# Section 2
# Description of the Proposed Modification

*This section provides the detail of Centennial's proposed modification to DA 504-00 to enable an increase in the road transportation from Clarence Colliery from 200 000 tonnes per annum to 500 000 tonnes per annum. The proposed road transportation increase involves very few changes to the existing operation with changes of note including an anticipated increase in product truck movements and the rate of processing/loading the sized coal product. The description of Clarence Colliery operations has been restricted to the activities associated with the sized coal production, loading and transportation. To assist, a comment has been provided within each sub-section highlighting the proposed modification (if any) for that aspect of the existing Clarence Colliery operations.*

*The description of the proposed modification is provided in sufficient detail to enable the assessment of the environmental impacts in Section 4 to be completed.*

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# 2.1 INTRODUCTION

## 2.1.1 Objectives

Centennial's principal objectives in proposing to modify DA 504-00 centre upon:

- meeting existing domestic customer requirements for the production of specifically sized coal products ("sized coal"); and
- increasing the scope of Centennial to supply additional domestic customers with sized coal from Clarence Colliery.

Centennial would continue to operate to achieve the following environmental and social objectives.

- All activities would be undertaken in an environmentally responsible manner that enables compliance with all relevant statutory requirements.
- All operations would be undertaken with due consideration given to all reasonable expectations of the local and wider community.
- All haulage operations would be undertaken to meet Centennial and RTA road safety standards.
- Manage, monitor and review environmental performance to ensure continuing improvement of operations at Clarence Colliery.

## 2.1.2 Project Overview

Centennial proposes to increase the quantity of coal products despatched from Clarence Colliery by road from 200 000 tonnes per annum to a maximum of 500 000 tonnes per annum. The proposed increase in the haulage of coal to domestic customers would require the following modifications to existing approved operations.

- An additional front-end loader would be required to load the coal from the Run-of-Mine Coal, Washed Coal and Secondary Coal Stockpile Areas.
- An increase in the number of trucks entering and exiting Clarence Colliery each day. As part of the proposed modification, Centennial would also formalise limits on the hours of operation for the truck loading and road haulage.
- Modification to the existing intersection of Clarence Colliery access road and Chifley Road to provide an eastbound acceleration lane.
- Modification to the intersection between Harley Avenue and the Great Western Highway to provide a right turn lane and pass-by lane for westbound traffic on the Great Western Highway.

It should be noted that the modification has been proposed to ensure Centennial can meet the existing and forecast future demand for coal products from domestic customers while remaining compliant with all remaining conditions of DA 504-00.

# 2.2 THE APPLICATION AREA

## 2.2.1 Introduction

For the purposes of this document, the area which is the subject of the proposed modification to DA 504-00, is referred to as the "Application Area". This area covers both the areas of Clarence Colliery site related to the processing, stockpiling, loading and haulage of the coal products for domestic markets, as well as the roads incorporated into the haulage routes between Clarence Colliery and the main distribution roads into Sydney (Bells Line of Road [beyond the Darling Causeway] and the Great Western Highway).

## 2.2.2 Clarence Colliery Layout (Sized Coal Production Operations)

**Figure 2.1** presents the layout of Clarence Colliery, identifying the component areas and activities of the sized coal production, stockpiling, loading and transportation operations.

(i) Underground drift entries.

(ii) Rotary breaker and primary crushing and screening station.

(iii) Coal stockpile areas.

(iv) Coal preparation plant and coal screening plant.

(v) Reject emplacement area.

(vi) Clarence Colliery access road, secured heavy vehicle entry and weighbridge.

(vii) Coal conveyor system (presented separately on **Figure 2.1** and identified within the prefix SC).

The proposed modification to the approved Clarence Colliery operations would not require any change to the layout as presented on **Figure 2.1**.

***The proposed modification would not require any change to the layout of operations on Clarence Colliery site covered by the existing development consent (DA 504-00).***

## 2.2.3 Local Road Network of the Haulage Routes

**Figure 2.2** displays the road network of the Application Area which includes:

- Clarence Colliery access road;
- Chifley Road (identified on some maps as Bells Line of Road) and the intersection of Chifley Road with the Darling Causeway;
- the Darling Causeway;
- Harley Avenue; and
- the relevant intersections of the Darling Causeway and Harley Avenue with the Great Western Highway.


