

Appendix F
Traffic Impact Assessment



RoadNet

Traffic Impact Study

Proposed Expansion of Champions Quarry Operation

For

Champions Quarry

November 2009



| | |
|------------------------|--------------|
| Document Status | FINAL |
|------------------------|--------------|

| Task | Responsibility | Signature |
|--------------|----------------|---|
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Executive Summary

An extension of quarry operations is proposed by Reavill Farm Pty Ltd and Tucki Hills Pty Ltd (the proponent) for the expansion of quarry operations at Champions Quarry at Tuckurimba. The quarry is located on Wyrallah Road, 16kms south of Lismore. The proposal is to transport additional material along three proposed routes.

- *Wyrallah Road via the Bruxner Highway-Coraki Road to Lismore*
- *Wyrallah Road to Woodburn and*
- *Broadwater Road to Broadwater for use and distribution.*

RoadNet Pty Ltd has been engaged by Champions Quarry to conduct a traffic impact assessment of the proposal in line with the Director Generals requirements, which will include discussion of safety and amenity issues that may arise from increased truck activity.

The existing Champions Quarry has a current approval for approximately 29,000 m³ (64,000 t) of material per annum. It is proposed to progressively increase production to 250,000 tonnes per annum to a maximum of 6.25 million tonnes for the life of the quarry.

At the maximum annual output of 250,000t pa the operation will generate on average 3 trucks per hour leaving the quarry with a mixture of truck and trailer and body trucks. In conducting intersection and capacity analysis 3 trucks per hour will be utilised returning to the quarry unladen.

A significant amount of annual production will be supplied to the upgrade of the Pacific Highway specifically supplying high quality sand for concrete production, in these instances 6-7 laden trucks per hour may leave the quarry, with the majority of trucks heading south towards the Pacific Highway to either Broadwater or Woodburn.

There will also be instances where truck activity leaving the quarry will be 1-2 trucks per hour as demand dictates deliveries.

The Quarry currently generates an average of 1.1 laden heavy vehicle movements per hour (11 vehicles per day.)

Champions Quarry estimates that 50% of product is proposed to be transported to the north via Wyrallah Road-Wyrallah Ferry Road-Coraki Road-Bruxner Highway through to Lismore. The balance of the increased production will be transported south via Wyrallah Road towards the Pacific Highway at Woodburn for locations north and south of Woodburn and to Broadwater via Broadwater Road for deliveries north and south of Broadwater.

The current proposal forecasts approximately 89t/hr of product leaving the quarry during normal operations to fulfil the annual output of 250,000t, over 280 working days.

This traffic study examines the section of the haulage route being,

- **Route 1** - North to Lismore via Wyrallah Road-Wyrallah Ferry Road-Coraki Road-and Bruxner Highway.
- **Route 2** - South via Wyrallah Road to Woodburn and the Pacific Highway.
- **Route 3** -South via Wyrallah Rd and Broadwater Rd and Pacific Highway.

As of 30 June 2009 maintenance funding for Wyrallah Road from the Pacific Highway to the Bruxner Highway was transferred from Lismore City Council to the State Government (RTA). Wyrallah Road connects Lismore in the north and the Pacific Highway in the South and has been previously designated a primary heavy haulage route in Lismore Councils DCP for Extractive industries. The quarry access is located approximately 12.7 km south of the Bruxner Highway, 15.8 km to Woodburn and approximately 17.3km to Broadwater at the Pacific Highway.

Wyrallah Road is an undulating sealed road through a rural environment. The seal width varies between 6.5 and 7.0m and has narrow gravel shoulders. It has centre line markings, guideposts and some speed advisory signposting on curves

The average daily traffic volumes on Wyrallah Road vary from 2640vpd at Wyrallah Ferry Road/Wyrallah Road intersection, and approximately 2350vpd at the Coraki /Wyrallah Ferry Road.

Historical traffic growth appears to be static from counts dating back to 1999.

Trucks and Buses account for

- 10% of the traffic stream at the Wyrallah Rd-Wyrallah Ferry Rd intersection
- 11% at the Coraki Rd-Wyrallah Ferry Rd intersection.
- 8% at the Broadwater Road- Wyrallah Road intersection

An inspection of the pavement condition of the route is fair with some sections of rough surface.

Rural properties are located along the route with several dwellings located close to the road.

The proposed expansion of the quarry will place an additional 19 laden trucks per day on average on Wyrallah Road.

Wyrallah Road is part of a school and public bus route. The impact of additional truck traffic and recommended action to make the haulage route safe is summarised in the following sections of the report.

Broadwater Road is generally a level sealed road through rural environment. The pavement widths vary from 6.6m to 7.5m along the route.

Lismore Council have provided average daily traffic volumes on Broadwater Road taken in April 2009 as 419 vpd with 8% heavy vehicles.

Road Safety Issues

- **Pavement Failures**

The quarry operation will contribute 1.2%-1.3% of the total traffic on Wyrallah Road. It is recommended that a proposed annual road levy of **11cents/tonne** plus CPI be contributed by the Quarry and should be utilised to contribute towards the maintenance of the current designated haulage route pavement failures, which currently exist.

- **Quarry Access**

The newly constructed intersection and access location is in a 100km/hr speed environment. **The current vertical alignment of Wyrallah Road past the quarry does not meet design requirements for a 100km/hr design speed. It is likely that there are other sections of Wyrallah Road which do not meet current road design requirements.**

The newly constructed quarry access location and design will satisfy safe intersection sight distance guidelines, but it will not meet Approach Sight Distance requirements as set out in Austroads Guide to Traffic Engineering Practice –Part 5 Intersections at Grade.

The newly constructed type CH includes design treatments to ameliorate the approach sight limitation.

The Approach Site Distance non compliance was discussed with Lismore City Council and the RTA with a detailed design submitted to Council and approved, based on these discussions.

Lismore City Council approved the intersection upgrade in 2008

- **Accidents**

There are no reported accidents in the vicinity of the quarry access and the report details the locations of accidents on the route

- **Signposting**

Signposting is provided along the route. The signage should to be reviewed in relation to the position of warning signs to curves.

- **School Buses/Garbage Trucks**

It is recommended that the quarry trucks be fitted with CB radios to enable communication with other commercial road users.

- **Sugar Cane Transport**

The southern half of Wyrallah Road is utilised for carting of sugar cane between the months of June to December.

Typically the cane trucks are 23t and 19m long (c single class). The carting program occurs 4 times in this period, over a period of 30 days. Broadwater Mill has indicated that approximately 9,000 vehicles per annum (two way traffic) currently use Broadwater Road (also prior to upgrading in 2008) which constitutes 5.8% of total yearly traffic on Broadwater road.

- **Road Levies for Quarry Operations**

It is recommended that the road maintenance levy contribution of (\$0.0074/t/km+ 2.5%)*CPI or 11 cents per tonne plus CPI be applicable to this development. This rate was derived using methodology outlined in the section 94 plan which utilises Lismore City Councils Equivalent Standard Axles (ESA's) value for a typical gravel truck of single front axle with tandem axle and dual wheels, as an input along with typical costs to maintain a section of road per Km.

This levy will contribute toward maintenance requirements on Lismore City Council's designated heavy haulage route to ensure that the haulage route remains in a safe and trafficable condition for all users.

At present there are existing haulage operations, which operate from quarries outside the Lismore City Council boundaries and transport material much greater distances within and through Lismore City Council road network **without** contributing any road levies.

In general, the expansion of the quarry should not cause road capacity problems on the haulage routes as Champions Quarry operation potentially will replace some of the existing transported material which would have been delivered by truck and trailer combinations. Road safety can be managed to an acceptable level by implementing the recommended measures in this report. There are no significant road safety or traffic management issues to prevent approval.

1.0 Introduction

An extension is proposed to the existing Champions Quarry. The quarry is located approximately 16km from Lismore along Wyrallah Road.

The additional material, to be extracted, is proposed to be transported along the 3 routes.

- **Route 1** is north to Lismore via Wyrallah Road, Wyrallah Ferry Road, and Coraki Road Bruxner Highway to Lismore.
- **Route 2** is along Wyrallah Road south to the Pacific Highway at Woodburn
- **Route 3** -South to Broadwater via Wyrallah Rd and Broadwater Rd

Roadnet PTY LTD on behalf of the quarry operators have been engaged to undertake a traffic study to determine the impact of the additional volume of traffic generated by the proposed development of the quarry on the surrounding road network.

The traffic study is a requirement of a Part 3a application for the development with the traffic study guidelines being set by the Director Generals Requirements from Department of Planning and the RTA.

The traffic assessment has been prepared in accordance with the RTA's 'Guide to Traffic Generating Developments' and makes reference to appropriate Council's Codes and relevant Australian Standards.

2.0 Scope

The Director General's requirements issued by the Department of Planning states that the impacts of the proposed development are to be investigated:

In relation to traffic and transport the part 3A application must include

- a detailed assessment of the potential impacts of traffic from the proposal on the safety and efficiency of the road network; and
- a detailed description of the measures that would be implemented to upgrade and/or maintain roads over the life of the project;
- Recommendation on road contributions levies

It is recommended that current RTA Road Design Guide and the RTAs Guide Traffic Generating Developments be adopted for any upgrading of the surrounding road infrastructure.

The section of haulage route examined in this report is

- The section of road between the quarry access road and the Bruxner Highway via Wyrallah Road/Wyrallah Ferry Road/Coraki Road, a distance of approximately 12.7km.
- Wyrallah Road between the quarry access road and the Pacific Highway at Woodburn a distance of approximately 15.8 km,
- The section of road between the quarry access road and Broadwater via Wyrallah Road and Broadwater Road a distance of approximately 17.3km

This report deals with the above dot points except for

- Road Traffic Noise

This issue will be addressed by others.

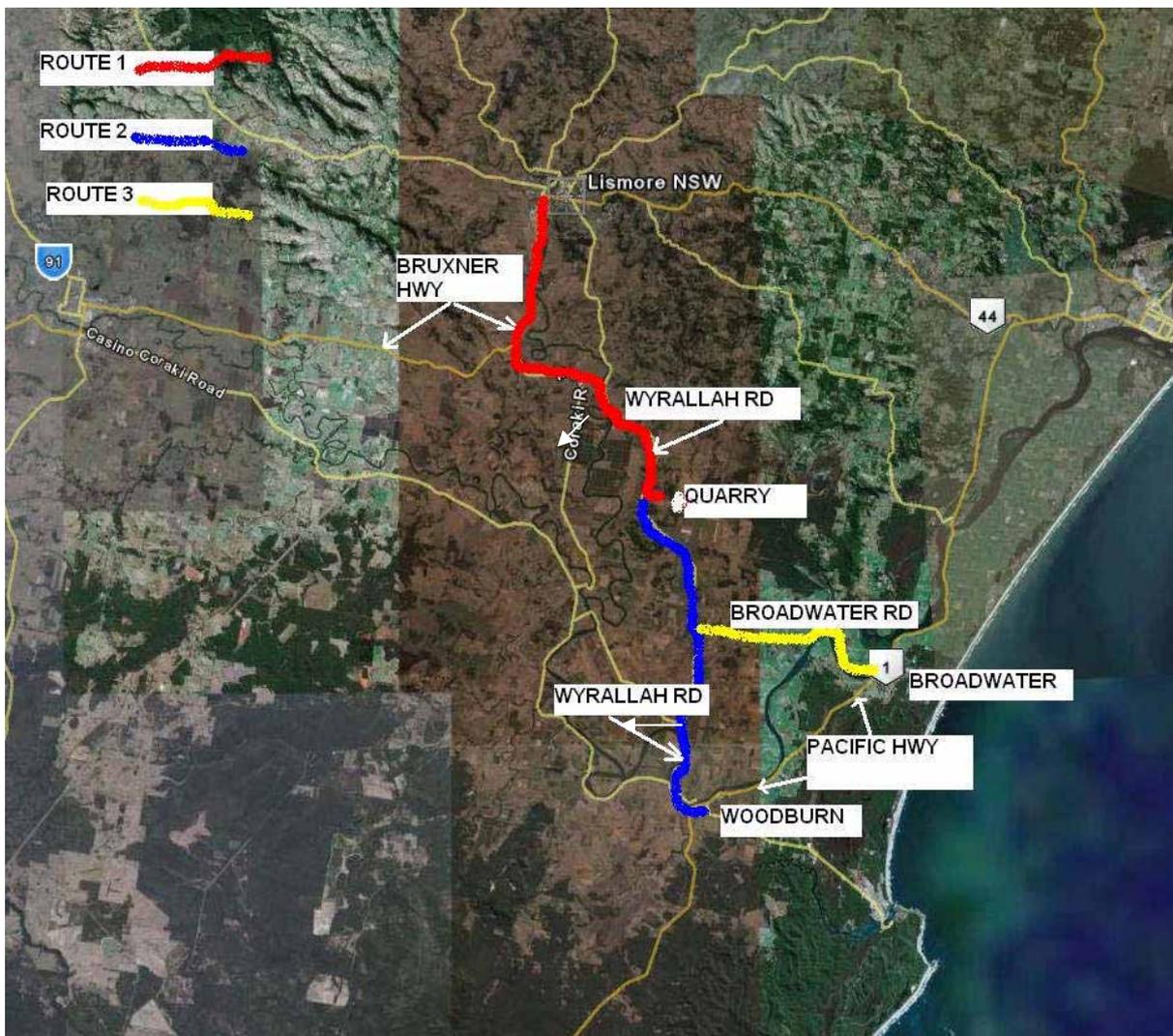


Figure 1 – Locality Plan

3.0 Methodology

- *Site Inspection and data collection.*
- *Consult with the RTA.*
- *Liaise with Consultant and Client.*
- *Carry out the road safety audit for the haulage route. This would include an assessment of school bus activity on the proposed haulage routes.*
- *Carry out traffic counts at Wyrallah Road/Pacific Highway intersection.*
- *Conduct traffic counts at Broadwater Road/Pacific Highway intersection.*
- *Conduct traffic counts at Broadwater Road/Wyrallah Road Intersection.*
- *Identify road and traffic issues for trucks along the haulage route.*
- *Conduct a visual inspection of pavement condition. Draw general conclusions as to the impact of the additional truck traffic on the life of the road pavement in Wyrallah Road and Broadwater Road.*
- *Conduct a general assessment of amenity issues such as visual and safety.*
- *Quantify the number of trucks and their configurations that currently use the Quarry. This involves identifying the average number of trucks per day over a year and the maximum number of trucks per day when the Quarry is busy.*
- *Calculate the additional traffic generated by the proposed upgrading of the Quarry in terms of averages and peak usage.*
- *Calculate traffic growth on Wyrallah Rd and Broadwater Road over the period of analysis, which would equate to the life of the Quarry.*
- *Assess the Coraki Road/Wyrallah Ferry Road intersection.*
- *Assess the Wyrallah Road/Wyrallah Ferry Road Intersection.*
- *Assess the Wyrallah Road/Broadwater Road intersection.*
- *Assess the Broadwater Road/Pacific Highway intersection.*
- *Take account of any the issues raised by RTA Northern Regional Office.*
- *Assess the project in accordance with the RTA Guide to Traffic Engineering Practice with reference to Australian Standards, Council's Codes and Austroads Guidelines.*

4.0 The Proposal

An existing sandstone quarry is located on the site with the current approved production rate being 29,000 m³ per annum (approximately 64,000t). It is proposed to progressively increase the production rate to 250,000 tonnes per annum to a maximum of 6.25 million tonnes for the life of the quarry.

