Appendix 4

Traffic Impact Assessment
prepared by
Constructive Solutions Pty Ltd

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DARRYL MCCARTHY CONSTRUCTIONS PTY LTD

ABN: 86 001 646 028

Traffic Impact Assessment

Prepared for:

R.W. Corkery & Co. Pty Limited
1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Tel: (02) 9985 8511
Fax: (02) 9985 8208
Email: brooklyn@rwcorkery.com

On behalf of:

Darryl McCarthy Constructions Pty Ltd.
PO Box 246
Tenterfield NSW 2372

Tel: (02) 6736 1988
Fax: (02) 6736 1385
Email: dmccarthy@nqq.com.au

Prepared by:

Constructive Solutions Pty Ltd
PO Box 1498
TAMWORTH NSW 2340

Tel: (02) 6762 1969
Fax: (02) 6762 1969
Email: ben@constructivesolutions.com.au

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Constructive Solutions

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COMMONLY USED ACRONYMS

AADT	Average Annual Daily Traffic
AUL	Auxiliary left turn lane
CHL	Channelised left turn lane
CHR	Channelised right turn lane
RMS	Roads and Maritime Services
SISD	Safe intersection sight distance

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EXECUTIVE SUMMARY

This report has been prepared for R.W. Corkery & Co. Pty Limited on behalf of Darryl McCarthy Constructions Pty Ltd (the Applicant) to assess traffic related impacts of the proposed continued operation (and extension) of Dowe's Quarry (the Proposal). The report will form part of an *Environmental Impact Statement* for the Proposal.

The Proposal involves the continued operation (and extension) of Dowe's Quarry. The purpose of this report is to assess the existing road network, the existing operations and the proposed ongoing transportation of raw materials to the Sunnyside Crushing and Screening Plant and destinations beyond and back-loading of fines for stockpiling within the Project Site.

The Dowe's Quarry is located 8km northeast of Tenterfield and is accessed via the Mount Lindesay Road.

The assessment has been prepared in accordance with the NSW Roads and Traffic Authority's (RTA) (2002) Guide to Traffic Generating Developments (now Roads and Maritime Services) and Austroads Road Design Guide, and addresses the Secretary's Environmental Assessment Requirements issued by the Department of Planning and Environment, as well as requirements nominated by the Roads and Maritime Services of NSW (RMS) and Tenterfield Shire Council (TSC).

The scope of the transport assessment has been limited to the local and regional road network utilised to and from Dowe's Quarry i.e. until these roads intersect with the State road network (New England Highway). The New England Highway has only been considered at its intersections with Naas Street and Old Ballandean Road.

An appreciation of the existing traffic situation relating to Dowe's Quarry was gained by examining the existing road network, reviewing recent traffic volumes on the existing road network and liaising with relevant stakeholders. These aspects are discussed in this report. The roads inspected and discussed in this report include the relevant sections of Naas Street, Mount Lindesay Road and Old Ballandean Road between the New England Highway and the quarry access road.

To accommodate the traffic generated by the Proposal mitigation measures have been identified and summarised in **Table 13**.

If the mitigation measures are adopted the Proposal is anticipated to only result in minor ongoing impacts to the road network and other road users.

1. INTRODUCTION

1.1 BACKGROUND

Darryl McCarthy Constructions Pty Ltd. is proposing the continued operation (and extension) of Dowe's Quarry (the Proposal) located 1.1km west of the Mount Lindesay Road, approximately 8km northeast of Tenterfield. **Figure 1** displays the location of the existing quarry and the surrounding road network.

The Proposal currently generates heavy truck traffic between Dowe's Quarry and the New England Highway with the majority of the quartzose rock being taken to the Sunnyside Crushing and Screening Plant approximately 10km northwest of Tenterfield adjacent to the New England Highway. **Figure 2** displays the current route utilised by heavy traffic in both the outgoing and incoming directions.

The current operations have been undertaken since 1987. The Proposal seeks approval for the continued transportation of raw materials at the existing annual average production level of 60,000t per annum, however it is expected that production in some years may reach 100,000t per annum. For the purposes of this assessment it is assumed that operations at the quarry would not exceed 40 truck movements (20 loads) per day i.e. the current maximum level of operations.

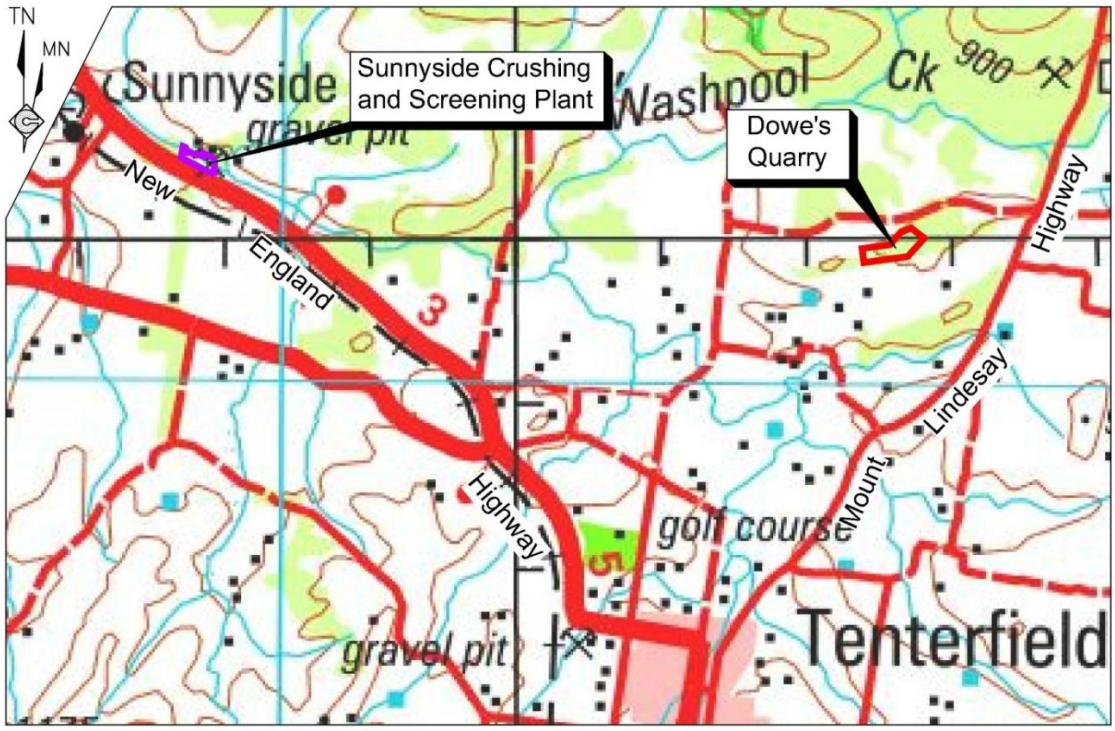

Figure 1 Locality Map (source RW Corkery 2014)

1.2 SCOPE OF REPORT

This report has been prepared to accompany an *Environmental Impact Statement* for Darryl McCarthy Constructions Pty Ltd, prepared by R.W. Corkery & Co. Pty Limited, in accordance with Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act), and assesses the traffic related impacts of the Proposal on the surrounding road network that would be affected for the duration of the Proposal. This report assesses traffic related impacts in

accordance with the RMS's Guide to Traffic Generating Developments, the Department of Planning's EIS Guidelines for Roads and related Facilities, and the specific requirements nominated by the RMS and Tenterfield Shire Council (and accompanying the Secretary's Environmental Assessment Requirements (SEARs) prepared for the Proposal by the Department of Planning and Environment).

As part of the assessment, any requirements or issues raised by the Secretary to the Director-General, other related agencies, stakeholders and local residents are considered. **Appendix C** lists the range of requirements nominated in the SEARs and requirements from RMS and TSC, and references where they are addressed in this report.

1.3 OVERVIEW OF EXISTING TRANSPORT ARRANGEMENTS

Laden trucks transporting the quartzose rock from Dowe's Quarry follow the Mount Lindesay Road for a distance of approximately 6.6km into Tenterfield, turning right at Naas Street and travelling for a distance of approximately 0.25km before turning right onto the New England Highway. Trucks would predominantly travel northwards for approximately 8.3km to the Sunnyside Plant. This route is displayed on **Figure 2**. Occasionally, some trucks turn left to other destinations.

Un-laden or back-loading trucks travel from the Sunnyside Plant for a distance of 4.8km along the New England Highway before turning left into Old Ballandean Road for a distance of 3.7km and then turning left onto the Mount Lindesay Road for the return to Dowe's Quarry. This route is also displayed on **Figure 2.**

The routes taken for the laden and un-laden/back-loading trucks between Dowe's Quarry and the Sunnyside Crushing and Screening Plant have been in use for in excess of 25 years with typically two or three trucks undertaking approximately six to seven return trips daily. Whilst it would be the Applicant's preference to avoid travelling through the edge of the built up area in Tenterfield, this route has been utilised as there is insufficient sight distance for trucks to turn right from Old Ballandean Road onto the New England Highway.

