Yoogali intersection upgrade
Submissions report
Roads and Maritime Services | December 2018

Prepared by Jacobs and Roads and Maritime Services

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### Approval and authorisation

<table>
<thead>
<tr>
<th>Title</th>
<th>Yoogali intersection upgrade submissions report</th>
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</thead>
<tbody>
<tr>
<td>Accepted on behalf of NSW</td>
<td>Tim Keyes, Project Manager</td>
</tr>
<tr>
<td>Roads and Maritime Services</td>
<td></td>
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<tr>
<td>by:</td>
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<td>28 November 2018</td>
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Executive summary

Roads and Maritime Services is proposing to upgrade the intersection of Burley Griffin Way, Mackay Avenue, Kurrajong Avenue and Irrigation Way at Yoogali. The proposal involves widening and upgrading all intersection legs, installing new traffic lights and upgrading the existing Irrigation Way bridge with a new culvert structure. The work will improve safety and productivity for road users by boosting the capacity of existing roads, particularly for heavy vehicle drivers.

The existing intersection is a priority intersection with a “Give Way” control for the side roads - Burley Griffin Way and Kurrajong Avenue. The Narrandera to Griffith rail line is immediately north of the intersection and runs alongside Irrigation Way and Mackay Avenue.

As part of the proposal, a Review of Environmental Factors (REF) was prepared to assess the likely impact of the proposal on the environment and to detail the protective measures to be implemented. In order to seek community feedback on the REF, the REF was publicly displayed from Monday 25 June 2018 to Friday 20 July 2018 in Griffith. The REF was also available for download on the Roads and Maritime website. Community feedback was encouraged in the form of formal submissions, submitted by phone, email and mail. This report summarises the issues raised and provides Roads and Maritime’s response to each issue.

A total of 22 submissions were received, the majority of which were individual submissions, with a small number of submissions from organisations and government agencies. The main issues included the introduction of traffic lights (support for, as well as opposition to), consultation, safety, construction traffic management and diversions, and alternative design options. Design changes adopted after the submissions process include adjustments to stormwater drainage to minimise impacts to businesses and assessment of utilities adjustments to aid future upgrades to intersection capacity.

This report also assesses the impact of closing Irrigation Way while the new bridge over Main Drain J is built. Road closures had not been assessed in the REF, however, safety and constructability reviews completed since the REF display identified a need to assess the impact of a three-month closure to address risks to workers and the public. The assessment includes an evaluation of noise impact on residents along the proposed detour route, detailed in Appendix B of this report.

Roads and Maritime has considered the submissions and provided responses to each aspect, given the project’s objectives and environmental assessment as detailed in the REF. Where required, additional environmental management measures have been detailed to provide further safeguards. For further detail, refer to the responses in this report.
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<tbody>
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</tr>
</tbody>
</table>
1. Introduction and background

1.1 The proposal

Roads and Maritime is proposing to upgrade the intersection of Burley Griffin Way, Mackay Avenue, Kurrajong Avenue and Irrigation Way at Yoogali in the Griffith Local Government Area (LGA), shown in Figure 1-1. The scope of work includes utility adjustments, improved street lighting, replacing the bridge structure, upgrading the railway level crossing and rail signals, reconstructing the road, upgrading kerbing and footpaths and installing traffic lights and signage.

An overview of the proposal is provided in Figure 1-2. A more detailed description of the Yoogali intersection upgrade is found in section 1.1 of the Yoogali intersection upgrade Review of Environmental Factors prepared by Roads and Maritime in June 2018.
1.2 REF display

Roads and Maritime prepared an REF to assess the potential environmental impact of the proposed work. The REF was publicly displayed for 26 days between Monday 25 June and Friday 20 July 2018 for community comment and feedback. Hard copies of the REF were available to view at Griffith City Council and Griffith City Library, and on Roads and Maritime’s website, as detailed in Roads and Maritime doorknocked properties and businesses next to the proposal to discuss the preliminary concept design in more detail and answer any questions. Residents and business owners were encouraged to provide feedback via formal submissions.

Table 1-1.

A community update was distributed to around 5500 residents and businesses in the area surrounding the proposal to raise awareness of the proposal and invite feedback. The community and stakeholders were encouraged to provide their feedback to the proposal team by phone, email or mail.

In addition to the public display, the REF was made directly accessible for feedback to Griffith City Council, St Mary’s Primary School and Yoogali Public School (see Appendix A).

Roads and Maritime doorknocked properties and businesses next to the proposal to discuss the preliminary concept design in more detail and answer any questions. Residents and business owners were encouraged to provide feedback via formal submissions.

Table 1-1: Display locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Griffith City Council</td>
<td>1 Benerembah Street, Griffith</td>
</tr>
<tr>
<td></td>
<td>Monday to Friday: 8.15am to 4pm</td>
</tr>
<tr>
<td>Griffith City Library</td>
<td>233-237 Banna Avenue, Griffith</td>
</tr>
<tr>
<td></td>
<td>Monday, Tuesday, Wednesday, Friday: 9am to 5.30pm</td>
</tr>
<tr>
<td></td>
<td>Thursday: 9am to 7pm</td>
</tr>
<tr>
<td></td>
<td>Saturday: 9am to 4pm</td>
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</table>

1.3 Purpose of the report

This submissions report relates to the REF prepared for the Yoogali intersection upgrade and should be read in conjunction with that document.

The REF was publicly displayed and submissions about the proposal and the REF were received by Roads and Maritime. This submissions report summarises the issues raised and provides responses to each issue (Chapter 2). It details investigations carried out since the REF’s finalisation (Chapter 3), describes and assesses the environmental impact of changes to the proposal (Chapter 4) and identifies new or revised environmental management measures (Chapter 5).

No changes are proposed that would require the preparation of an addendum REF. No revisions have been made to the assessment or environmental management measures as described in the environmental impact statement.
2. **Response to issues**

Roads and Maritime received 22 submissions, including submissions received one week after the close of the display period (up until Friday 27 July 2018). Table 2-1 lists the respondents and each respondent’s submission number. The table also indicates where the issues from each submission have been addressed in Chapter 3 of this report.

Table 2-1: Respondents

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Submission No.</th>
<th>Section number where issues are addressed</th>
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<tr>
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<tr>
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<tr>
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2.1 Overview of issues raised

Of the total 22 submissions made, one was received from Griffith City Council, three from businesses and 18 from individual community members. This included:

- Four letters
- 16 emails
- Two phone calls.

A total of 32 issues were raised in the submissions. Some submissions contained multiple issues. Each submission has been examined individually to understand the issues being raised. The issues raised in each submission have been collated and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and Roads and Maritime's responses to these issues forms the basis of this chapter.

Of the 22 submissions received, 64 per cent supported the proposal. A number of submissions noted the positive impact traffic lights would have on safety around the intersection, with a number of previous accidents and near-misses highlighted.

Three submissions objected to the proposal. Reasons provided included concern that the proposal would cause confusion and disruption, that the current traffic volume and incident numbers do not warrant traffic lights, and a preference for a roundabout. The remaining submissions were neutral and suggested changes or queried one or more elements of the proposal.

The most commonly raised issues included:

- Property impacts during construction
- Driveway access
- Construction timing and staging
- Alternative design options
- Traffic diversions during construction
- Drainage.

The majority of the comments received were related to property impacts during construction and driveway access.

The submission from Griffith City Council supported the proposal and recognised the need to upgrade the intersection to ensure safe and efficient access. However, council also raised a number of concerns, including intersection capacity, design and road safety.

The following sections of this report will discuss the issues raised in the submissions in more detail.

2.2 Traffic

Traffic was raised in 32 per cent of the submissions and was the category with the most responses. Within this category, respondents raised matters relating to:

- Traffic signals
- Method of calculating traffic
2.2.1 Traffic signals

Submission number(s)
3

Issue description
- Include a slip-lane or “left turn on red light when safe” on the Irrigation Way approach to reduce build-up of queued traffic
- Would traffic lights have a green arrow for turning, in addition to the “turn left on red” signage?

