ABN: 69 107 169 102

Werris Creek Coal Pty Limited

TRAFFIC ASSESSMENT

for

Werris Creek Coal Mine Life of Mine Project

Prepared by

Constructive Solutions

Specialist Consultant Studies Compendium
Volume 2, Part 8

December 2010

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Life of Mine Project

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PLATES

Please Note that a Colour Version of all Plates are Available on the Project CD

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EXECUTIVE SUMMARY

The Werris Creek Coal Mine (WCCM) is situated within the North West Slopes and Plains of New South Wales approximately 4km south of Werris Creek. Further exploration has identified an extension of the coal resource to the north of the approved open cut area. The Proponent, Werris Creek Coal Pty Limited, proposes to continue the WCCM to recover this life of mine (LOM) resource (hereafter referred to as the Life of Mine [LOM] Project). The site of the proposed LOM Project, which incorporates the existing WCCM, the proposed extension and modifications to mining related infrastructure, is referred to hereafter as the Project Site.

The purpose of this report is to determine the traffic and rail-related impacts in accordance with the RTA's Guide to Traffic Generating Developments and the Director-General's Requirements (DGR's) issued for the LOM Project by the Department of Planning.

Coal produced as part of the LOM Project would be predominantly transported via rail with only 100,000tpa transported from the Project Site by road. This represents a doubling in the approved road transport component.

Additional employee and delivery-related traffic would also be generated by the LOM Project during the development phase and throughout the operational phase.

A new entrance to the Project Site would be constructed off Escott Road to replace the existing entrance to the WCCM from Werris Creek Road. All site access, including coal haulage, would be via Escott Road.

There are three primary destinations for coal despatched via road haulage. They include Tamworth, Gunnedah and Newcastle which are likely to take 5%, 4.75% and 90.25% of the nominated 100,000tpa respectively. Consequently the haulage vehicles would principally utilise Werris Creek Road, Taylor's Lane and the Kamilaroi Highway within the bounds of the Liverpool Plains Local Government Area.

A review of Escott Road, Werris Creek Road, Taylor's Lane and the Kamilaroi Highway was undertaken to determine general characteristics and the capacity for each road and the associated intersections.

Generally Werris Creek Road, Taylor's Lane and the Kamilaroi Highway were identified to be suitable for current use with the following exceptions:

- There is no sealed shoulder on Taylor's Lane (two by 3.5m Lanes only);
- The auxiliary right turn is too short for vehicles turning right from Werris Creek Road onto Taylor's Lane; and
- Other minor items which are included in the body of the report.

The LOM Project would result in an increase of heavy haulage vehicles on the roads discussed above. Assuming an average payload for truck and stag (or super dog) of 33.5t this would equate to an average of 16 haulage vehicles on Werris Creek Road and Taylor's Lane and 15 on the Kamilaroi Highway per day en route to Newcastle. Heavy vehicles en route to Gunnedah and Tamworth would average 1 per day to each destination.

In addition to the existing deficiencies listed above, the following measures are recommended to cater for the increase in heavy vehicle haulage:

- Upgrade of Escott Road and the Escott Road Werris Creek Road Intersection; and
- Provide for a contribution (s94) to Liverpool Plains Shire Council to compensate for the increased rate of deterioration on Taylor's Lane.

An analysis of the impact of the heavy haulage has been undertaken based on the information available regarding Taylor's Lane. It was estimated that the LOM Project would contribute approximately 22.5% of the pavement damage based on the current ratio of heavy vehicles. Estimated applicable tonnage rates ranged between $0.31 and $0.59 per tonne depending on the methodology and assumptions made.

The LOM Project would also include the construction of a rail loop that would intersect Escott Road in two locations on the Project Site. Two rail crossings are subsequently required along with an emergency access track that by-passes the rail loop.

At present an average of 6 return rail movements per week are generated from the WCCM of a possible 9 (based on the maximum approved production rate). If the LOM Project was able to operate at maximum capacity, 11 return rail movements per week are anticipated. There are a total of 23 rail paths possible per day which we understand is generally utilised.

Although there could be some adverse impact associated with rail movements from the LOM Project, this is considered to be a broader issue relating to an increase in total rail movements and/or number of carriages that are likely to occur as the coal industry in the Gunnedah Basin progressively develops.

The LOM Project would have a minor adverse impact on traffic flow and the road network generally however the adoption of the recommendations included in this report would assist in mitigating this impact and may even enhance the network in certain areas.

1. INTRODUCTION

1.1 PROJECT BACKGROUND

The Werris Creek Coal Mine (WCCM) is located within the North West Slopes and Plains of New South Wales, approximately 4km south of Werris Creek and 11km north-northwest of Quirindi (see **Figure 1**). The WCCM received development consent from the Minister for Planning and Infrastructure in February 2005 and has been operated under Development Consent DA 172-7-2004 within Mining Lease (ML) 1563 by Werris Creek Coal Pty Limited ("the Proponent") since that time.

Current mining and associated activities approved under DA 172-7-2004 have some impact on local traffic and include:

- the loading and despatch of coal carrying trains from a Rail Load-out Facility located on a rail siding originating from the Werris Creek Railway Station ("the Werris Creek Rail Siding");
- the transportation of product coal from the on-site size reduction and screening facility to the Rail Load-out Facility along a purpose-built rail load-out road (which crosses a public road [Escott Road]);
- the despatch and transportation of coal to domestic markets by road; and
- the vehicle movements of WCCM staff, contractors and visitors.

Following the continuation of a comprehensive exploration program at the WCCM, an extension of the coal resource to the north of the approved open cut area has been confirmed (hereafter referred to as the Life of Mine [LOM] resource). The Proponent proposes to mine this LOM resource, increase annual production and modify various aspects of the Project Site (hereafter referred to as the LOM Project). The area that is the subject of the application of project approval includes the existing Werris Creek Coal Mine as well as those additional areas required for the LOM Project, and is referred to collectively as the Project Site.

1.2 SCOPE OF REPORT

This report has been prepared to accompany an *Environmental Assessment* for the LOM Project, prepared by R.W. Corkery & Co. Pty Limited in accordance with Part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act), and assesses the traffic related impacts of the LOM Project on the surrounding road network that is either travelled by coal haulage vehicles or affected by changes to rail traffic. This report assesses traffic related impacts in accordance with the RTA's *Guide to Traffic Generating Developments* and the specific requirements nominated by the RTA and Liverpool Plains Shire Council (and included as part of the Director-General's Requirements (DGRs) prepared for the LOM Project by the Department of Planning).

As part of the assessment, any requirements or issues raised by the Director General, other related agencies, stakeholders and local residents are considered.

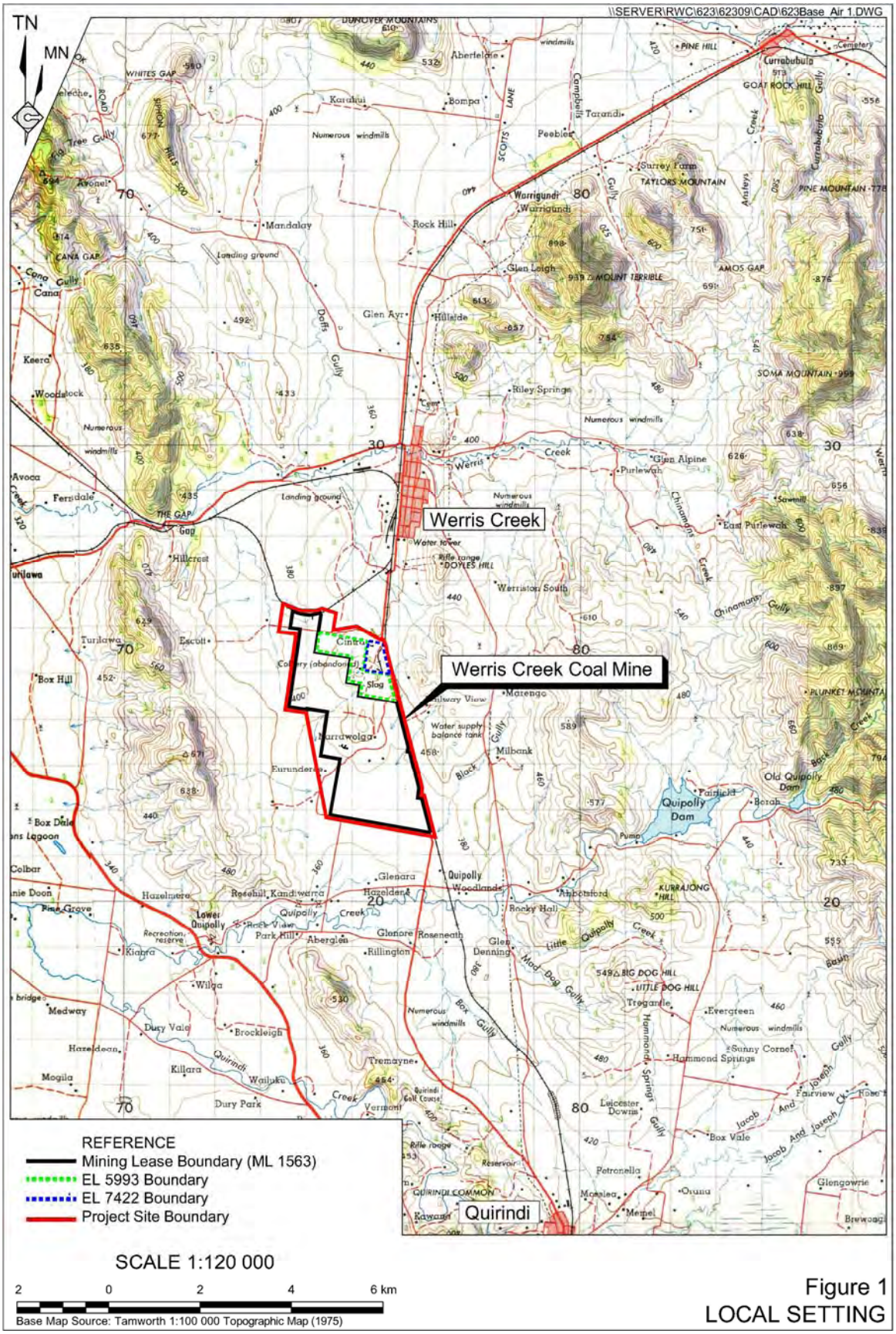

Figure 1
LOCAL SETTING

The report does not take into consideration noise and dust related issues associated with the transport of coal on or from the Project Site. An assessment of the impact of rail traffic on the road network is restricted to the potential delays associated with the increase in rail movements associated with the LOM Project.

1.3 PROJECT OVERVIEW

A full description of the LOM Project is provided by Section 2 of the *Environmental Assessment* (RWC, 2010). As part of the LOM Project, WCC proposes to implement the following modifications which would have some influence on local traffic and transport:

- An increase in annual maximum production from 2Mtpa to 2.5Mtpa (including an increase in road transportation of coal from 50,000tpa to 100,000tpa);
- Relocation of the Coal Processing Area and increase in the size of the ROM stockpile to 200,000t;
- Relocation of the Site Facilities and Administration Area;
- Construction of a second feed point at the Rail Load-out Facility (to allow for product separation, reduced inter-product contamination and more efficient train loading operations);
- Construction of a 'turn-around' rail loop off the Werris Creek Rail Siding to the immediate west of the Rail Load-out Facility;
- Construction of a new mine entrance off Escott Road (and closing the existing mine entrance off Werris Creek Road). The "Escott Road Entrance" would provide for more direct access to the relocated coal processing infrastructure, offices and facilities;
- The use of Escott Road as the primary access point to the Project Site would require the existing Escott Road and the intersection of Escott Road with Werris Creek Road to be upgraded; and
- The construction of a conveyor to transport coal from the Coal Processing Area to the Product Coal Stockpile Area is also being considered. The location and operation of this conveyor remains the subject of an ongoing economic feasibility study.

Figure 2 presents the proposed layout of the LOM Project incorporating the extended open cut, an extension to the out-of pit overburden emplacement and the noted additions/modifications to WCCM infrastructure.

1.4 PROPOSED HAUL ROUTES & MINE TRAFFIC

There are three main destinations for the coal despatched from the Project Site via road haulage: Tamworth; Gunnedah; and Newcastle, with transport route varying dependant on the destination. The proposed haul roads are identified in **Figure 3**.

Coal carrying trucks travelling to Tamworth would exit the Project Site via Escott Road, turn left into Werris Creek Road and follow this road through Werris Creek and onto Tamworth. The majority of haulage vehicles destined for Tamworth would return to the Project Site unloaded along the same route.

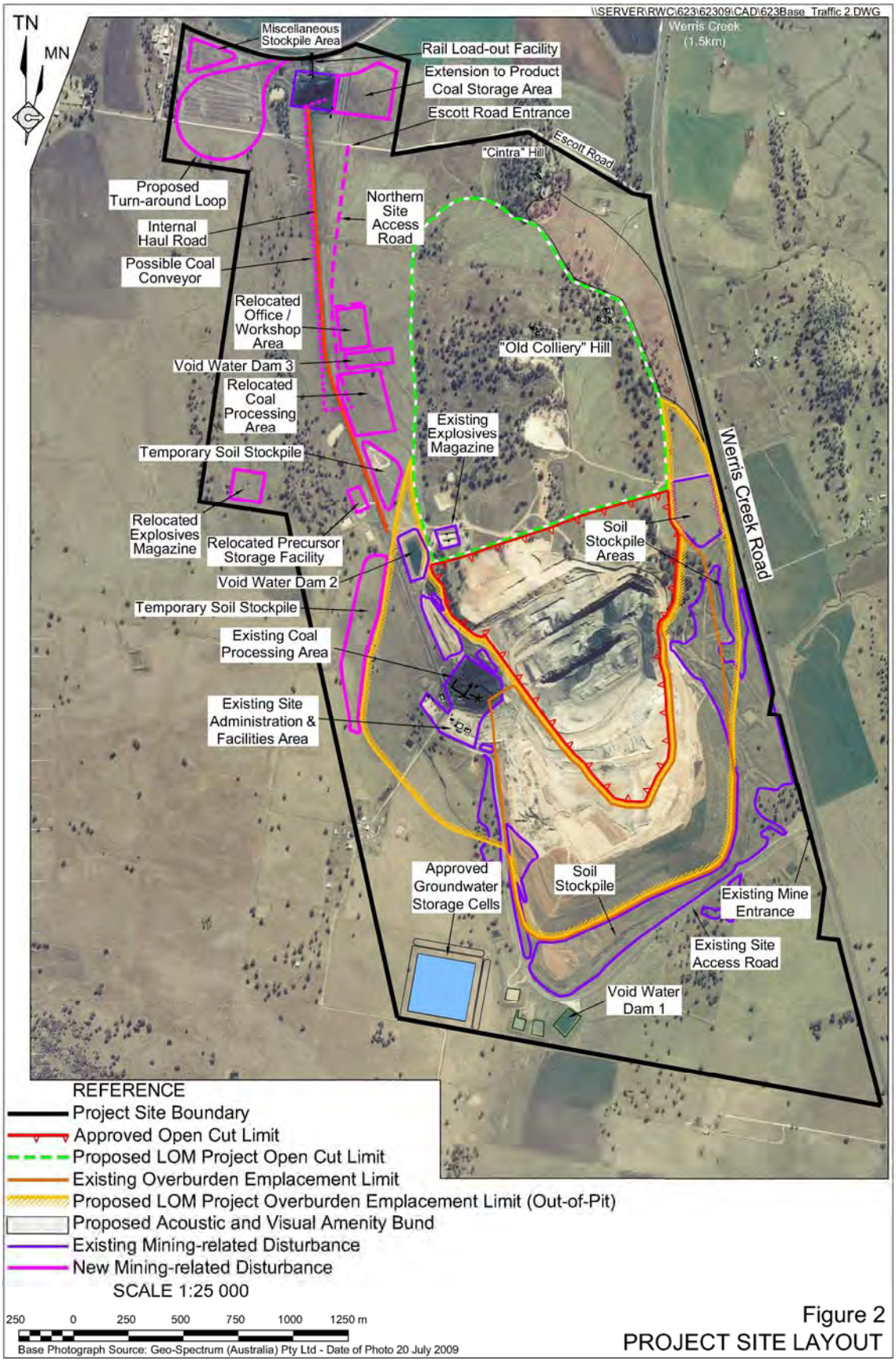

Figure 2
PROJECT SITE LAYOUT

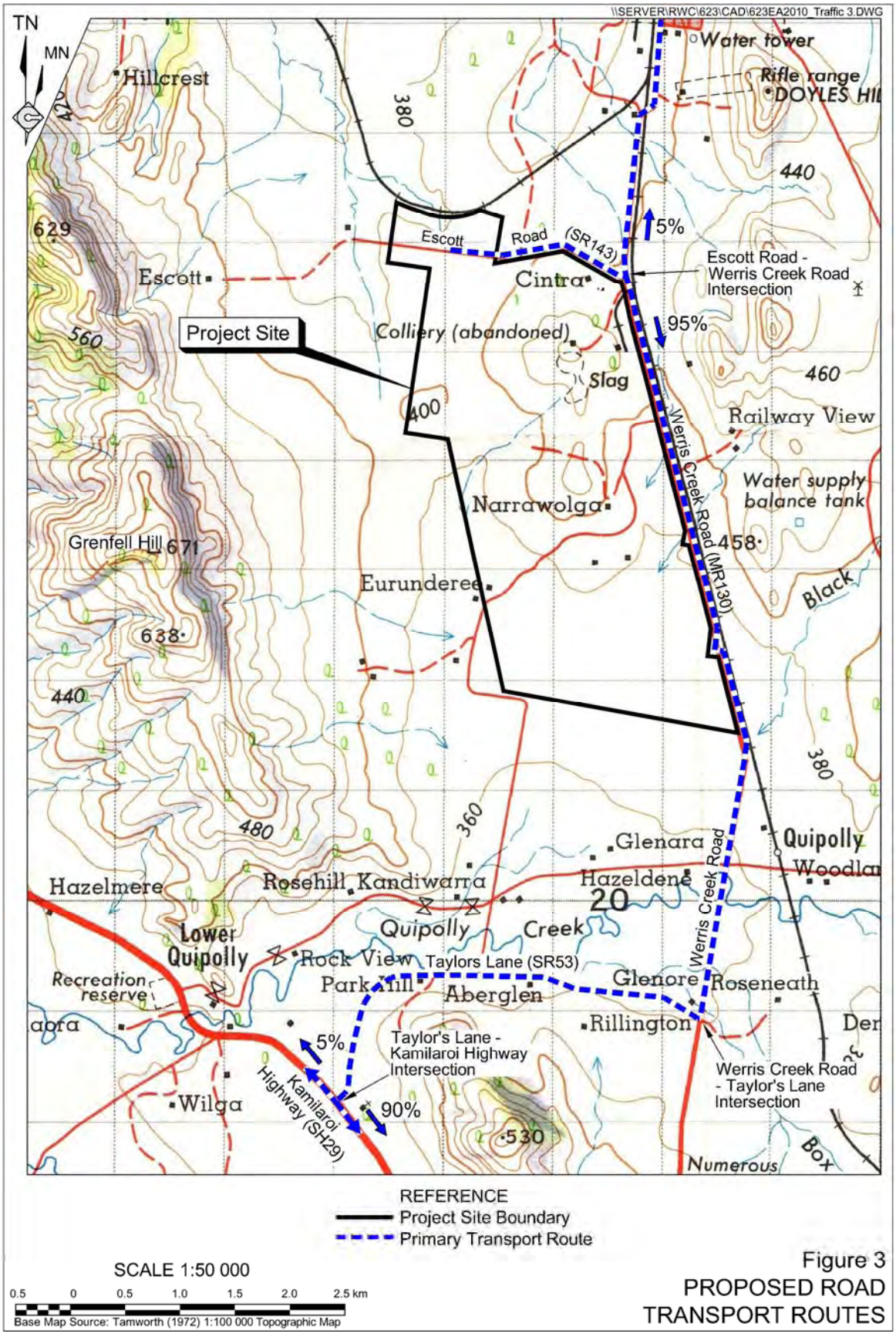

Figure 3
PROPOSED ROAD TRANSPORT ROUTES

Coal carrying trucks travelling to Gunnedah would exit the Project Site via Escott Road, turn right into Werris Creek Road, turn right into Taylor's Lane, turn right at the Kamilaroi Highway, then continue along the Kamilaroi Highway to Gunnedah. The majority of haulage vehicles destined for Gunnedah would return to the Project Site unloaded along the same route.