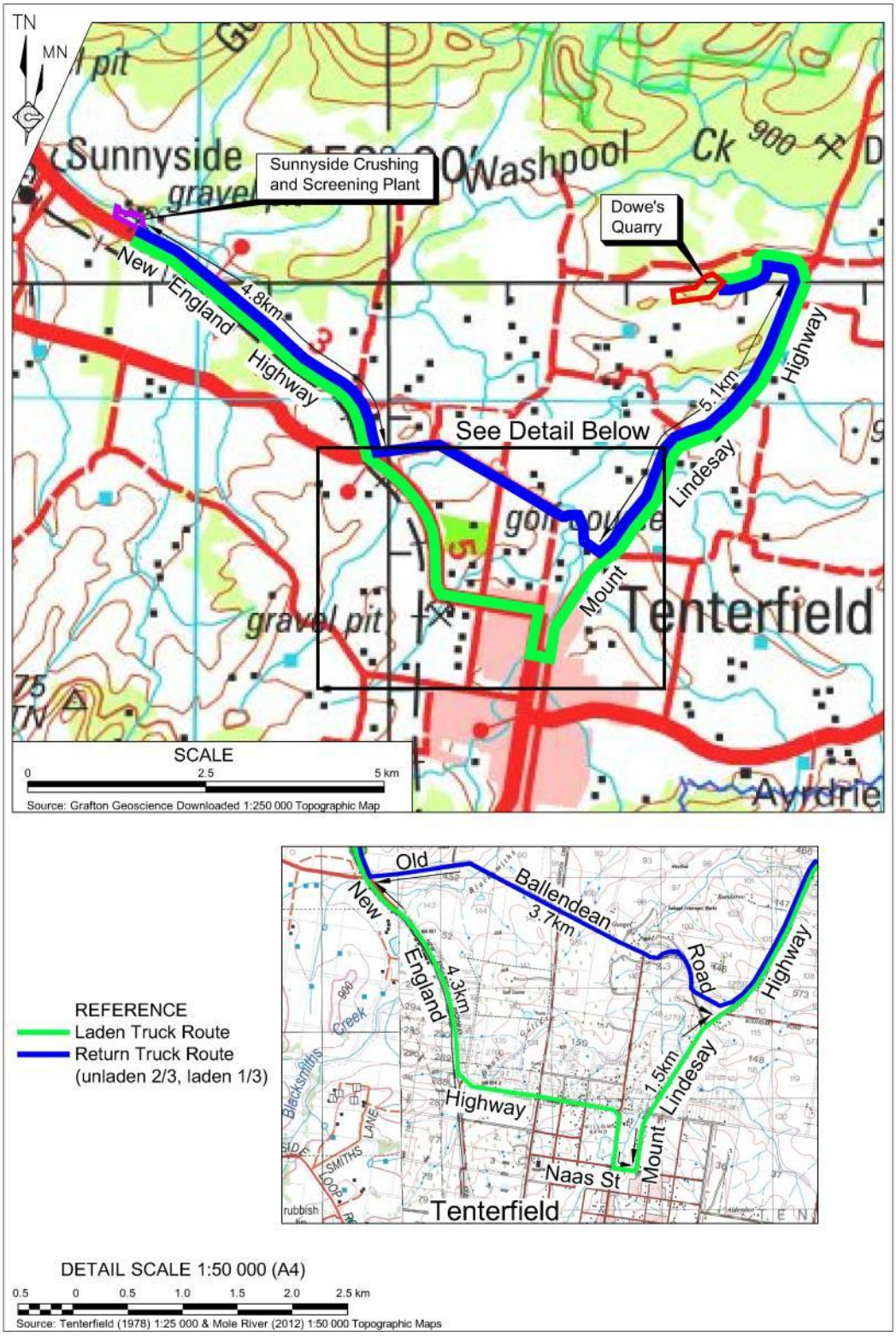

Figure 2 Dowe's Quarry Transport Route to Crushing Plant

2. CONSULTATION

Consultation with Tenterfield Shire Council (TSC), and Roads and Maritime Services (RMS) has been undertaken and is detailed in the corresponding sections below.

Tenterfield Shire Council

A meeting was held with TSC's Mr Dennis Gascoigne (DG) on the 29th April 2014. Other attendees included Mr Rob Corkery (RC), Mr Darryl McCarthy (DM) and Mr Ben Rossiter (BR). A summary of the questions posed / information sought and associated responses are included in **Table 1**.

Table 1
Summary of TSC Meeting 29/04/2014

Question	Response / Comments
RC asked what are the main issues that need to be addressed in the traffic assessment?	DG spoke about the history of Dowe's Quarry however iterated that a traffic assessment would be required and that particular emphasis is required in relation to the following: a) Driver behaviour (will a Code of Conduct be introduced?) b) Dust (will the sealed section of the access road be extended – to avoid complaints?) c) Ravelling of loose material onto intersections d) Materials falling from trucks e) Pavement damage (partially from turning movements) DG advised that the rate contained in Council's Section 94 Development Contributions Plan would require a contribution of 4c per tonne per kilometre.
DM asked whether backloading would be subject to the s94 contribution?	Some discussion took place in relation to whether the contribution was applicable to backloading. DG indicated that a case could be put forward arguing against its relevance to backloading provided an assessment of the impact on road maintenance and the pavement is completed. DM expressed his support to pay the levy for laden trucks carrying fines back to Dowe's Quarry.
RC asked whether the Council had any interest in the assessment including the New England Highway?	DG indicated that their interest was for the roads under Council's control including the Mount Lindesay Road, Old Ballandean Road, Naas Street and the associated intersections. DG indicated that the current transport route for heavy vehicles leaving and returning to the quarry were suitable.
BR asked what background counts were available?	DG advised that there have been recent counts undertaken on the subject roads as part of the Heavy Vehicle Bypass Study. DG said he would provide relevant counts from the document and put out additional counters where required to supplement the available counts.
BR asked whether any of the roads were part of a school bus route?	DG advised that there were school buses operating on Mount Lindesay Road. Contact should be made with bus operation (by BR).
Other notes: a) DG advised that emergency services access will need to be considered. b) A Driver's Code of Conduct was flagged as a potential measure to address some of the issues raised during the meeting.	

Roads and Maritime Services

A teleconference was held with RMS's Mr Matt Adams (MA) on the 12th May 2014. Other attendees included Mr Rob Corkery (RC) and Mr Ben Rossiter (BR). A summary of the questions posed / information sought and associated responses are included in **Table 2**.

Table 2
Summary of RMS Meeting 12/05/2014

Question	Response / Comments
RC spoke about the approval mechanism of the quarry and how the crushing plant already had approval and was a separate facility which did not require approval as it was established prior to the EP&A Act, therefore the haulage on the State Road network and in particular the intersections should not form part of this assessment.	MA responded that although approval was being sought for the quarry only there is an inter-relationship between the two as the majority of material was being transported between the two sites. There was a lengthy discussion on this issue. RC advised that he would need to further consider RMS's position and advise further.
RC asked whether a road safety audit was applicable to the works and whether an assessment of road safety issues could be undertaken as a suitable alternative?	MA advised that, as discussed with BR, the standard response for a development of this nature a Road Safety Audit (RSA) is normally required however in this instance a Road Safety Assessment would be appropriate. If any high risk items were identified as part of the Road Safety Assessment then an RSA would then need to be commissioned.

3. EXISTING ROAD NETWORK

3.1 ROADS

3.1.1 Naas Street

Naas Street, between Logan Street and the New England Highway is a Regional Road which links the Mount Lindesay Road to the New England Highway. This section of Naas Street is approximately 7m wide although it narrows over the culvert structure which has non conforming guardrail. Centreline marking is provided, although it is worn in sections. The seal and associated pavement is in reasonable condition as shown in **Plate 1**. There is some outer wheel path rutting near the intersection with the New England Highway.

Although within the town boundary, there are only a few adjacent residences with the majority of the land being vacant. The associated intersections with Logan Street (the Mount Lindesay Road) and the New England Highway are discussed in sections 3.2.3 and 3.2.2 respectively.

Plate 1 Naas Street between Logan Street and New England Highway

This section of Naas Street is utilised by Trevor Austin's school bus service although no pick ups or drop offs are made along this section.

3.1.2 Mount Lindesay Road

The Mount Lindesay Road is a Regional Road which provides a link between Tenterfield and the localities of Legume and Woodenbong. The road also provides an alternate route to areas over the border into Queensland around the Beaudesert Region.

Dowe's Quarry is located approximately 6.8km from the New England Highway along the Mount Lindesay Road. This section of the Mount Lindesay Road varies in standard and condition. The pavement width is variable although is generally between 6.5 to 7.0m wide. The alignment is generally reasonable considering the undulating to steep terrain along this section of road. The shoulder is unsealed and the verge is generally narrow. The speed limit is 50km/hr within the town boundary, 70km/hr between CH0.8 and CH2.0 and 100km/hr between CH2.1 and Dowe's Quarry access road.

Worn centreline marking is present where reseals have not been undertaken. There are no edge lines. Delineation is provided by guideposts however they are sparse and not always duplicated on both sides of the road. There are numerous intersections and property accesses adjacent to the road. The pavement condition is considered fair to reasonable although there is some evidence of rutting and edge break.

This section of Mount Lindesay Road is utilised by Mr Trevor Austin's school bus service. Two pick up and drop offs are made along this section at the transition of the speed limit between 50km/hr and 70km/hr and at the Old Ballandean Road intersection. Mr Austin advised that both locations were reasonable although the latter point was associated with an intersection.

No further school bus stops were currently utilised along Mr Austin's route which extended along the Mount Lindesay Road to Leechs Gully Road. Mr Austin indicated that he had previously raised concern about rocks falling from the quarry trucks although he noted this issue had been primarily rectified by the tarping of the trucks. He also raised concern about the speed at which the quarry trucks travelled on the downhill run on approach to the bridge over Branch Creek.

Table 3 lists the public road intersections with Mount Lindesay Road outside the town boundary and the estimated sight distances.

Table 3
Mount Lindesay Road Intersection Estimated Sight Distances

Chainage[#]	Intersecting Road	Sight Distance North	Sight Distance South	Speed Zone	SISD*	Plate Ref.
CH1.8	Old Ballandean Road	260	210m	70km/hr	151m	
CH3.7	Leechs Gully Road	220m	240m	100km/hr	248m	Plate 2
CH4.6	Sommerlads Road	450m	265m	100km/hr	248m	
CH6.2	Bryans Gap Road	260m	110m	100km/hr	248m	Plate 3
CH6.8	Quarry Access Road	250m	250m	100km/hr	248m	

Chainage commencing at New England Highway

* Safe Intersection Sight Distance based on reaction time of 2.0 seconds (Austroads 2010)

Plate 2 Poor sight distance due to crest looking north at Leechs Gully Road Intersection

Plate 3 Poor sight distance due to crest looking south at Bryans Gap Road

3.1.3 Old Ballandean Road

Old Ballandean Road is a local road which links the Mount Lindesay Road with the New England Highway opposite the Bruxner Way. The road provides a link between these two routes and provides localised access for a number of rural holdings along the length of the road.

In comparison with other rural roads it is of a reasonable to good standard. There is a relatively low incidence of pavement defects and the seal condition is good. In sections there is some edge break, predominantly on the northern side presumably due to the trucks returning to the quarry. There is minimal unsealed shoulder and a relatively narrow verge. The speed limit is not signposted from the western end however is signposted as 100km/hr from the eastern end.