Figure 2.1
CLARENCE COLLIERY SITE LAYOUT OF SURFACE OPERATIONS

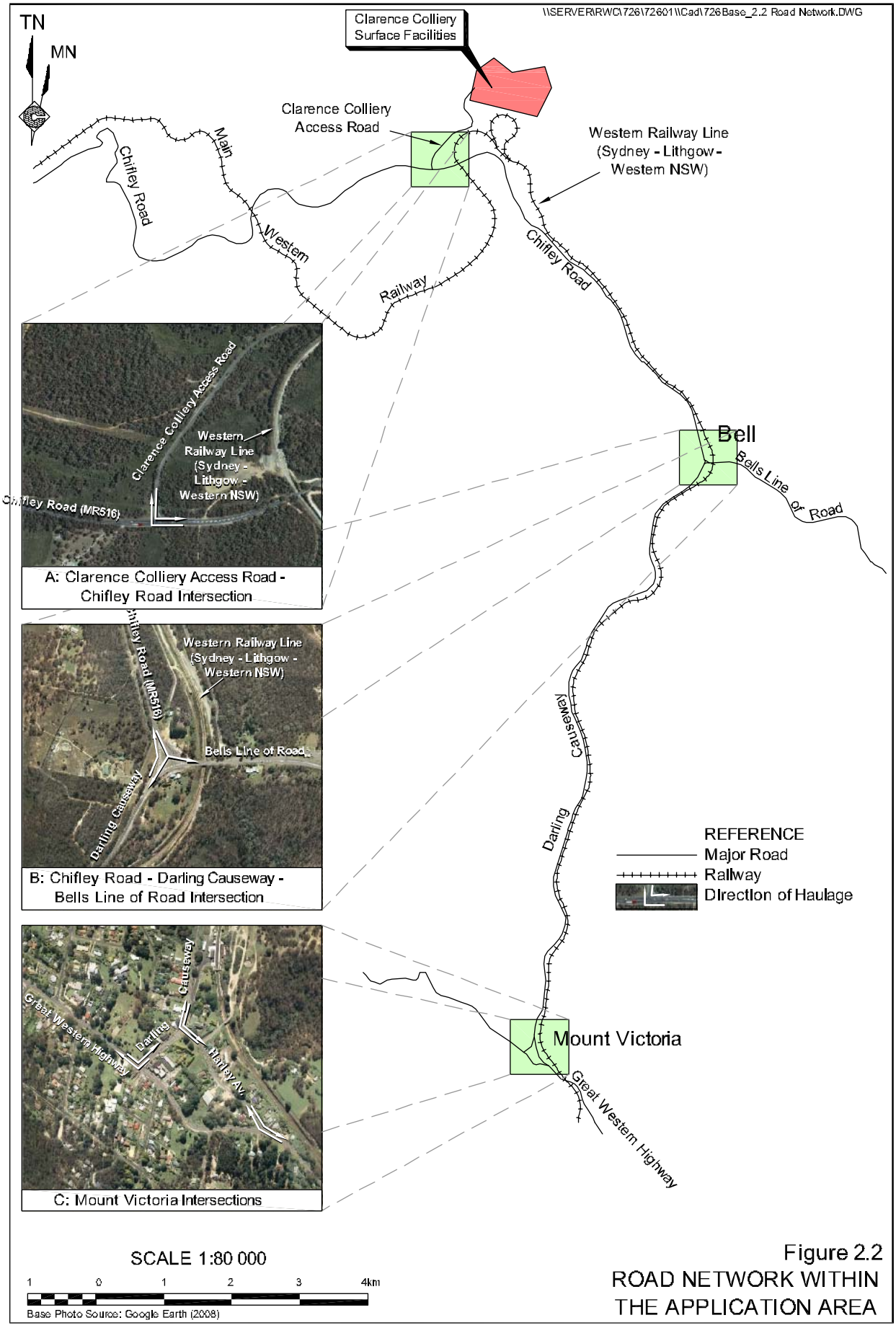



Figure 2.2
ROAD NETWORK WITHIN THE APPLICATION AREA

Chifley Road, the Darling Causeway, Bells Line of Road and the Great Western Highway are all managed under the authority of the NSW RTA. Clarence Colliery access road is a private road, although it provides public access to Sandham Road for local residents. Harley Avenue is a road maintained by Blue Mountains City Council.

## 2.3 PLANNING CONSIDERATIONS

### 2.3.1 Economic Considerations

Centennial currently supplies various quantities of sized coal products to numerous customers across NSW and beyond from Clarence Colliery. **Table 2.1** identifies, by region, the total quantity of coal sold in 2007/2008 together with the range in supply size.

**Table 2.1**
**Domestic Coal Supply (by Region) 2007/2008**

| Region | No. of Customers | Supply (t) | | |
|---|---|---|---|---|
| | | Total | Minimum* | Maximum* |
| Hunter & Central Coast | 3 | 101 085 | 30 | 100 000 |
| Sydney | 4 | 81 485 | 35 | 75 000 |
| Western NSW | 7 | 5 300 | 30 | 4 000 |
| South Coast | 2 | 5 030 | 30 | 5 000 |
| Blue Mountains | 2 | 800 | 300 | 500 |
| South Australia | 1 | 200 | | |
| Victoria | 1 | 150 | | |
| **Total** | **20** | **194 050** | | |

Source: Centennial Clarence Pty Ltd Note *: per customer

Based on correspondence received from many of these customers, demand for the sized coal products from existing customers alone is forecast to increase. **Appendix 3** provides correspondence provided by many of Centennial's existing customers identifying the continued and increased supply of coal from Clarence Colliery as critical to their continued viability, and therefore to the jobs or those employed directly and indirectly by these businesses. In addition, and as noted in Section 1.4.2, the number of producers of the sized coal sold to domestic industrial customers is reducing as some operations close and others cease the production of coal for domestic sale. Based on forecast demand and available supply, it is expected that Centennial could be required to supply up to 500 000 tonnes per annum from Clarence Colliery to ensure the continued viability of the many industrial operations across NSW and beyond that rely on the sized coal products for power generation, heat supply or other uses.

Therefore, in planning the proposed increase in road haulage, Centennial has considered the importance of:

- maintaining supply to increasing demand from existing customers;
- ensuring that the viability of these businesses is not compromised by an inability to source the sized coal; and
- providing scope within the operations of Clarence Colliery to provide supply to new customers as producers of coal for domestic industrial markets continue to reduce.

Section 4.5 provides further assessment of the predicted economic impact the proposed modification would have on local, regional and national economy.

### 2.3.2 Environmental Considerations

By increasing the approved limit of road haulage from Clarence Colliery, there would be an increase in the frequency of truck movements both on the Clarence Colliery site and along the haulage route, as well as an increase in the use of equipment used to load the coal trucks. These activities would have the potential to increase noise levels at residential receivers surrounding Clarence Colliery, as well as those fronting the roads of the haulage route.

### 2.3.3 Road Safety Considerations

The increased frequency of truck movements to and from Clarence Colliery may impact on aspects of the local road network including intersection performance, traffic congestion and pavement deterioration. Changes to these features of the road network may in turn impact on road safety. As a consequence, the impact of the proposed increase in road haulage on these features of the road network has been a major consideration, with various design features and management measures incorporated into the proposed modification by Centennial to enable relevant criteria and standards related to noise, traffic and road safety to be met.

### 2.3.4 Community Considerations

Centennial has consulted with Lithgow City Council and Blue Mountains City Council (the two Councils through which the coal is hauled to reach the primary distribution routes of Bells Line of Road and the Great Western Highway) to identify the major community-based issues associated with the proposed increase in coal haulage.

As far as practicable, the proposed modification has been designed to minimize impacts on the small communities, Dargan and Bell, and at individual residences between Clarence and Mount Victoria, with truck numbers and hours of operation restricted to ensure relevant noise criteria are met. Notably, the proposed modification has assessed impacts of hourly and daily truck numbers, as well as hours of operation, takes into consideration noise, dust and safety impacts for those communities and individual residents located adjacent to the product delivery routes.

## 2.4 RESOURCES AND PRODUCTS

### 2.4.1 Coal Resources

In June 2008, Centennial estimated an in-situ resource of 60 million tonnes of coal remained within the Lithgow and Katoomba seams within Clarence Colliery. This provides for an indicative remaining mine life of 30 years.

### 2.4.2 Coal Products

As noted in Section 1.4.2, the primary coal product of Clarence Colliery is a low sulphur thermal coal which is exported for use in power generation in Korea, Taiwan and Japan and represents between 80% and 90% of total annual sales.

Centennial also produces a range of specifically sized coal and coal products for sale to domestic customers, predominantly within NSW, for industrial purposes.

These products vary according to customer requirements but can generally classified into one of three categories.

1. Run-of-Mine coal. The broken and crushed coal from the underground.
2. Screened Coal Products[1]. Coal washed and passed through the coal screening plant (see **Figure 2.1**). Centennial currently produces two sizes of screened coal products, namely 25mm to 50mm and <25mm.
3. Coal Fines. The <0.5mm fraction washed from the coal within the Coal Processing Plant, discharged into the Clarence Colliery reject emplacement area and excavated once consolidated.[2]

**Figure 2.3** presents a flow diagram which illustrates schematically the mining and processing circuit resulting in the production of the export and domestic coal products. **Table 2.2** presents a summary of the size, use and proposed indicative production level of each product. DA 504-00 approves the production of up to 3 million tonnes of coal from the Clarence Colliery annually.

