



Transport
Roads & Maritime
Services

New Dubbo Bridge

Options report



May 2016

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Executive Summary

Dubbo, in central west NSW, has two major highway bridges crossing the Macquarie River. Combined, Emile Serisier Bridge on the Newell Highway and LH Ford Bridge on the Mitchell Highway carry around 37,500 vehicles per day over six lanes.

Emile Serisier Bridge is often closed when it is impacted by flooding. When Serisier Bridge is closed, all Newell Highway traffic uses a flood detour route that includes LH Ford Bridge and local roads. The two-lane LH Ford Bridge doesn't have the capacity to carry this traffic and Dubbo experiences long traffic delays in a flood.

Two strategic documents have highlighted the need for a new high level bridge in Dubbo. Transport for NSW's Newell Highway Corridor Strategy includes an improved flood route as a strategic outcome. Dubbo Council's Transportation Strategy also highlights the need for a second high level bridge.

The NSW Government has committed to duplicating LH Ford Bridge as part of an overall Newell Highway Upgrade Program. Roads and Maritime has started planning for a new bridge.

Apart from flooding impacts, Dubbo has other factors which influence where Roads and Maritime should build a new bridge, including:

- Restricted heavy vehicle load limits on LH Ford Bridge
- Growing local traffic demand from Dubbo's residential growth
- Local traffic delays at key highway intersections.

Duplicating LH Ford Bridge may not be the best way to solve Dubbo's traffic and flooding problems.

Roads and Maritime has developed six broad corridors for public comment. These six corridor options all have positives and negatives when considering all factors. The corridors, from north to south, include:

- Purvis Lane
- River Street
- Myall Street
- LH Ford Duplication
- Baird Street
- Tamworth Street.

Feedback on these options will, along with traffic, environmental and other studies help inform which options would best address Dubbo's needs. Roads and Maritime would further develop these options to confirm a new bridge location by late 2016.

Project context

A Newell Highway Corridor Strategy was published in 2015 which outlined the future direction for the highway and where corridor improvements could be made. Within a Dubbo context, the two key goals from that strategy included allowing Performance Based Standards (PBS) class 3(a) vehicles along the entire Newell Highway, and providing increased flood immunity for Newell Highway traffic.

In 2015 the state government announced an overall \$500 million commitment to a Newell Highway Upgrade Program which includes pavement upgrades, overtaking lanes and town bypasses along the entire Newell Highway. Within this program, \$50 million was committed to duplicating LH Ford Bridge over the Macquarie River in Dubbo.

Dubbo Council has advocated for a duplicated LH Ford Bridge since they released their Transportation Strategy to 2045. This report outlined a proposed program of road upgrades and new roads to support Dubbo's growth over the long term. The strategy also stated that Council considered the best location for a new high level bridge was next to the current LH Ford Bridge as it provided the shortest flood plain crossing.



Aerial view of Dubbo

Existing network

Dubbo is the major centre for NSW's central west region. Dubbo is found at the intersection of three major NSW highways:

- Newell Highway connecting Victoria to Queensland as a main north-south route through Dubbo. The Newell Highway is currently a road train route north of Dubbo
- Mitchell Highway connecting the central west region including Orange and Bathurst, via Dubbo, to Narromine and through to Broken Hill and South Australia
- Golden highway connecting Dubbo to Newcastle and the NSW north coast via the Hunter Valley.

The Golden Highway connects from north-eastern Dubbo and so doesn't cross the Macquarie River, however both other highways have a bridge crossing.

The Newell Highway crosses the river over the Emile Serisier Bridge which is a four lane bridge. Emile Serisier Bridge is also a low level bridge which is regularly at least partially covered by flood water. Serisier Bridge carries around 18,500 vehicles each day, including about 12.5% heavy vehicles.

The Mitchell Highway crosses the river over LH Ford Bridge. LH Ford Bridge is a two lane bridge carrying around 19,000 vehicles per day including around 7.5% heavy vehicles. LH Ford Bridge is a high level bridge which is not subject to flooding.

A third bridge across the river exists north of Dubbo over Troy Bridge. This bridge, on Troy Bridge Road, is a low level bridge on a local road and is not generally used by local or highway through traffic. When Serisier Bridge floods Troy Bridge also floods.

When Serisier Bridge is closed, all traffic is diverted across LH Ford Bridge and past Dubbo's CBD causing major traffic delays. It is reported that during the last major flood in 2010, residents waited up to two hours to cross the bridge.

Figure 1 over shows Dubbo's major road network and highway river bridges. The Golden Highway extends east of the Newell Highway in North East Dubbo and the Mitchell Highway extends over LH Ford Bridge to the east.