There are two causeways with no corresponding depth markers. There is no linemarking present and limited guideposts.

The school bus service run by Mr Trevor Austin also runs along a section of Old Ballandean Road between Washpool Creek Road and Homestead Road. There are no pick ups currently undertaken along this section.

Table 4 lists the public road intersections with Old Ballandean Road and the estimated sight distances.

Table 4
Old Ballandean Road Intersection Estimated Sight Distances

Chainage[#]	Intersecting Road	Sight Distance East	Sight Distance West	Speed Zone	SISD*	Plate Ref.
0.9	Homestead Road	230m	330m	100km/hr	248m	
1.9	Washpool Creek Road / Pelham Street	380m	100m	100km/hr	248m	
2.8	Rouse Street	Not assessed	360m	100km/hr	248m	

Chainage commencing at New England Highway

* Safe intersection sight distance based on reaction time of 2.0 seconds (Austroads 2010)

3.2 INTERSECTIONS

3.2.1 Old Ballandean Road and the New England Highway

The Old Ballandean Road intersects with the New England Highway at its western end opposite the Bruxner Way. The New England Highway has right of way to the two other intersecting roads. The sign posted speed limit is 100km/hr on all approaches.

There is widening adjacent to the through lanes for approximately 200m in either direction along the highway however the lanes are not developed to a sufficient width over an appropriate length to be effective as an auxiliary left lane or an acceleration lane in accordance with Austroads standards.

The intersections are controlled by duplicated give way signs on the Old Ballandean Road approach although they are set well back from the intersection. There is no corresponding hold line. There is good dimensional capacity for all turning manoeuvres.

The sight distance in either direction along the New England Highway is limited to the north at 110m and very good to the south at greater than 500m. Safe intersection sight distance (SISD) for 100km/hr is 248m therefore sight distance to the north in this speed environment is considered to be deficient. **Plate 4** shows the crest limiting sight distance to the north.

The pavement and linemarking along the highway are in good condition.

Plate 4 Poor Sight Distance due to crest looking north along the New England Highway

3.2.2 Mount Lindesay Road and Old Ballandean Road

The Old Ballandean Road intersects with the Mount Lindesay Road at its eastern extremity forming a four way intersection with Boundary Road. The Mount Lindesay Road has right of way. The speed limit for the Mount Lindesay Road is 70km/hr. Both the Old Ballandean Road and Boundary Road approaches are controlled by 'Give Way' signs although they are set back away from the intersection. There is a hold line present on Boundary Road, however the hold line on Old Ballandean Road has been sealed over.

There is reasonable dimensional capacity for most turning manoeuvres although articulated vehicles turning right into Old Ballandean Road may track across a presumed centreline. The pavement condition is fair to reasonable with some evidence of rutting. The safe intersection sight distance (SISD) for 70km/hr is 151m, therefore the available sight distance is more than adequate. Advanced warning for the intersections is provided on both approaches along the Mount Lindesay Road.

3.2.3 Naas Street and the New England Highway

Naas Street forms a four way intersection with the New England Highway. The signposted speed limit is 50km/hr on all approaches.

The New England Highway consists of one lane in each direction with a sealed shoulder between the fog line and the kerb and gutter approximately 1.5m wide. The Naas Street approaches are controlled by duplicated stop signs and hold lines.

The pavement condition is reasonable and the linemarking is in good condition along the highway. There is street lighting provided down the eastern side of the highway to the north and the western side of the highway to the south.

W beam guardrail is provided along the western side of the highway to the north along the highway extending around the corner into Naas Street heading west. The sight distance in either direction along the New England Highway is good to the north at 350m and reasonable to the south at 190m. Safe intersection sight distance (SISD) for 50km/hr is 97m therefore the available sight distance is more than adequate. Plates 5 and 6 below show the sight distance in either direction.

Plate 5 Sight Distance looking north along the New England Highway

Plate 6 Sight Distance looking south along the New England Highway

3.2.4 Naas Street and Logan Street (Mount Lindesay Road)

Naas Street and Logan Street form a four way intersection at their junction. Naas Street has right of way. The intersection is basic in its configuration and is controlled by give way signs and hold lines on both approaches along Logan Street. There is a channelised left lane ('slip lane') for vehicles approaching from the west turning left onto Logan Street.

There is centreline road marking provided on all approaches and street lighting from one pole on the north western corner. Light from this pole would only provide minimal lighting and would not provide adequate lighting along the channelised left lane. The sight distance in either direction along Naas Street is good to the east at 360m and reasonable to the west at 210m. Safe intersection sight distance (SISD) for 50km/hr is 97m therefore the available sight distance is more than adequate.

The pavement is in average condition with rutting prevalent however thin asphaltic concrete surfacing has been applied and is likely assisting in avoiding excessive pavement defects as a result of screwing. Plate 7 shows the layout of the four way intersection.

Plate 7 Logan Street intersection with Naas Street approaching from north

3.2.5 Quarry Access and Mount Lindesay Road

The quarry access road heads to the north west off the Mount Lindesay Road 6.8km from the highway. The access is sealed for approximately 120m from the edge of the through road. The road approaches on a skew approximately 25 degrees off perpendicular. There are no controls at the intersection and no advanced warning of the intersection or trucks turning along either approach along Mount Lindesay Road.

The pavement condition is reasonable along Mount Lindesay Road although there is some rutting and edge break. Defects are more prevalent just to the south of the intersection where there is heavy truck braking and acceleration.

The sight distance in either direction along Mount Lindesay Road is reasonable to the north and south at 250m in either direction. Safe intersection sight distance (SISD) for 100km/hr is 248m therefore the available sight distance is acceptable.

3.2.6 Other intersections

There are other intersections along the haulage routes as identified in sections 3.1.2 and 3.1.3 however vehicles travelling on the Mount Lindesay Road have right of way at these intersections. Of these intersections, there is limited sight distance at the following locations:

- Leechs Gully Road
- Bryans Gap Road
- Homestead Road
- Washpool Creek Road

3.3 TRAFFIC VOLUMES

3.3.1 Current and Forecast Traffic Volumes

Traffic volume data for the road network potentially affected by the Proposal was obtained from the Tenterfield Heavy Vehicle Bypass Route Assessment (GHD, 2014). The counts referenced were undertaken between 1998 and 2012. The most recent counts for the relevant locations are shown in **Table 6**.

Table 5 summarises the existing and estimated forecast traffic for the roads and locations shown. Forecast growth was extrapolated to 2044, assuming a 30 year quarry life, exceeding the requirement from RMS for 10 year traffic growth projections. An average annual growth estimate of 1.5% per annum for other traffic has been assumed.

Table 5
Current and Forecast Traffic Volumes

		Existing Traffic			Forecast Traffic (2044)		
Road	**Site**	**LV**	**HV**	**Total**	**LV**	**HV**	**Total**
New England Highway	Rouse Street#			6,321			10,332
	North of Bruxner Way*	2,044	483	2,527	3,292	778	4,069
Mount Lindesay Road	North of Old Ballandean Road*	340	85	425	548	137	684
Old Ballandean Road	West of Mount Lindesay Road*	149	42	191	240	68	308

* October 2012 surveys of traffic volumes for Tenterfield Heavy Vehicle Bypass investigation (GHD 2014)

2011 survey provided by RMS. No split in LV and HV. Rouse Street is the closest count location to Naas Street available.

3.3.2 Quarry Operation Traffic

Forecast traffic volumes have been calculated for each of the nominated sections of the route. The following assumptions have been made in relation to vehicle movements associated with Dowe's Quarry:

1. Average truck (rigid truck and super dog) movements are 10 laden trips or 20 movements per day.

2. At maximum quarry production rates (100,000 tonne per annum) truck movements are anticipated to be 20 laden trips or 40 movements per day.

3. The traffic volumes obtained from the GHD (2014) report during October 2012 are presumed to include an average of 16 loads or 32 heavy vehicle movements per day and four light vehicle movements per day based on quarry related activity during this time.

Expected light and heavy vehicle daily traffic volumes are listed in **Table 6**. Current and forecast combined traffic volumes are shown in

Table 7 and **Table 8** respectively with the presumed quarry activity during 2012 subtracted from the actual counts. The traffic volumes presumed for the quarry operations have been assumed to be at maximum production to reflect the worst case scenario and to differentiate between the current operations which result in little or no increase in volumes.

Table 6
Daily Range in Quarry Related Traffic Movements

	Daily Range LV	**Daily Range HV**
Mount Lindesay Road (north of Old Ballandean Road)	0 to 8	0 to 40
Mount Lindesay Road* (south of Old Ballandean Road)	0 to 4	0 to 20
Old Ballandean Road	0 to 4	0 to 20
* Including Logan Street and Naas Street		

Table 7
Quarry Operation, Current Traffic and Combined Traffic Volumes at Maximum Production

	Existing Traffic (less Proposal traffic)		Maximum Quarry Traffic Levels		Combined Traffic		Quarry contribution to total traffic (%)	Quarry Contribution to Heavy Vehicle Traffic (%)
Road	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**		
Mount Lindesay Road*	336	53	8	40	344	93	11.0	43.0
Mount Lindesay Road#	338	69	4	20	342	89	5.6	22.5
Old Ballandean Road	147	26	4	20	151	46	12.2	43.5

* Mount Lindesay Road north of Old Ballandean Road.

Mount Lindesay Road south of Old Ballandean Road. For the purposes of this assessment the current traffic volumes on Mount Lindesay Road to the south of Old Ballandean Road are presumed to be the same as those to the north of Old Ballandean Road

Table 8
Quarry Operation, Forecast Traffic (Year 2044) and Combined Traffic Volumes at Maximum Production

	Forecast Traffic (less Proposal traffic)		Maximum Quarry Traffic Levels		Combined Traffic		Quarry contribution to total traffic (%)	Quarry Contribution to Heavy Vehicle Traffic (%)
Road	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**		
Mount Lindesay Road[1]	542	86	8	40	550	126	7.1	31.7
Mount Lindesay Road[2,3]	545	112	4	20	549	132	3.5	15.2
Old Ballandean Road	237	42	4	20	241	62	7.9	32.3

* Mount Lindesay Road north of Old Ballandean Road.

