

Appendix 3

Dowes Quarry Key Intersection Report prepared by Constructive Solutions

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**R.W. CORKERY & CO. PTY.
LIMITED**

**Darryl McCarthy
Constructions Pty Ltd
Key Intersection Report**

DECEMBER 2014



Realising potential



Report prepared by:



Realising potential

PO Box 1498
TAMWORTH NSW 2340
Phone: 02 6762 1969
Fax: 02 6762 1969

Director: Steve O'Rourke

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1. Introduction

This report has been prepared for R.W. Corkery & Co. Pty Limited (RWC) on behalf of Darryl McCarthy Constructions Pty Ltd as additional information, following responses from Tenterfield Shire Council and RMS to the initial Traffic Impact Assessment which had been prepared to assess the traffic impacts of the proposed continuation (and extension) of Dowe's Quarry (the Proposal).

This report provides details of the following two key intersections located on the transport routes associated with Dowe's Quarry as follows:

- New England Highway (H9) – entrances to Sunnyside Crushing and Screening Plant north of Tenterfield and
- Mt Lindsay Road – entrance to Dowe's Quarry.

Commentary is also provided in Section 4 of this report in respect to the potential usage of the New England Highway and Old Ballandean Road intersection for laden vehicles travelling towards the Crushing Plant.

Further information about the entire route can be found in the original Traffic Impact Assessment (July 2014), which formed part of the Environmental Assessment for the Proposal.

2. New England Highway Intersection

The Sunnyside Crushing and Screening Plant is located on the eastern side of the New England Highway, approximately 10km north of Tenterfield. The Crushing Plant has northern and southern entrance gates spaced approximately 350m apart.

Movements to the Crushing Plant generally consist of raw product delivered from Dowe's Quarry from the south with vehicles entering the crushing plant via the southern gate off the New England Highway. Waste product and/or empty trucks exit the Crushing Plant from the southern gate and travel south along the New England Highway on their return to the quarry. Finished product from the Crushing Plant is taken either in a northerly or southerly direction along the New England Highway, using either the northern or southern gate respectively. Unladen trucks will enter the northern or southern gate depending on their direction of approach to the Crushing Plant.

Traffic volumes entering the Crushing Plant to and from the quarry are approximately 20 return trips per day. Haulage is undertaken using truck and dog combinations.

Finished product is delivered as per market requirements in respect to delivery rate and exit direction from the plant. Generally the vehicles used are truck and dog combinations with one semi-trailer. As part of the current operation, only one 25 metre long B Double collects finished product from the Crushing Plant.

2.1 Existing Conditions

The New England Highway (the "Highway") is essentially straight in this location, with a slight crest located midway between the northern and southern gates of the Crushing Plant. The approach grades to this crest from both directions are estimated at approximately 2%. The Highway comprises two 3.5m travel lanes with sealed shoulders.



The Highway passes through a 3m deep cutting over the crest adjacent to the Crushing Plant. Through this cutting kerb and gutter has been constructed with the shoulder being sealed out to the kerb (refer to Plate 1).



Plate 1 – Highway through cutting – looking north

The entrance to the Highway from the southern gate is aligned at right angles to the Highway. The northern gate is currently aligned at a more skewed angle, however this will be reconstructed as part of the Proposal in order to join the Highway at right angles.

Sight distances from both entrances and along the Highway in this vicinity are generally good, as evidenced by the lack of barrier lines on this section of the Highway. Sight distances will be further detailed in subsequent sections.

2.2 Southern Gate Intersection Improvements

The dominant traffic movement at the location is the raw product coming from a southerly direction from Dowe's Quarry and turning right from the Highway into the Crushing Plant. The returning trucks are generally unladen, although some may be returning waste product to the quarry. This traffic flow is added to with delivery vehicles collecting and/or delivering finished product, as needed.

Based on the traffic volumes using the intersection and from guidance provided in Section 4 of the RTA Road Design Guide (RDG), it is proposed that an AUR be constructed for northbound vehicles turning right into the southern gate. The existing BAL for vehicles turning left out of the south gate shall remain, with repairs being undertaken to the existing pavement in this vicinity. The proposed intersection configuration is conceptually shown in Appendix A, along with relevant sight distances. Pavement design will be undertaken in accordance with RMS requirements and detailed as part of the final design.