Figure 1 also shows Dubbo's other major roads, including Thompson Street connecting the Mitchell Highway to the Newell Highway near Serisier Bridge. Thompson Street is a road train route allowing these larger vehicles to travel from the west, across the river and north along the Newell Highway. The other main road is Darling Street which is a major local road connecting along the eastern side of the CBD. Darling Street crosses the railway line and remains open during a flood where other local road connections under the railway are closed.

Traffic using Dubbo's three highways can broadly be categorised into one of three types with each traffic type having different needs.

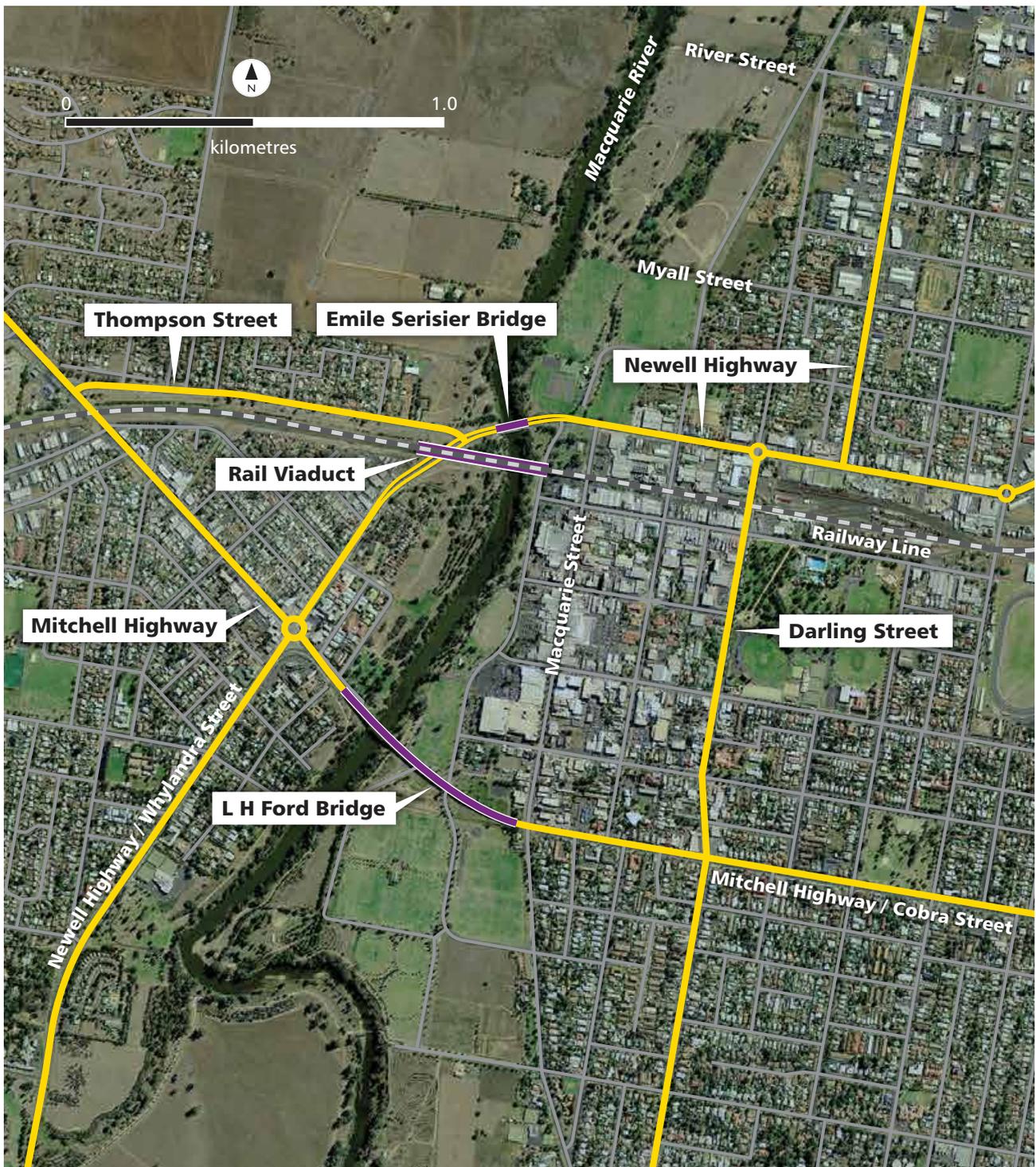
Highway through traffic not stopping or only stopping for a short time in town would be best served by a more efficient route avoiding the main centre of town. This traffic type is dominated by heavy vehicles but also includes light vehicles travelling through.