Mount Lindesay Road south of Old Ballandean Road. For the purposes of this assessment the current traffic volumes on Mount Lindesay Road to the south of Old Ballandean Road are presumed to be the same as those to the north of Old Ballandean Road

As can be seen from

Table 7 and **Table 8** above, the percentage contribution to heavy vehicle movements varies between 15.2% and 43.5% at maximum production, as the majority of movements associated with the quarry are already included in the existing counts. The roads all have relatively low traffic volumes well below their capacity, however it is anticipated that Logan Street and Naas Street would have higher volumes although no counts are available to substantiate this.

3.4 ACCIDENT (CRASH) DATA

Detailed crash reports were obtained from NSW Transport Centre for Road Safety. The data obtained summarises crashes on the subject roads over the past 5 years. The location and summary of the data is contained in **Figure 3** and **Table 9** below. The detailed crash reports are included in **Appendix C**. Crash data has only been incorporated into Table 9 where it is known to occur on the road network considered as part of the scope of this report.

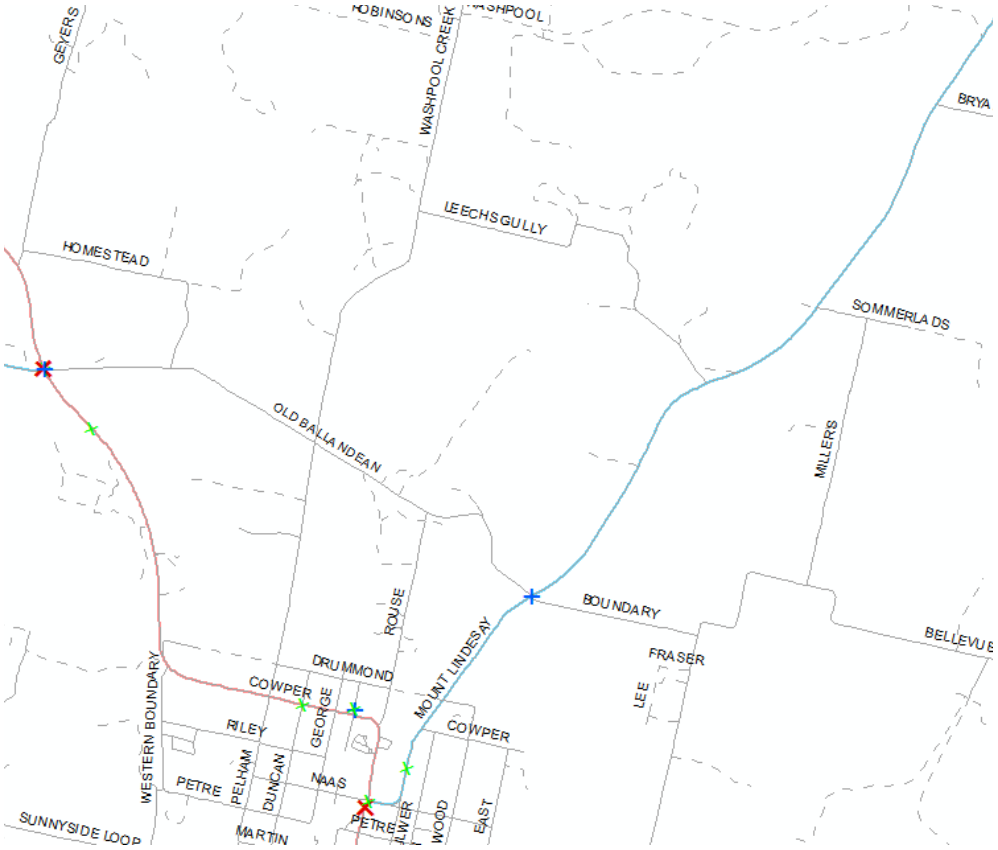

Figure 3 Crash locations over the past 5 years (source RMS 2014)

Table 9
Summarised Crash Data

Road	Description	Fatal	Injury
Logan Street	Car travelling north in Logan Street left the road to the right and struck fence.	0	0
Old Ballandean Road / Mount Lindesay Road intersection	Truck travelling east at 5km/hr along Old Ballandean Road collided with car travelling south at 60km/hr.	0	1
Bruxner Way / New England Highway / Old Ballandean Road intersection	Car travelling east at 100km/hr along Bruxner Way collided with car travelling north on New England Highway	0	3
	Ute travelling north at 10km/hr turning right into Old Ballandean Road collided with car travelling north at 30km/hr	0	0
	Truck travelling east along Bruxner Way collided with two vehicles travelling in either direction at 100km/hr along the New England Highway.	1	7
Naas Street / New England Highway intersection	Car travelling west at 20km/hr along Naas Street collided with car travelling north along New England Highway at 50km/hr.	0	0

The majority of incidents that have occurred appear to be associated with vehicles failing to give way and / or stop at the respective intersections. Sight distance is reasonable at the Old Ballandean Road intersection with the Mount Lindesay Road therefore is not believed to have contributed to the incident at this location. It is difficult to determine from the data provided whether the lack of sight distance to the north at the Old Ballandean Road intersection with the New England Highway contributed to this accident.

4. ASSESSMENT AND RECOMMENDATIONS

The following sections review the existing impacts that the current operational traffic has had and the forecast operational traffic will have on the local and regional road network and associated traffic volumes. Discussion relevant to the recommendations for impact mitigation or other controls is also included, where appropriate.

It should be noted that that the increase in production will generally be achieved by increasing the number of days that haulage is undertaken as opposed to increasing the number of movements per day which limits the forecast impact from the current operational traffic impacts.

A summary of the Road Safety Assessment, included as **Appendix A**, is included in the section below.

4.1 ROAD SAFETY ASSESSMENT

A road safety inspection was undertaken as part of the site inspection completed on 29 April 2014. The assessment is included as **Appendix A**. The assessment identified road safety issues, an associated risk rating (residual risk), proposed control measures and then reassessed the likely risk (anticipated risk) if all proposed control measures are fully implemented.

Assessment of risk levels for this assessment has been based on engineering judgement to identify the likelihood and consequence of events occurring. These results are then combined to arrive at the risk level. Tables used are shown below (as per Austroads).

Table 10
Road Safety Risk Assessment Table

Likelihood

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every 5 to 10 years
Improbable	Less than once every 10 years

Consequence

Category	Description
Catastrophic	Likely multiple deaths
Serious	Likely death or serious injury
Minor	Likely minor injury
Limited	Likely trivial injury or property damage only

Table 11
Risk Matrix

Risk Level	**Likelihood**			
Consequence	Frequent	Probable	Occasional	Improbable
Catastrophic	**Intolerable**	**Intolerable**	**Intolerable**	**High**
Serious	**Intolerable**	**Intolerable**	**High**	**Medium**
Minor	**Intolerable**	**High**	**Medium**	**Low**
Limited	**High**	**Medium**	**Low**	**Low**

With the proposed control measures implemented there were no identified road safety issues with a residual risk rating of high, however the road safety issues that were rated as 'high risk' in the absence of any additional control measures are summarised in **Table 12**.

Table 12
Summary of High Risk Road Safety Issues

CH	Aspect	Hazard	Existing Risk	Recommended Mitigation Measure	Anticipated Risk
Mount Lindesay Road (north of Old Ballandean Road) Chainage commencing at New England Highway					
	Trees / power poles	In clear zone	High	Reassess hazards where there is a higher probability of incident and either protect via barrier or remove hazard.	Medium
	Property Accesses along route	Obscured property accesses on 100km/hr road.	High	Trucks to operate at a self-imposed speed limit of 80km/hr. Provide advanced warning signage.	Medium
	Leechs Gully Road intersection	Limited sight distance to north due to crest	High	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage.	Medium
	Bryans Gap Road Intersection	Limited sight distance to south due to crest	High	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage.	Medium
	Quarry Access Intersection	Poor approach angle limiting sight distance to north	High	Widen and realign intersection. Provide heavy duty seal.	Medium
Mount Lindesay Road (south of Old Ballandean Road including Logan Street & Naas Street) Chainage commencing at New England Highway					
	Logan Street intersection CHL	Two driveways obtain access via CHL, one just prior to give way sign	High	Change give way on CHL to stop sign. Encourage residents to exit in forward direction where possible	Medium
	Major box culvert	Non conforming barrier over culvert headwall with no approach or departure treatments. Culvert same width as seal.	High	Provide conforming barrier	NA
0.0	New England Highway Intersection	Limited sight distance to north due to crest and horizontal curve.	High	Maintain existing haulage arrangements preventing the need for right or left turn out of Old Ballandean Road.	NA
	Minor drop off over causeway	Drop off over causeway. Guideposts delineators installed wider than causeway.	High	Move guideposts into the approximate width of the causeway. Provide edge lines on approach to the causeway tapering to an appropriate width	Medium
1.9	Washpool Creek Road intersection	Limited sight distance to west due to crest	High	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage to accompany existing reduce speed signs	Medium

It should be noted that the majority of the issues raised are pre-existing issues that are not necessarily exacerbated vehicles travelling to and from the quarry. There are exceptions, such as the edge break, which is believed to be primarily a result of trucks travelling to and from the quarry.

Recommended mitigation measures are incorporated in the relevant sections of this report.

4.2 ROADS

4.2.1 Naas Street

The section of Naas Street utilised for laden trucks from the quarry is generally considered suitable for the continuation of truck transportation. The minor pavement defects at the western end of this section close to the New England Highway will require some repairs however intervention is not required at present and future repairs should be covered as part of the s94 contribution.

The existing rail barriers over the culvert are non-conforming, however this is a pre-existing issue and exists in a low speed environment. Short of providing conforming barriers, improved delineation on approach to the existing barriers are recommended.

4.2.2 Mount Lindesay Road south of Old Ballandean Road (including Logan Street)

The general road standards are considered reasonable for the continuation of transportation activities associated with the Proposal. It is considered desirable to provide centre linemarking particularly for the section north of the change in regulatory speed to 70km/hr.

There are numerous hazards in the clear zone including power poles and trees as identified in the Road Safety Assessment. It is recommended that a further assessment is made by Council of hazards in the clear zone to assess whether they should either be removed or protection, such as a barrier, provided. This is a pre-existing issue not necessarily exacerbated by the Proposal.