Response
Yes, some traffic lights would have dedicated green arrows. The suitability of “turn left on red signage” would be considered in the detailed design.

2.2.2 Traffic assessment methodology

Submission number(s)
18, 20

Issue description
- Concerned the traffic assessment underestimates peak traffic as the traffic survey was not conducted during peak agricultural and industry operations
- Concerned the traffic assessment underestimates queue lengths during rail level crossing closures along Mackay Avenue approaching the intersection.

Response
As part of the REF, Roads and Maritime carried out a detailed traffic assessment which considers long-term growth to ensure the proposal can cater for predicted traffic volumes.

To account for seasonal variation, the initial traffic forecasts adopted in the traffic assessment were much higher than population growth. Sensitivity testing indicated a further 45 per cent increase of predicted traffic volumes in 2037 would still result in acceptable performance.

The traffic assessment considered a high level, worst-case scenario of a train arriving in the peak traffic period. Data used in the traffic model indicated train crossings currently occur on average three times per day. This may reduce to one per day as a result of the Wumbulgal intermodal terminal. The instance of a train arriving during peak traffic period is expected to be relatively rare.
2.2.3 Queuing

Submission number(s)
2, 3, 18

Issue description
- Concerned proposed traffic lights would cause queuing during peak periods and restrict driveway access along Mackay and Kurrajong avenues
- Concerned about stacking distance along Burley Griffin Way, particularly during peak hour periods. Suggested left and right turning lanes should be considered for southbound traffic at the Burley Griffin Way approach.

Response
The traffic assessment shows that while traffic queues would be created at peak times, queue lengths would not typically extend past the driveway access on Irrigation Way. Similarly, traffic lights would introduce queues along Mackay Avenue at peak times, however the delay to residents accessing properties on Mackay Avenue is expected to be minor. All traffic lights in NSW are triggered by actual vehicle movements and volumes to cater for peak flows.

Safety for residents should improve as traffic movements would be more predictable than the current intersection arrangement. Traffic modelling also revealed the proposed lane configuration is acceptable, with the addition of conservative future traffic volume projections.

A dedicated right-turn traffic light phase for southbound Burley Griffin Way traffic is proposed in the traffic light design to give priority to traffic on this approach and manage queue lengths. Traffic modelling showed queue lengths along Burley Griffin Way during peak periods would not typically extend past Edon Street, except in the instance of a train crossing. Rail-induced delays are an existing traffic condition and not a result of this proposal.

2.2.4 Traffic flow impact

Submission number(s)
8, 12, 19

Issue description
- Concerned about disruption and confusion for road users both during and after construction
- Concerned proposed traffic lights would cause traffic delays unless traffic-generated
- Concerned about the impact traffic lights would have on traffic flow.

Response
The intersection with traffic lights was evaluated as the best performing option, meeting all of the project objectives, including increasing the intersection’s capacity. It is expected installing traffic lights and widening the intersection would improve road user safety, traffic performance and higher productivity vehicle accessibility in the future.

All traffic lights in NSW are triggered by actual vehicle movements.
Traffic flow during construction will be managed through a Traffic Management Plan and the use of on-site traffic controllers.

2.2.5 Future traffic needs

Submission number(s)
18

Issue description
- Concerned increased traffic as a result of the upgrade would be greater than that projected in the REF and catered for in the current proposal
- Concern the proposed intersection would not be able to cater for current or future traffic needs and would result in delays. Suggested more turning lanes are needed.

Response
Traffic modelling of the proposal adopted an initial increase of 30 per cent in traffic volumes by 2037. This was based on the annual employment growth rates in Griffith between 2001 and 2011. Traffic volumes assumed a further 100 per cent increase in heavy vehicle movements along Burley Griffin Way and Kurrajong Avenue.

This forecast is considered conservative given that it is substantially higher than the NSW Department of Planning and Environment population growth forecasts and Griffith City Council forecast of 14 per cent population growth over 20 years.

Further assessment of the proposed intersection showed that an additional 45 per cent increase in forecasted 2037 traffic volumes would still result in the proposed intersection performing at an acceptable level.

2.2.6 Railway crossing safety

Submission number(s)
20

Issue description
- Traffic lights would not resolve the issue of drivers queuing across the rail crossing.

Response
The proposed intersection includes a stop line immediately north of the railway level crossing and a dedicated traffic light phase for Burley Griffin Way right turn and through movements without delay from oncoming traffic. The phasing gives priority to traffic turning right from Burley Griffin Way combined with the stop line north of the rail crossing, prevents queuing across the railway line.

Signposting and road markings at the level crossing would be installed as part of the upgrade.
2.2.7 Impact on local road network

Submission number(s)
20

Issue description
- Traffic lights would result in increased traffic on alternative routes as a result of drivers avoiding the intersection.

Response
Delays associated with the proposed upgrade are forecasted to be low, reducing the desire for drivers to use alternative routes. In addition, traffic lights would provide safe right turns, which may increase the number of road users wanting to use the proposed intersection.

2.3 Property impact

Property impacts were raised in 14 per cent of the submissions, mainly relating to driveway access along Mackay and Kurrajong avenues during construction and operation, drainage and concern about drainage and flooding impacts on nearby properties.

2.3.1 Drainage and flooding

Submission number(s)
2, 21

Issue description
- Existing drains on Mackay Avenue cause flooding on nearby properties due to blockages. Will this be addressed as part of the drainage for the project?
- Concerned about inadequate drainage along the Mackay Avenue frontage.

Response
Areas in the proposal’s vicinity are prone to drainage issues due to the existing intersection layout, approach roads and nearby land. The existing drainage issues along the southern side of Mackay Avenue are likely to be caused by silt or rubbish build-up along existing culverts and flat grades along the drainage path. Roads and Maritime would inspect the pipes and drains along Mackay Avenue and would clean and remove blockages where required.

The installation of kerb and guttering will also improve drainage.

2.3.2 Construction impact

Submission number(s)
2, 21, 22
Issue description

- Concerned about the impact to the Griffith City Volkswagen car dealership display area during the stormwater drain’s construction. Suggested the use of trenchless construction methods or the relocation of the stormwater drain
- Concerned about the impact of proposed kerbing on the Griffith City Volkswagen car dealership display area
- Safety bollards around the Griffith City Volkswagen car dealership display area should be reinstated to their current condition after construction
- Concerned about impacts to property and the Griffith City Volkswagen car dealership during construction. Ensure driveways are reinstated to their original condition once work is complete.
- Concerned about impact of construction work on property.

Response

There may be some short-term property access disruptions during construction which would be managed as part of the Construction Traffic Management Plan (CTMP).

The existing drainage line within the road reserve across the car dealership display area was nominated for replacement as part of the concept design. Roads and Maritime is currently reviewing the extent of the drainage design to minimise or eliminate work within this area.

The south-west corner of the intersection upgrade between Mackay and Kurrajong avenues would be designed to combine with the existing car dealership property and display area.

The final design of garden beds, bollards, shared paths, level differences and other finer details would be confirmed during the detailed design phase, with consideration to the above issues raised. Roads and Maritime would continue to consult directly with individual landowners during detailed design and construction about private property impacts and restoration work.

2.4 Design

Of the 22 submissions, 81 per cent raised issues relating to the design. This included submissions proposing changes to design elements or expressing a preference for an alternative traffic lights option.

2.4.1 Alternatives options

Submission number(s)
13, 19, 20

Issue description

- Would like to see the staggered intersection option (Option C) selected to minimise traffic past homes in Yoogali and deter speeding
- A roundabout (Option B) is preferable to the intersection with traffic lights (Option D)
- Preference for a long-term plan to divert heavy vehicles away from the town centre.

Response

Four options were compared as part of the options assessment:
Option A – Do nothing (maintain the existing intersection)
Option B – Roundabout
Option C – Staggered T intersection
Option D – Traffic lights at the intersection, integrated with railway level crossing.

The reasons for the preferred intersection option have been set out in Section 2 of the REF. The preferred option was judged as the best performing option, meeting project objectives.