Secondly, out of town visitors including tourists, business travellers and freight servicing Dubbo has different requirements. It needs an efficient way to get to town but also to get to a destination within town.

Thirdly, local traffic including commuters to the Central Business District (CBD), school trips and shopping trips needs an improved access between West Dubbo and East Dubbo. Many West Dubbo residents work and shop in East Dubbo as East Dubbo holds a majority of schools and larger shopping centres.

Finding a preferred option for a new bridge must balance each traffic types needs to make sure a new bridge benefits all users and not only one group.

Figure 1 Dubbo network



Constraints

Bridge Flooding

Macquarie River flooding in Dubbo is somewhat regulated by Burrendong Dam upstream. The dam is designed for irrigation and also flood mitigation as it restricts the peak flood water flow to reduce the impacts to Dubbo. The negative of restricting the peak flow is that flood water is released over a longer period. Flood impacts are therefore felt for long periods. In 2010, Serisier Bridge was closed to traffic for around two weeks to allow flood water to pass and bridge cleaning and inspections to occur.

During a flood, Serisier Bridge can be under more than 3m of water. Apart from highway traffic, local traffic is also impacted during a flood as Serisier Bridge and the Newell Highway provide a northern entry point to the CBD. With the Newell under water, all these vehicles must access Dubbo's CBD either from the south or east, increasing demand on local roads.

Roads and Maritime is planning for a new bridge is to improve traffic issues during a flood in Dubbo. As outlined above, when Serisier Bridge is flooded, all traffic is diverted across the river via LH Ford Bridge. This means, allowing for an overall reduction in traffic volumes during a flood, that around 35,000 vehicles cross the bridge each flooding day.

East of LH Ford Bridge, flood traffic follows a detour to the east along the Mitchell Highway to Wheelers Lane. This route is also only one lane in each direction with median turning lane providing local accesses. During a flood, council installs traffic control measures to ban right turning movements onto and off the highway as well as banning cross-highway traffic. This results in a "gun barrel" effect with turning traffic minimised between LH Ford Bridge and Fitzroy Street (two blocks east of Darling Street).

The flood detour route (figure 2 over) then travels up Wheelers Lane which is a four lane, urban local road between Mitchell Highway and Golden Highway. Once crossing the Golden Highway it continues along Yarrandale Road to re-join the Newell Highway further north at Tory Bridge Road.

This detour adds around 6km to the journey length for north-south Newell Highway traffic. It also has a slower travel speed through multiple intersections and 50km/h urban road environments. The slower travel speed is multiplied by traffic delays during a flood.

The detour also has constraints of its own including three level crossings, a low culvert which itself is subject to flooding and stormwater drainage problems also impacting the route.

