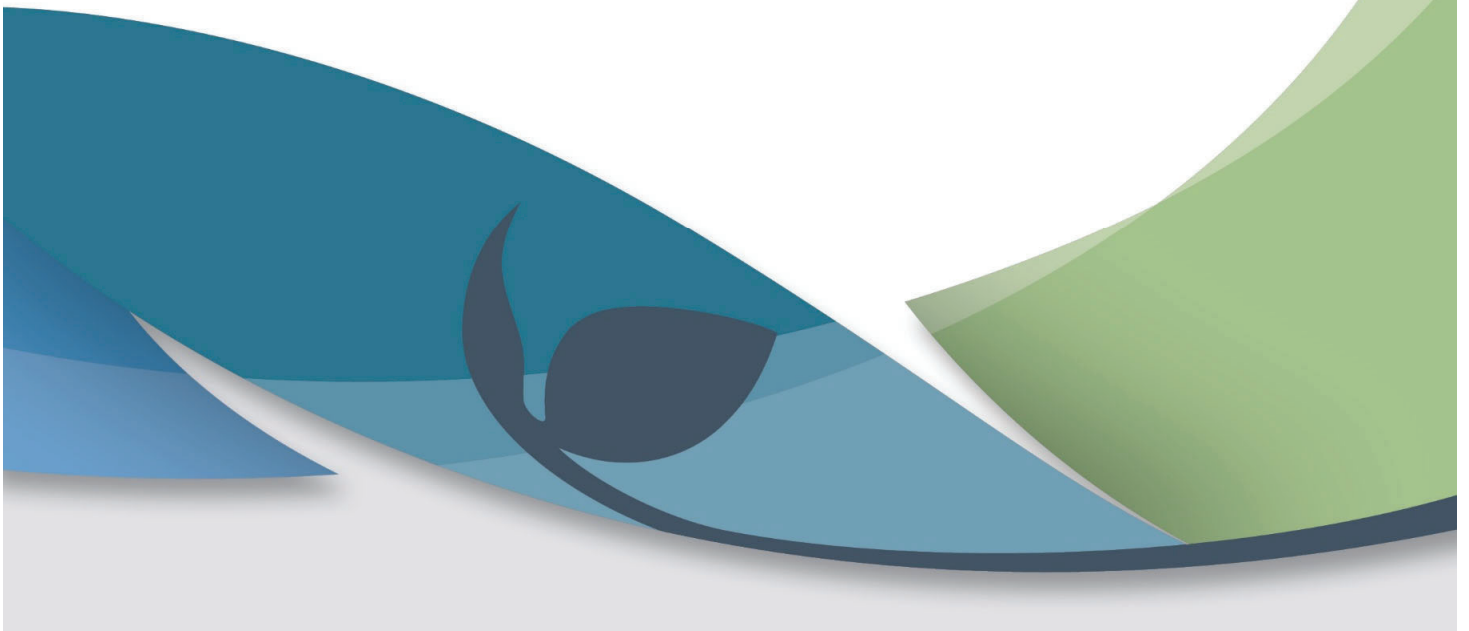


CLARENCE COLLIERY & LIDSDALE SIDING TEMPORARY COAL TRANSPORT MODIFICATION

MODIFICATION REPORT

*for Centennial Coal Company Pty
Limited*

21 September 2022



DOCUMENT CONTROL

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EXECUTIVE SUMMARY

Introduction

Centennial Coal Company Pty Ltd (Centennial) and its subsidiary, Ivanhoe Coal Pty Ltd (Ivanhoe Coal), operate the Clarence Colliery (Clarence) and the Lidsdale Siding respectively, which are located within the Lithgow Local Government Area (LGA). Centennial is the primary provider of coal to the Mount Piper Power Station (MPPS) which is owned and operated by Energy Australia.

The prevailing NSW energy crisis has resulted in diminished coal stockpile levels at the MPPS and may result in Energy Australia's inability to meet forward electricity demand. To ensure the MPPS can continue to operate and assist in meeting the electricity demands of NSW, Centennial has been investigating ways to deliver additional coal to the MPPS to assist in securing adequate energy generation and relieve the risk of an energy shortage in NSW.

Centennial and Ivanhoe Coal have each lodged a Modification Application under Section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify the existing approvals for Clarence and the Lidsdale Siding to allow the temporary transport of additional coal to the MPPS (including to the Lidsdale Siding for blending prior to being delivered to the MPPS).

James Bailey & Associates has prepared this Modification Report on behalf of Centennial Coal in support of the application to modify the existing approvals for Clarence and the Lidsdale Siding.

The Modification

Clarence operates under Development Application (DA) 504-00 which allows for underground mining and associated infrastructure, including the transport of coal via road. Centennial is seeking a modification (MOD 9) to DA 504-00 to allow:

- A temporary increase in the total volume of product coal that can be transported from Clarence by road from the currently approved 200,000 tonnes per annum (tpa) to 300,000 tpa until the end of 2023;
- A temporary increase in the total volume of product coal that can be transported by road to the west of Clarence from the currently approved 100,000 tpa to 200,000 tpa until the end of 2023. The currently approved transport of up to 200,000 tpa coal from Clarence by road to the east will remain unchanged; and
- Temporary truck transport of the coal from Clarence to either the MPPS or to the Lidsdale Siding until the end of 2023. Truck transport will occur via the previously assessed routes and then the Castlereagh Highway (rather than the previously assessed private haul roads for which access is not currently available to Centennial), with trucks returning to Clarence via the reverse route.

The Lidsdale Siding operates under MP 08_0223 and is approved to accept up to 6.3 Mtpa of coal from Centennial's Western Coal Services via overland conveyor and/or train. Ivanhoe Coal is seeking a modification (MOD 4) to MP 08_0223 to allow:

- Temporary acceptance of up to 200,000 tpa of coal from Clarence by truck into Lidsdale Siding via the Castlereagh Highway and Main Street until the end of 2023.

Stakeholder Consultation

Stakeholder consultation over the Modification has occurred with the Clarence Community Consultative Committee (CCC), the Western Region CCC, near neighbours, regulatory authorities (including Lithgow City Council, National Parks and Wildlife Service (NPWS), Transport for NSW and Department of Planning and Environment), Energy Australia and other interested parties.

Centennial will continue to consult with stakeholders throughout the Government review and assessment process.

Impacts, Management and Mitigation

This Modification Report includes an assessment of the potential environmental, social and economic impacts of the Modification in accordance with the applicable legislative requirements and relevant Government guidelines and policies.

The key environmental aspects of the Modification were the potential traffic impacts on key local and regional roads and noise impacts associated with the additional truck movements, and truck unloading at the Lidsdale Siding. Suitably qualified technical specialists were engaged to assist with the assessment of these impacts and these technical reports are appended to this Modification Report.

Stantec completed a Traffic Impact Assessment in accordance with the requirements of Austroads *Guide to Traffic Management* and the *Guide to Traffic Generating Development*. The assessment considered the potential impacts of the proposed traffic movements on intersection and road performance, and road safety. The Traffic Impact Assessment identified that the proposed increase in truck movements on the proposed route would have negligible impact to the Level of Service for the key intersections and on general road operating conditions. The Safe Intersection Sight Distance assessment for the two key intersections for the Modification identified that there was good intersection visibility at both intersections, which would allow the trucks to utilise these intersections safely. Centennial will ensure that the road haulage workforce is appropriately trained and experienced in accordance with its existing policies and procedures.

Bridges Acoustics completed a Noise Impact Assessment for the additional truck movements on the local road network in accordance with the *Road Noise Policy* (DECCW, 2011) and an assessment of additional industrial noise for the loading and unloading of trucks at Clarence and the Lidsdale Siding in accordance with the *Noise Policy for Industry* (EPA, 2017). The Noise Impact Assessment concluded that noise from truck loading and unloading and road transport would remain within the relevant noise criteria at sensitive receptors including those specified in DA 504-00 and MP o8_o223.

Other potential environmental, social and economic impacts have been assessed to be minimal and will continue to be appropriately managed in accordance with Centennial's approved environmental management systems for each site.

Merit Evaluation

The Modification is seeking to reinstate the ability to transport up to 200,000 tpa of coal (i.e. an additional 100,000 tpa greater than that currently approved) from Clarence to the west as was previously permitted (until the end 2020) under DA 504-00. It will also enable trucks to continue along the Castlereagh Highway to the Lidsdale Siding and the MPPS now that the previous haulage route via private haul roads in the region are not currently accessible to Centennial due to changes in ownership and/or expired lease arrangements.

The approval of the Modification will provide an additional supply of coal to the MPPS to assist in meeting the immediate electricity demands in NSW.

The potential environmental impacts of the Modification have been assessed to be minor with there being no material increase in impacts on the surrounding environment and the community.

The Modification to DA 504-00 and MP o8_o223 is considered to be of minimal environmental impact and will remain substantially the same development as the development originally approved (or as last modified by the former Section 75W of the EP&A Act). As such, it is considered the modification can be approved pursuant to Section 4.55(1A) of the EP&A Act.

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1. INTRODUCTION

This section provides an introduction, including a brief overview of the Clarence Colliery (Clarence) and the Lidsdale Siding, the Modification proposed to the approved operations and the proponents of the Modification Applications. It also outlines the purpose and structure of this Modification Report.

1.1 BACKGROUND

1.1.1 Clarence Colliery

Clarence has been in operation since the 1980s and is an underground coal mine within the Western Coalfield of NSW approximately 10 kilometres (km) east of Lithgow in the Lithgow local government area (LGA) (see **Figure 1**). Clarence is a joint venture operation managed by Clarence Colliery Pty Ltd (a wholly owned subsidiary of Centennial Coal Company Pty Ltd (Centennial)).

Presently, Clarence operates under three separate development consents:

- An interim development consent issued in 1976 by Blaxland Shire Council (now Lithgow City Council (LCC)) for the construction of surface facilities (IRM.GE.76);
- A development consent issued in 1994 by LCC for the extension of underground coal mining, surface reject emplacement areas (REAs) and water management and ancillary structures (Development Application (DA) 174/93); and
- Development consent issued in 2005 (DA 504-00) by the NSW Department of Infrastructure, Planning and Natural Resources (now the NSW Department of Planning and Environment (DPE)) to expand site operations into Mining Lease (ML) 1583.

DA 504-00 provides the approval for the transport of product coal from the site and has been modified on seven separate occasions to date.

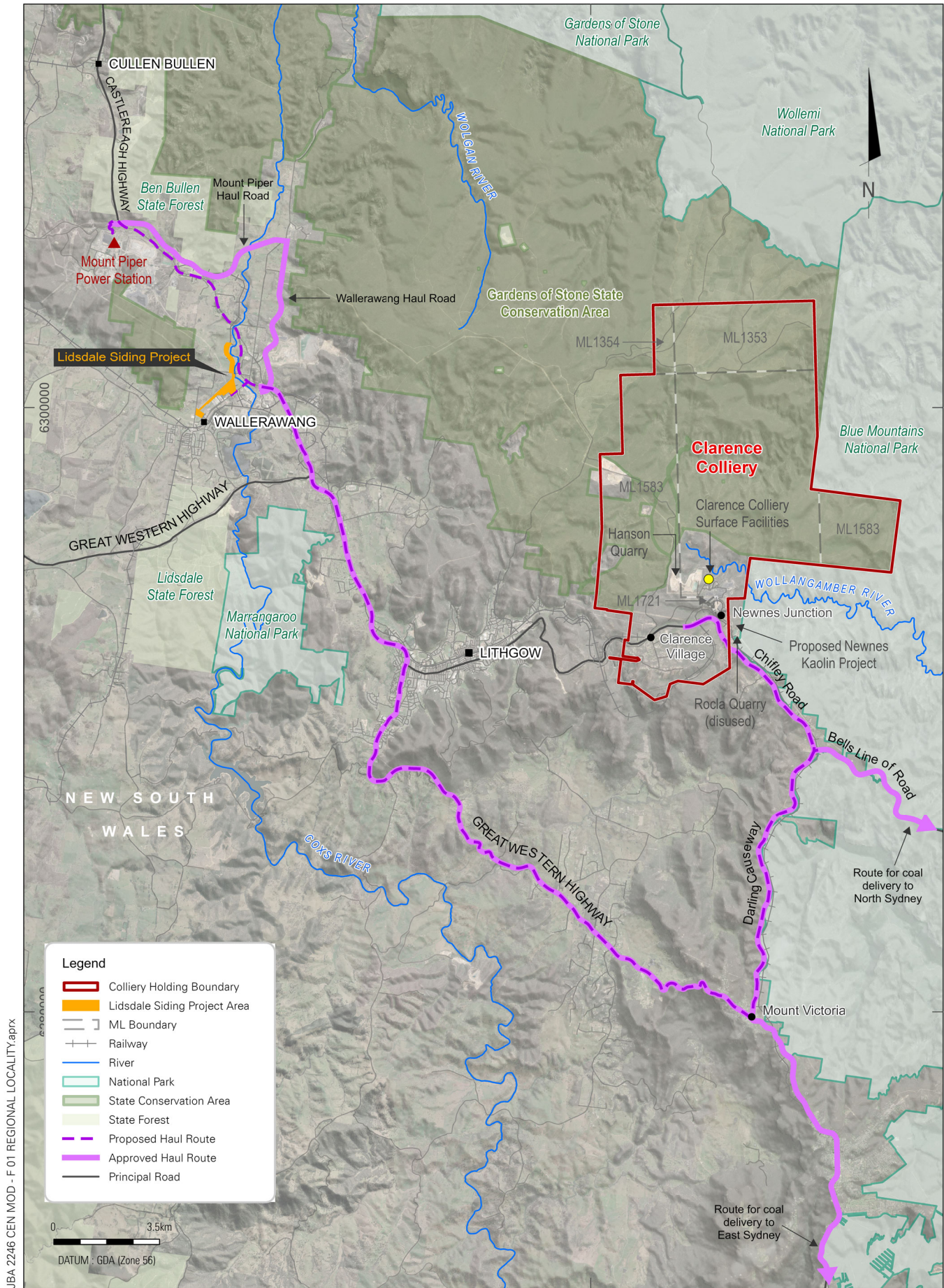
Clarence is approved to extract 3 Million tonnes per annum (Mtpa) of coal through underground bord and pillar mining until the end of 2026. The coal is run through a rotary breaker and crusher to reduce the size to 50 millimetres or less and stockpiled. From this stockpile, coal can either be directed to the rail load out facilities for loading of trains or to the beneficiation plant where it is washed prior to being loaded onto trains for transport. Up to 200,000 tonnes per annum (tpa) of coal is permitted to be transported by road, with up to 100,000 tpa being able to be transported to the west. Haulage of coal to the west can only take place between 7 am and 10 pm on Mondays to Saturdays and between 8 am and 10 pm on Sundays and public holidays. Most of Clarence's coal is railed to Port Kembla or Newcastle for shipping to international markets.

1.1.2 Lidsdale Siding

The Lidsdale Siding is an existing rail loading facility that has been in operation since 1974 and it automates the transfer and dispatch of coal from Centennial's Western Coal Services (WCS) Project. The facility is approximately 500 metres (m) north of Wallerawang and approximately 9 km north-west of Lithgow within the Lithgow LGA (see **Figure 1**).

The Lidsdale Siding is owned and operated by Ivanhoe Coal Pty Ltd (Ivanhoe Coal), a subsidiary of Centennial. The site operates under Project Approval (now Major Project (MP)) o8_0223 which was issued on 3 May 2013. Lidsdale Siding is approved to receive up to 6.3 Mtpa of coal at the site.

MP o8_0223 has been modified on three separate occasions to date. Whilst the Lidsdale Siding has historically received and dispatched coal by truck, current approvals enable the receipt and dispatching of coal by rail and/or conveyor only. Coal which is destined for the Mt Piper Power Station (MPPS) can be unloaded from trains at the Lidsdale Siding and fed to an overland conveyor for transport to the MPPS.



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CENTENNIAL COAL



Regional Locality

FIGURE 1

MP o8_0223 allows no more than seven trains to arrive at and leave (i.e. a maximum of 14 movements per day) the Lidsdale Siding each day, and train loading operations cannot be undertaken on the same day as coal train unloading operations. While loading of trains can occur at any time, trains may only be unloaded during the day period.

1.1.3 Overview of the Modification

Centennial is the primary provider of thermal coal for the Energy Australia (EA) owned MPPS, which is located within the Lithgow LGA. The MPPS comprises two 700 mega watt (MW) coal-fired steam turbine generators which have the capacity to meet the energy needs of approximately 1.18 million homes in NSW.