Key project objectives include heavy vehicle accessibility and eliminating short stacking, where long vehicles are prone to queueing across the railway level crossing. Option B (the roundabout) did not meet the project objectives, as heavy vehicle accessibility would be restricted and short stacking would remain.

Option C (the staggered intersection) was not considered feasible due to the significant cost of additional bridges, property impacts and measures to relieve drainage issues and flooding impacts. Option C was judged as the worst for traffic performance; the issue of short stacking remained and it did not meet all of the project objectives.

Option D (traffic lights) was identified as the best option as it improves road user safety by minimising short stacking as well as catering for all long vehicle movements. Option D would also likely improve the amenity of the town centre with reductions in noise and pollution, due to the higher intersection capacity.

The project enables heavy vehicles to be diverted around the town centre by improving heavy vehicle accessibility through the intersection. Consideration has also been given to future heavy vehicle corridors along Kurrajong Avenue. Heavy vehicle movements on local roads are managed under Griffith City Council's Heavy Vehicle Strategy.

Roads and Maritime would liaise with Griffith City Volkswagen directly on entry and exit layouts during detailed design to achieve a safe outcome.

### 2.4.2 Access

**Submission number(s)**

17

**Issue description**

- Consider realigning the northbound and southbound approaches so they are 90 degrees to Mackay Avenue and Irrigation Way.

**Response**

The study area is restricted by existing infrastructure including the Main Drain J drainage channel, significant utilities and a railway line. Road alignment adjustments would not be feasible given these restrictions, and is not required with traffic lights at the intersection. “Squaring” of the Burley Griffin Way and Kurrajong Avenue approach roads would also introduce bends in the road further away from the intersection and may impact nearby properties.
2.4.3 Turning lanes

Submission number(s)
18

Issue description
- The intersection should include dedicated right and left turning lanes for Mackay Avenue, Burley Griffin Way and Irrigation Way to reduce traffic delays.

Response
Traffic modelling indicates that without the turn lanes the intersection would operate at good levels of service, both with existing traffic volumes and forecasted traffic volumes for 20 years in the future. This includes further testing of a 45 per cent increase in traffic and doubling of heavy vehicle numbers.

It should be noted the traffic light design would introduce dedicated traffic light phases for both Kurrajong Avenue and Burley Griffin Way to give priority to turning traffic on these approaches without delay from opposing traffic movements. The Mackay Avenue left turn lane would be maintained.

Roads and Maritime has modelled a number of intersection layouts during development and determined the modest improvement in capacity as a result of additional right-turn lanes does not warrant the extra investment.

2.4.4 Drainage and flooding

Submission number(s)
18, 21, 22

Issue description
- Concerned about the proposed twin box culverts on Irrigation Way and the potential for flooding issues resulting from a build-up of debris. Stated a preference for a clear span bridge to avoid build-up of debris
- Would the kerb on Kurrajong Avenue be increased when the road is redesigned?

Response
The existing twin cell box culverts are 3.66 metres wide by 1.98 metres high. These are proposed to be replaced with a larger structure. The increased waterway area of the new structure would modestly improve drainage capacity and reduce the risk of blockage from debris. Further increases in the waterway area, whether through increased culvert sizes or a single span bridge, would provide negligible flood mitigation due to limits in the Main Drain J drainage channel capacity, as identified in the Griffith Main Drain J and Mirrool Creek Floodplain Risk Management Study and Plan (2015) by Griffith City Council.

Extension to existing kerbs along Kurrajong Avenue is not proposed. Only reconstruction of existing kerbs is planned to provide a link between existing and proposed infrastructure.
2.4.5 Impact to utilities

Submission number(s)
18

Issue description
- What is proposed for the water main relocation along the bridge structure?

Response
The utility relocation plans propose to replace the existing water main attached to the southern side of the existing bridge, with a new water main along the southern side of the proposed bridge. Roads and Maritime would consult further with council directly on water main adjustments.

2.4.6 Need for proposal

Submission number(s)
8, 19

Issue description
- The current traffic volume and incident numbers do not warrant traffic lights.

Response
Heavy vehicles queuing across the railway level crossing along Burley Griffin Way is a safety risk. This issue is known as short stacking and would be eliminated through traffic lights at the intersection. In addition to this, improvements in road user safety, heavy vehicle accessibility and traffic performance are anticipated as a result of the traffic lights solution.

2.4.7 Visual and landscape

Submission number(s)
20

Issue description
- Felt the roundabout option would provide better landscape and urban design opportunities.

Response
The reasons for the preferred intersection option have been set out in Section 2 of the REF. The preferred option was evaluated as the best performing choice, meeting project objectives.

The traffic lights option has a significantly smaller construction footprint than the roundabout option. As a result, it would have less impact on the existing landscape, particularly over Irrigation Way. The traffic lights option also has less impact on trees compared to the roundabout option, particularly along Mackay Avenue.
2.4.8 Parking

Submission number(s)
21, 22

Issue description
- Would parking along Kurrajong Avenue be impacted? Preference for road markings to stop people parking rather than a “no parking” sign.

Response
The proposed design introduces an edge line which delineates the proposed northbound travel lane along Kurrajong Avenue and the nearside shoulder. Existing layout changes would be minimal and no parking along Kurrajong Avenue is proposed. No-parking areas would be finalised in the detailed design in consultation with Griffith City Council and Griffith City Volkswagen.

2.5 Environmental

2.5.1 Noise impact

Submission number(s)
2, 19

Issue description
- Concerned about noise impacts as a result of more trucks braking at proposed traffic lights
- Concerned about noise impacts for nearby residents.

Response
As part of the REF, Roads and Maritime carried out a noise assessment to investigate and assess potential noise impacts during construction and operation of the proposed upgrade.

For operational noise levels, noise modelling of the proposed design estimates the proposal is unlikely to increase traffic noise levels by more than 2 dB(A) for surrounding receivers. This is not considered to be a noticeable increase in noise levels.

During construction, all activities would be carried out in line with Roads and Maritime’s Construction Noise and Vibration Guidelines (Roads and Maritime, 2016), and reduction measures would be carried out to minimise any activities having noise impacts. Vibration impacts during construction would be reduced by safe work distances.

For further information on the construction and operational noise impacts and proposed mitigations, refer to Section 6.5 of the REF. For further information on the management of noise and vibration impacts, please refer to Section 5 of this report.

2.5.2 Impact to trees
Submission number(s)
2, 20

Issue description
- Concerned about impact to trees on Mackay Avenue
- Preserve as many of the existing trees as possible, particularly the mature trees. The Greybox, Poplar Box and White Cypress should be preserved as they are important in maintaining local seed banks and providing wildlife habitat.

Response
Roads and Maritime would aim to minimise impacts to trees as far as reasonably practicable. However, the proposal would require removing some native trees and shrubs along the northern side of Mackay Avenue. Removing trees along the southern side of Mackay Avenue is not anticipated.

Areas of exotic grassland and native chenopod understory is also likely to be removed during construction. The proposal is unlikely to impact vegetation next to the proposal area south of Kurrajong Avenue.

As fauna habitat is limited in the study area, there would be no impact or disturbance to important habitat, including threatened species habitat.

The proposal is not likely to significantly impact threatened species or ecological communities or their habitats, within the meaning of the Biodiversity Conservation Act 2016 or Fisheries Management Act 1994.

2.6 Construction

2.6.1 Timing and staging

Submission number(s)
3, 22

Issue description
- The project should consider working with Murrumbidgee Irrigation to coordinate timing so the piping of the existing open drain on the southern side of Irrigation Way can be completed at the same time
- Work on the Griffith City Volkswagen car dealership access and parking should be staged early in construction so the current entry to the property off Kurrajong Avenue could be blocked off during construction and one entry/exit point is still available
- Some types of work during construction would have a major impact on the car dealership operations. Construction should be staged and coordinated with the car dealership to minimise impact.

Response
Murrumbidgee Irrigation has been consulted during project development. Piping of the existing drainage channel between Bartholomew Road and the Main Drain J is outside the scope of the proposal.
Current traffic movements and property access would be maintained throughout the construction work. There may be some short-term disruptions to property access during construction. Affected properties would be consulted before work starts and impacts managed through the construction traffic management plan.