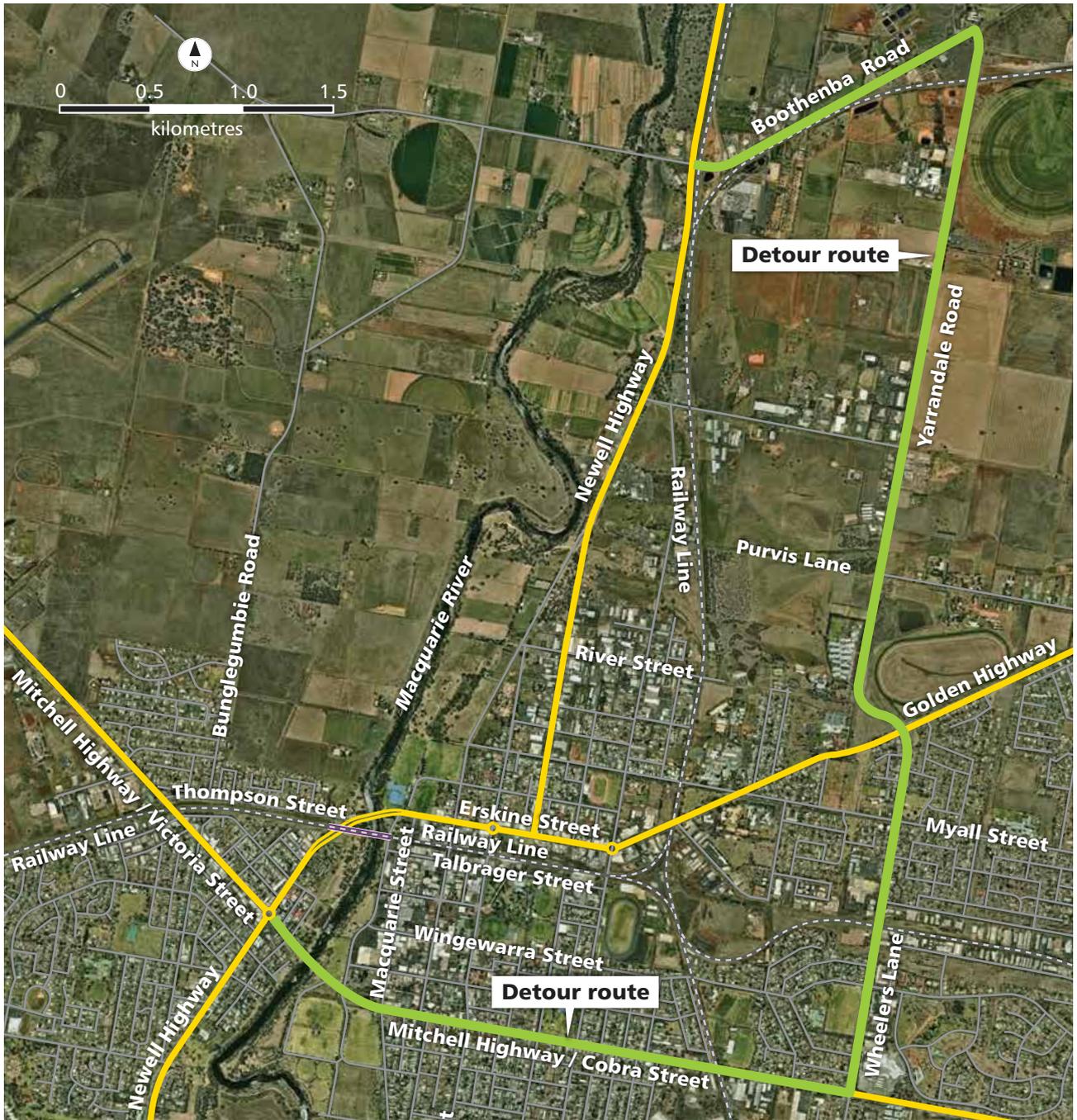
Removing these constraints on the current flood detour route is potentially needed for any corridor option keeping this route (or part of this route) during floods.

Dubbo's Residential Growth

Roads and Maritime is also planning for a new bridge to provide for future traffic expected to come from Dubbo's residential growth areas over coming years. Dubbo Council has released strategies for areas it plans to develop for residential growth. Areas include growth areas in South West Dubbo and North West Dubbo. South West Dubbo is currently growing with many new houses built in recent years. North West Dubbo is expected to develop in coming years.

More traffic from both western growth areas is expected to cross the Macquarie River frequently to access central and eastern Dubbo. Roads and Maritime is considering this future traffic to find a preferred new high level bridge location. A new bridge must allow for all traffic as well as traffic during a flood.

Figure 2 Flood detour route



Current LH Ford Bridge

LH Ford Bridge has major structural issues including the central span sagging and under-reinforcement causing cracking. Roads and Maritime has developed bridge strengthening works including two new piers within the river and increased reinforcement. This work is estimated to cost around \$10 million.

Even with this strengthening work completed, the bridge is not capable of supporting loads greater than a Higher Mass Limit B-Double. A new duplicated bridge would support larger vehicles however the load limit on the existing bridge restricts access for larger vehicles currently using the Newell Highway. A flood detour route for these vehicles using LH Ford would therefore be limited to northbound Newell Highway traffic only.

Other Constraints

Mitchell Highway traffic

Increasing traffic capacity crossing the Macquarie River by doubling the lanes over LH Ford Bridge would cause traffic impacts along the Mitchell Highway (Cobra Street) as four lanes merge into two. At a minimum, duplicating LH Ford would likely require widening the Mitchell Highway to four lanes between Macquarie Street and Darling Street. This would likely impact many businesses fronting the highway through reducing access and removing parking.