The prevailing NSW energy crisis has resulted in diminished coal stockpile levels at the MPPS with the potential to result in MPPS's inability to meet forward electricity demand. To ensure MPPS can continue to meet the electricity demands of NSW, Centennial has been investigating ways to deliver additional coal to MPPS to secure adequate energy generation and relieve the risk of an energy shortage in NSW.

Centennial is seeking a Modification to the Clarence (DA 504-00) development approval to allow up to

200,000 tpa (i.e. an additional 100,000 tpa of coal from the currently approved) from Clarence to be transported towards the west to either the Lidsdale Siding (for blending prior to transport to MPPS) or directly to the MPPS. It is noted that Clarence was previously approved to transport up to 200,000 tpa of coal towards the west, albeit on private haul roads which are not currently accessible by Centennial. The Modification will require trucks to continue along the Castlereagh Highway and turn onto Main Street (for delivery to the Lidsdale Siding) or Boulder Road (for delivery to MPPS).

Centennial is also seeking a Modification to the Lidsdale Siding (MP o8_0223) development approval to facilitate the receipt of up to 200,000 tpa of coal from Clarence by truck which will be blended with other coal onsite prior to transport to the MPPS via the existing coal transport system at Lidsdale and Centennial's Western Coal Services.

The proposed Modification to DA 504-00 and MP o8_0223 are collectively referred to as "the Modification" throughout this Modification Report.

1.2 APPLICANT

DA 504-00 is held by Centennial Coal Company Limited. MP o8_0223 is held by Ivanhoe Coal Pty Ltd, a wholly owned subsidiary of Centennial Coal Company Limited. Centennial is the applicant for Modification 9 (MOD 9) to DA 504-00. The relevant address is:

Centennial Coal Company Limited
Level 20, 1 Market Street
Sydney NSW 2000

Ivanhoe Coal is the proponent for Modification 4 (MOD 4) to MP o8_0223. The relevant address is:

Ivanhoe Coal Pty Limited
Level 20, 1 Market Street
Sydney NSW 2000

1.3 DOCUMENT PURPOSE

This Modification Report supports Centennial's applications for MOD 9 to DA 504-00 and MOD 4 to MP o8_0223 under Section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This Modification Report provides a description of the Modifications, assesses the potential environmental and social impacts of the changes sought and proposes additional mitigation and management measures where required.

1.4 DOCUMENT STRUCTURE

This document has been prepared in consideration of “State Significant Development Guidelines – Preparing a Modification Report” (DPE, 2021) and any directions received from the relevant regulatory authorities.

Section 2 describes the existing environment and the approved operations at Clarence and Lidsdale Siding;

Section 3 provides a description of the Modification activities;

Section 4 includes a brief discussion on the applicable regulatory framework;

Section 5 outlines the stakeholder consultation conducted;

Section 6 provides a discussion on the environmental impacts from the Modifications and identifies any required additional mitigation requirements;

Section 7 provides an evaluation of merits; and

A list of the abbreviations used throughout this Modification Report and a list of relevant reference materials is also provided.

Appendix A to **Appendix C** provides copies of the detailed technical assessments and other supporting information which has been utilised in support of this Modification Report.

2. STRATEGIC CONTEXT

This section provides a discussion on the existing approved activities at Clarence and the Lidsdale Siding, the environmental setting and the surrounding land ownership and land use as relevant to the Modification.

2.1 NATURAL ENVIRONMENT

2.1.1 Clarence Colliery

Clarence is bordered by the Blue Mountains National Park to the east and partly located within the Gardens of Stone State Conservation Area (SCA) which continues to the north and west. The residential areas of Newnes Junction and Clarence Village are 900 m south-east and 1.5 km south-west of Clarence, respectively (see **Figure 1**). A number of extractive industries are in close proximity, including the Hanson Quarry to the west and the disused Rocla Quarry to the south-east. The proposed Newnes Kaolin Project is also to the south-east of Clarence.

Clarence is located within the Hawkesbury-Nepean Catchment and drains to the Wollangambe River, which in turn drains to the Colo River.

2.1.2 Lidsdale Siding

The environment surrounding Lidsdale Siding generally consists of low-density development and rural uses. The land to the north and west of the Lidsdale Siding site consists of cleared and vegetated land containing scattered residences. Grazing of livestock occurs in these areas. Further to the north-east is the Ben Bullen State Forest and Gardens of Stone SCA. To the south of the site is an industrial area and Main Street leading to the residential area of Wallerawang. Motel accommodation is also provided to the south of the Lidsdale Siding on Main Street (see **Figure 1**).

2.2 LAND OWNERSHIP & LAND USE

The underground mining operations at Clarence are generally undertaken below Crown land (recently declared to form part of the Gardens of Stone SCA). The Clarence site surface facilities are located on freehold land to the north of Chifley Road (a continuation of Bells Line of Road) and the Main Western Rail Line. A spur rail line also connects the surface facilities to the Main Western Rail Line. Road access to Clarence is directly from Clarence Colliery Road.

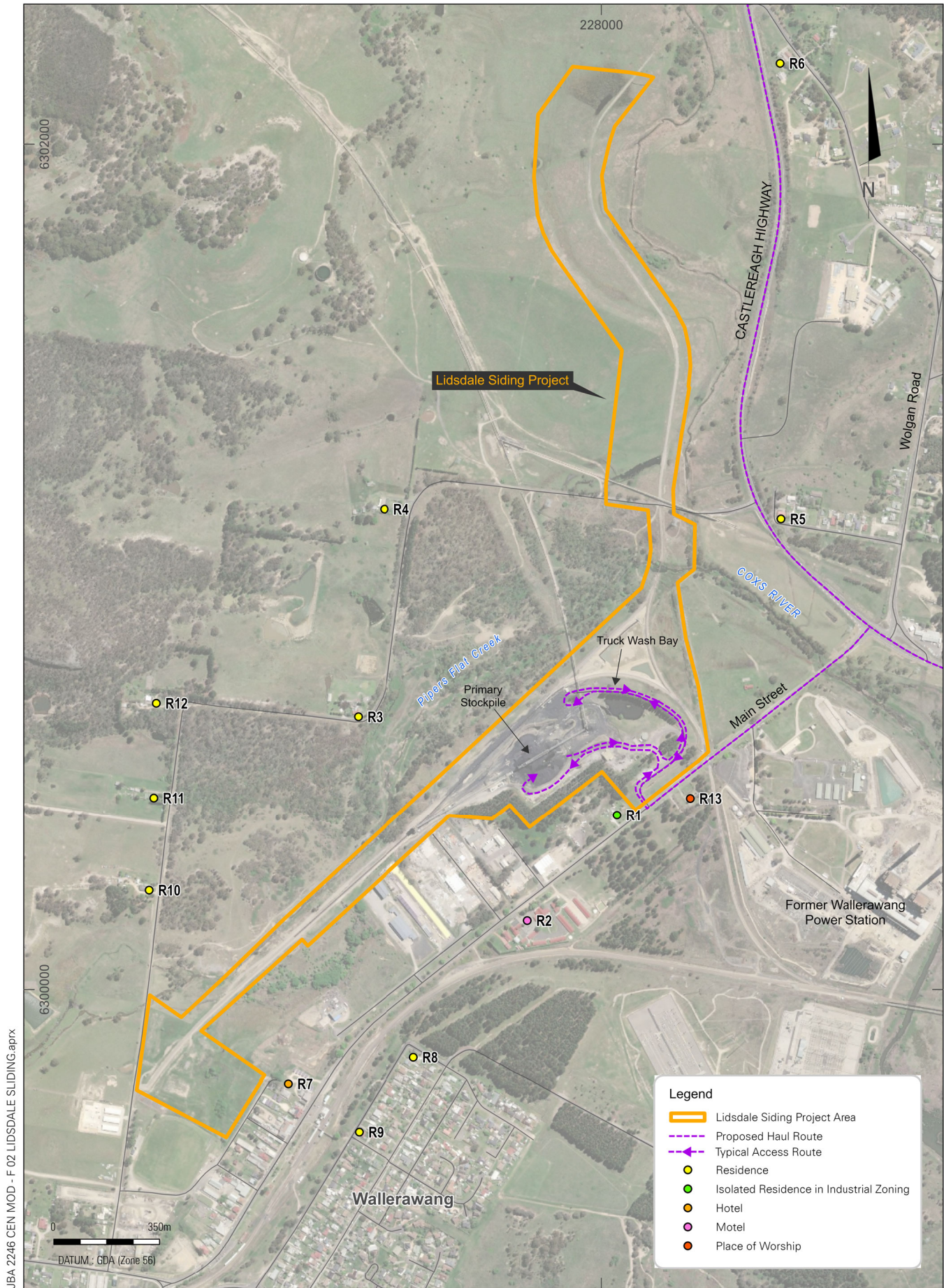
The land within Clarence's Colliery Holding boundary is zoned RU₃ (Forestry) and E₃ (Environmental Management) under the *Lithgow Local Environmental Plan 2014* (Lithgow LEP). Land uses surrounding Clarence include extractive industries, rural residential dwellings, conservation and forestry. There are six sensitive receivers within 1 km of Clarence's surface facilities. Clarence has a long history of underground mining, commencing operations in the 1980's.

The Lidsdale Siding is located on land leased by Ivanhoe Coal Pty Limited from Delta Electricity and the State Rail Authority. This land is zoned IN₁ (General Industrial) and RU₁ (Primary Production) under the Lithgow LEP. The primary land uses immediately around Lidsdale Siding include community, commercial and industrial uses (see **Figure 2**), notably:

- Black Gold Motel (approximately 250 m south);
- St John the Evangelist Church, Wallerawang (approximately 250 m south-east); and
- Residences approximately 300 m to the west, 500 m to the north and 600 m to the south.

The decommissioned Wallerawang Power Station is approximately 200 m east of the facility. Sensitive receivers, including regional receivers, and potential impacts on those receivers are discussed in **Section 6**.

Appendix A provides the schedule of land for both Clarence (DA 504-00) and the Lidsdale Siding (MP 08_0223).



CENTENNIAL COAL

2.3 APPROVED OPERATIONS

2.3.1 Clarence Colliery

Centennial was originally granted interim development consent (IRM.GE.76) in 1976 by Blaxland Shire Council (now Lithgow City Council (LCC)) for the construction of surface facilities. DA 174/93 was approved in 1994 by LCC for extension of underground coal mining, and other infrastructure. Clarence continues to operate under these approvals as modified.

Centennial was granted DA 504-00 in 2005 by the then NSW Department of Infrastructure, Planning and Natural Resources (now DPE) to expand operations at Clarence into ML 1583.

DA 504-00 has been modified seven times to date as follows:

- MOD 1: Sought approval to increase the approved road transport from 200,000 tpa to 500,000 tpa of coal from Clarence and for intersection upgrades at Clarence Colliery Road / Chifley Road intersection and Harley Avenue and the Great Western Highway. This modification application was subsequently withdrawn;
- MOD 2: Development of a reject emplacement area, upgrade and relocation of irrigation systems for rehabilitation and increase in employment numbers, approved June 2014;
- MOD 3: Approval to haul coal to the west to Kerosene Vale, approved June 2014;
- MOD 4: Temporary approval (until the end 2020) to transport additional coal to the west to supply MPPS, approved August 2019;
- MOD 5: Approval to increase workforce at Clarence, approved October 2019;
- MOD 6: Approval for rail transfer of coarse reject material to Charbon Colliery, approved August 2021; and
- MOD 7: Administrative modification to update the description of Subsidence Management Plans to Extraction Plans, approved October 2021.

Clarence has recently proposed a further modification (MOD 8) to enable the extension to mining operations. At the time this Modification Report was prepared, the application was in the process of being prepared.

Clarence has approval to extract and transport up to 3 Mtpa of coal via rail until the end of 2026, which can take place 24 hours per day, seven days per week.

Schedule 2, Condition 7 of DA 504-00 currently permits Clarence to transport up to 200,000 tpa of coal by road in total, with a maximum of 100,000 tpa of coal transported to the west, via the Darling Causeway and the Great Western Highway haulage route.

The approved haulage route to the east is shown in **Figure 1** and consists of:

- Trucks turn left from Clarence Colliery Road onto Chifley Road;
- Trucks continue east to where Chifley Road intersects with Darling Causeway - from the intersection of Chifley Road and Darling Causeway, there are two options:
 - The majority of trucks turn right onto Darling Causeway and travel south towards Mount Victoria until turning left from Station Street onto Harley Avenue and left again onto the Great Western Highway (for delivery of coal to eastern NSW); or
 - A small proportion of trucks continue to destinations north of Sydney via Bells Line of Road.

The approved haulage route (approved via MOD 3) to the west (for delivery to the Kerosene Vale Stockpile Site near Lidsdale and MPPS) is shown in **Figure 1** and consists of:

- Trucks turn left from Clarence Colliery Road onto Chifley Road;
- Trucks continue east to where Chifley Road intersects with Darling Causeway;
- Trucks turn right onto Darling Causeway and travel south towards Mount Victoria until turning right from Station Street onto the Great Western Highway towards Lithgow; and

- Trucks continue towards the Castlereagh Highway, before turning left onto the Wallerawang Power Station Haul Road to Kerosene Vale.
- The MOD 4 approval enabled short term transport to MPPS which allowed for continued haulage along the Wallerawang Power Station Haul Road and then left onto the Mt Piper Haul Road.

The Traffic Impact Assessment previously prepared by GHD (GHD, 2013) as part of the environmental assessment for MOD 3 to allow the transport of coal to the west considered impacts associated with 25 truck loads per day (ie. 50 truck movements) travelling via the approved haulage route to the west. This assessment assumed that the average load per truck would be approximately 32 tonnes (t) and that trucks would travel along the approved haulage route to the west for around 125 days per year to transport a total of 100,000 tpa.

The Traffic Impact Assessment prepared by EMM (EMM, 2019a) for MOD 4 assessed the impact of the additional daily number of trucks travelling via the approved haulage route to the west, which provided access to the MPPS via the Wallerawang Haul Road and the Mt Piper Haul Road.

2.3.2 Lidsdale Siding

Lidsdale Siding has been used for coal storage and rail loading since 1974. Historically, coal was received at the project site via the overland conveyor and road. Stockpiled coal was then loaded onto trains by front end loaders (FELs) for transport via the Main Western Railway line. Stockpiles were formed by moving coal from the overland conveyor and truck stockpiles to a train stockpile by FELs.

MP o8_0223 allowed for the extension of the rail line and establishment of a purpose-built train loading facility. Approvals for the receipt of coal by truck was suspended, with conveyors and reclaimers being installed between the overland conveyor and train loading facility to largely automate the handling and transport of coal at the Lidsdale Siding. FELs are still required for the clearing of sumps and general stockpile management.

MP o8_0223 has been modified on three occasions to date as follows:

- MOD 1: to allow the unloading of coal from trains to provide coal to MPPS, approved August 2019;
- MOD 2: minor modification to clarify the number of daily train movements at the site, approved October 2019; and
- MOD 3: removed the previous restriction for the receipt and transfer of coal to the MPPS under emergency situations only, approved November 2020.

Schedule 2 Condition 7 of MP o8_0223 states:

“The Proponent must ensure that:

- (a) All coal is transported to or from the site by conveyor or by rail;*
- (b) No more than 7 trains arrive at or leave the site each day (a maximum of 14 movements per day);*
- (c) No more than 5 trains arrive at or leave the site each day, when averaged over a calendar year; and*
- (d) Coal train loading operations are not undertaken on the same day as coal train unloading operations.”*

While the Lidsdale Siding currently has no approval to receive any coal by road, it retains operational infrastructure including a calibrated truck weigh station and a truck wash station.

3. MODIFICATION DESCRIPTION

This section provides a comprehensive description of the Modification for which approval is sought. It also provides a justification for these changes and discussion on the alternatives considered.

3.1 OVERVIEW

Centennial is the primary provider of thermal coal for MPPS, which is located within the Lithgow LGA. MPPS comprises two 700 megawatt (MW) coal-fired steam turbine generators which have the capacity to meet the energy needs of approximately 1.18 million homes in NSW.

The prevailing NSW energy crisis has resulted in diminished coal stockpile levels at MPPS and this may result in MPPS's inability to meet forward electricity demand. To ensure MPPS can continue to meet the electricity demands of NSW, Centennial has been investigating ways to deliver additional coal to MPPS to ensure adequate energy generation to relieve the risk of an energy shortage in NSW.

