NEW ENGLAND HIGHWAY MAITLAND - RAILWAY STATION ROUNDBOAT

Options assessment report:
Determination of preferred option

June 2013
SUMMARY

Purpose

This paper outlines Roads and Maritime Services (RMS) processes and considerations for determining a preferred option for upgrading the roundabout on the New England Highway adjacent to Maitland Railway Station.

The RMS preferred option for the Railway Station Roundabout is grade separation of the Highway over the roundabout for east bound traffic. The estimate for the preferred option for the Railway Station Roundabout is estimated at $45 million (2013 dollars) which includes a contingency.

Key Issues

- In September 2011, the NSW Government confirmed $45 million for upgrades to improve safety and traffic efficiency at the Maitland roundabouts, through the Hunter Investment and Infrastructure Fund.

- Maitland was by-passed in the 1980’s with construction of a five kilometre length of dual carriageway and three at-grade intersections that provide access at the southern, central and northern edges of the business district. The main access points are a roundabout adjacent to Maitland Railway Station that provides access to the city centre (the “Railway Station Roundabout”), and a roundabout at the northern edge of the business district adjacent to Maitland Hospital (the “Hospital Roundabout”).

- The Railway Station Roundabout has a higher order function than the Hospital Roundabout as it provides an intersection of two State Roads: the New England Highway and Cessnock Road. Cessnock Road links Maitland to Kurri Kurri and Cessnock and will be the link between Maitland and the Hunter Expressway. The Hospital Roundabout provides access to Maitland Hospital and the Maitland business district via a local road, and provides other local road connections to commercial, industrial and residential areas, and Telarah Railway Station.

- The New England Highway has a wider road reserve near the Railway Station Roundabout than near the Hospital Roundabout. Land adjacent to the Railway Station Roundabout is largely undeveloped, whereas the Hospital Roundabout has adjacent residential and commercial development, as well as a hospital car park.

- The Railway Station Roundabout is within the Maitland flood mitigation scheme, and the Highway immediately to the west of the roundabout has been designed to serve as a spillway in the event of a major flood.

- There has been growing congestion at the two roundabouts over the past ten years, with large scale residential and commercial development in Maitland local government area, and increasing traffic travelling to mines in the Hunter Valley. The main traffic flow issues have been lengthy queuing eastbound on the New England Highway approach to the Railway Station Roundabout, and lengthy queuing on local road approaches to the Hospital Roundabout.

- The Hunter Expressway is expected to be completed by the end of 2013 and will reduce traffic on the New England Highway at each of the roundabouts. However, as the Railway Station Roundabout will provide access between Maitland and the Hunter Expressway (via Cessnock Road), the amount of circulating traffic that conflicts with Highway through movements will increase. Substantial residential and industrial development is planned around Cessnock Road and near Kurri Kurri in the next 10 years. For both roundabouts, traffic is forecast to approach existing levels over the next 15 – 20 years.

- The local community has long expressed concerns about safety at the roundabouts, which both have five approaches and departures, and are not very large (they have radii of 24 metres); some approaches and departures are very close together and accessing the roundabouts under peak conditions can require acceptance of small gaps in traffic.
A severe road safety issue emerged to the west of the Railway Station Roundabout in 2010, with several head on crashes in this area. A wire rope median barrier was installed between the roundabouts in late 2010. The roundabouts and the two kilometre road length in between have had 91 crashes in the five years between 2006 and 2011, resulting in two fatalities and 48 casualties.

RMS displayed initial options for the roundabouts in February 2012 from a study undertaken in 2008, with traffic counts, forecasts and modelling updated for 2012. The options were based on preliminary flood investigations which had indicated that work near the Railway Station Roundabout would be very constrained, given the role of the Highway in the flood mitigation scheme. The options had an effective life of 10 to 20 years and included partial grade separation (Cessnock Road over the New England Highway) and a link road option at the Railway Station Roundabout, and signalisation or retaining the existing roundabout at the Hospital Roundabout.

In response to the display the main suggestion from the community was for larger scale grade separation of the New England Highway, over each of the roundabouts, similar to the interchange at Weakleys Drive.

RMS undertook more detailed traffic and engineering investigations and identified a favoured option for the Railway Station Roundabout which was more consistent with community views. This option was circulated for community comments in August 2012.

Since the consultation in late 2012 RMS has undertaken further investigations and determined a preferred option for the Railway Station roundabout.

The RMS Preferred Option

The preferred option for the Railway Station Roundabout involves the following works estimated at $45M (2013 dollars) which includes contingency:

- Construction of a two-lane overpass for eastbound Highway traffic from 400 metres west of the roundabout to 400 metres east of the roundabout;
- Retention of the roundabout, with improved alignment to Highway departures;
- Removal of the exit from Walker Street onto the roundabout. Motorists wishing to access the roundabout from Walker Street will need to turn left onto Cessnock Road (via a left slip lane), and then do a u-turn on Cessnock Road before approaching the roundabout from Cessnock Road.
- Construction of a left slip lane from Cessnock Road onto the New England Highway (westbound)

The preferred option would alleviate future congestion at the roundabout, have minimal impact on flood waters, and would compliment very long term grade separation of the westbound carriageway over the roundabout. It is more consistent with the community desire for total grade separation, has a long term traffic flow benefit, and is a similar in cost to the Cessnock Road grade separation option that was included in the initial Community Update.

The preferred option would include retaining the existing roundabout, with several modifications to improve road safety. The number of access points at the roundabout would be reduced from five to four (i.e. removing the Walker Street approach), and the departure geometry would be changed to better meet current guidelines. Five exits from the roundabout would be retained, and access from Walker Street would be achieved via a u-turn bay on Cessnock Road.

The preferred option has a road user Benefit Cost Ratio in excess of 3.5:1.

Changes to the Design

The main changes between the Favoured Options (Railway Station roundabout distributed August 2012) and the Preferred Option for the Railway Station roundabout announced mid 2013 are:
- The introduction of a left slip lane out of Cessnock Road to improve capacity for vehicles departing Cessnock Road
- A minor realignment of the eastbound overpass to improve the geometry of the overpass
- Relocation of the U-turn bay on Cessnock Road 30 metres south of the original location to improve storage length for vehicles using the u-turn bay
- Minor realignment of the highway on the westbound approach to the Railway Roundabout to allow for the overpass connection to the eastbound lanes
- Installation of upgraded guard fence alongside Maitland Park
- Removal of a merge conflict on the eastbound departure of the Railway roundabout
- Improved provisions for cyclists around the Railway Roundabout

Further Considerations

- The main objective of this project is to provide upgrades at the Railway and Hospital Roundabouts to improve safety and cater for future traffic growth. The $45M funding provided by the Hunter Infrastructure and Investment Fund has been provided specifically for improvements associated with the Hospital and Railway station roundabouts. Funding for road safety and traffic efficiency upgrades along the New England Highway outside the scope of this project will be considered as part of RMS' wider network planning.

- The larger scale full grade separated options (similar to the New England Highway and Weakleys Drive interchange) suggested by the community in the consultation during 2012 were investigated and estimated at over $70 million for the Railway Station Roundabout, and around $100 million for the Hospital Roundabout. They are not considered to be tenable or necessary at this time.
1. Purpose

This paper outlines Roads and Maritime Services (RMS) processes and considerations for determining a preferred option for upgrading the roundabout on the New England Highway adjacent to Maitland Railway Station.

The preferred option for the Railway Station roundabout is described in a Community Update issued by RMS in June 2013.

A community update showing a favoured option was issued to the community and stakeholders for comment in August 2012. RMS has determined a preferred option following consideration of comments received from this consultation. The concept for the preferred option is similar to the favoured option, though does include additional features aimed at improving safety and traffic efficiency.

$45M was provided for the upgrade of the two five leg roundabouts. The majority of the funding will be allocated to the Railway station roundabout for the following reasons:

- The Railway station has more consistent and extensive queues and delays than the Hospital Roundabout;
- The Railway Roundabout serves a higher order function as the intersection of two State roads (New England Highway and Cessnock Road) and will provide a crucial link to the Hunter Expressway from 2013 onwards;
- The Railway Roundabout experiences many conflicting turning movements during peak periods, while the Hospital Roundabout is predominantly through traffic on the New England Highway;
- Significant flood impact issues need to be accounted for at the Railway Roundabout.

2. Introduction

The New England Highway is part of the Auslink network providing a north/south route between Hexham and the Queensland Border. It connects to the F3 Freeway at Beresfield and the Pacific Highway at Hexham. The primary functions of the route are transport of interstate and inter-regional freight, and regional and local connectivity.

As a commuter route, the New England Highway carries over 40,000 vehicles per day at East Maitland.

In response to a commitment by the State Government, RMS is preparing for upgrades to the two existing five leg roundabouts on the New England Highway in Maitland. The roundabouts are contained in the Maitland City Council local government area, and are approximately 1.9 kilometres apart. Maps of the locations of the roundabouts are provided in figures 1 – 4 (Section 6 of this report).

Maitland was by-passed in the 1980’s with construction of a five kilometre length of dual carriageway and three at-grade intersections providing accesses at the southern, central and northern edges of the business district. The main access points are a roundabout adjacent to Maitland Railway Station that provides access to the city centre (the “Railway Station Roundabout”), and a roundabout at the northern edge of the business district adjacent to Maitland Hospital (the “Hospital Roundabout”). The southern access to the business district is a T-intersection controlled by traffic signals, which has less turning traffic than the two roundabouts and is subject to less queuing.

The roundabouts both have five approaches and departures and are located at the intersections of:

- New England Highway, Cessnock Road, Church Street, and Walker Street, Maitland (the Railway Station Roundabout)
- New England Highway, High Street, Bungaree Street, Johnston Street, Maitland (the Hospital Roundabout).
Before determining a solution for the two 5-leg roundabouts, it is important to understand the key issues and differences between the two roundabouts and the surrounding traffic and land use environments, as outlined in the following Table:

### Table 1: Key issues and differences between the Railway Station and Hospital Roundabouts

<table>
<thead>
<tr>
<th>Issue</th>
<th>Railway Station Roundabout</th>
<th>Hospital Roundabout</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td>This roundabout joins two State roads – New England Highway (east-west) and Cessnock Rd (north-south). Cessnock Rd will carry higher volumes of traffic from 2013 onwards as it will provide a link to Hunter Expressway. The roundabout also provides access to Maitland CBD via Church Street, and recreational areas via Walker Street. Church Street and Walker Street are both local roads.</td>
<td>This roundabout primarily carries north-south traffic on the New England Highway. It provides access to Maitland Hospital and CBD via High Street, as well as minor traffic flows to businesses and households via Johnson Street and Bungaree Street. High Street, Bungaree Street and Johnson Street are all local roads.</td>
</tr>
<tr>
<td><strong>Land use / development</strong></td>
<td>The Railway Roundabout is generally a green-field site. The land surrounding the roundabout is owned by Maitland Council and two private landowners. The main restrictions on this roundabout are: 1) the railway line north east of the roundabout 2) the rail overpass at Church Street 3) a pedestrian overbridge east of the roundabout 4) several houses and a veterinary business to the east of Walker St</td>
<td>The Hospital Roundabout is in a built up area. The land surrounding the roundabout is owned by several landowners. The main restrictions on this roundabout are large developments which make expansion of the intersection more difficult and costly, including: 1) Maitland Hospital 2) Hungry Jacks 3) Tyre Power 4) Bunnings 5) Heritage Motor Group</td>
</tr>
<tr>
<td><strong>Environmental issues</strong></td>
<td>The main environmental issue at this roundabout is flooding impacts. Previous floods have had a major impact on the road network surrounding the roundabout.</td>
<td>The Hospital Roundabout is in a built up and highly disturbed environment. The impacts of flooding at the roundabout are minimal. However, flooding does occur to the west / south of Heritage Motors (opposite Ledsam St)</td>
</tr>
<tr>
<td><strong>Traffic Flows</strong></td>
<td>Current (2010 / 2011): Highway 37,500 (Between the Roundabouts) Cessnock Rd 9,800 Church St 13,100 Walker St (Estimated) 2,000 Post HEX (2016): Highway (Est of RDB) 21,800 Highway (VWst of RDB) 21,800 Cessnock Rd 17,500 Church St (Estimated) 13,900 Walker St (Estimated) 2,000</td>
<td>Current (2010 / 2011): Highway 37,500 (Between the Roundabouts) High St 12,700 Bungaree St (Estimated) 8,700 Johnson St (Estimated) 1,800 Post HEX (2016): Highway (Nth of RDB) 22,200 Highway (Sth of RDB) 21,800 High St (Estimated) 12,800 Bungaree St (Estimated) 8,700 Johnson St (Estimated) 1,800</td>
</tr>
<tr>
<td><strong>Key traffic issue</strong></td>
<td>The key issue at the roundabout is congestion created for eastbound Highway traffic by the high number of</td>
<td>The key issue at the roundabout is long delays on side streets caused by the fact that the Highway traffic is so dominant.</td>
</tr>
<tr>
<td>Issue</td>
<td>Railway Station Roundabout</td>
<td>Hospital Roundabout</td>
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</tr>
<tr>
<td>conflicts between through traffic on the Highway and turning vehicles into Church St and Cessnock Rd.</td>
<td>There are insufficient gaps for side street traffic due to the fact that only 5% of total traffic turns right from the Highway into the side streets.</td>
<td></td>
</tr>
<tr>
<td>Traffic performance (Peak Hours)</td>
<td>AM: Highway – Average delay 177s Eastbound with a 550m queue</td>
<td>AM Peak: Highway – Average delay 23s Southbound with a 180m queue</td>
</tr>
<tr>
<td></td>
<td>PM: Highway – Average delay 65s Eastbound with a 240m queue</td>
<td>PM Peak: High St – Average delay 34s Westbound with a 70m queue</td>
</tr>
<tr>
<td>Safety</td>
<td>Between 2006 and 2011 there were 28 crashes within a 50m radius of the roundabout. Of the 28 crashes 12 resulted in injuries. The main crash problems are cross traffic / turning vehicle crashes and vehicle loss of control crashes.</td>
<td>Between 2006 and 2011 there were 34 crashes within a 50m radius of the roundabout. Of the 34 crashes 13 resulted in injuries. The main crash problems are rear end crashes, followed by cross traffic / turning vehicle crashes and loss of control crashes.</td>
</tr>
</tbody>
</table>

3. Background

In September 2011, the NSW Government confirmed $45 million for upgrades to improve safety and traffic efficiency at the Maitland roundabouts, through the Hunter Investment and Infrastructure Fund.

The Railway Station Roundabout has a higher order function than the Hospital Roundabout as it provides an intersection of two State Roads (the New England Highway and Cessnock Road), as well as local road connections. Cessnock Road links Maitland to Kurri Kurri and Cessnock and will provide access between Maitland and the Hunter Expressway when the expressway is completed at the end of 2013.

The Railway Station roundabout also has important local road connections. Church Street provides direct access to Maitland Railway Station, the business district and the Belmore Bridge (which provides access to suburbs north of Maitland). There is large scale commercial and residential development planned in central Maitland and along Cessnock Road (at Gillieston Heights), with the former recently attracting $11 million in support from the Federal Government and the latter well underway. Walker Street provides access to Maitland Park, which includes memorials, the town swimming pool, a large scale play centre, playing fields, and a large veterinary service.

The Hospital Roundabout provides access to Maitland Hospital and the Maitland business district via High Street, and provides other local road connections to commercial (including Bunnings and Hungry Jacks), industrial and residential areas, and Telarah Railway Station.

The New England Highway has a wider road reserve near the Railway Station Roundabout than near the Hospital Roundabout. Land adjacent to the Railway Station Roundabout is largely undeveloped whereas the Hospital Roundabout has adjacent residential and commercial development, as well as a hospital car park.

The Railway Station Roundabout is within the Maitland flood mitigation scheme, and the Highway immediately to the west of the roundabout has been designed to serve as a spillway in the event of a major flood. It served this function in the 2007 flood event, when the Highway was closed for several days.

In response to the Government commitment, a community update was issued in February 2012 and a public meeting was held in March 2012, to advise the community of the findings of RMS earlier investigations into traffic flows and traffic projections, and seek feedback on preliminary options for each of the roundabouts.

Two preliminary options for each roundabout were displayed, that had been identified in a study undertaken in 2008, with traffic counts, forecasts and modelling updated for 2012. The options were based on preliminary flood investigations which had indicated that work near the Railway Station
Roundabout would be very constrained, given the role of the Highway in the flood mitigation scheme. The options had an expected life of 10 to 20 years and included partial grade separation (Cessnock Road over the New England Highway) and a link road option at the Railway Station Roundabout, and signalisation or retaining the existing roundabout at the Hospital Roundabout.

A copy of the February community update showing the preliminary options is provided as Attachment A. The community update was issued to approximately 26,000 residents and businesses. The pervasive view from the community meeting was that each roundabout should be grade separated with the Highway passing over the roundabouts (like the Weakleys Drive interchange). The community meeting was well reported in local media. A wide range of issues and alternative options were raised by the 52 submissions received from the community.

Since the community feedback closed in March 2012 RMS has:

- Progressed environmental and flood impact studies
- Held further meetings with local businesses and residents surrounding the roundabouts, as well as Maitland City Council
- Undertaken further traffic studies to verify future traffic predictions following the opening of the Hunter Expressway in 2013
- Developed initial designs and cost estimates for several options raised by the community, including the fully grade separated options
- Undertaken further traffic modelling
- Undertake utility and geotechnical investigations
- Assessed the main options raised by the community against a range of criteria - particularly road safety, traffic efficiency, environmental and flooding impacts, community impacts and cost efficiency.

A favoured option for the Railway Station Roundabout was released in August 2012 and is available on the internet (www.rms.nsw.gov.au), while a favoured option for the Hospital Roundabout was presented to the community in February 2013. This report presents the preferred option which is the option that is to be constructed.

4. Need for the project

Upgrading both of the roundabouts is a key Government commitment and is important for the future development of Maitland and its surrounds.

The Hunter Expressway (due for completion at the end of 2013) will remove a large volume of traffic from the New England Highway at both of the roundabouts. However, at the Railway Station Roundabout the opening of the expressway will see an increase in traffic on the Cessnock Road leg and an increase in the overall volume of traffic turning and crossing the Highway, at the roundabout. With expected development around Maitland, total traffic at the Railway Station Roundabout is forecast to return to near current levels by 2026 - 2031.

4.1 Traffic Needs

There has been growing traffic at the two roundabouts over the past ten years, and at the Railway Station Roundabout this has resulted in lengthy queuing eastbound on the New England Highway approach.

The New England Highway near the roundabouts currently carries around 40,000 vehicles per day. Current peak hour flows on the Highway are 1,700 vehicles eastbound in the morning peak and 1,700-2,000 in either direction in the afternoon peak. There are 500-700 vehicles per hour on Church Street, Cessnock Road and High Street.

Historical growth rates have been around 1% per annum on the Highway, 1.3% on Church Street and 2.5% on Cessnock Road.
Eastbound queuing on the approach to the Railway Station Roundabout occurs because all of the traffic turning right into Maitland from the westbound highway approach, and all of the traffic heading north into Maitland or east onto the New England Highway from Cessnock Road, has priority over eastbound highway traffic. In peaks, this amounts to around 800 vehicles per hour (or, on average, one vehicle every 4.5 seconds) that cross the eastbound highway approach.

A series of travel time surveys were undertaken on the New England Highway in the lead up to the opening of the Third Crossing of the Hunter River (east of Maitland) at the end of 2010. Prior to the opening of the Third Crossing, the eastbound queue on the Highway approaching the Railway Station Roundabout was measured at 800 to 1300 metres in the morning and afternoon traffic peaks. The average travel time over the 1.9 kilometre approach was 305 seconds in the morning peak and 302 seconds in the afternoon peak (or around 23 km/hr over the 1.9 kilometre approach).

Following the opening of the Third Crossing, the number of vehicles entering central Maitland via the New England Highway was reduced, with a reduction in the right turning traffic that opposes the eastbound traffic flow on the Highway of 50-100 vehicles per hour. Surveys after the opening measured the morning peak hour queues on the eastbound approach to the Railway Station Roundabout at between 600 to 700 metres. The average eastbound travel time was measured at 214 seconds in the morning peak and was negligible in the afternoon peak.

Since the opening of the Third Crossing of the Hunter River, traffic on the Highway has continued to grow and both morning and afternoon queuing has been observed.

Much of the queuing will be alleviated when the Hunter Expressway is completed at the end of 2013, however, traffic patterns are expected to change especially at the Railway Station Roundabout with increased turning traffic and increased traffic on Cessnock Road, and traffic is expected to grow significantly over the next 15 years. Projected traffic data and various measures of performance for three time steps (prior to completion of the expressway, in 2016 and 2026) are shown in Table 1.

The future traffic projections in Table 1 are based on a network model managed by RMS for the Hunter. The model has been carefully developed over the past 10 years, with updates to reflect Bureau of Statistics data and land use planning documents. The model has been used to identify the need for, and demonstrate the impacts of, the Hunter Expressway.

From the model, there is expected to be rapid land use and population growth in Maitland and surrounding areas, as well as associated traffic growth on the New England Highway and Cessnock Road, over the next 20 years. This includes significant new land releases in the Maitland and Cessnock Local Government Areas, continued growth of mining in the Hunter Valley, and growth of economic development zones. Traffic volumes are predicted to approach existing levels on the New England Highway through Maitland by 2026 - 2031.

In particular, large scale and rapid traffic growth is expected on Cessnock Road. Daily traffic on Cessnock Road is expected to increase by 7,000 vehicles per day to 17,500 (between 2012 and 2016) as a result of the combined effects of changed traffic patterns from the Hunter Expressway and land use development. By 2026, daily flows are forecast to reach 20,100 vehicles per day.

| Table 1: Railway Station Roundabout – Traffic Data and Measures |
|-------------------|-------------------|-------------------|-------------------|
|                   | Existing (2011) am / pm | 2016 Post-HEX am / pm | 2026 Post-HEX am / pm |
| Total Demand      | 4011 / 4722         | 3441 / 3815        | 3991 / 4376        |
| Overall Degree of Saturation | 0.95 / 1.08         | 0.86 / 0.66        | 1.20 / 0.98        |
4.2 Safety Needs

The local community has long expressed concerns about safety at the roundabouts, which both have five approaches and departures, and are not very large (they have radii of 24 metres). Some approaches and departures are essentially very close together and accessing the roundabouts under peak conditions can require acceptance of small gaps in traffic.

The five legs also add a complexity in terms of lane selection and exiting from the roundabout, which adds to the complexity of decision making for motorists waiting to enter the roundabout.

In the area of influence of the preferred option for the Railway Station Roundabout (that is, 300 metres either side of the roundabout), the casualty crash rate is 7.8 casualty crashes per kilometre per year which is higher than the New South Wales Network Class Average of 5.8 for roads similar in function to the New England Highway.