**Table 2.2**
**Coal Products and Use**

| Product | Size (mm) | Use | Production Level (tonnes per annum) | Domestic / Export | % of Domestic Sales |
|---|---|---|---|---|---|
| Thermal Coal | | Power Generation | 2 500 000 | Export | N/A |
| Run-of-Mine Coal | 0.5 to 50 | Heating (Coking) | 75 000 | Domestic | 15% |
| Screened Coal | 25 to 50 | Power Generation | 250 000 | | 50% |
| | <25 | | 100 000 | | 20% |
| Coal Fines | <0.5 | Blending | 75 000 | | 15% |
| | | **Total** | **3 000 000** | | |
| Source: Centennial Clarence Pty Ltd | | | | | |

While the exact proportions of each product may vary each year in response to market demand, Centennial would continue to produce the primary export coal and variously sized coal products.

***The proposed modification does not seek to change the volume or type of products approved for production from Clarence Colliery.***

Section 2.5 provides a brief overview of the processing and stockpiling activities undertaken to produce these sized coal products.

[1] Screened coal products are also sold to export markets and transported from the Clarence Colliery by rail. The screened coal products despatched from the Clarence Colliery in this manner are not considered further in this *Environmental Assessment*.
[2] The installation of a tailings press, due for commissioning in early 2009, will allow for the <0.5mm fine fraction to be blended with product coal, removing the necessity for excavation from the reject emplacement area.

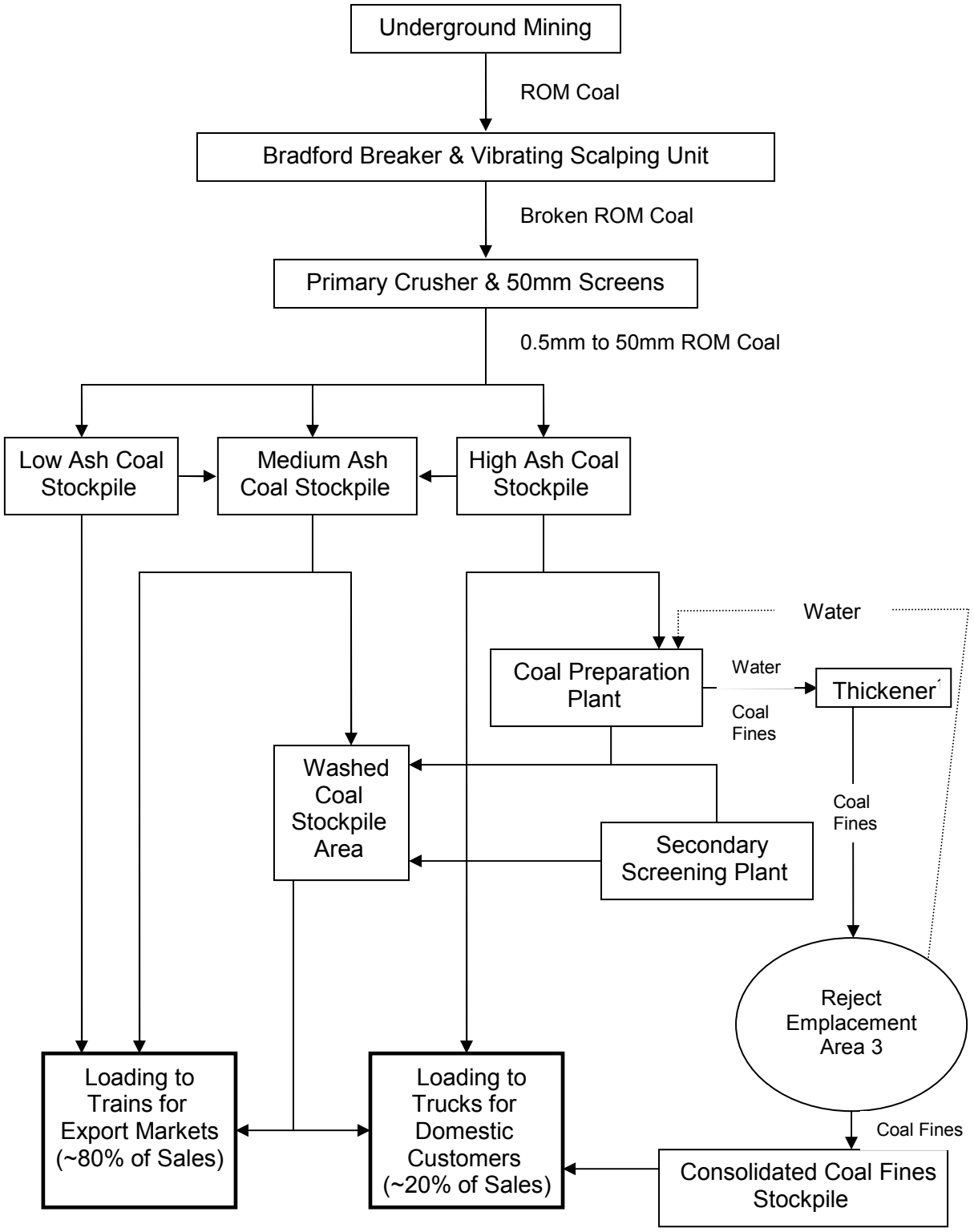



**Figure 2.3**
**COAL MINING AND PROCESSING CIRCUIT**

Note: The installation of a tailings press, currently being commissioned, will allow for the <0.5mm fine fraction to be blended with product coal, removing the necessity for excavation from the reject emplacement area.

Source: Centennial Clarence Pty Ltd

## 2.5 Coal Product Processing and Stockpiling

**Figure 2.3** presents a flow chart of the mining and processing circuit at Clarence Colliery. A summary of the key components of the processing circuit, with reference to **Figures 2.1** and **2.3**, is as follows.

1. The mined Run-of-Mine coal is conveyed to the surface and passed through a rotary breaker and vibrating scalping screen to reduce the size of the coal and remove some of the finer (<0.5mm) material.
2. The primary crusher then further reduces the size of the coal to <50mm, with material >50mm (oversize) removed (considered as reject).
3. The crushed coal is then placed on the Run-of-Mine Coal Stockpile Area according to ash content (low, medium[3] or high).
4. The low ash coal is transferred via an underground conveyor (SC5u/g) directly to the train loader for despatch by rail to export markets.
5. The high ash coal is either:
   - conveyed to the Coal Preparation Plant (CPP) for washing to remove the <0.5mm fraction (and reduce the ash content); or
   - loaded to trucks for sale to domestic customers.
6. The medium ash coal may be managed as either low or high ash coal, ie. as per (4) or (5) above.
7. The washed coal is either:
   - conveyed to the Washed Coal Stockpile Area where it may be loaded to trains for export or trucks for domestic sale; or
   - conveyed to the Coal Screening Plant from where the screened coal products may be loaded to trains for export or trucks for domestic sale.
8. The fine fraction (<0.5mm material) washed from the coal, is dewatered through a thickener and then discharged into reject emplacement area 3 (REA 3).
9. The coal fines are allowed to settle, and the water eventually recovered through various dams and reused through the CPP. The consolidated and dried coal fines are then excavated and stockpiled on the Washed Coal Stockpile Area for loading to trucks and haulage from the colliery.