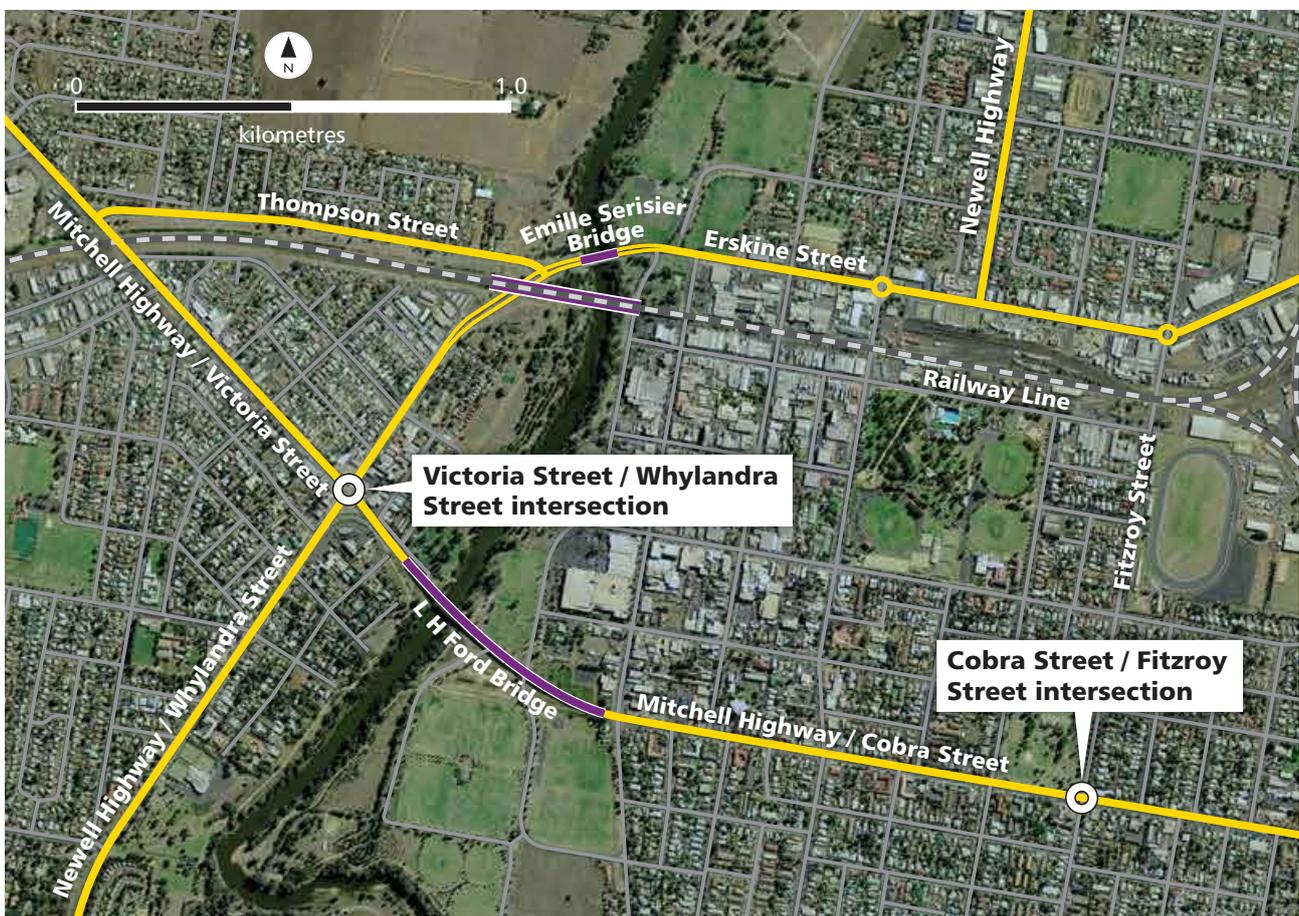
Rail overbridge

A rail overbridge (figure 1) crosses the Newell Highway in West Dubbo, near Serisier Bridge. In major floods, the highway under the overbridge is also under water and so any new bridge corridor near the Thompson Street/Newell Highway intersection must include other improvements to ensure traffic can pass through in a flood.

Intersection upgrades

Across Dubbo, other intersections are planned for upgrading over coming years. In separate projects, up to three roundabout intersections are planned to be upgraded to traffic lights in coming years. Two higher priority intersections are at Victoria Street (Mitchell Highway)/Whylandra Street (Newell Highway) and at Cobra Street (Mitchell Highway)/Fitzroy Street (figure 3). A third roundabout intersection is at Erskine Street (Newell Highway)/Darling Street, however this intersection is a relatively lower priority compared with the other two.

Figure 3 Intersection upgrades



Preliminary options

Council's Transportation Strategy was released in 2012 and outlined a future road strategy for Dubbo. This strategy provides council's response to growing development areas around Dubbo, including North West and South West growth sectors. It also includes a proposed "freightway" ring road to allow an alternative heavy vehicle route away from central Dubbo. The strategy also mentioned eight different locations for a new high level bridge outlined in figure 4 over:

1. River Street
2. Myall Street
3. Next to Serisier Bridge linking Thompson Street and Erskine Street
4. Opposite Talbragar Street
5. Connecting to Wingewarra Street in the CBD
6. A duplicated LH Ford Bridge
7. Cobra Street to East Street
8. Minore Road to Tamworth Street.