Clarence produces high quality, low ash thermal coal for both domestic and export customers. Clarence's planning approval (DA 504-00) currently permits the dispatch of coal via rail and allows limited dispatch of coal in trucks via public roads which includes an upper limit of 200,000 tpa of coal may be dispatched from Clarence by road. This may include:

- Up 200,000 tpa to the east; or
- Up to 100,000 tpa to the west via the Darling Causeway and Great Western Highway.

This requirement is set out in Schedule 2, Condition 7 of DA 504-00. To date for the 2022 calendar year, Clarence has transported approximately 150,000 t of coal via road to destinations to the east. Therefore, for the remainder of 2022, Clarence only has the ability to dispatch a further 50,000 t of coal to either the west or the east.

Modification 4 (MOD 4) to DA 504-00 was granted in August 2019 to facilitate (via Schedule 2 Condition 7AA) the temporary approval (i.e., from August 2019 until 31 December 2020) for the transport of up to 300,000 tpa of coal by road from Clarence. This condition also authorised the transport of up to 200,000 tpa of coal to the MPPS or to locations north of Sydney or Eastern NSW using the assessed haulage routes provided in Appendix 5 of DA 504-00. The temporary haulage route approved by Schedule 2, Condition 7AA of DA 504-00 restricted truck movements to the MPPS via Chifley Road, the Darling Causeway, Great Western Highway, Castlereagh Highway and then onto private haul roads, principally the Wallerawang Haul Road and then the Mt Piper Haul Road before entering the MPPS. Access to these private haul roads is not currently available due to changes in ownership and/or expired lease arrangements. Accordingly, any future approval to transport coal to the MPPS to the west (particularly the most western sections of the approved haulage route) would need to utilise alternate routes to those previously assessed and approved under MOD 4 to DA 504-00.

Centennial is seeking a modification to DA 504-00 for Clarence (herein referred to as MOD 9) under Section 4.55(1A) of the EP&A Act to allow for:

- A temporary increase in the total volume of product coal that can be transported from Clarence by road from the currently approved 200,000 tpa to 300,000 tpa until the end of 2023;
- A temporary increase in the total volume of product coal that can be transported by road to the west of Clarence from the current approved 100,000 tpa to 200,000 tpa until the end of 2023. The currently approved transport of up to 200,000 tpa coal from Clarence by road to the east will remain unchanged; and
- Temporary truck transport of the coal from Clarence to either the MPPS and/or to the Lidsdale Siding until the end of 2023. Truck transport will occur via the Castlereagh Highway (rather than the previously assessed private haul roads for which access is not currently available), with trucks returning to Clarence via the reverse route.

This Modification does not seek to make changes to various aspects of the approved mining operations at Clarence including (but not limited to): existing access to the mine site, the approved Disturbance Boundary, operational hours, mining methods, mining related infrastructure, water management system, coal handling and processing methods, employees and coal production rates.

In order to achieve the coal specifications required by MPPS, it is anticipated that some coal from Clarence will be required to be delivered to Centennial's Lidsdale Siding Rail Loading and Unloading Facility for blending. Blended coal from the Lidsdale Siding will then be transferred to MPPS via conveyor through Centennial's Western Coal Services Project as currently approved.

In this regard, Centennial (via its subsidiary Ivanhoe Coal Pty Ltd) is seeking to modify the Lidsdale Siding approval, MP o8_o223 (herein referred to as MOD 4) under Section 4.55(1A) of the EP&A Act to allow the temporary acceptance of up to 200,000 tpa of coal (at a rate of up to 25 truck loads per day) from Clarence by truck into Lidsdale Siding via the Castlereagh Highway and Main Street until the end of 2023.

This Modification does not seek to make changes to various aspects of the approved activities at the Lidsdale Siding including (but not limited to): existing access to the site, the approved Disturbance Boundary, operational hours, maximum rate of coal receipt/dispatch (i.e. 6.3 Mtpa), infrastructure, water management system, employees and coal handling methods.

Further details of each modification are provided within the following sections.

3.2 COAL HAULAGE

As identified above, Centennial was previously granted approval in 2019 (DA 504-00 MOD 4) to enable the temporary transport of an additional 100,000 tpa of coal (i.e. to a total of 200,000 tpa) from Clarence to the MPPS. The approval for the temporary haulage of this additional coal to the west expired at the end of 2020. The previously approved haul route allowed the transport of coal from Clarence to the MPPS via Chifley Road, the Darling Causeway, Station Street, Great Western Highway and the Castlereagh Highway to the Wallerawang Haul Road and the Mt Piper Haul Road. Access to the Wallerawang Haul Road and the Mt Piper Haul Road is no longer available.

In order to supply the additional coal to the MPPS from Clarence, Centennial is seeking to modify the approvals for Clarence and the Lidsdale Siding to authorise the transport of coal via public road to the Lidsdale Siding for blending with other coal prior to delivery to the MPPS and/or to deliver coal directly to the MPPS. The proposed transport route will essentially be equivalent to the routes illustrated within Appendix 5 of DA 504-00, however in light of the restricted access to the private haul roads, will follow either of the below routes:

- Continue along the Castlereagh Highway for a further 500 m beyond the Wallerawang Haul Road turn off and turn left onto Main Street at Wallerawang and then turning right off Main Street into the Lidsdale Siding; and/or
- Continue along the Castlereagh Highway for approximately 8 km beyond the Wallerawang Haul Road to turn left onto Boulder Road and then left off Boulder Road into the MPPS.

Trucks delivering coal to either the Lidsdale Siding and/or directly to the MPPS will return to Clarence via the reverse route. Trucks will not traverse through the City of Lithgow without the prior approval of the LCC (as is currently stipulated within Condition 7A of DA 504-00). The two haulage route options are presented in **Figure 1**.

Clarence is approved to operate up to 25 trucks per day (one way) from the site via either the eastern or western haulage routes. The proposed increase in total coal haulage by road will increase the total number of trucks which transport coal from Clarence from a maximum of up to 25 one-way trucks per day (i.e. maximum 50 total truck movements) to a maximum of up to 40 trucks per day (i.e. maximum of 80 total truck movements). Of these, a maximum of up to 25 trucks per day (one way) will travel to the west to either the Lidsdale Siding or directly to the MPPS. The proposed 25 trucks per day (one way) travelling to the west is an upper limit on any one day.

The haulage of coal to the west will be limited to the currently approved operating hours (as per Schedule 2, Condition 7B of DA 504-00) of 7 am to 10 pm (Monday to Saturday) and 8am to 10pm (Sunday and public holidays).

The additional coal haulage will be transported using a haulage contractor with their existing truck fleet. The current road haulage management controls in place at Clarence will continue to be employed. There will be no change to the approved daily maximum number of trucks transporting coal to the east. Trucks will travel via the vehicle wash bay to ensure each truck is clean prior to leaving Clarence. Furthermore, all truck loads will be covered prior to leaving Clarence.

3.3 LIDSDALE SIDING

The Lidsdale Siding is approved under MP o8_0223 to accept up to 6.3 Mtpa of coal. This coal is currently approved to arrive at the Lidsdale Siding via overland conveyors and via train utilising temporary unloading infrastructure. Coal is then transported from the Lidsdale Siding by rail to various destinations across the rail network, and to the MPPS when required via overland conveyors.

No more than seven trains can arrive or leave the site each day (a maximum of 14 movements per day) and no more than five trains per day can arrive or leave the site when averaged over a calendar year. The Lidsdale Siding is currently approved to unload coal from trains during the day period only. Train loading operations are not undertaken on the same day as train unloading operations.

The modification proposes a maximum of up to 25 trucks per day to deliver coal from Clarence to the main coal stockpile in the south western extents of the Lidsdale Siding. Access to the coal stockpile will be provided by the existing access roads at the Lidsdale Siding with no additional disturbance or construction required. From this coal stockpile, coal will either be blended with other coal at the Lidsdale Siding or be loaded directly onto the conveyor system for delivery to the MPPS using existing equipment and infrastructure. The typical access (subject to safety requirements on the day of delivery) around the Lidsdale Siding is shown in **Figure 2**.

There will be no change to the 6.3 Mtpa of coal able to be received at the Lidsdale Siding. The unloading of the trucks at the Lidsdale Siding will occur during the hours specified within DA 504-00 for the haulage of coal to the west (i.e. 7 am to 10 pm (Monday to Saturday) and 8am to 10pm (Sunday and public holidays)). Empty trucks will travel via the vehicle wash bay to ensure the trucks are clean prior to leaving the Lidsdale Siding (see **Figure 2**).

3.4 MT PIPER POWER STATION

Centennial has confirmed with Energy Australia that the approval for MPPS allows the delivery/receipt of coal via truck at the rates that are proposed under the Modification. The trucks will unload coal consistent with current MPPS site procedures. Trucks will travel via the MPPS vehicle wash bay to ensure they are clean prior to leaving the site. Accordingly, no modification is being sought to the approval for the MPPS. The access route for trucks into MPPS is shown in **Figure 3**.

3.5 MODIFICATION JUSTIFICATION

Centennial is the primary provider of thermal coal to MPPS. Coal stockpile levels at the MPPS have diminished significantly due to the prevailing NSW energy crisis. This may result in MPPS's inability to meet the immediate forward electricity demand.

Centennial's previous approval to truck 200,000 tpa of coal to the MPPS expired in 2020. This Modification is required to re-instate this ability, using a modified transport route. The previously approved route using the Wallerawang Haul Road and Mount Piper Haul Road is not currently available due to changes in ownership and/or expired lease arrangements.

The transport of coal from Clarence to Lidsdale Siding is required to allow for blending to occur to ensure that the coal meets the specifications required for the efficient operation of the MPPS.



JBA 2246 CEN MOD - F 03 POWER STATION.aprx

CENTENNIAL COAL



Mount Piper Power Station

FIGURE 3

Environmental assessments have been undertaken to support this Modification Report. The findings of these environmental assessments are summarised in **Section 6** along with the proposed mitigation and management measures to be implemented to avoid, minimise and manage the potential impacts of the Modification. These environmental assessments have not identified any material additional environmental impacts which are not able to be appropriately managed.

3.6 ALTERNATIVES CONSIDERED

3.6.1 Rail Transport

Centennial has previously considered the transport of coal to the west by train as part of MOD 2 to DA 504-00 and determined that this alternative was not feasible.

Coal which is proposed to be sent from Clarence to the MPPS typically contains a higher fines content which is sensitive to rainfall and moisture. The fine coal component of the coal product absorbs any rainfall and becomes "sticky" to handle. This results in difficulties being experienced during the loading into trains and the unloading from trains, where particular difficulties may be experienced as a result of the unloading procedures currently employed at Lidsdale Siding.

The potentially "sticky" nature of the fine coal component will cause blockages and may result in the material "hanging up" in the wagon. Furthermore, Centennial has identified that it is more feasible to manage the transport of coal to MPPS using covered trucks from a logistics point of view. The dispatch of coal via truck offers far superior flexibility as compared to trains. It allows Centennial to respond to demand at short notice, respond to the prevailing weather conditions and protect the coal within a covered vessel. Organising a train requires notice well in advance of the day of transport which pays no regard to the prevailing weather conditions. The residual risk is the chance of rainfall resulting in the coal being unable to be loaded onto trains and/or the coal getting wet from rainfall in transit resulting in issues when unloading.

3.6.2 Road Haulage/Supply from Other Centennial Operations

Centennial has a number of mining operations within the Western Region. Airly Mine, Springvale and Clarence are currently operational and continue to supply coal to the domestic and export markets.

Road haulage from Airly Mine was previously not determined to be feasible given the potential road impacts and the feedback from community consultation during the environmental assessment process for that project. Supplies from the Springvale Mine via the Western Coal Services will continue as currently approved. However, it is noted that the additional coal supplies from Clarence will supplement the coal already approved to be supplied by Springvale. Springvale does not currently have the capacity to meet MPPS's immediate additional supply need.

3.6.3 Other Rail Unloading and Coal Transfer Options

Energy Australia received approval for the construction of the Pipers Flat rail unloader facility in 2009 and a modification to the consent in 2019 included a revised design to improve efficiency and reduce the environmental impacts of the development, as well as to extend the required start date of the approval permit. The construction of the Pipers Flat rail unloader facility has not yet commenced and it is anticipated to take a number of years. Accordingly, the Pipers Flat rail unloader facility is not considered an option to meet predicted immediate shortfalls in coal supply to the MPPS.

3.6.4 Do Nothing

Failure to proceed with Clarence's MOD 9 and Lidsdale Siding's MOD 4 will result in Centennial not being able to deliver the additional coal immediately required by MPPS to meet the forecast NSW energy demands. This could result in the ongoing decline of coal and energy stocks available at MPPS. Alternatively, coal supplies could be procured from other operations (including from suppliers) outside of the Lithgow LGA if available and cost effective, resulting in longer travel times and greater environmental consequence. The 'do nothing' scenario could risk the MPPS power generation capacity, potentially impacting supply of electricity to NSW.

4. STATUTORY CONTEXT

This section describes the provisions of legislation that are applicable to this Modification.

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

4.1.1 Modification of Approvals

Centennial is seeking to modify DA 504-00 and MP 08_0223 pursuant to Section 4.55(1A) of the EP&A Act. Development consent may be modified under Section 4.55 of the EP&A Act provided that the development as modified will be substantially the same development as the development for which consent was originally granted. Compliance of the proposed modification with the requirements of Section 4.55(1A) is provided in Table 1.

Table 1 Comparison with Section 4.55(1A) Requirements

Section 4.55(1A) Requirement	DA 504-00	MP 08_0223
(a) it is satisfied that the proposed modification is of minimal environmental impact	<p>Impact assessments have been undertaken which have determined that the Modification to DA 504-00 will result in minimal environmental impacts.</p> <p>DA 504-00 currently includes Schedule 2, Condition 7AA which permitted the transport of up to 200,000 tpa of product coal to the west until the end of 2020, albeit the western portion of the approved haulage route is proposed to be realigned to remain on Castlereagh Highway as part of the Modification. The traffic assessment concluded that the road network will continue to perform at a satisfactory capacity as a result of the Modification.</p>	<p>Impact assessments have been undertaken which have determined that the Modification to MP 08_0223 will result in minimal environmental impacts.</p> <p>Lidsdale Siding is currently approved for the receipt of coal via overland conveyor and train only. The receipt of up to 200,000 tpa of coal by truck is not expected to result in material additional environmental impact. Noise impacts from the Lidsdale Siding with delivery of coal by trucks have been predicted to remain within applicable criteria.</p>
(b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all)	<p>The proposed Modification to DA 504-00 is substantially the same development for which consent was originally granted and its modifications, being the underground mining of coal, and transport of coal off-site by rail and road.</p> <p>The modification proposes a temporary increase to the volume of coal to be transported by road from the site from 200,000 tpa to 300,000 tpa and transported by road to the west from 100,000 tpa to 200,000 tpa. This increase will operate for a limited time until 31 December 2023.</p>	<p>The proposed Modification to MP 08_0223 is substantially the same development for which consent was originally granted and its modifications, being the receipt and transferral of coal for transport to the domestic and export markets.</p> <p>Although the receipt of coal at the Lidsdale Siding is currently approved by overland conveyor and rail, the temporary receipt of coal by truck will not change the overall scope of the Lidsdale Siding as a coal handling and rail loading facility. Coal receipt will continue</p>

Section 4.55(1A) Requirement	DA 504-00	MP 08_0223
	With the exception of additional truck movements and modified haul route, there will be no other changes to the approved project.	to remain within the currently approved limit of 6.3 Mtpa.
(c) it has notified the application in accordance with- <ul style="list-style-type: none"> i. the regulations, if the regulations so require, ii. a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and 	DPE will consider the public notification requirements in accordance with Section 105 of the <i>Environmental Planning and Assessment Regulation 2021</i> (EP&A Regulation). It is noted that it is at DPE’s discretion whether an application under Section 4.55(1A) of the EP&A Act is publicly exhibited and for how long.	
(d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.	Any submissions received concerning the Modification will be reviewed by DPE. DPE may seek Centennial to consider and respond to any submissions by way of a Submissions Report.	

4.2 LITHGOW LOCAL ENVIRONMENT PLAN 2014

Clarence is located on land zoned RU₃ (Forestry) and E₃ (Environmental Management) under the *Lithgow Local Environment Plan 2014* (LEP). Section 2.9(1)(a) of the *State Environmental Planning Policy (Resources and Energy) 2021* (Resources & Energy SEPP) states that development for the purpose of underground mining may be carried out on any land with development consent. In relation to any inconsistency between the Resources & Energy SEPP and an LEP, Section 2.6(1) provides that the Resources & Energy SEPP prevails to the extent of the inconsistency. On this basis, any provision in the Lithgow LEP that will otherwise operate to prohibit the proposed modification has no effect. The proposed Modification is permissible with development consent.