At the roundabout itself, plus 50 metres either side, there were 28 crashes including 11 casualty crashes between 2006 and 2011. There were 11 cross traffic crashes, 8 loss of control crashes, 5 side swipe crashes, and 4 rear end crashes. 4 crashes occurred in the dark, 7 in the wet and 9 during peak periods. Attachment B provides a crash diagram for the roundabout.

Between 2006 and 2011 there were 18 crashes on the Highway within 300 metres of the roundabout on the western side and 14 crashes on the Highway within 300 metres of the roundabout on the eastern side. This exclude crashes within 50 metres of the intersection. Of the 32 crashes, there were 2 fatal crashes and 13 injury crashes. The crashes were generally severe with 11 head on crashes and 13 loss of control (2 to the right and 11 to left). Attachment B also provides a crash map for the New England Highway between the two roundabouts.

A severe road safety issue emerged to the west of the Railway Station Roundabout in 2010, with several head on crashes in this area, including fatal crashes in June 2007 and September 2010. There were also several serious injury head on crashes between the two roundabouts (mainly concentrated in the 300 metres just to the west of the railway roundabout) in 2009. In response, a wire rope median barrier was installed between the roundabouts in late 2010.

With the median safety barrier installed, concerns were still being raised by the community about the increasing traffic volumes, complexity of the 5 leg roundabouts and underlying causes of the crashes not being addressed.

<table>
<thead>
<tr>
<th>Highway Eastbound LoS (Average Delay) #</th>
<th>F (177) / C (29)</th>
<th>E (59) / B (17)</th>
<th>F (510) / C (36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway Eastbound Travel Speed (over 1.9km)</td>
<td>26.4 / 62.2 km/h</td>
<td>49.2 / 69.8 km/h</td>
<td>10.4 / 57.0 km/h</td>
</tr>
<tr>
<td>Highway Westbound LoS (Delay)</td>
<td>B (15) / B (22)</td>
<td>A (12) / A (11)</td>
<td>A (13) / B (15)</td>
</tr>
<tr>
<td>Network Approach Travel Time^</td>
<td>404 / 357</td>
<td>259 / 230</td>
<td>784 / 376</td>
</tr>
</tbody>
</table>

# Paramics LoS and Average Delay

^ Paramics Summed Average Travel Time data in seconds, on the 4 most significant road links approaching the roundabout (the summed length of the links is 3.4km)
Further short term safety improvements were undertaken in 2012 to address crashes within the roundabouts including:

- Removal of vegetation at the hospital roundabout to assist with driver visibility.
- Resurfacing the westbound departure of the railway roundabout to improve loss of control in the wet crashes.
- Line marking and signposting improvements to improve delineation and guidance of motorists within the roundabout.
- Installation of kerbside barrier in key locations around the roundabouts and between the roundabouts.

Crash numbers and rates for the Railway Station Roundabout and the adjoining 300 metre lengths of the Highway are shown below in Table 2. The whole section overall is above the stereotypical rates for roads in New South Wales with a similar function to the New England Highway.

<table>
<thead>
<tr>
<th>Table 2: Railway Station Roundabout – Current Safety Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New England Highway, 50m around Railway Station Roundabout</strong></td>
</tr>
<tr>
<td>Crashes (2006 – 2011)</td>
</tr>
<tr>
<td>Casualty Crashes</td>
</tr>
<tr>
<td>Casualties</td>
</tr>
<tr>
<td>Years</td>
</tr>
<tr>
<td>AADT (2010)</td>
</tr>
<tr>
<td>Length (km)</td>
</tr>
<tr>
<td>Crash rate per 100M VKT (all crashes)</td>
</tr>
<tr>
<td>Casualty crashes per km per year</td>
</tr>
<tr>
<td>Casualty crash rate per 100M VKT</td>
</tr>
</tbody>
</table>

5. Project Objectives

The primary objectives of upgrading the Railway Station Roundabout are to:

- Improve safety through reduced crash rates and reduced severity of crashes.
- Improve traffic efficiency (that is, reduce overall delay and queuing).
- Provide infrastructure to cope with expected traffic growth over the next 15 years and provide as a basis for further works in the long term (i.e. beyond 15 years).
• Minimise the impact on the environment
• Minimise impacts on the Maitland flood mitigation scheme
• Maintain reasonable accessibility to adjacent communities and businesses
6. Context of the Project

Figure 1 - Project Location Plan – Street Map

Figure 2 - Project Location and Hunter Expressway
Figure 3 – Railway Station Roundabout – Street Map

Figure 4 - Hospital Roundabout – Street Map
7. Process for Determining the Preferred Option

7.1 Overview of the Process

In 2008, Roads and Traffic Authority (as it was known at the time) looked at a range of options for upgrading the Maitland Roundabouts. The study purpose was to closely examine traffic behaviour, congestion and safety issues at the two intersections, and identify potential improvements for the future. The study involved initial concept development and modelling of various options. The findings of the study fed into the broader Lower Hunter Transport Needs Study (LHTNS) which was jointly funded by the NSW and the Australian Governments.

Following the announcement by the NSW Government that $45M has been provided for upgrading the two roundabouts under the Hunter Infrastructure Investment Fund in 2011, RMS commenced further investigations and community consultation to develop preferred options.

RMS identified the following objectives for the project, from previous community concerns:

- Improve road safety
- Improve traffic management
- Provide long term infrastructure
- Minimise community and business impacts
- Minimise flood impact
- Minimise other environmental impacts

The process for determining a preferred option involved technical and engineering investigations, as well as community consultation, and is outlined below.

Step 1 – Community Feedback

In March 2012, a community update was issued to approximately 26,000 dwellings showing two initial options for the railway station roundabout and two initial options for the hospital roundabout. The community was asked for comments on the proposal.

A community meeting was held at Monte Pio on 21st March 2012 where further feedback was sought from the community.

A total of 52 submissions were received from the community during the consultation period. Further details of the community feedback that was received is shown in Attachment C. The main issues identified during the feedback process were:

- A strong desire for a flyover with the New England Highway going over the roundabout
- The community want to see options that will cater for future traffic growth
- Concerns were raised about closing the entrance to Walker Street (particularly in relation to connectivity to recreational areas), but there was generally acceptance that the exit from Walker Street needed improving
- Issues were raised in relation to the Elgin Street link road proposal. Issues were raised around increased traffic on this side road, reduced safety, and the fact that Elgin Street is not designed for increased traffic volumes
- Many amendments to the existing roundabout and the 2 options were proposed. These included additional slip lanes / ramps; redirection of traffic to other parts of the network, opening up local road connections to the highway; and installation of traffic signals.

In August 2012 a favoured option was distributed to the community for comments. The proposal showed:
• Grade separation of the two New England Highway eastbound through lanes over the existing roundabout. The overpass would be half bridge structure (within the Maitland flood mitigation scheme) and half reinforced earth wall (to the east of the roundabout). This is necessary to manage flood impacts and for cost efficiency.
• Retaining the existing roundabout.
• Improving the approach and departure geometry of the existing roundabout, and lane allocations within the roundabout.
• Closure of the entry of Walker Street onto the roundabout with provision of a left slip lane onto Cessnock Road and a u-turn bay approximately 250 metres along Cessnock Road. The entry into Walker Street from the roundabout would be retained.

A total of 27 submissions were received from the community during the consultation period. Further details of the community feedback that was received in the second round of consultation is shown in Attachment C. The main issues identified during the feedback process were:

• Continued interest from some parts of the community for a flyover in each direction (which exceeds the allocated budget), and concerns that westbound highway traffic has not been addressed
• Some concerns about the proposed changes at Walker Street, particularly in relation to the location of the U-turn bay and whether access to the roundabout should be retained.
• Detailed design concerns about how the proposal will accommodate vulnerable road users and heavy vehicles, and how speed limits and merge arrangements will operate
• Several suggestions for alternative options – in particular reconsideration of a north-south overpass between Church Street and Cessnock Road
• Some support for the proposed layout

Step 2 – Determination of main options to further investigate

The community options from both the March 2012 and August 2012 consultations were individually assessed with consideration of technical merit and engineering feasibility and a decision was made by RMS as to whether they would progress to more detailed investigations. The main factors in determining whether an option would progress to more detailed investigation included whether the proposal:

a) addresses the traffic and safety problems
b) has the potential to be compatible with future long term upgrades
c) can be effectively constructed under traffic
d) has no obvious negative environmental or flood impact issues
e) could be delivered within the allocated budget

The options considered for further assessment are listed in Attachment D.

Step 3 – Collection of additional information

Once the list of options had been revised down to a smaller set of more likely candidates, the following tasks were undertaken:

<table>
<thead>
<tr>
<th>Task</th>
<th>Reason for work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional meetings were held with land</td>
<td>To obtain further feedback on local issues immediately surrounding the roundabout</td>
</tr>
<tr>
<td>owners of adjoining properties and Maitland City council.</td>
<td></td>
</tr>
<tr>
<td>Concept design of the community options</td>
<td>To look at the feasibility and design issues associated with each option. This includes looking at the footprint of the proposals (ie</td>
</tr>
</tbody>
</table>
Step 4 – Technical Assessment of Options

The options listed in Attachment D were further assessed against a range of criteria:

a) Safety benefits
b) Traffic performance in 2016
c) Traffic performance in 2026
d) Cost estimate
e) Flood assessment
f) Environmental issues
g) Property Acquisition
h) Community Issues

A more detailed assessment of options is provided in Attachment D.

The options were compared against the criteria, with some options noted as having significant deficiencies against one or more of the criteria. For example, it was clear from community feedback that identifying a long term strategy for addressing congestion was important. Some options show low level performance in 2026 based on traffic projections and modelling, and therefore aren’t likely to provide a cost competitive project for the future or meet the longer term needs of the community.

On the basis of consideration of the criteria above, RMS has adopted the eastbound grade separation of the New England Highway over the existing roundabout as the preferred option. Details of the preferred option are outlined in Section 8 of this report.

The preferred option will improve traffic flow by:

- Removing the eastbound through movement from the roundabout, and allowing it to pass unimpeded over the roundabout. Following completion of the Hunter Expressway, the
through movement will account for 20% of total peak hour traffic at the roundabout (in 2016), and 65-70% of the total traffic on the eastbound approach to the roundabout.

- Reducing the key conflict that results in queuing at the roundabout, namely the conflict between eastbound through traffic and westbound traffic that turns right into Maitland, and Cessnock Road traffic that is heading north into Maitland or east on the New England Highway.
- Construction of a left slip lane from Cessnock Road onto the New England Highway (westbound) to reduce queues and delays on Cessnock Road

The preferred option will improve safety by:

- Removing the eastbound through movement and its associated conflict.
- Improving the geometry of the Highway departures to the roundabout.
- Improving the lane allocation within the roundabout, to remove ambiguities for motorists entering the roundabout from the westbound Highway approach and Cessnock Road.
- Removing the Walker Street entry to the roundabout, which is the entry that requires drivers to make the most complex decisions at the roundabout, and accept the smallest gaps.
- Minor realignment of the highway on the westbound approach to the Railway Roundabout to improve sight lines
- Installation of upgraded guard fence alongside Maitland Park
- Improved provisions for cyclists around the Railway Roundabout

The preferred option has the following advantages over other options:

- It has the greatest traffic flow benefit (apart from the option of total grade separation)
- It has an expected life of greater than 15 years.
- Its effect on the Maitland flood mitigation scheme has been assessed as minimal and acceptable.
- It can be added to in future if necessary, with a similar grade separation of the westbound carriageway.
- It is consistent with the community desire for total grade separation.
- Could be delivered within the allocation.