***The proposed modification does not seek to change the coal processing operations of Clarence Colliery.***

[3] Low and high ash coal are commonly combined within the medium ash content stockpile area.

# 2.6 HAULAGE OPERATIONS

## 2.6.1 Introduction

The following sub-sections consider the current and proposed haulage operations, including truck loading and internal haulage, from Clarence Colliery to the two primary distribution routes over the Blue Mountains, namely the Bells Line of Road and the Great Western Highway.

## 2.6.2 Internal Haulage Network and Truck Loading

### 2.6.2.1 Internal Haulage Network

Heavy vehicle entry to Clarence Colliery is via Clarence Colliery access road (off Chifley Road) and a designated heavy vehicle entry approximately 50 metres from the main vehicle car park. The heavy vehicle entrance is secured with an automated security gate operated by swipe card or intercom.

Once entering Clarence Colliery through the heavy vehicle entry, the trucks travel along this sealed road and past the site weighbridge where the internal road network splits depending on the coal product to be loaded. Internal haulage is then via one of three routes, which are presented on **Figure 2.4** and summarized as follows.

(i) Run-of-Mine Coal Stockpile Route (the yellow line on **Figure 2.4**).

(ii) Washed Coal Stockpile Route (the blue line on **Figure 2.4**).

(iii) Secondary Coal Stockpile Route (the pink line on **Figure 2.4**).

The sealed sections of the internal haulage routes are regularly swept to reduce the amount of fine coal matter on the roads and therefore the potential for dust generation by the internal traffic at the colliery. The unsealed sections of the internal haulage routes are watered as required by a 10,000L water cart. In addition, a sprinkler system operates on the three stockpile areas and covers the areas traversed by the entering and exiting trucks. Further detail on dust suppression activities is provided in Section 4.4.

***The proposed modification would require an increase in the number of trucks using the internal haulage routes but would require no change to the alignment of these routes.***

### 2.6.2.2 Truck Loading

Trucks are currently loaded by a single front-end loader which moves between the three loading areas, as required. It currently takes conservatively approximately 10 minutes for the front-end loader (FEL) to completely fill the trailer(s) of a standard semi-trailer or truck and dog unit. Based on this loading time, the maximum number of trucks able to be loaded and exit Clarence Colliery is currently limited to six (maximum) per hour.

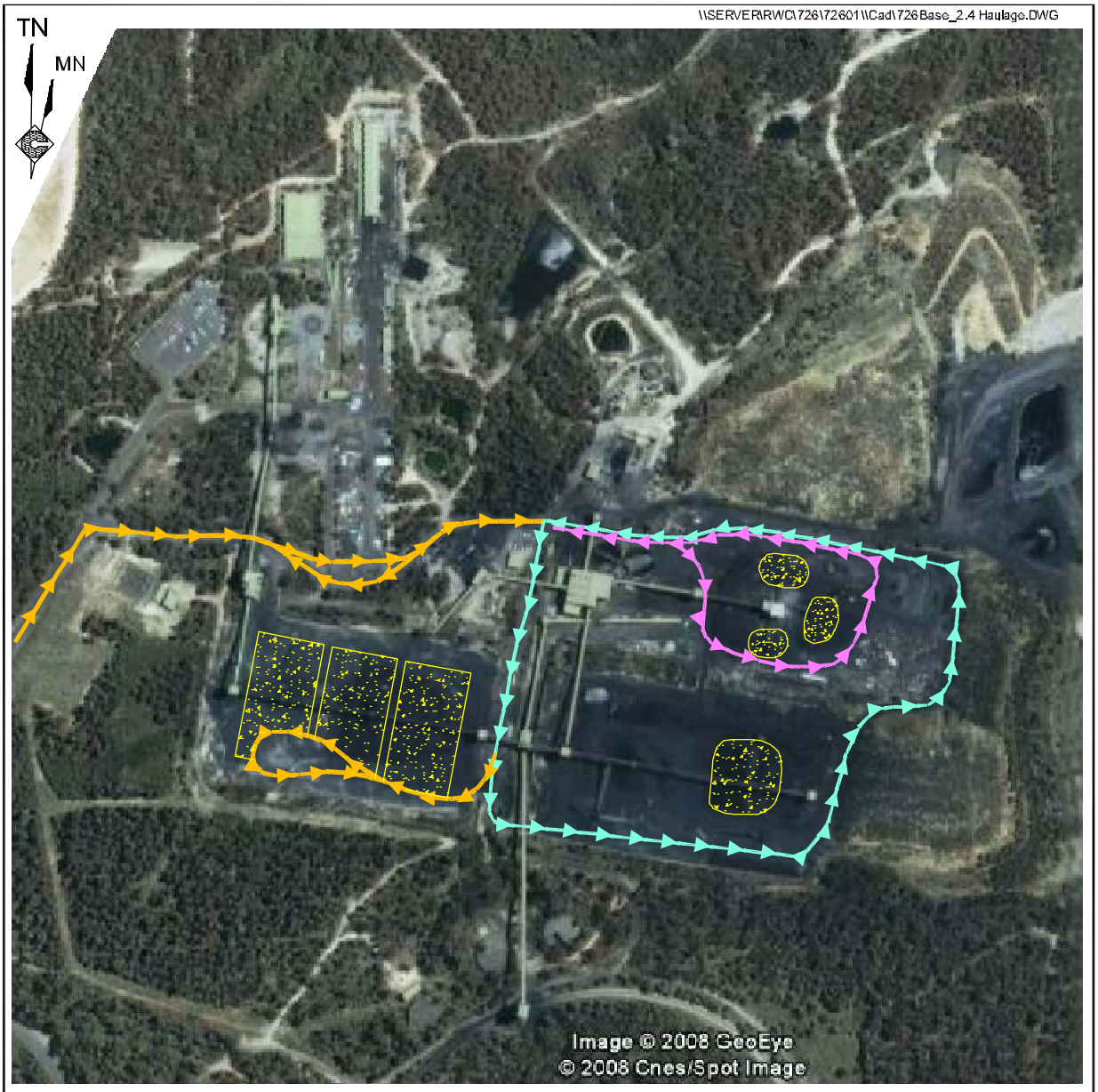



Figure 2.4
INTERNAL HAULAGE ROUTES

Based on weighbridge records maintained at Clarence Colliery, there are generally between 40 and 80 truck movements each day, although up to 100 truck movements have occasionally been recorded. Traditionally, the number of truck movements each day has been greatest at the beginning and end of each week given there is currently no road haulage operations on weekends.