This type of intersection layout has been proposed with consideration given to the following factors:



- A "BAR" treatment for both in/out movements is indicated from Figure 4.5.12 of the RDG¹ "Warrants for Rural Turn Lanes";
- An AUR treatment has been proposed to enhance safety by allowing through traffic to bypass a right turning vehicle (refer Section 4.5.22 of the RDG);
- There is ample sight distance for southbound traffic to observe a truck entering the Highway and heading south. This has been measured at approximately 367m for car to car sight distance (1.10m to 1.25m above ground level), however it should be noted that the car to truck tipper body/truck drivers eye height (1.10m to 2.4m) extends this to approximately 1100m; and
- There is ample sight distance (approximately 770m) for northbound traffic to sight a truck turning right into the southern gate intersection.



Plate 2 – Southern gate intersection – looking south

2.3 Northern Gate Intersection Improvements

Traffic movements from this gate are relatively minor and are due to the collection and/or delivery of finished products to the north of the Crushing Plant depending on customer demands at the time. The existing intersection joins the Highway on a skew. It is proposed to straighten this access point such that it joins the Highway at right angles. A BAL treatment is proposed for the northern gate intersection.

It is proposed to erect "no right turn" signage for northbound vehicles and to require any northbound traffic to enter via the southern gate, where an AUR will be constructed.

¹ RTA Road Design Guide



3. Mount Lindsay Road Intersection

The access to the Dowe's Quarry off the Mount Lindsay Road is discussed in Section 3.2.5 of the Traffic Impact Assessment. This notes that the intersection itself has adequate sight distance, however in Table 12 of that report, it notes a requirement to "widen and realign the intersection and provide heavy duty seal", as a mitigation measure for the risk of "Poor approach angle limiting sight distance to north". It should be noted that all heavy vehicles and most light vehicles entering the quarry will be approaching from the south.



Plate 3 – Dowe's Quarry intersection – looking north

This intersection was inspected on 3 December 2014 and recommends design of the intersection in accordance with the concept design attached in Appendix B. A feature of this design is widening of this intersection (refer to Plate 3) and the installation of a give way sign on the access road to ensure that outbound vehicles stop short of the intersection to give priority to inbound vehicles. Given the relatively small number of truck movements, this control is considered to be more than adequate. This will require the extension of the existing pipe culvert by one pipe length at each end.



Plate 4 – View into Dowe's Quarry access road – looking west

4. Old Ballandean Road Intersection

It is understood that as part of the consultation process with Council and RMS, the option of using the Old Ballandean Road for laden vehicles travelling to the Crushing Plant was raised. This would require laden vehicles turning right onto the Highway at this intersection.

Sight distance to the north from Old Ballandean Road is significantly below the required standard at 145m as opposed to the required 260m. Allied to this, a laden truck would have to turn "uphill" as it entered the Highway travelling towards the Crushing plant, reducing its ability to accelerate and thus move clear of any oncoming southbound Highway traffic. Old Ballandean Road can be seen in Plate 5 entering the Highway from the right. Note the proximity of the sharp crest in the Highway immediately north of the intersection. Sight distance from Old Ballandean Road to the south is ample.



Plate 5 – Highway/Old Ballandean Road intersection – looking north

In theory, a system of lights could be installed, similar to those used for warning over-height vehicles on the approach to a low height clearance bridge, which could provide advance warning of oncoming vehicles to turning traffic. Construction of this would involve considerable cost and would need to be relatively “fail safe” by including adequate redundant systems, in view of the risk should they become non-functional. Operational considerations would include ensuring vegetation did not block view of the signals, “setting sun” effects at certain times of the year, vandalism and disruptions to the power supply.

Use of the Old Ballandean Road route for laden vehicles travelling towards the Crushing Plant and turning right onto the Highway is strongly opposed on the grounds of:

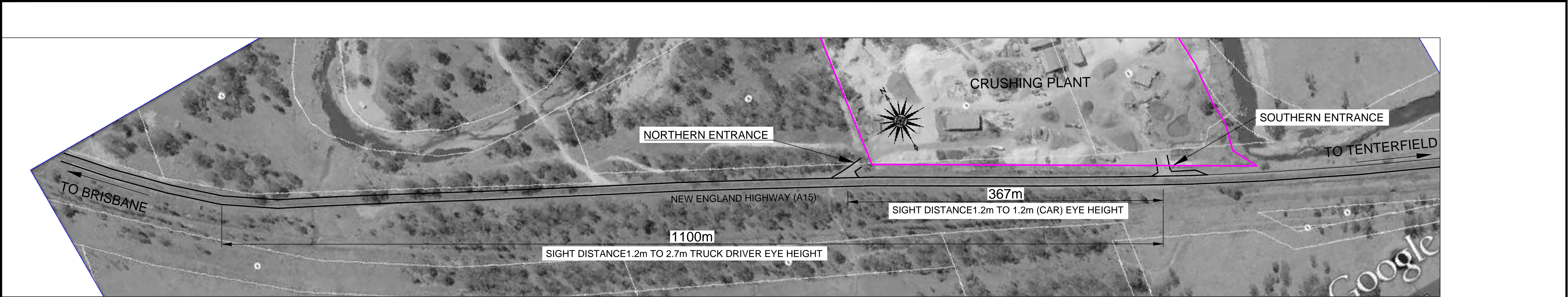
Road Safety:

- Safe Intersection Sight Distance (SISD) is significantly deficient at around 50% of the required distance; and
- Right turning vehicles will have reduced acceleration, as they will be moving uphill as they make the right hand turn.

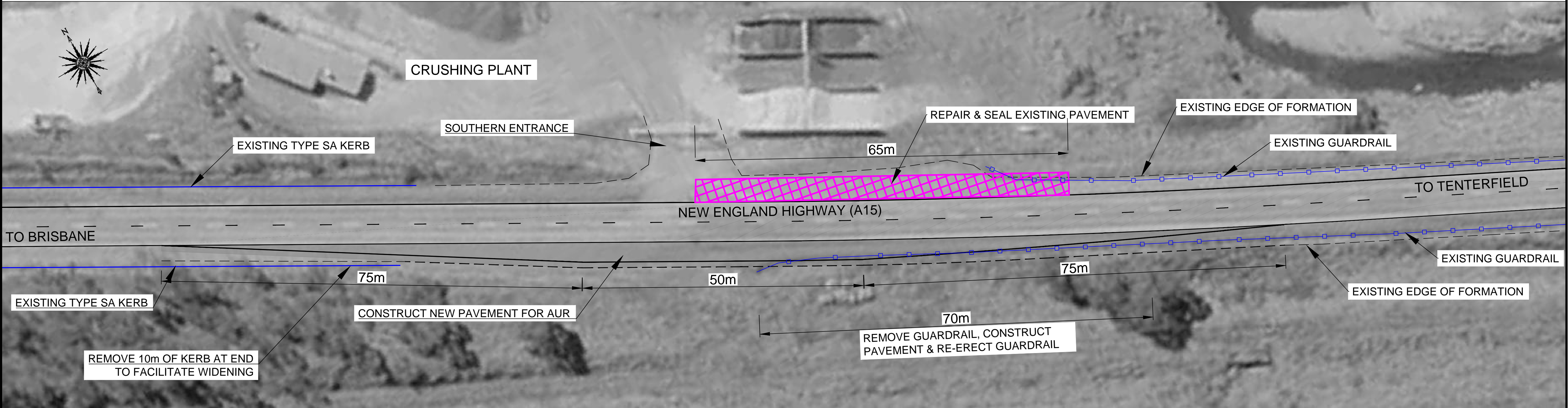
Work Health and Safety

- Drivers hauling from Dowe's Quarry to the Crushing Plant have identified this as a high risk manoeuvre and potential risk treatment options would not appear to be totally reliable; and
- Daryl McCarthy Constructions Pty Ltd has a legal obligation to provide a safe system of work and requiring drivers to undertake this turn would appear to compromise their ability to fulfil this obligation.

APPENDIX A
Concept Layout New
England Highway
Intersection



INTERSECTION SIGHT DISTANCE SKETCH
NTS



DIMENSIONS & LENGTHS BASED ON GOOGLE IMAGERY & SITE VISIT 03-12-2014

REVISIONS				
A	ISSUED FOR REVIEW	08-12-2014	DB	
REV.	DESCRIPTION	DATE	CHK.	