Roads and Maritime would consult with Griffith City Volkswagen on works programming and access matters.

2.6.2 Diversions

Submission number(s)
5, 15

Issue description
- What are the planned traffic diversions for light and heavy vehicles during the intersection’s construction?
- Would Gardiner Road be used for diverted traffic during construction? If so, would there be traffic management and/or would Gardiner Road be upgraded to accommodate the traffic volume?
- Would McCormack Road be used for diverted traffic during construction? If so, consider including speed humps to deter speeding along McCormack Road for safety.

Response
Temporary diversions would be implemented for the bridge and rail level crossing reconstruction to manage safety risks and minimise construction time. Roads and Maritime would complete the bridge works by closing the western end of Irrigation Way, with the remainder of the works completed under traffic. The details of the proposed diversion are set out in section 3.1 of this report.

A construction traffic management plan would be prepared to minimise potential traffic flow impacts during construction. Any safety reduction measures such as reduced speed limits, traffic control, signage and other measures would be included as part of the construction traffic management plan, developed in consultation with Griffith City Council and local residents.

2.6.3 Dust

Submission number(s)
2, 22

Issue description
- Concerned about dust impacts for nearby residents
- Concerned about dust impacts to vehicles in the Griffith City Volkswagen car dealership display area during construction.

Response
Air quality impacts as a result of dust generation from the proposal are considered to be minor and would be limited to the construction phase. Any dust impacts during construction would be minimised by
implementing dust suppression measures, including watering or covering exposed areas and stockpiles in line with the Roads and Maritime Services’ Stockpile Site Management Guideline (EMS-TG-10).

2.6.4 Impacts to utilities

Submission number(s)
2

Issue description
• Concerned about disruption to utility services during utility relocation work during construction.

Response
Roads and Maritime is working closely with utility providers to minimise the extent of adjustments for the relocation of services. Utility adjustments will be in line with service provider requirements, with measures taken to minimise disruptions. No long-term utility shutdowns are anticipated. The design allows for new service line construction while existing lines remain in place, with only minor disruptions when switching over. In most cases, no service disruption would occur. Roads and Maritime would consult with utility providers and affected residents about any utility impacts before starting work.

2.6.5 Surface levels

Submission number(s)
21, 22

Issue description
• Would there be a drop between the footpath and the kerb line as a result of the drainage relocation or would this be relocated?

Response
The proposed footpath would be kerbed and raised from the existing road levels. The Griffith City Volkswagen car dealership display area would be at a lower level than the proposed carriageway and shared path.

2.6.6 Site compound

Submission number(s)
21

Issue description
• Suggested that four acres of land on Oakes Road could be used as site compound area.
Response
The suggested location is noted. Compound areas have been assessed under the REF.

2.7 Access

2.7.1 Driveway access

Submission number(s)
2, 16, 18, 21, 22

Issue description
- Concerned the proposed median strip on Kurrajong and Mackay avenues would restrict driveway access.
- Concerned about safety as a result of the proposed median strip on Kurrajong and Mackay avenues and the need for residents to do a u-turn after the lights to access their properties.
- Shorten the concrete median strip to allow driveway access along Kurrajong and Mackay avenues.
- Concerned the proposed median strip would restrict access to the Griffith City Volkswagen car dealership. Proposed an alternative access to the car dealership to convert the current entry point to an exit point. As part of this, the car park would need to be realigned to be 90 degrees using road reserve land.

Response
A u-turn movement from Mackay Avenue through the intersection would not be permitted. Roads and Maritime is still investigating median designs and driveway accesses along Mackay Avenue. Other community submissions are also being considered in the design before property access impacts are finalised.

The median along Kurrajong Avenue would not be shortened due to safety issues as a result of the driveway’s proximity to the intersection. Australian Standard (AS2890.1 cl 3.2.3) stipulates driveways should not be located within the area of influence for queue lengths at traffic lights. Where it is not practical to relocate existing driveways, it may be necessary to provide an arrangement that confines traffic to turning left when either entering or exiting driveways.

Roads and Maritime recognises the effect on access to Griffith City Volkswagen and agrees reversal of the driveway access on Kurrajong Avenue is the most practical solution. Roads and Maritime would consult directly with the owners and tenants on how this was to be implemented.

2.7.2 Heavy vehicle access

Submission number(s)
7, 14, 18, 19
**Issue description**

- Felt the proposal should include dual lanes and wider exit lanes at the Kurrajong Avenue and Burley Griffin Way approaches to cater for oversized loads
- Will the new intersection be able to accommodate movement of oversize heavy vehicle loads between Kurrajong Avenue and Irrigation Way?
- Consider permitting dual lane access and turning lanes to allow for modular B-triples.

**Response**

The proposal aims to enhance productivity of heavy vehicles by accommodating long vehicles including B-triples and road trains of up to 36.5 metres for all turning movements across the intersection. In addition, there would be a general improvement to carriageway width due to lane design widths of 3.5 metres and 1.5 metres for nearside shoulders.

New traffic lights, raised medians and rail boom gates would introduce some clearance restrictions, however oversized loads turning right from Kurrajong Avenue to Irrigation Way would not be affected, with a general improvement to turning paths. Turning from Irrigation Way to Kurrajong Avenue would be restricted with five metre clearance to an overhead traffic light outreach arm. New overhead electrical services would be installed on this route to provide seven metre clearance as per existing conditions.

Clearance between rail crossing lights on Burley Griffin Way would be assessed further during the detailed design.

Roads and Maritime has considered dual lane access for modular B-triples in the concept design. The additional construction and utilities impact is beyond the project’s funding allocation. Roads and Maritime has determined the chosen single lane B-triple layout performs acceptably, as detailed in S.2.4.3.

**2.7.3 Reduce speeding**

**Submission number(s)**

13, 17

**Issue description**

- Consider implementing measures to deter speeding leading up to the intersection.

**Response**

Roads and Maritime is not proposing to change speed limits to the intersection’s north and southbound approaches as part of the proposal. However, it is anticipated that introducing traffic lights would improve intersection safety due to controlled traffic movements. Additional signage to provide advanced warning of the intersection would be considered during detailed design.

**2.7.4 Signage**

**Submission number(s)**

17
**Issue description**

- Consider including stop signs and warning signs on the north and southbound approaches.

**Response**

Traffic lights have been adopted as the preferred intersection treatment for the reasons outlined in Section 2 of the REF. Stop signs were not considered as they would not address the project’s safety and performance objectives. Signage design and location has been carried out in line with Australian Standards. Additional signage to provide advanced warning of the intersection would be considered during detailed design.

2.8 Consultation

2.8.1 Lack of consultation

**Submission number(s)**

2, 8, 16, 18

**Issue description**

- Concerned about a lack of consultation
- Concerned the community has not been consulted about the proposed drainage. Ensure community is consulted on the twin box culverts proposed for the irrigation channel.

**Response**

Between Monday 25 June 2018 and Friday 20 July 2018, Roads and Maritime displayed the Yoogali intersection upgrade REF and proposed preliminary concept designs for community comment and feedback. A community update was distributed to about 5500 residents and businesses in the suburbs, surrounding the intersection including Griffith, Griffith East, Bilbul, Yoogali, Kooba, Hanwood and Yenda, to raise awareness of the proposal and invite feedback. Hard copies of the REF were made available at Griffith City Council and Griffith Library. Roads and Maritime also door-knocked residents and business owners next to the intersection to discuss the proposal. Updates were also published on Roads and Maritime’s website.

Roads and Maritime would continue to consult with the community and stakeholders during the detailed design and construction phases. Drainage canal structure treatments would be verified with drainage modelling and be consistent with council’s floodplain risk management plan.

2.9 Maintenance

2.9.1 Landscaping

**Submission number(s)**

21, 22
**Issue description**

- Would sprinklers be installed to maintain the grassed/landscaped area next to the Griffith City Volkswagen car dealership once construction is complete?