The Lidsdale Siding is located on land zoned IN₁ (General Industrial) and RU₁ (Primary Production) under the Lithgow LEP. The relevant permitted activities within these zones are General Industries and Agriculture. Section 2.9(1)(b)(i) of the Resources & Energy SEPP allows for mining, including the stockpiling, processing, treatment and transportation of materials extracted on land where agriculture or industry is permitted. The stockpiling and transportation of coal proposed by the Modification is therefore permissible.

4.3 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

4.3.1 Clarence Colliery

Clarence is classified as a ‘premises based scheduled activity’ under the *Protection of the Environment Operations Act 1997* (POEO Act) and operates under Environment Protection Licence (EPL) 726. No changes to EPL 726 are proposed, and the Modification will continue to operate under this EPL.

4.3.2 Lidsdale Siding

The Lidsdale Siding is classified as a 'premises based scheduled activity' under the POEO Act and operates under EPL 5129. The proposed Modification will continue to operate under EPL 5129 with no changes proposed.

4.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) outlines the role of the Commonwealth in the protection of the environment. The EPBC Act provides protection for listed Matters of National Environmental Significance (MNES). A proponent must make a Referral under Section 68 of the EPBC Act if the proposed action has the potential to result in significant impacts to MNES.

The proposed Modification does not seek to conduct any further disturbance and will not change the existing water management approach at either Clarence or the Lidsdale Siding and is therefore unlikely to have a significant impact on any MNES listed under the EPBC Act. Centennial has therefore considered that the proposed Modification is not required to be referred to the federal Department of Climate Change, Energy, the Environment and Water (DCCEEW).

4.5 STATE ENVIRONMENTAL PLANNING POLICY (RESOURCES AND ENERGY) 2021

Section 2.22 of the Resources & Energy SEPP requires that, prior to consent being given for the transport of materials for the purposes of mining, a consent authority should consider conditions that:

"(a) require that some or all of the transport of materials in connection with the development is not to be by public road,

(b) limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,

(c) require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads."

The consent authority is also required to provide a copy of a development application to each roads authority for a road where materials will be transported and to the Transport for NSW (TfNSW). The application may not be determined until it takes into consideration any response from these authorities within 21 days after they were provided with a copy, and must provide them with a copy of the determination.

The proposed Modification generally follows routes already approved for the transport of coal. The exception is the continuation of road haulage along the Castlereagh Highway to either the Main Street or to Boulder Road for access to the Lidsdale Siding or MPPS respectively.

This Modification Report has included a Traffic Impact Assessment which confirms that the proposed Modification will not result in any material impacts to traffic operation or road safety. Centennial has consulted with TfNSW and provided a briefing over the changes sought by the Modification. Matters raised during the meeting with TfNSW have been addressed within this Modification Report.

Centennial has in place an internal Haulage Management Standard which establishes processes, procedures and other requirements to ensure trucks are roadworthy, loaded correctly prior to entering and leaving site and are operated in a suitable manner. The internal Haulage Management Standard will be revised and updated post approval to ensure that it remains consistent with all approved operations.

5. STAKEHOLDER ENGAGEMENT

This section provides a summary of the stakeholder engagement undertaken for the purposes of the Modification.

5.1 CONSULTATION PROGRAM

The stakeholder consultation program for the Modification has included engagement with the Clarence and Western Regions Community Consultative Committee’s (CCC’s), near neighbours, and regulatory authorities (including the relevant local and state government agencies) and industry stakeholders. Table 2 outlines the relevant level of consultation activities undertaken for this Modification. Outcomes from discussions have been incorporated into this Modification Report.

Centennial wrote to DPE on 22 July 2022 providing an overview of the proposed Modification and requested feedback in relation to the proposed approvals path and environmental assessments to be completed. DPE responded, via the Portal, on 26 July 2022 that the DPE has reviewed the proposed approach to preparing a Modification Report (including the approvals pathway and the proposed environmental assessment requirements for the Modification Report). DPE confirmed that, based on the above, the Modification Report could be prepared and lodged via the Portal.

Various communication and engagement mechanisms will continue to be implemented to ensure the effective ongoing engagement with key stakeholders.

Key consultation avenues that are maintained by Centennial include:

- Regular consultations with the key agencies, local Council and the community; and
- Updates to the Clarence and the Western Region CCCs.

Table 2 Stakeholder Engagement and Consultation

Stakeholder	Method of Consultation	Issues Raised
Community		
Western Region CCC	Meeting held 17 August 2022	Overview of proposed changes sought by the Modifications and proposed Environmental Assessments. Tour of the Lidsdale Siding facility including coal handling infrastructure, truck bay and environmental monitoring. Nil issues raised.
Clarence CCC	Letter correspondence sent to CCC members dated 13 September 2022	Overview of proposed changes sought by the Modifications and proposed Environmental Assessments.
	Meeting held 20 September 2022	Overview of proposed changes sought by the Modifications and proposed Environmental Assessments in particular the transport routes. Nil issues raised.
Near Neighbours	Face to face meeting with neighbouring residential landholder and nearby accommodation business on 13 September 2022. Written correspondence also provided.	Brief overview of proposed changes sought by the Modifications and proposed Environmental Assessments.

Stakeholder	Method of Consultation	Issues Raised
Community Representative Groups	Letter correspondence (dated 13 September 2022) sent to: <ul style="list-style-type: none"> Wallerawang Lidsdale Progress Association; and Clarence Dargan RFS. 	Overview of proposed changes sought by the Modifications and proposed Environmental Assessments. Nil issues raised.
Regulatory Authorities		
DPE	Meeting via MS Teams held on 11 July 2022	Briefing on the proposed Modification. Requirement for Scoping Letter to be prepared and submitted on Planning Portal for DPEs review and confirmation.
	Letter correspondence sent to DPE on 22 July 2022	Letter provided a brief overview of the Modification, the proposed approvals path and key Environmental Assessments proposed within the Modification Report for DPE confirmation
	Email from DPE dated 24 July 2022	Email indicates that DPE had reviewed the proposed approach to preparing a Modification Report (including the approvals pathway and the proposed environmental assessment requirements for the Modification Report) and confirmed that the Modification Report could be prepared and lodged via the Portal.
Transport for NSW	Meeting on 21 September 2022	Brief overview of proposed changes sought by the Modifications and outcomes of the Traffic Impact Assessment. TfNSW commented on the adequacy of SIDRA modelling assumptions in relation to vehicles to be used and has requested a copy of the SIDRA modelling files for review. TfNSW also raised the need for a detailed justification to be provided in relation to the current access to private haul roads.
Lithgow City Council	Meeting on 8 July 2022	General meeting update including a brief introduction on the proposed Modification.
	Attend Western Region CCC 17 August 2022	Brief overview of proposed changes sought by the Modifications and proposed Environmental Assessments. Nil issues raised.
	Email correspondence 19 August 2022	Notification to Mr Craig Butler (CEO) of the proposed changes sought by the Modifications and proposed Environmental Assessments. Nil issues raised.
	Email correspondence 6 September 2022	LCC Planner seeking clarification if seeking to amend condition 7AA Clarence Coal Consent- Schedule 2 Administrative Conditions of the consent to 31 December 2023. Provided transport route figure and

Stakeholder	Method of Consultation	Issues Raised
		notification letter CEY had previously provided to DPE as a means to clarify.
National Parks and Wildlife Service (NPWS)	Meeting on 9 September 2022	Brief overview of the Modification. NPWS requested confirmation that the trucking of coal will not traverse through the Gardens of Stone SCA. Confirmation provided that coal will only be transported via public sealed roads and will not traverse through the SCA.
Industry		
Energy Australia	Various discussions in relation to the supply of additional coal to MPPS	Brief overview of proposed changes sought by the Modifications and proposed Environmental Assessments. Nil issues raised.

6. IMPACTS, MANAGEMENT AND MITIGATION

This section provides an assessment of the potential environmental impacts of the Modification and describes the measures that will be implemented to mitigate these impacts.

6.1 TRAFFIC MANAGEMENT

6.1.1 Background

A Traffic Impact Assessment has been prepared by Stantec for the Modification and is provided in **Appendix B**. This assessment considered the potential impacts of the additional truck movements proposed by the Modification on the regional road network.

The previous impact assessments completed for MOD 4 to DA 504-00 in 2019 for the eastern portion of the proposed haulage route to the west (i.e. to the Wallerawang Haul Road) remains relevant and has been relied on for the Traffic Impact Assessment.

Stantec specifically focussed on the assessment of impacts to the new sections of the haulage route to the west (i.e. the section of Castlereagh Highway from its intersection with the Wallerawang Haul Road to the Lidsdale Siding and the MPPS). This includes the consideration of interactions with the Castlereagh Highway/Boulder Drive intersection and the Castlereagh Highway/Main Street/Wolgan Road intersection, and increased heavy vehicle traffic along the proposed route shown in **Figure 1**.

Classified turning movement counts were undertaken at two intersections on Wednesday, 3 August 2022 for the periods between 6 am to 10 am and 2 pm to 6 pm (representing the morning and afternoon peak periods). The survey data indicated that peak hourly traffic flows for the morning and afternoon periods as follows:

- Castlereagh Highway / Main Street / Wolgan Road
 - Morning peak: 6:15 am to 7:15 am;
 - Afternoon peak: 2:45 pm to 3:45 pm.
- Castlereagh Highway / Boulder Road
 - Morning peak: 7:45 am to 8:45 am;
 - Afternoon peak: 2:45 pm to 3:45 pm.

The proportion of heavy vehicle movements using Castlereagh Highway was observed to be generally higher during the morning peak hour than the afternoon peak hour.

6.1.2 Assessment of Impacts

An analysis of the intersection performance at the two intersections was undertaken using SIDRA (version 9) software. The purpose of the intersection analysis was to identify capacity issues at the intersections and assist in proposing mitigation measures (if required) to ensure the satisfactory performance of these intersections.

The intersection performance criteria from the TfNSW *Traffic Modelling Guidelines* (2013) were utilised for the assessment. The capacity of a road network can be primarily determined by the capacity of the controlling intersections. The key indicator of the Level of Service (LoS) of an intersection is the average delay experienced by vehicles. The LoS is measured on a continuum from 'A' to 'F', with LoS A indicating good operation and LoS F indicating unsatisfactory operation and requires hard measures to improve the performance of the intersection.

The intersection analysis was conducted for the current (Base) case and the proposed (Base + Modification) case.

Analysis of the Castlereagh Highway / Main Street / Wolgan Road intersection and the Castlereagh Highway / Boulder Drive intersection identified that performance at both intersections remains unchanged at LoS A between the Base and Base + Modification scenarios. This indicates that these intersections are performing with good operation.

Criteria contained within Austroads *Guide to Traffic Management Part 3: Traffic Studies and Analysis Methods* (2020) were used to assess traffic performance along the road network and determine the mid-block road capacity. The mid-block LoS assessment criteria provide a useful benchmark to assess changes as a result of the Modification. The mid-block volumes for both the 'Base' and the 'Base + Modification' scenarios remained the same at LoS A. This indicates the proposed modification has little to no impact on the road network performance.

Crash data extracted from the TfNSW *Centre for Road Safety* database for the period 2016 to 2020 for the proposed haulage route were reviewed. The data identified that there had been a total of 91 crashes along the proposed haulage route, the majority of which were rear-end collisions, left off carriageway into object and left off carriageway on a right bend into an object. Four crashes occurred at intersections along the route. None of the crashes resulted in a fatal accident. Stantec concluded that the additional traffic assessed under the Modification is unlikely to have a detrimental impact on the crash rate along the proposed haulage route.

A Safe Intersection Sight Distance (SISD) assessment was completed for the two intersections and identified that there was good intersection visibility for both intersections. Stantec concluded that intersections comply with the Austroads safe intersection site distance.

6.1.3 Mitigation

The Traffic Impact Assessment determined that the additional traffic generated by the Modification would have a negligible impact on the operation of the road network and there were no specific upgrade measures warranted to address the potential adverse impacts of the Modification.

Centennial will continue to implement internal standards and procedures, including the Clarence Haulage Management Standard which addresses the code of conduct, fatigue management and other measures for truck drivers hauling coal along the proposed route.

6.2 ACOUSTICS

6.2.1 Background

A Noise Impact Assessment has been prepared for the Modification by Bridges Acoustics and is presented in **Appendix C**. This assessment considered the potential noise impacts as a result of the additional truck movements proposed by the Modification at Clarence, the Lidsdale Siding and along the proposed haulage route.

The Noise Impact Assessment has been undertaken in consideration of the requirements of the following contemporary technical policies and guidelines:

- *Noise Policy for Industry* (NPfI) (EPA, 2017) in relation to the assessment of noise of trucks at Clarence and the Lidsdale Siding; and
- *Road Noise Policy* (RNP) (DECCW, 2011) in relation to the assessment of the truck noise on public roads.

Noise criteria as specified within DA 504-00 and MP o8_o223 were relied upon in relation to the assessment of truck noise at Clarence and the Lidsdale Siding. The RNP traffic noise criteria were utilised for the assessment of the additional truck noise on the local road network. The RNP recommends a maximum traffic noise increase of 12 LAeq,15hr during the day due to increased traffic from a development.

6.2.2 Assessment of Impacts

Clarence Colliery

Previous modifications have assessed the noise impacts of truck haulage from Clarence, including up to 40 truck movements per day as proposed by this Modification. Consistent with the findings of previous assessments, the proposed additional truck movements from Clarence would not increase the approved noise levels in a 15 minute assessment period. Rather, the trucks movements will be experienced over a greater number of days per year. Accordingly, the predicted noise levels from Clarence to receptors, expressed as LAeq, 15min level for direct comparison with the DA 504-00 noise criteria, would therefore remain unchanged.

Lidsdale Siding

Currently approved operations at the Lidsdale Siding with the potential to generate noise include:

- Receiving coal from mines in the area by conveyor;
- Dispatching coal by conveyor to MPPS and to Centennial's Western Coal Services (WCS);
- Loading up to 7 trains per day with coal; and
- Unloading coal from trains.

Train movements and the operation of mobile plant on stockpiles are the predominant noise emissions, with relatively insignificant noise from conveyors.

Bridges Acoustics concluded that the predicted truck noise is lower than recent measurements of noise from the Lidsdale Siding and the combined noise from existing operations and proposed truck movements would comply with the relevant noise criteria at the closest receptors to the Lidsdale Siding site in all directions.

Traffic Noise

Road traffic noise (including for the transport of up to 200,000 tpa to the west of Clarence) has previously been assessed in modifications to DA 504-00. Those assessments did not identify any road noise issues as a result of the haulage of coal along the approved haulage route.

The western portion of the proposed haulage route for this Modification was subject to further assessment.

Existing and proposed traffic noise levels on the Castlereagh Highway (between Wallerawang Haul Road and Boulder Road) were predicted to remain below the 60 LAeq,15hr traffic noise criterion for the day period. The proposed additional truck movements would result in an increase of approximately 0.3 LAeq,15hr to all residences which is well below the recommended maximum increase of 12 dBA (from the RNP).

In relation to the assessment of traffic noise at Main Street, the existing and proposed traffic noise levels were predicted to be between 53 to 54 LAeq,1hr outside of the closest receptor to the road (i.e. a church located opposite the intersection with the Lidsdale Siding). The RNP noise criteria for a place of worship during the day when the space is occupied is 40 LAeq inside the building. Internal noise levels would be approximately 10 dBA lower than external noise levels with windows and doors open, therefore internal noise levels of approximately 43 to 44 LAeq,1hr are predicted. While the predicted traffic noise levels are above the recommended 40 LAeq internal noise level, the proposed truck movements are not expected to increase existing traffic noise levels by more than 1 dBA which is considered insignificant. The proposed traffic noise levels are therefore considered acceptable at this receptor.

The approximate 300 m section of Boulder Road to be utilised does not contain any nearby receptors for consideration of potential road noise impacts.

6.2.3 Mitigation

The Noise Impact Assessment concluded that the proposed road transportation of coal from Clarence to either the Lidsdale Siding or the MPPS is considered acoustically acceptable. Road noise impacts resulting from the transport of up to 200,000 tpa of coal will generally produce similar traffic noise levels that occurred under Schedule 2 Condition 7AA of DA 504-00 until 31 December 2020.