Information supplied from the quarry in respect to the operation includes:

- *Average loadings of 30 trucks per day (30 t/load).*
- *Average hourly volumes of trucks leaving the site at 3 trucks per hour.*
- *250,000 t pa at 30 average tonnes per truck.*
- *A total of 280 working days per year.*

- 50% of movements travel north to Lismore via Wyrallah Road/Bruxner Highway. (Route 1) 15 movements per day out of the quarry 125,000 t pa.
- 50% movements travel south to Woodburn along Wyrallah Road with
 - 50 % travelling along Wyrallah Road to Woodburn at the Pacific Highway, (Route 2) 7.5 movements per day i.e. 63,000 t pa.
 - 50% travelling along Broadwater Road to the Pacific Highway (Route 3) at 7.5 movements per day, i.e. 63,000 t pa.
- Proposed operating hours Monday to Friday 7.00am to 5.30pm, Saturday 7.30am to 3pm.

5.0 Existing Traffic Conditions

5.1 General

Traffic volumes on Wyrallah Road have remained static since counts conducted in 1998. The daily volume of traffic estimated using Wyrallah Road in 1998 was 2,658. In a count conducted in 2007 the Wyrallah Road has a weekday average traffic volume of approximately 2640 vpd in the vicinity of the quarry access.

Wyrallah Road (MR 147) as of June 30 2009 became a RTA state funded road connecting Lismore and the Pacific Highway. The quarry access is located approximately 12.7 km south of the Bruxner Highway/Coraki Rd intersection approximately 15.8 km from the Pacific Highway at Woodburn and approximately 17.3km from the Pacific Highway at Broadwater.

Wyrallah Road is an undulating sealed road through a rural environment. The seal width varies between 6.5 and 7.5m and has narrow gravel shoulders. It has centre line markings, guideposts and speed advisory signposting on some curves.

The pavement condition of the route is fair to good with some sections of rough surface.

Rural properties are located along the route with several dwellings located close to the road.

Broadwater Road is approximately 10 km in length and provides access to Broadwater and the Pacific Highway. The road is generally in good condition, being level and winding its way on gentle curves through sugarcane fields to the intersection of Wyrallah Road. There are no safety or traffic flow issues associated with existing or proposed truck traffic using this route.

5.2 Road Safety Inspection

RoadNet's Road Safety Auditor Brian Kerwick conducted a road safety audit on routes 1 and 2 in December 2007. An inspection was carried out on Broadwater Road in April 2009.

Potential haulage routes were inspected in the context of safety and efficiency for additional truck use.

Wyrallah Road to the south of the quarry

The section of Wyrallah Road to the south of the quarry is generally in good condition. It is generally level and winds its way on gentle curves through sugarcane fields to Woodburn. The road has a speed limit of 100kph and seal width of approximately 7.0 to 7.5m with centre line markings.

There are several rough patches along this route but these can be readily repaired during routine maintenance. They are not unsafe.

There are no safety or traffic flow issues associated with existing or proposed truck traffic using this route.

Quarry Access

The newly constructed quarry access forms a CH (Channelised) type intersection with Wyrallah Road and is approximately 370m north of Tuckurimba Road. Wyrallah Road is on a straight alignment past the upgraded quarry access with the terrain rising on the western side necessitating the road to be cut into the batter slope. The terrain is generally level around the access point on the eastern side before falling away to the quarry. The seal width is 7.5m with gravel shoulders all in good condition. The upgraded quarry access location complies with Safe Intersection Sight distance (SISD) 1.05m to 1.05m requirements as per Austroads Part 5 Intersections at Grade Section 6.2.2 for a 100km/hr speed environment. Safe intersection sight distance will be the minimum standard to be provided on Wyrallah Road as per section 6.2.2.2 of Austroads Part 5 Intersections at Grade.

The upgraded quarry access location does not meet the requirements of Approach Site Distance (1.05m to 0.2m) as per the guidelines set out in Austroads - Part 5 Intersections at Grade.

To ameliorate the Approach Sight Distance non-compliance a modified type CH intersection has been installed with design elements included to assist in improving the Approach Sight Distance.



Figure 2 - New CH intersection into quarry (April 2009)

Wyrallah Road to the north of the quarry

Wyrallah Road to the north of the quarry is on a reasonable alignment (undulating and curving) and is generally in fair condition.

The alignment of this section of road through to Wyrallah Ferry Road is Lismore City Councils designated heavy vehicle route and will be acceptable for additional heavy vehicles. This has been previously acknowledged with Wyrallah Ferry Road being signposted for northbound traffic in Wyrallah Road with an advance direction sign stating: 'Alternative heavy vehicle route to Lismore'. Figures 3 to 6 shows the junction of Wyrallah Ferry Road and Wyrallah Road.

| Chainage (km) / Marker | Noted |
|---------------------------------|---|
| Wyrallah Rd | Wyrallah Ferry Rd South to Champions Quarry |
| 0.0 | Intersection of Wyrallah Ferry Rd and Wyrallah Rd – (HV detour) Intersection has no widening, sight distance OK |
| 0.2 | 60/100 posted speed |
| 0.3 | Tight curve – no signs/advisory speed |
| 0.8 | Tight curve – no signs/advisory speed |
| 1.1 | Tight curve – no signs/advisory speed |
| 1.1-1.4 | Road pavement rough and narrow |
| 2.3 | Pot hole on curve |
| 2.9 | Tuckurimba Rd/Leslie Lane right |
| 3.6 | Tucki Rd left (seal widening) |
| 5.3 | Mathieson Rd left , Munro Wharf Rd right |
| 6.0 | Pavement failure |
| 7.4 | Champions quarry (start video) |
| | |
| Wyrallah Road Southbound | Champions Quarry to Pacific Hwy |
| 0.00 | Quarry entrance left – running distance restarts 7.5m seal, edge markers, no edgelines |
| 0.2 | Coraki Rd left – widened opp into for through traffic but no markings (Tuckurimba Rd) Few bumps in surface, generally OK |
| 1.2 | Localised pavement failure |
| 2.7 | Localised pavement failure |
| 3.5 | 75k advance curve signs |
| 4.3 | Maxwell Lane right |
| 4.4 | Dungarubba Rd left |
| 4.3-4.6 | pavement cracking – |
| 5.3-6.4 | pavement cracking – |
| 6.4 | Sheehan Rd right |
| 7.0 | Broadwater Rd left |
| 7.2 | advance curve sign no advisory speed Woodburn sign, 7m seal, pavement OK, no edgelines |
| 7.8 | Canal |
| 8.0 | Localised pavement failures |
| 9.0 | Localised pavement failures |
| 9.3 | advance curve sign no advisory speed Continuous pavement failures restart – 30% |
| 10. 1 | Thompsons Lane left Rough pavement |
| 11.1 | Swan Bay Rd right |
| 11.5 | Oakland Rd right |

| | |
|------|--|
| | Seal narrows to 6.5m |
| 11.9 | Main road turns left |
| | Buckendoon School Rd straight ahead (unsealed side road) |
| | Give Way on main road for Buckendoon traffic right |
| 12.0 | Continuous pavement failures – 10% |
| | 7m seal, no edgelines |
| 12.3 | Traffic count tubes |
| 12.5 | advance curve sign no advisory speed |
| 12.8 | Forest Rd left |
| 13.5 | Bad pavement cracking restarts, 20% |
| | 7.5m seal |
| | Uneven ride |
| 15.1 | 50km/h speed limit |
| 15.3 | Bank St left and right |
| | Bridge starts (hump) |
| 15.5 | Pacific Highway at Woodburn |
| | Stop control |
| | No left turn in lane |
| | No left turn out lane |
| | 50km/h |

Table 1 Site Inspection Wyrallah Ferry Road to Woodburn

Wyrallah Ferry Road

Wyrallah Ferry Road meets Wyrallah Road at a T junction just over a bridge. The grading of the bridge is quite steep to gain clearance over the River. A 'T' junction warning sign is located before the bridge on the western approach however trees obscure it. It also lacks a distance plate to indicate that the junction is only 200m further on over the bridge. A chevron board and direction signs are located at the junction.

There is good sight distance for the 60 km/hr speed limit on all approaches. The intersection is slightly deficient in terms of turning paths for large vehicles. Wyrallah Road is approximately 6.5 to 7 m at the intersection with an access to a small rest area/park is located 50m to the south of the intersection.

Champions Quarry has previously reached agreement with Lismore City Council to pay a contribution towards the upgrade of the intersection to Austroads standards (See section 8).

Coraki Road

Coraki Road is a two lane RTA funded regional road generally 6.5m to 7.0m wide seal plus centre line markings. It is on a level alignment with a number of gentle curves. It is in reasonable condition and is suitable for truck use including quarry trucks. It meets the Bruxner Highway at a 'T' junction which is well delineated and signposted.

The Coraki Rd / Wyrallah Ferry Rd junction would benefit from the provision of increased turning widths into Wyrallah Ferry Road to improve turning the left turn movement for heavy vehicles using this heavy vehicle route as per figure 21.

Champions Quarry has previously reached agreement with Lismore City Council to pay a contribution towards the upgrade of this intersection to Austroads standards. (See section 8)



Figure 3
Looking west along Wyrallah Ferry Road



Figure 4
Looking north along Wyrallah Road from Wyrallah Ferry Road on left



Figure 5
Wyrallah Ferry Road and Wyrallah Road
Intersection looking east



Figure 6 Wyrallah Ferry Road looking east

Broadwater Road

Broadwater Road is approximately 10 km in length and provides access to Broadwater and the Pacific Highway. The road is generally in good condition, being level and winding its way on gentle curves through sugarcane fields to the intersection of Wyrallah Road. The road has a speed limit of 100km/hr and seal width of approximately 6.5 to 7.5m with centre line markings in several sections. Lismore Council has just completed a sealing program whereby Broadwater Road has been upgraded and is sealed for the full length from Wyrallah Road to the Pacific Highway.

Broadwater Road carried 419 vehicles/day in April 2009 (two way traffic).

There are several rough patches along this route but these can be readily repaired during routine maintenance. They are not unsafe.

There are no safety or traffic flow issues associated with existing or proposed truck traffic using this route.



Figure 7- Intersection of Broadwater Road and Wyrallah Road



Figure 8-Broadwater Road looking east from Wyrallah Road

5.3 Traffic Volumes

Lismore City Council has provided traffic volumes in two locations on Wyrallah Road taken in 2002 and Broadwater Road in 2009.

5.3.1 Wyrallah Road / Wyrallah Ferry Rd

The RTA average two-way traffic volumes in year 2002 at Wyrallah Road 100m south of Wyrallah Village (approximately 200m north of Wyrallah Ferry Road and Wyrallah Road)

yielded 2067 vehicles per day (2200 on weekdays). It is assumed that peak hour comprises 10% of the average daily traffic.

Traffic counts conducted at the Wyrallah Road/Wyrallah Ferry Road intersection in December 2007 yielded a pm peak hour traffic volume of 264 vph. This equates to a daily volume of 2640 vpd and a growth rate of 4.5% per annum since 2002. Therefore a value of 2640 vpd will be used for analysis.

Location Wyrallah Road Street 2 Wyrallah Ferry Rd Town Lismore
 Date 17th December 2007 Day Wednesday

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|---|----|----|-----|----|-----|----|----|---|----|---|----|---|-------------|------------|----|----|----|-------------|
| 8.00-8.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 8.15-8.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| 8.30-8.45 | 5 | 1 | 13 | 1 | 49 | 2 | 5 | 0 | 11 | 3 | 6 | 1 | 97 | | 0 | 0 | 0 | 0 |
| 8.45-9.00 | 8 | 0 | 15 | 0 | 41 | 2 | 5 | 1 | 15 | 0 | 1 | 0 | 88 | 185 | 0 | 0 | 0 | 0 |
| 9.00-9.15 | 9 | 0 | 3 | 1 | 29 | 0 | 6 | 1 | 9 | 0 | 2 | 0 | 60 | 245 | 0 | 0 | 0 | 0 |
| 9.15-9.30 | 2 | 1 | 6 | 0 | 33 | 1 | 5 | 0 | 6 | 0 | 5 | 5 | 64 | 309 | 0 | 0 | 0 | 0 |
| 9.30-9.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 212 | 0 | 0 | 0 | 0 |
| 9.45-10.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 124 | 0 | 0 | 0 | 0 |
| 10.00-10.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 0 | 0 | 0 | 0 |
| 10.15-10.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10.30-10.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10.45-11.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 24 | 2 | 37 | 2 | 152 | 5 | 21 | 2 | 41 | 3 | 14 | 6 | Max Hr | 309 | 0 | 0 | 0 | 0 |
| Overall peak hour: 8.30-8.45 to 9.15-9.30 | | | | | | | | | | | | | | 3 | | | | |
| Peak total | 24 | 2 | 37 | 2 | 152 | 5 | 21 | 2 | 41 | 3 | 14 | 6 | 303 | 0 | | | | |
| Light+HV | 26 | 39 | 157 | 23 | 44 | 20 | | | | | | | | | | | | |