In identifying its preferred option, the strategy considered factors including whether or not a new bridge would be used by both Newell and Mitchell Highway traffic during a flood, whether or not an option was too far away to attract traffic in "normal" (non-flood) times and whether or not an option would impact local residents. Council's strategy also considered whether or not an option would likely gain state or federal funds based on how close it is to a highway.

Based on this assessment, Council determined LH Ford Bridge duplication as its preferred high level bridge option.

Roads and Maritime designers based preliminary options on Council's options. Council's options have been amended to better suit road design criteria and fit into the road network. Preliminary options developed by Roads and Maritime designers are outlined (from north to south) in table 1 below.

The above Roads and Maritime options were discussed with council staff. From this discussion, Council and Roads and Maritime agreed to six different corridors for further development. The following options (table 2) were discounted as they were not considered to be viable options based on likely impacts to the community.

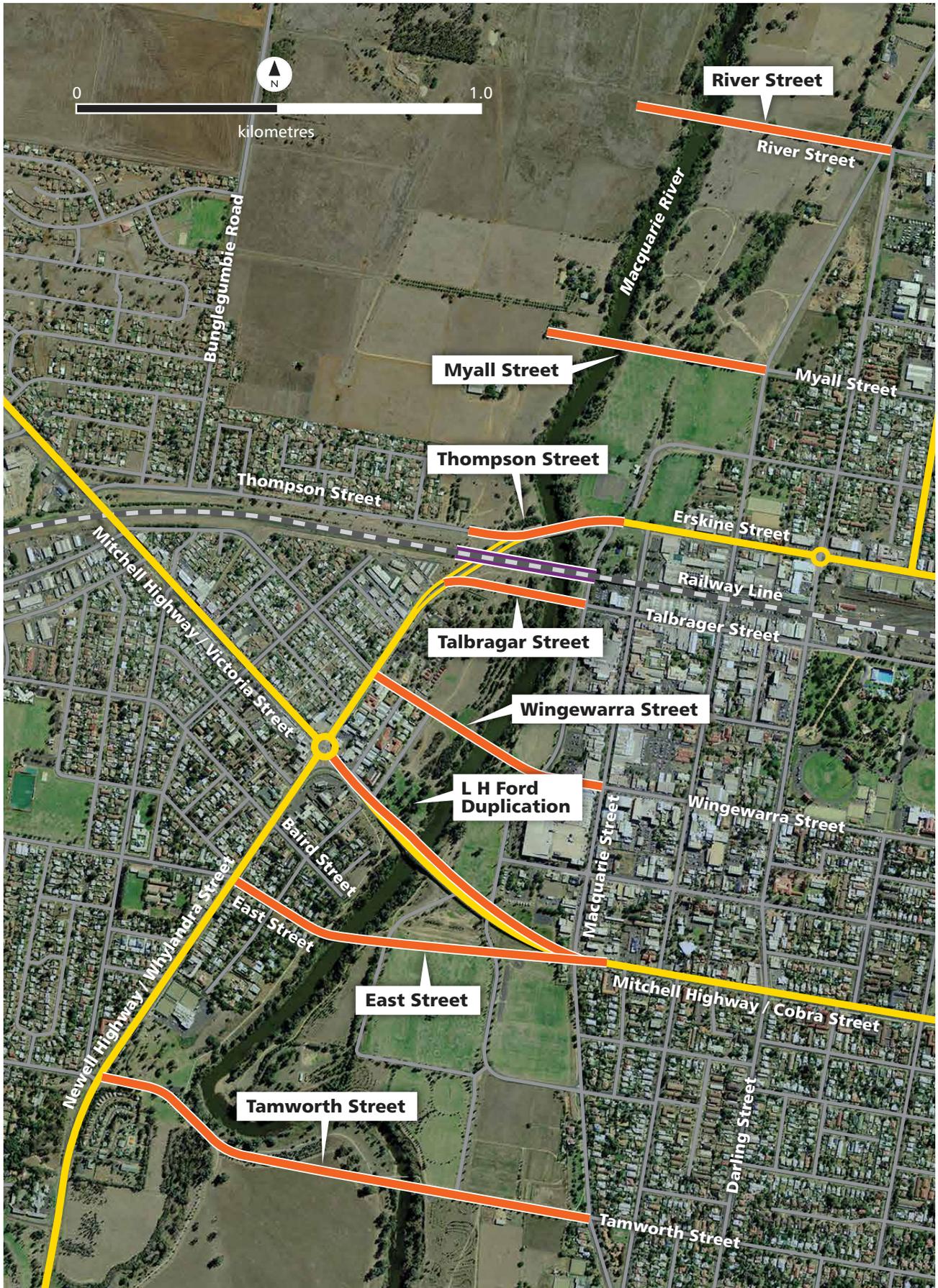
Table 1 Preliminary options

Council Option	Roads and Maritime Option	Comment
No option	Troy Bridge Road	Council compared Troy Bridge Road in their LH Ford Bridge economic analysis. It has been included for early discussion
No high level option	Purvis Lane	Council propose a low level bridge to connect to Purvis Lane to connect to its outer “freightway” proposal. It has been included as a high level bridge
River Street	River Street	Connects via a new road along the western river bank
Myall Street	Myall Street	As above
	Macleay Street	Similar to Council’s Thompson Street option but connecting one block north at Macleay Street
Thompson Street	Thompson Street	No change
Talbragar Street	Talbragar Street	No change
Wingewarra Street	Wingewarra Street	No change
LH Ford Duplication	LH Ford Duplication	No change
East Street	Baird Street	Amended to avoid impacts to Macquarie Street intersection and better connection in West Dubbo
Tamworth Street	Tamworth Street	West Dubbo connection moved south to the golf course instead of Minore Road to allow a straighter bridge.

Table 2 Options not proceeding

Option	Reason for not continuing
Troy Bridge Road	Local traffic not considered to be served by this option as it is too far out of town. Purvis Lane option considered to offer similar benefits closer to town.
Macleay Street	Serisier Bridge would be replaced and connections to CBD would be restricted during non-flood conditions.
Thompson Street	Similar to Macleay Street with even more restrictions on CBD access.
Talbragar Street	Major impacts on CBD property and traffic impacts on local streets during a flood.
Wingewarra Street	Major impacts on CBD property and traffic impacts on local streets during a flood.

Figure 4 Council high level bridge options



Consultation options

Community and stakeholder consultation is expected to start in early May 2016. Consultation allows Roads and Maritime to seek feedback on six broad corridor options. These options are intentionally broad to allow flexibility in design and reduce community expectations of specific design outcomes.

The six corridor options for public consultation are:

Purvis Lane