The management and monitoring of noise impacts from the operations at Clarence and the Lidsdale Siding will continue to be undertaken in accordance with the approved Centennial Western Region Noise Management Plan.

6.3 OTHER ENVIRONMENTAL IMPACTS

An assessment of other potential environmental impacts is provided in the sections below. The proposed modification does not include any ground disturbance which may impact on biodiversity, Aboriginal Heritage, Historic Heritage, groundwater or soils.

Environmental Management, including monitoring and reporting requirements, will continue to be managed in accordance with Clarence's *Environmental Management Strategy* (Centennial, 2021a) and the Lidsdale Siding's *Environmental Management Strategy Springvale Coal Services* (Centennial, 2021b).

Other potential environmental impacts are discussed in the following sections.

6.3.1 Air Quality

The key aspects of the Modification which may result in air quality impacts are the loading of trucks, transport of coal by road and unloading of coal from the trucks. There will be a small increment in particulate emissions from the additional trucks being loaded and unloaded, however this is unlikely to result in an exceedance of air quality criteria.

All haul trucks will pass through a vehicle wash bay before leaving each site (i.e. Clarence, the Lidsdale Siding and MPPS). This will remove any 'hang up' or spillage of coal and dirt or mud from vehicle tyres. Further, loaded trucks will be covered to ensure no windblown dust leaves each loaded vehicle during transport.

Air quality impacts at Clarence and the Lidsdale Siding will continue to be managed in accordance with Centennial's *Air Quality and Greenhouse Gas Management Plan Western Region* (Centennial, 2021c) (AQGHGMP).

6.3.2 Greenhouse Gas

There will be an incremental increase in Greenhouse Gas (GHG) emissions resulting from the additional truck movements required (as opposed to this coal being transported by rail), however this increase will be immaterial in relation to NSW's or Australia's total GHG emissions.

The Modification does not seek an increase in the approved coal extraction limits at Clarence with coal production rates currently scheduled to remain well below the approved 3 Mtpa limit.

GHG emissions from the Clarence and Lidsdale Siding will continue to be managed in accordance with Centennial's AQGHGMP, including the use of low sulphur diesel in its contracted coal haulage trucks.

Centennial will continue to actively pursue, with Banpu Energy Australia (BEN), opportunities to decarbonise its operations and upcycle its assets into future renewable energy projects. Centennial strives to part of low carbon society, supporting initiatives, research and development of low greenhouse gas emission technologies.

As described within Centennial's 2020 Sustainability Report, Centennial's sister company, BEN, with its focus on renewable energy projects/solutions, will facilitate the decarbonisation of Centennial's operations. Centennial has engaged BEN to support decarbonisation of its portfolio through:

- Re-use of assets for renewable power (solar, underground pumped hydro);

- Energy management (efficiency, demand response);
- Waste gas to energy (Mandalong Mine Power Station); and
- Introduction and use of advanced analytics platforms.

6.3.3 Hazards

The loading of trucks at Clarence will continue to be undertaken in accordance with internal processes and procedures which will not change as a result of the Modification. The unloading of trucks at the Lidsdale Siding represents a change to the current operations and internal processes and procedures will be prepared to assess the safety risks associated with this activity onsite.

The traffic risks associated with the proposed use of the Castlereagh Highway / Boulder Road intersection and the Castlereagh Highway / Main Street intersection have been assessed and will not result in any tangible impacts to traffic operation or road safety (**Section 6.1**). The internal Haulage Management Standard will be utilised to continue to manage potential traffic risks.

6.3.4 Socio-Economic

The potential socio-economic risks associated with the Modification include:

- Road traffic noise;
- Traffic and road safety;
- Air quality; and
- Economic.

Potential traffic and noise impacts have been assessed and are discussed in **Section 6.1** and **Section 6.2**. These assessments identified negligible impacts due to the Modification.

Air quality impacts have been discussed in **Section 6.3.1**, and any impacts are considered minor.

There will be an economic benefit to society in the form of additional salaries to the contractors operating the additional haul trucks and the flow on benefits from the costs associated with the operation of these trucks.

The Modification is also anticipated to provide a net benefit to NSW in delivering suitable quality coal at a competitive price to the MPPS to assist it in its endeavours to supply reliable and affordable electricity to NSW households. The additional coal provided to the MPPS will reduce the risk of an energy shortage at the Power Station, through the provision of additional energy stocks up until the end of 2023. This in turn, will assist in reducing the likelihood of power outages caused by a lack of energy stocks at the MPPS, depending on demand.

7. MERIT EVALUATION

This section provides a justification and evaluation, integrating the findings of previous sections to weigh up the positive and negative impacts of the Modification.

7.1 JUSTIFICATION OF THE MODIFIED PROJECT

The Modification to DA 504-00 (MOD 9) as assessed within this Modification Report will result in changes to the following aspects of the approved activities at Clarence:

- A temporary increase in the total volume of product coal that can be transported from Clarence by road from the currently approved 200,000 tpa to 300,000 tpa until the end of 2023;
- A temporary increase in the total volume of product coal that can be transported by road to the west of Clarence from the current approved 100,000 tpa to 200,000 tpa until the end of 2023. The currently approved transport of up to 200,000 tpa coal from Clarence by road to the east will remain unchanged; and
- Temporary truck transport of coal from Clarence to either the MPPS and/or to the Lidsdale Siding until the end of 2023. Truck transport will occur via the Castlereagh Highway (rather than the previously assessed private haul roads for which access is not currently available), with trucks returning to Clarence via the reverse route.

The Modification is seeking to reinstate the ability to transport up to 200,000 tpa of coal (i.e. an additional 100,000 tpa greater than that currently approved) from Clarence to the west as was previously permitted (until the end 2020) under DA 504-00. It will also enable trucks to continue along the Castlereagh Highway towards the Lidsdale Siding and the MPPS now that the previous haulage route via the private haul roads is not currently available. All other aspects of the approved operations at Clarence will remain the same.

The Modification to MP 08_0223 (MOD 4) as assessed within this Modification Report will result in the following changes to the approved activities at the Lidsdale Siding:

- Temporary acceptance of up to 200,000 tpa of coal from the Clarence by truck into Lidsdale Siding via the Castlereagh Highway and Main Street until the end of 2023.

All other aspects of the approved operations at the Lidsdale Siding will remain as currently approved.

Section 6 provides an assessment of the potential environmental impacts of the Modification, which included assessments on the potential traffic and noise implications. The Traffic Impact Assessment concluded that the Modification will not significantly increase the traffic demand on the road network during the peak period and that there will be no material impacts to traffic operation or road safety. The Noise Impact Assessment concluded that the noise emissions generated by the Modification remain within the relevant criteria at Clarence, the Lidsdale Siding and along the proposed haulage route to the west and is therefore acoustically acceptable. Other potential environmental and social impacts were assessed to be minor and can be appropriately managed utilising the environmental management system in place at Clarence and the Lidsdale Siding.

The Modification will benefit NSW by providing an immediate cost-effective additional coal supply to the MPPS up until the end of 2023. This in turn will assist Energy Australia in meeting a potential shortfall in reliable and affordable electricity supply during this period.

The Modification to DA 504-00 and MP 08_0223 is considered to result in minimal environmental impact. Each development will remain substantially the same development as the development originally approved (or as last modified by the former Section 75W of the EP&A Act). As such, it is considered that both Modification Applications can be approved pursuant to Section 4.55(1A) of the EP&A Act.

REFERENCES

- Austroads (2020) *Guide to Traffic Management Part 3: Traffic Studies and Analysis Methods*
- Centennial (2021a). *Clarence Colliery Environmental Management Strategy*.
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- Centennial (2021c). *Air Quality and Greenhouse Gas Management Plan Western Region*.
- Department of Planning and Environment (2021). *State Significant Development Guidelines – Preparing a Modification Report*
- DECCW (2011). *Road Noise Policy*.
- EPA (2017). *Noise Policy for Industry*.
- EMM (2019a). *Clarence Colliery Modification to DA 504-00 Traffic Impact Assessment*
- EMM (2019b). *Lidsdale Rail Siding modification: Noise Assessment*
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- TfNSW (2013). *Guide to Traffic Generating Developments*.

ABBREVIATIONS

Abbreviation	Meaning
AQGHGMP	Air Quality and Greenhouse Gas Management Plan
BEN	Banpu Energy Australia
CCC	Community Consultative Committee
Centennial	Centennial Coal Company Pty Ltd
Clarence	Clarence Colliery
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	Department of Planning and Environment
EA	Environmental Assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
FEL	Front end loader
GHG	Greenhouse Gas
Ivanhoe Coal	Ivanhoe Coal Pty Ltd
LCC	Lithgow City Council
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
km	Kilometres
m	metres
ML	Mining Lease
MNES	Matters of National Environmental Significance
MOD	Modification
MP	Major Project
MPPS	Mount Piper Power Station
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Mega watt
NPfi	Noise Policy for Industry
NPWS	National Parks and Wildlife Service
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
REA	Reject Emplacement Area
Resources & Energy SEPP	<i>State Environmental Planning Policy (Resources and Energy) 2021</i>

Abbreviation	Meaning
RNP	Road Noise Policy
SCA	State Conservation Area
SISD	Safe Intersection Sight Distance
t	tonnes
TfNSW	Transport for NSW
tpa	tonnes per annum
WCS	Western Coal Services

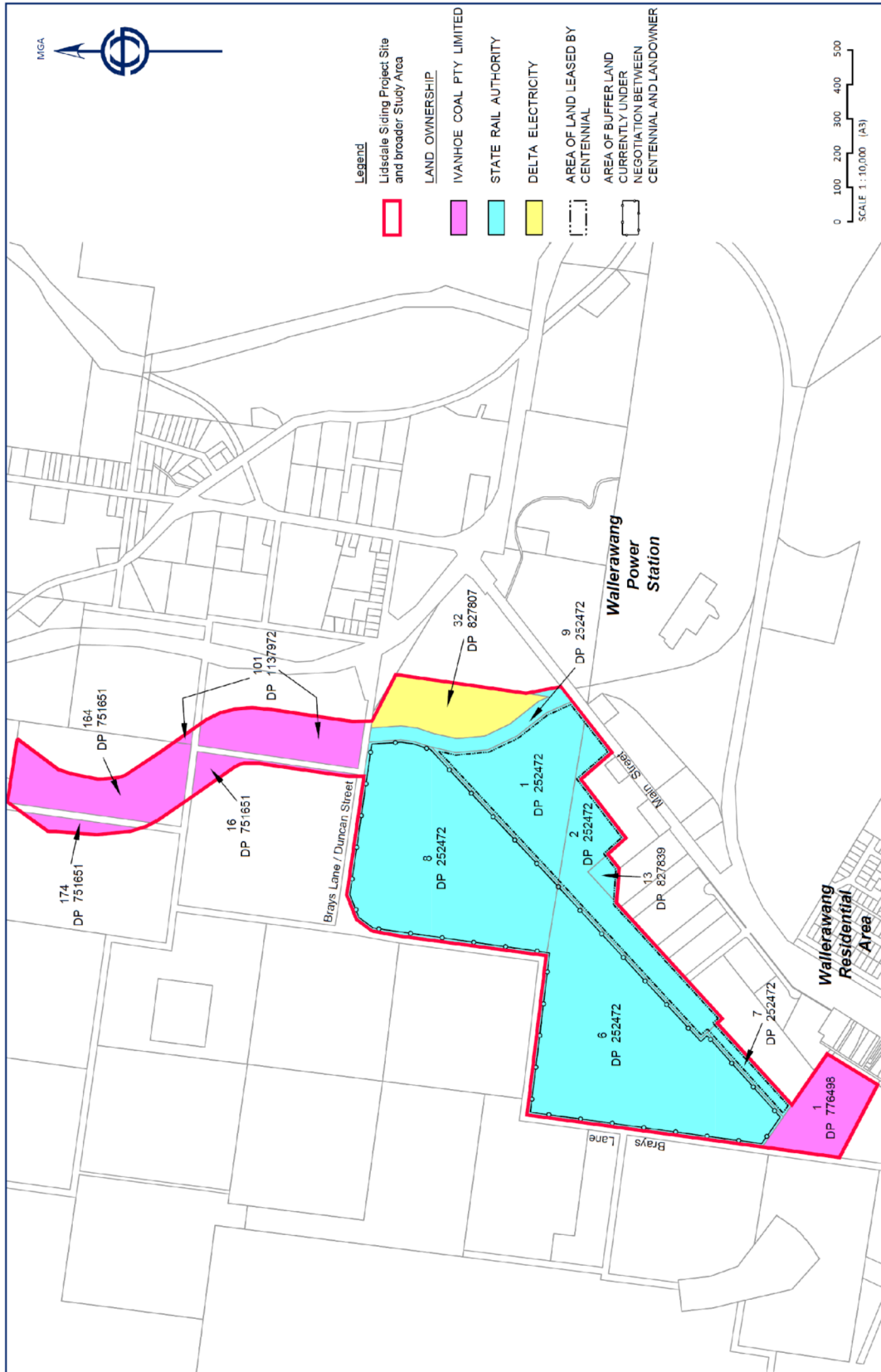
APPENDIX A
SCHEDULE OF LAND

**APPENDIX 1
SCHEDULE OF LAND**

This Appendix to be completed by an officer of the local office of the Department of Land and Water Conservation, a Registered Surveyor, Survey Drafting Officer or Property Officer.

ITEM	PARTICULARS REPORTED
Nature of the land (i.e, Freehold, occupied or vacant Crown land).	Freehold : Parish: Marrangaroo : County: Cook
	Lots Pt 20, 47, 50 139, Pt 94, Pt 19, 200 & 17 DP 751655
	Lot 1 DP 576152 Lot 1 DP 113040
	Lot 1 DP 574704 Lot 2 DP 787403
	Lot 1 DP 911661 Lot Pt 1 DP 4330
	Lot 19 DP 661122 Lots A & B DP 377435
	Lots Pt A & Pt B DP 400049 Lots A & B DP 410209
	Lots Pt 2, Pt 3, Pt 4, Pt 5 & Pt 6 DP 834082
	Lots Pt 1 & Pt 2 DP 514250
	Lots 1-14, 17 & 18 DP 7199
	Shown by Orange Edge
	Freehold : Parish: Lett : County: Cook
	Lots Pt81, Pt 274, Pt 275, 16, 218, 4 & 134 DP 751650
	Lots 1-35, 37-95, 97 & 98 DP 237413
	Lots 14, 15, 16 & 17 Section 4 DP 2018
Lots 3, 4, 5, 7, 8, 9 & 10 Section 2 DP 2018	
Lots 2-6 & 11 Section 1 DP 2018	
Lots A & B DP 350637 Lots A & B 440786	
Lot 369 DP 726995 Pt 1 & Pt 20 DP 5083	
Lots 8,9 & 9A DP 981609 Lots 10-13 DP 852373	
Lots A & B DP 440786 Lots 1 & 2 DP 575422	
Lot 1 DP 871022 Lots 8 & 5 DP 788554	
Lot 1 DP 105037 Lot 1 DP 982496	
Lots 191 & 192 DP 875912 Lot 4 DP 251935	
Lots 1 & 2 DP 719201 Lots 1 &2 DP 823423	
Lots 1 & 2 DP 823390 Lot 1 DP 47648	
Lot 3 DP 601456 Lot 3 DP 778317	
Lots A & B 345465	
Shown by Orange Edge	
Freehold : Parish: Clywdd : County: Cook	
Lots 45, Pt23, 37, 38, 39, 40, 54 & 59 DP 751631	
Lot 167 DP 821851 Lot Pt 165 DP 751631	
Lots 1 &2 DP 606571 Lot 1002 DP 843871	
Lots 361 & 363 DP 209982 Lot 1 DP 579474	
Lot Pt 1 DP 741138	
Shown by Orange Edge	
Leasehold Land : Parish: Lett : County: Cook	
Lot 339 DP 720625	
Special Lease 1963/32 Lithgow (73420)	
Shown by Brown	

APPENDIX 1 LIDSDALE SIDING PROJECT LANDS



APPENDIX B
TRAFFIC IMPACT ASSESSMENT

Traffic Impact Assessment

Centennial Clarence Transport Modification

304100844

Prepared for
James Bailey and Associates

21 September 2022



now



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4	9/09/2022	Final	Sabal Sharma	Hayden Calvey
5	12/09/2022	Final	Sabal Sharma	Hayden Calvey
6	19/09/2022	Final	Sabal Sharma	Hayden Calvey
7	21/09/2022	Final	Sabal Sharma	Hayden Calvey

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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1 Introduction

Cardno now Stantec has been commissioned by James Bailey & Associates (JBA), to undertake a traffic impact assessment to assess the proposed modification to the Development Consent approvals for Clarence Colliery (Clarence) and Lidsdale Siding. The modification is required to enable the delivery of thermal coal to Energy Australia's Mount Piper Power Station (MPPS).