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|---|-----|----|----|----|----|----|----|---|----|---|----|---|-------------|------------|----|----|----|-------------|
| 3.00-3.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 3.15-3.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| 3.30-3.45 | 26 | 1 | 14 | 2 | 14 | 1 | 3 | 2 | 8 | 1 | 10 | 0 | 82 | | 0 | 0 | 0 | 0 |
| 3.45-4.00 | 28 | 2 | 10 | 0 | 15 | 0 | 0 | 2 | 12 | 1 | 11 | 1 | 81 | 163 | 0 | 0 | 0 | 0 |
| 4.00-4.15 | 39 | 1 | 9 | 3 | 19 | 1 | 3 | 1 | 18 | 1 | 12 | 0 | 107 | 270 | 0 | 0 | 0 | 0 |
| 4.15-4.30 | 26 | 1 | 14 | 0 | 16 | 1 | 7 | 3 | 12 | 0 | 6 | 1 | 86 | 356 | 0 | 0 | 0 | 0 |
| 4.30-4.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 274 | 0 | 0 | 0 | 0 |
| 4.45-5.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 193 | 0 | 0 | 0 | 0 |
| 5.00-5.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 | 0 | 0 | 0 | 0 |
| 5.15-5.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.30-5.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.45-6.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 119 | 5 | 47 | 5 | 64 | 3 | 13 | 8 | 50 | 3 | 39 | 2 | Max Hr | 356 | 0 | 0 | 0 | 0 |
| Overall peak hour: 3.30-3.45 to 4.15-4.30 | | | | | | | | | | | | | | 3 | | | | |
| Peak total | 119 | 5 | 47 | 5 | 64 | 3 | 13 | 8 | 50 | 3 | 39 | 2 | 356 | 0 | | | | |
| Light+HV | 124 | 52 | 67 | 21 | 53 | 41 | | | | | | | | | | | | |

Table 2 Traffic Counts for Wyrallah Ferry Rd and Wyrallah Rd

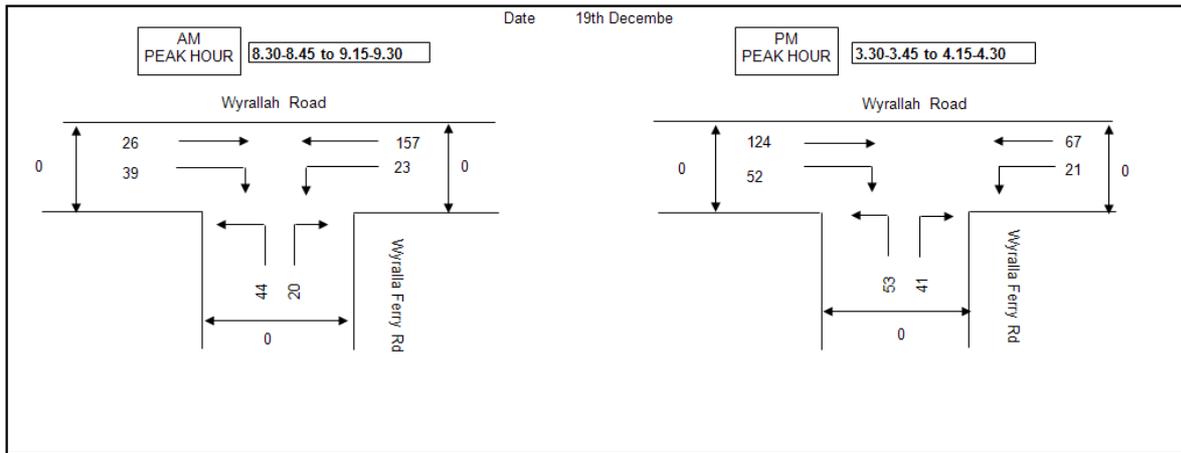


Figure 9. Movement Diagram for Wyrallah Rd and Wyrallah Ferry Rd

5.3.2 Wyrallah Ferry Road/Coraki Road

The RTA average traffic volumes in year 2002 were 1785 vehicles per day (2100 on weekdays). It is assumed that peak hour comprises 10% of the average daily traffic.

Traffic counts conducted in December 2007 indicated daily traffic volumes of 2370 vpd, with peak daily flows of 237 vph this represents a growth rate of approximately 5.4%.

Location Coraki Rd Street 2 Wyrallah Ferry Rd Town Lismore
 Date 19th Dec 2007 Day Wednesday

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|---|----|----|----|----|----|----|----|----|----|----|----|---|-------------|------------|----|----|----|-------------|
| 8.00-8.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 8.15-8.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| 8.30-8.45 | 18 | 3 | 10 | 0 | 4 | 2 | 12 | 3 | 5 | 1 | 13 | 0 | 71 | | 0 | 0 | 0 | 0 |
| 8.45-9.00 | 5 | 1 | 9 | 0 | 5 | 2 | 3 | 0 | 4 | 0 | 10 | 1 | 40 | 111 | 0 | 0 | 0 | 0 |
| 9.00-9.15 | 20 | 2 | 5 | 0 | 5 | 2 | 6 | 0 | 1 | 1 | 15 | 1 | 58 | 169 | 0 | 0 | 0 | 0 |
| 9.15-9.30 | 22 | 2 | 9 | 0 | 12 | 2 | 5 | 5 | 3 | 0 | 10 | 0 | 70 | 239 | 0 | 0 | 0 | 0 |
| 9.30-9.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 168 | 0 | 0 | 0 | 0 |
| 9.45-10.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 0 | 0 | 0 |
| 10.00-10.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 0 |
| 10.15-10.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10.30-10.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10.45-11.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 65 | 8 | 33 | 0 | 26 | 8 | 26 | 8 | 13 | 2 | 48 | 2 | Max Hr | 239 | 0 | 0 | 0 | 0 |
| Overall peak hour: 8.30-8.45 to 9.15-9.30 | | | | | | | | | | | | | | 3 | | | | |
| Peak total | 65 | 8 | 33 | 0 | 26 | 8 | 26 | 8 | 13 | 2 | 48 | 2 | 237 | | | | | |
| Light+HV | 73 | 33 | | 34 | | 34 | | 15 | | 50 | | | | | | | | |

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|---|----|----|----|----|----|----|----|----|----|----|----|---|-------------|------------|----|----|----|-------------|
| 3.00-3.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 3.15-3.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 |
| 3.30-3.45 | 7 | 2 | 5 | 1 | 9 | 4 | 17 | 0 | 15 | 1 | 6 | 2 | 67 | | 0 | 0 | 0 | 0 |
| 3.45-4.00 | 7 | 1 | 7 | 0 | 4 | 1 | 9 | 2 | 3 | 0 | 2 | 2 | 36 | 103 | 0 | 0 | 0 | 0 |
| 4.00-4.15 | 9 | 1 | 7 | 0 | 19 | 1 | 24 | 1 | 6 | 1 | 5 | 2 | 74 | 177 | 0 | 0 | 0 | 0 |
| 4.15-4.30 | 2 | 1 | 9 | 0 | 9 | 2 | 10 | 1 | 15 | 0 | 9 | 2 | 58 | 235 | 0 | 0 | 0 | 0 |
| 4.30-4.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 168 | 0 | 0 | 0 | 0 |
| 4.45-5.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 | 0 | 0 | 0 | 0 |
| 5.00-5.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 5.15-5.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.30-5.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.45-6.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 25 | 5 | 28 | 1 | 41 | 8 | 60 | 4 | 39 | 2 | 22 | 8 | Max Hr | 235 | 0 | 0 | 0 | 0 |
| Overall peak hour: 3.30-3.45 to 4.15-4.30 | | | | | | | | | | | | | | 3 | | | | |
| Peak total | 25 | 5 | 28 | 1 | 41 | 8 | 60 | 4 | 39 | 2 | 22 | 8 | 235 | | | | | |
| Light+HV | 30 | 29 | | 49 | | 64 | | 41 | | 30 | | | | | | | | |

Table 3 Traffic Count for Wyrallah Rd and Coraki Rd

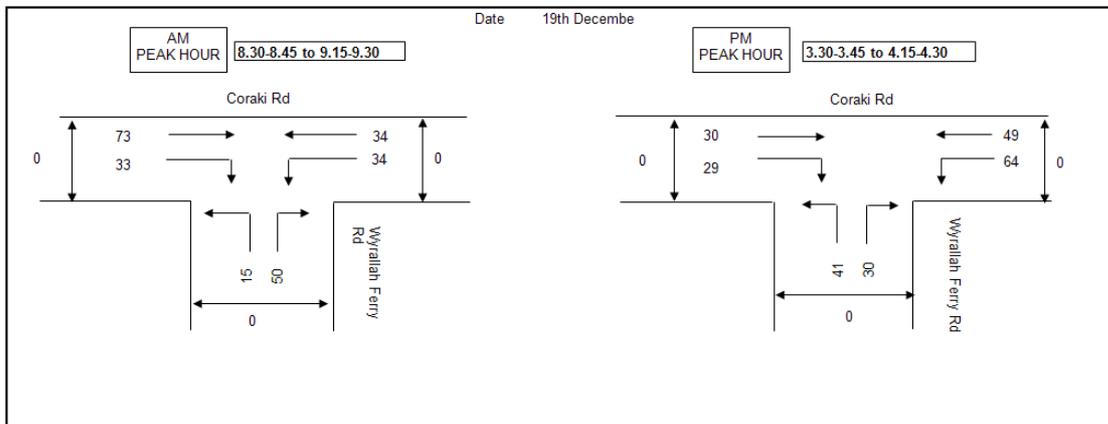


Figure 10 Movement Diagram for Coraki Rd and Wyrallah Ferry Rd

5.3.3 Wyrallah Road/Pacific Highway intersection (At Woodburn)

The intersection of the Pacific Highway and Wyrallah Road is currently configured as a 4-way intersection with a sheltered right turn (south bound). The right turn into Wyrallah Road from the Pacific Highway has a lowered median nose to facilitate truck-turning movements.

Traffic counts conducted in January 2008 indicated am peak turning traffic flows of 50vph turning onto the Pacific Highway from Wyrallah Road. The through traffic peak pm volumes

(Pacific Highway) at the time of the count was approximately 830 vph. (Using 8% peak traffic volumes for daily traffic volumes equates to approximately 11,000vpd) Therefore for this analysis the RTA traffic volumes of 830 vph will be utilised as Pacific Highway traffic and a volume of 50 vph will be utilised as turning volumes onto the Pacific Highway.

The addition of two extra movements per hour at this intersection to conduct a turn movement onto the Pacific Highway will not have any significant impact on this intersection and will continue to operate effectively as a CH type intersection.

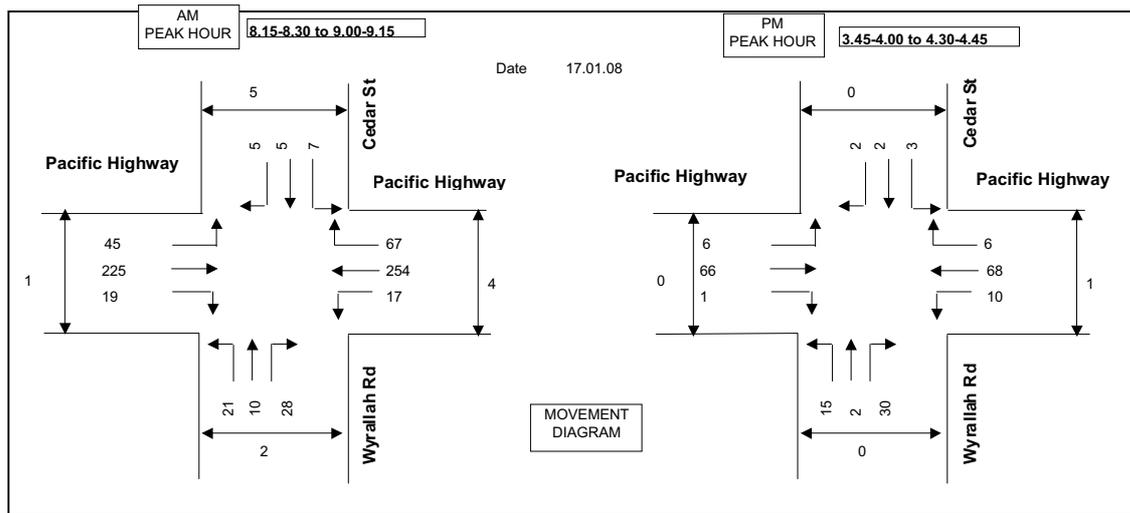


Figure 11 Movement Diagrams for the Pacific Highway/Wyrallah Road

5.3.4 Broadwater Road/Pacific Highway intersection (Broadwater)

The intersection of the Pacific Highway and Broadwater Road is currently configured as a modified type AU intersection, with a sheltered right turn (south bound). The right turn out of Broadwater Road from the Pacific Highway has a lowered median nose to facilitate truck-turning movements. The south and north bound carriage ways at this intersection is approximately 3.5-4m in width with good sight distance south and north bound.

Traffic counts conducted in May 2009 indicated am peak turning traffic flows of 34 vph turning onto the Pacific Highway from Broadwater Road. The through traffic peak PM volumes (Pacific Highway) at the time of the count was approximately 521 vph. (Using 10% peak traffic volumes for daily traffic volumes equates to approximately 5210 vpd)



Figure 12- Intersection of Pacific Highway with Broadwater Road (Broadwater)

5.3.5 Broadwater Road/Wyrallah Road intersection

The intersection of Broadwater Road and Wyrallah Road is currently configured as a T-intersection. Traffic counts conducted in May 2009 indicated PM peak turning traffic flows of 32 vph turning into Broadwater Road. The through traffic peak pm volumes (Wyrallah Road) at the time of the count was approximately 169 vph. (Using 8% peak traffic volumes for daily traffic volumes equate to approximately 2100 vpd past the intersection.)

Therefore for this analysis the RTA traffic volumes of 169 vph will be utilised as Wyrallah Road traffic and a volume of 32 vph will be utilised as turning volumes onto the Pacific Highway. Heavy Vehicles transporting sugar cane to the mill will contribute 7-8 peak movements

The addition of two extra movements per hour at this intersection to conduct a turn movement onto the Pacific Highway will not have any significant impact on this intersection and will continue to operate effectively as a CH type intersection.