**Response**

Installation of sprinklers is not within the scope of the project.
3. Changes to the proposal

3.1 Change 1 Closure of Irrigation Way during bridge construction

3.1.1 Description

The REF, displayed between Monday 25 June 2018 and Friday 20 July 2018, noted in Section 6.4.4 “that some partial road closures would be required for construction work within the proposal area. It is not anticipated that there will be a requirement for full road closures”.

Following display, further detailed design, safety and constructability assessments revealed that full road closures on Irrigation Way would be necessary to demolish the existing structure and build the channel crossing safely and efficiently. Roads and Maritime determined the density and clearance to existing live utilities and proximity to nearby rail, traffic and drainage corridors require closing the road to provide safe passage for workers, plant and channel flow diversions.

Roads and Maritime anticipates the road closure and detour routes would remain in place for three months, using the approved emergency detour route shown below:

Figure 3-1: Irrigation Way to Yoogali via Whitton Stock Route Road, Whitton Road and Burley Griffin Way, east of Widgelli
Existing routes between Leeton/Darlington Point and Griffith are approved for light vehicles and General Mass Limit (GML) B-doubles, including Wilga Road/Kidman Way as an alternate detour route:

Figure 3-2: Irrigation Way to Griffith via Wilga Road, North Kooba Settlers Road and Kidman Way, east of Willbriggie

Roads and Maritime is currently investigating opportunities to accelerate the construction program and would liaise with councils, affected businesses, local residences and service providers to coordinate alternative accesses before the start of work.

3.2 Change 2 Clarification of proposal footprint

Section 3.1 of the project REF detailed the proposal with Figures 3-1 to 3-5 presenting the key features of the concept design including road alignment and table drains. These figures did not illustrate the work area required for utility adjustments and earthworks. RMS has since clarified the work area footprint for relocation of underground utilities, materials storage, temporary works and space for access ramps and operating earthmoving machinery.

Figure 3-3 maps the area to be occupied at various stages of the project to complete the proposed scope of works.
### 3.3 Change 3 Site compound area

Section 3.4 of the REF identified Lot 273 DP751709 as a potential location for site facilities and plant and stockpiled materials storage. The addition of adjacent Lot 272 DP751709 is needed to provide access to the site compound off Bartholomew Road.

The inclusion of lot 272 in the potential site compound area is shown in Figure 3-4. The environmental assessment for the use of the additional lot is detailed in Section 4 of this report.
Figure 3.4: Revised site compound and ancillary facility locations
4. Environmental assessment

4.1 Detour traffic noise

4.1.1 Additional study

A construction traffic noise assessment has been prepared to estimate the noise impact from detoured traffic while Irrigation Way is closed to traffic. The assessment, provided in Appendix B, also recommends suitable mitigation measures.

4.1.2 Methodology

The Environment Protection Authority’s *Interim Construction Noise Guideline* does not directly address construction related traffic noise, but refers to the *NSW Road Noise Policy* for the assessment of construction traffic on public roads.

Where noise levels, generated by a temporary reroute due to a road closure, would increase by no more than 2 dBA, no further assessment is needed. Where increases of more than 2 dBA are expected, noise mitigation should be considered using Roads and Maritime’s *Noise Criteria Guideline*. This documents Roads and Maritime’s approach to implementing the *Road Noise Policy*.

Given construction traffic noise is not permanent, guidance to feasible and reasonable noise mitigation differs from operational traffic noise. On this project, the detour is expected to be in place for up to three months.

Roads and Maritime’s *Construction Traffic Noise Estimator* tool was used to calculate the expected traffic noise increase for each separate road for the following two detour scenarios, as shown in Figure 4-1.

1. **Scenario 1** – 100% of detour traffic to use northern route. This scenario is considered the worst case scenario for sensitive receivers along the northern route. It is not considered likely that 100% of detoured traffic would use the northern route.

2. **Scenario 2** – 50% of detour traffic to use northern route and 50% to use southern route. This scenario is considered to be a reasonably likely split of traffic during the Irrigation Way closure at Yoogali.

4.1.3 Description of existing environment

The proposed detour route for the Irrigation Way closure is via Whitton Stock Route Road and Burley Griffin Way, shown as the northern detour route in Figure 4-1. This route is considered preferable given it is an existing approved road train route and provides good visibility at intersections. Although the northern detour route would be the formally advertised and sign posted detour route, it is considered that some local traffic may eventually use a more convenient route via Wilga Road and Kidman Way, shown as the southern detour route in Figure 4-1.
4.1.4 Potential impacts

Increases in road traffic noise greater than 2 dBA result in a noticeable change in the noise environment. Results of the noise assessment are summarised in Table 4-1 and Table 4-2. Where the traffic noise increase is expected to be more than 2 dbA, the cells are shaded red. Where the traffic noise increase is expected to be 2 dBA or less, the cells are shaded green.
Table 4-1: Summary of expected increase in road traffic noise along northern detour route – Scenario 1

<table>
<thead>
<tr>
<th>Road</th>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitton Stock Route Road</td>
<td>&gt;2 dBA</td>
<td>&gt;2 dBA</td>
</tr>
<tr>
<td>Burley Griffin Way</td>
<td>&lt;2 dBA</td>
<td>&lt;2 dBA</td>
</tr>
</tbody>
</table>

Table 4-2: Summary of expected increase in road traffic noise along northern and southern detour routes – Scenario 2

<table>
<thead>
<tr>
<th>Road</th>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitton Stock Route Road</td>
<td>&gt;2 dBA</td>
<td>&gt;2 dBA</td>
</tr>
<tr>
<td>Burley Griffin Way</td>
<td>&lt;2 dBA</td>
<td>&lt;2 dBA</td>
</tr>
<tr>
<td>Wilga Road</td>
<td>&lt;2 dBA</td>
<td>&lt;2 dBA</td>
</tr>
<tr>
<td>Kidman Way</td>
<td>&lt;2 dBA</td>
<td>&lt;2 dBA</td>
</tr>
</tbody>
</table>

A noticeable change in the noise environment resulting from the detoured traffic is only expected for Whitton Stock Route Road and is expected for both scenarios. The noise increase along Whitton Stock Route Road been estimated to be 6.7 dBA for scenario 1 and 4.5 dBA for scenario 2.

A mitigation distance, where additional mitigation measures should be considered, was calculated by Roads and Maritime’s Construction Traffic Noise Estimator tool. The most conservative mitigation distance along Whitton Stock Route Road is 63 metres (for night-time traffic). The mitigation distance for this road during the day is 51 metres. These distances relate to Scenario 1, which is the worst case scenario for the sensitive receivers along Whitton Stock Route Road.

There is one sensitive receiver within the mitigation distance of 63 metres from Whitton Stock Route Road, as shown in Figure 4-2. This residence is located about 210 metres north of Wood Road and is set back about 30 metres from Whitton Stock Route Road. Mitigation measures to minimise the temporary detour traffic noise impact on the sensitive receiver are listed in section 4.1.5.
4.1.5 Revised safeguards and management measures

The following additional safeguards and management measures are recommended to address the traffic noise expected to be generated while Irrigation Way is closed.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguard</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic noise</td>
<td>Consult with affected resident shown in Figure 4-2 at least two weeks prior to work starting.</td>
<td>PM</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>Traffic noise</td>
<td>Install signage to influence driver behaviour and avoid the use of engine compression brakes.</td>
<td>PM</td>
<td>Construction</td>
</tr>
<tr>
<td>Traffic noise</td>
<td>Consider reducing vehicle speed along a select section of Whitton Stock Route Road. It is noted this may not be preferable given additional noise may be generated from vehicles braking and accelerating.</td>
<td>PM</td>
<td>Construction</td>
</tr>
<tr>
<td>Traffic noise</td>
<td>Where possible, schedule work to</td>
<td>PM</td>
<td>Pre-construction /</td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguard</td>
<td>Responsibility</td>
<td>Timing</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------</td>
<td>----------------</td>
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</tr>
<tr>
<td></td>
<td>minimise the amount of time the detour is in place (keep the Yoogali Road intersection open where certain work can be done under traffic).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>construction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Clarification of proposal footprint

4.2.1 Potential impacts

There would be no additional impact on the environment from the clarification of the proposal footprint.