Clarence has been in operation since the 1980s and is an underground coal mine within the Western Coalfield of NSW approximately 10 kilometres (km) east of Lithgow in the Lithgow local government area (LGA). Clarence is a joint venture operation managed by Clarence Colliery Pty Ltd (a wholly owned subsidiary of Centennial Coal Company Limited (Centennial)). Clarence operates under three separate development consents: IRM.GE.76 issued by the Blaxland Shire Council (now Lithgow City Council); DA 174/93 issued by the Lithgow City Council and DA 504-00 issued by the Department of Planning and Environment.

Clarence maximum approved production rate is 3 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. The majority of product coal (including ROM and beneficiated coal) is transported from Clarence by rail along the Main Western Rail Line to Port Kembla or Newcastle. Coal transport by rail takes place 24 hours per day, seven days per week.

A small proportion of the product coal is transported by road and is limited to a maximum of 200,000 tonnes per annum (tpa). Up to 100,000tpa can be sent to the west and the remainder, up to 200,000tpa, can be sent to the east.

Lidsdale Siding is an existing rail loading facility that has been in operation since 1974 and automates the transfer and dispatch of coal from Centennial Western Coal Services (WCS) Project. The facility is approximately 500 metres (m) north of Wallerawang and approximately 9 km northwest of Lithgow within the Lithgow LGA. The Lidsdale Siding is owned and operated by Ivanhoe Coal Pty Ltd, a subsidiary of Centennial. The Lidsdale Siding operates under (Major Project (MP) 08_0223) which was issued on 3 May 2013.

1.1 Modification Application Overview

The current application is for a modification to DA 504-00 for Clarence under Section 4.55(1A) of the Environmental Planning & Assessment Act 1979 (EP&A Act) to allow for:

- > A temporary increase in the total volume of product coal that can be transported from Clarence by truck from the currently approved 200,000tpa to 300,000tpa until the end of 2023;
- > A temporary increase in the total volume of product coal that can be transported to the west of Clarence from the currently approved 100,000tpa to 200,000tpa until the end of 2023. The currently approved transport of up to 200,000tpa coal from Clarence to the east will remain unchanged; and
- > Temporary truck transport of up to 200,000tpa of coal from Clarence directly to MPPS and/or to the Lidsdale Siding until the end of 2023. Truck transport will occur via the Castlereagh Highway, with trucks returning to Clarence via the reverse route.

Also, the application is also seeking a modification to MP 08_0223 for Lidsdale Siding under Section 4.55(1A) of the EP&A Act to allow:

- > Temporary acceptance of up to 200,000tpa of coal from the Clarence by truck into Lidsdale Siding via Castlereagh Highway until the end of 2023.

This assessment has been undertaken to assess the impacts of the proposed modification on traffic, transport, and local road infrastructure as well as demonstrate the compliance of the development with relevant standards and Lithgow City Council controls.

1.2 Previous Assessments

The *Clarence Colliery Modification 4 Traffic Impact Assessment (TIA)* by EMM Consulting (2019) considered modifying DA 504-00 pursuant to Section 4.55(2) of the EP&A Act to:

- > Increase total allowable coal haulage off-site by road from 200,000tpa to 300,000tpa for a limited period of time up to 31 December 2020;

- > Increase total allowable coal haulage off-site to the west by road from 100,000tpa to 200,000tpa for a limited period of time up to 31 December 2020; and
- > No change to total coal haulage off-site to the east by road (a maximum of 200,000tpa).

The proposed modification application is consistent with similar truck volumes and durations that were sought and obtained under Clarence Modification 4 to DA 504-00 in 2019 and forms Condition 7AA of that Consolidated Consent.

Approval condition 7AA expired on 31 December 2020. Furthermore, the previously assessed route from Clarence into MPPS where trucks travel along the Castlereagh Highway before turning left onto the Wallerawang Power Station Haul Road and left onto the MPPS Haul Road, both of which are private haul roads is no longer accessible.

1.3 Scope of Works

The main objective of this report is to evaluate the traffic impacts that are generated by the proposed modification, and its associated impact on the surrounding road network. Stantec’s scope of work for this study includes:

- > Reviewing existing transport network conditions;
- > Estimate the traffic generated by the proposed modification; and
- > Analysis of the development’s impact on the surrounding road network and intersections including impacts on capacity, condition, safety, and efficiency.

1.4 Reference Document

- > Austroads Guide to Road Design Part 4A (Austroads 2021);
- > Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings (Austroads 2013);
- > Guide to Traffic Management Part 12: Traffic Impacts of Developments (Austroads, 2016);
- > Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019);
- > Centennial Coal Haulage Management Standard;
- > Guide to Traffic Generating Developments (Transport for NSW, 2002); and
- > Technical Direction (Roads and Maritime, TDT 2013/04a).

1.5 Report Structure

Section 1 – Introduction

Overview of the proposal and requirements of the traffic and transport assessment

Section 2 – Existing Conditions

Examination of the site and existing traffic and transport condition

Section 3 – Proposed Modification

Summary of the modification

Section 4 –Traffic Assessment

Examination of the operational traffic impact due to the modification

Section 5–Mitigation & Management Measures

Outline of recommendations based on the findings of the traffic assessment

Section 6 – Conclusion

Summarises the findings of the traffic and transport assessment

2 Existing Conditions

2.1 Subject Site

Clarence is an underground coal mining operation within the Western Coalfield of NSW, approximately 10km east of Lithgow in the Lithgow LGA.

The regional road network connecting Clarence with Lithgow and other townships is shown in **Figure 2-1**. Clarence is bordered by the Blue Mountains National Park to the east and Gardens of Stone State Conservation Area to the north and the west. The residential area of Newnes Junction is approximately 900m to the south-east and Clarence village is approximately 1.5km to the south-west. Lidsdale Siding facility is approximately 500m north of Wallerawang and approximately 9km north-west of Lithgow within the Lithgow LGA.

Figure 2-1 Regional Location

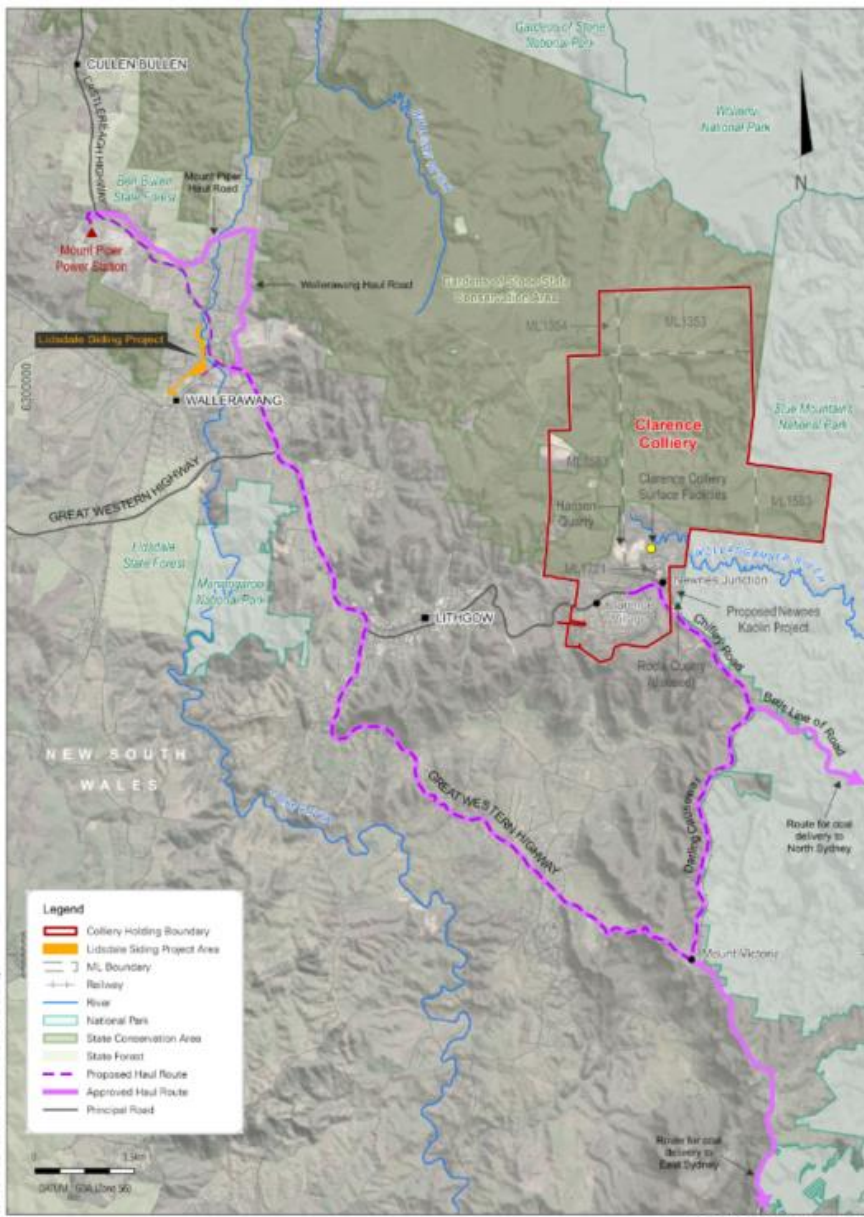


FIGURE 1

2.2 Existing Road Network

Transport for NSW (TfNSW) in partnership with local governments established an administrative framework of State, Regional and Local Road categories to help manage the extensive network of roads.

State Roads are managed and financed by TfNSW, and Regional / Local Roads are managed and financed by Councils. Notwithstanding, Regional Roads perform an intermediate function between the main arterial network of State Roads and Council-controlled Local Roads and therefore received financial assistance from TfNSW.

The key road network relevant to the subject site consists of:

- > Great Western Highway
- > Castlereagh Highway
- > Clarence Colliery Road
- > Darling Causeway (Station Street)
- > Chifley Road
- > Boulder Road
- > Main Street

2.2.1 Great Western Highway

The Great Western Highway is a State Highway (Number 5) in NSW, Australia. From east to west, the highway links Sydney with Bathurst, on the state's Central Tablelands. The highway is a high-standard arterial road, which either has multiple traffic lanes in each direction or where there is only a single traffic lane in each direction, the road has wide sealed shoulders.

2.2.2 Castlereagh Highway

Castlereagh Highway is a State Highway (Number 18) located in NSW and Queensland, Australia. The highway's northern terminus is at a junction with the Carnarvon Highway, south of St George, Queensland. Its southern terminus is at a junction with the Great Western Highway at Marrangaroo, 10km northwest of Lithgow. Around the subject site, Castlereagh Highway has a single lane in each direction (with additional turning lanes provided at the Main Road and Boulder Road intersection). Most of the Castlereagh Highway is signposted at 100km/hr however has a speed limit of 80km/h near Main Road and Boulder Road intersection.

2.2.3 Clarence Colliery Road

Clarence Colliery Road is the main access road connecting to the main car park and gates of Clarence pit top area. Clarence Colliery Road intersects Chifley Road approximately 10km east of Lithgow. Clarence Colliery Road is a two-lane two-way sealed road with narrow shoulder widths. The road has a sign-posted speed limit of 50km/h.

2.2.4 Darling Causeway (Station Street)

The Darling Causeway route is approximately 10-km long from Bell to Mount Victoria. The road has been constructed to a generally similar sealed width as Chifley Road and the Bells Line of Road route east of Bell and is generally between 7–8 m wide. Darling Causeway has wide gravel shoulders along most sections.

The sign-posted speed limit is generally 80km/h in the rural sections. Within the urban area of Mount Victoria, the road (Station Street) has a 60km/h speed limit and increased road width and kerb and guttering in the areas where kerbside parking occurs.

2.2.5 Chifley Road

Chifley Road south of Clarence Colliery Road is a State Road (No 516) extends west to Lithgow and south-east to Bell. Most sections of Chifley Road are two-way two-lane sealed roads and some parts have additional lanes or increased shoulder widths to improve road safety. The general two-way two-lane road width between Clarence Colliery Road and Bell is approximately 7.2–7.6m. Chifley Road is approximately 20km long from Lithgow in the west to Bell in the east. The road has a sign-posted speed limit of 80km/h.

2.2.6 Boulder Road

Boulder Road is a local road under the care and maintenance of Lithgow City Council with a speed limit of 60km/h. The road is currently configured as three-lane with two lanes provided for the eastbound direction.

2.2.7 Main Street

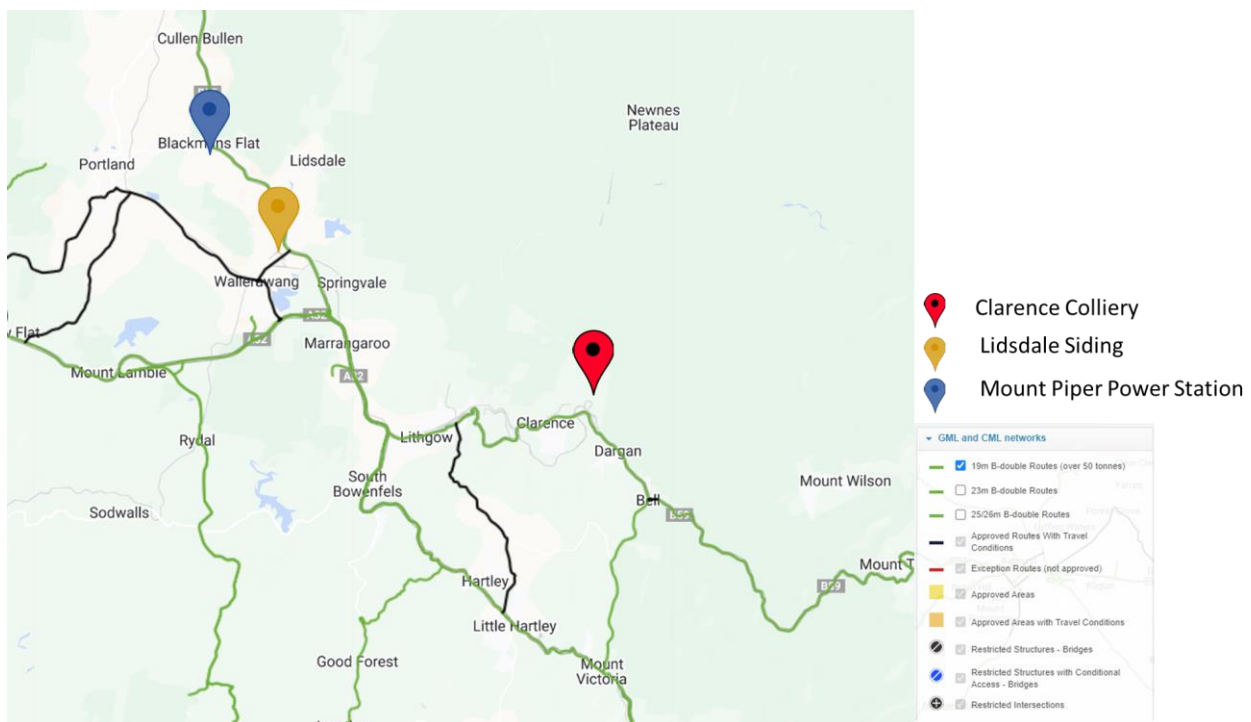
Main Street is a local road under the care and maintenance of the local council with a speed limit of 50km/h. The road is currently configured as two-lane with one lane provided in each direction.

2.3 Existing Freight Network

TfNSW imposes limitations on heavy vehicle routes throughout the state. Three tiers of mass limits are defined based on vehicle mass and axle group category:

- > General Mass Limits (GML): Heavy vehicles with unrestricted access to the road system;
- > Concessional Mass Limits (CML): Increased mass limits for eligible vehicles, require accreditation; and
- > Higher Mass Limits (HML): The highest level of mass except for vehicles requiring special permits, requires accreditation, and GPS tracking to manage access and compliance.