Location Pacific Highway Street 2 Broadwater Road Town Lismore
 Date 3rd June 2009 Day Wednesday

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|------------|-----|----|----|---|-----|-----|----|---|----|---|---|---|-------------|------------|----|----|----|-------------|
| 7.00-7.15 | 21 | 6 | 1 | 0 | 29 | 17 | 2 | 0 | 6 | 0 | 1 | 0 | 83 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 7.15-7.30 | 36 | 16 | 2 | 3 | 44 | 14 | 2 | 0 | 10 | 4 | 1 | 2 | 134 | | 0 | 0 | 0 | 0 |
| 7.30-7.45 | 36 | 11 | 5 | 0 | 47 | 16 | 5 | 2 | 6 | 0 | 1 | 0 | 129 | | 0 | 0 | 0 | 0 |
| 7.45-8.00 | 36 | 10 | 9 | 0 | 51 | 26 | 7 | 0 | 8 | 0 | 0 | 0 | 147 | 493 | 0 | 0 | 0 | 0 |
| 8.00-8.15 | 37 | 4 | 4 | 0 | 39 | 9 | 4 | 0 | 2 | 0 | 0 | 0 | 99 | 509 | 0 | 0 | 0 | 0 |
| 8.15-8.30 | 38 | 9 | 1 | 0 | 42 | 12 | 2 | 0 | 3 | 0 | 2 | 0 | 109 | 484 | 0 | 0 | 0 | 0 |
| 8.30-8.45 | 60 | 7 | 4 | 0 | 38 | 14 | 4 | 0 | 7 | 0 | 1 | 0 | 135 | 490 | 0 | 0 | 0 | 0 |
| 8.45-9.00 | 53 | 12 | 0 | 0 | 43 | 11 | 0 | 0 | 8 | 0 | 1 | 0 | 128 | 471 | 0 | 0 | 0 | 0 |
| 9.00-9.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 372 | 0 | 0 | 0 | 0 |
| 9.15-9.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 263 | 0 | 0 | 0 | 0 |
| 9.30-9.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 0 | 0 | 0 |
| 9.45-10.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 317 | 75 | 26 | 3 | 333 | 119 | 26 | 2 | 50 | 4 | 7 | 2 | Max Hr | 509 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | |
|---|-----|----|----|---|-----|----|----|---|----|---|---|---|-----|---|---|---|---|---|
| Overall peak hour: 7.15-7.30 to 8.00-8.15 | | | | | | | | | | | | | | 2 | 0 | 0 | 0 | 0 |
| Peak total | 145 | 41 | 20 | 3 | 181 | 65 | 18 | 2 | 26 | 4 | 2 | 2 | 507 | | | | | |
| Light+HV | 186 | | 23 | | 246 | | 20 | | 30 | | 4 | | | | | | | |

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|-----------|-----|----|----|---|-----|----|----|---|----|---|----|---|-------------|------------|----|----|----|-------------|
| 3.30-3.45 | 44 | 19 | 3 | 0 | 37 | 5 | 1 | 0 | 2 | 0 | 3 | 0 | 114 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 3.45-4.00 | 42 | 14 | 2 | 0 | 84 | 11 | 1 | 0 | 0 | 0 | 6 | 0 | 160 | | 0 | 0 | 0 | 0 |
| 4.00-4.15 | 41 | 15 | 7 | 0 | 52 | 10 | 2 | 0 | 2 | 0 | 4 | 0 | 133 | | 0 | 0 | 0 | 0 |
| 4.15-4.30 | 51 | 8 | 9 | 0 | 51 | 11 | 1 | 0 | 4 | 1 | 1 | 0 | 137 | 544 | 0 | 0 | 0 | 0 |
| 4.30-4.45 | 10 | 1 | 0 | 0 | 27 | 1 | 7 | 1 | 2 | 0 | 12 | 0 | 61 | 491 | 0 | 0 | 0 | 0 |
| 4.45-5.00 | 12 | 1 | 1 | 0 | 29 | 0 | 7 | 0 | 0 | 0 | 6 | 0 | 56 | 387 | 0 | 0 | 0 | 0 |
| 5.00-5.15 | 12 | 1 | 1 | 0 | 34 | 1 | 6 | 1 | 0 | 0 | 2 | 1 | 58 | 312 | 0 | 0 | 0 | 0 |
| 5.15-5.30 | 9 | 0 | 0 | 0 | 29 | 1 | 5 | 0 | 0 | 0 | 2 | 1 | 46 | 221 | 0 | 0 | 0 | 0 |
| 5.30-5.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 0 | 0 | 0 | 0 |
| 5.45-6.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104 | 0 | 0 | 0 | 0 |
| 6.00-6.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 6.15-6.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 221 | 59 | 23 | 0 | 343 | 40 | 30 | 2 | 10 | 1 | 36 | 2 | Max Hr | 544 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | |
|---|-----|----|----|---|-----|----|---|---|---|---|----|---|-----|---|---|---|---|---|
| Overall peak hour: 3.30-3.45 to 4.15-4.30 | | | | | | | | | | | | | | 1 | 0 | 0 | 0 | 0 |
| Peak total | 178 | 56 | 21 | 0 | 224 | 37 | 5 | 0 | 8 | 1 | 14 | 0 | 544 | | | | | |
| Light+HV | 234 | | 21 | | 261 | | 5 | | 9 | | 14 | | | | | | | |

Table 4 Traffic Counts for Pacific Highway/Broadwater Road intersection

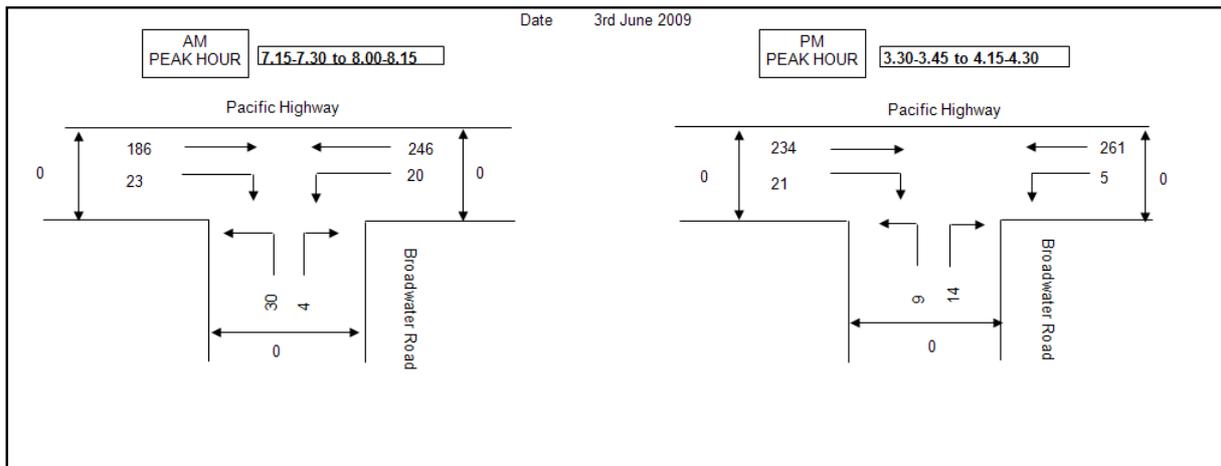


Figure 13 Movement diagrams for Pacific Highway/Broadwater Road intersection

Location Wyrallah Road Street 2 Broadwater Road Town Lismore
 Date 3rd June 2009 Day Wednesday

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|---|-----|----|---|----|----|----|----|---|---|----|----|---|-------------|------------|----|----|----|-------------|
| 7.00-7.15 | 16 | 3 | 0 | 0 | 2 | 0 | 11 | 2 | 0 | 0 | 2 | 0 | 36 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 7.15-7.30 | 13 | 4 | 0 | 0 | 12 | 1 | 8 | 0 | 0 | 0 | 2 | 0 | 40 | | 0 | 0 | 0 | 0 |
| 7.30-7.45 | 30 | 2 | 0 | 0 | 9 | 0 | 4 | 0 | 0 | 0 | 3 | 1 | 49 | | 0 | 0 | 0 | 0 |
| 7.45-8.00 | 25 | 1 | 1 | 1 | 14 | 0 | 7 | 0 | 1 | 1 | 10 | 0 | 61 | 186 | 0 | 0 | 0 | 0 |
| 8.00-8.15 | 39 | 1 | 0 | 0 | 13 | 0 | 3 | 1 | 0 | 0 | 6 | 0 | 63 | 213 | 0 | 0 | 0 | 0 |
| 8.15-8.30 | 42 | 2 | 0 | 0 | 14 | 1 | 4 | 0 | 0 | 0 | 7 | 0 | 70 | 243 | 0 | 0 | 0 | 0 |
| 8.30-8.45 | 24 | 0 | 0 | 0 | 8 | 1 | 4 | 0 | 0 | 0 | 2 | 0 | 39 | 233 | 0 | 0 | 0 | 0 |
| 8.45-9.00 | 31 | 1 | 0 | 0 | 13 | 1 | 7 | 0 | 1 | 0 | 7 | 0 | 61 | 233 | 0 | 0 | 0 | 0 |
| 9.00-9.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 170 | 0 | 0 | 0 | 0 |
| 9.15-9.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| 9.30-9.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 0 | 0 | 0 | 0 |
| 9.45-10.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 220 | 14 | 1 | 1 | 85 | 4 | 48 | 3 | 2 | 1 | 39 | 1 | Max Hr | 243 | 0 | 0 | 0 | 0 |
| Overall peak hour: 7.30-7.45 to 8.15-8.30 | | | | | | | | | | | | | | 3 | | | | |
| Peak total | 136 | 6 | 1 | 1 | 50 | 1 | 18 | 1 | 1 | 1 | 26 | 1 | 242 | 0 | | | | |
| Light+HV | 142 | 2 | | 51 | | 19 | | 2 | | 27 | | | | | | | | |

| Time | 1 | H | 2 | H | 3 | H | 4 | H | 5 | H | 6 | H | 1/4h totals | Hrly Total | P1 | P2 | P3 | 1/4h totals |
|---|-----|---|---|-----|-----|----|----|---|---|----|----|---|-------------|------------|----|----|----|-------------|
| 3.30-3.45 | 12 | 0 | 0 | 0 | 21 | 1 | 5 | 0 | 1 | 0 | 2 | 1 | 42 | Incl. Hvy | 0 | 0 | 0 | 0 |
| 3.45-4.00 | 19 | 0 | 0 | 0 | 32 | 3 | 2 | 0 | 0 | 0 | 2 | 0 | 58 | | 0 | 0 | 0 | 0 |
| 4.00-4.15 | 19 | 2 | 0 | 0 | 22 | 0 | 7 | 0 | 0 | 0 | 5 | 0 | 55 | | 0 | 0 | 0 | 0 |
| 4.15-4.30 | 9 | 0 | 0 | 1 | 30 | 1 | 6 | 1 | 1 | 1 | 7 | 0 | 57 | 212 | 0 | 0 | 0 | 0 |
| 4.30-4.45 | 10 | 1 | 0 | 0 | 27 | 1 | 7 | 1 | 2 | 0 | 12 | 0 | 61 | 231 | 0 | 0 | 0 | 0 |
| 4.45-5.00 | 12 | 1 | 1 | 0 | 29 | 0 | 7 | 0 | 0 | 0 | 6 | 0 | 56 | 229 | 0 | 0 | 0 | 0 |
| 5.00-5.15 | 12 | 1 | 1 | 0 | 34 | 1 | 6 | 1 | 0 | 0 | 2 | 1 | 58 | 232 | 0 | 0 | 0 | 0 |
| 5.15-5.30 | 9 | 0 | 0 | 0 | 29 | 1 | 5 | 0 | 0 | 0 | 2 | 1 | 46 | 221 | 0 | 0 | 0 | 0 |
| 5.30-5.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 0 | 0 | 0 | 0 |
| 5.45-6.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 104 | 0 | 0 | 0 | 0 |
| 6.00-6.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 6.15-6.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 102 | 5 | 2 | 1 | 224 | 8 | 45 | 3 | 4 | 1 | 38 | 3 | Max Hr | 232 | 0 | 0 | 0 | 0 |
| Overall peak hour: 4.15-4.30 to 5.00-5.15 | | | | | | | | | | | | | | 4 | | | | |
| Peak total | 43 | 3 | 2 | 1 | 120 | 3 | 26 | 3 | 3 | 1 | 27 | 1 | 232 | 0 | | | | |
| Light+HV | 46 | 3 | | 123 | | 29 | | 4 | | 28 | | | | | | | | |

Table 5 Traffic Counts for Wyrallah Rd/Broadwater Road intersection

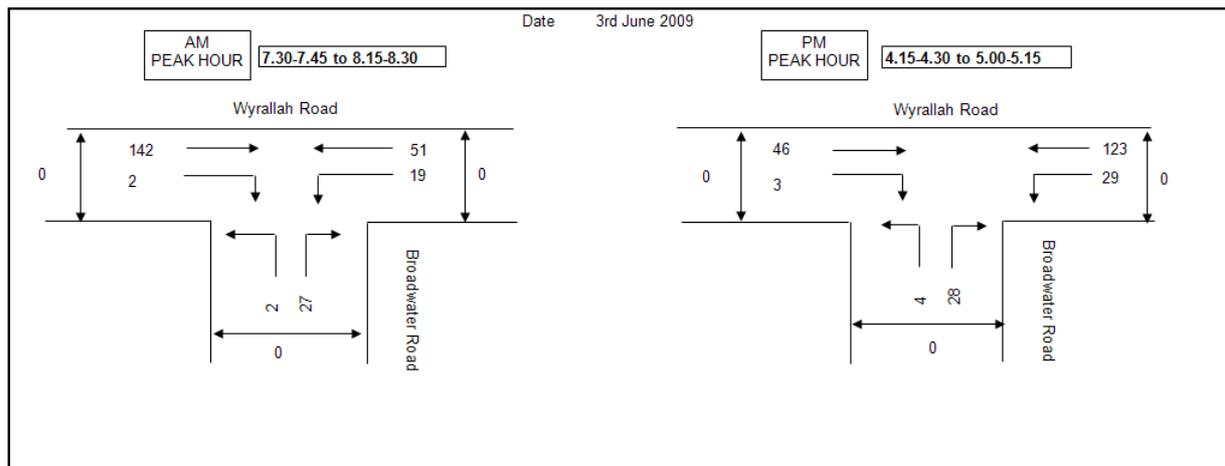


Figure 14 Movement diagrams for Wyrallah Road/Broadwater Road intersection

5.4 Traffic Growth

Wyrallah Road

Daily volumes for Wyrallah Road at Wyrallah were measured in 1998 as part of the Lismore City Wide Road Study with traffic counts of 2658 vpd.

Traffic counts conducted in 2007 at Wyrallah / Wyrallah Ferry Road intersection yielded a traffic volume of 2640 vpd, which indicates that the traffic growth has been static for the last 10 years.

Applying a growth rate of 3% over 10 years to 2018 the predicted traffic volume on Wyrallah Road will be 3432 vpd.

This is in line with the findings of the 1998 Lismore City Wide Road Study that has predicted a traffic volume of approximately 3510 vpd on Wyrallah Road. The traffic volumes of 3432 AADT will be used in the analysis.

Broadwater Road

Traffic Counts supplied by Lismore Council in April 2009 indicated Broadwater Road carried 419 vehicles/day (two way traffic). Traffic volumes on Broadwater Road have been decreasing since 2003 when traffic volumes were 473 vehicles per day. For this assessment a traffic growth figure of 1% will be utilised for Broadwater Road.

Pacific Highway

Traffic counts were conducted on the Pacific Highway at Wyrallah Road and Broadwater Road. The RTA do not have Traffic volumes for this section of the Pacific Highway, therefore a 3% growth rate will be adopted.