With a continuation of the current loading operations, ie. using one FEL, the haulage of coal products to domestic customers would be limited to between 250 000 tonnes per annum and 300 000 tonnes per annum. To increase annual haulage of the sized coal, Centennial would therefore introduce a second FEL. One FEL would operate solely on the Secondary Coal Stockpile Area with a second FEL to traverse between the Run-of-Mine Coal and Washed Coal Stockpile Areas as required. As the time taken by the FEL to load each truck is the limiting factor on road haulage, the introduction of the second FEL would increase the number of trucks that could be loaded and despatched from Clarence Colliery each hour and each day.

***The proposed modification would require the addition of a second FEL for loading the sized coal to trucks.***

## 2.6.3 External Haulage

### 2.6.3.1 Haulage Routes

Centennial currently delivers coal products from Clarence Colliery to a number of domestic customers across NSW and further afield (see **Table 2.1**). Notably, DA 504-00 currently prohibits the haulage of these products to the west on Chifley Road (towards Clarence and Lithgow), with all trucks approaching and leaving the access road to the east. Centennial would maintain this restriction on the direction of travel as part of the modified haulage operations.

At the intersection of Chifley Road, the Darling Causeway and Bells Line of Road[4] (see **Figure 2.2**), approximately 25% of trucks delivering coal to the Hunter and Central Coast continue onto Bells Line of Road, ie. 12% of all haulage. The majority, however, turn right onto the Darling Causeway and continue approximately 11 kilometres to Mount Victoria. At Mount Victoria, approximately 85% travel eastwards on the Great Western Highway to markets in Sydney, the Hunter and Central Coast, or South Coast with the remainder (~3%) travelling to markets west of the Blue Mountains.

Centennial is proposing to maintain these three delivery routes (see **Figure 2.2**), with a more detailed description of each provided as follows.

**Bells Line of Road to Northwestern Sydney, the Hunter and Central Coast**

From Clarence Colliery Access Road, Chifley Road continues approximately 7 kilometres to the east where it becomes Bells Line of Road (at the Chifley Road – Bells Line of Road – Darling Causeway intersection - see **Figure 2.2**). Bells Line of Road traverses the Blue Mountains, distributing traffic into northwestern Sydney at Richmond from where the majority would travel via Richmond Road to the M7. Empty trucks return via the same route.

[4] While Chifley Road and Bells Line of Road are identified as coincident exiting Lithgow on many maps, this assessment identifies the Darling Causeway as representing the changeover from Chifley Road to Bells Line of Road.

It is expected that the Bells Line of Road haulage route would maintain a significant proportion of road haulage between Clarence Colliery and markets in northern and northwestern Sydney, as well as the Hunter and Central Coast regions. While the exact proportion is likely to vary with customer demand, Centennial anticipates that up to 20% of all deliveries would be via Bells Line of Road.

**Great Western Highway to Sydney and Markets East of the Blue Mountains**

The majority of trucks delivering coal from Clarence Colliery would continue to travel to markets in Sydney and east of the Blue Mountains (including the Hunter and Central Coast regions) via the Great Western Highway. At the Chifley Road – Bells Line of Road – Darling Causeway intersection (see **Figure 2.2**), trucks turn right using a designated right hand turn lane onto the Darling Causeway travelling the 11 kilometres to Mount Victoria. Approximately 100 metres before the termination of the Darling Causeway at the Great Western Highway, trucks make a left hand turn into Harley Avenue, before making another left hand turn (at a T-intersection at approximately 120º) onto the Great Western Highway. Empty trucks bound for Clarence Colliery return via the same route.

There are no designated left-turn bays or road markings at either the Darling Causeway – Harley Avenue or Harley Avenue – Great Western Highway intersections. There is no designated acceleration or merging lane on the Great Western Highway for vehicles entering the Great Western Highway from Harley Avenue. There is no designated right turn bay or road markings for vehicles entering Harley Avenue from the Great Western Highway and there is insufficient space on the westbound shoulder for through traffic to safely pass-by a right-turning truck.

Centennial recognises that increasing the volume of traffic using the Harley Avenue – Great Western Highway intersection may require some upgrade to this intersection, especially with regard to the right turn (from the Great Western Highway into Harley Avenue) required by returning trucks. This is considered in greater detail in Section 2.9.

**Great Western Highway to Western NSW**

Haulage of coal to customers west of the Blue Mountains would require the trucks to continue past Harley Avenue before making a right hand turn at the signalled Darling Causeway – Great Western Highway T-intersection. Empty trucks bound for Clarence Colliery would return via the same route.

The proportional use of the three haulage routes is expected to vary annually based on market demand, however, haulage of coal to domestic customers would continue to be via these three routes.

***Coal haulage would continue via the existing and established routes, ie. the proposed modification would not result in the creation of any additional haulage routes.***

#### 2.6.3.2 Hours of Operation

DA 504-00 does not currently restrict the hours of road haulage, however, with the exception of Mondays when loading and haulage sometimes commences at 3:00am, loading and haulage generally commences at 6:00am and ceases no later than 10:00pm.

In order to maintain flexibility for supplying domestic customers, Centennial proposes to operate 24 hour haulage operations, Monday to Saturday. Restrictions would be placed on the number of truck movements each hour during the night and day time periods (see Section 2.6.3.4) and it is noted that haulage between 10:00pm and 6:00am would generally only occur in response to unusually high demand periods or emergency supply requirements of customers.

***The proposed modification provides for 24 hour haulage operations, Monday to Saturday.***

### 2.6.3.3 Vehicle Types

A variety of truck types are loaded and despatched from Clarence Colliery, depending on the requirements of the domestic customer, ranging from single articulated trucks, semi-trailers, truck and dog units and 19m B-doubles. Based on existing haulage contacts, the average coal load per truck is 27 tonnes, with no truck when loaded having a maximum Gross Carriage Mass (GCM) exceeding 50 tonnes.

***There would be no change to the type of trucks used to haul the sized coal to domestic customers.***

### 2.6.3.4 Traffic Levels

A review of truck movements over Clarence Colliery weighbridge indicates that Clarence Colliery generates between 40 and 80 truck movements each week day. As noted in Section 2.6.2, limitations imposed by the use of a single FEL restricts the maximum number of truck movements on weekdays to 100.

As the type of truck used to transport the coal to domestic customers would remain equivalent to the existing operations, ie. the average coal load would remain 27t, an average of 148 truck movements would be required each day in order to achieve an annual road haulage of 500 000 tonnes per annum.

In order to minimise the potential for the proposed increase in haulage operations to result in exceedance of traffic noise criteria at residences within Mount Victoria (fronting the Darling Causeway), the following restrictions would be placed on day and night time truck movements[5].

- Day time (7:00am to 10:00pm) : 14 truck movements (7 truck loads).
- Night time (10:00pm to 7:00am) : 8 truck movements (4 truck loads).