4.2.2 Revised safeguards and management measures

No additional or revised safeguards or management measures are needed for the clarification of the proposal footprint.

4.3 Site compound area

4.3.1 Description of existing environment

The lot to be included in the potential site compound area (Lot 272) is currently used for agricultural purposes. The lot is heavily disturbed, has been cleared of vegetation and appears to be regularly ploughed and cropped. An existing lot access point is available from Bartholomew Road, about 300 metres south of its intersection with Irrigation Way.

Bartholomew Road is an unsealed local road that provides direct access to a small number of rural residences and agricultural properties.

4.3.2 Potential impacts

Should the existing access point along Bartholomew Road be used to access the site compound area, there would be an increase in traffic movements along Bartholomew Road. The construction traffic movements along Bartholomew Road would generate dust and traffic noise.

The nearest sensitive receiver is a farm cottage located on the south-eastern side of Irrigation Way and Bartholomew Road, shown in Figure 4-3. This cottage is expected to be the most affected by the proposed change.

The REF assessed construction noise impacts, which included construction traffic noise generated by traffic movements to the potential site compound area. The REF determined additional noise arising from construction traffic movements to the potential site compound area is unlikely to change the above stated noise criteria. Although this assessment was based on the expected change in traffic numbers along Irrigation Way and not Bartholomew Road, the most affected residence is located close to Irrigation Way.
and the expected noise impact from a change in access point to the potential site compound area would be minor.

No vegetation clearing would be needed to use the additional lot. No additional environmental impact is expected from the proposed change.

The expected environmental impact of the additional lot for site compound use is considered to be minor. Implementing the safeguards and mitigation measures listed in Table 5-1 would manage and minimise expected noise and air quality impacts. Safeguard AQ1 requires the preparation and implementation of a CEMP to manage dust generation and safeguard NV1 requires the preparation and implementation of a Noise and Vibration Management Plan.

### 4.3.3 Revised safeguards and management measures

No additional or revised safeguards or management measures are needed for the inclusion of the additional site compound lot.
5. **Environmental management**

The Yoogali intersection upgrade REF identified the environmental management framework, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (Section 7 of the REF).

After considering the issues raised in the public submissions and changes to the proposal, the safeguard and management measures have been revised to include additional mitigation measures to address expected noise impacts along traffic detour routes.

Should the proposal proceed, environmental management will be guided by the framework and measures outlined below.

5.1 **Environmental management plans (or system)**

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during construction and operation.

A Construction Environmental Management Plan (CEMP) would be prepared to describe safeguards and management measures identified. The CEMP would provide a framework for establishing how these measures would be carried out and who would be responsible for their implementation.

The CEMP would be prepared before construction of the proposal and must be reviewed and certified by South West region’s Environment staff before the start of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in line with the specifications set out in the QA Specification G36 – *Environmental Protection (Management System)*, QA Specification G38 – *Soil and Water Management (Soil and Water Plan)*, QA Specification G40 – *Clearing and Grubbing* and QA Specification G10 – *Traffic Management*.

5.2 **Summary of safeguards and management measures**

The Yoogali intersection upgrade REF identified a range of environmental outcomes and management measures that would be required to avoid or reduce environmental impacts.

After considering the issues raised in the public submissions, the environmental management measures for the proposal (refer to Section 7 of the REF) have been revised. Should the proposal proceed, the environmental management measures in Table 5-1 would guide the following proposal phases. Additional and/or modified environmental safeguards and management measures to those presented in the REF have been underlined and deleted measures, or parts of measures, have been struck out.
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
</tr>
</thead>
</table>
| GEN1 | General - minimise environmental impacts during construction | A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager before the start of the activity. As a minimum, the CEMP will address:  
- any requirements associated with statutory approvals  
- details of how the project will implement the identified safeguards outlined in the REF  
- issue-specific environmental management plans  
- roles and responsibilities  
- communication requirements  
- induction and training requirements  
- procedures for monitoring and evaluating environmental performance, and for corrective action  
- reporting requirements and record-keeping  
- procedures for emergency and incident management  
- procedures for audit and review. The endorsed CEMP will be implemented during the activity. | Contractor / Roads and Maritime project manager | Pre-construction / detailed design | Section 3.1 of QA G36 Environment Protection |

| GEN2 | General - notification | All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days before the start of the activity. | Contractor / Roads and Maritime project manager | Pre-construction | Standard safeguard |
All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings.

The environmental awareness training is to include (as a minimum):

- environmentally sensitive locations and/or no go zones
- requirement to report and the process for reporting environmental issues on-site
- requirement to report and the process for reporting damaged environmental controls
- erosion and sediment control measures
- incident management process
- site staff environmental responsibilities.
A Flora and Fauna Management Plan will be prepared in accordance with Roads and Maritime's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (Roads and Traffic Authority, 2011) and implemented as part of the CEMP. It will include, but not be limited to:

- plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas
- requirements set out in the Landscape Guideline (Roads and Maritime, 2008)
- pre-clearing survey requirements
- procedures for unexpected threatened species finds and fauna handling
- procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management Update 2013 (Department of Primary Industries, 2013)
- Protocols to manage weeds and pathogens.

Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.

Pre-clearing surveys would be carried out in accordance with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority, 2011).

<table>
<thead>
<tr>
<th>B5</th>
<th>Biodiversity</th>
<th>Native vegetation would be re-established in accordance with Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority, 2011).</th>
<th>Contractor</th>
<th>Post construction</th>
<th>Standard safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6</td>
<td>Biodiversity</td>
<td>The unexpected species find procedure is to be followed under Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority, 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal site.</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>B7</td>
<td>Biodiversity</td>
<td>Exclusion zones would be set up at the limit of clearing (i.e. the edge of the impact area) in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority, 2011).</td>
<td>Contractor</td>
<td>Pre-construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>B8</td>
<td>Aquatic impacts</td>
<td>Aquatic habitat would be protected in accordance with Guide 10: Aquatic habitats and riparian zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority, 2011) and Section 3.3.2 Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013 (Department of Primary Industries, 2013).</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>B11</td>
<td>Invasion and spread of pathogens and disease</td>
<td>Pathogens would be managed in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Transport Authority, 2011).</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>B12</td>
<td>Noise, light and vibration</td>
<td>Shading and artificial light impacts would be minimised through detailed design.</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>F1</td>
<td>Hydrology and flooding</td>
<td>Staging of construction activities within Main Drain J would minimise obstruction of the channel and culverts, and limit the extent of flow diversion required.</td>
<td>Contractor</td>
<td>Detailed design / pre-construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>F2</td>
<td>Hydrology and flooding</td>
<td>Detailed design would ensure there is no reduction in the existing waterway area of the Main Drain J culvert structure.</td>
<td>Contractor</td>
<td>Detailed design / pre-construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>F3</td>
<td>Hydrology and flooding</td>
<td>Consultation would be carried with Griffith City Council to ensure consistency with the floodplain risk management study and plan developed for the Main Drain J catchment.</td>
<td>Roads and Maritime Services</td>
<td>Detailed design / pre-construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>SW1</td>
<td>Soil and water</td>
<td>A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.</td>
<td>Contractor</td>
<td>Detailed design / pre-construction</td>
<td>Section 2.1 of QA G38 Soil and Water Management</td>
</tr>
<tr>
<td>SW2</td>
<td>Soil and water</td>
<td>A site specific Erosion and Sediment Control Plan/s will be prepared and implemented as part of the SWMP. The Plan will include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.</td>
<td>Contractor</td>
<td>Detailed design / Pre-construction</td>
<td>Section 2.2 of QA G38 Soil and Water Management</td>
</tr>
</tbody>
</table>
| SW3 | Contaminated land | A Contaminated Land Management Plan will be prepared in accordance with the Guideline for the Management of Contamination (Roads and Maritime, 2013) and implemented as part of the CEMP. The plan will include, but not be limited to:  
- capture and management of any surface runoff contaminated by exposure to the contaminated land  
- further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2)  
- management of the remediation and subsequent validation of the contaminated land, including any certification required  
- measures to ensure the safety of site personnel and local communities during construction. | Contractor | Detailed design / Pre-construction | Section 4.2 of QA G36 Environment Protection |

| SW4 | Contaminated land | If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime Environment Manager and/or Environment Protection Authority (EPA). | Contractor | Detailed design / Pre-construction | Section 4.3 of QA G36 Environment Protection |

| SW5 | Accidental spill | A site specific emergency spill plan will be developed, and include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management (Roads and Traffic Authority, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers). | Contractor | Detailed design / Pre-construction | Section 4.3 of QA G36 Environment Protection |
A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime Traffic Control at Work Sites Manual (Roads and Traffic Authority, 2010) and QA Specification G10 Control of Traffic (Roads and Maritime, 2008). The TMP will include:

- confirmation of haulage routes
- measures to maintain access to local roads and properties
- site specific traffic control measures (including signage) to manage and regulate traffic movement
- measures to maintain pedestrian and cyclist access
- requirements and methods to consult and inform the local community of impacts on the local road network
- access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads
- a response plan for any construction traffic incident
- consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic
- monitoring, review and amendment mechanisms.

Current traffic movements and property accesses are to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays.

Pedestrian and cyclist access is to be maintained throughout construction. Provision of signposts outlining the pedestrians and cyclists’ diversion routes would be displayed during construction. Any temporary pedestrian diversions or footpath closures are to be addressed in the CTMP.
| TT4 | Traffic and transport | Access to appropriate bus stop locations would be maintained during construction, where possible, in consultation with bus operators. Ongoing updates on locations and access to bus stops would be provided to the community during construction period to ensure that disruption is minimised. | Contractor | Construction | Standard safeguard |
| NV1 | Noise and vibration | A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim Construction Noise Guideline (ICNG) (Department of Environment and Climate Change, 2009) and identify:
- all potential significant noise and vibration generating activities associated with the activity
- feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014)
- a monitoring program to assess performance against relevant noise and vibration criteria
- arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures
- contingency measures to be implemented in the event of non-compliance with noise and vibration criteria. | Contractor | Detailed design / pre-construction | Section 4.6 of QA G36 Environment Protection |
| NV2 | Noise and vibration | All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:
- the proposal
- the construction period and construction hours
- contact information for project management staff
- complaint and incident reporting
- how to obtain further information. | Contractor | Detailed design / pre-construction | Standard safeguard |
<p>| NV3  | Noise and vibration | Limit the most noise-intensive construction processes (e.g. pneumatic hammering, pavement sawing, stormwater upgrades) to standard construction hours where possible. | Contractor | Construction | Additional safeguard |
| NV5  | Vibration            | The use of vibratory compaction equipment within two metres of underground services should not be undertaken without further investigations. | Contractor | Pre-construction / construction | Additional safeguard |
| NV6  | Vibration            | If plant and equipment changes materially from that which has been assessed, a review of construction vibration should be undertaken prior to commencing work. | Contractor | Pre-construction | Additional safeguard |
| NV7  | Traffic noise        | Consult with affected resident shown in Figure 4-2, at least two weeks prior to work commencing. | Roads and Maritime | Pre-construction | Additional safeguard |
| NV8  | Traffic noise        | Install signage to influence driver behaviour and avoidance of the use of engine compression brakes. | Roads and Maritime | Construction | Additional safeguard |
| NV9  | Traffic noise        | Consider reducing the speed of vehicles along a select section of Whitton Stock Route Road. It is noted that this may not be preferable given additional noise may be generated from vehicles braking and accelerating. | Roads and Maritime | Construction | Additional safeguard |
| NV10 | Traffic noise        | Where possible, schedule work to minimise the amount of time the detour is in place (keep the Yoogali Road intersection open where certain work can be done under traffic). | Roads and Maritime | Pre-construction / construction | Additional safeguard |
| AH1 | Aboriginal heritage | The CEMP prepared for the proposal will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Aboriginal heritage. The CEMP will be prepared in accordance with the Procedure for Aboriginal cultural heritage consultation and investigation (Roads and Maritime, 2011) and Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015). | Contractor | Detailed design / pre-construction | Section 4.9 of QA G36 Environment Protection |
| AH2 | Aboriginal heritage | The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place. Work will only re-commence once the requirements of that Procedure have been satisfied. | Contractor | Detailed design / pre-construction | Section 4.9 of QA G36 Environment Protection |
| H1 | Non-Aboriginal heritage | The CEMP prepared and implemented for the proposal will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage. | Contractor | Detailed design / pre-construction | Section 4.10 of QA G36 Environment Protection |
| H2 | Non-Aboriginal heritage | The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. | Contractor | Detailed design / pre-construction | Section 4.10 of QA G36 Environment Protection |
| LV2 | Management of works | Works are to be managed in accordance with EIA-N04 Guidelines for visual impact assessment and landscape character assessment (Roads and Maritime, 2013). | Contractor | Construction | Standard safeguard |</p>
<table>
<thead>
<tr>
<th>LV3</th>
<th>Site compound visual impacts</th>
<th>Fencing with material attached (e.g. shade cloth in a colour sympathetic to surrounding area) around the construction compound to screen views of the construction compound from nearby properties.</th>
<th>Contractor</th>
<th>Construction</th>
<th>Standard safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV4</td>
<td>Worksite</td>
<td>Maintaining the work site in a clean and tidy stage and completing the work within the shortest possible timeframe.</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
</tbody>
</table>
| SE1   | Socio-economic              | A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum):  
  - mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions  
  - contact name and number for complaints.  
  The CP will be prepared in accordance with the Community Involvement and Communications Resource Manual (Roads and Traffic Authority, 2008). | Contractor | Detailed design / pre-construction | Standard safeguard |
<p>| SE2   | Socio-economic              | In the event that utility service interruptions are required as a result of utilities relocation on within the proposal area, residents would be informed prior to any interruptions. | Contractor | Pre-construction / construction | Standard safeguard |
| SE3   | Socio-economic              | Fencing with material attached (e.g. shade cloth) would be provided around the construction compound and other areas to screen views of the construction compound from adjoining properties. | Contractor | Pre-construction / construction | Standard safeguard |</p>
<table>
<thead>
<tr>
<th>AQ1</th>
<th>Air quality</th>
<th>The CEMP prepared and implemented for the proposal will address air quality and include, but not be limited to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• potential sources of air pollution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• air quality management objectives consistent with any relevant published EPA and/or Office of Environment and Heritage (OEH) guidelines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• mitigation and suppression measures to be implemented.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• methods to manage work during strong winds or other adverse weather conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• a progressive rehabilitation strategy for exposed surfaces.</td>
</tr>
</tbody>
</table>

| AQ2 | Air quality | Measures for dust suppression, including watering or covering exposed areas and stockpiles are to be implemented and be in accordance with the Roads and Maritime Services Stockpile Site Management Guideline (EMS-TG-10). |

| AQ3 | Air quality | Disturbed areas will be minimised in extent and rehabilitated progressively. |

| AQ4 | Air quality | Stockpiles will be located as far away from residences and other sensitive receivers as possible. |

| AQ5 | Air quality | Burning of material on-site is prohibited. |

| AQ6 | Air quality | Vehicles transporting waste, spoil or other material that may produce odours or dust will be covered during transport. |