Figure 2-2 NSW Restricted Vehicle Access



Route restrictions for vehicle types within each mass limit are set separately by TfNSW. Within the study area, these restrictions include:

- > Main Street: only for use in emergency situations when directed by TfNSW personnel or NSW Police (Applicable for 19m B-double (over 50 tonnes))

2.4 Existing Consent

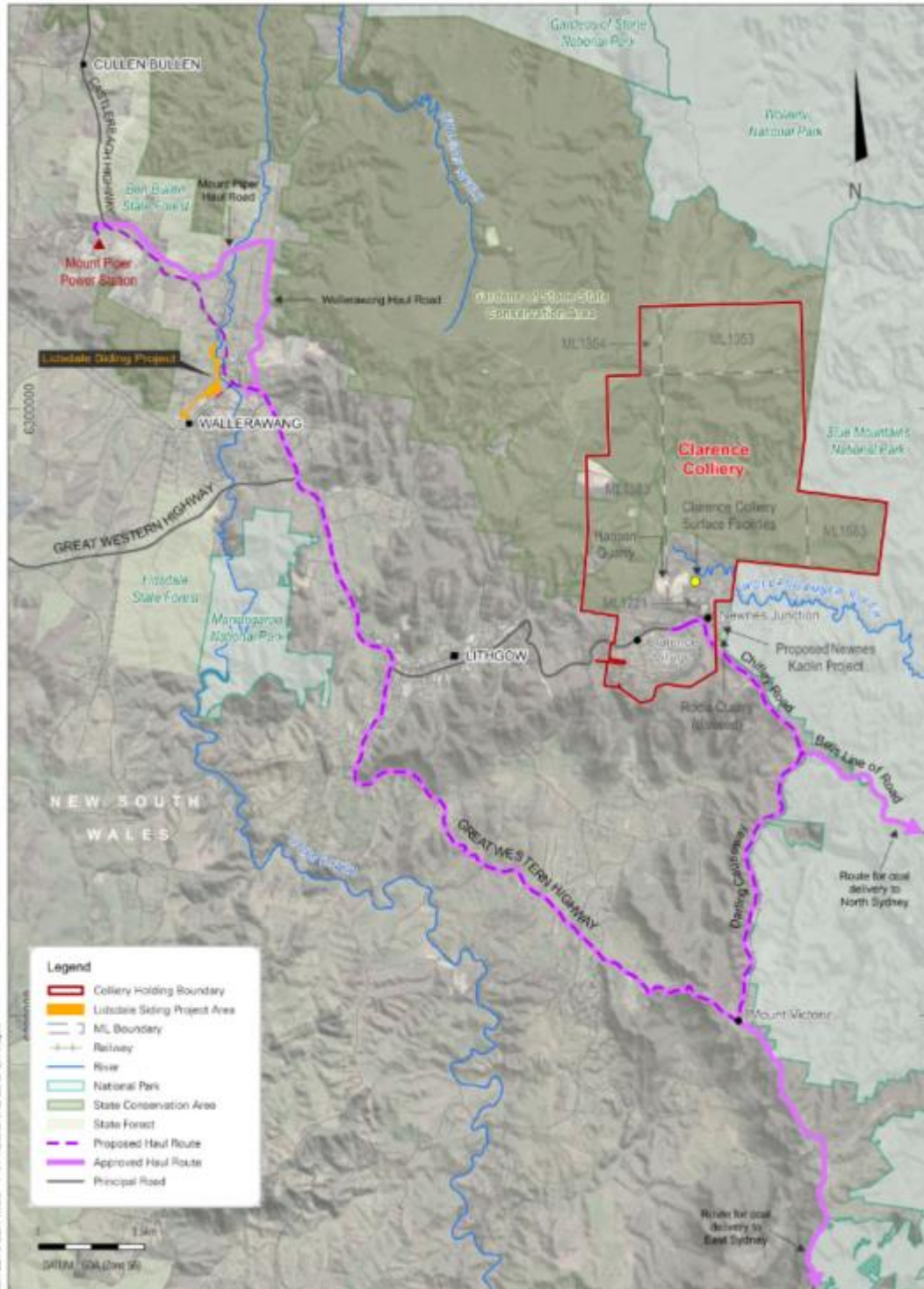
As per Schedule 2, Condition 7 of DA 504-00, Clarence Colliery is permitted to transport up to 200,000tpa of coal by road, with a maximum of 100,000tpa transported to the west, via the Darling Causeway and Great Western Highway:

- > The haulage route to the west consists of:
 - trucks turn left from Clarence Colliery Road onto Chifley Road;
 - trucks continue east to where Chifley Road intersects with Darling Causeway;
 - trucks turn right onto Darling Causeway and travel south towards Mount Victoria until turning right from Station Street onto the Great Western Highway towards Lithgow; and

- trucks continue towards the Castlereagh Highway, before turning left onto the Wallerawang Power Station Haul Road and then turning left onto the MPPS Haul Road.
 - As per Schedule 2, Condition 7B of DA 504-00, trucking of coal to the west occurs only between 7:00 am and 10:00pm Monday to Saturday and between 8:00am and 10:00pm on Sundays and public holidays.
- > Condition 7 of MP 08_0223 for Lidsdale Siding only permits all coal transported to or from the site by conveyor or by rail.

The existing approved haulage route to the is shown in **Figure 2-3**.

Figure 2-3 Existing Haulage Route



2.5 Traffic Data Collection

2.5.1 Classified Intersection Counts

Stantec commissioned an external sub-consultant to undertake classified turning movement count. The intersection counts were conducted on Wednesday 3 August 2022 from 6am to 10am and 2pm to 6pm.

The traffic survey locations are summarised in **Table 2-1**.

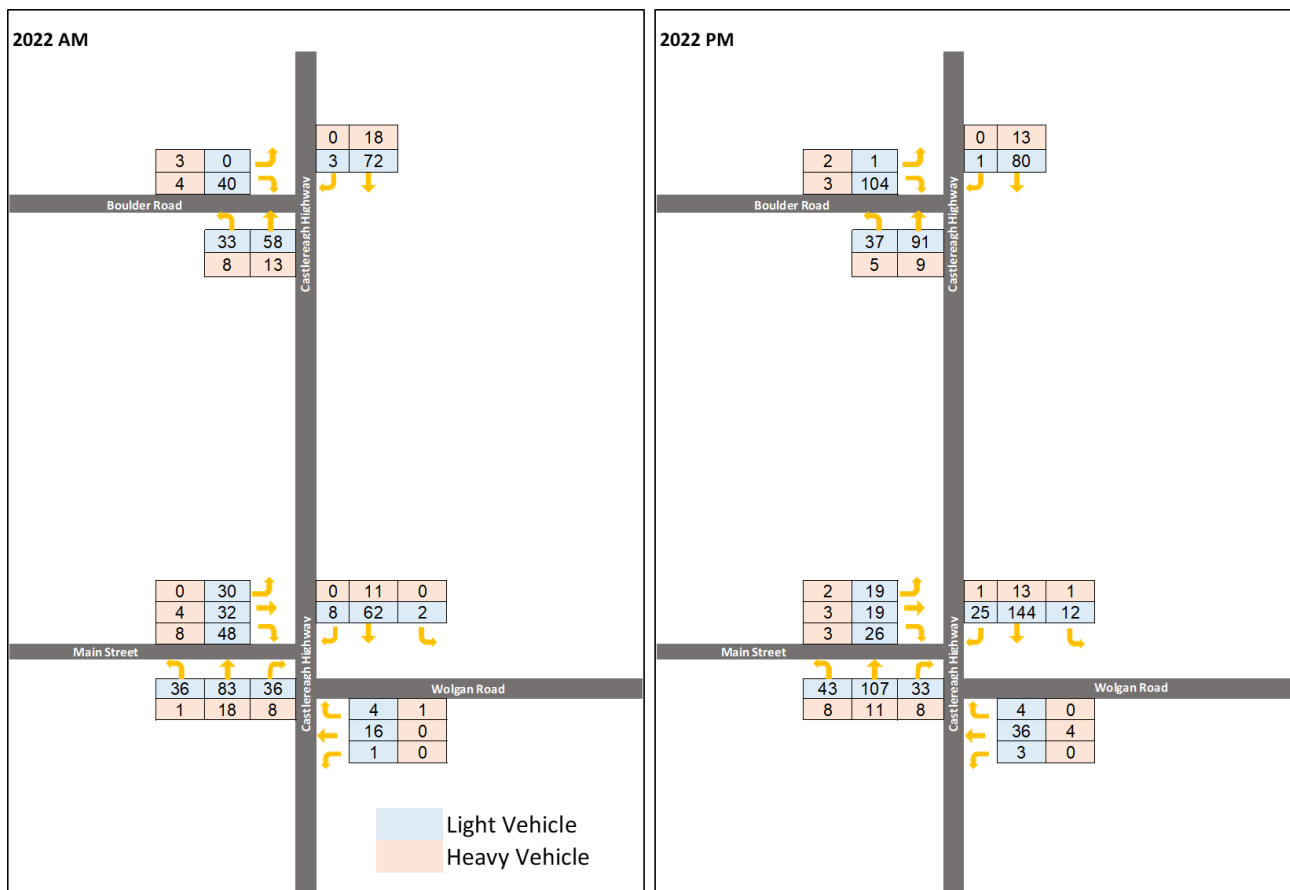
Table 2-1 Traffic Survey Locations

Intersection	Type	Peak Hour
Castlereagh Highway / Main Street / Wolgan Road	Giveaway	6.15am-7.15am 2.45pm-3.45pm
Castlereagh Highway / Boulder Road	Giveaway	7.45am-8.45am 2.45pm-3.45pm

With regard to the traffic volumes at the site access intersection, Chifley Road/Darling Causeway intersection and Station Street/Harley Avenue reference is made *Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019)* which is detailed in the following sections.

Figure 2-4 summarise the hourly traffic volumes of the peak period for the two intersection.

Figure 2-4 2022 Intersection Count



Daily traffic volumes for Castlereagh Highway, Boulder Road and Main Street have been estimated based on the intersection traffic count data and are summarised in **Table 2-2**.

Table 2-2 Estimation of Daily Volumes from Intersection Counts

Location	AM peak hourly volume(two-way)	PM peak hourly volume(two-way)	Estimated Daily volume (vpd)
Castlereagh Highway (south of Boulder Road)	246 (17.5%)	342 (8.8%)	2940 (12.4%)
Boulder Road (west of Castlereagh Highway)	91 (16.5%)	153 (6.5%)	1220 (10.2%)
Castlereagh Highway (south of Main Street)	348 (13.2%)	421 (10.2%)	3845 (11.6%)
Main Street	183 (7.1%)	189 (11.1%)	1860 (9.1%)

Note 1. Daily traffic volumes are estimated as 10 x the average morning and afternoon peak hourly volumes; 2. Heavy Vehicle Percentage in parenthesis

The proportion of heavy vehicle movements using Castlereagh Highway is generally higher during the morning peak hour than the afternoon peak hour. The proportions of heavy vehicle traffic are calculated as ratios of total heavy vehicle numbers to all vehicle numbers during these two peak hours.

2.5.2 Historic Traffic Data

Traffic volumes around the site are also sourced from *Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019)*. Intersection traffic surveys were undertaken at three intersections for the morning and afternoon traffic peak periods:

- > the Clarence Colliery Access/Chifley Road intersection;
- > the intersection between Chifley Road, Bells Line of Road, and Darling Causeway at Bell; and
- > the intersection of Station Street with Harley Avenue at Mount Victoria.

The traffic volumes provided by EMM assessment are summarised below in **Table 2-3**.

As described within **Section 1.2** of the EMM assessment, the increase in total coal haulage by road for the previous modification was assessed to increase the total number of trucks which transport coal from Clarence from 25 trucks per day (i.e. 50 truck movements) to 40 trucks per day (i.e. 80 truck movements). As part of the previously approved modification, truck movements between the intersection of Station Street and Harley Avenue, in Mount Victoria, and the Wallerawang Power Station Haul Road (i.e. haulage to the west) were expected to remain within the previously assessed and approved limits (i.e. 25 trucks per day or 50 truck movements). The haulage of 100,000t per year can be achieved well within these limits with haulage required to occur on only about 125 days per year. The increased tonnage that was previously approved along the western haul route (i.e. to 200,000tpa) was assessed to be achieved through an increase to the number of days per year that truck movements will occur (i.e. from approximately 125 days per year to 250 days per year).

Therefore, the increase in daily truck movements that required assessment in the EMM assessment was limited to the existing haulage route between Clarence and the intersection of Station Street and Harley Avenue via Darling Causeway.

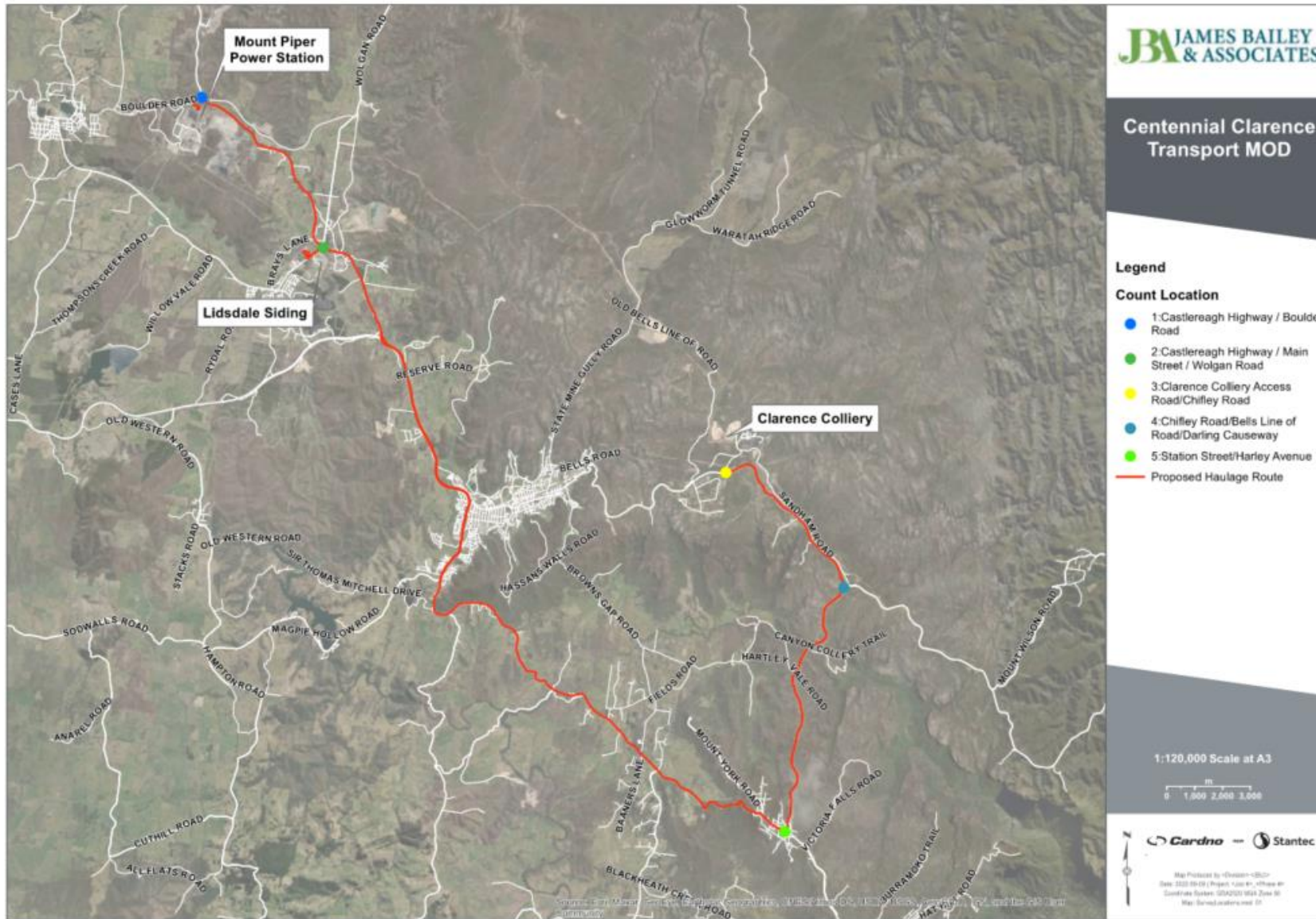
Table 2-3 Traffic Volumes

Location	AM peak hourly volume	PM peak hourly volume	Estimated daily traffic volume
	(two-way)	(two-way)	(two-way total)
Clarence Colliery Road (north of Chifley Road)	61	74	675
Chifley Road (west of site access intersection)	206	265	2,355
Chifley Road (east of site access intersection)	183	235	2,090
Chifley Road (west of Darling Causeway)	170	220	1,950
Darling Causeway (south of Chifley Road)	80	82	810
Station Street (north of Harley Avenue)	111	114	1,125
Station Street (south of Harley Avenue)	41	80	605

Source: Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019). Note:1. The daily light and heavy vehicle movements were calculated based on 10 x the surveyed peak hourly volumes.