5.5 Accidents

An analysis has been made of the traffic accident history of the section of Wyrallah Road between Woodburn - Wyrallah Ferry Road and the quarry access and Broadwater Road. This analysis has been carried out on the accident data supplied by Lismore City Council from January 2000 to March 2006. Figure 15 shows a diagram of accident sites. Red dots are casualty accidents and green dots are tow aways.

5.6 Accident Statistics of the proposed transport routes

Analysis of accident data for the period January 2000 to March 2006 for Wyrallah Road indicated

- 41 accidents
- 18 injury accidents.
- 32 single vehicle accidents.
- 30 accidents occurred on a curve.
- The times of accidents were spread throughout the day – no distinct pattern.

- *82% of accidents occurred during the week*
- *Monday had the highest number of accidents (11) of any day.*
- *15 accidents occurred in the dark.*
- *Year 2003 had the highest number of accidents –11, 2001 – 4, 2002 - 9, 2004 – 4, 2005 –7, 2006 - 4*
- *2 accidents involving light trucks*
- *1 accident involving a heavy truck*
- *1 accident involving articulated trucks*
- *0 accidents involving cyclists or pedestrians*

Clusters of accidents at:

- *6 accidents either side of Sheehan Rd/ Wyrallah Rd intersection*
- *3 accidents near the Maxwell Lane/ Wyrallah Rd intersection.*
- *There were no fatalities reported in this period*

Analysis of accident data for the period January 2000 to March 2006 for Broadwater Road indicated

- *4 accidents*
- *2 without injury*
- *2 with injury*

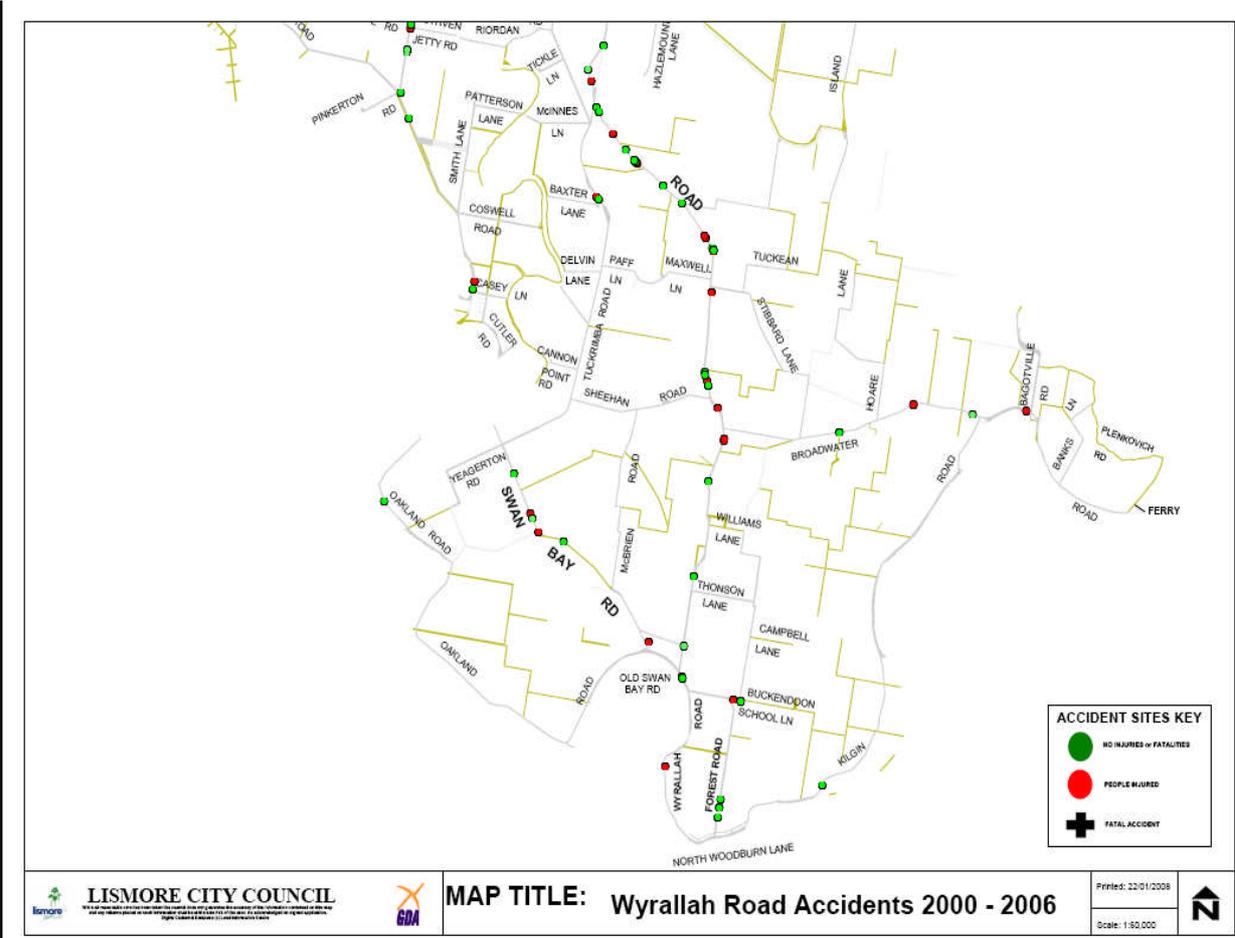


Figure 15 - Accident Locations

5.7 Buses

Northern Rivers Bus Line (Kirklands Bus Company) conduct school bus services on Wyrallah Road at peak morning and afternoon school times. They also run a public bus route with timetable shown below.

Lismore to Woodburn

The bus service from Lismore to Woodburn has five am services and four pm services via Wyrallah Rd Monday to Friday only. (Excluding Public Holidays). Buses set down and pick up at various locations along the haulage route. When contacted, Kirklands Buses indicated that buses have to wait at intersections to turn if there are vehicles waiting to turn into Wyrallah Road and Coraki Road.

The other bus routes Kirklands Bus Company provide are

- **Lismore to Evans Head**
- **Grafton to Lismore**
- **Evans Head Ballina**

Amos Bus service has a bus school bus service along Broadwater Road between the hours of 7:15am-8am and 4.30pm – 5.15pm weekdays.

5.8 Garbage Trucks

Lismore City Council collects waste bins at rural properties along Wyrallah Road and Broadwater Road every Wednesday. The stopping areas for these trucks are limited and present a safety hazard for other large vehicles, quarry trucks and buses, should they not be able to stand fully off the road carriageway. This is a Lismore Council road safety issue and will require addressing.

5.9 Sugar Cane Carting

Specialised Container Transport carts sugar cane to the Broadwater Mill via Wyrallah Road and Broadwater Road during the months of June to December.

The southern half of Wyrallah Road is utilised for carting of sugar cane between the months of June to December.

Broadwater Mill have indicated that approximately 9,000 vehicles per annum (two way traffic) currently use Broadwater Road to cart cane to the mill at Broadwater prior to upgrading in 2008 which constitutes 5.8% of total yearly traffic on Broadwater Road.

These traffic volumes are expected to be similar for the immediate future.

6.0 Assessment of traffic impacts

The haulage route from the extraction site is via Wyrallah Road for a distance of approximately

- 12.7 km to the Bruxner Highway (Lismore)
- 15.8 km from Woodburn
- 17.3km from Broadwater.

An inspection of existing road and traffic conditions on the route was carried out as part of the investigation of the haulage route. (Refer to figure 1)

6.1 Details of the traffic volumes generated by the project

The proposed operation involves the extraction of sandstone material and topsoil for

- washed sand for the concrete market,
- select and engineer fill,
- blended road base,
- brick Layers sand,
- garden topsoil, and
- dimensioned stone and rock.

This material is primarily transported to the Lismore market via

- Wyrallah Road / Wyrallah Ferry Road / Coraki Road / Bruxner Highway

To the Pacific Highway via

- Wyrallah Road Woodburn,
- Broadwater Road to Broadwater.

The transporting of the material to markets commonly takes places over consolidated periods and then declines in intensity until the next supply is needed.

The current approval for Champions quarry generates about 11 trucks per day on average leaving the quarry. The current proposal will have an estimated volume of 30 trucks per day (90% Truck and trailer and 10% body trucks) leaving the quarry with the traffic assignment being 50% travelling to Lismore and 25% travelling to Woodburn and 25% travelling to Broadwater. This equates to an extra 19 trucks per day leaving the quarry.

The proposed increase in volumes will be,

- 10 extra trucks per day leaving the quarry on average utilising route one (To Lismore),
- 4.5 extra trucks per day leaving the quarry on average utilising route two (To Woodburn), and
- 4.5 extra trucks per day leaving the quarry on average utilising route 3 (To Broadwater).

The forecast extra volume of 19 trucks leaving the quarry is less than 1% (0.71%) of the 2007 Wyrallah Road traffic volumes and less than 1% (0.55%) of the predicted 2018 volumes and consequently will have little impact on road capacity and traffic movements along the proposed routes.

EXTRACTION SUMMARY FOR PROPOSED OPERATION

| Proposed Annual Extraction (t) | Av trucks per day leaving the quarry | Tonnes/truck Average tonnes/day | Tonnes/Day | Tonnes extracted for days at rate of 900t per day |
|---------------------------------------|---|--|-------------------|--|
| | 30 | 33t (90%) 10% Body truck 15 t | | |
| 250,000t | 30 | 890 | 890 | 250,000 |

Table 6 - Calculation of Average Truck Movements

The average daily truck numbers proposed will be 30 trucks per day leaving the quarry. The Quarry operator provided this information and is based on an extraction rate of approximately 250,000 tonnes being transported by truck.

The truck and trailer combination would carry approximately 33 tonnes and the body truck would carry approximately 15 tonnes.

On this basis approximately 250,000 tonnes would be transported over 280 days.

6.2 Road Capacity of the proposed transport route

Wyrallah Road

Wyrallah Road is a two lane RTA funded regional road through this section with an estimated AADT of 2,600 to 2700 (2858 south of Tucki Rd).

Table 7 shows that the existing road operates at a level of service “B” which represents an acceptable level of operational performance.

In 20 years time at a linear growth rate of 3% the predicted traffic volumes are 3500 AADT. The road will still be at a level of service “B” at that time.

Broadwater Road

Broadwater Road is a two lane regional road with an AADT of 419. (April 2009).

Table 7 shows that the existing road operates at a level of service of “A”.

In 20 years time at a linear growth rate of 1% the predicted traffic volumes will be in the order of 503 AADT, which represents a level of service of “A” a good level of operational performance.

Wyrallah Ferry Road

Wyrallah Ferry Road is a two lane rural regional road with an estimated 1670 AADT.

Table 7 shows that the existing road operates at a level of service “B” which represents an acceptable level of operational performance.

In 20 years time at a linear growth rate of 3% the predicted traffic volumes are 2672 AADT. The road will still be at a level of service “B” at that time.

Coraki Road

Coraki Road is a two lane rural regional road with an estimated 2400 AADT.

Table 7 shows that the existing road operates at a level of service “B” which represents an acceptable level of operational performance.

In 20 years time at a linear growth rate of 3% the predicted traffic volumes are 3840 AADT. The road will still be at a level of service “C” at that time.

| LOS | AADT | Hourly Volume |
|-----|--------|---------------|
| ‘A’ | 1,100 | 110 |
| ‘B’ | 2,800 | 280 |
| ‘C’ | 5,200 | 520 |
| ‘D’ | 8,000 | 800 |
| ‘E’ | 14,800 | 1,480 |

AUSTROADS Level of Service (LOS) (0.10 peak hour & 0.10 heavy vehicles)

Table 7
Two Lane Rural Road Capacity – Rolling Terrain
Two Way Flow

The operational performance of roads can be summarised using Level of Service criteria. This is measured between levels 'A' and 'F', with 'A' being good and 'F' being poor.

Level of service 'B' is an acceptable standard for this type of road.

6.3 Intersection assessment on the proposed transport route

There are 7 intersections on the haulage route.

1. The Quarry Access,
2. Wyrallah Ferry Road and Wyrallah Road,
3. Wyrallah Ferry Road and Coraki Road,
4. Coraki Road and Bruxner Highway,
5. Pacific Highway and Wyrallah Rd, and
6. Wyrallah Road and Broadwater Road.
7. Broadwater Road and Pacific Highway

A detailed assessment of Wyrallah Road and the quarry access is provided in this section.

All other intersections referred to were found to be acceptable for sight distance with relatively low traffic volumes at the time of the inspection.

Intersection treatments of Wyrallah Ferry Road / Wyrallah Road and Wyrallah Ferry Road / Coraki Road are detailed in figures 10 and 11.

6.3.1 Junction of Wyrallah Road and Quarry Access

The quarry intersection has recently been upgraded to a CH (Channelised intersection) to cater for increased traffic movements and to improve the overall safety of the intersection. (See figure 16)

This intersection was approved by Lismore City Council in conjunction with the RTA as part of a development application in 2006. Correspondence from the RTA to Lismore City Council on 16 August 2007 contained an intersection layout to suit 200,000 m³ (approx. 400,000 tonnes) extraction rate annually. The intersection constructed in 2008 exceeds the intersection warrants for the intersection volumes forecast.

Safe Intersection Sight Distance (1.05m to 1.05m)

Safe Intersection Sight Distance (SISD) for cars exiting has been assessed for the proposed intersection as per the requirements of Austroads Guide to Traffic engineering Practice Intersections at Grade for 100km/hr. The safe intersection sight distance requirements are as follows:

- 253m from the south and
- 238m from the north (grade correction of -15m)

The assessment of Safe Intersection Sight Distance was conducted for a 100km/hr speed environment and has been met for the current intersection centreline of 370.67m and vehicle position at the intersection of 368.67m

Approach Sight Distance (1.05m to 0.2m)

Approach Sight Distance (ASD) was assessed for vehicles exiting the quarry as per the requirements of Austroads Guide to Traffic Engineering Practice Intersections at Grade for 100km/hr.

The location of the intersection **does not** meet Austroads Guide to Traffic Engineering Practice Intersections at Grade requirements for Approach Sight Distance.

The ASD required for the intersection at 100km/hr are

- 170m from the north
- 155m to the south (grade correction of -15m)

The assessment of Approach Sight Distance was conducted and has **not** been met for the current intersection centreline of 370.67m and vehicle position at the intersection of 368.67m

The provision of a type CH intersection will aid in reducing the impacts of the Site Distance non compliance.

Truck Stopping Sight Distance

Truck Stopping Sight Distance (TSSD) was assessed for the intersection for trucks entering the intersection as per the requirements of Austroads Guide to Traffic Engineering Practice Intersections at Grade for 100km/hr.

