and Roads Regulation 2018.	
Financial Implications	Budget Area	There are no financial implications arising from this report.
	Proposed Cost	The cost of the provision of the blade sign and installation would be met by the Proponent Imrie, Astley and Associates.
Policy Implications	Policy Title	Naming of Thoroughfares and Other Geographical Features within the City of Dubbo; and the Geographical Names Board NSW Addressing Policy.
	Impact on Policy	The proposed road name has been considered in accordance with the above policies.

STRATEGIC DIRECTION

The Towards 2040 Community Strategic Plan is a vision for the development of the region out to the year 2040. The Plan includes six principal themes and a number of objectives and strategies. This report is aligned to:

Theme: 2 Infrastructure

CSP Objective: 2.1 The road transportation network is safe, convenient and efficient

Delivery Program Strategy: 2.1.1 Traffic management facilities enhance the safety and

efficiency of the road network

Theme:	2 Infrastructure
CSP Objective:	2.1 The road transportation network is safe, convenient and efficient
Delivery Program Strategy:	2.1.5 Council works collaboratively with the government and stakeholders on transport-related issues

RECOMMENDATION

1. That the road name as proposed, being Bragg Street be approved by Council as per the road layout plan.
2. That the proposed road name be notified on Council’s website for a period of 14 days and provided to Government Authorities in accordance with Section 162 of the Roads Act 1993 and Part 2, Division 1 of the Roads Regulation 2018.
3. If no objections are received, the proposed road name of Bragg Street be provided to the NSW Geographical Names Board.
4. If Council receives any objections to the proposed road name, a further report be provided to Council for consideration.

Steven Jennings
Director Development and Environment

KE
LIS and E-Services
Coordinator

BACKGROUND

It is understood that the Bragg family-owned land at Wongarbone, was part of the original property Murrumbidgee. The road is proposed to be named Bragg Street in respect of this association with the history of Wongarbone.

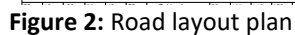
REPORT

A request has been received from Imrie, Astley and Associates to name a public road adjoining Lots 184 and 186 DP754321 and Lot 1 DP1257721, Tendandra and Barbical Streets, Wongarbone, on the north-eastern side (**Figure 1**).



Figure 1: Location of lots 184 & 186 DP754321 and lot 1 DP1257721, Tendandra and Barbical Streets, Wongarbone

The public road has been constructed as part of Development Consent D2017-460 Part 4. A road layout plan identifying the proposed development is shown as **Figure 2**.



The preferred option of Whiteley Street is not suitable due to duplication within the Dubbo Regional Local Government Area.

The second option Bragg Street is suitable and is recommended for approval.

Consultation

- Geographical Names Board – Road Name Eligibility Check, NSW Addressing Policy and Dubbo Regional Council's Policy, Naming of Thoroughfares and Other Geographical Features within the City of Dubbo.
- No potential issues were found.

Resourcing Implications

- Blade signs will be required to be provided at the expense of the Proponent.

Options Considered

- The Proponent listed Whiteley Street as their preferred option, Bragg Street as their second option and Rutherford Street as their third option.

- Whiteley Street is not acceptable due to duplication within the Dubbo Regional Local Government Area.

Preferred Option

- Due to Whiteley Street not being suitable, their second option Bragg Street is recommended, which complies with NSW Addressing Policy and Dubbo Regional Council's Policy, Naming of Thoroughfares and Other Geographical Features within the City of Dubbo.

Planned Communications

- Public notification will be undertaken through Council's Yoursay engagement platform for a period of 14 days. Council will advise authorities in accordance with the Roads Regulation 2018.
- Council's website and NSW Place and Road Naming Proposal System.

Next Steps

- If no objections are received from the general public and authorities, the proposed road name will move forward for gazettal by the NSW Geographical Names Board.
- If Council receives any objections to the proposed road name, a further report will be provided to Council for consideration.