Coal carrying trucks travelling to Newcastle would exit the Project Site via Escott Road, turn right into Werris Creek Road, turn right into Taylor's Lane, turn left at the Kamilaroi Highway, turn right into the New England Highway and continue along the New England Highway to Newcastle. The majority of haulage vehicles destined for Newcastle would return to the Project Site unloaded along the same route.

Access to the Project Site for all other vehicles would be via Escott Road, as the existing Mine Entrance and Mine Access Road would be closed following the construction of the Escott Road Entrance.

The proposed proportional volume of traffic using each of these routes is discussed in Section 3.1.

2. EXISTING ROAD NETWORK AND COAL TRANSPORT

2.1 ROADS

2.1.1 Road Condition Report Preparation

The existing road network information was collected in July 2010 following an inspection by Constructive Solutions staff. The information was compiled to provide a summary of existing roads standards and their respective condition. A copy of this report is provided as **Appendix A**.

Road traffic count data for local roads were obtained from Liverpool Plains Shire Council (LPSC) and consists of data collected between November 2009 and July 2010.

Road traffic count data for state roads was collected by the Roads and Traffic Authority (RTA) in 2004 and obtained from the RTA website at the following URL.

http://www.rta.nsw.gov.au/trafficinformation/downloads/aadt_data_files/aadtnorthern2004_i.pdf

2.1.2 Escott Road

Escott Road (Shire Road [SR] No. 143) is a local road which primarily services the existing properties along its length (see **Plate 1**). The road is a low trafficked road that consists of a gravel pavement approximately 6m in width between table drains. The road accommodates two-way traffic in one travelling Lane, with enough width between table drains to allow passing. The existing alignment is considered fair to poor. Liverpool Plains Shire Council is the authority responsible for the road.

The existing annual average daily traffic (AADT) traffic on Escott Road is presumed to be less than 100.

2.1.3 Werris Creek Road

Werris Creek Road (Main Road [MR] No. 130) is a regional road that provides a strategic link between the centres of Quirindi (to the south) and Tamworth (to the north) with Werris Creek.

Plate 1 Escott Road Typical Alignment and Condition

Werris Creek Road consists of two Lanes from 3.2m to 3.5m wide with sealed shoulder of width varying from 0m to 1.0m (see **Plate 2**). The alignment is generally good, however, there are several sections where pavement failure is evident.

Werris Creek Road is maintained by Liverpool Plains Shire Council who receives allowance contribution from the RTA ('block grant') to assist with road maintenance.

The existing AADT on Werris Creek Road, based on the most recent count conducted in July 2010, is 2,316.

2.1.4 Taylor's Lane

Taylor's Lane (Shire Road [SR] No. 53) is a local road which services the existing properties at various intervals along its length. It also serves as a designated alternative route for heavy vehicles to bypass Quirindi.

Taylor's Lane consists of a 7m seal on 9m formation with approximately 300mm of local gravel pavement (see **Plate 3**). It was constructed in the 1997-1998 financial year in two sections, the join being the Wadwells Lane intersection. The western section of this road was resealed in 2008. The road has a centreline marked, which is significantly faded on the eastern section of the road that has not yet been resealed. Two areas of pavement failure were observed each over an area of approximately $0.5m^2$ (see **Plate 4**). The alignment is generally fair to good. The seal width is considered to be narrow.

A rural residential subdivision has occurred along the southern side of Taylor's Lane from chainage (CH) 500 to CH1700. One of the newly constructed accesses has minimal sight distance to the East at approximately 200m due to the curve located approximately 150m away.

The existing AADT on Taylor's Lane, based on the most recent count obtained in 2009, is 273.

Plate 2 Werris Creek Road Typical Alignment and Condition

Plate 3 Taylor's Lane Typical Alignment and Condition

Plate 4 Taylor's Lane Pavement Failure

Plate 5 Taylor's Lane Driveway Access Close to Bend (Approximately 575m from Werris Creek Road Intersection)

2.1.5 Kamilaroi Highway

The Kamilaroi Highway (State Highway [SH] No.29) is a state road that provides a strategic link between the Great Dividing Range and outback New South Wales. It commences at the New England Highway (at Willow Tree) and continues through Quirindi, Gunnedah and Narrabri before terminating at the Castlereagh Highway near Walgett.

The formation consists of two Lanes between 3.2m and 3.5m wide with sealed shoulders varying in width from 0m to 1.0m (see **Plate 6**). The alignment is generally good.

Plate 6 Kamilaroi Highway Typical Alignment and Condition

The Kamilaroi Highway is maintained on behalf of the RTA by Liverpool Plains Shire Council through a maintenance contract (RMCC) arrangement.

The existing AADT on the Kamilaroi Highway, based on the most recent count obtained in 2004 is 1,833.

2.2 INTERSECTIONS

2.2.1 Escott Road Entrance

It is proposed to close the existing Mine Entrance and Mine Access Road on Werris Creek Road following the construction of the Escott Road Entrance and new access road from Escott Road to the Project Site facilities ("the Northern Access Road"). The Northern Access Road would facilitate the movement of all mine-related traffic between Escott Road and the Site Administration and Facilities Area. The Escott Road Entrance is proposed to be constructed as a basic right hand (BAR) and basic left hand (BAL) type intersection.

2.2.2 Escott Road and Werris Creek Road

The eastern end of Escott Road terminates at a T intersection when it meets Werris Creek Road. The existing treatment at this intersection is a basic rural treatment without tapers. The general geometry of the intersection appears reasonable for the existing traffic volumes of the respective roads. Sight distance is good to the north (see **Plate 7**) and partially restricted to the south (see **Plate 8**). It is estimated that sight distance to the south is approximately 300m.

Plate 7 Escott Road Intersection Looking North Towards Werris Creek

There is a grid approximately 30m from the intersection on Escott Road and a driveway access to the south of the intersection on Werris Creek Road. The location of the driveway coupled with the intersection and available sight distance from the driveway is considered undesirable.

2.2.3 Taylor's Lane and Werris Creek Road

The existing intersection between Taylor's Lane and Werris Creek Road is a modified rural treatment with tapers on all turning manoeuvres on and off Werris Creek Road to assist turning articulated vehicles (see **Plates 9** to **11**). There is a short deceleration Lane for vehicles turning left into Taylor's Lane (see **Plate 10**). There is a short passing Lane for vehicles turning right into Taylor's Lane (see **Plate 11**), however, this facility is considered inadequate for B-Double configurations (see Section 4.4.6).

There is a property access located approximately half way along the passing Lane almost directly opposite the Taylor's Lane intersection. It is considered undesirable to have the access located adjacent to the passing Lane and opposite the intersection.

The sight distance is good approaching from Werris Creek along the Werris Creek Road (see **Plate 11**), and is reasonable approaching from Quirindi (see **Plate 10**).

Plate 8 Escott Road Intersection Looking South Towards Quirindi

Plate 9 Taylor's Lane Intersection with Werris Creek Road

Plate 10 Taylor's Lane Intersection Looking Towards Quirindi (the Private Driveway Access is the Partially Visible the Cleared Area on the Left Hand Side of the Plate)

Plate 11 Taylor's Lane Intersection Looking Towards Werris Creek

2.2.4 Taylor's Lane and Kamilaroi Highway

The existing intersection between Taylor's Lane and the Kamilaroi Highway is a modified rural treatment with tapers on all turning manoeuvres on and off the Kamilaroi Highway to assist turning articulated vehicles (see **Plates 12** to **14**). There is limited sight distance for vehicles approaching the intersection along Taylor's Lane, with no advance warning of the intersection. There is a Give Way Sign at the intersection and barrier board located opposite the intersection (although this barrier board is not centred).

Plate 12 Taylor's Lane Intersection Looking Towards Gunnedah

The sight distance is good approaching from Quirindi along the Kamilaroi Highway (see **Plate 13**), and is good approaching from Gunnedah along the Kamilaroi Highway (see **Plate 14**). Similarly sight distance is good for vehicles exiting Taylor's Lane in either direction.

2.2.5 Kamilaroi Highway Quirindi (Lennox and Loder Streets)

The existing intersection between Lennox Street and Loder Street (which are local road names for the Kamilaroi Highway) in Quirindi is an urban T-intersection with passive controls (see **Plates 15** to **17**). Lennox Street consists of two approach Lanes, and acceleration Lanes for vehicles entering and exiting Loder Street. Loder Street carries two-way traffic with a single Lane in each direction.

The speed limit for this intersection and road approaches is 50km/hr.

There is parallel parking on both sides of Lennox and Loder Streets and sufficient manoeuvring capacity for the swept path of a B-Double vehicle to negotiate the intersection safely. There is also adequate sight distance in all directions for all manoeuvres.

Plate 13 Taylor's Lane Intersection Looking Towards Quirindi

Plate 14 Taylor's Lane Intersection with Kamilaroi Highway

Plate 15 Loder Street Travelling South Towards Lennox Street

Plate 16 Lennox and Loder Streets Looking West (Down Lennox Street)

Plate 17 Loder Street Looking North Towards Lennox Street

2.3 RAIL CROSSINGS

There are a number of rail crossings that will be affected, to a varying degree, by the rail movements generated by the LOM Project (and rail movements generally). **Plates 18** to **21** identify the location of each of these which include:

- South Street, Werris Creek;
- Werris Creek Road, Werris Creek (South);
- Nowland Street Crossing, Quirindi; and
- Henry Street Crossing, Quirindi.

The South Street crossing (Werris Creek) (see **Plate 18**) would be the most affected by any increase in rail movements. It consists of passive controls and is located on a 50km/hr road with the road alignment approaching the crossing being straight with a rail maintenance facility access road running parallel with the rail line (see **Plates 22** and **23**). The access road for the rail maintenance facility is located close to the rail line and offers insufficient manoeuvring room for articulated vehicles. There is a stop sign for eastbound traffic, however, there is no stop sign for westbound traffic.

Plate 18 Level Crossing at South Street Werris Creek

Plate19 South Street Crossing Looking Along West Street

Plate 20 South Street Crossing Looking Along the Maintenance Facility Access

Plate 21 Level Crossing at Werris Creek Road South Werris Creek

Plate 22 Level Crossing at Nowland Street Quirindi

Plate 23 Level Crossing at Henry Street Quirindi

The Werris Creek Road, Werris Creek (South) crossing (see **Plate 18**) is a dog leg style single rail crossing with approaches being approximately parallel to the rail line. The crossing consists of active controls. The intersection of South Street is located approximately 30m to the west of the crossing.

The Nowland Street Crossing, Quirindi (see **Plate 22**) consists of active controls over two tracks. The Allnutt street approach contains a ninety degree bend approximately 20m before the crossing that allows traffic to cross perpendicular to the tracks. The Nowland Street approach consists of a straight alignment with good visibility.

The Henry Street Crossing, Quirindi (see **Plate 23**) consists of active controls over two tracks. Both approaches to the crossing consist of a straight horizontal alignment enabling traffic to cross perpendicular to the tracks. There is a roundabout located approximately 40m from the crossing for the intersection of Henry and George Streets. The location of this crossing coupled with the location of the roundabout combine to provide an undesirable traffic scenario whereby eastbound traffic queuing at the crossing can bank up and block the traffic on George Street.

2.4 TRAFFIC VOLUMES

2.4.1 Road

As noted in Section 2.1.1, existing traffic counts for local roads (Werris Creek Road and Taylor's Lane) were provided by Liverpool Plains Shire Council following the placement of periodic counters in late 2009 and early 2010. Existing traffic counts for state and regional roads (Kamilaroi Highway) were provided by the RTA. The RTA counts were taken in 2004 and projected figures for 2010 were extrapolated based upon the growth trends observed from the 2001, 1998, and 1995 data on the same roads. **Table 1** shows the collected or projected traffic volumes for the respective roads.

Table 1
Current Traffic Volumes

	Section of Road	Year of Data	Total AADT	Data Type (Projected or Actual)
Escott Road			No Data Available (est. < 100)	
Kamilaroi Highway	North of Taylor's Lane	2010	1145	Projected from 2004 Data
	South of Taylor's Lane	2010	1853	Projected from 2004 Data
	South of Quirindi	2010	2614	Projected from 2004 Data
Werris Creek Road	North of Werris Creek	2010	2316	Actual AADT
	South of Werris Creek, North of Escott Road	2010	1852	Actual AADT
	South of Werris Creek, South of Escott Road	2010	1852	Actual AADT
Taylor's Lane		2009	273	Actual AADT

2.4.2 Rail

Existing rail paths for the main rail line to the south of Werris Creek were provided by Australian Rail Track Corporation (ARTC) (see **Table 2**). These rail paths are current as of August 2010

Table 2
Current Rail Paths

Train Type	Paths (Return Trips)
Coal	10
Passenger	1
Freight	12

3. CHANGES TO TRAFFIC RESULTING FROM THE LOM PROJECT

3.1 ROAD TRAFFIC GENERATION

3.1.1 Introduction

The LOM Project would generate traffic from various activities occurring on the Project Site through various stages of LOM Project development. The volumes of traffic likely to be experienced during the construction and operation of the LOM Project have been estimated, based on traffic data collected at the WCCM, and are presented in Sections 3.1.2 to 3.1.5.

3.1.2 Construction Traffic Volumes

Construction of the Escott Road Entrance, Northern Access Road and the relocation of coal processing and administration areas, along with the upgrade of Escott Road would occur prior to the increase in haulage of coal from the Project Site. During this phase of the LOM Project, traffic generated by the construction would vary in number and composition depending on the phase, location and type of construction. It is expected that a construction workforce of between 5 and 20 full-time equivalent persons would be employed generating up to 60 vehicle movements per day for the initial 2 years of the LOM Project.

3.1.3 Haulage Traffic Volumes

Currently WCCM uses the haulage vehicle configurations presented in **Table 3**.

Table 3
Haulage Vehicle Configurations

Description	Payload (Tonnes)	GCM (Tonnes)
B - Double	42	62.5
Truck and Super Dog	32	45
Truck and Stag	35	48.5

WCCM has advised that 5% of coal carrying trucks are destined for Tamworth, all of which are B-Double configuration. Of the remaining vehicles, which travel south from the Project Site to either Newcastle or Gunnedah, all are Truck and Superdog or Truck and Stag configuration. Proportional distribution of coal haulage is as follows.

- 90.25% are destined for Newcastle;
- 4.75% are destined for Gunnedah; and
- 5% are destined for Tamworth.

Based on the currently approved road haulage of 50 000tpa, an average of 9 vehicles per day travel south on Werris Creek Road, along Taylor's Lane and onto the Kamilaroi Highway. Of these an average of 8 vehicles per day travel via the Kamilaroi Highway south of Taylor's Lane (to and from Newcastle) with an average of 1 vehicle per day travelling on the Kamilaroi Highway north of Taylor's Lane (to and from Gunnedah). On average, 1 vehicle travels to or from Tamworth via Werris Creek Road to the north of the Project Site each day.

The proposed increase in road haulage would double the number vehicle movements to each of the three destinations. It is assumed that the proportional distribution of these vehicle movements would remain consistent with current road haulage.

Based upon the existing and proposed volume of coal carrying trucks to be despatched from the WCCM, **Tables 4** and **5** present an analysis of the proportional representation of these trucks on the road network.

3.1.4 Workforce Traffic Volumes

The LOM Project proposes to establish the WCCM as a 24 hour, seven day per week operation. The exception to the proposed 24 hour operations would be blasting which would be restricted to between 9:00am and 5:00pm, Monday to Friday.

The Proponent currently employs 58 full-time equivalent personnel, with a further 15 full-time persons involved in coal processing operations and despatch activities at the train loader. At any given time, there are likely to be an additional 5 to 10 persons employed on a casual basis. It is anticipated that an additional 10 full-time personnel would be required should the LOM Project be approved. This would take the expected workforce vehicle movements from approximately 170 trips per day to 190 trips per day.

3.1.5 Other Traffic

Other traffic travelling to and from the Project Site would include site deliveries, intermittent visits by site staff and regulatory authorities. Overall it is presumed that other traffic would be relatively low at around 10 vehicles per day of which 20% would be expected to be commercial vehicles.