The preferred option is superior to the two preliminary options outlined in the first community update because:

- Those options achieve lower traffic flow benefits and have a more limited effective life.
- The Cessnock Road grade separation over the Highway is not consistent with future grade separation of other movements and is not consistent with community desires.
- It will be able to cope better with accelerated traffic generation that is expected to occur if residential and commercial development in Maitland business district is successfully accelerated by $11 million in Federal funding for local road infrastructure, announced in June 2012. The Federal funding is targeted to be spent by mid 2015.

8. Description of the Preferred Option – Railway Station Roundabout

8.1 Preferred Option

The preferred option is shown in Attachment E. The preferred option has the following components:

- Grade separation of the two New England Highway eastbound through lanes over the existing roundabout. The overpass would be half bridge structure (within the Maitland flood mitigation scheme) and half reinforced earth wall (to the east of the roundabout). This is necessary to manage flood impacts and for cost efficiency.
• Retaining the existing roundabout.
• Improving the departure geometry of the existing roundabout, and lane allocations within the roundabout.
• Closure of the entry of Walker Street onto the roundabout with provision of a left slip lane onto Cessnock Road and a u-turn bay approximately 250 metres along Cessnock Road. The entry into Walker Street from the roundabout would be retained.
• Construction of a left slip lane from Cessnock Road onto the New England Highway (westbound)

8.2 Key Issues and Statistics

a. Road Safety

The area of influence of the preferred option (that is, 300 metres either side of the roundabout) has a casualty crash rate of 7.8 casualty crashes per kilometre per year which is considerably higher that the NSW Network Class Average of 5.8 for roads with a similar function to the New England Highway.

The impact of the preferred option on the existing casualty crash rate is calculated in table 3 below. The casualty crash rate following implementation of the preferred option is expected to be 3.8 casualty crashes per kilometre per year, which is well below the stereotypical rate for roads with a similar function to the New England Highway.

Table 3: Calculation of Road Safety Impact

<table>
<thead>
<tr>
<th>Treatment(s)</th>
<th>Crashes affected</th>
<th>No. crashes 06-11</th>
<th>No. casualty crashes 06-11</th>
<th>Expected reduction rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median barrier treatments, improvements to departure geometry and eastbound grade separation</td>
<td>Head on and loss of control to the right crashes</td>
<td>17</td>
<td>1 fatal and 7 injury</td>
<td>95%</td>
</tr>
<tr>
<td>Realigned eastbound carriageway and some kerbside barrier on existing carriageway</td>
<td>Eastbound loss of control to the left crashes</td>
<td>10</td>
<td>1 fatal and 6 injury crashes</td>
<td>65%</td>
</tr>
<tr>
<td>Eastbound grade separation</td>
<td>Cross traffic crashes involving eastbound highway traffic</td>
<td>4</td>
<td>3 injury</td>
<td>80%</td>
</tr>
<tr>
<td>Realignment of the westbound departure and kerbside barrier</td>
<td>Westbound loss of control to the left crashes</td>
<td>3</td>
<td>1 injury</td>
<td>65%</td>
</tr>
<tr>
<td>Closure of Walker St departure</td>
<td>Cross traffic crashes that occurred near Walker St</td>
<td>5</td>
<td>0 injury</td>
<td>50%</td>
</tr>
</tbody>
</table>

*Using percentage reduction rates for the various crash types, from Centre for Road Safety crash BCR spreadsheet where they are available)

b. Traffic Data
Modeling of the future performance of various options has been undertaken both by GTA consultants (Paramics network modeling) and in-house (SIDRA modeling). Of all the options modeled (apart from total grade separation), the preferred option produced superior results. The results are shown in table 4 below.

A traffic signal option was also modeled. It produced inferior results to “doing nothing” (that is, retaining the existing roundabout) in 2016, and had a poor level of service in 2026.
Table 4: Traffic Outcomes of Preferred Option and other Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Measure</th>
<th>2013 (pre-HEX)</th>
<th>2016 (post HEX)</th>
<th>2026 (post HEX)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td></td>
<td>Travel Time</td>
<td>846</td>
<td>779</td>
<td>464</td>
</tr>
<tr>
<td></td>
<td>Stops</td>
<td>16910</td>
<td>17685</td>
<td>9057</td>
</tr>
<tr>
<td></td>
<td>VHT</td>
<td>527</td>
<td>461</td>
<td>265</td>
</tr>
<tr>
<td></td>
<td>Average Delay</td>
<td>165</td>
<td>89</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Level of Service</td>
<td>F</td>
<td>F</td>
<td>D</td>
</tr>
<tr>
<td>Existing roundabout</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travel Time</td>
<td>478</td>
<td>729</td>
<td>408</td>
</tr>
<tr>
<td></td>
<td>Stops</td>
<td>11546</td>
<td>13659</td>
<td>7439</td>
</tr>
<tr>
<td>Preferred Option</td>
<td>Overpass - Eastbound New England Highway Lanes over the roundabout</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travel Time</td>
<td>502</td>
<td>541</td>
<td>490</td>
</tr>
<tr>
<td></td>
<td>Stops</td>
<td>12075</td>
<td>14145</td>
<td>8183</td>
</tr>
<tr>
<td></td>
<td>VHT</td>
<td>389</td>
<td>428</td>
<td>264</td>
</tr>
<tr>
<td></td>
<td>Average Delay</td>
<td>70</td>
<td>77</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Level of Service</td>
<td>E</td>
<td>F</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Community Option</td>
<td>New Link Road – Cessnock Road to New England Highway west</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travel Time</td>
<td>823</td>
<td>595</td>
<td>464</td>
</tr>
<tr>
<td></td>
<td>Stops</td>
<td>20386</td>
<td>15176</td>
<td>8206</td>
</tr>
<tr>
<td></td>
<td>VHT</td>
<td>523</td>
<td>438</td>
<td>263</td>
</tr>
<tr>
<td></td>
<td>Average Delay</td>
<td>155</td>
<td>69</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Level of Service</td>
<td>E</td>
<td>F</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Community Option</td>
<td>Overpass - East &amp; West bound Highway over roundabout</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Travel Time</td>
<td>420</td>
<td>440</td>
<td>393</td>
</tr>
<tr>
<td></td>
<td>Stops</td>
<td>10231</td>
<td>10958</td>
<td>6506</td>
</tr>
<tr>
<td></td>
<td>VHT</td>
<td>366</td>
<td>383</td>
<td>244</td>
</tr>
<tr>
<td></td>
<td>Average Delay</td>
<td>57</td>
<td>52</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Level of Service</td>
<td>E</td>
<td>D</td>
<td>C</td>
</tr>
</tbody>
</table>
“Travel time” is the sum of the average travel time for vehicles on each road link that approaches the roundabout, for peak hours
“Stops” is the number of vehicles stops within the modelled network, within the peak hour
“VHT” is Vehicle Hours Travelled, which is the total hours of travel within the network during the peak hour

c. Alignment and Grading

The existing New England Highway alignment gently falls from east to west through the roundabout with a low point further to the west of the roundabout (which allows the Highway to serve as a spillway) before rising up at the existing Trzecinski Bridge.

The existing roundabout has five legs with four of the legs being located on one half of the roundabout.

The overpass in the preferred option is aligned to the north of the existing eastbound New England Highway carriageway. It has been located to avoid impact on Rail Corp land and assets to the north, and the existing pedestrian overbridge on the eastern side of the roundabout.

The vertical grade of the east bound overpass will provide 6 metre clearance over the existing Church Street carriageway.

The existing roundabout was designed and constructed in the 1980's, and the existing east and westbound approach geometry on the New England Highway results in an approach speed at the entry to the roundabout of approximately 50 km/hr. Current design guidelines require deflection on the approach to a roundabout to reduce approach speeds, and cost effective ways of achieving this are being considered in further design.

The existing westbound departure geometry contains reverse curves joined by a short straight and has adverse cross fall. The initial safety improvements have upgraded the surface texture on the New England Highway western departure and installed centrally located wire rope at this location. Further improvements will be made by re-aligning and straightening the westbound departure with the inclusion of superelevation, in line with current practice.

The eastbound departure to the roundabout is of similar alignment to the westbound and will be reconstructed under these works with the connection of the overpass eastbound ramp, and will include superelevation.

The current option for Walker Street is to provide a left turn out exit onto Cessnock Road, with a u-turn facility south around 250 metres to the south of the roundabout on Cessnock Road. This is the lowest traffic volume leg of the roundabout, with around 50 and 100 vehicles per hour in peaks. There is limited scope to improve the entry into Walker Street from the roundabout, or provide greater separation of this leg from the New England Highway westbound approach, given the existing radius of the roundabout.

d. Economic Analysis

The preferred option of eastbound grade separation of the Highway has a road user Benefit Cost Ratio of 3.5:1 (that is, the future economic benefit that will be achieved from the preferred in terms of crash cost savings, and travel time and vehicle operating cost savings, is expected to exceed the costs of the project by a factor of 3.5 to 1).

e. Environment

A preliminary environmental investigation has been conducted and indicates there are no significant environmental constraints aside from flood impact.
A preliminary flood impact assessment has been conducted on the preferred option using Maitland Council’s flood model. The New England Highway between the Railway Station Roundabout and the Trzecinski Bridge is inundated by major flood events, and serves as a spillway within the flood mitigation scheme. It was inundated in 2007, which was a one in fifteen to twenty year flood event.

The preliminary hydrology assessment indicated the land on the western side of the roundabout is located partially within the floodway. Accordingly, further obstruction within the floodway would result in raising flood levels (backwater levels). For this reason the western approach to an overpass is required to be constructed as a bridge structure and cannot be constructed as embankment or as retaining walls.

The preliminary hydrology assessment undertaken on the preferred option, with bridge structure on the western approach, indicates a negligible rise in peak flood water levels, and where water level increases do occur, they are to the west and are confined to areas that are away from private developable land. Construction of an embankment or retaining wall in this area would result in a larger increase in flood levels.

Noise impact will require assessment and mitigation will be considered if required.

f. Community

During consultation undertaken in 2012 the concept of grade separation proved the most popular amongst the community.

There was a strong sentiment that there should be an overpass of the Highway over the roundabout in both directions. However, this option is not affordable within the context of the available budget, and a good traffic outcome is achievable in 2026 without full grade separation.

While there are additional traffic benefits in grade separating the westbound movement, the option would appropriately be considered in the longer term (competing against other worthwhile projects from across the State). The design of the eastbound overpass would not conflict at all with a westbound overpass being constructed at some later date.

g. Acquisition

The preferred option requires an area of Council owned property to be acquired on the northern side of the New England Highway. Acquisition of a small parcel of privately owned land will also be required for the construction of the Uturn bay located on Cessnock Road.

h. Current Estimate

Based on the design and construction of the preferred option as a half bridge/half wall structure, the project strategic estimate is $45M.

The strategic estimate has been reviewed by RMS Project Management Office with only minor comments provided regarding increase to a small number of rates.

9. Recommendation

The RMS preferred option for the Railway Station Roundabout is eastbound grade separation of the New England Highway over the existing roundabout, minor geometric changes to the roundabout, and removal of the Walker Street approach to the roundabout. The strategic estimate for this option is $45M (in 2013 dollars) which includes contingency.
Attachment A

Community Updates
FEBRUARY 2012 COMMUNITY UPDATE SHOWING 2 PRELIMINARY OPTIONS

Roundabout Improvements on the New England Highway at Maitland

Roads and Maritime Services (RMS) is planning to undertake initial safety improvements and build larger scale upgrades for safety and traffic flow improvements at the roundabouts on the New England Highway at Maitland. This community update contains information on these upcoming works which RMS would like to discuss with the community over the next few weeks.