There is a non conforming barrier over the culvert at CH1.3 which is relatively narrow. The existing barriers should have conforming leading and trailing barrier terminals installed to prevent a head-on collision with the existing barriers. This is a pre-existing issue which would be exacerbated by continued transportation activities under the Proposal.

There is evidence of developing pavement defects however the majority of the road length is in reasonable condition. Other hazards and mitigation measures are detailed in the Road Safety Assessment in Appendix C.

4.2.3 Mount Lindesay Road north of Old Ballandean Road

The general road standards are considered reasonable for the continuation of transportation activities associated with the Proposal. It would be considered desirable to re-instate the existing faded centre linemarking to improve delineation.

There are numerous hazards in the clear zone including power poles, trees and culvert headwalls as identified in the Road Safety Assessment. It is recommended that a further assessment is made by Council of hazards in the clear zone to assess whether they should either be removed or protection, such as a barrier, provided.

Numerous box culverts along this section have no barrier rail over the headwall. It is recommended that Council consider the need for a barrier in these locations.

The sealed roadway is narrow in sections which is leading to edge break particularly around tighter radius curves. A slightly widened shoulder, in certain sections where edge break is prevalent, would reduce the extent of the problem, reduce ravelling onto the roadway and rocks being thrown by vehicles.

There is a reasonable drop off to the outside of the curve just to the north of the bridge over Branchs Creek however no barrier has been provided in this section. The road side is heavily delineated with guide posts, however lateral shift markers are recommended to further enhance delineation.

The intersections along this section generally lack suitable controls on the secondary road approach and should, as a minimum, consist of a give way sign, hold line and sight screen. Two of the intersections have limited sight distance due to the proximity of a road crest.

The two intersections with Mount Lindesay Road are Leechs Gully Road and Bryans Gap Road which have limited sight distances of 220m and 110m respectively in the direction of the crest (see Plates 2 and 3). There are also numerous private accesses along the route that are either concealed or have limited sight distance. This is a pre-existing issue that is not necessarily exacerbated by the Proposal however it is recommended that the trucks operate at a self-imposed speed limit of 80km/hr to improve the reaction time of vehicles approaching the intersections and accesses along this section of road.

4.2.4 Old Ballandean Road

The general road standards are considered reasonable for the continuation and potential increase in haulage. It would be considered desirable to provide centre linemarking.

There is a noticeable increase in edge break down the northern side of the road adjacent to the outer wheel path of the trucks returning to the quarry. A slightly widened shoulder down the northern side in appropriate sections where edge break is prevalent, particularly around curves, is recommended using the funds accumulated from the s94 contribution.

There are minimal hazards in the clear zone along this section. The causeway to the east of the Homestead Road intersection is of similar width to the seal. Guideposts are placed wider than the causeway. It is recommended that delineation be improved by bringing the guideposts in and providing edge lines for both approaches.

The intersections along this section generally lack suitable controls on the secondary road approach and should, as a minimum consist of a give way sign, hold line and sight screen. The sight distance at the Homestead Road intersection and the Washpool Creek Road intersection is less than the required SISD. It is therefore recommended that the trucks operate at a self-imposed speed limit of 80km/hr to improve the reaction time of vehicles approaching the intersections along this section of road.

4.3 INTERSECTIONS

4.3.1 Old Ballandean Road and the New England Highway

The Old Ballandean Road intersection with the New England Highway has good dimensional capacity although the lane constructed by the former RTA is not to the standard of an auxiliary left lane in accordance with Austroads. Notwithstanding the design of the auxiliary left lane, there is adequate length and room in the widening for the haulage vehicles to decelerate and turn without having a significant impact on through traffic.

Trucks on route to the Sunnyside Plant do not utilise this intersection due to the limited sight distance to the north, high speeds of oncoming traffic from the north and slow acceleration speeds of the trucks from the side road heightens the risk of an incident.

Regardless of the destination it is recommended that the current practice of trucks not travelling westward on Old Ballandean Road should continue. That would avoid the need for trucks to make a right turn manoeuvre from Old Ballandean Road or continuation onto the Bruxner Way at this intersection. Rather, it is recommended that the current safer practice of travelling to the Naas Street / New England Highway intersection continue.

4.3.2 Old Ballandean Road and the Mount Lindesay Road

The Old Ballandean Road intersection with the Mount Lindesay Road has reasonable dimensional capacity, and suitable sight distance.

The controls are reasonable although the prominence of the give way signs could be improved by moving the give way signs closer to the hold lines. A hold line is required over the spray seal on the Old Ballandean Road approach.

4.3.3 Naas Street and the New England Highway

The Naas Street intersection with the New England Highway has reasonable dimensional capacity and reasonable to good sight distance in either direction given the speed environment.

The controls are satisfactory which includes a stop sign and hold line for trucks exiting Naas Street from the east. The pavement is in reasonable condition and does not appear to be significantly affected by the trucks screwing when tracking right across the intersection.

A truck was observed turning right out of the intersection during the site inspection. Although delayed by on-coming traffic from the south for approximately one minute the truck had sufficient area to manoeuvre and was able to be completely contained within the through lane approximately 10m north of the Naas Street centreline.

The prominence of the stop sign could be improved slightly by placing the stop sign closer to the intersection and the line of the kerb although it is likely, given geometry of the kerb returns, that you would only gain approximately 1m. Alternatively, the sign sizing could be increased to improve prominence.

4.3.4 Naas Street and Logan Street (Mount Lindesay Road)

The Naas Street intersection with Logan Street has limited dimensional capacity for articulated vehicles although the route is approved for B Double use[1]. The intersection could be improved by some shoulder widening adjacent to Naas Street, on the south western side to enable the trucks to take a wider turning path negating the need for the trucks to 'cut the corner' when turning right from Logan Street.

Although sight distance is good to the east and reasonable to the west, it is recommended that the northern approach is controlled by a stop sign instead of give way. This would force the drivers to be more cognisant of other traffic and pedestrians within the vicinity of the intersection before turning right across the opposing traffic lane.

A small number of trucks returning to the quarry from the south are envisaged to occasionally use the channelised left lane. This is generally considered suitable although the road safety assessment has identified a potential traffic conflict between the driveways at either end of the channelised lane particularly at the northern end where the give way sign and driveway are in close proximity. For this reason, it is recommended that a stop sign be considered where the channelised lane merges back into Logan Street. If possible it would also be desirable if the residents could be requested to exit in a forward direction.

There is loose material spread over the road across the northern approach to the intersection from an adjacent driveway. It is recommended that drainage provisions be improved and the driveway sealed or concreted, in consultation with Council, to prevent re-occurrence.

4.3.5 Quarry Access and the Mount Lindesay Road

The intersection of the quarry access road with the Mount Lindesay Road is situated in a suitable position to obtain reasonable sight distance in both directions however the approach angle is undesirable and provides a suboptimal observation angle from a truck turning out of the quarry intersection back to the north.

The pavement on the quarry access road is in average condition and requires repairs to prevent further deterioration and ravelling into the intersection. It is recommended that the pavement of the quarry access road be widened to the north to improve the approach angle. This would be approximately 3.0m in width close to Mount Lindesay Road tapering off back along the quarry access for approximately 15m. The mouth of the intersection requires reconstruction and resealing, with a heavy duty seal, to reduce the likelihood of failure.

There are currently no controls and no linemarking. It is recommended that a give way and hold line be installed along with centre linemarking on all approaches. The centreline along the quarry access road should curve around close to perpendicular after the widening has been established.

[1] Darryl McCarthy Constructions Pty Ltd do not use B-Double trucks for the transportation of quartzose rock from Dowe's Quarry.

4.4 DRIVERS AND HAULAGE VEHICLES

The drivers of the trucks transporting materials from the quarry need to be suitably qualified and suitably experienced. Records pertaining to these requirements need to be kept. The Applicant has recently introduced a Drivers Code of Conduct which clearly outlines the expectations of the drivers, their responsibility whilst operating the trucks and the consequences of not adhering to the code of conduct. This code will be discussed with all school bus operators along the nominated haulage routes.

The Applicant should continue to service the trucks used on a regular basis i.e. based on distance travelled. All drivers are required to undertake pre-start inspections of their vehicles. Servicing and checks in this manner has enabled the Applicant to identify and repair defective items before the truck is placed back in the operational fleet.

The current practice of spot weighing of trucks arriving at the Sunnyside Plant should continue to ensure trucks are not overloaded consequently impacting on the associated road pavements and braking distances. The trucks are currently tarped. This requirement should be maintained to prevent loose materials falling from the truck body.

The above measures should be incorporated into a system of auditable procedures, inspections and records which can be used to validate compliance with the Driver's Code of Conduct and inspection regimes.

4.5 SCHOOL BUS SERVICES

There is only one known school bus operator on the sections of road considered as part of the scope of this report. Mr Trevor Austin's school bus service runs from Tenterfield along Naas Street, Logan Street, the Mount Lindesay Road to Leechs Gully Road, looping around via Washpool Creek Road back to Old Ballandean Road and then turning right onto Homestead Road.

On this loop there are only two pick up and drop off locations that are on the current (and proposed) transportation route. They are located near the transition from the 50km/hr zone to the 70km/hr zone along Mount Lindesay Road and at the intersection of Mount Lindesay Road with Old Ballandean Road. Mr Austin believed that both locations are suitable.

Mr Austin indicated that he had previously raised concern about rocks falling from the quarry trucks although he noted this issue had been primarily rectified by the tarping of the trucks. He also raised concern about the speed at which the quarry trucks travelled on the downhill run on approach to the bridge over Branch Creek.

Consideration of the school bus operations is required particularly where there is a change to the pick up and drop off locations. In such instances a suitable check is required to ensure the suitability of the location and that this information is conveyed to all of the truck drivers.

4.6 PEDESTRIAN AND CYCLIST ACTIVITY

There was no pedestrian or cycling activity observed along the road network with the exception of sections of road within the town boundary. During the inspection, some school children were observed walking along the southern side of Naas Street. No other pedestrians or cyclists were observed.

If significant pedestrian or cyclist activity is anticipated in the future consideration of the impacts of what is already a B-Double route would need to be considered.

4.7 CUMULATIVE TRAFFIC IMPACTS

There are no known cumulative traffic impacts that are likely to affect the road network.