3.2 RAIL TRAFFIC VOLUMES

It is proposed to increase the approved output of coal via rail from 1,950,000tpa to 2,400,000tpa. WCC is currently operating significantly under its approved output only transporting 1,334,505 tonnes annually (see **Table 6**). This equates to 307 trains per year or approximately 6 return trips per week. If WCC operated at its current approved capacity there would be approximately 449 return rail trips per year or 9 per week.

Should the LOM Project be approved as proposed, the number of return rail loads per day would increase to a maximum of 552 trains per year, or approximately 11 return trips per week. In order to achieve this increased output WCC are proposing the construction of a rail loop to allow the trains to enter, load and exit with a minimum of shunting. **Table 7** provides a comparison of the current, approved and proposed rail movements from the Rail Load-out Facility of the WCCM.

Table 4
Haulage Traffic Volumes

	Section of Road	Year of Data	Total AADT	Current Haul Distribution	Vehicle Type	Typical Mass (Tonnes)	Current WCC Haul VPD	WCC % of AADT	Current % CV	WCC % Share of CV	Proposed WCC Haul VPD	WCC % of AADT	Proposed % CV	WCC % Share of CV
Escott Road			No Data Available (est. < 100)	Nil	Truck and Stag or Truck and Superdog	33.5	Nil				17			
Kamilaroi Highway	North of Taylor's Lane	2010	1145	4.75%	Truck and Stag or Truck and Superdog	33.5	1	0.09%	10%	0.87%	1	0.09%	10.00%	0.87%
	South of Taylor's Lane	2010	1853	90.25%	Truck and Stag or Truck and Superdog	33.5	8	0.43%	10%	4.32%	15	0.81%	10.38%	7.80%
	South of Quirindi	2010	2614	90.25%	Truck and Stag or Truck and Superdog	33.5	8	0.31%	10%	3.06%	15	0.57%	10.27%	5.59%
Werris Creek Road	North of Werris Creek	2010	2316	5.00%	B-Double	41	1	0.04%	10%	0.43%	1	0.04%	10.00%	0.43%
	South of Werris Creek, North of Escott Road	2010	1852	5.00%	B-Double	41	1	0.05%	10%	0.54%	1	0.05%	10.00%	0.54%
	South of Werris Creek, South of Escott Road	2010	1852	95.00%	Truck and Stag or Truck and Superdog	33.5	8	0.43%	10%	4.32%	16	0.86%	10.43%	8.28%
Taylor's Lane		2009	273	95.00%	Truck and Stag or Truck and Superdog	33.5	8	2.93%	20%	14.8%	16	5.69%	22.71%	25.8%

Table 5
Commercial Vehicle Traffic on Taylor's Lane

	AADT (VPD)	Commercial (VPD)	Commercial (%)	WCC Current Commercial (VPD)	WCC Current Commercial (%)	WCC Proposed Commercial (VPD)	WCC Proposed Commercial (%)
Taylor's Lane	273	54	19.78%	8	14.81%	16	25.81%

Table 6
Actual Rail Haulage from WCC Rail Loading Facility

Month	Werris Creek	
	Trains	Tonnes
Jul-09	15	69,175.30
Aug-09	30	136,358.35
Sep-09	17	72,212.55
Oct-09	13	54,852.85
Nov-09	28	108,454.15
Dec-09	23	84,371.05
Jan-10	25	111,487.50
Feb-10	17	67,687.40
Mar-10	19	82,865.55
Apr-10	25	92,083.05
May-10	29	125,952.90
Jun-10	31	160,636.30
Jul-10	35	168,367.60
Annual	**307**	**1,334,505**
Weekly Average	**6**	**25664**
Daily Average	**1**	**3657**

Table 7
Actual, Approved and Proposed Movements from the WCC Rail Loading Facility

	Movements from WCC Rail Loadout Facility					
	Actual Current		Approved Current		Proposed	
	Trains	Tonnes	Trains	Tonnes	Trains	Tonnes
Annual	307	1334505	449	1950000	552	2400000
Weekly Average	6	25664	9	37500	11	46154
Daily Average	1	3657	2	5342	2	6575

4. ASSESSMENT OF TRAFFIC IMPACTS

4.1 INTRODUCTION

The following sections review the potential impact the LOM Project would have on traffic conditions. Where commitments have been made in relation to road design or operational management, these are noted. Recommendations for further impact mitigation or control are also included as appropriate.

4.2 EXISTING ROAD STANDARD CONSIDERATIONS

As discussed in Section 2, it is important to note that sections of the existing road network do not necessarily meet existing road design standards. This can be attributed to the changing of standards over time, as well as changes to traffic types and volumes.

Some of the deficiencies are applicable with or without the consideration of current or proposed coal haulage associated with the WCCM.

It should be noted that, with the exception of Escott Road, each of the haul routes proposed are currently approved for B–double use.

4.3 HEAVY VEHICLE TYPE

As previously discussed, Truck and Stag, Truck and Superdog and B-Double configurations are currently being used to transport coal from the WCCM. The LOM Project does not seek to alter this arrangement in any way other than to increase the number of truck movements. All three configurations are used extensively in the local area with an increasing emphasis being placed upon phasing out the use of standard articulated vehicles in favour of the more freight efficient combination vehicles.

The primary impacts associated with using combination vehicles are considered to be the dimensional capacity of the existing road infrastructure and traffic interaction. Safeguards and operational controls which should be incorporated into the design and operation of road haulage for the LOM Project include the following.

- All recommended road and intersection upgrades should be designed to accommodate B-Double use;
- Intersection upgrades should also provide simplified traffic interaction and provide appropriate warning relating to the increased volume of heavy vehicles;
- Speed and other related driving characteristics need to be managed; and
- Spillage from the trucks transporting coal will be controlled by mandatory requirement that all trucks are fitted with tarps to cover loads.

4.4 ROAD NETWORK

4.4.1 Escott Road

The section of Escott Road from the proposed Escott Road Entrance to Werris Creek Road would experience a significant increase in traffic volumes. The road would form part of the coal transport route, as well as providing general access for employees, site deliveries and other associated traffic to the Project Site.

For this reason, a component of the LOM Project is to upgrade Escott Road to an 8m seal on a 10m formation, as well as upgrade the intersection with Werris Creek Road in order to cater for the increased dimensional capacity requirements of the haul vehicles that are proposed to enter and exit the site via Escott Road.

The upgrade shall consist of improvements to stormwater drainage, alignment, the construction of a new light vehicle intersection to the Project Site and upgrades to the existing intersection of Escott Road with the existing Rail Load-out Road (between the mining and processing areas of the Project Site and the Coal Product Stockpile Area and Rail Load-out Facility). A preliminary design for the Escott Road upgrade is included as **Appendix B**. Improvements to property accesses may be required depending on site constraints associated with the realigned formation.

It is noted that changes to the alignment would require the road reserve to be realigned.

The proposed turn-around rail loop would cross Escott Road twice, requiring the need for two level crossings. While the rail loop is located to the west of the intersections associated with the WCCM, with traffic only consisting of local access to the Escott property and Zeolite Processing Plant, an emergency side track should be constructed around the rail loop to allow emergency access should the road be blocked by a train.

It is anticipated that rail speeds at the level crossings will be low, however the crossings should be designed and constructed in accordance with *AS 1742.7 Manual of uniform traffic control devices Part 7: Railway crossings*.

As it is proposed to upgrade the road, with the entire costs met by the Proponent, section 94 contributions, in the form of a tonnage rate, are not considered applicable for this part of the local road network.

4.4.2 Werris Creek Road

Werris Creek Road varies significantly in condition. Significant sections of the road have been 'heavy patched' and others are displaying some initial signs of failure.

There are only expected to be an additional 8 return heavy vehicle movements per day on Werris Creek Road. This represents a very small percentage of the overall AADT of the road generated by the WCCM (approximately 0.86% of AADT) (see **Table 4**).

As there was no vehicle classification data available for Werris Creek Road, it has been assumed that the percentage of Commercial Vehicles (CV) on the road is currently 20%. Based on this assumption, WCCM's current haulage and proposed haulage volumes represent an increase in commercial vehicle traffic of 2.2% and 4.3% respectively.

It is noted that the haul vehicles would be on the heavier end of the spectrum, however, the overall increases of CV's would be relatively small. Excluding the existing intersections this section of Werris Creek Road is considered to be suitable for the proposed increase in haulage.

4.4.3 Taylor's Lane

Increases in traffic from the WCCM on Taylor's Lane would be predominantly associated with coal transportation. It is anticipated that the majority of other traffic generated by the LOM Project would not generally use Taylor's Lane.

The percentage CV's attributable to the WCCM would increase from 14.8% to 25.8% (see **Table 4**).

The pavement is generally in good condition particularly given that it is now 12 years old and has minimal defects. The increased haulage associated with the LOM would accelerate the rate of pavement failure. In accordance with the DGR's a review of s94 contributions is provided below.

Taylor's Lane was constructed to its current standard by Council in the 1997-1998 financial year, for the purpose of creating a bypass for heavy vehicles around Quirindi. Given the strategic purpose of Taylor's Lane it would be considered desirable to have 0.5m of sealed shoulder outside the 3.5m travelling Lanes partially to improve safety but predominantly to protect the pavement and prevent edge break. This is considered to be a pre-existing deficiency.

Whilst it is considered that the current centreline is adequate, it is recommended that edge lines, to define the travelling Lanes and to try and keep the outer wheel path of heavy vehicles away from the shoulder, be provided. This is considered to be a pre-existing deficiency that is not exacerbated to a significant extent by the increase in haulage.

Given the undesirable location of the property access at CH575 it is recommended that it either be relocated or that appropriate advance warning signs be installed. This is considered to be a pre-existing deficiency that is not exacerbated to a significant extent by the increase in haulage.

Section 94 Contributions – Taylor's Lane

Section 94 of the *Environmental Planning and Assessment Act 1979*, enables councils to levy contributions from developers for the provision of public amenities and services which are required as a consequence of development.

Liverpool Plains Shire Council has requested a review of the contributions made on local roads which includes Taylor's Lane. This is based on the observation that the LOM Project would exacerbate the rate of failure of the pavement increasing maintenance expenditure and bringing forward capital renewal expenditure.

The traffic count for Taylor's Lane was utilised to estimate the amount, or percentage impact resulting from the LOM Project. The count included a breakdown in vehicle categories which was subsequently used to calculate the equivalent standard axles (ESA's) which is commonly used as a measure of pavement impact resulting from commercial vehicles. Calculations and relevant assumptions are provided in **Appendix C**.

The existing ESA's for Taylor's Lane, excluding current WCCM coal haulage, was estimated to be 57,612 pa. The ESA's associated with the proposed levels of coal haulage were estimated to be 16,640 pa resulting in a total of 74,252 ESA's pa on Taylor's Lane. The LOM Project's share of the impact expressed in ESA's is therefore approximately 22.5%.

Typically where the rate of pavement failure is exacerbated to this extent the contribution is generally calculated by estimating the opportunity cost of bringing forward capital renewal expenditure due to the increased rate of pavement damage resulting from the development. This is commonly referred to as the 'bring forward cost'. All calculations and detailed assumptions are included as **Appendix D**.

An estimate of the 'bring forward cost' was calculated based on previous road design assumptions provided by Council and the ESA's calculated as described above. Given the condition of the road and the year of construction it was assumed that without haulage the road should reach its theoretical design life which is the year 2018. It was estimated that the haulage would reduce the theoretical remaining life to 6.2 years meaning the road would have a reduced life of approximately 1.8 years.

The estimated cost of rehabilitation and maintenance over this period utilising a figure provided by Council is $1,771,200 in 2010 dollars. At a rate of 7%, the cost to bring the works forward 1.8 years is $347,633.

Over the same time period (6.2 years) 589,683t of coal could be hauled which means the applicable tonnage rate based on this methodology would be $0.59 per tonne.

Two alternative methodologies were utilised to check that the 'bring forward cost' method was indicative of the impact caused (see **Appendix E**). The first method was to consider the increased pavement thickness required in addition to the existing pavement to allow for increased traffic volumes. The second method was to consider the life cycle costs for the road over the LOM and what the pro-rata share resulting from haulage would be. Both alternative methodologies returned a rate of $0.31 per tonne.

Of the various methodologies adopted, the life cycle cost analysis was considered to be the most indicative of the actual cost and therefore representative of the impact on the road network resulting from the development.

At a rate of $0.31 per tonne, assuming 95,000t per annum, the total contribution made over the LOM would be $581,595 for Taylor's Lane.

4.4.4 Kamilaroi Highway

The sections of the Kamilaroi Highway that form part of the proposed coal transportation routes vary considerably in condition. Some sections of the highway have been 'heavy patched' whilst other have been widened.

As there are only expected to be an additional 8 heavy vehicle movements per day on the Kamilaroi Highway (depending on vehicle configuration), and the relatively small percentage of the overall AADT of the road that WCC haul traffic represents (approximately 0.81%), it is anticipated that the increase in haulage volumes would have a negligible impact on traffic and this section of the Highway.

4.4.5 Escott Road and Werris Creek Road Intersection

The traffic volumes through this intersection would increase markedly as previously discussed in the report. The trucks and other associated WCCM traffic would originate from both directions along Werris Creek Road.

The Escott Road, Werris Creek Road intersection is inadequate in its current form and would require a significant upgrade in line with the proposed upgrade of Escott Road.

The new intersection is proposed to be located in the vicinity of the existing intersection which joins Werris Creek Road on the outside of a bend. The sight distance is very good to the north (towards Werris Creek), however, is limited, and partially obscured by the power poles to the south (towards Quirindi). This issue should be addressed during the upgrade of the intersection.

Laden trucks exiting the intersection would have sufficient sight distance to merge into the existing traffic, however, with a stop sign at the intersection combined with a slight uphill grade for the right turn out manoeuvre, it is unlikely that the heavy vehicles would exceed 80km/hr before cresting the top of the hill to the south on Werris Creek Road. An acceleration Lane is recommended for laden vehicles turning right onto Werris Creek Road to enable laden haul vehicles to maintain and develop a reasonable speed thus providing a smoother merge into existing traffic.

A deceleration Lane in the form of a channelised right for vehicles approaching from Werris Creek is recommended to accommodate light vehicles and the small number of returning unladen haulage vehicles. Adequate storage capacity is required to ensure that the deceleration distance is suitable.

A deceleration Lane for vehicles turning left into Escott Road is recommended to prevent unnecessary impedance to through traffic. An acceleration Lane for vehicles turning left out of Escott Road towards Werris Creek is considered unnecessary as there is a minimal number of heavy vehicles proposed to make this turn manoeuvre which is on a slight downhill grade.

A proposed conceptual layout reflecting the recommendations discussed in this section of the report is included as **Appendix G**.

Further investigation should be undertaken to ascertain the possibility of relocating the driveway access on Werris Creek Road adjacent to the intersection to a location along Escott Road. Relocating this driveway access would decrease vehicle movement conflicts and improve the ultimate safety of the intersection.

All other alternative accesses to the Project Site should be closed to ensure all access is via the nominated coal transportation route.

4.4.6 Taylor's Lane and Werris Creek Road Intersection

The Auxiliary Right Turn (AUR) and the Auxiliary Left Turn (AUL) treatment at this intersection assists in achieving the dimensional capacity to improve B-Double manoeuvres onto and off Werris Creek Road and in minimising the impact of turning vehicles on through traffic.

The storage capacity and the length of the passing Lane for the Auxiliary Right Turn (AUR) (currently 120m) do not currently meet Austroads Standards. Austroads Standards state that for a road with speed limit 100km/h and travel Lanes 3.2m in width, a 70m approach taper, 50m storage Lane and 70m exit taper are required (as a minimum) (190m). The current passing Lane length is 70m short of the minimum Austroads Standards requirement (see **Figure 8** and **Table 8**). It is recommended that the intersection be upgraded to meet the Austroads standard and that the cost of such an upgrade be the joint financial responsibility of the Proponent, RTA and Council.

It is further noted that the safety and performance of this intersection could be further improved by increasing the storage capacity and deceleration length by the length of one larger articulated vehicle greater than the nominated Austroads storage capacity. The Austroads Standards storage Lane of 50m would not accommodate two articulated trucks which could impede traffic flow or force vehicles continuing through the intersection to utilise the shoulder to pass stationary vehicles at speed. The ability to achieve greater storage capacity is partially constrained by a large multi cell box culvert on the Northern side of the intersection.

Although the issue relating to intersection safety and performance would be exacerbated by the additional coal haulage of the LOM Project, the impact attributable to the LOM Project would be commensurate with the number of articulated vehicles turning right into Taylor's Lane. As identified in **Table 4**, approximately 26% of all commercial vehicles using this intersection would be generated by the WCCM.

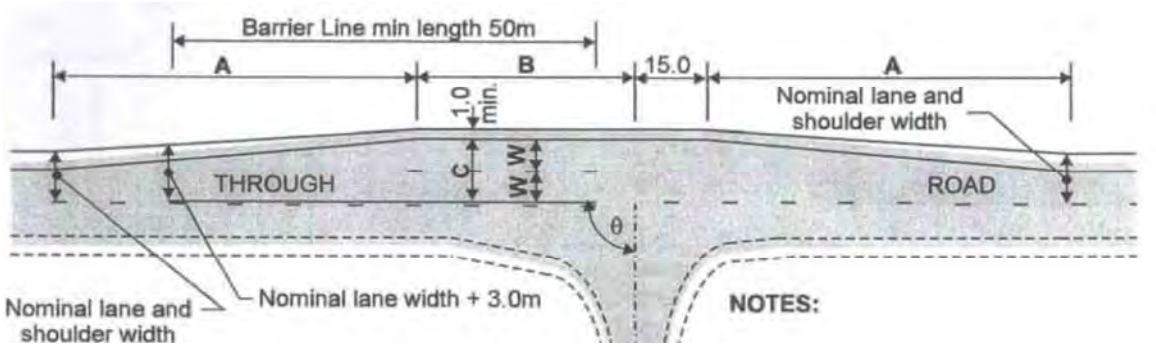

Figure 4 LOM Project Road Transport Routes

Table 8
Current and Required Table of Dimensions Relating to Figure 4

Dimension	Current	Required
A	50	70
B	20	35
C	6.4	6.4
W	3.2	3.2

It was noted during the site inspection that there is a property access on Werris Creek Road directly opposite the Taylor's Lane Intersection. Consideration should be given to relocating this access to a more suitable location to decrease the number of potential traffic conflicts. It is noted that this property access was most likely in this location prior to the upgrade of Taylor's Lane in the 1997-1998 financial year, and was in this location prior to the introduction of haulage vehicles from the WCCM. Given this, it would be considered to be unreasonable to expect the Proponent to bear all of this cost.