The TSSD required for the intersection at 100km/hr are

- 210m to the south, and
- 144m to the north (grade correction of -66m).

The assessment of Truck Stopping Sight Distance was conducted and has been met for the current intersection centreline of chainage 370.67m and vehicle position at the intersection of chainage 368.67m

Entering Sight Distance

Entering Sight Distance (ESD) was assessed for the intersection for vehicles entering at 1.05m to 1.05m as per the requirements of Austroads Guide to Traffic Engineering Practice Intersections at Grade for 100km/hr.

The ESD required at the intersections has been determined at

- 500m

The assessment of Entering Sight Distance was conducted and has **not** been met for the current intersection centreline of 370.67m and vehicle position at the intersection of 368.67m.

Austroads Guide to Traffic Engineering Practice Intersections at Grade states:-

“Because of the large distances required ESD is rarely achieved but should be provided wherever possible”

“Where the provision of full ESD (either for passenger cars or trucks) is impractical, SISD should be the minimum provided and an effort should be made to achieve as much sight distance above this as possible.”

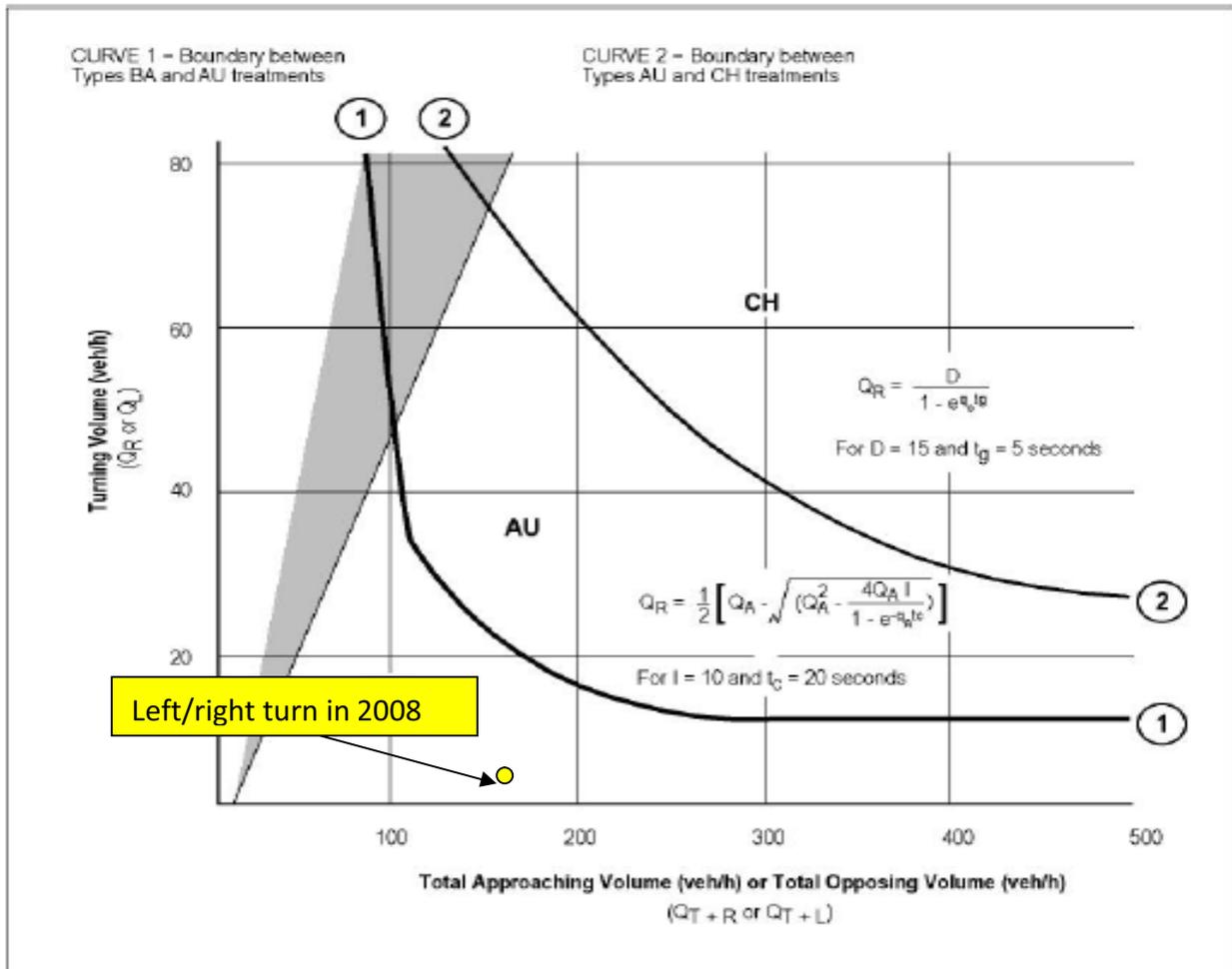
Therefore SISD has been be utilised as the minimum sight distance requirement.

| SIGHT DISTANCE TYPE AT 100KM/HR | DISTANCE NORTHBOUND REQUIRED | DISTANCE SOUTHBOUND REQUIRED |
|------------------------------------|------------------------------------|------------------------------------|
| ASD (1.05m to 0.2m) | 170m | 155m |
| SISD (1.05m to 1.05m) | 253m | 238m |
| TSSD (2.4m to 0.6m) | 210m | 144m |
| ESD | 500m | 500m |

Table 8 Sight Distance requirements for the proposed quarry intersection

Notwithstanding this assessment to improve the safety of the intersection and to allow for increased storage turning into the quarry with any potential increase in production over and above the current proposal, a type CH intersection treatment has been constructed as maximum treatment for this intersection. This treatment has ameliorated the Approach Sight Distance issue and was discussed with, and approved by Lismore City Council in conjunction with the RTA as a design treatment to overcome the Approach Sight Distance non-compliance.

The current alignment of Wyrallah Rd (Horizontal, vertical and intersections) between Wyrallah and Tuckurimba past the quarry does not meet current road design guidelines for the posted speed limit of 100km/hr. To address these issues it is recommended that the posted speed of Wyrallah Road between Wyrallah and Tuckurimba including the quarry intersection be reduced to 80km/hr.



**Figure 17 – Austroads Intersections Warrants
Quarry Access and Wyrallah Road (2008)**

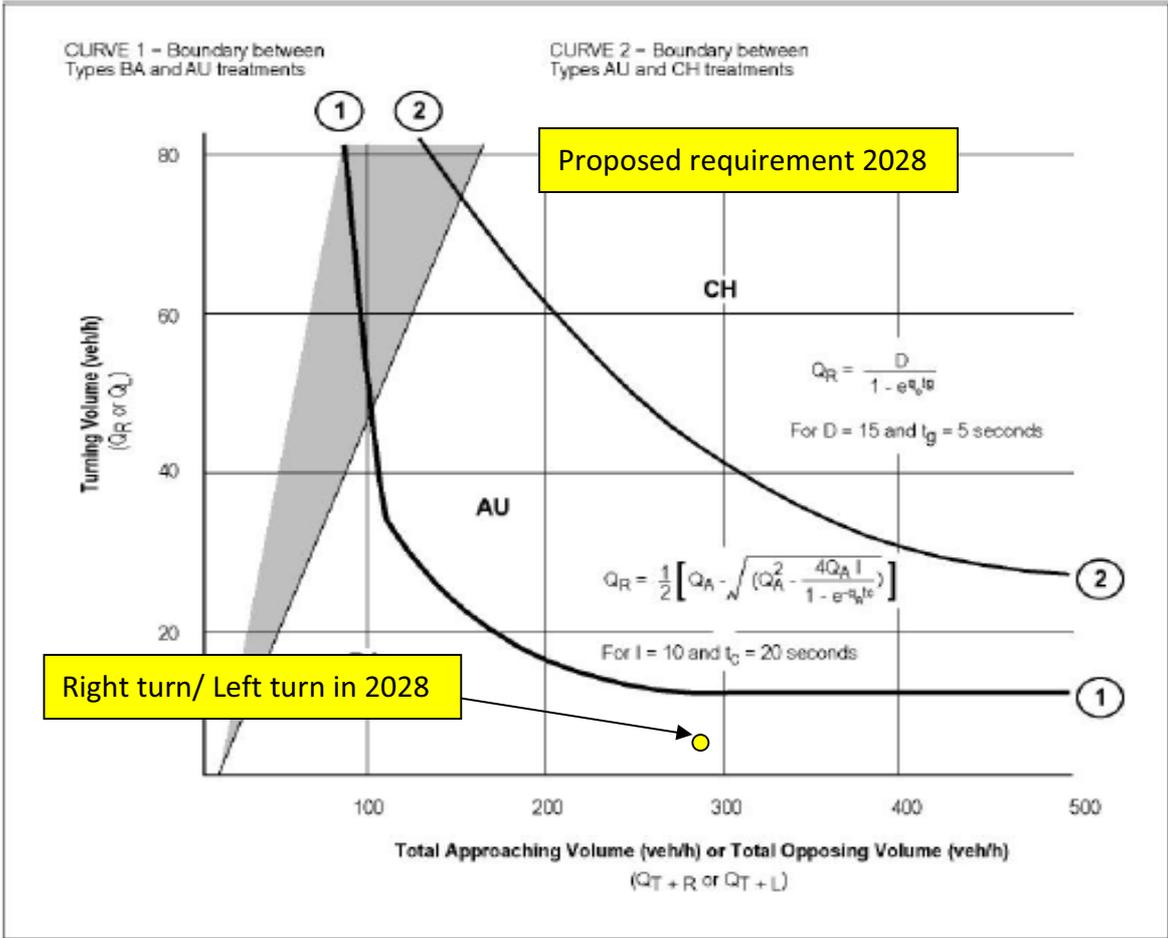


Figure 18 – Austroads Intersections Warrants Quarry Access and Wyrallah Road (2028)

6.3.2 Junction of Wyrallah Ferry Road and Wyrallah Road

Wyrallah Ferry Road meets Wyrallah Road at a T-junction leading to the eastern approach of the Wyrallah Bridge. The grading of the bridge is steep to gain clearance over the river. A ‘T’ junction warning sign is located before the bridge on the western approach however trees obscure it. It also lacks a distance plate to indicate that the junction is only 200m further on over the bridge. A chevron board and direction signs are located at the junction.

The extra heavy vehicle traffic proposed from the Quarry operations at this intersection, on average, will be 2 vehicle movements per hour, and as such, will not have any impact on intersection safety or capacity of the road network. Sight distance for the 60 km/h speed limit is met on all approaches. The intersection is slightly deficient in terms of turning paths for large vehicles. Wyrallah Road is approximately 7m wide at the intersection; however the intersection has been recently upgraded by Lismore City Council. Lismore Council have just recently provided the intersection with an asphalt overlay. An access to a small rest area/park is located 50m to the south of the intersection.

6.3.3 Upgrading required for the junction of Wyrallah Ferry Road and Wyrallah Road.

The intersection of Wyrallah Road and Wyrallah Ferry Road is currently substandard and will require upgrading in the form of widening for the left turn in for heavy vehicles from Wyrallah Road. (See Figure 19 and 21). It is recommended that Lismore City Council undertake these works as part of their rolling works program and part funded part of the \$6,700 contribution from Champions Quarry as per condition 31A of the recommended conditions of consent 9 February 2009, (DA 2008/233) to maintain this section of road network as Lismore City Councils primary heavy haulage route. This substandard intersection provides another example of a Lismore City Council not constructing intersections to Austroad design standards. There are other examples of recently constructed intersections on the Lismore Council road network which do not meet Austroads Standard. On completion of these upgrade works the intersection will comply with Austroads design standards.



Figure 19- Upgrading requirements for the Wyrallah Road- Wyrallah Ferry Road intersection.

6.3.4 Junction of Coraki Road and Bruxner Highway

Coraki Road and the Bruxner Highway meet at a 'T' junction; the intersection is configured as a modified AU type intersection with a sheltered right turn lane into Coraki Road from the Bruxner highway and an auxiliary left turn lane into Coraki Road from the Bruxner Highway.

There are no sight distance non compliances. On completion of these upgrade works the intersection will comply with Austroads design standards.

The extra heavy vehicle traffic proposed from the quarry operations at this intersection, on average, will be 2 vehicle movements per hour, and as such, will not have any impact on intersection safety or capacity of the road network.

6.3.5 Junction of Wyrallah Ferry Road and Coraki Road

Coraki Road and Wyrallah Ferry road meet at a T-intersection. This intersection is configured as a left and right turn with tapers. There are no sight distance non compliances associated with this intersection. The extra heavy vehicle traffic proposed from the quarry operations at this intersection, on average, will be 2 vehicle movements per hour, and as such, will not have any impact on intersection safety or capacity of the road network.

6.3.6 Upgrading required for the junction of Wyrallah Ferry Road and Coraki Road.

The intersection of Coraki Road and Wyrallah Ferry Road is currently substandard and will require upgrading in the form of widening for the left turn in to cater for heavy vehicles from Coraki Road. (See Figure 20 and 22)

The proposed design will require 90m² of pavement widening with in conjunction with a 2 coat seal. It is recommended that Lismore City Council undertake these works as part of their rolling works program and part funded from part of the \$6,700 contribution paid by Champions Quarry as per condition 31A of the recommended conditions of consent 9 February 2009 (DA 2008/233).

This substandard intersection provides another example of Lismore City Council not constructing intersections to Austroad design standards. There are other examples of recently constructed intersections on the Lismore Council road network which do not meet Austroads Standards.



Figure 20- Upgrading requirements for the Coraki Road –Wyrallah Ferry Road intersection

6.3.7 Junction of the Pacific Highway and Wyrallah Road

The intersection of the Pacific Highway and Wyrallah Road is currently configured as a 4-way intersection with a sheltered right turn (south bound). The right turn into Wyrallah Road from the Pacific Highway has a lowered median nose to facilitate truck-turning movements.

Traffic counts conducted in January 2008 indicated am peak turning traffic flows of 50vph turning onto the Pacific Highway from Wyrallah Road. The through traffic peak pm volumes (Pacific Highway) at the time of the count was approximately 830 vph. (Using 10% peak traffic volumes for daily traffic volumes equate to approximately 8300 vpd). . The extra heavy vehicle traffic proposed from the quarry operations at this intersection, on average, will be 2 vehicle movements per hour, and as such, will not have any impact on intersection safety or capacity of the road network combined with 2014 Pacific Highway traffic volumes.