Section 4.3.6 provides further detail on the prediction of noise levels at residences fronting the proposed haulage routes undertaken by Heggies Pty Ltd (Heggies, 2009a),

These restrictions will enable Centennial to achieve the proposed increase in domestic haulage.

***In order to accommodate the haulage of 500 000 tonnes per annum, the average number of truck movements generated by the road haulage would increase to 148. Truck movements would, however, be limited to 14 per hour during the day (7:00am to 10:00pm) and 8 per hour during the night (10:00pm to 7:00am).***

[5] A truck movement is equivalent to a single one-way journey of each vehicle, ie. a return truckload = 2 truck movements.

## 2.7 EQUIPMENT

In order to accommodate the increased daily haulage, a second FEL would be introduced within the stockpile area at Clarence Colliery. The introduction of a second FEL would enable one FEL to operate from the Secondary Coal Stockpile Area, with the second FEL to move between the Run-of-Mine Coal and Washed Coal Stockpile Areas as required.

***The proposed modification would require the use of an additional FEL at Clarence Colliery.***

## 2.8 ROAD/INTERSECTION UPGRADES AND CONSTRUCTION

In order to ensure the proposed increase in road haulage from Clarence Colliery would have minimal impact on motorists and road-side residents adjacent to the haulage routes, Centennial sought advice from a traffic consultant (FJF Group Pty Ltd) and the RTA in relation to recommended road and/or intersection improvements. These recommendations, which are provided in detail in FGF Group (2009) (see **Appendix 4**), would be implemented by Centennial as follows.

### Clarence Colliery Access Road – Chifley Road Intersection

**Figure 2.5a** illustrates the proposed upgrade to this intersection which would ensure through traffic travelling east or west on Chifley Road are not affected by the increase in trucks entering this intersection. The primary upgrade of the intersection would be to widen the pavement of the eastbound lane from the intersection to provide for a 220m acceleration lane. Some minor tree pruning and branch removal within the road reserve would be required to allow for the proposed road widening.

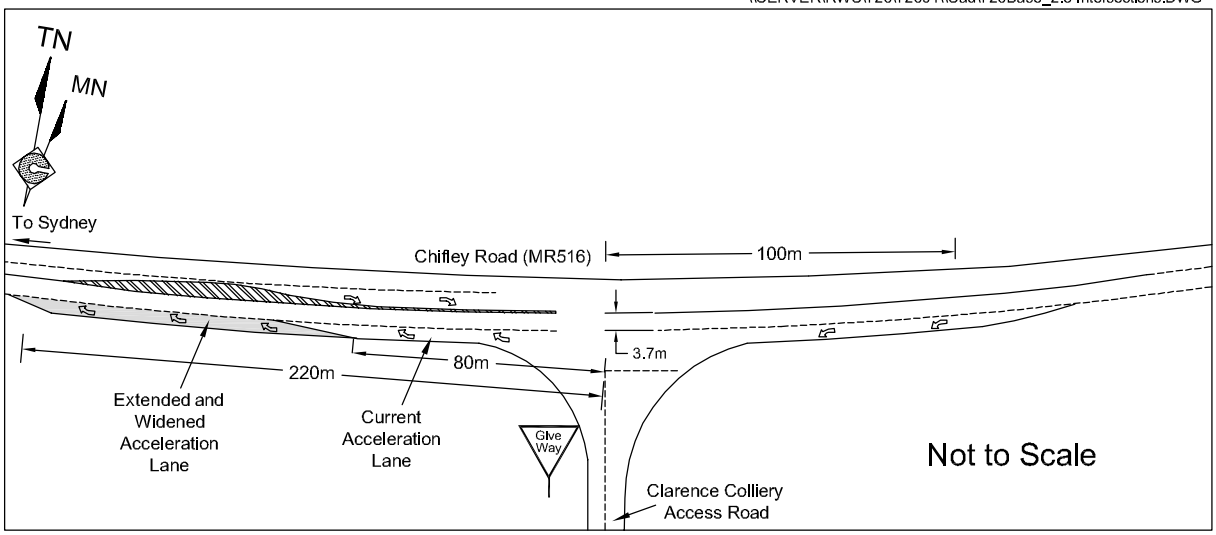
The intersection already provides a protected right turn bay of appropriate length to allow for the deceleration and storage of turning vehicles, with no further works required.

### Harley Avenue – Great Western Highway Intersection

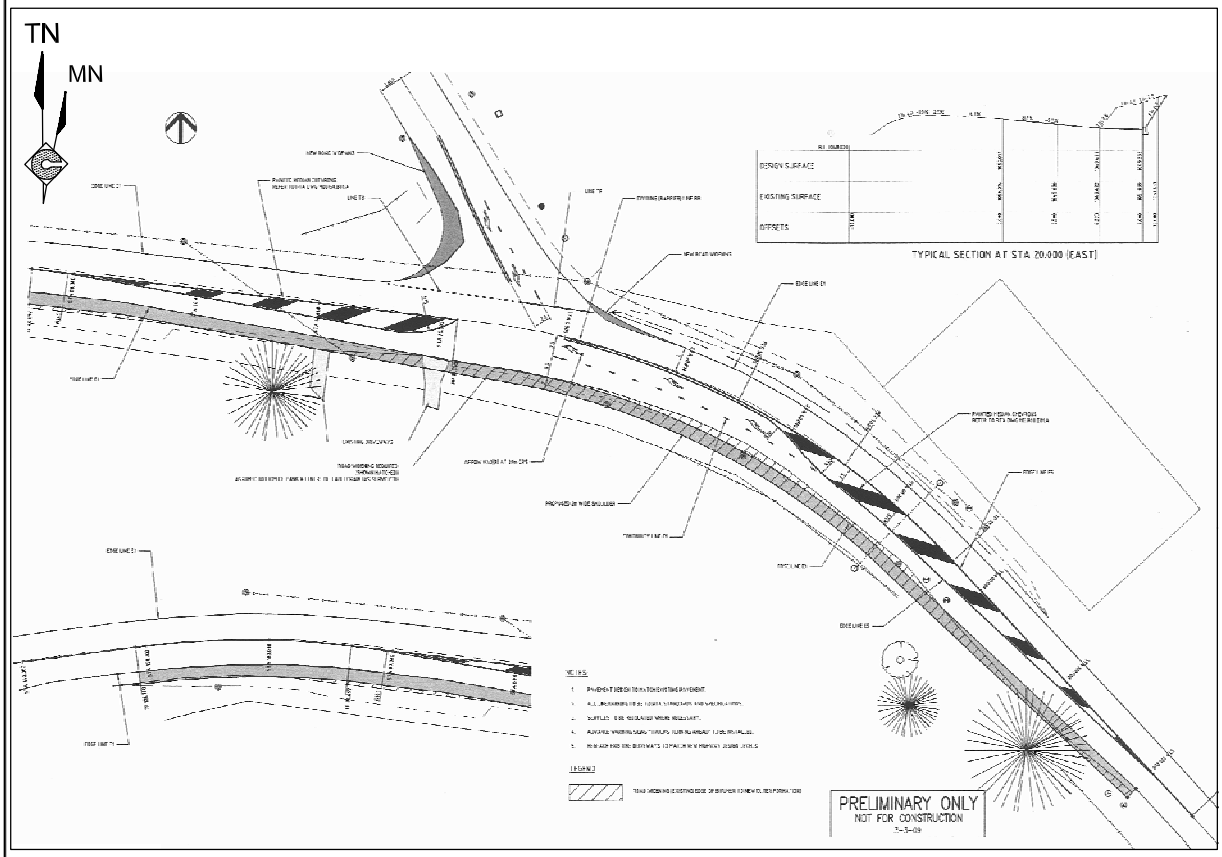
**Figure 2.5b** illustrates the proposed upgrade to this intersection which would ensure that a safe and efficient passing opportunity would be provided for westbound through traffic on the Great Western Highway, ie. around trucks waiting to turn right into Harley Avenue from the Great Western Highway.