4.4.7 Taylor's Lane and Kamilaroi Highway Intersection

The BAR and BAL treatment at this intersection assists in achieving the dimensional capacity to improve B-Double manoeuvres onto and off the Kamilaroi Highway. Although the existing intersection could accommodate the proposed increased level of heavy vehicle movements, it is recommended that the intersection be upgraded to an AUR to reduce the impact on through traffic. Again given the ratio of traffic associated with the LOM Project and other traffic it would be considered unreasonable for the Proponent to bear all of this cost.

The existing width of the road pavement on Taylor's Lane, when approaching the Kamilaroi Highway, is considered to be adequate. Over 500m sight distance for turning manoeuvres is available in both directions onto the Kamilaroi Highway.

It was noted on the site inspection that the barrier board opposite the intersection is not centred. This board should be centred, and a "Give Way Ahead" sign should be installed on Taylor's Lane to provide advanced warning for the requirement to "Give Way".

4.4.8 Kamilaroi Highway Quirindi (Lennox and Loder Streets)

The intersection of Lennox and Loder Streets is considered adequate to accommodate the existing traffic and the negligible increase on the Kamilaroi Highway associated with LOM Project traffic.

4.4.9 Rail Crossings

There are currently a maximum of 23 rail paths possible per day on the main line to the south of Werris Creek (due to current infrastructure capacity restraints). The LOM Project does not seek to increase this number, but seeks to operate within this capacity.

It is understood that the Australian Rail Track Corporation (ARTC) intends to undertake upgrades to increase the maximum number of rail paths in the future, however, details of this upgrade and its timing are not currently available. In any case the proposal is not seeking to operate outside the maximum number of rail paths currently available, but to increase the number of rail movements generated by the LOM Project from 9 to 11 return movements per week.

The most significantly impacted rail crossing is expected to be on South Street Werris Creek. This is due to the speed limit of 15km/hr for trains on the Werris Creek Rail Siding. Based on this travel speed it is anticipated that a train will take approximately 7 minutes to pass. The delays experienced by traffic at other level crossings are expected to be around the 3 to 4 minute duration at the maximum based upon a travel speed of 25 to 40km/hr.

Based on roads with 2,000 AADT, the number of vehicles that may be delayed from one train movement on average would be approximately 5 to 6. Considerable variations either side of this would occur based on the time of day and other traffic influences. Given the average increase in rail movements is proposed to be a maximum of 5 per week, approximately 30 vehicles in each direction may be delayed.

Due to the proximity of the Henry Street – George Street Roundabout to the crossing at Henry Street Quirindi it is currently possible that eastbound traffic on Henry Street queuing at the crossing could potentially back up and block traffic on the roundabout. It is not expected that the LOM Project would exacerbate the current situation given that the Project would not increase the duration of any delays. Given the surrounding road network, traffic volumes and current delays experienced at the other level crossings it is not expected that any other similar issues would arise in those locations.

The increased frequency of trains may increase the likelihood of accidents at level crossings. Although the increased risk is only minor, it is recommended that the level crossings affected be reviewed for compliance with AS1742.7.

Emergency vehicle access could be delayed as a result of the LOM Project. Given that it is proposed to provide an emergency access track adjacent to the rail loop along Escott Road and that there are alternative routes around other rail crossings, minimal impact to emergency vehicles access is anticipated.

Given that the LOM Project would not increase the number of rail paths, or the duration of level crossing delays, it is considered that the proposed increase in the number of weekly rail movements from the WCCM is acceptable, and would have a minimal impact on traffic.

4.4.10 Town and School Bus Services

Both town and school bus routes are located along the coal transportation routes. Whilst there are no dedicated pick-up and drop-off locations outside the townships of Werris Creek and Quirindi, it is noted that pick-ups and drop-offs still occur along the route depending particularly on the number of school children and their location.

It is recommended that pick-up and drop-off points be determined in consultation with school bus proprietors along the coal transportation route, as well as other stakeholders to prevent ad-hoc use of areas that may be unsuitable.

It is expected that the main impact on town and school bus services would be delays caused at level crossings due to increased numbers of train movements. Given that the LOM Project is only seeking to increase the approved rail movements from 9 (approved) to 11 trains per week, it is not anticipated that the Project would have any significant impact on delays to these services. Any delays experienced are not expected to exceed 4 minutes at the majority of the crossings.

4.4.11 Pedestrian and Cycling Activity

There is very limited pedestrian or cycling activity along the coal transportation routes outside the townships of Werris Creek and Quirindi. No pedestrian or cycling activity was witnessed outside these areas. On this basis, it is not anticipated that there would be any significant impact on pedestrian activity as a result of the increase in haulage from the proposed development.

5. RECOMMENDATIONS

The LOM Project would result in increased traffic volumes, to a varying extent, on the roads of the three coal transportation routes. Although road haulage volumes are increasing by 100%, it should be remembered that this only an average of eight additional truck movements per day.

Light vehicle access to and from the Project Site, with the exception of Escott Road and the associated intersection, would have a negligible impact on the road network.

The current coal transportation routes proposed for use have been reviewed based on their suitability to cater for:

- existing traffic without any haulage associated with the WCCM; and
- existing traffic with the proposed LOM Project haulage movements taken into consideration.

A summary of proposed road upgrades is provided in **Table 9** for the haulage routes and associated intersections with and without the LOM Project traffic.

Table 9
Summary of Proposed Road Upgrading Activities

Location	Recommendations	Responsibility
All	• All recommended road and intersection upgrades should be designed to accommodate B-Double use in accordance with Austroads. • Intersection upgrades should provide simplified traffic interaction and provide appropriate warning relating to the increased volume of heavy vehicles.	• Proponent/Council • Proponent
Escott Road	• Upgrade Escott Road to an 8m seal on a 10m formation, and upgrade the intersection with Werris Creek Road. • Improve stormwater drainage. • Improve road alignment. • Construction of a new light vehicle intersection to the Project Site. • Upgrades to the existing intersection of Escott Road with the existing Rail Load-out Road. • Upgrade two level crossings, designed and constructed in accordance with *AS 1742.7 Manual of Uniform Traffic Control Devices Part 7: Railway Crossings*.	• All of Escott Road is the Responsibility of the Proponent.
Werris Creek Road	• Excluding the existing intersections, this section of Werris Creek Road is considered to be suitable for the proposed increase in haulage.	• N/A

Location	Recommendations	Responsibility
Taylor's Lane	• Provide for 0.5m of sealed shoulder outside the 3.5m travelling Lanes (partially to improve safety but predominantly to protect the pavement and prevent edge break). • It is recommended that edge lines, to define the travelling Lanes and to try and keep the outer wheel path of heavy vehicles away from the shoulder, be provided. • It is recommended that property access at CH575 either be relocated or that appropriate advance warning signs be installed.	• All of Taylor's Lane Through S94 Contribution
Escott Road and Werris Creek Road Intersection	• Significant upgrade in line with the proposed upgrade of Escott Road is recommended. • The new intersection is proposed to be located in the vicinity of the existing intersection. • An acceleration Lane is recommended for laden vehicles turning right onto Werris Creek Road to enable laden haul vehicles to maintain and develop a reasonable speed thus providing a smoother merge into existing traffic. • A deceleration Lane in the form of a channelised right for vehicles approaching from Werris Creek is recommended to accommodate light vehicles and the small number of returning unladen haulage vehicles. Adequate storage capacity is required to ensure that the deceleration distance is suitable. • A deceleration Lane for vehicles turning left into Escott Road is recommended to prevent unnecessary impedance to through traffic. • Further investigation should be undertaken to ascertain the possibility of relocating the driveway access on Werris Creek Road adjacent to the intersection to a location along Escott Road. • All other alternative accesses to the Project Site should be closed to ensure all access is via the nominated coal transportation route.	• All of Escott Road is the Responsibility of the Proponent.

Location	Recommendations	Responsibility
Taylor's Lane and Werris Creek Road Intersection	• It would be considered preferable to have the nominated storage capacity and deceleration length as the length of one larger articulated vehicle is greater than the existing storage capacity. • Consideration should be given to relocating property access on Werris Creek Road directly opposite the Taylor's Lane Intersection to a more suitable location.	• Council / RTA / Proponent
Taylor's Lane and Kamilaroi Highway Intersection	• It is recommended that the intersection be upgraded to include an AUR to reduce the impact on through traffic. • It was noted on the site inspection that the barrier board opposite the intersection is not centred. This board should be centred, and a "Give Way Ahead" sign should be installed on Escott Road to provide advanced warning for the requirement to "Give Way".	• Council / RTA / Proponent

6. LOCAL GOVERNMENT, RTA AND DIRECTOR-GENERAL'S REQUIREMENTS

Table 10 describes the relevant authority's requirement and identifies the section or sections of this report that the requirement is addressed in.

Table 10
Local Government, RTA and Director General's Requirements

Government Agency	Paraphrased Requirement	Relevant EA Section(s)
Liverpool Plains Shire Council	**Road network impacts**	
	The proposed road works in the vicinity of the Escott Road - Werris Creek Road intersection will require careful planning given the topography of the locality which already dictates double centre lines in this area.	4.4.5
	Council's expectation in this regard would be: • Clear data on all vehicle movements and a current best practice proposal covering royalties payable to Council for-product movements by road. Two aspects require attention; the first being an upper limit for the amount of product to be moved by road and secondly an increase in the current royalty ($0.85/tonne plus CPI) paid to Council as it is not addressing the wear and tear on the roads (as current designated routes) in the Shire. The negotiated royalty (calculated primarily on the impact to Taylor's Lane) is insufficient to meet the cost of maintaining the deteriorating state of these routes and will need to cover other proposed transport routes within the Shire as discussed in the PEA.	4.4.5
	• A comprehensive traffic safety study from the project site to the surrounding road network especially detailing design improvements proposed to be undertaken by the Proponent to the new entrance off Escott Road, the upgrade of Escott Road and the upgrade of the Escott Road - Werris Creek Road intersection.	4.4.1, 4.4.5
	• A comprehensive assessment of the impact of two new road / rail crossings on Escott Road. Council's concerned that with the increased length of coal trains the potential exists for Escott Road to be blocked for long periods of time and seriously inconveniencing the neighbouring property…….	4.4.1

Table 11
Local Government, RTA and Director General's Requirements

Government Agency	Paraphrased Requirement	Relevant EA Section(s)
	Rail activity impacts	
Liverpool Plains Shire Council	The increased rail movements generated by the project will have a cumulative effect on the following problems already being experienced by Shire residents:	4.4.9
	• <u>Prolonged obstructions of the road network by trains at level crossings</u> Council is aware that proposals are being considered to permit longer coal trains to utilise the rail network. In some locations near level crossings the trains must also climb inclines that slow their progress The two crossings in Quirindi effectively cut the town in half and the two crossings In Werris Creek isolate the southern part of the Shire from the major medical service centre of Tamworth. Clearly any emergency services are compromised by this situation. Council would be pleased to see this issue addressed in the final PEA and what contribution the Proponent will be making toward an expedient solution……..	4.4.9
Roads & Traffic Authority	• The RTA would recommend that a traffic impact study should be undertaken to assess the impacts on road safety, traffic management and efficiency. The criteria listed in Table 2.1 of the RTA's – *Guide to Traffic Generating Developments* should be used as a guide. In addition the following matters need to be addressed. 1. The impact on the wider classified and local road network including infrastructure, junctions, sight distances, turning facilities, transport and road users. 2. Impact of road traffic noise, vibration and dust. 3. Consideration to rationalising accesses to the mine. 4. The provision of safe and efficient facilities for turning traffic at junctions and accesses on Werris Creek and Escott Road. 5. Contribution to the maintenance of the local road network. 6. Impact on town and school bus services. 7. Safe and efficient design of the internal road network, <u>parking areas and servicing areas.</u>	This Report
	• In assessing any facilities for road junctions or accessed AUSTROADS guidelines should be used to identify the relevant treatments required.	4
	• The creation of any new access to a classified road or the undertaking of road works will require approval and concurrence from the relevant road authorities.	4

APPENDIX A INSPECTION REPORT

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26/07/2010
Werris Creek Coal (Whitehaven)
Traffic Impact Study – Road Data

Note: pavement and shoulder widths have been estimated due to variation over length of route

CH Start (m)	CH Finish (m)	No. Of Lanes Each Direction (m)	Approx Lane Width	Approx Sealed Shoulder Width (m)	Notes
Werris Creek Road (Chainages commence at the northern boundary of LPSC)					
0	500	1	3.2	< 1.0	100 km/h zone
500	1100	1	?	?	currently under full width road works
1100	3900	1	3.2	< 1.0	80 km/h zone
3900	6700	1	3.2	< 1.0	100 km/h zone, pavement deformation at Davis Street Bridge
4400					rail crossing
6700	12500	1	3.5	0.5 - 1.0	100 km/h zone, isolated pavement failures, some sections have <0.5 Shoulder
12500	12800	1		0	100 km/h zone, no sealed shoulder
13200	15300	1	3.3	0.0 - 0.5	
15300	18000	1	3.2	> 0.5	
18000	18900	1	3.2		100 km/h zone, considerable pavement deformation
19100					60 km/h zone, rail crossing - acceptable for B Doubles
19100	19500	1	variable		60 km/h zone, variable Lane width, nth bound Lane is narrow?
19500	21400	1	< 3.1	< 0.3	
21990					100 km/h zone, rail crossing - will be relocated
22000	25900	1	3.2	> 0.5	
23600					100 km/h zone, Escott Road Intersection
25900	26600	1	3.2	< 0.5	100 km/h zone, pavement deformation and failure
29100					100 km/h zone, Paynes Road intersection
Taylor's Lane (Chainages commence at the intersection					
0	2100	1	3.5	0	Werris Creek Road Intersection, no Give Way sign, 100 km/h zone, Taylor's Lane, needs widening (for shoulders) Seal in good condition with the exception of two areas listed below, centreline faded, no RPPMS
500	1400				Several driveways on southern side of road some of them have poor sight

CH Start (m)	CH Finish (m)	No. Of Lanes Each Direction (m)	Approx Lane Width	Approx Sealed Shoulder Width (m)	Notes
					distance and are located too close to horizontal curves
800					0.5m^2 area of pavement failure on northern side of road
1700					0.5m^2 area of pavement failure on southern side of road
2100	4100	1	3.5	0	No warning of approach to Kamilaroi intersection when on Taylor's Lane, Barrier Board not centred in the intersection
					100 km/h zone, Taylor's Lane Intersection needs upgrade - further inspection required
Kamilaroi Highway - North of Taylor's Lane					
0	12900	1	3.2 - 3.5	0.5 - 1.0	Kamilaroi Highway 100 km/h zone, and 110 km/h
					Taylor's Lane Intersection needs upgrade - further inspection required
Kamilaroi Highway - South of Taylor's Lane					
0	10900	1	3.2 - 3.5		100 km/h zone, Quirindi
10900	11900	2	3.2		50 km/h
11900					T intersection in Quirindi
17700					100 km/h, of road rest area
21300	22600	1	3.2	0	no sealed shoulder
22600	26300	1	3.2	< 0.5	100 km/h
23000					100 km/h, of road rest area
26300					New England Highway intersection

APPENDIX B PRELIMINARY DESIGN FOR ESCOTT ROAD

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WHITEHAVEN COAL MINING Pty Ltd.
ESCOTT ROAD
INTERSECTION & ROAD IMPROVEMEMT

SHEET INDEX

SHEET No	DESCRIPTION
1	COVER SHEET/INDEX
2	GENERAL ARRANGEMENT
3	TYPICAL SECTIONS
4	DETAIL PLAN CH 00 - CH 140
5	DETAIL PLAN CH 140 - CH 500
6	DETAIL PLAN CH 500 - CH 840
7	DETAIL PLAN CH 840 - CH 1180
8	DETAIL PLAN CH 1180 - CH 1480
9	DETAIL PLAN CH 1480 - CH 1606.845
10	ACCESS ROAD INTERSECTION DETAIL PLAN
11	ESCOTT ROAD 4 WAY INTERSECTION DETAIL PLAN

LOCALITY SKETCH

REVISIONS

REV.	DATE	BY	DESCRIPTION	CHK.
E	29.06.2010	AB	ISSUE FOR REVISION	BR
D	18.06.2010	PG	ISSUE FOR REVISION	BR
C	21.05.2010	PG	ISSUE FOR REVISION	BR
B	22.04.2010	AB	ISSUE FOR REVISION	BR
A	22.03.2010	PG	DRAFT ISSUE	BR