RMS does not have preferred options for the larger scale upgrades but has undertaken traffic and initial design investigations and is seeking community input on options at the sites by 30 March 2012.

---

Initial safety improvements

RMS previously installed a wire rope safety barrier between the two roundabouts at Maitland in 2010 and this has helped prevent further head on crashes in this area, RMS will undertake further work to improve safety, which includes:

- Removing vegetation on the Hospital roundabout.
- Installing roadside safety barriers.
- Installing improved safety signs for motorists.
- Resurfacing of westbound exit at Church Street roundabout.

Involving the community and stakeholders

RMS is developing larger scale upgrades for improving safety and traffic flow at these two roundabouts.

Overleaf are two initial options for each roundabout.

The initial options for the Hospital roundabout would involve either new traffic lights or modifying the existing roundabout. Both options would involve consolidating Bunganee Street and Johnson Street into one approach to reduce the complexity of the roundabout.

---

You are invited to a meeting on Wednesday, 21 March 2012 to learn more about the initial proposed improvements and contribute your ideas on the larger scale upgrade options.

The meeting is being held at Monte Pio, corner New England Highway and Dwyer Street, Maitland 6.30pm.

Background

The NSW Government through the Hunter Infrastructure and Investment Fund has provided $45 million for upgrades to the two five leg Maitland roundabouts at Church Street (near Maitland Railway station) and High Street (near Maitland Hospital).

RMS has completed preliminary field investigations including traffic counts and traffic projections, traffic modelling, survey, sketching of options and a preliminary flood study.
Railway Roundabout
Two options we are currently considering for community discussion

NEW ENGLAND HIGHWAY OVERBRIDGE OPTION

NEW LINK ROAD OPTION
The initial options for the Railway Station roundabout would involve grade separation of traffic travelling between Cessnock Road and Church Street or a new link road from Cessnock Road to the New England Highway to take some traffic out of the existing intersection. Both options would involve a new connecting road for traffic accessing Walker Street.

The design of the upgrades will need to take account of expected future traffic patterns, especially with the impact of the Hunter Expressway, environmental issues, the flood mitigation scheme in the local area and stay within $45 million allocated.

**Project objectives**

The objectives of this project are to provide initial safety improvements and larger scale upgrades at the roundabouts to improve safety and cater for future traffic growth. The upgrades must be designed to not significantly impact on flooding in the area.

We are interested in your thoughts on these options and/or any other suggestions you have. Please send written comments to the project manager by 30 March 2012.

You are invited to attend a meeting on Wednesday, 21 March 2012 at Monie Plo to learn more about the project and contribute your ideas. Arrival at 6pm for a 6.30pm start.

Please contact us if you plan to attend for catering and room set up purposes on 02 4924 0240 or email Sharon.Pamm@rms.nsw.gov.au.

---

**Steps to plan and build roundabout upgrades**

1. **Preliminary Investigations**
   - FEB 2012
   - Display initial options for comment
2. **Assess feedback and compare options**
3. **Display favoured options for comment**
4. **Finalise planning for the preferred options at both sites**
5. **Detailed design**
6. **Environmental impact assessment**
7. **Potential land property acquisition**
8. **Call tenders**
9. **Construction**

---

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Send your comments to
Adam Thomas
Roads and Maritime Services, Locked Bag 30 Newcastle NSW 2300
T 02 4924 0611 (during business hours) | E Adam.Thomas@rms.nsw.gov.au

February 2012

RMS 12.033
Improving traffic flow through the roundabouts on the New England Highway at Maitland

Roads and Maritime Services (RMS) is planning large scale upgrades to achieve safety and traffic flow improvements at the roundabouts on the New England Highway at Maitland. This community update contains information on RMS’s favoured option to build an overpass at the roundabout adjacent to Maitland Railway Station. The option is on display for your comment by 17 September 2012. This project is funded by the NSW Government through the Hunter Infrastructure and Investment Fund.

You are invited to a meeting at 5pm on Thursday 30 August 2012 to learn more about the favoured overpass option for the Railway Station roundabout.

The meeting is being held at Monte Pio, corner New England Highway and Dwyer Street, Maitland.

Since the consultation in March 2012 RMS has undertaken investigations for a range of options for each roundabout including traffic counts and traffic projections, traffic modelling, survey sketching of options, flood studies and cost estimates.

Small scale safety improvements
RMS has recently improved safety by undertaking work, including:
• Removing vegetation on the Hospital roundabout.
• Installing roadside safety barriers.
• Installing improved safety signs for motorists.
• Resurfacing of the westbound exit at Church Street roundabout.

Hospital roundabout
We will finalise a favoured option for the Hospital roundabout later in 2012 and display it for community comment.

Background
The NSW Government through the Hunter Infrastructure and Investment Fund has provided $45 million for upgrades to the two five leg Maitland roundabouts at Church Street (near Maitland Railway station) and High Street (near Maitland Hospital).

In March 2012 RMS presented proposals for the two roundabouts to the community for comment. A total of 52 submissions were received along with feedback from meetings with local businesses and land owners.
Railway Station roundabout

The favoured option design for the Railway Station roundabout would involve constructing an overpass from 400 metres west of the roundabout to 400 metres east of the roundabout. This option would remove a large amount of traffic from the ground level roundabout and remove a key conflict between eastbound highway traffic and traffic entering Church Street.

The favoured option would include retaining the existing roundabout and building straighter Highway departures.

Changes to Walker Street access

Walker Street access from the roundabout would be retained with the favoured option. However, motorists wishing to access the roundabout from Walker Street would need to turn left onto Cessnock Road, then do a u-turn to approach the roundabout from Cessnock Road. Alternatively, drivers wishing to enter the highway from Walker Street could use local road intersections to the east.

RMS has investigated the traffic flow benefits of the favoured overpass option and the intersection is expected to operate with a low level of delay for at least the next 15 years.

The favoured option would improve safety by reducing a key conflict within the roundabout and reduce the complexity of the roundabout.

The estimated cost of the overpass option is $35 million (in 2012 dollars).

RMS did examine the other options at this site. An option assessment report containing information on these alternative options for the roundabout is available for your information on the RMS website or by contacting Adam Thomas (details on back).
Project objectives
The objectives of this project are:
- Firstly, to provide initial safety improvements.
- Secondly, to provide large scale upgrades at the
  roundabouts to improve safety and cater for future
  traffic growth.

The upgrades must be designed to not significantly
impact on flooding in the area.

We invite your ideas and opinions on the favoured
option for the Railway Station roundabout. Please write
or phone the project manager by 17 September 2012.

Meeting invitation
You are invited to a meeting commencing at 5pm
on Thursday 30 August 2012 at Monte Pio to
learn more about the project and contribute your
ideas. Project staff will be available for one-on-one
discussions after the meeting to at least 8pm.

Please contact us if you plan to attend for catering
and room set up purposes on 02 4924 0240 or email
Sharon.Parr@rms.nsw.gov.au. Thank you.

Steps to plan and build roundabout upgrades

- Preliminary investigations
- Display initial options for comment
- Assess feedback and compare options
- Display favoured options for comment
- Finalise planning for the preferred options at both sites
- Detailed design
- Environmental Impact assessments
- Potential property acquisition
- Call tenders
- Construction

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your consent, if authorised by the law. Your personal information will be held by RMS Hunter region. You have the right to access and correct the
information if you believe that it is incorrect.

Send your comments to
Adam Thomas
Roads and Maritime Services, Locked Bag 30 Newcastle NSW 2300
T 02 4924 0611 (during business hours) | E Adam.Thomas@rms.nsw.gov.au
www.rms.nsw.gov.au
August 2012
RMS 12.233
Roundabout upgrades on the New England Highway at Maitland

Roads and Maritime Services (RMS) is planning upgrades to improve safety and traffic flow at the roundabouts on the New England Highway at Maitland. This community update contains information on RMS preferred options for the roundabouts next to Maitland Railway Station and Maitland Hospital.

Background
The NSW Government through the Hunter Infrastructure and Investment Fund has provided $45 million for upgrades to the two five leg roundabouts on the New England Highway at Church Street (near Maitland Railway Station) and High Street (near Maitland Hospital). The purpose of the upgrades is to improve safety and traffic flow, while catering for future traffic growth.

The majority of the $45 million funding will be allocated to the Railway Station roundabout, which has more consistent and extensive queues and delays than the Hospital roundabout.

The Railway Station roundabout also serves a higher order function as the intersection of two State roads (New England Highway and Cessnock Road) and will provide a crucial link to the Hunter Expressway from 2013 onwards.

Process to identify the preferred options
In March 2012 RMS presented proposals for the two roundabouts to the community for comment. A total of 52 responses were received along with feedback from meetings with local businesses and land owners.

RMS considered this feedback and carried out further investigations to develop favoured options for both roundabouts.

In August 2012 RMS released a favoured option for the Railway Station roundabout for community comment. A public meeting was held and 27 responses were received.

In February 2013 a favoured option for the Hospital roundabout was released for community comment. A public meeting was held in March and 17 responses were received.
HOSPITAL ROUNDABOUT
Preferred option

Inlet: New England Highway and John Street / Johnson Street Intersection

- Concrete median
- Addition of new pedestrian crossing
- Removal of the mid-block pedestrian lights
- Safety barrier
- Traffic signals
- Pedestrian refuge across New England Highway and new footpath connecting to existing path network
- Left slip lane into High Street
- Retain left turn access
- Further tree removal and landscaping
- Pedestrian path and fence leading to new pedestrian refuge
- John Street and Johnson Street signals to be coordinated

Key:
- Proposed new line markings and new works
- Pedestrian path
- Pedestrian fence
RMS has undertaken further investigations since the release of the favoured options to assess issues raised by the community.

The investigations involved collecting additional traffic data, additional traffic modelling, further survey and design, and assessment of the cost and feasibility of additional options.

During this time RMS also implemented safety improvements in the area including removal of vegetation at the Hospital roundabout, installing safety barriers, improved line marking and signposting, and resurfacing the westbound exit at the Railway Station roundabout.

Determining the preferred options

The primary objectives in determining the preferred roundabout options were to:

- Consider comments and suggestions raised by the public
- Reduce crash rates and severity of crashes
- Improve traffic performance
- Cater for future traffic growth
- Minimise environmental and flooding impacts
- Maintain accessibility to adjacent residential and commercial areas

Reports providing the detailed options assessments for the two roundabouts are available on the RMS website at www.rms.nsw.gov.au

Railway Station roundabout

The Railway Station roundabout preferred option retains the existing roundabout and involves:

- Constructing an eastbound overpass
- Constructing a left slip lane from Cassmack Road onto the New England Highway
- Removing the roundabout entry from Walker Street
- Providing a U-turn bay on Cassmack Road for access to the roundabout from Walker Street
- Relocating the westbound New England Highway approach and departure to the roundabout.

A drawing of the preferred option is provided in this update.

The main changes to the design since the favoured option was released in August 2012 include:

- A left slip lane from Cassmack Road onto the New England Highway for improved vehicle capacity
- Increased bridge length on the overpass to better suit geotechnical findings
- Changes to the entry of the overpass to give greater priority to the overpass traffic
- Minor realignment of the overpass to improve sight lines
- Minor realignment of the westbound lanes adjacent to Maland Park to allow connection of the overpass to the eastbound highway
- A guard fence between the realigned westbound traffic lanes and Maland Park
- The U-turn bay on Cassmack Road has been moved 30 metres south to extend the length of the right turn bay
- Reducing the eastbound departure from the roundabout to one lane to simplify traffic arrangements
- Improved provisions for cyclists.