6.3.8 Junction of Wyrallah Road and Broadwater Road

The intersection of Broadwater Road and Wyrallah Road meets at a T-intersection. The intersection is configured as an Austroads modified BA intersection. Current peak hour traffic volumes counted on Wyrallah Road are in the order of 210 vph with 32 vph entering Wyrallah Road from Broadwater Road.

Traffic Counts were conducted at the intersection of Wyrallah Road and Broadwater Road Counts indicated a PM peak of 32 vph along Broadwater Road which will approximate to 320 vehicles per day (Two way traffic). Lismore City Council have also supplied traffic counts for the same period with counts indicating 419 vehicles per day utilising Broadwater Road.

Both counts were taken outside the normal sugar cane carting period of July to December whereby an additional 9,000 movements occur along Broadwater Road to the Mill at Broadwater. This additional traffic converts to an extra 75 vehicles per day (two way traffic) using Broadwater Road during this period or 18% of total traffic in this period. The Quarry total truck movements of 7.5 movements per day equates to 1.5% of the total traffic in this period.

The intersection has been assessed currently (2009) as a BA type intersection and assessed for 2014 volumes with the application of the Quarry Traffic (7.5vpd) and the Sugar Cane vehicles (75vpd) on turning onto Broadwater Road and Wyrallah Road.

With the forecast turning and through traffic volumes the intersection will continue to operate efficiently as an Austroads type BA intersection.

6.3.9 Junction of Broadwater Road and Pacific Highway

The intersection of the Pacific Highway and Broadwater Road is currently configured as a T-intersection with a sheltered right turn (south bound). The right turn out of Broadwater Road from the Pacific Highway has a lowered median nose to facilitate truck-turning movements. The south and north bound carriage ways at this intersection is approximately 3.5-4m in width with good sight distance south and north bound. The intersection performs satisfactorily with the current and forecast extra heavy vehicle traffic volumes.

Current two way traffic volumes on the Pacific Highway are 548 vph in the PM peak. Current volumes turning onto the Pacific Highway are 23vph in the PM peak.

This intersection is currently configured as an Austroad AU type intersection and has been assessed as an AU type intersection for 2009 peak volumes.

The application of growth on the Pacific Highway of 3% results in traffic volumes of 630 vph in 2014.

Applying the growth of Broadwater Road turning left (300vpd) combined with the Quarry Traffic (7.5vpd) and Sugar Cane Carting Traffic (38vpd) the volumes turning left at the Pacific Highway will be 345 vpd. The intersection was assessed using Pacific Highway volumes of 6300 vpd. (Two way traffic 2014).

Assessing average delays to left turning vehicles results in a 9-10 second delay at the intersection, which is a Level Of Service of A. With the forecast turning and through traffic volumes the intersection will continue to operate efficiently as an Austroads type AU intersection.

(Note: All of the Sugar Cane traffic and Quarry traffic will turn left at the Pacific Highway intersection and hence will not be turning across the Pacific Highway.)

6.4 Amenity of the proposed transport route

The term 'amenity' describes a wide range of environmental factors and facilities that influence the comfort and pleasantness of living areas. In this instance, amenity would relate to the agreeable features of the locality that contribute to:

- *Residents enjoyment of their properties, and*
- *Safety on the public roads sections of the haulage route.*

There will be a slight increase in truck traffic (19 trucks per day one way traffic) distributed throughout the proposed haulage network with the proposed increase in production.

Road safety measures have been identified throughout this report to ensure that haulage operations on Wyrallah Road and Broadwater Road can be conducted safely. The suggested use of CB radios between quarry haul trucks and other heavy vehicle users is recommended.

If the quarry is transporting significant amounts of material it is suggested that the quarry inform the bus company of its intentions and possible duration.

In terms of potential nuisance it is likely that traffic noise would have the greatest impact on amenity. While noise impacts associated with the quarry proposal will be undertaken in detail by others, consideration of noise issues have been addressed with the design of the Wyrallah Rd intersection with the quarry access.

6.5 Road Contribution Levies

*Section 75R(4) of the Environmental Planning & Assessment Act 1979 (the **Act**) provides that "Divisions 6 and 6A of Part 4 apply to projects... in the same way as they apply to development and the granting of the consent to the carrying out of the development under Part 4..."*

By reference to Sections 94 and 94B of the Act, a consent authority may impose a condition requiring a proponent to make a contribution towards provision or improvement of amenities or services – so long as that contribution is determined in accordance with a contributions plan.

The plans considered to be applicable as part of this project are:

- *Lismore Contributions Plan (Section 94 Plan) dated March 2004 and in particular Section 2.3.3 of that plan; and*
- *The Lismore City Council Development Control Plan, Chapter 18 “Extractive Industries” (DCP).*

Roadnet conclude that a reasonable contribution towards road maintenance cannot be calculated having regard to these plans. The reasons for this are as follows:

1. *The DCP identifies two types of contributions that may be applicable. The DCP states the following in relation to the first contribution:*

*“Where haulage routes do not meet Council’s road standard requirements, a development application may be refused, or a levy applied, either in lump sum or by quarterly payment per tonne of production, **to fund upgrading of the haulage road.** The amount of the levy will be assessed in relation to the amount of quarry production and the **extent of road upgrading works required.**”*

(para 18.4, DCP, emphasis added)

The second contribution is detailed as follows

*“All quarries will be levied a road maintenance levy **to fund additional road maintenance costs associated with extra wear and tear created by quarry trucks on local roads.** Road maintenance levies are payable quarterly and are calculated as a rate per tonne per kilometre of material extracted.*

(para 18.4, DCP, emphasis added)

2. *To determine whether the first contribution applies – that is, the upgrading of the haulage road – it is necessary to consider the standard of the existing, proposed route. The DCP states:*

“Generally Council requires that primary haulage routes and routes servicing larger quarries (production greater than 10,000m³ pa) have a sealed road width of 6 metres.”

(para 18.4, DCP)

It continues with the following statement,

“Where average traffic counts exceed 1,000 vehicles per day, a minimum road seal width of 6.5m should be provided along the haulage route.”

Wyrallah Road is nominated as Lismore Council’s primary haulage route with traffic counts exceeding 1000 vehicles per day and has a sealed road width varying from 6.5m-7.0m along the route, and as such satisfies and exceeds the 6.5m standard for width as prescribed in Council’s DCP (as noted in the Roadnet report).

3. *For these reasons, Roadnet asserts that a contribution for bringing the road “up to standard” does not apply as in Roadnets opinion it already meets the standard as set out in the S94 plan.*
4. *Roadnet and the proponent accept that a contribution may be required with respect to the second contribution – that is, funding additional road maintenance. However, the*

calculation of what contribution might be required is set out in the DCP: instead of the correct document, being the Section 94 Plan.

5. Therefore, regard must be had to the “Formula for Heavy Haulage Development” in the Section 94 Plan to try and determine the quantum of contribution.
6. The Section 94 Plan contains a formula for calculating contributions for the upgrade or building of a new road satisfactory for “Heavy Haulage Development”.

The formula contains a number of variables including

- The number of Equivalent Standard Axles (ESAs) used in the formula per heavy vehicle as 1.9
- Number of design axle repetitions as 1,000,000
- Payload of 12.8 t value nominated by Lismore City Council for Equivalent Standard Axle repetitions.(ESA’s).

The formula is as follows:

$$\text{Levy} = \frac{\text{\$328,000 to \$369,000}}{10^6 \times 6.74}$$

For Major ROADS (Class A&B and Regional and State Roads)

The first point to note is that this project will utilise existing roads, which have been investigated for compliance with Australian Standards and deemed to have satisfied Australian Standards, except for two intersections which have been identified as requiring upgrades which the proponent is willing to contribute towards.

Secondly, the Section 94 Plan does not contain specific provisions that allow a contribution to road maintenance to be calculated (the “second contribution” in the DCP).

To illustrate this, note that the Section 94 Plan only provides that the relevant costs for the construction of heavy haulage routes (that is, the “construction costs to bring the road up to the standard required **before** the development, ie, to adequate width and pavement design” (emphasis added)) are said to be “in the range of \$246,000 to \$328,000 per kilometre for rural roads”. Again – it is a reference to construction of roads where the existing roads are inadequate (not the case here).

Even if formula (noted above) were to be adopted it would produce a result that is illogical and without a foundation from the Section 94 Plan. The “range of \$246,000 to \$328,000 per kilometre”, being the construction costs, is a quote from page 46 of the Section 94 Plan. However, the formula (on page 47 and quoted above) includes an upper figure for “Major Roads” that is in excess of the range quoted at page 46: the upper figure is \$369,000. There is no reason provided in the Section 94 Plan for including this upper figure.

Even if the project required upgrading sections of road and the formula is adopted, it is likely to produce a contribution that is unreasonable and without foundation from the Section 94 Plan.

But to make the point explicit: the formula is for the construction of a road – and Roadnet already note that the route to be used for this project is at the required standard.

7. *In reference to the Roadnet report, Wyrallah Road is at an acceptable standard except for the two intersections (Wyrallah Road / Wyrallah Ferry Road intersection and Wyrallah Ferry Road and Coraki Road intersections). The proponent accepts that where the existing intersection/s on the “haul road” are inadequate, then an upgrade of those intersections to meet the reasonable traffic requirements is necessary and the proponent is willing to contribute to its upgrading. The application of the formula in these limited circumstances may produce a quantum of contribution that is applicable. However we ask you to consider what is reasonable – and draw your attention to paragraphs 12 to 14 below.*
8. *To continue with the Section 94 Plan, and as noted in the quote above, the Formula applied in the Section 94 Plan adopts, as a starting position, the assumption that the road is **not** at the acceptable standard. With Wyrallah Road satisfying the standards as set out by Lismore City Council it is Roadnet’s belief that the upgrading contribution is not applicable in this case and a reasonable road maintenance levy **only** should be applied.*
9. *In determining a reasonable maintenance levy Roadnet have used the “upgrading levy formula” to calculate a road maintenance contribution (or levy).*

The same constants will be utilised as used in the road upgrading formula, ie

- *The number of Equivalent Standard Axles (ESAs) used in the formula per heavy vehicle as 1.9.(Typical gravel truck of single front axle with tandem axle and dual wheels on rear or 6.74t=1ESA)*
- *Number of design axle repetitions as 1,000,000*
- *Payload of 12.8 t value nominated by Lismore City Council for Equivalent Standard Axle repetitions.(ESA’s).*

*The quantum adopted is not the “upgrade range” (\$328,000 to \$369,000); the quantum adopted is typical road maintenance costs for haulage routes (ranging from \$32,000/km -\$50,000/km) to maintain a sealed road. These typical rates have been taken from information supplied from NSW regional local Councils. The Section 94 levy formula for major roads using **a maintenance rate** of \$32,000-\$50,000/km yields the following result:*

(Using the upper limit of the range - \$50,000/km)

$$\begin{aligned}
 \text{Levy} &= \frac{\text{Maintenance cost/km}}{10^6 \times 6.74} \\
 &= \frac{\$50,000}{10^6 \times 6.74} \\
 &= (\$0.0074/\text{T/Km} + 2.5\%) \times \text{CPI (approx 11c/t)}
 \end{aligned}$$

(Using the lower limit of the range - \$32,000/km)

$$\begin{aligned}
 \text{Levy} &= \frac{\text{Maintenance cost/km}}{10^6 \times 6.74} \\
 &= \frac{\$32,000}{10^6 \times 6.74} \\
 &= (\$0.004/\text{T/Km} + 2.5\%) \times \text{CPI (approx 6c/t)}
 \end{aligned}$$

10. That is, the rate for a maintenance contribution that is calculated in accordance with the formula using the same theory and formula in the Section 94 Plan – but on a rate that is applicable for maintenance rather than upgrade – gives the results noted above. That is, a contribution in the range of

$$\begin{aligned}
 &(\$0.004/\text{T/Km} + 2.5\%) * \text{CPI or 6 cents/tonne plus CPI} \\
 &\text{to} \\
 &(\$0.0074/\text{T/Km} + 2.5\%) * \text{CPI or 11cents/tonne plus CPI}
 \end{aligned}$$

11. As the majority of distance travelled by the heavy vehicles are on RTA funded roads, ie Wyrallah Road and Coraki Road, the proponent offers the following contribution options;

1. To pay the proposed maintenance levy of 11 cents / tonne on the percentage of the haulage route that is on Lismore City Council maintained roads or
2. To pay the 11 cents/tonne plus CPI to Lismore City Council, or whichever the Department of Planning deems most appropriate.

12. There is one further matter to note. Because Division 6 of Part 4 applies to the determination of a project in accordance with Part 3A, all of those provisions will arise with respect to both the determination of a reasonable contribution and the rights of the proponent with respect to that contribution. As the Court of Appeal makes clear in *Rose Consulting Group -v- Baulkham Hills Shire Council* ((2003) 58 NSWLR 159) the Land and Environment Court on appeal will be in a position to determine what is a reasonable contribution notwithstanding the provisions of the Section 94 Contributions Plan. It is for this reason that we have provided the calculations as noted above.

13. This project has an existing example of an excessive contribution being made by the proponent in accordance with Council’s requirements. The proponent has provided an upgrade to an intersection relevant to the project – the intersection between Wyrallah Road and the access road to the Quarry. That upgrade was provided in accordance with a previous development consent. However, on closer analysis of that “contribution”, it was an upgrade that is well in excess of that which would otherwise be considered reasonable in the circumstances. Roadnet have provided advice to the proponent about that intersection (which was included as part of a Traffic Impact Assessment) and further information in relation to the upgrade of the intersection can be provided at your request.

14. In those circumstances, s. 94(6) would require that “excess contribution” to be taken into account (the benefit provided was in excess of that which was required under the

development consent). This is the case particularly with respect to what contribution may be required for the upgrading of the intersections identified in the Roadnet report.

Road Levies Summary

The Section 94 plan refers to a contribution levy applicable for upgrading prior to a development to bring the road up to standard. Section 2.2.3 of the Lismore City Councils section 94 Plan states “Where haulage routes do not meet Council’s road standard requirements, a development application may be refused, or a levy applied, either in lump sum or by quarterly payment per tonne of production, **to fund upgrading of the haulage road**. The amount of the levy will be assessed in relation to the amount of quarry production and the **extent of road upgrading works required.**” (emphasis added)

The Formula applied in the Section 94 Plan adopts, as a starting position, the assumption that the road is **not** at the acceptable standard. In Roadnets opinion Wyrallah Road satisfies the standards as set out by Lismore City Council in its Section 94 plan, and of Roadnet’s belief that the upgrading contribution is not applicable in this case, and a reasonable road maintenance levy **only** should be applied in accordance with Lismore City Councils Extractive Industries DCP. The Section 94 Contributions Plan (and the DCP) illustrate that a condition imposed strictly in accordance with these plans is unreasonable and unable to be calculated (if not impossible due to the terms of the Section 94 Plan).