Constructive Solutions
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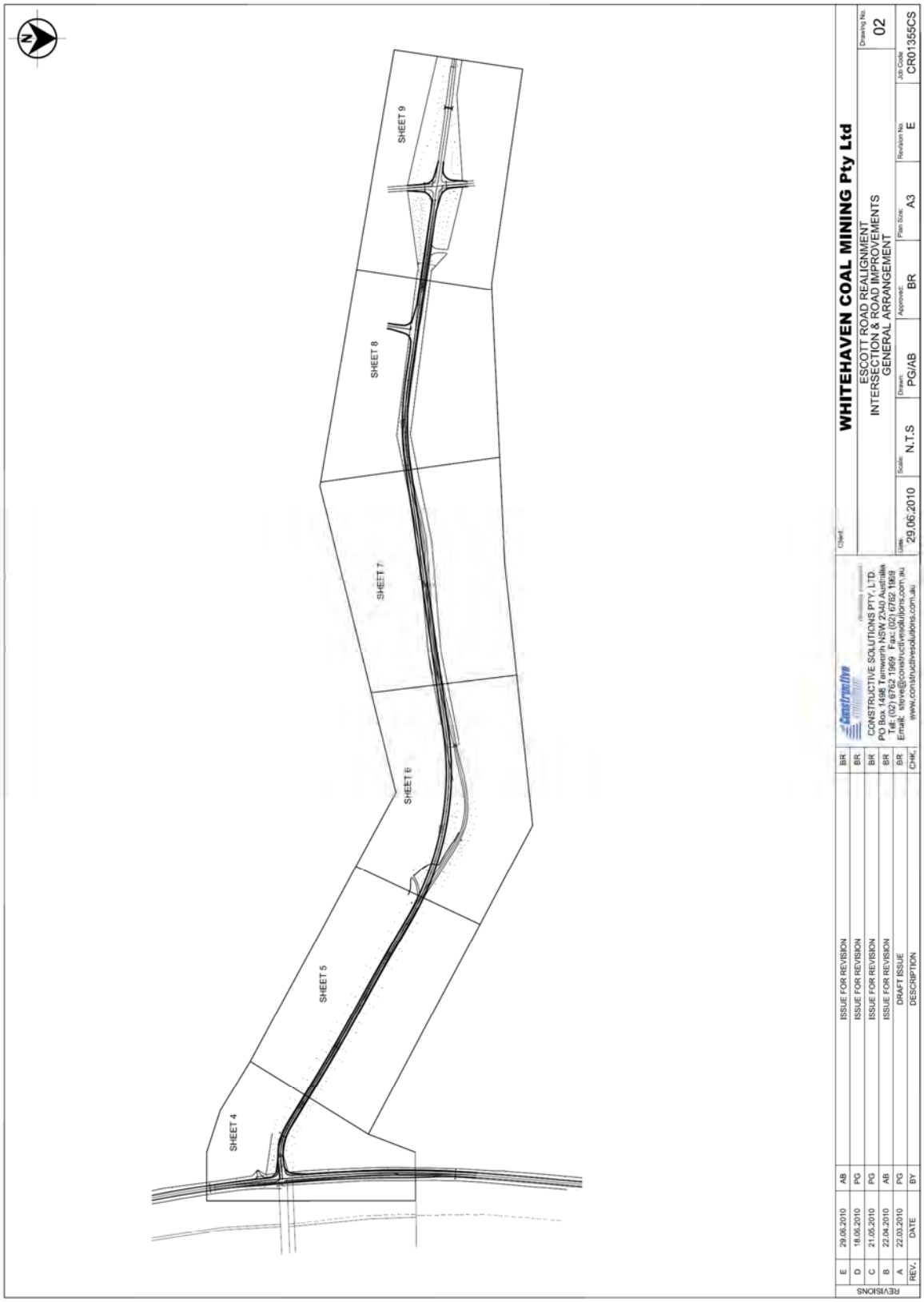
www.constructivesolutions.com.au

Client: **WHITEHAVEN COAL MINING Pty Ltd**

ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
COVER SHEET/SHEET INDEX

Date:	Scale:	Drawn:	Approved:	Plan Size:	Revision No.	Job Code	Drawing No.
29.06.2010	N.T.S	PG/AB	BR	A3	E	CR01355CS	01


SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
GENERAL ARRANGEMENT
Drawing No. 02
Date 29.06.2010
Scale N.T.S
Drawn PG/AB
Approved BR
Plan Size A3
Revision No. E
Job Code CR01355CS
CONSTRUCTIVE SOLUTIONS PTY. LTD.
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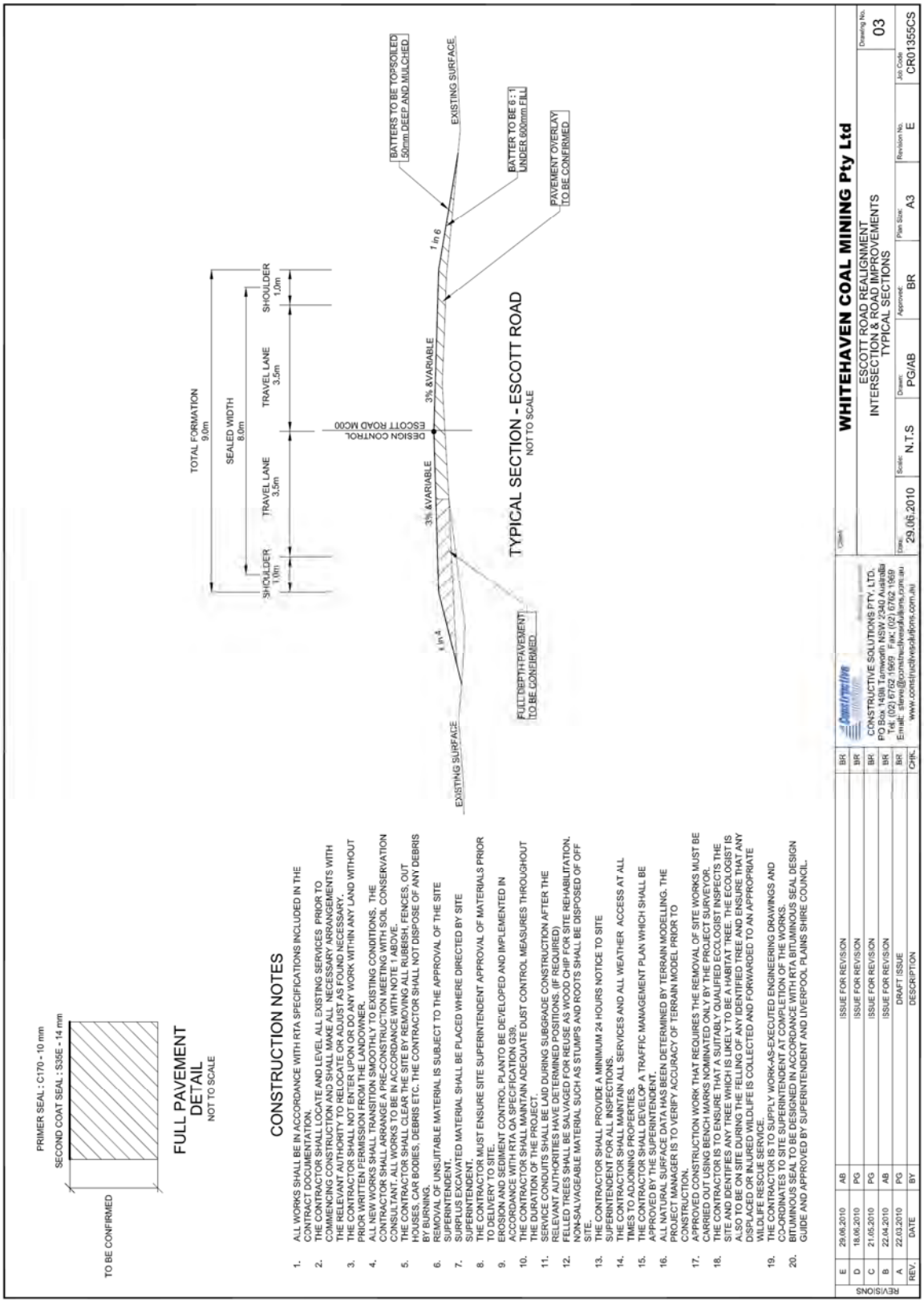
Email: steve@constructivesolutions.com.au
www.constructivesolutions.com.au
REVISIONS
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.03.2010 PG DRAFT ISSUE BR
REV. DATE BY DESCRIPTION CHK.


PRIMER SEAL : C170 - 10 mm
SECOND COAT SEAL : S35E - 14 mm
TO BE CONFIRMED
FULL PAVEMENT DETAIL
NOT TO SCALE
CONSTRUCTION NOTES
1. ALL WORKS SHALL BE IN ACCORDANCE WITH RTA SPECIFICATIONS INCLUDED IN THE CONTRACT DOCUMENTATION.
2. THE CONTRACTOR SHALL LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND SHALL MAKE ALL NECESSARY ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST AS FOUND NECESSARY.
3. THE CONTRACTOR SHALL NOT ENTER UPON OR DO ANY WORK WITHIN ANY LAND WITHOUT PRIOR WRITTEN PERMISSION FROM THE OWNER.
4. ALL NEW WORKS SHALL TRANSITION SMOOTHLY TO EXISTING CONDITIONS. THE CONTRACTOR SHALL ARRANGE A PRE-CONSTRUCTION MEETING WITH SOIL CONSERVATION CONSULTANT. ALL WORKS TO BE IN ACCORDANCE WITH NOTE 1 ABOVE.
5. THE CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES, OUT HOUSES, CAR BODIES, DEBRIS ETC. THE CONTRACTOR SHALL NOT DISPOSE OF ANY DEBRIS BY BURNING.
6. REMOVAL OF UNSUITABLE MATERIAL IS SUBJECT TO THE APPROVAL OF THE SITE SUPERINTENDENT.
7. SURPLUS EXCAVATED MATERIAL SHALL BE PLACED WHERE DIRECTED BY SITE SUPERINTENDENT.
8. THE CONTRACTOR MUST ENSURE SITE SUPERINTENDENT APPROVAL OF MATERIALS PRIOR TO DELIVERY TO SITE.
9. EROSION AND SEDIMENT CONTROL PLANTO BE DEVELOPED AND IMPLEMENTED IN ACCORDANCE WITH RTA QA SPECIFICATION G39.
10. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DUST CONTROL MEASURES THROUGHOUT THE DURATION OF THE PROJECT.
11. SERVICE CONDUITS SHALL BE LAID DURING SUBGRADE CONSTRUCTION AFTER THE RELEVANT AUTHORITIES HAVE DETERMINED POSITIONS. (IF REQUIRED)
12. FELLED TREES SHALL BE SALVAGED FOR REUSE AS WOOD CHIP FOR SITE REHABILITATION. NON-SALVAGEABLE MATERIAL SUCH AS STUMPS AND ROOTS SHALL BE DISPOSED OF OFF SITE.
13. THE CONTRACTOR SHALL PROVIDE A MINIMUM 24 HOURS NOTICE TO SITE SUPERINTENDENT FOR ALL INSPECTIONS.
14. THE CONTRACTOR SHALL MAINTAIN ALL SERVICES AND ALL WEATHER ACCESS AT ALL TIMES TO ADJOINING PROPERTIES.
15. THE CONTRACTOR SHALL DEVELOP A TRAFFIC MANAGEMENT PLAN WHICH SHALL BE APPROVED BY THE SUPERINTENDENT.
16. ALL NATURAL SURFACE DATA HAS BEEN DETERMINED BY TERRAIN MODELLING. THE PROJECT MANAGER IS TO VERIFY ACCURACY OF TERRAIN MODEL PRIOR TO CONSTRUCTION.
17. APPROVED CONSTRUCTION WORK THAT REQUIRES THE REMOVAL OF SITE WORKS MUST BE CARRIED OUT USING BENCH MARKS NOMINATED ONLY BY THE PROJECT SURVEYOR.
18. THE CONTRACTOR IS TO ENSURE THAT A SUITABLY QUALIFIED ECOLOGIST INSPECTS THE SITE AND IDENTIFIES ANY TREE WHICH IS LIKELY TO BE A HABITAT TREE. THE ECOLOGIST IS ALSO TO BE ON SITE DURING THE FELLING OF ANY IDENTIFIED TREE AND ENSURE THAT ANY DISPLACED OR INJURED WILDLIFE IS COLLECTED AND FORWARDED TO AN APPROPRIATE WILDLIFE RESCUE SERVICE.
19. THE CONTRACTOR IS TO SUPPLY WORK-AS-EXECUTED ENGINEERING DRAWINGS AND CO-ORDINATES TO SITE SUPERINTENDENT AT COMPLETION OF THE WORKS.
20. BITUMINOUS SEAL TO BE DESIGNED IN ACCORDANCE WITH RTA BITUMINOUS SEAL DESIGN GUIDE AND APPROVED BY SUPERINTENDENT AND LIVERPOOL PLAINS SHIRE COUNCIL.
TOTAL FORMATION 9.0m
SEALED WIDTH 8.0m
SHOULDER 1.0m
TRAVEL LANE 3.5m
TRAVEL LANE 3.5m
SHOULDER 1.0m
DESIGN CONTROL ESCOTT ROAD MC00
3% &VARIABLE
3% &VARIABLE
1 in 6
1 in 6
BATTERS TO BE TOPSOILED 50mm DEEP AND MULCHED
EXISTING SURFACE
BATTER TO BE 6 : 1 UNDER 600mm FILL
PAVEMENT OVERLAY TO BE CONFIRMED
EXISTING SURFACE
FULL DEPTH PAVEMENT TO BE CONFIRMED
TYPICAL SECTION - ESCOTT ROAD
NOT TO SCALE
REVISIONS
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.03.2010 PG DRAFT ISSUE BR
REV. DATE BY DESCRIPTION CHK
Constructive Solutions
CONSTRUCTIVE SOLUTIONS PTY. LTD.
PO Box 1498 Tamworth NSW 2340 Australia
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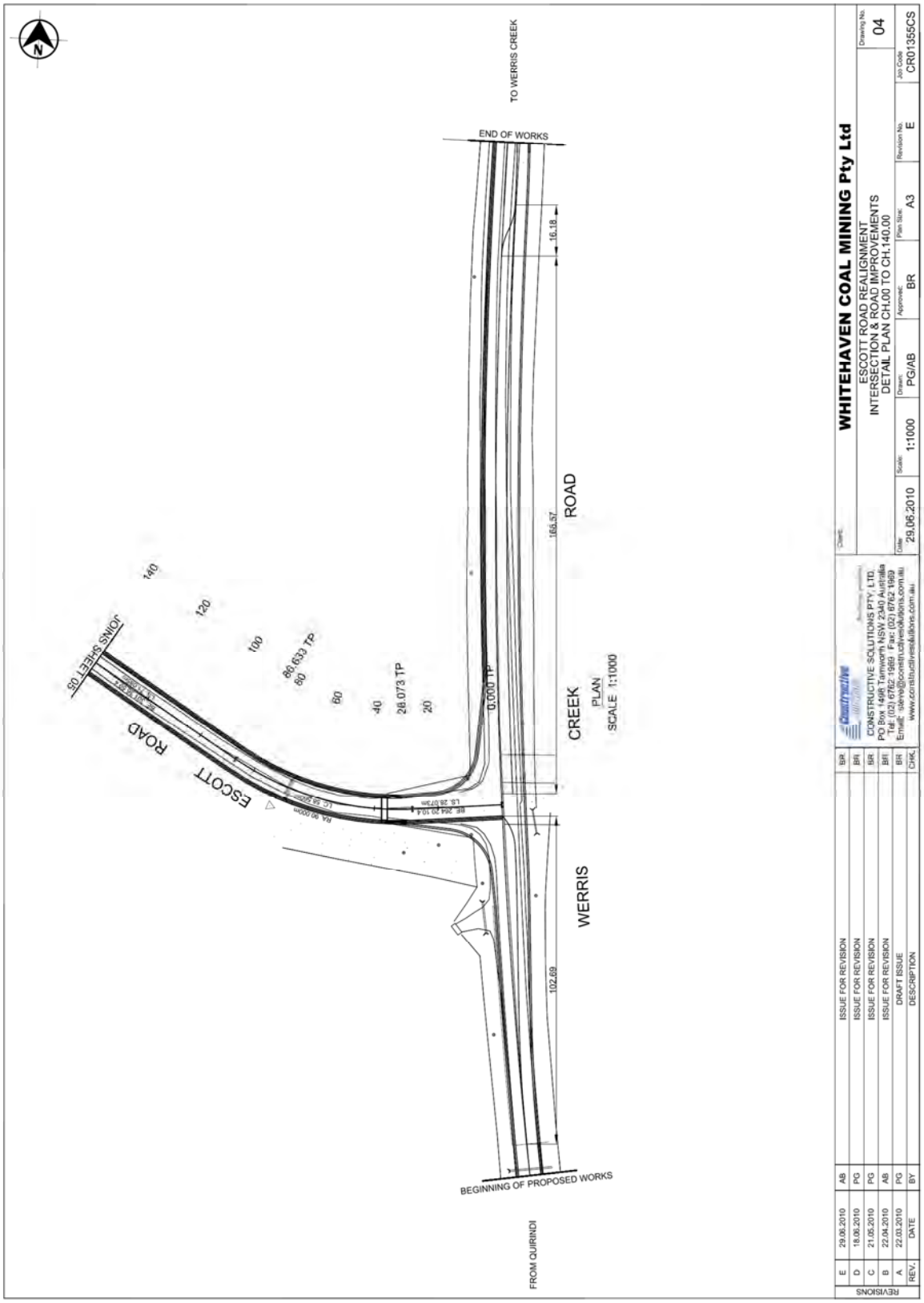
www.constructivesolutions.com.au
Client: WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
TYPICAL SECTIONS
Drawing No. 03
Date: 29.06.2010
Scale: N.T.S
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No. E
Job Code CR01355CS


TO WERRIS CREEK
END OF WORKS
16.18
166.57
ROAD
CREEK
PLAN
SCALE 1:1000
WERRIS
102.69
BEGINNING OF PROPOSED WORKS
FROM QUIRINDI
JOINS SHEET 03
ESCOTT ROAD
140
120
100
80
60
40
20
86.633 TP
28.073 TP
0.000 TP
WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.00 TO CH.140.00
Drawing No. 04
Job Code CR01355CS
Revision No. E
Plan Size: A3
Approved: BR
Drawn: PG/AB
Scale: 1:1000
Date: 29.06.2010
CONSTRUCTIVE SOLUTIONS PTY. LTD.
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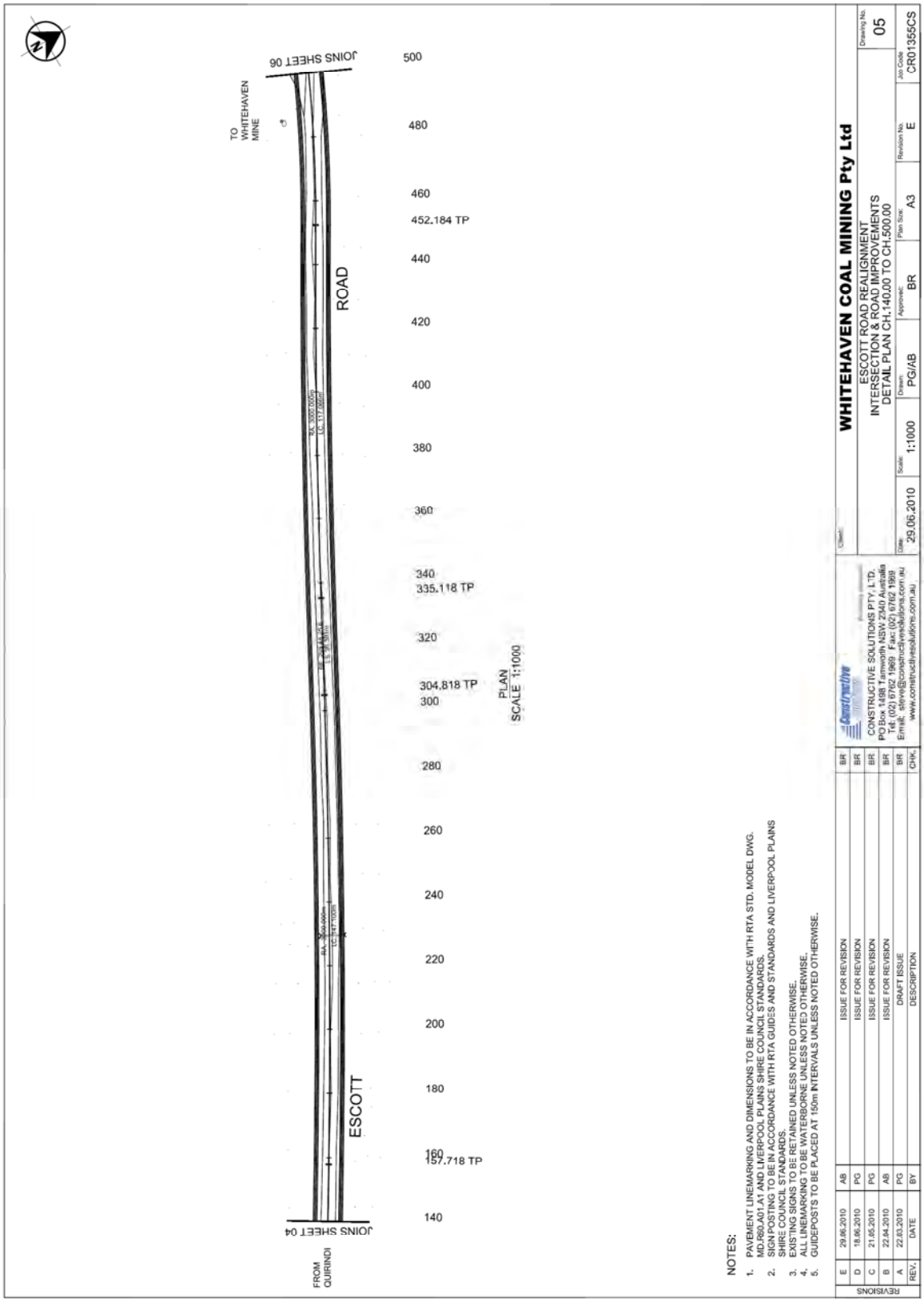
REVISIONS
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.01.2010 PG DRAFT ISSUE BR
REV. DATE BY DESCRIPTION CHK.