Hospital roundabout

The Hospital roundabout preferred option retains the existing roundabout and involves:

- Installation of traffic signals at the northern end of Johnson Street
- Removal of the mid-block pedestrian signals 60 metres to the east of Johnson Street
- Construction of left turn slip lanes into High Street and Bungaree Street
- Removal of vegetation in the roundabout
- Provision of pedestrian paths, fencing and a crossing point through the median to the west of the roundabout.

A drawing of the preferred option is provided in this update.

The main design changes since the favoured option was released in February 2013 include:

- Additional pedestrian facilities to the west of the Hospital roundabout, including a pedestrian refuge, connecting footpaths and fencing
- A change to the design for the intersection at Mount Pleasant Street to improve pedestrian safety at the nearby crossing point.
Next steps

Construction on the two roundabouts will start in August 2013. Initial work will focus on the Cessnock Road side of the Railway Station, followed by the slip lanes and pedestrian work at the Hospital roundabout, and the new traffic signals at Johnson Street. These works are expected to be completed in mid 2014.

Construction of the eastbound overpass at the Railway Station roundabout will start in late 2014 and is expected to be completed by late 2015. Extensive detailed design work is required before the overpass construction can commence. The tender process for the detailed design of the overpass is expected to commence in July 2013.

For more information

Visit: www.rms.nsw.gov.au

The project website is regularly updated and contains copies of the reports undertaken on the project and community consultation.

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All information in correspondence is collected for the sole purpose of assisting in the assessment of this proposal. The information received, including names and addresses of respondents, may be published in subsequent documents unless a clear indication is given in the correspondence that all or part of that information is not to be published. Otherwise RMS will only disclose your personal information, without your consent, if authorised by the law. Your personal information will be held by RMS Hunter Region. You have the right to access and correct the information if you believe that it is incorrect.

For more information

Please contact the Project Manager, Adam Thomas
Roads and Maritime Services, Locked Bag 2030 Newcastle NSW 2300
T 02 4924 0611 (during business hours) | E Adam.Thomas@rms.nsw.gov.au
www.rms.nsw.gov.au

June 2013
RMS 13.328
Attachment B

Crash Diagrams for the Railway Station Roundabout and Adjoining Highway
### SITE: NEW ENGLAND HIGHWAY AND CHURCH STREET / CESSNOCK ROAD, MAITLAND

**PERIOD START:** MAR QUARTER 2006  
**PERIOD ENDS:** JUN QUARTER 2011  
**TOTAL YEARS:** 5.50

**PRELIM. DATA STARTS:** SEP QUARTER 2011  
**PRELIM. DATA ENDS:** MAR QUARTER 2012

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#### KEY

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<td>INJURY CRASH</td>
</tr>
<tr>
<td>F</td>
<td>FATAL CRASH</td>
</tr>
<tr>
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<td>WET/ICY SURFACE</td>
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**E.G.: T=1**

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**TOTALS:**

- 16 TOWAWAY
- 12 INJURY
- 0 FATAL
- 7 WET/ICY SURFACE
- 4 DARKNESS

**AUTHOR:** JASON GILLET
**DATE:** 8/03/2012
**REVIEWED:**

**DATE:**

**NOTE: FOR FURTHER DETAILS REGARDING INDIVIDUAL CRASHES - REFER TO CRASH PROFILE**
### SUMMARY – COMMUNITY FEEDBACK (52 submissions) – MARCH 2012

#### CONSULTATION

<table>
<thead>
<tr>
<th>Comment</th>
<th>Number of times raised</th>
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<tr>
<td>Prefer flyover of roundabout(s) with NEH overpass/underpass (eg Weakleys Drive)</td>
<td>16</td>
</tr>
<tr>
<td>Add on/off ramps or more slip lanes to proposals</td>
<td>9</td>
</tr>
<tr>
<td>Options presented are waste of money / need better funded options / need options which account for longer term traffic / options don’t address problem</td>
<td>7</td>
</tr>
<tr>
<td>Issues with Elgin St proposal (increased traffic on side road, reduced safety, road not designed for traffic, poor condition)</td>
<td>6</td>
</tr>
<tr>
<td>Delay any work until HEX opens to see the impact of HEX on Maitland</td>
<td>3</td>
</tr>
<tr>
<td>Like the overpass option at railway roundabout</td>
<td>4</td>
</tr>
<tr>
<td>Closure of Walker St is good</td>
<td>3</td>
</tr>
<tr>
<td>Closure of Walker St is not good</td>
<td>6</td>
</tr>
<tr>
<td>Like the link road option at railway roundabout</td>
<td>3</td>
</tr>
<tr>
<td>Concerns about existing geometry (camber at railway rdbt, b double paths)</td>
<td>2</td>
</tr>
<tr>
<td>Need a local inner city bypass</td>
<td>4</td>
</tr>
<tr>
<td>Opposed to link road option – introduces additional intersections and delay</td>
<td>3</td>
</tr>
<tr>
<td>Concerns about traffic impacts on Cessnock Rd</td>
<td>3</td>
</tr>
</tbody>
</table>

Various one-off alternative proposals raised. Examples include:

- Remove the roundabout entirely, grade separate the highway, add on and off ramps or slip lanes
- Various options involving opening of nearby streets to alleviate congestion eg Ledsam St, Regent St, Stream St, Mount Dee Rd
- Add a connecting road at the pedestrian walk way under the highway (joins Ledsam Street at Long Bridge) to connect Telarah and Maitland
- Overpass from Cessnock Rd to Allan Walsh Drive
- Overpass from Louth Park Rd to Maitland CBD
- Traffic signals at Louth Park Rd
- Variations of option shown for overpass from Cessnock Rd to Church St
- Full interchange
- Install traffic signals similar to Turton Road and Griffith Road intersection near the football stadium
**SUMMARY – COMMUNITY FEEDBACK ON PREFERRED OPTION (27 submissions) – AUGUST 2012 CONSULTATION**

<table>
<thead>
<tr>
<th>Comment (Number times raised)</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>There should also be a westbound overpass / solution provided is only half a solution (8 people)</td>
<td>The option of having an overpass in both directions was considered (both as 1 lane and 2 lane options). Of the options modelled with estimated costs within the $45M funding allocated, the eastbound approach provides the greatest expected traffic benefit based on traffic modelling. The design will allow for the westbound approach to be considered for future funding and built onto at a later point. The westbound approach will have a more significant impact on local businesses and dwellings on the south-eastern side of the roundabout, and a greater flood impact. This option requires acquisition of property and is estimated at a further $35M (total estimate to have a 2 lane overpass in both directions is $70M). Traffic modelling based on future traffic projections following completion of the Hunter Expressway shows that the westbound provides marginal extra benefits, and is not as significant as the benefits from having an eastbound overpass.</td>
</tr>
<tr>
<td>Like the Preferred Option shown (6 people)</td>
<td>Some of these comments also suggested minor amendments to the design.</td>
</tr>
<tr>
<td>Concerns about the Walker Street U turn bay - should retain connection of Walker St to roundabout (3 people) - concerns about how the design will operate with heavier weekend traffic leaving Walker Street on weekends - Concerns about crossing Cessnock Rd which will become busier and is circuitous (2 people) - Walker St should have a roundabout rather than a Uturn across Cessnock Rd (1 person)</td>
<td>The original proposals for the Railway roundabout (displayed earlier in 2012) showed both the entry and exit of Walker Street closed off from the roundabout. Following consultation, it was determined that there was a strong desire to have the entry into Walker Street retained, with a safer options for exiting Walker Street to be considered. The proposal to remove the Walker Street departure was based on the following factors: 1) The legs on the southern side of the roundabout are in very close proximity to each other, making it difficult for drivers to get safe gaps 2) The crash history at this roundabout shows several cross traffic crashes at the Walker Street entrance. There is a desire to improve safety at the roundabout 3) Traffic information and feedback from local residents shows that it often takes a considerable time for motorists to get a safe gap out of Walker Street due to a combination of high vehicle volumes and the close proximity of Walker Street departure to the New England Highway (ie. westbound traffic) An earlier proposal looked at joining Walker Street to Cessnock Road via Elgin Street (down near the bridge on Cessnock Road). Again, there were several concerns from residents about this proposal. The main issues were to do with potential rat running and the fact that Elgin Street was not designed for larger vehicle volumes and would require upgrading. There were potentially significant issues with property</td>
</tr>
</tbody>
</table>

Printed copies of this document are uncontrolled
acquisition required for the link road.

The preferred option provides a safer slip lane access from the roundabout to Cessnock Road. The proposal involves a dedicated right turn bay from Cessnock Road into the U-turn bay which is located off Cessnock Road. The U-turn bay will be designed to cater for larger vehicles such as trucks and vehicles with horse floats.

Traffic modelling shows that the delays experienced by vehicles departing from Walker Street will be reduced under this proposed arrangement as vehicles have safer gaps entering the roundabout at Cessnock Road as compared to Walker Street. The increased traffic expected in the future on Cessnock Road (particularly increases from the Hunter Expressway) has been factored into the traffic modelling and design work.

Drivers wishing to leave the park area and head east also have the option of using Melbourne Street to access the highway if they are not comfortable with using the U-turn bay.

It should be noted that the overpass is for eastbound traffic only. Under the proposal presented, motorists heading west/north along the highway will continue to travel through the roundabout. If the Walker Street departure was retained it would continue to be in close proximity to westbound highway traffic.

RMS has investigated a revised design which pushes the location of the U-turn bay back further from the roundabout. Traffic modelling indicates the U-turn bay will be a sufficient distance away from the roundabout to avoid conflicts with queued traffic. From a safety perspective, the U-turn arrangement is consistent with current design standards and considered appropriate for the volumes of traffic expected.

The original proposals displayed to the public for comment earlier in the year included an option which had a flyover from Cessnock Rd to Church St (north-south) and retained the existing roundabout. Following strong feedback from the community RMS agreed to look at east-west flyover options.

While Cessnock Road traffic will increase following the completion of the Hunter Expressway, New England Highway traffic will continue to exceed Cessnock Road traffic.

The determination of a preferred option looked at a range of factors - including future traffic modelling, cost, community feedback, constructability issues, flood impacts and safety. Ultimately the eastbound flyover provided better outcomes in terms of future traffic modelling than a north-south flyover. A north-south flyover can be made to work efficiently by increasing the scale of works to an interchange type arrangement (ie. remove the roundabout, provide on and off ramps to Cessnock Rd and Church St etc) but this becomes very expensive and beyond the scope of funding.

There were several design and construction issues identified during further investigations of this option. A key issue is difficulties achieving
the vertical grading of the north-south overpass. Construction of this option also requires a roundabout/intersection on the northern side to merge Church St and overpass traffic, which is difficult within close proximity to the rail overbridge. There were also concerns about how this small northern roundabout would operate with future traffic volumes. Various concerns were also raised by the public during the first round of consultation about options that involve replacing a large roundabout with two smaller roundabouts. The main criticism was that we would simply be transferring the crash problems (resulting from a high number of conflicts each day), and providing a layout that would be viewed as complicated.