The pavement width of the westbound lane of the Great Western Highway would be widened to 8m to provide the "*minimum urban right hand turn treatment*" as required by the *Road Design Guide* of the NSW RTA (RTA, 2004). The upgraded intersection would provide a 4m wide storage lane for right turning traffic, tapered from the through lane which would also be 4m in width. The pavement widening would be undertaken in consultation with the RTA (the road authority), the relevant electricity supplier (as there may be a requirement to relocate several power poles) and local residents (as the proposed pavement widening would encroach on the current exit point of several driveways onto the Great Western highway).

Centennial also proposes that "Truck Turning" signs be erected either side of the intersection (on the Great Western Highway).




(a) Clarence Colliery Access Road - Chifley Road




(b) Harley Avenue - Great Western Highway

Source: FGF Group (2009)

Figure 2.5
PROPOSED INTERSECTION UPGRADES

### Harley Avenue Road Maintenance

As a result of the existing heavy vehicle traffic on Harley Avenue, the pavement condition of the road is relatively poor with and uneven surface, pot holes and road edge crumbling evident. FGF Group (2009) indicates that this poor condition of the road could be managed by regular inspection and maintenance of the road. Centennial proposes to contribute to this road maintenance.

***The proposed modification would require the upgrading of two intersections (Clarence Colliery access road – Chifley Road Intersection and the Harley Avenue – Great Western Highway Intersection) and the ongoing maintenance of one road (Harley Avenue).***

## 2.9 REHABILITATION AND DECOMMISSIONING

The proposed modification would not require any additional disturbance, nor any additional plant which would require decommissioning, within Clarence Colliery. The proposed upgraded intersections would be retained following the cessation and rehabilitation of the Clarence Colliery site.

***The proposed modification would not require any change to the proposed decommissioning and rehabilitation activities approved for Clarence Colliery.***

## 2.10 CONSIDERATION OF ALTERNATIVES

### 2.10.1 Loading Methods

The incorporation of a truck loading bin was an alternative loading method considered by Centennial. Loading from a bin would have the advantage of eliminating the requirement for the operation of the front-end loaders, thereby eliminating this noise source, as well as reducing the potential emissions of dust from the coal stockpiles and operating FEL. However, as Centennial produces at least five separate coal products for domestic markets from Clarence Colliery, five separate loading bins would be required. Noise and dust is currently well managed at Clarence Colliery and as such the minor reduction in noise and dust emissions that could be expected through the incorporation of a bin loading system is outweighed by the time and cost associated with the construction or installation of appropriate bins.

### 2.10.2 Transport Methods

Coal to export markets is currently delivered to the Port of Newcastle by rail, with rail presenting a potential alternative transport method for the delivery of domestic coal.

Delivering coal by rail to domestic customers would, however, present several economic and logistic problems given that most domestic coal customers do not have direct access to coal unloading points on the NSW rail system. As a consequence, in order to deliver coal to domestic customers by rail, the following imposts would be placed on either Centennial or the customer.

- The cost of upgrading or constructing, and maintaining a suitable coal unloading point.

- The additional cost of transporting the coal by rail to the unloading facility.
- The additional cost of re-handling the coal at the coal unloading point.
- The cost of road haulage from the coal unloading point to customers, a distance which in many cases may be further from Clarence Colliery.
- The additional cost and logistical implications associated with obtaining the required statutory approvals for access to adequate rail paths, construction of the required infrastructure and related requirements. Further commercial negotiation would be required, for example in respect of access to rolling stock and construction tender processes.

The most practical road/rail interchange (to enable the transfer of the coal from the public road network onto the rail network or vice versa) is at Lidsdale Siding, Wallerawang, which is located approximately 16 kilometres from Clarence Colliery and is owned by Centennial Coal. An assessment of the feasibility of both a rail to road, and road to rail transport option has been included in **Appendix 7** (Aigis, 2009). Neither option was considered viable due to the lack of infrastructure available at the Lidsdale Siding for the unloading of coal.

Aigis (2009) also considered other rail transport related alternatives to take into consideration alternative rail unloading options for the major customers of Clarence Colliery (located in the Newcastle region). These alternatives included rail transport to and subsequent unloading from:

- Port Waratah Coal Services coal terminal on Kooragang Island, in Newcastle (for unloading and road haulage to customers);
- Eraring Power Station operated by Eraring Energy; and
- Vales Point Power Station (VPPS) operated by Delta Electricity.

All alternative rail unloading options assessed were determined to be unfeasible, with a full economic assessment included in **Appendix 7**. . .

### 2.10.3 Delivery Routes

The three delivery routes identified in Section 2.6.3 are well established and have been used by Centennial and other companies for haulage of materials for many years. When consulted by FJF Group Pty Ltd, the RTA indicated there was no reason to restrict use of these roads to light vehicles only (see **Appendix 4**). This notwithstanding, Centennial investigated several variations of these established routes in an attempt to identify the route(s) which would result in the least impact on other road users and residential/commercial premises. The route variations considered included the following.

Option 1: Exclusion of Harley Avenue from the eastbound Great Western Highway haulage route, ie. all trucks to use the signalled intersection of Darling Causeway – Great Western Highway.

Option 2: One way traffic only (eastbound) on Harley Avenue, ie. trucks from Clarence Colliery would use Harley Avenue when travelling to Sydney and the South Coast but would return via the signalled intersection of the Great Western Highway and Darling Causeway.

Option 3: Restricting all eastbound traffic to Bells Line of Road, ie. only traffic destined for markets west of the Blue Mountains to use Darling Causeway and the Great Western Highway.

Each is discussed in more detail as follows.

### Option 1 - Exclusion of Harley Avenue

This option has the advantage of restricting the movement of trucks to collector roads only. As suggested in Section 2.9, the condition of the Harley Avenue pavement is poor. This is most likely to be a result of the use of this road by heavy vehicles, while the maintenance schedule is that for a local road used predominantly by light vehicles.