This option extends from Thompson Street near the Mitchell Highway in West Dubbo and travels along the current Bunglegumbie Road to near Blizzardfield Road. It then turns to cross the river over a new straight bridge and connect with the Newell Highway near Purvis Lane.

This option uses current roads for some of its length however these roads would likely need improving as part of this project. A new river bridge could be shorter than LH Ford, subject to flood investigation. This option would also need intersection upgrades at Thompson Street/Bunglegumbie Road and Newell Highway/Purvis Lane. It would also possibly need improvements to Thompson Street/Newell Highway or Thompson Street/Mitchell Highway.

During a flood, vehicles would travel either westbound along the Mitchell Highway and join the new corridor via Thompson Street eastbound, or would travel westbound along Thompson Street from an improved (and flood protected) Newell Highway intersection.

This corridor option could potentially connect well to Council's "freightway" proposal and provides an outer route for through Newell Highway traffic including heavy vehicles. Local traffic would either continue to use LH Ford Bridge during a flood, or detour north to Purvis Lane and access town via Bourke Street.

Flood access for this route would involve a raised roadway on the western side. On the eastern side, flood access could either continue along an improved Newell Highway, or continue to the current Yarrandale Road detour along an improved Purvis Lane.

River Street

This option continues from Thompson Street near the Newell Highway along a new road following along the western river bank. This new road (in line with Council's Transportation Strategy) would travel north before crossing the river to connect to the Newell Highway near River Street.

Most of this option involves new roads rather than existing roads. A new river bridge may be shorter than LH Ford, subject to flood investigation. This option would need an improved (and flood protected) Thompson Street/Newell Highway intersection in West Dubbo and an improved River Street/Newell Highway intersection in North Dubbo.

Flood traffic would, subject to further investigation, continue along an improved Newell Highway to the north, join the current Yarrandale Road flood detour by travelling south along the Newell Highway, or potentially travel along an extended River Street to the Yarrandale Road intersection near the Charles Sturt University.

This option allows North West Dubbo's growth area to have an efficient link to eastern Dubbo. This option also allows through traffic to avoid Erskine Street on the CBD's northern edge.

Myall Street

Similar to the River Street option above, the Myall Street option follows a new road along the western river bank. It then crosses the river near the northern side of Bob Dowling fields before joining the Newell Highway near Myall Street.

This option would also need an improved Thompson Street/Newell Highway intersection, along with an improved Myall Street/Newell Highway intersection. A connection between Darling Street and Myall Street may provide alternative CBD access to the Newell Highway.

This option could also have a shorter river bridge than LH Ford subject to flood investigation.

Flood traffic with this option would likely turn south along the Newell Highway for two blocks and travel along the Golden Highway to the Yarrandale Road flood detour route.