<p>| AQ7 | Air quality | Construction works (including the spraying of paint and other materials) during periods of high winds would be modified to avoid drift. |
| AQ8 | Exhaust emissions | Visual monitoring of air quality will be undertaken to verify the effectiveness of controls and enable early intervention. Work activities will be reprogrammed if the management measures are not adequately restricting dust generation. | Contractor | Construction | Standard safeguard |
| AQ9 | Exhaust emissions | Construction plant and equipment would be maintained in a good working condition in order to limit impacts on air quality. | Contractor | Construction | Standard safeguard |
| AQ10 | Exhaust emissions | Plant and machinery would be turned off when not in use. | Contractor | Construction | Standard safeguard |
| W1 | Waste | A Waste and Resource Management Plan would be prepared as part of the CEMP, which details waste management strategies which are consistent with the Waste Avoidance and Resource Recovery Act 2007 (Australian government, 2007) and the resource management hierarchy principles (in order of priority) of avoidance, resource recovery and disposal. | Contractor | Construction | Standard safeguard |
| W2 | Waste | The Waste and Resource Management Plan would include procedures to classify all waste types in accordance with the Waste Classification Guidelines (EPA, 2014) and NSW legislative requirements and would include procedures for reuse (where feasible) and disposal arrangements for unsuitable excavated material or contaminated material (if encountered). | Contractor | Construction | Standard safeguard |
| W3 | Waste | Waste disposed of off-site would be disposed of to a waste facility that is licensed under the Protection of the Environment Operations Act (NSW, 1997) to receive wastes of that type. | Contractor | Construction | Standard safeguard |
| W4 | Waste | There is to be no disposal or re-use of construction waste on to other land. | Contractor | Construction | Standard safeguard |</p>
<table>
<thead>
<tr>
<th>W5</th>
<th>Waste</th>
<th>Types of waste collected, amounts, date/time and details of disposal are to be recorded in a waste register.</th>
<th>Contractor</th>
<th>Construction</th>
<th>Standard safeguard</th>
</tr>
</thead>
<tbody>
<tr>
<td>W6</td>
<td>Waste</td>
<td>Cleared weed free vegetation will be chipped and reused on-site as part of the proposed landscaping and to stabilise disturbed soils where possible.</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
<tr>
<td>W7</td>
<td>Waste</td>
<td>The works area will be kept free of rubbish, with appropriate receptacles provided for waste management and recycling.</td>
<td>Contractor</td>
<td>Construction</td>
<td>Standard safeguard</td>
</tr>
</tbody>
</table>
| CI1 | Cumulative construction impacts | A CP will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include consultation with Griffith City Council and proponents of the Griffith Solar and Riverina Solar projects to:  
   - understand any concurrent development being undertaken within the area  
   - increase awareness of construction timeframes and impacts  
   - coordinate impact mitigation and management (e.g.: respite periods). | Roads and Maritime | Pre-construction / during construction | Standard safeguard |
5.3 Licensing and approvals

Table 5-2: Summary of licensing and approval required

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Requirement</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection of the Environment Operations Act 1997 (s43)</td>
<td>Environment protection licence (EPL) for scheduled activities [if known describe the applicable scheduled activities eg road construction / extractive activities etc] from the EPA.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Protection of the Environment Operations Act 1997 (s43)</td>
<td>Environment protection licence (EPL) for non-scheduled activities for the purposes of regulating water pollution.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Fisheries Management Act 1994 (s199)</td>
<td>Notification to the Minister for Primary Industries prior to any dredging or reclamation works. [Note exemption under s263A of the Fisheries Management (General) Regulation 2010]</td>
<td>A minimum of 28 days prior to the start of work.</td>
</tr>
<tr>
<td>Fisheries Management Act 1994 (s205)</td>
<td>Permit to harm marine vegetation from the Minister for Primary Industries.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Fisheries Management Act 1994 (s206)</td>
<td>Permit to disturb a gravel bed where trout or salmon are likely to spawn.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Fisheries Management Act 1994 (s218)</td>
<td>Notification to the Minister for Primary Industries prior to any activities to construct, alter or modify a dam, weir or reservoir on a waterway.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Fisheries Management Act 1994 (s219)</td>
<td>Permit to obstruct the free passage of fish (temporary or permanent) from the Minister for Primary Industries.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Fisheries Management (General) Regulation 2010 (cl71)</td>
<td>Permit to use explosives in any waters from the Secretary of the Department of Primary Industries.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Forestry Act 2012 (Division 2, Part 4)</td>
<td>Licence to remove trees or forest materials from a State forest, timber reserve or flora reserve from the Department of Primary Industries.</td>
<td>Prior to removing trees or forest materials from a State forest, timber reserve or flora reserve.</td>
</tr>
<tr>
<td>Heritage Act 1977 (s60)</td>
<td>Permit to carry out activities to an item listed on the State Heritage Register or to which an interim heritage order applies from the Heritage Council of NSW.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Heritage Act 1977 (s57)</td>
<td>Exemption notification for [insert standard exemption eg ‘maintenance and cleaning’ / ‘repairs’ / ‘painting’ / ‘excavation’ / ‘restoration’ etc] to an item on the State Heritage Register from the Director OEH.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Heritage Act 1977 (s139)</td>
<td>Excavation permit from the Heritage Council of NSW / the Minister.</td>
<td>Prior to start of the activity.</td>
</tr>
<tr>
<td>Heritage Act 1977</td>
<td>Exception notification for [insert appropriate</td>
<td>Prior to start of the</td>
</tr>
<tr>
<td>Instrument</td>
<td>Requirement</td>
<td>Timing</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>(s139(4))</td>
<td>description from the schedule of exceptions] from the Heritage Council of NSW.</td>
<td>activity</td>
</tr>
<tr>
<td>National Parks and Wildlife Act 1974 (s90)</td>
<td>Aboriginal heritage impact permit from the Chief Executive of OEH.</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>National Parks and Wildlife Act 1974 (s120)</td>
<td>General licence from the Chief Executive of OEH.</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Environmentally Hazardous Chemicals Act 1985 (s28)</td>
<td>A licence to carry on any prescribed activity with respect to an environmentally hazardous chemical or a declared chemical waste from the EPA.</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Water Management Act 2000 (s91B)</td>
<td>Water supply work approval from DPI (Water). [Note exemptions under s34-36 of the Water Management (General) Regulation 2011.]</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Water Management Act 2000 (s91C)</td>
<td>Drainage work approval from DPI (Water).</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Water Management Act 2000 (s91D)</td>
<td>Flood work approval from DPI (Water). [Note exemption under s41E of the Water Management (General) Regulation 2011.]</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Water Management Act 2000 (s91F)</td>
<td>Aquifer interference approval from DPI (Water).</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Water Management Act 2000 (s304)</td>
<td>Notice to the Minister for Primary Industries to exercise functions in special areas within the catchment area.</td>
<td>14 days prior to exercising functions.</td>
</tr>
<tr>
<td>Water Act 1912 (s10 / s18F)</td>
<td>Licence and/or permit for construction or use of a ‘work’ (eg water conservation, irrigation, water supply, drainage or changing the course of a river) for certain purposes from the DPI (Water).</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Marine Estate Management Act 2014 (ss 55 and 56)</td>
<td>Consult with the relevant Ministers if a proposed activity is likely to have an effect on the plants or animals within a marine park or aquatic reserve or their habitat.</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Mine Subsidence Compensation Act 1961</td>
<td>Approval to alter or erect improvements or to subdivide land within a mine subsidence district from the Mine Subsidence Board.</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>Crown Lands Act 1989 (s6)</td>
<td>Licence to occupy areas of Crown land.</td>
<td>Prior to start of the activity</td>
</tr>
<tr>
<td>SEPP 55 (s16)</td>
<td>Notification about Category 2 works to council or the Commissioner.</td>
<td>At least 30 days before start of the activity.</td>
</tr>
</tbody>
</table>
6. References


Department of Primary Industries, 2013. Policy and guidelines for fish habitat conservation and management.


Roads and Maritime Services, 2013. EIA No4 Guidelines.


Roads and Traffic Authority, 2005. Shotcrete design guidelines: design guidelines to avoid, minimise and improve the appearance of shotcrete.

Roads and Traffic Authority, 2006. Noise wall design guideline: design guidelines to improve the appearance of noise walls in NSW.


Appendix A

Identified stakeholders

The following stakeholders were sent an invitation to comment and digital copy of the REF:

- St Mary’s Primary School – Edon Street, Yoogali, NSW, 2680.
- Yoogali Public School – 1 East Street, Yoogali, NSW, 2680.
- Griffith City Council – 1 Benerembah Street, Griffith, NSW, 2680.
Appendix B
Detour traffic noise assessment