Based on the Route Options Assessment for the Tenterfield Heavy Vehicle Bypass (GHD 2014) the preferred route follows the existing rail corridor which if realised will not affect the roads assessed within the scope of this report.

4.8 ROAD MAINTENANCE

Maintenance of the roads utilised for the Proposal would be an ongoing requirement of TSC or RMS as the respective Road Authorities. TSC's s94 Development Contributions Plan require a contribution to be made by mining or major industries 'per tonne per kilometre of goods over'. This is deemed to be applicable for both the transportation of materials from the quarry and the transportation of waste products back to the quarry.

The Applicant and Council have agreed it is appropriate for the Applicant to pay 26.4 cents per tonne of quartzose material transported from the quarry and 35.2 cents per tonne of clay fines back-loaded to the quarry. As this contribution is consistent with the Section 94 Development Contributions Plan a commercial assessment to demonstrate the Proposal is meeting a fair cost of infrastructure renewal has not been undertaken.

4.9 MITIGATION SUMMARY

A summary of proposed mitigation measures is provided in **Table 13** for the transportation routes between the quarry and the New England Highway including all associated intersections. The responsibility for addressing each mitigation measure has been assigned. It is recognised that this will be subject to further consultation with Council.

Table 13
Summary of Mitigation Measures

Location	Recommendations	Responsibility
All	• Follow the transport route as is currently being utilised as described in Figure 2.	Proponent
	• Address all findings of the road safety assessment included as Appendix C. Alternative mitigation measures may be agreed where applicable and/or Council may determine that the risk is acceptable.	Council
	• Place a self-imposed speed limit of 80km/hr on Mount Lindesay Road and Old Ballandean Road except where the regulatory speed limit is less.	Proponent
	• Modify the Drivers Code of Conduct to cover the following: o Vehicle checking and maintenance procedures o Details of all known hazards on the haulage route including current bus stop locations.	Proponent
	• Continue to adopt the servicing plan for all trucks travelling to and from Dowe's Quarry and pre start inspections.	Proponent
	• Maintain the spot weighing system for checking the weight of loads.	Proponent
Naas Street	• Improve delineation on approach to the existing non conforming barriers over the box culvert.	Council
Mount Lindesay Road (incl. Logan Street)	• Provide centreline marking north of the 70km/hr regulatory speed limit.	Council
	• Review the trees and power poles in the clear zone in consultation with Council. Remove and/or protect high risk hazards.	Council
	• Review the associated drop off over culverts in close proximity to the road in consultation with Council. Provide a safety barrier for high risk hazards.	Council
	• Asses the need for a safety barrier and/or improved delineation for the drop off to the north of the bridge over Branchs Creek.	Council
	• Provide suitable controls at all intersections which, as a minimum shall consist of a give way sign, hold line and sight screen.	Council
	• Seal the existing road shoulder as required down the northern side where edge break is prevalent particularly along narrow sections of pavement or around curves where edge break is most prevalent.	Council
Old Ballandean Road	• Seal the existing road shoulder as required down the northern side where edge break is prevalent particularly along narrow sections of pavement or around curves where edge break is most prevalent.	Council
Old Ballandean Road / New England Highway Intersection	• Maintain existing transport arrangements preventing trucks from travelling westward along Old Ballandean Road to the New England Highway.	Proponent

Location	Recommendations	Responsibility
Naas Street / New England Highway Intersection	• Consider either relocating or increasing the size of the stop sign to improve prominence.	Council
Naas Street / Logan Street Intersection	• Improve dimensional capacity by widening the shoulder adjacent to Naas Street on the south western side • Replace the give way with a stop sign for vehicles approaching from the north. • Improve drainage provisions and seal / concrete the driveway to material washing across intersection. • Replace the give way with a stop sign for vehicles merging from the CHL into Logan Street.	Proponent / Council
Quarry Access / Mount Lindesay Road Intersection	• Improve the suboptimal approach angle of the quarry access road by widening the mouth of the intersection and associated road approach to enable truck to approach at an angle closer to 90 degrees. • Reconstruct the intersection to remove current pavement defects and provide a heavy duty seal. • Provide a give way sign, hold line and associated line marking on all approaches.	Proponent

5. REFERENCES

Australian Standards (AS) (2007) 1742.7 – *Manual of Uniform Traffic Control Devices Part 7: Railway crossings*.

Austroads (2009) Guide to Road Design – *Part 4A: Un-signalised and Signalised Intersections*.

Guide to Traffic Generating Developments, NSW Roads and Traffic Authority: Now Roads and Maritime Services (2002)

Tenterfield Heavy Vehicle Bypass Preliminary Route Options Report – GHD (2014)

Appendices

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Appendix A Road Safety Assessment

Appendix B Secretary's Environmental Assessment Requirements

Appendix C Detailed Crash Reports

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APPENDIX A

Road Safety Assessment

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	Aspect	Hazard	Residual Risk Rating Freq.	Severity	Risk	Recommended Mitigation Measure	Anticipated Risk Rating* Freq.	Severity	Risk
Mount Lindesay Road (north of Old Ballandean Road) – Chainage commencing at New England Highway									
	Edge of seal	Edge break in numerous sections on both sides of road	Improb.	Serious	Medium	Ensure routine maintenance of edge break is undertaken. Widen critical areas where the sealed road width is too narrow.	Improb.	Serious	Medium
	Trees / power poles	In clear zone	Occas.	Serious	High	Reassess hazards where there is a higher probability of incident and either protect via barrier or remove hazard.	Improb.	Serious	Medium
	Property Accesses along route	Obscured property accesses on 100km/hr road.	Occas.	Serious	High	Trucks to operate at a self-imposed speed limit of 80km/hr. Provide advanced warning signage.	Improb.	Serious	Medium
	Drop off over RHS around curve	No barrier. Delineation provided by guideposts. No lateral shift markers.	Improb.	Serious	Medium	Provide conforming barrier	Improb.	Serious	Medium
	Leechs Gully Road intersection	Limited sight distance to north due to crest	Occas.	Serious	High	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage.	Improb.	Serious	Medium
	Box culvert	No barrier over culvert headwall.	Improb.	Serious	Medium	Provide conforming barrier	Improb.	Minor	Low
	Box culvert	No barrier over culvert headwall.	Improb.	Serious	Medium	Provide conforming barrier	Improb.	Minor	Low
	Box culvert	No barrier over culvert headwall.	Improb.	Serious	Medium	Provide conforming barrier	Improb.	Minor	Low
	Pavement defects	Rough pavement surface likely to deteriorate quickly	Improb.	Serious	Medium	Heavy patch.	Improb.	Minor	Low
	Bryans Gap Road Intersection	Limited sight distance to south due to crest	Occas.	Serious	High	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage.	Improb.	Serious	Medium
	Pavement defects	Rough pavement surface likely to deteriorate quickly	Improb.	Serious	Medium	Heavy patch.	Improb.	Minor	Low
	Quarry access intersection	Seal failing. Pothole in mouth of intersection	Improb.	Serious	Medium	Widen and realign intersection. Provide heavy duty seal.	Improb.	Minor	Low
		Poor approach angle limiting sight distance to north	Occas.	Serious	High	Widen and realign intersection. Provide heavy duty seal.	Improb.	Serious	Medium
Mount Lindesay Road (south of Old Ballandean Road including Logan Street & Naas Street) – Chainage commencing at New England Highway									
	Trees / power poles	In clear zone	Improb.	Serious	Medium	Reassess hazards where there is a higher probability of incident and either protect via barrier or remove hazard.	Improb.	Serious	Medium
0.1	Barrier over culvert headwall	Non conforming barrier over culvert headwall with no approach or departure treatments	Improb.	Serious	Medium	Low speed (50km/hr) environment along a straight. Short of installing conforming barrier improve delineation by installing width markers to increase prominence	Improb.	Serious	Medium
0.2	Logan Street Intersection	Limited dimensional capacity for articulated vehicles forcing vehicles to cut corner.	Improb.	Serious	Medium	Provide widening on south western side of intersection adjacent to Naas Street. Clean table drain and fix offending driveway.	Improb.	Serious	Medium

	Aspect	Hazard	Residual Risk Rating Freq.	Severity	Risk	Recommended Mitigation Measure	Anticipated Risk Rating* Freq.	Severity	Risk
		School children walking across adjacent roads.	Improb.	Serious	Medium	Change give way to stop sign	Improb.	Serious	Medium
		Material over intersection from nearby driveway.	Improb.	Serious	Medium	Improve drainage and/or seal / concrete driveway	Improb.	Serious	Medium
	Logan Street intersection CHL	Two driveways obtain access via CHL, one just prior to give way sign	Occas.	Serious	High	Change give way on CHL to stop sign. Encourage residents to exit in forward direction where possible	Improb.	Serious	Medium
	Culvert headwall on RHS	Close proximity to seal. Guideposts dictate location.	Improb.	Serious	Medium	Low speed (50km/hr) environment along a straight. Short of installing conforming barrier improve delineation by installing width markers to increase prominence	Improb.	Serious	Medium
	Culvert headwall	Obscured headwall on LHS and protruding headwall down RHS	Improb.	Serious	Medium	Remove top layer of besa bricks on RHS to bring the headwall height down to ground level. Reshape as applicable. Provide additional guideposts for delineation.	Improb.	Serious	Medium
	Major box culvert	Non conforming barrier over culvert headwall with no approach or departure treatments. Culvert same width as seal.	Occas.	Serious	High	Provide conforming barrier	Improb.	Minor	Low
Old Ballandean Road									
	Edge of seal	Edge break in numerous sections primarily down LHS of road. Some sections potholed.	Improb.	Serious	Medium	Ensure routine maintenance of edge break is maintained. Widen critical areas where the sealed road width is too narrow.	Improb.	Serious	Medium
0.0	New England Highway Intersection	Limited sight distance to north due to crest and horizontal curve.	Occas.	Serious	High	Maintain existing haulage arrangements preventing the need for right or left turn out of Old Ballandean Road.	Improb.	Minor	Low
0.8	Homestead Road Intersection	Sight distance slightly less than desired SISD	Improb.	Serious	Medium	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage.	Improb.	Serious	Medium
	Minor drop off over causeway	Drop off over causeway. Guideposts delineators installed wider than causeway.	Occas.	Serious	High	Move guideposts into the approximate width of the causeway. Provide edge lines on approach to the causeway tapering to an appropriate width	Improb.	Serious	Medium
	Causeway	No depth marker provided. Driver may attempt to cross causeway when the depth of water is too great.	Improb.	Serious	Medium	Provide depth marker	Improb.	Serious	Medium
1.9	Washpool Creek Road intersection	Limited sight distance to west due to crest	Occas.	Serious	High	Trucks to operate at a self-imposed speed limit of 80km/hr to improve reaction time. Provide advanced warning signage to accompany existing reduce speed signs	Improb.	Serious	Medium
NOTE: INSPECTION BETWEEN ROUSE STREET AND MOUNT LINDESAY ROAD NOT INSPECTED AS IT WAS CLOSED FOR ROADWORKS									