JOINS SHEET 06
TO WHITEHAVEN MINE
ROAD
ESCOTT
JOINS SHEET 04
FROM QUIRINDI
500
480
460
452.184 TP
440
420
400
380
360
340
335.118 TP
320
304.818 TP
300
280
260
240
220
200
180
160
157.718 TP
140
PLAN
SCALE 1:1000
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MD.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
2. SIGN POSTING TO BE IN ACCORDANCE WITH RTA GUIDES AND STANDARDS AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
3. EXISTING SIGNS TO BE RETAINED UNLESS NOTED OTHERWISE.
4. ALL LINEMARKING TO BE WATERBORNE UNLESS NOTED OTHERWISE.
5. GUIDEPOSTS TO BE PLACED AT 150m INTERVALS UNLESS NOTED OTHERWISE.
REVISIONS
REV. DATE BY DESCRIPTION CHK.
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.03.2010 PG DRAFT ISSUE BR
Constructive Solutions Pty Limited
CONSTRUCTIVE SOLUTIONS PTY. LTD.
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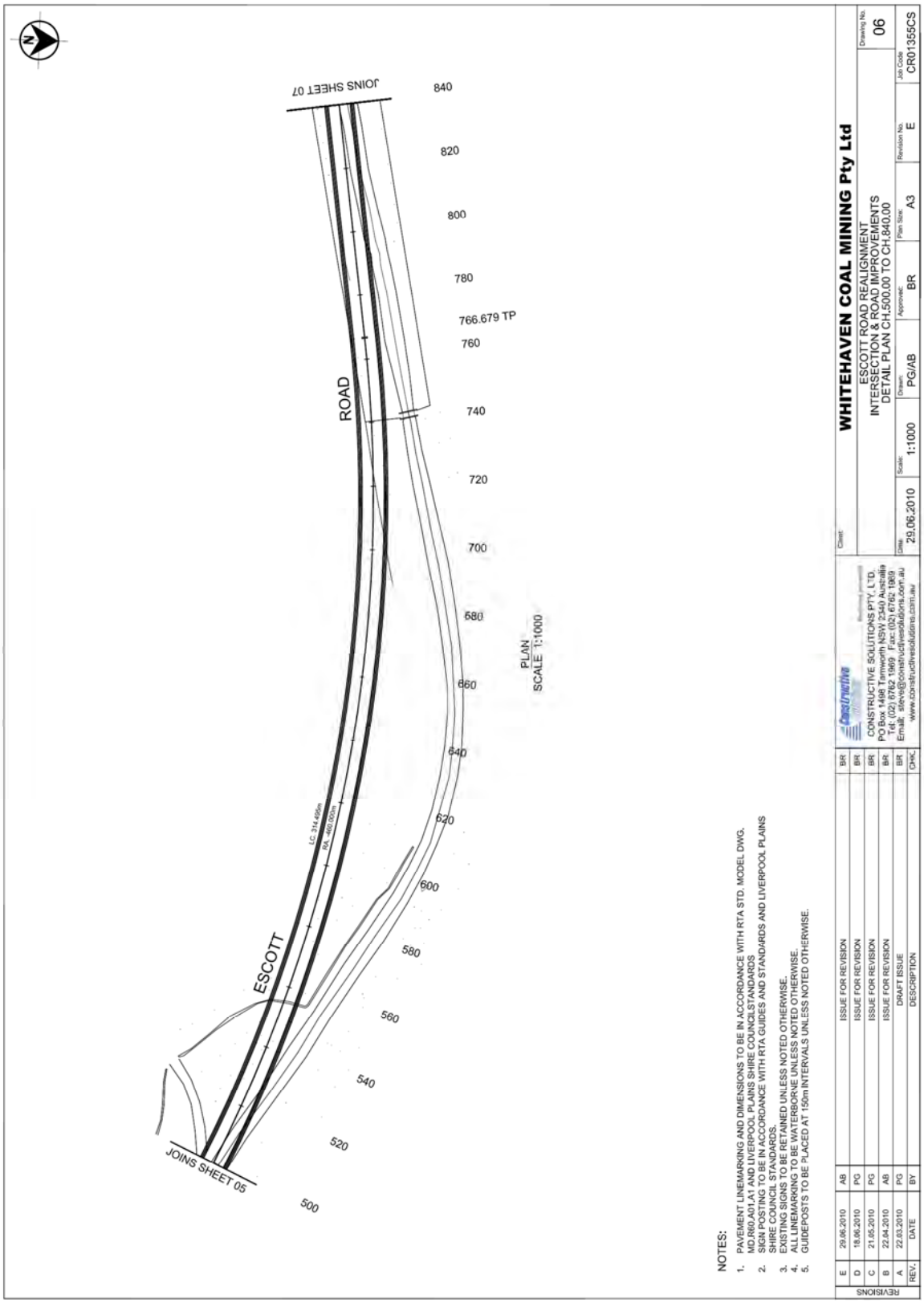
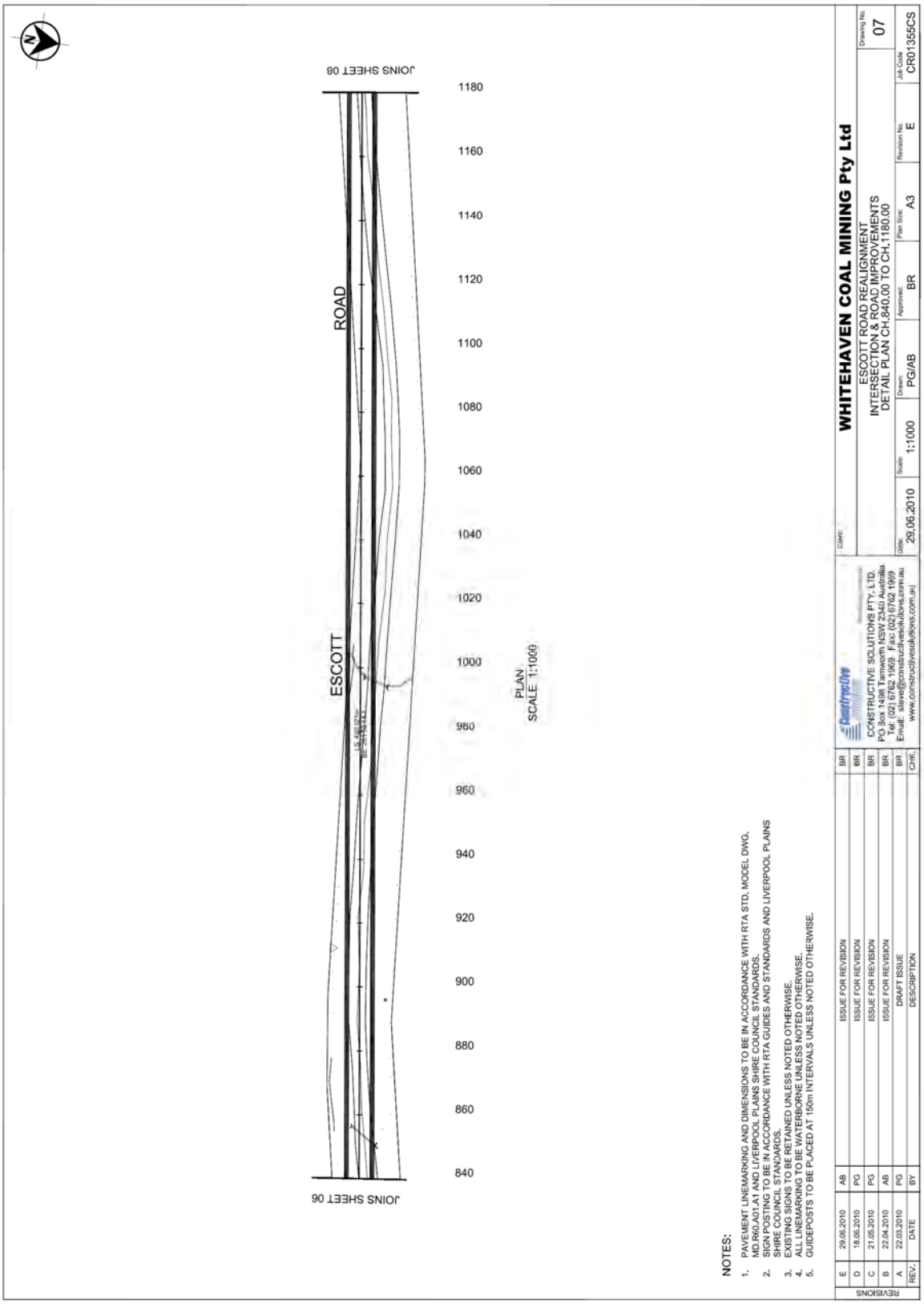
Email: steve@constructivesolutions.com.au
www.constructivesolutions.com.au
Client:
WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.1,140.00 TO CH.500.00
Date: 29.06.2010
Scale: 1:1000
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No.: E
Job Code: CR01355CS
Drawing No.: 05


JOINS SHEET 07
840
820
800
780
766.679 TP
760
740
720
700
680
660
640
620
600
580
560
540
520
500
ROAD
ESCOTT
JOINS SHEET 05
PLAN
SCALE 1:1000
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MD.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCILSTANDARDS
2. SIGN POSTING TO BE IN ACCORDANCE WITH RTA GUIDES AND STANDARDS AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
3. EXISTING SIGNS TO BE RETAINED UNLESS NOTED OTHERWISE.
4. ALL LINEMARKING TO BE WATERBORNE UNLESS NOTED OTHERWISE.
5. GUIDEPOSTS TO BE PLACED AT 150m INTERVALS UNLESS NOTED OTHERWISE.
REVISIONS
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.03.2010 PG DRAFT ISSUE BR
REV. DATE BY DESCRIPTION CHK
CONSTRUCTIVE SOLUTIONS PTY. LTD.
Client: WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.1500.00 TO CH.840.00
Date: 29.06.2010
Scale: 1:1000
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No. E
Job Code CR01355CS
Drawing No. 06


JOINS SHEET 08
ROAD
ESCOTT
1180
1160
1140
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
900
880
860
840
JOINS SHEET 08
PLAN
SCALE 1:1000
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MID.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
2. SIGNPOSTING TO BE IN ACCORDANCE WITH RTA GUIDES AND STANDARDS AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
3. EXISTING SIGNS TO BE RETAINED UNLESS NOTED OTHERWISE.
4. ALL LINEMARKING TO BE WATERBORNE UNLESS NOTED OTHERWISE.
5. GUIDEPOSTS TO BE PLACED AT 150m INTERVALS UNLESS NOTED OTHERWISE.
REVISIONS
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.03.2010 PG DRAFT ISSUE BR
REV. DATE BY DESCRIPTION CHK.
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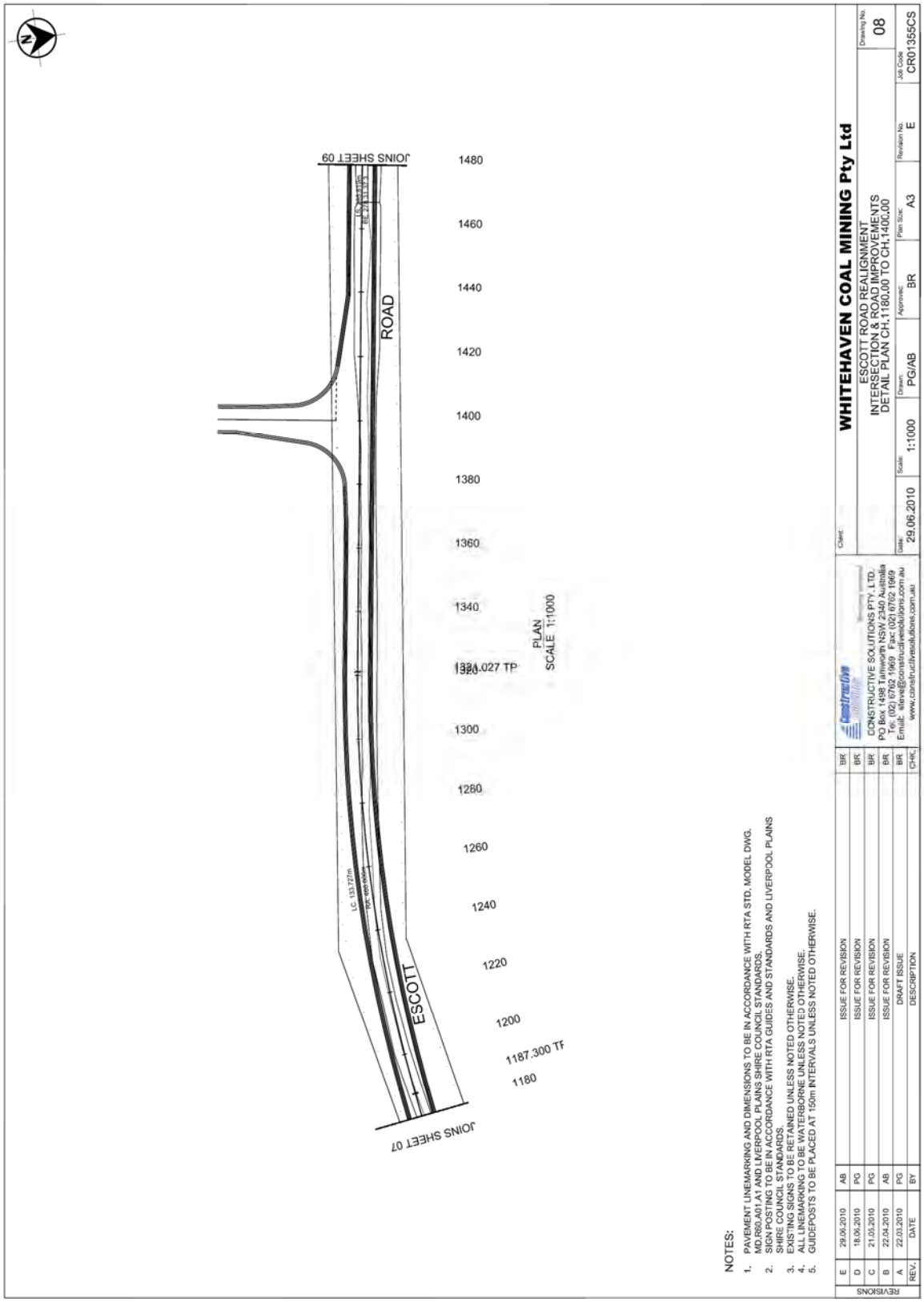
Client:
WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.840.00 TO CH.1180.00
Drawing No. 07
Date: 29.06.2010
Scale: 1:1000
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No. E
Job Code: CR01355CS