The road maintenance levy proposed has been derived using the same methodology proposed by the upgrading formula, using contemporary road maintenance rates of \$50,000/km and the same ESA values as used in the Section 94 plan. This calculation yields a contribution at the rate of $(\$0.0074/T/Km + 2.5\%) *CPI$ or **11 cents/tonne plus CPI**. In our experience, and having regard to the law, this is both a reasonable and an equitable result in the circumstances.

As the proposed haulage routes are only on a percentage of Lismore City Council funded roads it is proposed to either;

1. To pay the proposed maintenance levy of 11 cents / tonne on the percentage of the haulage route that is on Lismore City Council maintained roads or
2. To pay the 11 cents/tonne plus CPI to Lismore City Council, or whichever the Department of Planning deems most appropriate.

7 Conclusions

The number of trucks generated from Champions Quarry utilising Wyrallah Road between the Quarry access and Woodburn, and the Quarry access and Lismore under the current approval would be in the vicinity of 11 trucks per day leaving the quarry.

Under this current proposal this is expected to increase to 30 trucks per day leaving the quarry on average or 3 trucks per hour

Traffic assignment of these movements will be 50% to the north to Lismore and 50% to the south to Woodburn and Broadwater.

Traffic generated by the proposed extraction operation would not be expected to have an adverse impact on traffic flow or safety along the haulage route providing that the recommendations of this report are implemented.

With the upgraded quarry access there is no safety or traffic flow issues associated with truck haulage to and from the south.

The haulage route to and from the north will generally be via the Bruxner Highway, Coraki Road, Wyrallah Ferry Road, Wyrallah Road and south to Broadwater Road.

In addition, some improvements to pavement condition for the section of Wyrallah Road between the quarry and Wyrallah Ferry Road should be undertaken by Lismore City Council to make the road safe for existing users.

The Wyrallah Road / Wyrallah Ferry Road, Coraki Road / Wyrallah Ferry Road junctions would benefit from the construction of a widened left turn lane into Wyrallah Ferry Road to improve turning the left turn movement for heavy vehicles using this heavy vehicle route as specified by condition 29 of the Lismore City Councils recommended condition of consent 9 February 2009 (DA 2008/233).

Condition 29 of the Lismore City Council recommended conditions of consent 9 February 2009 states;

“The proponent shall provide the following roadworks with associated stormwater drainage structures that have been designed and constructed in accordance with Councils development, Design and Construction manual (as amended). The proponent shall be responsible for any costs, including maintenance, for a period of six months from the date of approval of completion of the work. Required roadwork’s include;”

- ***Construction of an intersection layout at the junction of Wyrallah Ferry Road and Wyrallah Road in accordance with AUSTRROADS Pt 5 Intersections at Grade giving particular attention to turning paths for heavy vehicles.***
- ***Construction of an intersection layout at the junction of Wyrallah Ferry Road and Coraki Road in accordance with AUSTRROADS Pt 5 Intersections at Grade giving particular attention to turning paths for heavy vehicles.***
- ***Clearing of road side vegetation and placement of a distance advisory sign as recommended within Appendix 5, Traffic Impact Study by Roadnet Pty Ltd of the environmental Impact Statement dated May 2008.***

Champions Quarry has previously reached agreement with Lismore City Council which has been specified in condition 31A of the recommended conditions of consent 9 February 2009 for DA 2008/233, to pay a contribution towards the upgrading of both these intersections. Condition 31A states;

Alternatively Council will accept in lieu of and in full satisfaction of the requirements of conditions 29, 30, and 31, a payment by the proponent of \$6,700 (if paid within 12 months from the date of this consent) for Council to undertake the work required by Condition 29.

Payment is to be made six months prior to the commencement of extraction. Should it not be paid within 12 months of the date of this consent, the amount shall be increased in accordance with the percentage increase, from the date of approval to the date of payment , as notified by the Consumer Price Index (Sydney)

Lismore City Council has recently upgraded Broadwater Road, which has improved the road surface and drainage characteristics.

The additional trucks generated by the quarry should make little difference to the current pavement conditions at least in the short term while it is ramping up its activities. This may change if the road maintenance obligations by the RTA are not provided at the appropriate service levels.

Section 18.4 of the Extractive Industries DCP states:

“ All quarries will be levied a road maintenance levy to fund additional road maintenance costs associated with extra wear and tear created by quarry trucks on local roads”

*It is proposed that Champions Quarry contribute a road maintenance levy of **(\$0.0074/T/Km+2.5%)*CPI or 11 cents/tonne plus CPI***

This levy has been calculated using the methodology set out in the Section 94 plan for calculating upgrading levies for roads. The methodology utilises Lismore City Councils Equivalent Standard Axles (ESA's) value for a typical gravel truck of single front axle with tandem axle and dual wheels, as an input along with typical costs to maintain a section of road per Km.

It is recommended that the road levy contribution from Champions Quarry go towards part funding maintenance activities to maintain appropriate levels of road safety.

Wyrallah Road and Broadwater Road forms part of a school and public bus route network; Kirkland's Bus Company and others did not have any issues with this route with the current volume of quarry traffic.

8 Recommendations

- *The preferred route to and from Lismore will be generally via the Bruxner Highway, Coraki Road, Wyrallah Ferry Rd and Wyrallah Road.*
- *The preferred route to and from the Pacific Highway will generally be Wyrallah Road or via Broadwater Road*
- *A road maintenance levy of (**\$0.0074/T/Km+2.5%**) plus CPI or **11cents/tonne** plus CPI is proposed, to contribute towards road maintenance requirements on Lismore Councils designated heavy haulage route to ensure that the haulage route remains in a safe and trafficable condition for all users in accordance with Lismore City Councils Development Control Plan for Extractive Industries*
- *That the widening of the left turn lane at the Wyrallah Road/Wyrallah Ferry Road and widening of the left turn lane at the Coraki Road/Wyrallah Ferry Road intersection be undertaken as part of Lismore City Councils rolling works program, and to be part funded by the \$6,700 contribution from Champions Quarry as per condition 31A of the Lismore City Councils recommended condition of Consent 9 February 2009 for DA 2008/233. The upgrading of these intersections will ensure that the intersections generally comply with Austroads road design standards.*
- *Reduction in the speed limit on Wyrallah Road from 100km/hr to 80km/hr from Wyrallah to the Tuckurimba intersection.*
- *The RTA to adopt a more vigorous pavement maintenance program along Wyrallah Road as this is the designated heavy vehicle route.*
- *Vegetation be cleared that obscures the T-junction warning sign in Wyrallah Ferry Road on the approach to the Bridge.*
- *A '200m'-distance plate be added to the above sign.*
- *Truck drivers would be instructed to limit using engine brakes in proximity of any residences and is supported by Champions Quarry code of practice for trucking operations.*
- *Trucks will be expected to adopt best practice principles including avoid unnecessary engine and chassis noise, and to comply with the quarries code of practice for trucking operations.*
- *Trucks will be maintained to ensure that engine and exhaust systems are operating within specification. In addition, unladen trucks would be required to secure any loose fittings.*
- *The suggested installation of CB s in all quarry trucks*
- *When the quarry has increased truck volumes forecast for particular periods this information should be forwarded on the bus company*

9 Appendix

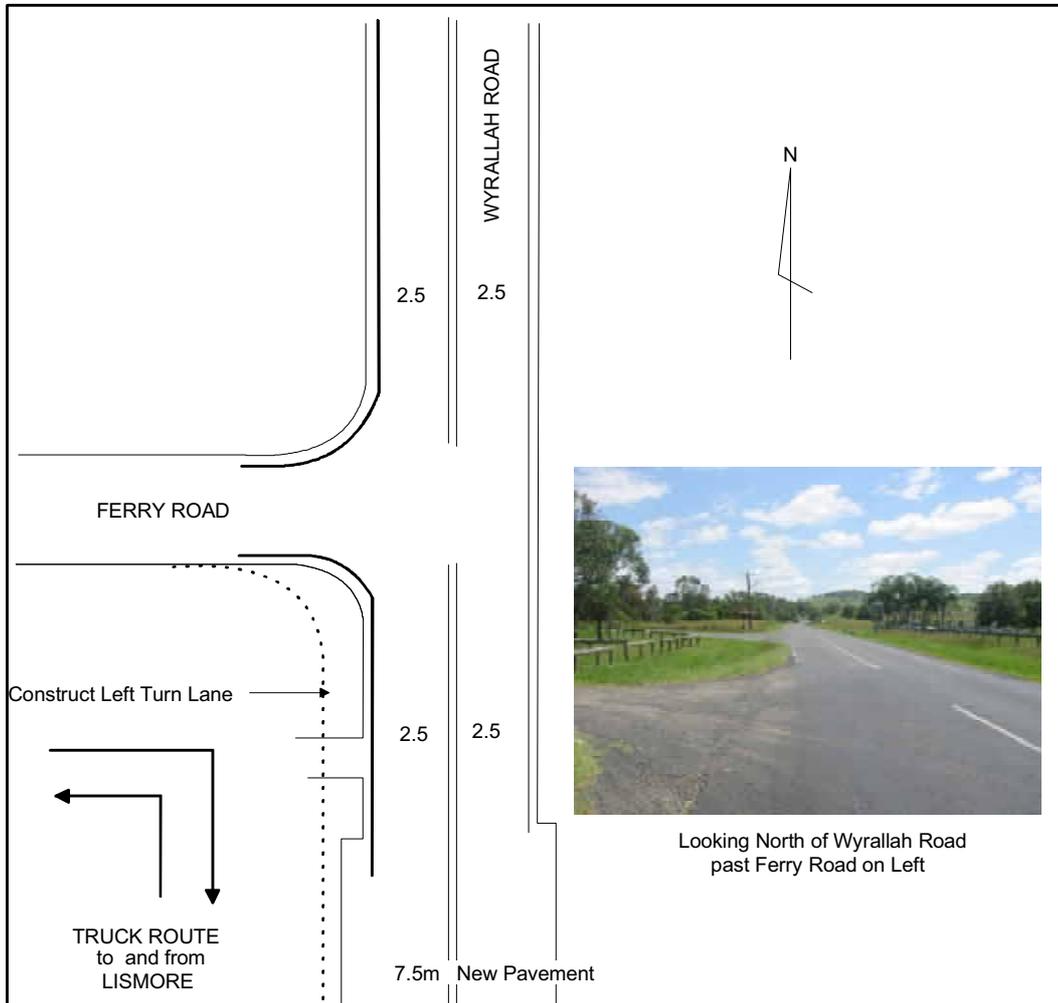


Figure 21 Proposed widening of Wyrallah Road and Wyrallah Ferry Road

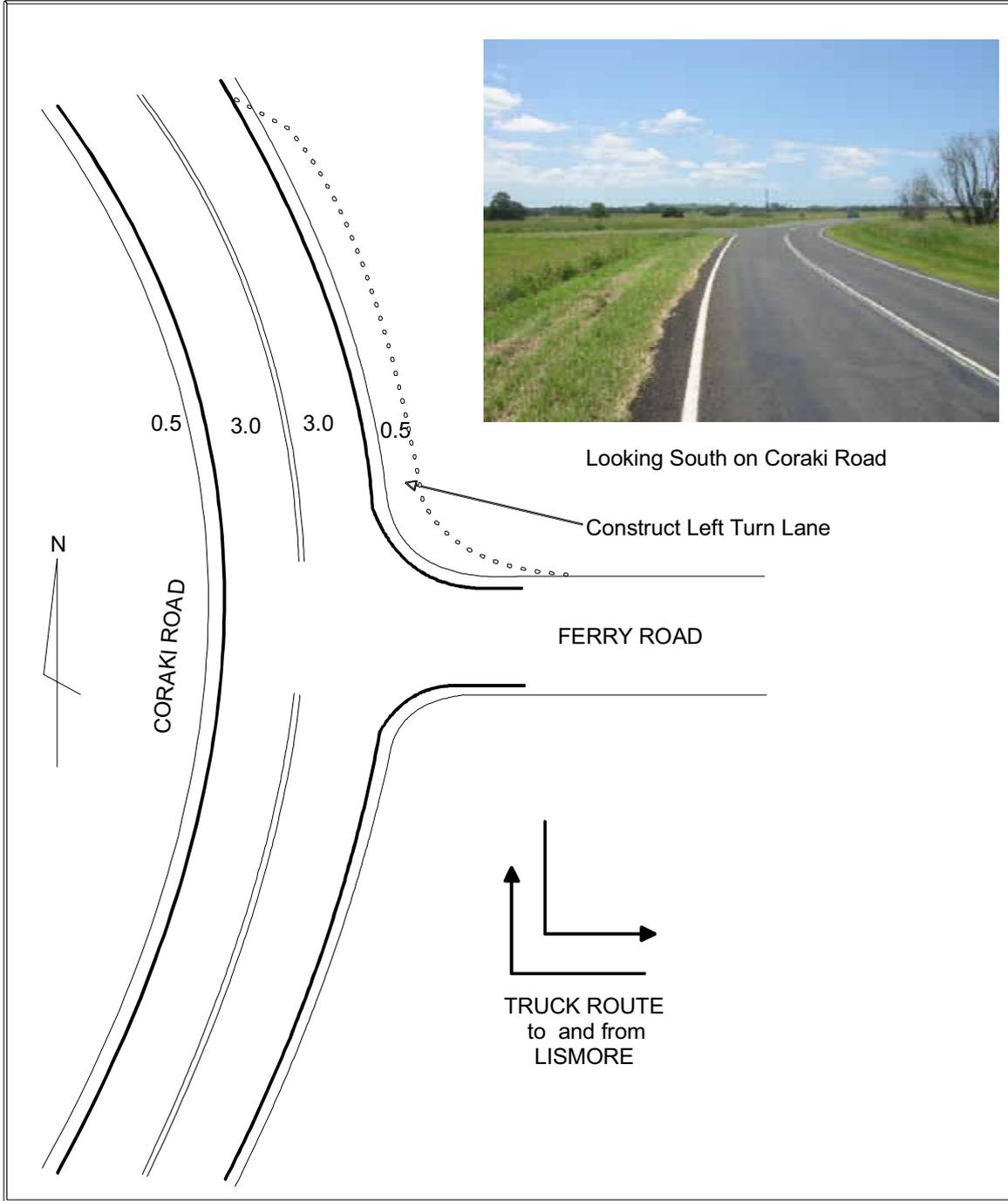


Figure 22 Proposed widening of Coraki Road and Wyrallah Ferry Road