This option provides similar outcomes to the River Street option, but with closer access to the CBD. This option also allows good access for Dubbo's future north-west growth area. This option may however impact Bob Dowling sporting facilities in North Dubbo, and would likely increase traffic and noise impacts to Myall Street residents.

For both Myall Street and River Street corrido options, an alternative flood traffic solution may be to travel westbound along the Mitchell highway and then eastbound along Thompson Street to avoid a flooded Thompson Street/Newell Highway intersection.

LH Ford Duplication

This option is included as it was not only announced by the government but also is the option closest to current conditions. This option involves building a second bridge next to the current LH Ford Bridge, either upstream or downstream. The new bridge would connect to the Mitchell Highway's current four lanes in West Dubbo and to an improved Macquarie Street intersection. The Macquarie Street intersection would be improved to allow four bridge lanes to connect to Macquarie Street north and south, and Cobra Street.

This option would likely involve extra lanes along Cobra Street/Mitchell Highway to fit extra traffic, particularly in flood conditions. The current flood detour would continue to be used when Serisier Bridge closes.

This option provides two extra lanes across the river next to the current bridge but larger heavy vehicles (e.g. road trains) would not be able to cross due to current bridge weight limits. A flood detour would therefore be in one direction only.

This option would also likely impact businesses and access along Cobra Street as extra lanes would be needed east of Macquarie Street. Impacts could range from losing on street parking, to banning right turns into a property, to possible property acquisition.

If this option is chosen as a preferred location, Roads and Maritime would carry out economic analysis for a new four lane bridge instead of a new two lane bridge. This would be significantly more expensive however removes ongoing maintenance and vehicle restrictions on the current bridge.

Baird Street

This option amends Council's East Street option to improve connections at both ends. In West Dubbo, Baird Street is not as steep as East Street which helps build the bridge. Baird Street also better connects across the Newell Highway to West Dubbo's residential area.

This option connects the Newell Highway in West Dubbo to Macquarie Street near Mitchell Street in South Dubbo. It would involve intersection improvements at Baird Street/Newell Highway and where the new bridge connects at Macquarie Street. Local traffic could either connect to the CBD and Cobra Street along Macquarie Street through an improved Macquarie Street/Cobra Street intersection, or travel along Mitchell Street to Darling Street.

A new Baird Street Bridge would likely be slightly longer than LH Ford Bridge to allow for flood water to flow through.

Baird Street and LH Ford Bridge could operate as twin bridges, with LH Ford becoming eastbound only and the new Baird Street build as a westbound only bridge. This would allow traffic to use one bridge (with two way traffic) while the other is being maintained.

Flood traffic with this option would continue to use the current flood detour route. New bridge traffic would connect to Cobra Street as outlined above. This option would impact sporting fields in Lady Cutler Park as well as impacting residential areas in South Dubbo and West Dubbo.

Tamworth Street

The Tamworth Street option connects from near the golf course in West Dubbo, across the flood plain to Macquarie Street near Tamworth Street. This option would need intersection improvements at both ends.

Compared to Dubbo Council's original proposal, this option has been moved to allow a straighter and more suitable bridge alignment across the river. This option also moves its Newell Highway connection from Minore Road to near the golf course to allow a more efficient and safer intersection. This option is likely to require a longer bridge to LH Ford to allow flood water to flow through.

Flood traffic would cross the new bridge and either continue up Macquarie Street to Cobra Street through an improved intersection, or continue along Tamworth Street to Darling or Fitzroy Streets to connect back to Cobra Street. An alternative, longer term through traffic connection for Council to develop could be an upgraded connection around South Dubbo to Wheelers Lane near Hennessy Drive.

This option would provide an improved connection between South West Dubbo and South Dubbo across the river. During a flood, all traffic including heavy vehicles would cross the new bridge and travel through South Dubbo to re-join Cobra Street and the current flood route. This option would therefore likely impact residential areas in South Dubbo.

Next steps

Roads and Maritime is currently carrying out traffic modelling on each option.

Connections from each option displayed for public comment are to be tested for their relative impact to local traffic. Roads and Maritime is also carrying out an environmental study to find any environmental issues with any option.

The traffic study and environmental report will both be used along with community feedback on strategic corridor options to narrow the options choice to two or three bridge options. These options will then be subject to further analysis including flood testing, economic analysis and investigating other intersection or road improvements needed. A preferred option will then be confirmed by Roads and Maritime with input from Council and major stakeholders in late 2016.



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For more information

 rms.nsw.gov.au/dubbobridge @ newell.upgrade@rms.nsw.gov.au

 1800 741 636

 Roads and Maritime Services, PO Box 36, Dubbo, NSW 2830