- Anticipated risk rating is the rating expected if the recommended treatments are fully implemented

APPENDIX B

Coverage of Secretary's Environmental Assessment Requirements

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Government Agency	Requirement	Relevant EA Section(s)
Roads and Maritime Services	The total impact of existing and proposed development on the state road network with consideration for a 10 year horizon.	Outside scope
	The volume and distribution of traffic generated.	3.3.2
	Intersection sight distances at key intersections along the primary haul route.	3.1.2, 3.1.3
	Existing and proposed access conditions.	3.2.5, 4.3.5
	Details of improvements for road intersections with consideration for the current Austroads Guidelines, particularly; • New England Highway & Naas Street intersection. • New England Highway, Bruxner Way and Old Ballandean Road intersection • New England Highway and Sunnyside Crushing Facility Site access point/s. • Mount Lindesay Road and Old Ballandean Road intersection. • Mount Lindesay Road and Dowe's Quarry access road.	 4.3.2 4.3.1 Outside scope 4.3.4
	Detail of staff, servicing and parking arrangements	EA
	Traffic Management for construction and operational phases of the development	NA
	Impact on public transport (public and school bus routes) and consideration for alternative transport modes such as cyclists and pedestrians	4.6
	Impacts of road traffic noise and dust generation along the identified haulage route.	EA
	Details of any proposed Road Maintenance Contributions Plan	2, 4.8
	Consideration for Clause 16(1) of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 regarding; • Impact on school zones and residential areas. • Truck Management Plan • Code of Conduct for Haulage Operators • Road Safety Assessment of key haulage routes	 EA 4.4 2, 4.4 2, 4.1, 4.9, Appendix A
	Where any Road Safety Assessment of the key haulage routes identifies potential safety concerns, Road and Maritime recommends that the Traffic Impact Assessment be supported by a Road Safety Audit undertaken by suitably qualified persons.	4.1
	The current Austroads Guidelines, Australian Standards and RMS Supplements are to be adopted for any proposed works on the classified road network. The Developer would be required to enter into a 'Works Authorisation Deed' (WAD) with Roads and Maritime for	NA

Government Agency	Requirement	Relevant EA Section(s)
	any works deemed necessary on the classified state road network. The developer would be responsible for all costs associated with the works and administration for the WAD	
	Roads and Maritime highlights that in determining any application under Part 4 of the Environmental Planning and Assessment Act 1979 it is the Consent Authority's responsibility to consider the environmental impacts of any road works which are ancillary to the development. This includes any works which form part of the proposal and/or any works which are deemed necessary to include as requirements in the conditions of development consent. Depending on the level of environmental assessment undertaken to date and nature of the works, the consent authority may require the developer to undertake further environmental assessment for any ancillary road works.	NA
Planning and Environment	Traffic and transport including: • An assessment of potential traffic impacts on the capacity, efficiency and safety of the road network, in particular the assessment must include a Road Safety Audit to the review the condition of the proposed routes and identify any safety issues which may be exacerbated by the development; and • A description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network in the surrounding area over the life of the Proposal.	4 Appendix A 4
Tenterfield Shire Council	Vehicle Movements/Activities:	
	Plans need to reflect the fact that trucks are laden in both directions;	1.3, 2, 3.3.2
	Council will require royalties to be paid on laden trucks or alternatively the applicant may provide a commercial assessment to demonstrate the development is meeting a fair cost of infrastructure renewal;	2, 4.8
	Potential impact from dust on residents in the vicinity of the quarry access and Mount Lindsay Road, and along the route to the crusher plant;	EA
	Council notes that the intersection of the New England Highway and the crusher plant (destination of quarry material) may require work – refer Roads and Maritime Services	EA
	The intersection of the quarry access and Mount Lindsay Road needs to be addressed based on traffic movements and current intersection condition – likely upgrade	4.3.5
	Driver code of conduct should be established, addressing, but not limited to: vehicle clean down, speeds and safety (in particular the descent to the bridge on Mount Lindsay Highway), use of mobile phone/other devices, covering of loads	2, 4.4
	Dust – methods to be implemented to prevent trafficking of dust and fines off site, which may include, but not be limited to: washdown and rumble pads	EA

Government Agency	Requirement	Relevant EA Section(s)
	Council has a history of complaints from the current operations on the site, primarily related to dust and debris from vehicles entering and exiting the site, as such council requires proposed methods to address this and any future potential for dust nuisance on the basis of increased traffic movements as a result of the increase in quarry activities and extraction	4.4
	Section 94 contribution payable in accordance with Council's Section 94 Plan 28/8/13 – Section B - Roads	2, 4.2.1, 4.8
	The only effect on Crown Land appears to be on the transport route for quarry trucks to the east of the quarry, before joining the Mount Lindsay Road. While most of this road is either on private land or council owned road reserve (according to CRV), a short section (approximately 150m) of the actual road crosses Crown Reserve 1149 (Lot 245 DP751540), reserved for the purposes of camping, and other public purposes. This reserve is under management of Local Land Services (as part of the TSR network), and has a current incomplete Aboriginal Land Claim over it (ALC32071). The actual road does not align with the Crown Road reserve just to the north through Crown Reserve 1149. The existing road may also service surrounding properties. NSW Trade and Investment, Crown Lands should be referenced regarding the section of road that crosses the road when preparing the EIS.	EA
	Traffic Noise associated with the construction, site establishment and decommissioning phase of the Proposal should be assessed using the NSW Road Noise Policy (DECCW, 2011)	EA
NSW Trade and Investment – Crown Lands	Route(s) used to transport quarry products to market needs to be addressed when preparing the Environmental Assessment	2,3,4,5
NSW EPA		
NSW Trade and Investment – Resources and Energy		

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APPENDIX C

Detailed Crash Reports

(Total number of pages including blank pages = 6)

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Summary Crash Report

# Crash Type		
Car Crash	14	93.3%
Light Truck Crash	3	20.0%
Rigid Truck Crash	0	0.0%
Articulated Truck Crash	1	6.7%
'Heavy Truck Crash	(1)	(6.7%)
Bus Crash	0	0.0%
"Heavy Vehicle Crash	(1)	(6.7%)
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	1	6.7%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	6	40.0%
Non intersection	9	60.0%

* Up to 10 metres from an intersection
~ 07:30-09:30 or 14:30-17:00 on school days

Collision Type		
Single Vehicle	7	46.7%
Multi Vehicle	8	53.3%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	11	73.3%
Other Classified Road	2	13.3%
Unclassified Road	2	13.3%

Contributing Factors		
Speeding	1	6.7%
Fatigue	2	13.3%
Alcohol	1	6.7%

Weather		
Fine	12	80.0%
Rain	2	13.3%
Overcast	1	6.7%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	2	13.3%
Dry	13	86.7%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	8	53.3%
Dusk	0	0.0%
Darkness	7	46.7%

Crash Movement		
Intersection, adjacent approaches	5	33.3%
Head-on (not overtaking)	2	13.3%
Opposing vehicles; turning	1	6.7%
U-turn	0	0.0%
Rear-end	0	0.0%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	2	13.3%
Off road, on straight	0	0.0%
Off road on straight, hit object	4	26.7%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	0	0.0%
Out of control on curve	0	0.0%
Other crash type	1	6.7%

CRASHES	15	
Fatal crash	3	20.0%
Injury crash	4	26.7%
Non-casualty crash	8	53.3%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

CASUALTIES	21	
Killed	4	19.0%
Injured	17	81.0%
^ Unrestrained	0	0.0%

Time Group		% of Day	
00:01 - 02:59	1	6.7%	12.5%
03:00 - 04:59	2	13.3%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	1	6.7%	4.2%
08:00 - 08:59	0	0.0%	4.2%
09:00 - 09:59	1	6.7%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	2	13.3%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	0	0.0%	4.2%
15:00 - 15:59	1	6.7%	4.2%
16:00 - 16:59	1	6.7%	4.2%
17:00 - 17:59	2	13.3%	4.2%
18:00 - 18:59	3	20.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	1	6.7%	8.3%

Street Lighting Off/Nil		% of Dark
3	of 7 in Dark	42.9%

Crashes		Casualties
3	2013	0
2	2012	0
5	2011	10
3	2010	8
2	2009	3

~ School Travel Time		
Involvement	2	13.3%

McLean Periods			% Week
A	1	6.7%	17.9%
B	2	13.3%	7.1%
C	2	13.3%	17.9%
D	0	0.0%	3.5%
E	1	6.7%	3.6%
F	3	20.0%	10.7%
G	3	20.0%	7.1%
H	1	6.7%	7.1%
I	1	6.7%	12.5%
J	1	6.7%	10.7%

Speed Limit			~ 40km/h or less	0	0.0%
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	7	46.7%	90 km/h zone	0	0.0%
60 km/h zone	0	0.0%	100 km/h zone	7	46.7%
70 km/h zone	1	6.7%	110 km/h zone	0	0.0%

Day of the Week						# Holiday Periods		
Monday	1	6.7%	Thursday	1	6.7%	Sunday	1	6.7%
Tuesday	3	20.0%	Friday	3	20.0%	WEEKDAY	10	66.7%
Wednesday	2	13.3%	Saturday	4	26.7%	WEEKEND	5	33.3%