The major disadvantage of this option is that the existing geometry of the signalled intersection of the Darling Causeway – Great Western Highway precludes a legal left-hand turn manoeuvre from Darling Causeway onto the Great Western Highway. *Annexure 6* of FJF Group (2009) (see **Appendix 4**) provides further detail on the geometric restrictions which constrain the use of the Darling Causeway – Great Western Highway for turning heavy vehicle traffic. Therefore, in order for this option to be undertaken, significant road and intersection upgrades would be required which would likely be costly and create further delays to traffic on the Great Wester Highway during construction.

### Option 2 - One-way Circuit Using the Darling Causeway, Harley Avenue and the Great Western Highway

By creating a one-way circuit at Mount Victoria, the number of vehicle movements along Harley Avenue and the Darling Causeway between Harley Avenue and the Great Western Highway would be halved, thereby reducing the impact of truck movements on the residential and commercial premises along these roads.

However, similar to Option 1, the existing geometry of the signalled intersection of the Darling Causeway – Great Western Highway precludes a legal right-hand turn manoeuvre from the Great Western Highway onto the Darling Causeway. *Annexure 6* of FJF Group (2009) (see **Appendix 4**) provides further detail on the geometric restrictions which constrain the use of the Darling Causeway – Great Western Highway for turning heavy vehicle traffic. The cost of the required intersection and road upgrades and impacts upon adjoining properties would make this option unfeasible.

### Option 3 - Restricting Eastbound Traffic to Bells Line of Road

Bells Line of Road represents an alternative route for traffic between the central west of NSW and Sydney, the Central Coast, the Hunter and eastern seaboard. Currently, approximately 12% of truck movements generated by Clarence Colliery use Bells Line of Road to deliver coal to the Central Coast, Newcastle and the Hunter. This represents approximately 25% of all truck movements to these regions of NSW and illustrates that the majority of truck drivers use the Great Western Highway preferentially over Bells Line of Road.

Through consideration of the road alignment and conditions, and through reference to a report prepared by the NSW RTA and the Commonwealth Department of Transport and Regional Services (DOTARS) investigating the preferred route of a designated 19m B-Double haulage route between the central west of NSW and Sydney (RTA / DOTARS, 2005), the advantages and disadvantages of the Bells Line of Road route have been identified.

**Advantages of the Bells Line of Road Haulage Route**

The Bells Line of Road haulage route offers several advantages over Great Western Highway route for haulage operations.

1. The distance between Clarence Colliery and the M7 motorway in Sydney (a distribution route to the north and south of Sydney) using Bells Line of Road is 70.5 kilometres, whereas the route to the M7 via Mount Victoria and the Great Western Highway is 85.2 kilometres.
2. Bells Line of Road carries less traffic than the Great Western Highway with RTA/DOTARS (2005) recording 3 000 vehicles per day (vpd) on Bells Line of Road compared to 22 000vpd on the equivalent section of the Great Western Highway.
3. As would be expected, based on the lower total distance and volume of traffic, RTA/DOTARS (2005) documented a travel time reduction for heavy vehicles of up to 10 minutes. While travel time on Bells Line of Road is likely to have increased slightly since 2006, as a consequence of the reduction of the speed limit on Bells Line of Road to 80km/hr in 2007, the travel time of the Bells Line of Road route would still be less than that of the Great Western Highway. There would be an additional saving of an estimated 10 minutes related to the required travel time on the M7 between the M4 motorway (a continuation of the Great Western Highway at Emu Plains, Sydney) and Richmond Road.
4. Bells Line of Road also provides for a consistent 80km/hr speed limit, thereby potentially avoiding the necessity for truck drivers to brake and accelerate in response to the speed zone changes.
5. There would be no requirement for any upgrading of roads or intersections beyond Clarence Colliery access road.

**Disadvantages of the Bells Line of Road Haulage Route**

Evidenced by the fact that 75% of truck drivers delivering coal and coal products to the Central Coast, Newcastle and the Hunter regions use the longer Great Western Highway haulage route, there are a number of disadvantages to the increased use of Bells Line of Road as a coal haulage route.

1. Bells Line of Road is winding over much of its length and includes many steep ascents/descents. 6% of the route has grades in excess of 10% (13% maximum) and 34% has grades between 4% and 10% (RTA/DOTARS, 2005).
2. The winding nature of the road and steeper vertical grades largely counteract the advantage gained by the consistent speed zone of 80km/hr. RTA/DOTARS (2005) documents that fully-laden trucks generally travel at speeds of less than 50km/hr when sustained uphill grades exceed 4% to 6%.
3. Bells Line of Road is predominantly two lanes for its entire length, which when coupled with the circuitous and steeply graded nature of the route restricts the passing opportunities available to vehicles. Additional trucks on Bells Line of

Road could potentially increase congestion on the road, increase travel times for other traffic and disadvantage other road users.

4. Bells Line of Road is also subject to more extreme meteorological conditions such as fog, snow and ice on the road which reduces travel times and increases the risk of incident between trucks and other traffic.
5. The accident rate on Bells Line of Road is higher than the State average and higher than the Great Western Highway with RTA/DOTARS (2005) recording that over 120 serious injury accidents occur each year on Bells Line of Road. The highest proportion of accidents involving heavy vehicles was between Kurrajong Heights and Newnes Junction (included within the Bells Line of Road haulage route), generally caused by vehicles leaving the road. RTA/DOTARS (2005) note that steep grades were attributable in a number of cases.

While Bells Line of Road offers a potential reduction in travel distance and time between Clarence Colliery and customers in Sydney, the Central Coast, Newcastle and the Hunter, the inferior safety record compared to that of the Great Western Highway, was a primary factor in discounting the option of increasing or restricting haulage to Bells Line of Road.

Interestingly, RTA/DOTARS (2005) effectively reached the same conclusion when determining the preferred route of a designated B-Double haulage route into Sydney from the central west. That is, while significant advantages were nominated for the development of Bells Line of Road as the primary freight route into Sydney (due largely to the comparatively lower current traffic volumes), the associated costs were likely to make this option prohibitive. RTA/DOTARS (2005) recognised the Great Western Highway as the more developed route which is designated as part of the Australian Government's AusLink National Network. The recommendation of RTA/DOTARS (2005) was that continued investment in the Great Western Highway should remain the priority, with periodic but limited improvements to Bells Line of Road as the supplementary route.

Considering the advantages and disadvantages of the Bells Line of Road haulage option, the use of the Great Western Highway as the dominant haulage route into Sydney and beyond is clearly the preferred option due to the inferior road alignment and safety record of Bells Line of Road and potential impacts on other road users resultant from an increase in slower moving coal trucks where there are limited passing opportunities. This position is supported by the recommendations of RTA (2006) which identified the Great Western highway as the preferred route for the movement of road freight between the NSW central west and Sydney.

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