JOINS SHEET 09
JOINS SHEET 07
ROAD
ESCOTT
1480
1460
1440
1420
1400
1380
1360
1340
1320
1300
1280
1260
1240
1220
1200
1180
1187.300 TF
PLAN
SCALE 1:1000
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MD.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
2. SIGN POSTING TO BE IN ACCORDANCE WITH RTA GUIDES AND STANDARDS AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
3. EXISTING SIGNS TO BE RETAINED UNLESS NOTED OTHERWISE.
4. ALL LINEMARKING TO BE WATERBORNE UNLESS NOTED OTHERWISE.
5. GUIDEPOSTS TO BE PLACED AT 150m INTERVALS UNLESS NOTED OTHERWISE.
REVISIONS
REV. DATE DESCRIPTION CHK
A 22.03.2010 PG DRAFT ISSUE BR
B 22.04.2010 AB ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
D 18.09.2010 PG ISSUE FOR REVISION BR
E 29.06.2010 AB ISSUE FOR REVISION BR
CONSTRUCTIVE SOLUTIONS PTY. LTD.
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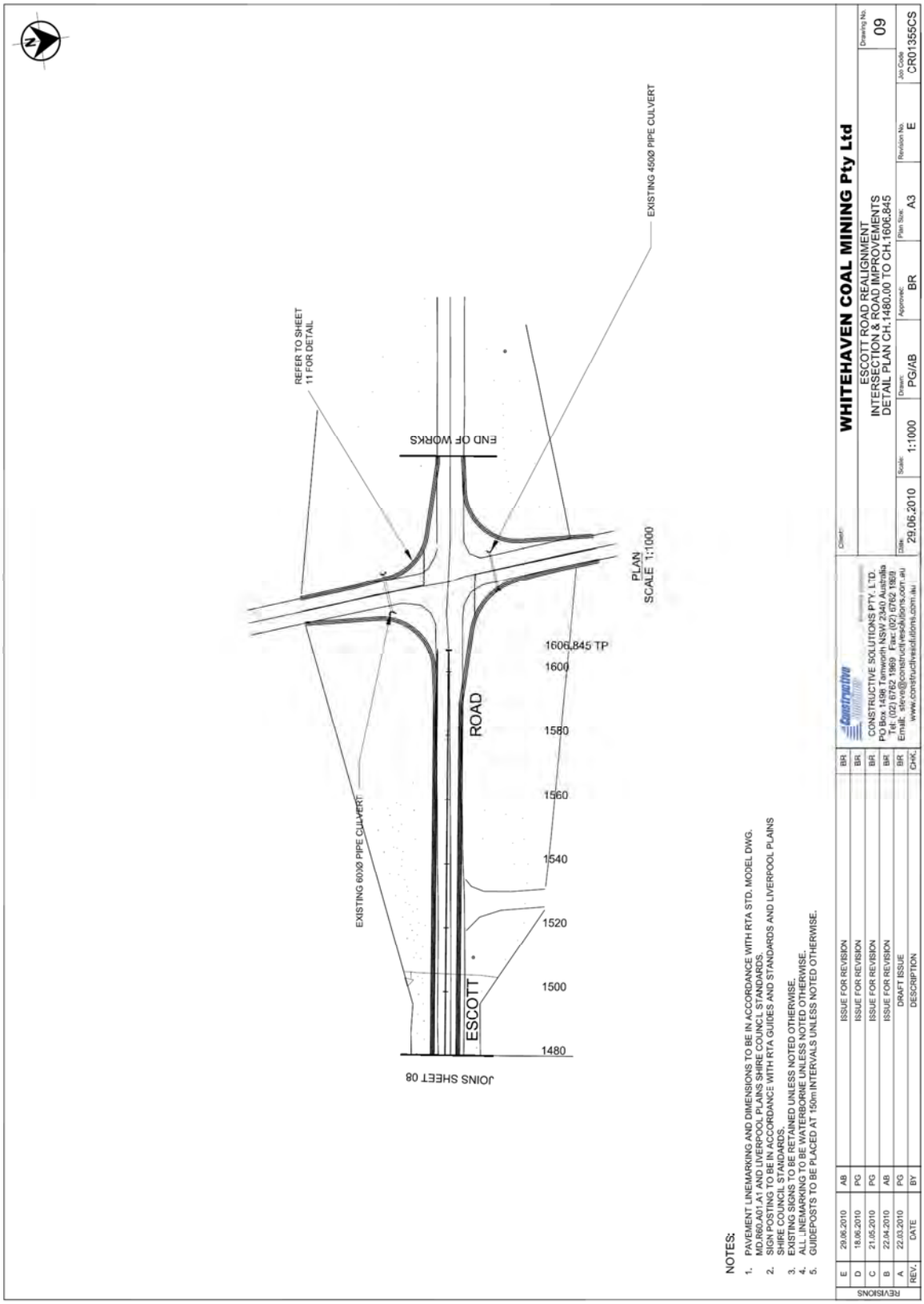
Email: steve@constructivesolutions.com.au
www.constructivesolutions.com.au
Client: WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.1180.00 TO CH.1400.00
Date: 29.06.2010
Scale: 1:1000
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No. E
Drawing No. 08
Job Code CR01355CS


N
REFER TO SHEET 11 FOR DETAIL
EXISTING 45000 PIPE CULVERT
END OF WORKS
PLAN
SCALE 1:1000
1606.845 TP
1600
1580
1560
1540
1520
1500
1480
ROAD
ESCOTT
EXISTING 60X0 PIPE CULVERT
JOINS SHEET 08
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MD.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
2. SIGN POSTING TO BE IN ACCORDANCE WITH RTA GUIDES AND STANDARDS AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
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REVISIONS
REV. DATE BY DESCRIPTION CHK.
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.03.2010 PG DRAFT ISSUE BR
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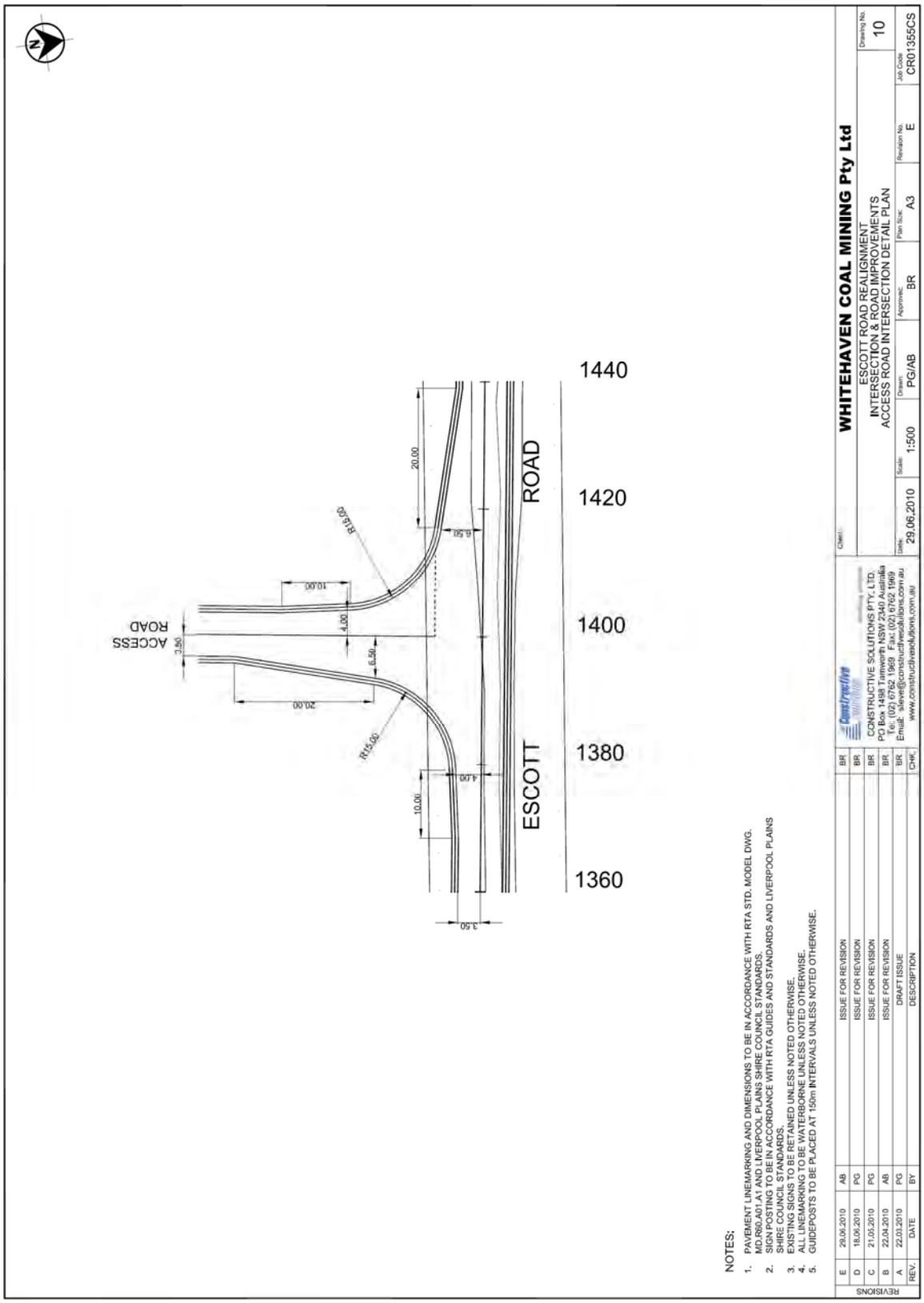
www.constructivesolutions.com.au
Client: WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.1480.00 TO CH.1606.845
Date 29.06.2010
Scale 1:1000
Drawn PG/AB
Approved BR
Plan Size A3
Revision No. E
Drawing No. 09
Job Code CR01355CS


1440
1420
1400
1380
1360
ESCOTT ROAD
ACCESS ROAD
R15.00
R15.00
20.00
10.00
6.50
4.00
3.50
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MD.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
2. SIGN POSTING TO BE IN ACCORDANCE WITH RTA GUIDES AND STANDARDS AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
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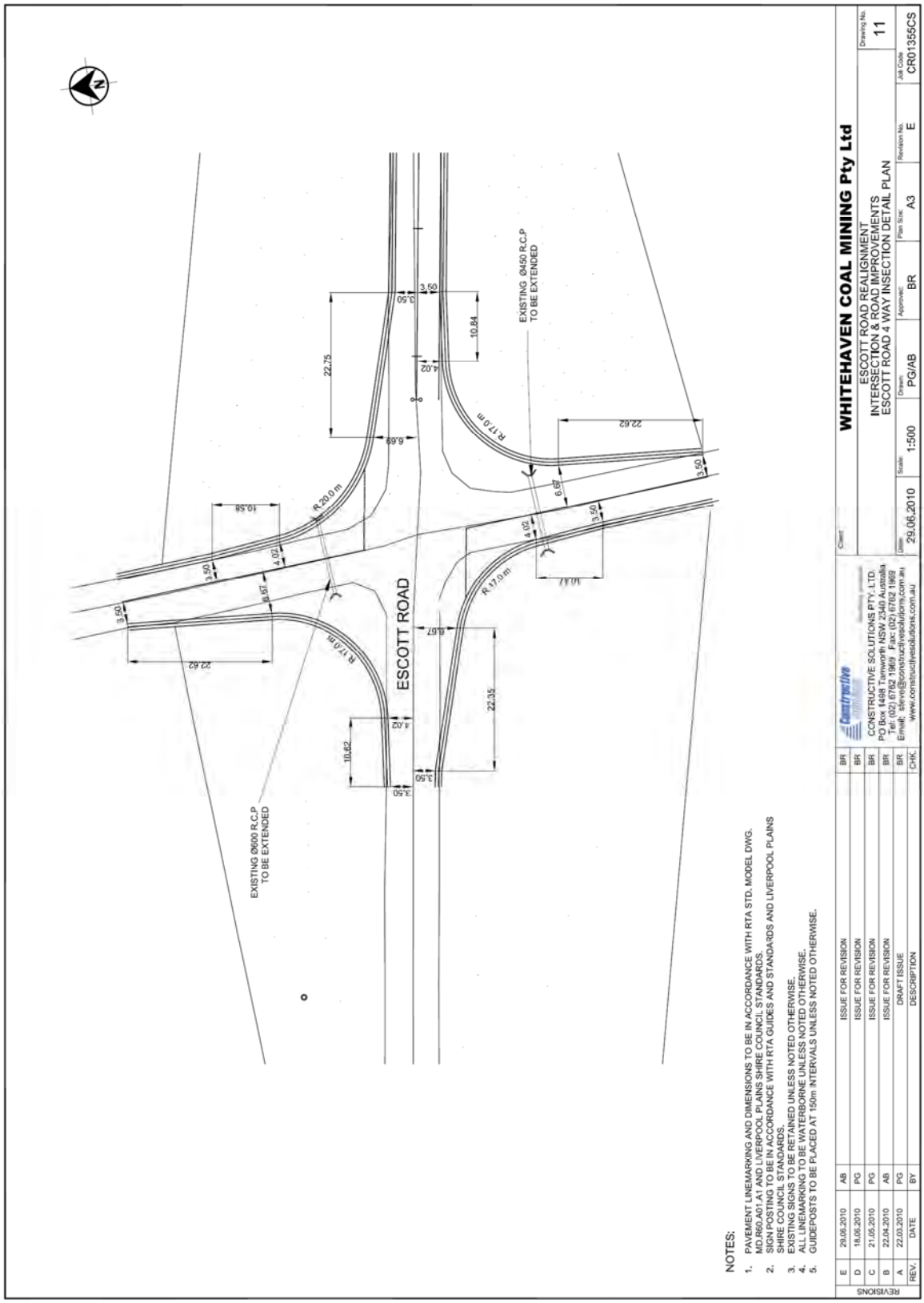
5. GUIDEPOSTS TO BE PLACED AT 150m INTERVALS UNLESS NOTED OTHERWISE.
REVISIONS
E 29.06.2010 AB ISSUE FOR REVISION BR
D 18.06.2010 PG ISSUE FOR REVISION BR
C 21.05.2010 PG ISSUE FOR REVISION BR
B 22.04.2010 AB ISSUE FOR REVISION BR
A 22.01.2010 PG DRAFT ISSUE BR
REV. DATE BY DESCRIPTION CHK
Constructive
CONSTRUCTIVE SOLUTIONS PTY. LTD.
PO Box 1498 Tamworth NSW 2340 Australia
Tel: (02) 6762 1969 Fax: (02) 6762 1969
Email: Steve@constructivesolutions.com.au
www.constructivesolutions.com.au
Client: WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
ACCESS ROAD INTERSECTION DETAIL PLAN
Date: 29.06.2010
Scale: 1:500
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No. E
Job Code: CR01355CS
Drawing No. 10


ESCOTT ROAD
EXISTING Ø450 R.C.P TO BE EXTENDED
EXISTING Ø600 R.C.P TO BE EXTENDED
R.20.0 m
R.17.0 m
R.17.0m
22.75
22.62
22.35
10.84
10.58
10.62
10.47
3.50
4.02
6.67
6.69
5.02
NOTES:
1. PAVEMENT LINEMARKING AND DIMENSIONS TO BE IN ACCORDANCE WITH RTA STD. MODEL DWG. MD.R60.A01.A1 AND LIVERPOOL PLAINS SHIRE COUNCIL STANDARDS.
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REV. DATE BY DESCRIPTION CHK
Constructive
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ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
ESCOTT ROAD 4 WAY INSECTION DETAIL PLAN
Date: 29.06.2010
Scale: 1:500
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No.: E
Drawing No.: 11
Job Code: CR01355CS

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APPENDIX C S94 CONTRIBUTION - EQUIVALENT STANDARD AXELS

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Total Vehicles During Survey (33 Days)	10074			
Total Heavy Vehicles During Survey (33 Days)	1994			
AADT (based on 33 days data collection)	305.3			

Total Vehicles Annually Based on Survey Data	111424.5		
Total Heavy Vehicles Annually Based on Survey Data	22054.5	Total ESA's	65932.3
Percent Heavy Vehicles	20%		
HV AADT (based on 33 days data collection)	60.4	HV ESA AADT	199.8

Traffic Data taken between 10th February 2009 and 19th March 2009 (33 days)

Current Werris Creek Haul Vehicles	8	per day	2080	per annum
Proposed Werris Creek Haul Vehicles	16	per day	4160	per annum

Pavement Life - 20 year, 1.5% Growth with traffic detail as above	
Calculated Overall ESA	1.52E+06
Calculated WCCM ESA	9.82E+04
Percent of WCCM wear on pavement	#REF!

Vehicle Class	Vehicle Description	Traffic No. during survey	Traffic No. / annum	ESA/Vehicle (ESA = 8.2T)	ESA's / annum	WCCM No. / annum	WCCM ESA (current)	ESA (Total - WCCM)	WCCM No. / annum (forecast)	WCCM ESA (forecast)	Forecast ESA	Current % WCCM	Proposed % WCCM	Proposed overall % HV
1	Car	7710	85277.3		0									
2	Car & Trailer	370	4092.4		0									
3	Two axle truck	591	6705.0	2	13410									
4	Three axle truck	103	1139.2	2	2278.5									
5	Four axle truck	74	818.5	3	2455.5									
6	Three axle articulated truck	14	154.8	3	464.5									
7	Four axle articulated truck	23	254.4	3	763.2									
8	Five axle articulated truck	42	464.5	3	1393.6									
9	Six axle articulated truck	541	5983.8	3	17951.4									
10	B Double (truck & stag)	629	6957.1	4	27828.5	2080	8320	19508.5	4160	16640				
11	Double road train - eleven axle	7	77.4	5	387.1									
	Totals	10074	111425		65932	2080	8320	57612	4160	16640	74252	14.44%	22.41%	21.28%
	20 Year Design Traffic (ESA)													

Design Traffic Calculator - For Taylors Lane (Werris Creek Coal)

Based on a 20 year life and 3.0 HVAG

Formula for calculation of Cumulative Growth Factor (CGF)

$CGF = [(1+0.01R)^P-1]/(0.01R)$

Where; R = Annual Growth 1.50 P = Design Life Period (Y 20

$CGF = [(1+0.01R)^P-1]/(0.01R)$
CGF = [(1+0.01*1.5)^20-1]/(0.01*1.5)
CGF = 23.1236671

Formula for calculation of design traffic (N_{DT})

$N_{DT} = 365 \times (AADT^{*}DF) \times \%HV/100 \times N_{HVAG} \times LDF \times CGF$

Where; NDT = Design Traffic, AADT = Annual Average Daily Traffic,
DF = Direction Factor, LDF = Lane Distribution Factor, CGF = Cumulative Growth Factor

AADT =	**305**	Based on AADT data as supplied by LPSC
DF =	0.5	Based on equal traffic both ways
LDF =	1	Based on one lane in each direction
CGF =	23.1236671	Based on Cumulative Growth of 1.5%
N_{HVAG} =	3	Based on Presumptive Value for B Doubles
%HV/100 =	**0.20**	Based on AADT data as supplied by LPSC

$N_{DT} = 365 \times (AADT^{*}DF) \times \%HV/100 \times N_{HVAG} \times LDF \times CGF$
.= 772963.23
NDT = 7.73E+05

TLD for Damage Index from Part 2 Table 7.8
DESA = ESA/HVAG x NDT **ESA/HVAG 0.9**
DESA = 1.7E+06 Presumptive Value - Austroads

DSARm = SARm/ESA x DESA Damage Index from Part 2 Table F2
DSARm = **1.83E+06** **SARm/ESA 1.1**
Presumptive Value - Austroads

Lowest CBR % value (4 day soak) 3.0

Based on Design Traffic (DESA) of 1.66E+06 and a CBR of 3.0
the minimum thickness of the pavement material is 544.8 mm