New Year	0	0.0%	Queen's BD	0	0.0%	Easter SH	1	6.7%
Aust. Day	0	0.0%	Labour Day	0	0.0%	June/July SH	0	0.0%
Easter	0	0.0%	Christmas	0	0.0%	Sept./Oct. SH	0	0.0%
Anzac Day	0	0.0%	January SH	3	20.0%	December SH	0	0.0%

Crashid dataset Tenterfield - NE Hwy, Mt Lindesay Rd, Naas St, Logan St, Ballandean Rd (2009 - June 2014)
Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Rep ID: REG01 **Office:** Southern **User ID:** joinerk

Generated: 24/06/2014 10:58

Brief Crash Report

Transport for NSW — Centre for Road Safety

Crash No	Date	Day	Time	Dist		ID Feature	Loc	Alg	Lgt	Wth	Sfc	SL	RUM	Tus	TU1	S1	D	Manoeuvre1	TU2	S2	D	Manoeuvre2	K	I	Fac S	Fac F	Fac A
Northern Region																											
Tenterfield LGA																											
Sunnyside																											
New England Hwy																											
691243	29/01/2010	Fri	17:00	5 km	N	BRUXNER HWY	2WY	STR	Nil	Fine	Dry	100	20	2	4WD	1	S	Incorrect side	CAR	1	N	Proceeding in lane	1	4		F	
659126	24/02/2009	Tue	12:00	1.2 km	N	GEYERS RD	2WY	STR	Nil	Fine	Dry	100	20	2	CAR	1	S	Incorrect side	SEM	1	N	Proceeding in lane	0	1		F	
Tenterfield																											
Logan St																											
808196	13/12/2011	Tue	22:00	265 m	N	NASS ST	2WY	STR	On	Fine	Dry	50	73	1	CAR	1	N	Proceeding in lane					0	0			
Mt Lindesay Rd																											
741275	08/02/2011	Tue	16:50		at	OLD BALLENDEAN RD	XJN	STR	Nil	Overcast	Dry	70	10	2	TRK	2	E	Proceeding in lane	CAR	1	S	Proceeding in lane	0	1			
New England Hwy																											
696730	09/01/2010	Sat	07:20		at	BRUXNER HWY	XJN	CRV	Nil	Fine	Dry	100	10	2	CAR	2	E	Proceeding in lane	CAR	1	N	Proceeding in lane	0	3			
725066	23/08/2010	Mon	18:10		at	BRUXNER HWY	XJN	STR	On	Raining	Wet	50	21	2	UTE	1	N	Turning right	CAR	1	S	Proceeding in lane	0	0			
850987	14/08/2013	Wed	04:35	500 m	S	BRUXNER HWY	2WY	CRV	Nil	Fine	Dry	100	67	1	CAR	1	N	Proceeding in lane					0	0			
768616	27/11/2011	Sun	12:35		at	BRUXNER WAY	XJN	STR	Nil	Fine	Dry	100	10	3	TRK	2	E	Proceeding in lane	4WD	1	N	Proceeding in lane	1	7			
835387	26/04/2013	Fri	18:10		at	DUNCAN ST	XJN	STR	On	Fine	Dry	50	10	2	4WD	2	N	Proceeding in lane	TRK	1	E	Proceeding in lane	0	0			
804401	18/02/2012	Sat	02:23	1.9 km	N	GEYERS RD	2WY	STR	Nil	Fine	Dry	100	73	1	CAR	1	S	Proceeding in lane					0	0			
810862	18/08/2012	Sat	15:20		at	NAAS ST	XJN	STR	Off	Fine	Dry	50	10	2	CAR	2	W	Proceeding in lane	CAR	1	N	Proceeding in lane	0	0			
659641	09/05/2009	Sat	03:30	40 m	S	NAAS ST	2WY	STR	On	Fine	Dry	50	71	1	M/C	1	S	Proceeding in lane					2	0	S		A
764397	17/08/2011	Wed	17:50	6 km	N	TENTERFIELD TN	2WY	STR	Nil	Fine	Dry	100	67	1	WAG	1	S	Proceeding in lane					0	0			
Polworth St																											
739893	06/01/2011	Thu	09:50	40 m	N	NEW ENGLAND HWY	2WY	STR	Off	Raining	Wet	50	46	1	CAR	1	E	Reverse from drive					0	1			
825745	18/01/2013	Fri	18:20	50 m	N	NEW ENGLAND HWY	2WY	STR	Off	Fine	Dry	50	71	1	CAR	1	N	Proceeding in lane					0	0			

Report Totals: Crashes: 15 Fatal Crashes: 3 Injury Crashes: 4 Non-Casualty Crashes: 8 Traffic Units: 24 Killed: 4 Injured: 17

Crashid dataset Tenterfield - NE Hwy, Mt Lindesay Rd, Naas St, Logan St, Ballandean Rd (2009 - June 2014)
Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Detailed Crash Report

Crash No.	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
																		A	S		F
Northern Region																					
Tenterfield LGA																					
Sunnyside																					
New England Hwy																					
691243	29/01/2010	Fri	17:00	5 km	N	BRUXNER HWY	2WY	STR	Fine	Dry	100	2	4WD	M30	S in NEW ENGLAND HWY	100	Incorrect side	F	1	4	F
E39809059							RUM:	20	Head on				CAR	F51	N in NEW ENGLAND HWY	100	Proceeding in lane				
659126	24/02/2009	Tue	12:00	1.2 km	N	GEYERS RD	2WY	STR	Fine	Dry	100	2	CAR	F48	S in NEW ENGLAND HWY	100	Incorrect side	I	0	1	F
E36747103							RUM:	20	Head on				SEM	M61	N in NEW ENGLAND HWY	90	Proceeding in lane				
Tenterfield																					
Logan St																					
808196	13/12/2011	Tue	22:00	265 m	N	NASS ST	2WY	STR	Fine	Dry	50	1	CAR	F36	N in LOGAN ST	Unk	Proceeding in lane	N	0	0	
E48497289							RUM:	73	Off rd rght => obj				Fence (prior to 2014)								
Mt Lindesay Rd																					
741275	08/02/2011	Tue	16:50		at	OLD BALLENDEAN RD	XJN	STR	Overcast	Dry	70	2	TRK	F66	E in OLD BALLENDEAN RD	5	Proceeding in lane	I	0	1	
E43783849							RUM:	10	Cross traffic				CAR	F41	S in MT LINDESAY RD	60	Proceeding in lane				
New England Hwy																					
696730	09/01/2010	Sat	07:20		at	BRUXNER HWY	XJN	CRV	Fine	Dry	100	2	CAR	F80	E in BRUXNER HWY	100	Proceeding in lane	I	0	3	
E179531093							RUM:	10	Cross traffic				CAR	F62	N in NEW ENGLAND HWY	100	Proceeding in lane				
725066	23/08/2010	Mon	18:10		at	BRUXNER HWY	XJN	STR	Raining	Wet	50	2	UTE	M41	N in NEW ENGLAND HWY	10	Turning right	N	0	0	
E365784891							RUM:	21	Right through				CAR	F20	S in NEW ENGLAND HWY	30	Proceeding in lane				
850987	14/08/2013	Wed	04:35	500 m	S	BRUXNER HWY	2WY	CRV	Fine	Dry	100	1	CAR	M29	N in NEW ENGLAND HWY	90	Proceeding in lane	N	0	0	
E52163613							RUM:	67	Struck animal				Kangaroo								
768616	27/11/2011	Sun	12:35		at	BRUXNER WAY	XJN	STR	Fine	Dry	100	3	TRK	M57	E in BRUXNER WAY	Unk	Proceeding in lane	F	1	7	
E47219608							RUM:	10	Cross traffic				4WD	F55	N in NEW ENGLAND HWY	100	Proceeding in lane				
													CAR	M62	S in NEW ENGLAND HWY	100	Proceeding in lane				
835387	26/04/2013	Fri	18:10		at	DUNCAN ST	XJN	STR	Fine	Dry	50	2	4WD	M58	N in DUNCAN ST	5	Proceeding in lane	N	0	0	
E51314418							RUM:	10	Cross traffic				TRK	M59	E in NEW ENGLAND HWY	50	Proceeding in lane				
804401	18/02/2012	Sat	02:23	1.9 km	N	GEYERS RD	2WY	STR	Fine	Dry	100	1	CAR	M22	S in NEW ENGLAND HWY	90	Proceeding in lane	N	0	0	
E46391620							RUM:	73	Off rd rght => obj				Embankment								
810862	18/08/2012	Sat	15:20		at	NAAS ST	XJN	STR	Fine	Dry	50	2	CAR	F35	W in NAAS ST	20	Proceeding in lane	N	0	0	
E48519517							RUM:	10	Cross traffic				CAR	M29	N in NEW ENGLAND HWY	50	Proceeding in lane				

Detailed Crash Report

Transport for NSW — Centre for Road Safety

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
																				A S F
659641	09/05/2009	Sat	03:30	40 m S	NAAS ST	2WY	STR	Fine	Dry	50	1	M/C	M19	S in NEW ENGLAND HWY	900	Proceeding in lane	F	2	0	A S
E37441604						RUM:	71	Off rd left => obj				Utility pole								
764397	17/08/2011	Wed	17:50	6 km N	TENTERFIELD TN	2WY	STR	Fine	Dry	100	1	WAG	F22	S in NEW ENGLAND HWY	90	Proceeding in lane	N	0	0	
E45030437						RUM:	67	Struck animal				Straying stock								
Polworth St																				
739893	06/01/2011	Thu	09:50	40 m N	NEW ENGLAND HWY	2WY	STR	Raining	Wet	50	1	CAR	F49	E in POLWORTH ST	20	Reverse from drive	I	0	1	
E42787270						RUM:	46	Reversing into obj				Fence (prior to 2014)								
825745	18/01/2013	Fri	18:20	50 m N	NEW ENGLAND HWY	2WY	STR	Fine	Dry	50	1	CAR	M23	N in POLWORTH ST	Unk	Proceeding in lane	N	0	0	
E50035817						RUM:	71	Off rd left => obj				Fence (prior to 2014)								

Report Totals: Total Crashes: 15 Fatal Crashes: 3 Injury Crashes: 4 Killed: 4 Injured: 17

Crashid dataset Tenterfield - NE Hwy, Mt Lindesay Rd, Naas St, Logan St, Ballandean Rd (2009 - June 2014)

Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.