<table>
<thead>
<tr>
<th>Concern about impact on westbound traffic (3 people)</th>
<th>The option of having an overpass in both directions was considered (both as 1 lane and 2 lane options). Of the options modelled with estimated costs within the $45M funding allocated, the eastbound overpass provides the greatest expected traffic benefit based on future traffic modelling.</th>
</tr>
</thead>
</table>
| - there will be less breaks for westbound traffic as eastbound traffic wont stop traffic entering from Church Street.  
- westbound traffic currently suffers from queues and hasn't been addressed | The design will allow for the westbound approach to be considered for future funding and built onto at a later point. A westbound flyover will have a more significant impact on local businesses and dwellings on the south-eastern side of the roundabout, and a greater flood impact. This option requires acquisition of property and is estimated at a further $35M. Traffic modelling based on future traffic projections following completion of the Hunter Expressway shows that the westbound flyover provides marginal extra benefits, and is not as significant as the benefits from having an eastbound overpass. |

Following completion of the Hunter Expressway, the distribution and volumes of traffic at the Railway roundabout are expected to change. The number of vehicles travelling both east and west on the highway is expected to decrease significantly in the near future, while volumes on Cessnock Road are expected to increase. With development in Maitland, overall traffic volumes at the roundabout are expected to return to close to current volumes in approximately 15 years. However, through traffic on the highway in 15 years will remain below current volumes with the increase in traffic coming mainly from Cessnock Road.

RMS has conducted extensive counts and surveys at the roundabout. Analysis of this information shows the reason why the eastbound traffic experiences longer and more consistent queues and delays than westbound traffic at present is that there are a much larger number of conflicts during peak hours that affect the eastbound movement. The combined movements which cause the greatest conflict are the through movement from Cessnock Road into Church Street, and the right turn from the highway into Church Street.

Traffic modelling of the eastbound flyover for future years shows a more balanced roundabout operation and significant reductions in queues for all movements, including the westbound highway traffic. In the future the westbound highway approach will work better due to a combination of reduced demand on the highway (ie fewer westbound vehicles approaching the roundabout in peak hours) and an increase in turning vehicles / conflicts at Church Street (ie. increases in vehicles turning right from the highway into Cessnock Road, and increases in vehicles
turning right from Cessnock Road and heading east on the highway). Overall, the traffic modelling shows a decrease in congestion for westbound traffic.

| Consider adding a left slip lane from Cessnock Rd to NEH westbound (2 people) | RMS investigated this option and decided to implement this into the design. The left slip lane will:  
- cater for the increased volumes of traffic turning left from Cessnock Road following completion of the Hunter Expressway  
- reduce queue lengths and delays on Cessnock Road  
- reduce the incidence of queues on Cessnock Road reaching the U-turn bay for traffic exiting Walker Street. |

| Prefer an alternative proposal of taking Cessnock Rd/Church St traffic over the NEH and construct an elevated roundabout about 100m west of the current roundabout. The existing roundabout would be removed to allow highway traffic free movement both east and west. (2 people) | In terms of traffic performance this layout is expected to operate similarly to the option of grade separating both directions of the highway over the existing roundabout. Essentially both options involve separating through traffic from conflicting turning traffic. However a more detailed assessment of this proposal shows some significant issues concerning design, cost and constructability including:  
- The elevated roundabout would be required to be built as bridge structures in order to minimise flood impacts. This would add additional cost;  
- Both the eastbound off-ramp and the westbound on-ramp would be required to be built as bridge structures in order to minimise flood impacts. This would add additional cost;  
- The grade between Cessnock Road and the elevated roundabout would be excessively steep at approximately 6.5%;  
- There are constructability issues with rebuilding the Highway through the existing roundabout. This would require extensive side tracks and roadworks, with significant impacts on traffic expected over a much longer period;  
- The existing Pedestrian Overbridge couldnt be retained at its current location. This would need to be reconstructed to a substantially greater height or moved to a new location further to the east where it is less likely to be utilised.  

In many cases similar interchanges in NSW relied on the natural surface level and topography to provide the height for the elevated intersection. While the roundabout sections are bridging structures, the minor road approaches are in fact at (or close to) the natural ground level with the main road passing in an excavation underneath. To construct a similar elevated roundabout near the Railway Roundabout would require all of the height for the roundabout (as well as the overpass sections and the approach ramps) to be created through either bridging structures, earth-filled retaining walls or both. The strategic cost for this option has been estimated at between $70 million and $90 million. The variation in estimates depends on the construction method used for the connecting ramps, with the second estimate of $90M referring to an option which included bridge structures for parts of the eastbound on-ramp and westbound off-ramp in order to minimise disruption to motorists during construction.  
The cost estimates for such a proposal is of the same magnitude as grade separation of the highway in both directions, and the traffic benefits are similar. RMS proposal of an eastbound flyover was selected because it provided the best traffic outcome for the options assessed within the allocated budget, with modelling showing that the
| Suggestions for improvements to other intersections along the New England Highway through Maitland LGA (such as widening, grade separation, inner city bypasses etc) – 2 people | Traffic volumes on the Highway are expected to decrease significantly following the opening of the Hunter Expressway.

The $45M that has been allocated by the Hunter Infrastructure and Investment Fund was provided specifically for the Hospital and Railway station roundabouts.

RMS will consider proposals at other intersections along the New England Highway against other potential projects for future funding.

Funding has been allocated for the pinch point on the Highway between Regiment Road and Racecourse Road in Rutherford. The NSW Government has provided $3.5M for widening to provide 4 lanes. |
<table>
<thead>
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<tbody>
<tr>
<td>Concerns about timing - what is the rush? Why not continuing planning / wait until Hunter Expressway (2 people) - can we have the works implemented as soon as possible (1 person) - RMS should delay works and focus on a broader masterplan for the area first (1 person)</td>
<td>The NSW State Government has made a commitment to develop options for the two roundabouts (Railway and Hospital) which maximise safety and traffic efficiency benefits within the $45M allocated. This commitment was confirmed in September 2011 through the allocation of $45 million from the Hunter Investment and Infrastructure Fund (HIIF). The HIIF funding is a one-time only allocation which is fixed (capped) at $45 million in today’s dollars and will not increase in the future to reflect increasing costs. RMS have been undertaking investigations on a range of options for upgrading the Maitland Roundabouts since before 2008. As a government agency, RMS has a responsibility to deliver the commitments of the NSW Government, while consulting with and taking into consideration views of the community and stakeholders.</td>
</tr>
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</table>
| Detailed design concerns: - concerns about the eastbound merge between traffic on the overpass and traffic coming from the roundabout (2 comments) - how will cyclists be catered for (1 comment) - reconsider warning signage and speed signage at roundabouts (2 people) - increase the westbound highway movement to 3 through lanes to minimise delay for this approach (1 person) - The pedestrian path under the bridge | The proposal presented is a concept. Prior to construction of any works the project will need to go through an extensive design process which includes independent road safety audits. The audits will assess the preferred option against road design guidelines, and will include a review of issues such as bicycle and pedestrian facilities, shoulder widths, alignments of the approaches and departures, design speeds, merge arrangements. The detailed design decisions are still being worked through.

Overall RMS is seeking to improve facilities for vulnerable users such as cyclists over what exists currently. In 2012 RMS provided $200,000 funding to Maitland Council to upgrade off path facilities near the park, and will be developing suitable cyclist routes within the upgrade project. |
places pedestrians closer to traffic danger.
- Public transport has been ignored.
- Heavy / oversize loads will have problems passing through the intersection.
Attachment D