CRUSHING PLANT ACCESS
ACCESS DETAILS

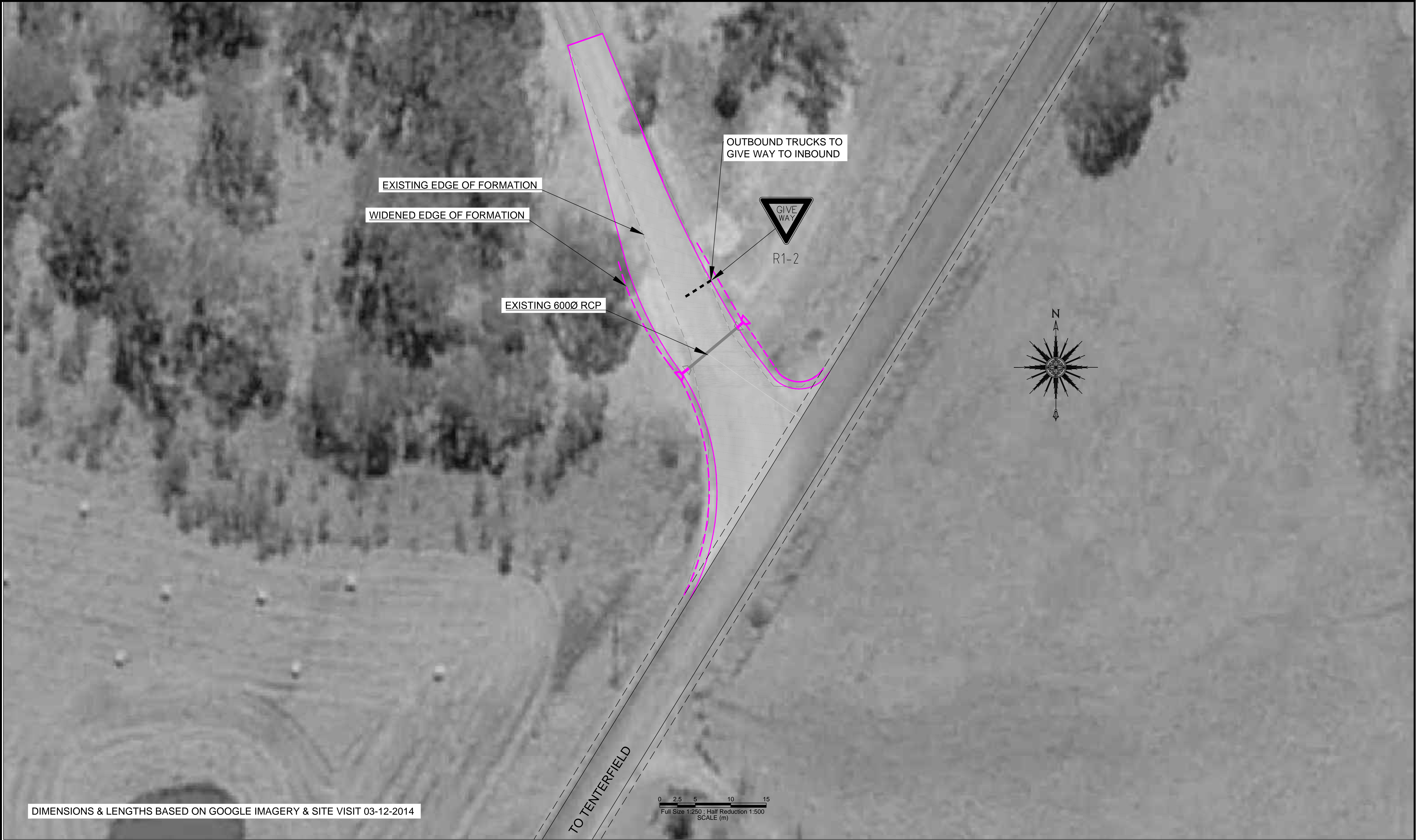
Client: R. W. CORKERY		
DOWES QUARRY DEVELOPMENT		
Design Completed:	Designed: DB	Status: CONCEPT



CONSTRUCTIVE SOLUTIONS PTY. LTD.
PO Box 1498 Tamworth NSW 2340 Australia
Tel: (02) 6762 1969 Fax: (02) 6762 1969
Email: admin@constructivesolutions.com.au
www.constructivesolutions.com.au

Plan Size: A1	Drawing No: 201447 - 001
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APPENDIX B
Concept Layout Mount
Lindsay Rd Intersection



REVISIONS				
	A	ISSUED FOR REVIEW	08-12-2014	DB
REV.		DESCRIPTION	DATE	CHK.

QUARRY ACCESS CONCEPT

Client: R. W. CORKERY		
DOWES QUARRY DEVELOPMENT		
Design Completed:	Designed: DB	Status: CONCEPT



CONSTRUCTIVE SOLUTIONS PTY. LTD.
PO Box 1498 Tamworth NSW 2340 Australia
Tel: (02) 6762 1969 Fax: (02) 6762 1969
Email: admin@constructivesolutions.com.au
www.constructivesolutions.com.au

Plan Size: A1	Drawing No: 201447 - 002
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