Based on Design Traffic (DSARm) 1.83E+06 and a CBR of 3.0
the minimum thickness of the pavement material is 550.3 mm

Design Traffic Calculator - For Taylors Lane (Werris Creek Coal)

Based on a 20 year life and 3.0 HVAG

Formula for calculation of Cumulative Growth Factor (CGF)

$CGF = [(1+0.01R)^P-1]/(0.01R)$

Where; R = Annual Growth (% **0.00** P = Design Life Period (Y **20**

$CGF = [(1+0.01R)^P-1]/(0.01R)$
CGF = [(1+0.01*5)^20-1]/(0.01*5)
CGF = 20.00190011

Formula for calculation of design traffic (N_{DT})

N_{DT} = 365 x (AADT*DF) x %HV/100 x N_{HVAG} x LDF x CGF

Where; NDT = Design Traffic, AADT = Annual Average Daily Traffic,
DF = Direction Factor, LDF = Lane Distribution Factor, CGF = Cumulative Growth Factor

AADT =	**16**	Based on AADT data as supplied by LPSC
DF =	0.5	Based on equal traffic both ways
LDF =	1	Based on one lane in each direction
CGF =	20.00190011	Based on Cumulative Growth of 1.5%
N_{HVAG} =	3	Based on Presumptive Value for B Doubles
%HV/100 =	**1.00**	Based on AADT data as supplied by LPSC

N_{DT} = 365 x (AADT*DF) x %HV/100 x N_{HVAG} x LDF x CGF
.= 175216.65
N_{DT} = 1.75E+05

TLD for Damage Index from Part 2 Table 7.8
DESA = ESA/HVAG x NDT — **ESA/HVAG** **0.9**
DESA = 1.58E+05 — Presumptive Value - Austroads

DSARm = SARm/ESA x DESA — Damage Index from Part 2 Table F2
DSARm = 1.73E+05 — **SARm/ESA** **1.1**
Presumptive Value - Austroads

Lowest CBR % value (4 day soak) 5.0

Based on Design Traffic (DESA) of 1.58E+05 and a CBR of 5.0
the minimum thickness of the pavement material is 311.4 mm

Based on Design Traffic (DSARm) o 1.73E+05 and a CBR of 5.0
the minimum thickness of the pavement material is 315.5 mm

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APPENDIX D S94 CONTRIBUTION - BRING FORWARD COST METHOD

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S94 CONTRIBUTION - BRING FORWARD COST METHOD

PROJECT **Werris Creek Coal Mine - Taylors Lane**

PURPOSE Assess the tonnage rate associated with the haulage of coal by WCCM

DATE Sep-10

GENERAL ROAD CHARACTERISTICS		
Road Length		4100 m
Seal Width		7 m
Formation Width		9 m
Pavement Area		36900 sq. m
ESTIMATED REPLACEMENT COSTS (2010)		
Sq. m Rate (in 2010 dollars)		$48 per sq. m
Km Rate (in 2010 dollars)		420,000 per km
Replacement Cost (Sq. m Rate - Council Figure inc. maintenance)	$	1,771,200
Replacement Cost (km Rate) inc. Maintenance	$	1,722,000
CONSTRUCTION YEAR, PAVEMENT DESIGN & PAVEMENT DEPTH		
Year of Construction		1998
Presumed Pavement Design Life		20 years
Design ESA's (Council figure)		200000 ESA's
Current Year		2010
Remaining ESA's (prorata)		80000 ESA's
Assumed Pavement Depth (Based on Council's calculations)		300 mm

EXISTING AND PROPOSED DEVELOPMENT TRAFFIC (used BIN chart to establish current ESA's - refer to other worksheet)			
Existing ESA's (March 2009)		6.6E+04	ESA's pa
less WCCM haulage at this time		8.3E+03	ESA's pa
Net ESA's (excluding WCCM haulage)		5.8E+04	ESA's pa
Net ESA's to theoretical design life (2018 - no growth)*		**4.6E+05**	ESA's
Proposed Haulage ESA's		**1.7E+04**	**ESA's pa**
Theoretical Life with Haulage*		6.2	years
Bring Forward		1.8	years
Bring Forward Cost assuming 7% inflation	$	347,633	
Tonnage for 6.2 years		589683	t
Rate / tonne based on BFC	**$**	**0.59**	**$/tonne**

*Note: this calculation is normally done by calculating against the theoretical design life ESA's and seeing what the reduction in design life is from this point forward. Using this methodology the road should have failed a long time ago. The pavement is either sitting over a good subgrade, or the pavement thickness is deeper than anticipated or the subgrade was stabilised at construction. As an alternative measure it has been presumed that without WCCM traffic the road would easily reach its pavement design life (2018). This is supported by the fact that Council resealed the road which would normally not be undertaken if the road required rehabilitation within 10 years

APPENDIX E S94 CONTRIBUTION - BASED ON % OF LIFE CYCLE COSTS

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S94 CONTRIBUTION - BASED ON % OF LIFE CYCLE COSTS

This approach has been taken to provide an alternative method for working out a suitable rate for s94 contribution as a comparison for the BFC methodology. The approach is to assume that the haulage vehicle should share a % of the total life cycle cost based on % of ESA's. The cost are shown in todays dollars. The WCCM LOM ties in with the standard design life of a pavement

ASSUMPTIONS FOR REHABILITATION		
Required Pavement Depth	550	mm
Existing Pavement	300	mm
Required Overlay	250	mm
Presumed Seal Width	8	m
Presumed Pavement Width (widening assumed on one side)	9	m

CAPITAL COST OF REHABILITATION			
Select Fill in Widening	$	35	per cu. m
Sub base	$	75	per cu. m
Base	$	95	per cu. m
Seal (Primer followed by Double Double)		14	per sq. m
Cost Select Fill in Widening (assume 1m deep by 2m wide one side)	$	287,000	
Cost DGS20 (125mm by average of 10.5m wide)	$	345,938	
Cost DGB20	$	462,531	
Cost Seal	$	459,200	
Other (traffic control, stormwater, driveways, signage, linemarking)	$	150,000	
Total Capital Cost	**$**	**1,704,669**	

NON RECURRING (ONE OFF) COSTS			
Reseal at approx 10 years (single in todays dollars)	$	6	per sq. m
Cost Reseal	$	196,800	
Heavy Patching (various years, in todays dollars)	$	85	per sq. m
Cost of Heavy Patching (assume 15% of pavement area)	$	418,200	
Total Non Recurring Costs	**$**	**615,000**	
ANNUAL MAINTENANCE (AND OTHER) COSTS			
Patching (assume 100hrs pa at 180 per hour)	$	18,000	
Shoulder Grading (10 hours pa grader roller watercart 400 per hour)	$	4,000	
Other (weed spraying sign maintenance, drainage etc)	$	5,000	
Overheads	$	2,500	
Total Annual Maintenance Costs (over 20 years)	**$**	**590,000**	
CALCULATION OF TONNAGE RATE BASED ON PRORATA SHARE			
Total Life Cycle Cost	$	2,909,669	
DESA (excluding haulage for 20 years)		1.3E+06	
DESA (Haulage 20 years)		3.3E+05	ESA
DESA (total)		1.7E+06	ESA
% of DESA resulting from haulage		20%	
Share of Total Life Cycle Cost based on Prorata of DESA	$	581,595.21	
Tonnage over 20 years		1900000	
Rate / tonne based on % of Life Cycle Costs	$	0.31	

APPENDIX F S94 CONTRIBUTION - S94 CONTRIBUTION - CAPEX METHOD

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S94 CONTRIBUTION - CAPEX METHOD

This approach has been taken to provide an alternative method for working out a suitable rate for s94 contribution as a comparison for the BFC methodology. The approach is to assume that if a reconstruction was undertaken at the time of consent what would the pavement overlay consist of. This comparison is considered pertinent as the design life of the pavement ties in with the LOM and is simpler than the BFC method.

THEORETICAL PAVEMENT THICKNESS WITHOUT HAULAGE			
Design Life		20	years
Presumed Growth		2%	pa
Current Nett ESA's (excluding WCCM haulage)		**5.8E+04**	ESA's pa
DESA		1.3E+06	ESA
Pavement Thickness (assume CBR 3)		530	mm
THEORETICAL PAVEMENT THICKNESS WITH HAULAGE			
Design Life		20	years
Presumed Growth		2%	pa
Current Nett ESA's (excluding WCCM haulage)		**5.8E+04**	ESA's pa
DESA (excluding haulage)		1.3E+06	ESA
DESA (Haulage 20 years)		3.3E+05	ESA
DESA (total)		1.7E+06	ESA
Pavement Thickness (assume CBR 3)		550	mm
ESTIMATED COST OF PROVIDING ADDITIONAL PAVEMENT			
Estimated Volume of Additional Pavement Material		738	cu. m
Assumed Cost of Material (placed insitu DGB20)	$	140	per cu. m
Additional Pavement Material	$	103,320.00	
Seal (initial primer and two coat seal)	$	14	per sq. m
New Seal	$	459,200	
TOTAL	**$**	**562,520.00**	
Tonnage over 20 years		1900000	
Rate / tonne based on upfront CAPEX	$	0.30	

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APPENDIX G CONCEPTUAL DESIGN

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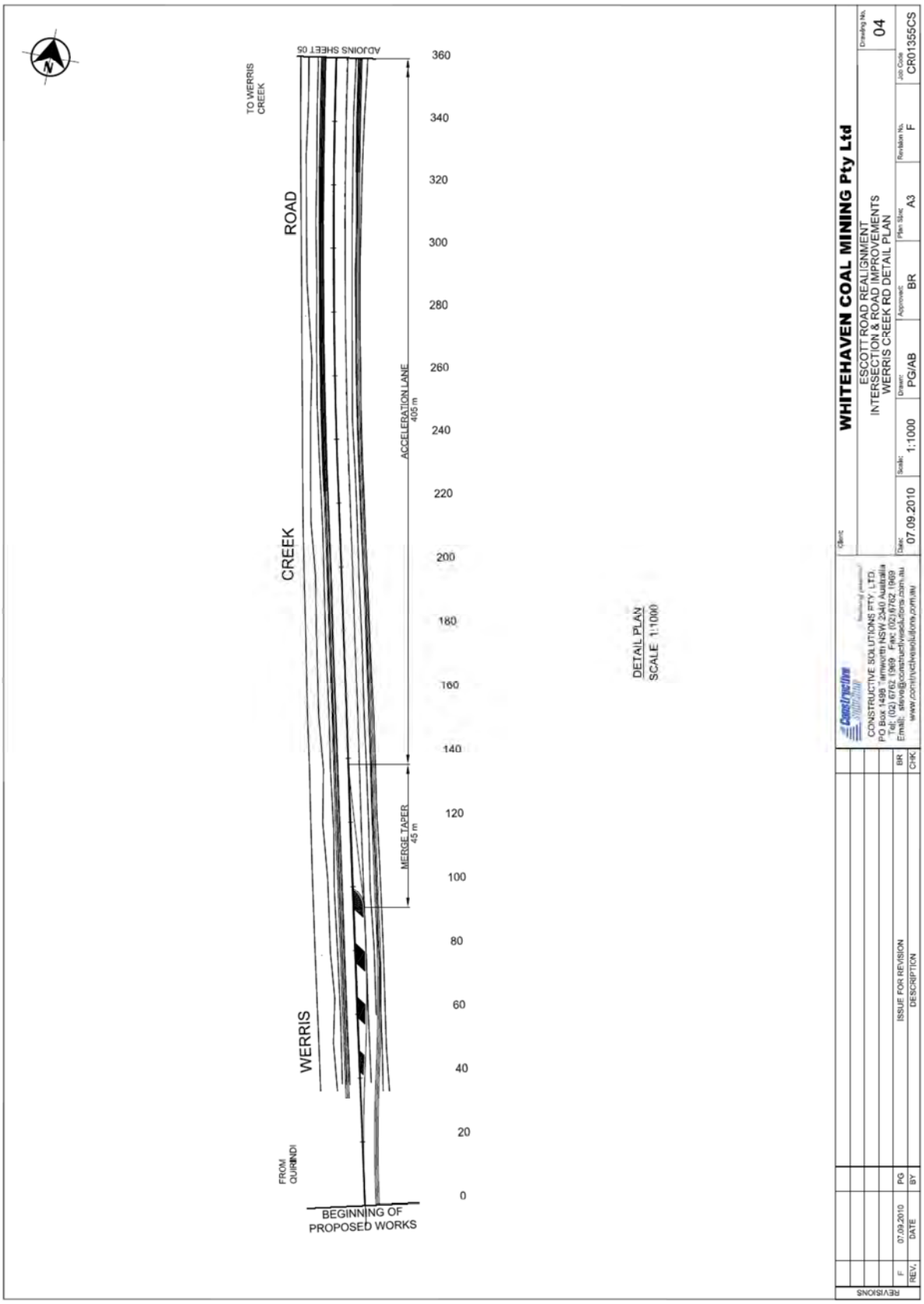
ADJOINS SHEET 05
TO WERRIS CREEK
ROAD
CREEK
WERRIS
FROM QUIRINDI
ACCELERATION LANE 405 m
MERGE TAPER 45 m
BEGINNING OF PROPOSED WORKS
360
340
320
300
280
260
240
220
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180
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140
120
100
80
60
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DETAIL PLAN
SCALE 1:1000
WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
WERRIS CREEK RD DETAIL PLAN
Drawing No. 04
Job Code CR01355CS
Revision No. F
Plan Size A3
Approved: BR
Drawn: PG/AB
Scale: 1:1000
Date: 07.09.2010
Client:
CONSTRUCTIVE SOLUTIONS PTY. LTD.
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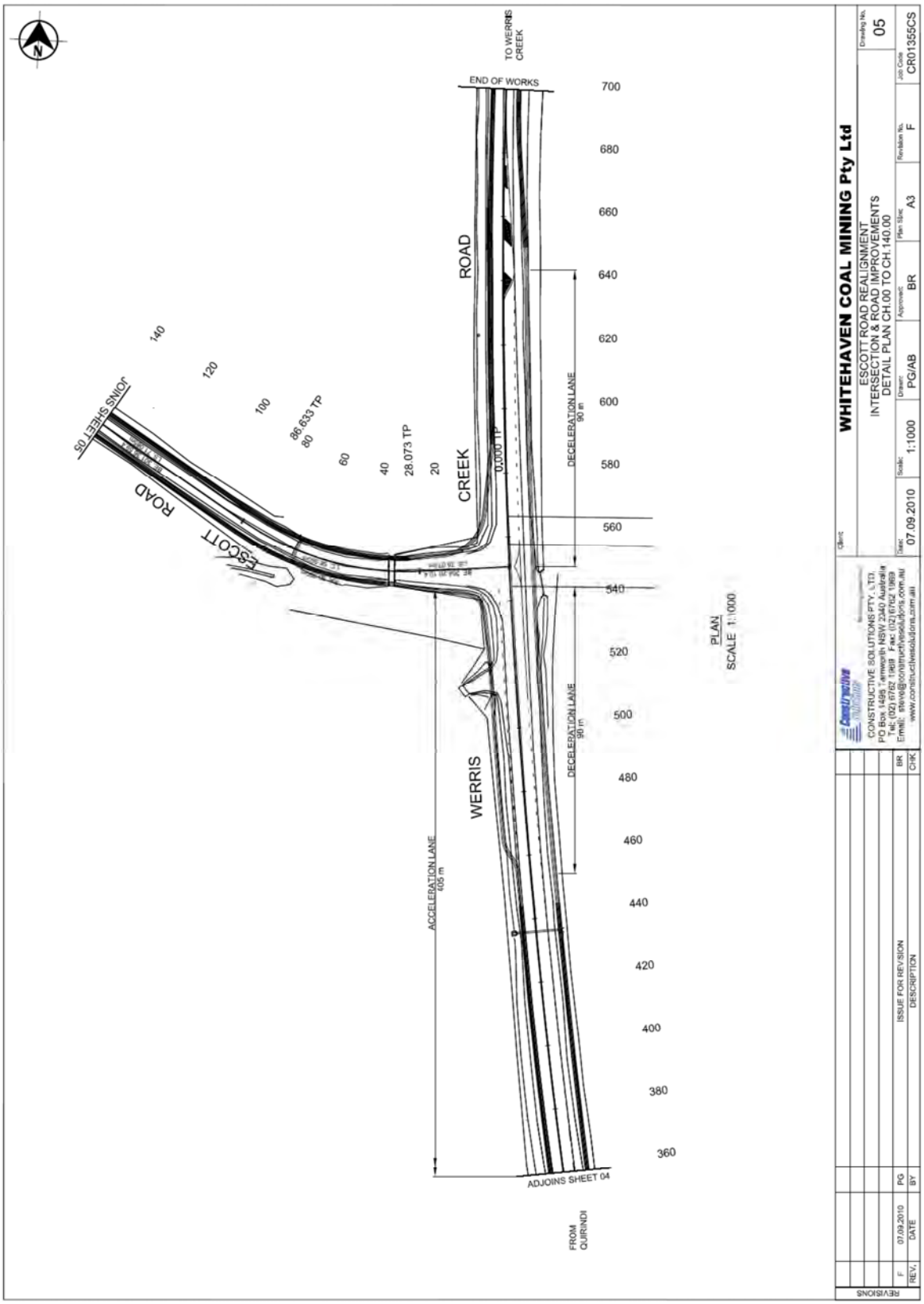
REVISIONS
F 07.09.2010 PG ISSUE FOR REVISION BR
REV. DATE BY DESCRIPTION CHK


TO WERRIS CREEK
END OF WORKS
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
ROAD
CREEK
WERRIS
ESCOTT ROAD
JOINS SHEET 05
ADJOINS SHEET 04
FROM QUIRINDI
DECELERATION LANE 90 m
DECELERATION LANE 90 m
ACCELERATION LANE 405 m
140
120
100
80
60
40
20
86.633 TP
28.073 TP
0.000 TP
PLAN
SCALE 1:1000
WHITEHAVEN COAL MINING Pty Ltd
ESCOTT ROAD REALIGNMENT
INTERSECTION & ROAD IMPROVEMENTS
DETAIL PLAN CH.00 TO CH.140.00
Date: 07.09.2010
Scale: 1:1000
Drawn: PG/AB
Approved: BR
Plan Size: A3
Revision No. F
Job Code CR01355CS
Drawing No. 05
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