Assessment of Preferred and Alternative Options
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<td>Nil change – existing roundabout.</td>
</tr>
<tr>
<td>Church St to Cessnock Rd overpass (shown in community update Feb 2012)</td>
<td>$35M (Excludes costs for connections to Elgin Street shown in some layouts)</td>
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<td>Worst 95th % queue: 416m (NEW ENGLAND HIGHWAY Eastbound AM)</td>
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<td>Worst leg – delay: 163s (NEW ENGLAND HIGHWAY Eastbound AM)</td>
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<td>5 legs remain on the roundabout - additional improvements required to address safety, particularly conflicts between westbound approach and Walker St. Main benefit is reduced traffic / conflicts at the roundabout via separated movement of north-south movements</td>
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<td>Minor impact based on proposed alignment and initial flood assessment</td>
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<td>Potential impact on Rail buildings at connection to existing rail bridge. Acid Sulfate Soils (ASS) to be managed.</td>
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<td>Potential visual impact.</td>
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<td>Area of Council land to be acquired.</td>
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<td>Potential acquisition of Rail Corp land. Limited private property to be acquired.</td>
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<td>Moderate impacts on Steamfest site. Not as ideal as addressing the major traffic movements at the roundabout as grade separation of the highway.</td>
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<td>There are issues with the give way intersection and the vertical grades on Church St. There are traffic benefits, but not as much as East-West grade separation.</td>
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<td>Removes HW9/Church St left turn movements and Cessnock Rd /Church St through movements. HW9 through and right turn movements remain as existing.</td>
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<td>Link road option</td>
<td>Strategic cost estimate approx $18M (Cessnock Rd link road + r'bout only $15M Elgin St link Rd additional $3M)</td>
<td>Worst leg LOS: C (HW9 Eastbound AM) Worst 95th % queue: 75m (HW9 Eastbound AM) Worst leg – delay: 34s (HW9 Eastbound AM)</td>
<td>Worst leg LOS: F (HW9 Eastbound AM) Worst 95th % queue: 400 (HW9 Eastbound AM) Worst leg – delay: 190s (HW9 Eastbound AM)</td>
<td>There is a benefit in separating some movements from the roundabout, particularly improves the conflict between westbound highway and right turn into Cessnock Rd, and reduces westbound loss of control crashes. This option doesn’t improve Walker St conflicts.</td>
<td>No impact if high point on carriageway x-section does not exceed existing top of levy levels.</td>
<td>Negligible identified. ASS to be managed.</td>
<td>Large area of rural property to be acquired from two property owners. Initial discussions with property owners indicate willingness to co-operate.</td>
<td>Elgin St link road had limited support from the community with several concerns raised about Elgin St not designed for increased traffic. Community preference for east-west grade separation.</td>
<td>Majority can be constructed offline. Alignment uses existing levy and provides for flood free route to bridge (alternative highway route). Removes HWY9/Cessnock Rd RT movements and Cessnock Rd/HW9 LT movements. Introduces 2 new intersections (HW9 &amp; Cessnock Rd). There are traffic benefits, but not as much as East-West grade separation.</td>
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<td>Eastbound overpass (2 lanes) - Preferred option</td>
<td>Strategic cost estimate $43.1M for full bridge structure. $38.1M for RE walls east of Church St and bridge structure west of Church St.</td>
<td>Worst leg LOS: B (HW9 Eastbound AM) Worst 95th % queue: 55m (HW9 Westbound AM) Worst leg – delay: 18s (HW9 Eastbound AM)</td>
<td>Worst leg LOS: B (HW9 Eastbound AM) Worst 95th % queue: 106 (HW9 Westbound AM) Worst leg – delay: 23s (HW9 Eastbound AM)</td>
<td>Improves loss of control crashes and rear enders on the highway eastbound, and reduces conflicts / potential for cross traffic crashes via reduced volumes entering the roundabout. 5 legs remain on roundabout so additional improvements are required to address close proximity of legs and cross traffic conflicts</td>
<td>Flood impact is minor with structure. Western side of Church St to be bridge structure to minimise flood impacts.</td>
<td>Negligible identified. Noise mitigation to be considered as part of environmental assessment. ASS to be managed although less than link road options. Potential visual impact to be managed through urban design.</td>
<td>Large area of Council land to be acquired. No private property to be acquired.</td>
<td>Compatible with future upgrade to build w/b overpass. Removes through HW9 traffic. Significantly reduces Cessnock Rd/HW9 RT conflict. Grade separation preferred by the community. Traffic modelling shows as the best future performance of all options within the allocated budget.</td>
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<td>Eastbound and westbound overpass – 2 separate structures, 2 lanes each direction</td>
<td>Strategic cost estimate $70M if constructed using bridge structure (Assumes the roundabout is retained in its current layout)</td>
<td>Worst leg LOS: B (HW9 Eastbound AM) Worst 95th % queue: 33m (HW9 Eastbound AM) Worst leg – delay: 19s (HW9 Eastbound AM) (Paramics output)</td>
<td>Worst leg LOS: B (HW9 Eastbound AM) Worst 95th % queue: 40m (HW9 Eastbound AM) Worst leg – delay: 24s (HW9 Eastbound AM) (Paramics output)</td>
<td>Improves loss of control crashes and rear enders for both directions on the highway, and reduces conflicts / potential for cross traffic crashes via reduced volumes entering the roundabout. 5 legs remain on the roundabout so additional improvements are required to address close proximity of legs and cross traffic conflicts</td>
<td>Flood impact greater then Eastbound grade separation due to works on the south western side of the intersection. Western side of Church St would be bridge structure.</td>
<td>Potential European heritage impact in Memorial Park. Noise mitigation likely. ASS to be managed although less than link road options. Potential visual impact.</td>
<td>Large area of Council land to be acquired. Includes acquisition of memorial park. One total acquisition of private property. Westbound approach would be very close to vet surgery and private dwellings.</td>
<td>Option would gain most community acceptance of all options for commuters. There would be significant impacts on dwellings, vet and park located on the south eastern side of the roundabout.</td>
<td>Same as grade separation eastbound but with westbound overpass south of roundabout. Requires addressing of existing safety issues. Acquisition issues for westbound. Will impact on the park and local residents / businesses. Best modelled option but also significantly more expensive. Exceeds allocation for project.</td>
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<td>Eastbound and westbound overpass - 1 lane each direction combined on northern side of bridge (o/pass)</td>
<td>Higher than preferred option (ie &gt; $38M) due to additional construction work required to connect westbound lane to existing carriageways plus provision of additional centre median barrier.</td>
<td>Worst leg LOS: B (HW9 Eastbound AM) Worst 95th % queue: 31m (HW9 Eastbound AM) Worst leg – delay: 21s (HW9 Eastbound AM) (Paramics output)</td>
<td>Worst leg LOS: C (HW9 Eastbound AM) Worst 95th % queue: 50m (HW9 Eastbound AM) Worst leg – delay: 31s (HW9 Eastbound AM) (Paramics output)</td>
<td>As per above. Highway traffic will need to merge from 2 lanes into 1 lane to get onto the overpass which increases the risk for merging crashes.</td>
<td>Flood impact slightly greater than the NEH eastbound overpass (preferred option). Western side of Church Street required to be constructed as bridge structure.</td>
<td>Negligible identified. Noise mitigation likely. ASS to be managed although less than link road options. Potential visual impact.</td>
<td>Large area of Council land to be acquired. Limited private property to be acquired.</td>
<td>Option likely to gain community support. However the merge of highway traffic from 2 lanes into 1 to get onto the flyover is likely to present safety and queuing issues.</td>
<td>Addresses east/west traffic congestion in both directions. Much larger structure and higher cost than preferred option. Expensive to upgrade in the future. Constructability issues when constructing NEH westbound connections.</td>
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Future traffic performance models very similar to preferred option. Worst leg is still NEH Eastbound.
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<td>4 way traffic signals (TCS) – 2 through lanes east and west on the highway</td>
<td>Cost estimated in the order of $20M.</td>
<td>Overall LOS: C (AM &amp; PM) Worst leg LOS: D (HW9 West AM) Overall – 95% queue (m): 149 (AM) Worst leg – delay: 47 sec (HW9 AM) (SIDRA output)</td>
<td>Overall LOS: D/E (AM/PM) Worst leg LOS: F (HW9 East and West in PM) Overall – 95% queue (m): 334m (PM) Worst leg – delay: 85 sec (HW9 east PM) (SIDRA output)</td>
<td>Improved control of turning movements over existing roundabout, and improvements to conflicts by reducing from 5 legs to 4 legs. Main risks are red light runners and rear enders (especially in peak periods, sun setting)</td>
<td>2 lane approaches have negligible impact</td>
<td>Negligible identified. Would be built primarily within existing footprint.</td>
<td>No private property to be acquired.</td>
<td>Strong community opposition to more traffic signals in this area. Want to see priority given to the highway. Negligible desire for pedestrian facilities at this location.</td>
<td>Requires large footprint, impacts the pedestrian bridge, would require widening in future. Community objections expected, three lane approaches better traffic efficiency but has higher flood impacts and costs. Traffic performance poorer than other options. Two lane configuration does not perform acceptably in 2026.</td>
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<td>4 way traffic signals (TCS) – 3 through lanes east and west on the highway</td>
<td>Cost estimated in the order of $34M. (similar to preferred option)</td>
<td>Overall LOS: C (AM peak) Worst leg LOS: C (Various legs AM/PM) Overall – 95% queue: 126m (AM) Worst leg – delay: 42 secs (Cessnock Rd AM) (SIDRA output)</td>
<td>Overall LOS: D (AM peak) Worst leg LOS: D (Cessnock Rd &amp; Church St AM) Overall – 95% queue: 233m (AM) Worst leg – delay: 55 secs (Cessnock Rd AM) (SIDRA output)</td>
<td>Improved control of turning movements over existing roundabout, and improvements to conflicts by reducing from 5 legs to 4 legs. Main risks are red light runners and rear enders (especially in peak periods, sun setting)</td>
<td>Much larger impact than 2 lane approaches option</td>
<td>Negligible identified. Noise mitigation likely. Potential impact on Memorial Park. Potential flood impact to be mitigated.</td>
<td>Acquisition of Council land required.</td>
<td>Community opposition to more traffic signals in this area. Want to see priority given to the highway.</td>
<td>Requires much larger footprint than existing roundabout. Existing pedestrian overbridge would be removed. Would have a better traffic impact than 2 lanes each way. Longer term doesn’t work as well as the preferred option.</td>
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<td>Underpass (East / West)</td>
<td>Not costed as flooding impact deems option not feasible</td>
<td>Traffic performance expected to be the same as an overpass – refer to NEH eastbound overpass.</td>
<td>Traffic performance expected to be the same as an overpass – refer to NEH eastbound overpass.</td>
<td>Expected to be the same as an overpass – refer to NEH eastbound overpass.</td>
<td>Significant flood impacts – underpass would be inundated with water and would require system for pumping water out.</td>
<td>Significant water quality management required. Significant ASS impact.</td>
<td>Large area of Council land to be acquired. No private property to be acquired.</td>
<td>Limited support shown from the community. Would be an ineffective option during heavy rain periods.</td>
<td>Vertical grading of underpass to clear Church St means that underpass will be subject to flood inundation. Horizontal alignment requires acquisition of rail property. Benefits similar to NEH eastbound overpass.</td>
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<td>Full Interchange</td>
<td>Similar scope to Cessnock Rd north - south overpass but higher costs due to additional roundabouts required; Church St rail bridge widened to three lanes; multiple ramps; larger pavement footprint; and conversion of</td>
<td>Similar to north south Cessnock Road overpass.</td>
<td>Similar to north south Cessnock Road overpass.</td>
<td>Addresses loss of control crashes and rear endsers on the highway, and reduces conflicts / potential for cross traffic crashes via reduced volumes entering the roundabout. Interchange operation is more complicated (eg eastbound turning right into Cessnock Rd requires left turn movement off the highway before coming back over SH9). With 2 new roundabouts installed and one in close proximity to rail</td>
<td>Similar to north south Cessnock Road overpass.</td>
<td>Negligible identified. Significant ASS impact.</td>
<td>Similar to north south Cessnock Road overpass.</td>
<td>Similar to north south Cessnock Road overpass.</td>
<td>Same vertical grading issues as north south Cessnock Road overpass., Significant impact on Steamfest site. Right turn out of Cessnock Rd and right from NEH into Cessnock Rd requires longer distance to be travelled. New roundabouts required on Church St and Cessnock Rd.</td>
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<td>roundabout to four through lanes.</td>
<td>overbridge, this option is likely to introduce a new crash pattern.</td>
<td>Both rdbts expected to cope with significant turning volumes.</td>
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<td>Signalise all legs of the roundabout – with circulating anti-clockwise green phase</td>
<td>Low cost option around $1M - $2M. Installing traffic signal equipment and re-surfacing to re-line mark pavement.</td>
<td>Overall LOS: F Worst leg LOS: All F Overall – 95% queue (m): &gt;500m Worst leg – delay (secs): &gt;3 mins on HW9 (SIDRA output)</td>
<td>Overall LOS: F Worst leg LOS: All F Overall – 95% queue (m): &gt;500m Worst leg – delay (secs): &gt;3 mins on HW9 (SIDRA output)</td>
<td>Retains 5 legs of the roundabout, with legs closely spaced. Cross traffic crashes should improve with controlled movements, provided red-light runners and speeds are managed. Costs would increase if the roundabout was reduced to 4 legs (for safety reasons)</td>
<td>Negligible</td>
<td>Yes</td>
<td>Negligible</td>
<td>Not likely to be accepted by community, short term option rather than long term investment</td>
<td>Community acceptance not likely, traffic modelling indicates it is not a long term solution (fails in the short term), inefficient system as no parallel movements are catered for. Doesn’t cater for future traffic growth.</td>
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<td>Construction of an elevated option to the west of the existing roundabout, remove current roundabout and allow the highway to flow unobstructed</td>
<td>Cost estimated in the order of $110M (wall and bridge structure)- $140M (all bridge structure)</td>
<td>Performs similar to grade separation of the highway in both directions</td>
<td>Performs similar to grade separation of the highway in both directions</td>
<td>Similar safety benefits as grade separation of the highway in both directions</td>
<td>Wall and bridge option would have significant impact. Bridge structure option would have greater impact than preferred option.</td>
<td>Similar to preferred option.</td>
<td>Greater footprint than preferred option.</td>
<td>Is likely to be seen as elevating the existing roundabout rather than improving separation and movement conflicts.</td>
<td>Constructing under live traffic would be very difficult and would involve substantial temporary works and sidetracks resulting in impacts to traffic over a long period. Significant cost well beyond allocation. See attachment C for other issues.</td>
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Attachment E

The Preferred Option - Eastbound Highway Lanes Over Existing Roundabout
Attachment F

Alternative options considered for the Railway station roundabout
Figure: Example of an overpass between Church Street and Cessnock Road (several variations of this option were considered)
Figure: Example of a link road connecting Cessnock Rd and the highway (several variations of this option were considered)
Examples of eastbound overpass options (looking at different structures for the overpass)
Figure: Overpass both eastbound and westbound (2 lanes in each direction)
Figure: Overpass both eastbound and westbound (1 lanes in each direction on the northern side of the roundabout)
Figure: 4 way traffic signals replacing the roundabout (2 through lanes on each highway approach, plus left and right turn lanes)
Figure: 4 way traffic signals replacing the roundabout (3 through lanes on each highway approach, plus left and right turn lanes)
Figure: Broad concept of a full interchange
Figure: Interchange involving grade separation of Church Street to Cessnock Road, roundabout removed, new roundabouts constructed on Church Street and Cessnock Road to facilitate turning movements.
Figure: Elevated roundabout to the west of the existing roundabout, remove current roundabout and allow the highway to flow unobstructed
Figure: Left slip lane out of Cessnock Road