The locations of the various count locations are mapped in **Figure 2-5**.

Figure 2-5 Count Locations



2.6 Intersection Assessment

SIDRA (version 9) software package was used for intersections to model intersections listed in **Section 2.5.1**. The purpose of the intersection analysis is to identify capacity issues at the intersections and assist in proposing mitigation measures (if required) to ensure the satisfactory performance of these intersections.

With regard to the intersection performance at the site access intersection, Chifley Road/Darling Causeway intersection and Station Street/Harley Avenue reference is made to SIDRA Intersection analysis from *Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019)*.

2.6.1 Intersection Performance Criteria

The intersection performance criteria are based on the *TfNSW Traffic Modelling Guidelines (2013)*. The capacity of a road network can be primarily determined by the capacity of the controlling intersections. The key indicator of intersection performance Level of Service (LoS) is delay, where results are placed on a continuum from 'A' to 'F' as shown in **Table 2-4**.

Table 2-4 Level of Service Criteria

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Giveaway & Stop Signs
A	< 14	Good Operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Unsatisfactory and requires additional capacity	Unsatisfactory and requires additional capacity

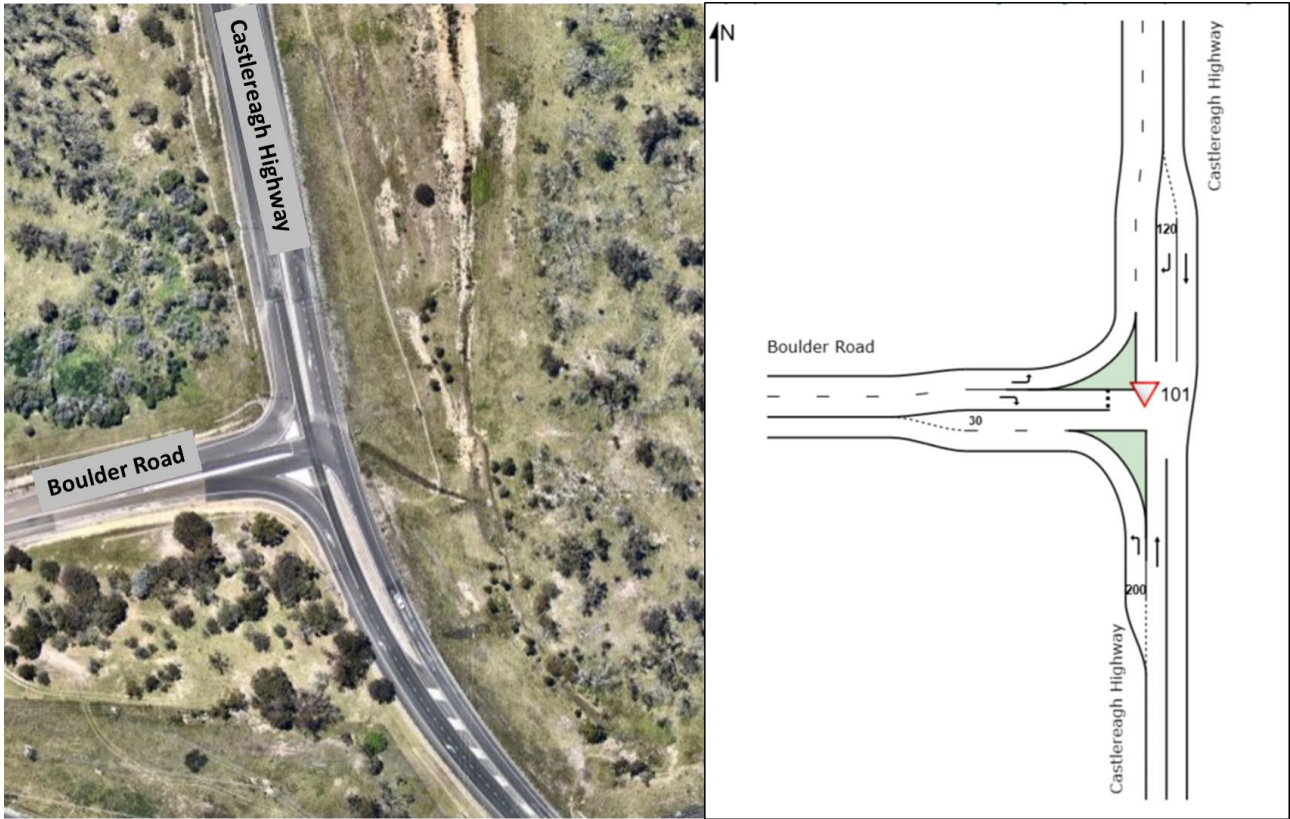
Source: *TfNSW Traffic Modelling Guidelines (2013)*

TfNSW guidelines state that for roundabouts and priority control intersections a LoS assessment should be reported based on the worst-performing movement of the intersection. For traffic signals, the average movement delay and corresponding Level of Service overall movements should be determined and reported.

2.6.1.2 Castlereagh Highway / Boulder Road

Castlereagh Highway / Boulder Road intersection was modelled using SIDRA Intersection Analysis software. The intersection geometry is illustrated in **Figure 2-6**.

Figure 2-6 Castlereagh Highway / Boulder Road SIDRA Layout



The SIDRA Intersection modelling for the existing scenario is summarised in **Table 2-5**.

Table 2-5 Intersection Performance

Approach	AM Peak					PM Peak				
	DoS	Avg Delay	LoS	Model Max Queue (m)	Observed Queue (m)	DoS	Avg Delay	LoS	Model Max Queue (m)	Observed Queue (m)
Castlereagh Highway (South)	0.043	5.9	A	-	-	0.057	5.8	A	0	-
Castlereagh Highway (North)	0.055	5.8	A	0.1	-	0.055	5.9	A	0	-
Boulder Road (West)	0.058	7.2	A	1.9	6	0.130	7.2	A	4	12
Total	0.058	7.2	A	1.9		0.130	7.2	A	4	

Intersection performance shows that under the existing scenarios, the performance of Castlereagh Highway / Boulder Road is LoS A in the AM and PM peak respectively.

2.6.1.3 Castlereagh Highway / Main Street / Wolgan Road

The Castlereagh Highway / Main Street / Wolgan Road intersection was modelled using SIDRA Intersection Analysis software. The intersection geometry is illustrated in **Figure 2-7**.

Figure 2-7 Castlereagh Highway / Main Street / Wolgan Road SIDRA Layout



The SIDRA Intersection modelling for the existing scenario is summarised in **Table 2-6**.

Table 2-6 Intersection Performance

Approach	AM Peak					PM Peak				
	DoS	Avg Delay	LoS	Model Max Queue (m)	Observed Queue (m)	DoS	Avg Delay	LoS	Model Max Queue (m)	Observed Queue (m)
Castlereagh Highway (South)	0.061	3.1	A	0	-	0.099	6.5	A	0	-
Castlereagh Highway (North)	0.044	6	A	0.1	-	0.098	6.3	A	0.3	-
Main Street (West)	0.175	8.3	A	2.6	12	0.124	10.1	A	1.7	12
Wolgan Road (East)	0.029	7.3	A	0.3	6	0.080	9.2	A	0.9	6
Total	0.175	8.3	A	2.6		0.124	10.1	A	1.7	

Intersection performance shows that under the existing scenarios, the performance of The Castlereagh Highway / Main Street / Wolgan Road is LoS A in both the AM peak and PM peak.

2.7 Network Performance

For the purposes of determining mid-block road capacity, traffic performance was assessed using criteria contained within *Austrroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austrroads)*. The midblock LoS assessment criteria contained with the *Austrroads Guide* provide a useful benchmark to assess changes as a result of development particularly for road segments which have relatively low traffic volumes whereby intersection performance and delay is not necessarily the appropriate measure. **Figure 2-8** illustrates theoretical road performance under different flow and speed conditions, also referred to as Service Flow Rates. *Austrroads* describes Service Flow Rate as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point under the prevailing roadway, traffic and control conditions while maintaining a designated level of service. They indicate the vehicle capacity for each LoS and are used to determine the level of service corresponding to actual traffic volumes.

For example, a traffic flow of 1,450 passenger cars per lane travelling at 110 km/h results in LoS C, however, the same volume travelling at an average speed of 60km/h results in LoS E. These thresholds were used to assess level of service as part of the study. Furthermore, Austroads Guide to Traffic Management Part 3 stipulates the capacity for a two-lane highway as 1,700 passenger cars per hour (pc/h) in each direction whilst for extended lengths the capacity will not exceed 3,200pc/h for both directions of travel combined.

At each level of service, the service flow rate is defined as the maximum for that level. Service flow rates are discrete values, whereas the level of service represents a range of conditions. Service flow rates therefore effectively define the flow boundaries between the levels of service.

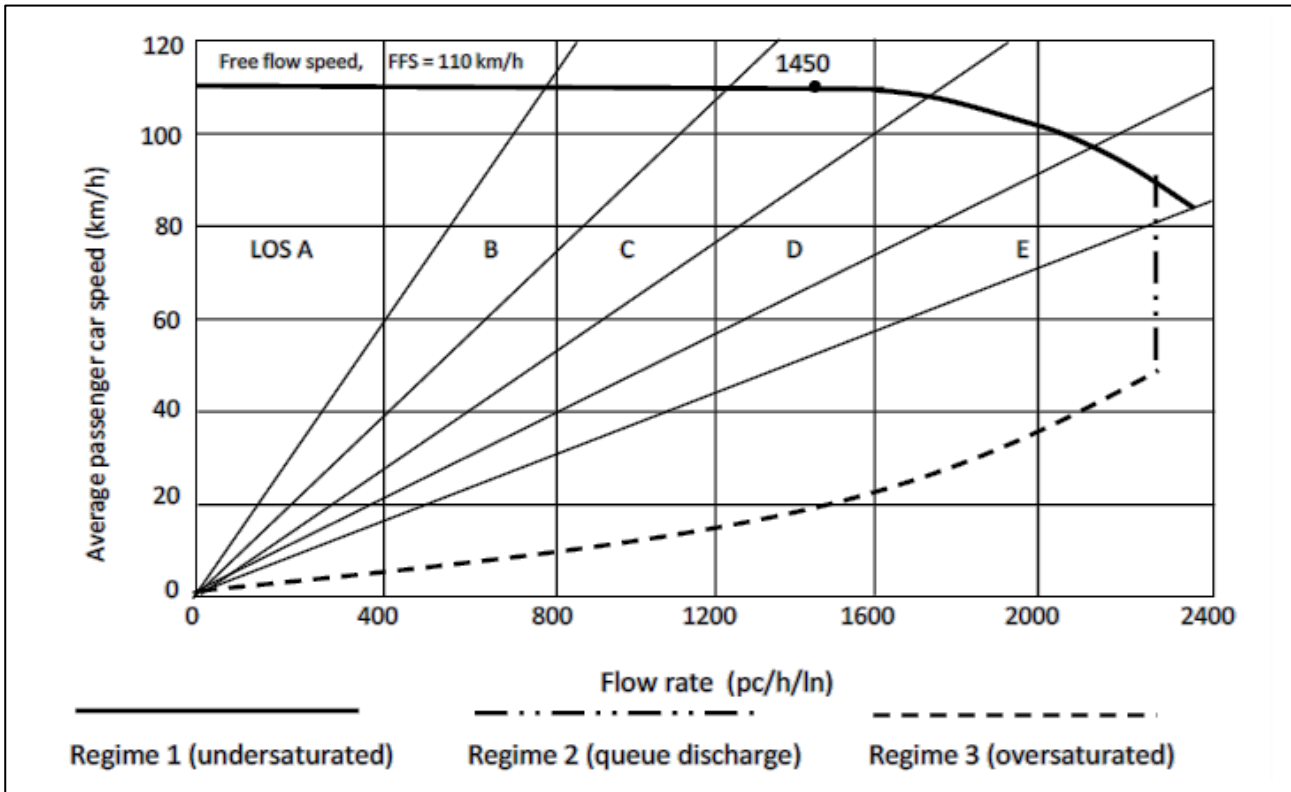


Figure 2-8 Service Flow Rates Definition of the Flow Boundaries between Levels of Service

Source: Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis

Table 2-7 provides definitions for the Service Flow Rate and LoS classifications 'A' to 'F'.

Table 2-7 Level of Service and Service Flows Rates

LoS	Description	Speed and Flow Ranges *
A	A condition of free-flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.	60km/h - 0-400 veh/h/ln 90km/h - 0-600 veh/h/ln 110km/h - 0-800 veh/h/ln
B	In the zone of stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is a little less than with level of service A.	60km/h - 400-650 veh/h/ln 90km/h - 600-900 veh/h/ln 110km/h - 800-1,200 veh/h/ln
C	Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.	60km/h - 650-850 veh/h/ln 90km/h - 900-1,400 veh/h/ln 110km/h - 1,200-1,650 veh/h/ln
D	Close to the limit of stable flow and approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.	60km/h - 850 - 1,250 veh/h/ln 90km/h - 1,400 - 1,800 veh/h/ln 110km/h - 1,650 - 1,900 veh/h/ln
E	Traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause breakdown.	60km/h - 1,250 - 1,650 veh/h/ln 90km/h - 1,800 - 2,000 veh/h/ln 110km/h - 1,900 - 2,100 veh/h/ln
F	In the zone of forced flow, where the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdown occurs, and queuing and delays result.	60km/h - above 1,650 veh/h/ln 90km/h - above 2,000 veh/h/ln 110km/h - above 2,100 veh/h/ln

Source: Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis

* Approximate range

For determining the existing road network performance, the criteria contained within the Austroads Guide were utilised. **Table 2-8** shows the existing road performance.

Table 2-8 Baseline Network Performance

Location	Direction	AM peak hourly volume	LoS	PM peak hourly volume	LoS
Chifley Road (east of site access intersection)	Westbound	88	A	121	A
	Eastbound	95	A	114	A
Chifley Road (west of Darling Causeway)	Westbound	95	A	160	A
	Eastbound	75	A	105	A
Darling Causeway (south of Chifley Road)	Northbound	30	A	38	A
	Southbound	50	A	44	A
Station Street (north of Harley Avenue)	Northbound	47	A	50	A
	Southbound	64	A	64	A
Station Street (south of Harley Avenue)	Northbound	22	A	38	A
	Southbound	19	A	42	A
Castlereagh Highway (south of Boulder Road)	Northbound	112	A	142	A
	Southbound	134	A	200	A

Location	Direction	AM peak hourly volume	LoS	PM peak hourly volume	LoS
Castlereagh Highway (south of Main Street)	Northbound	182	A	200	A
	Southbound	166	A	211	A

The baseline traffic volumes are within acceptable LoS.

With regard to the intersection performance at the site access intersection, Chifley Road/Darling Causeway intersection and Station Street/Harley Avenue reference is made to SIDRA Intersection analysis from *Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019)* which shows the LoS for all movements during the morning and afternoon peak hours is LoS A (indicating good intersection operation). The results from EMM assessment are shown in **Figure 2-9**.

Figure 2-9 Intersection Performance from Previous Assessment

Table 4.2 Summary of existing and proposed maximum intersection traffic operations

Intersection	Peak hour	Existing typical maximum traffic			Proposed typical maximum traffic		
		LOS	DOS	DEL	LOS	DOS	DEL
Site access intersection	Morning peak hour (8:00 am–9:00 am)	A	0.055	8.8	A	0.058	8.9
	Afternoon peak hour (3:15 pm–4:15 pm)	A	0.087	8.5	A	0.090	8.5
Chifley Road/Bells Line of Road/Darling Causeway	Morning peak hour (7:45 am–8:45 am)	A	0.043	9.6	A	0.043	9.7
	Afternoon peak hour (3:45 pm–4:45 pm)	A	0.054	9.5	A	0.054	9.6
Station Street/Harley Avenue	Morning peak hour (8:15 am–9:15 am)	A	0.031	5.8	A	0.032	5.8
	Afternoon peak hour (2:30 pm–3:30 pm)	A	0.034	5.9	A	0.036	5.9

Note: LOS – level of service, DOS – degree of saturation, DEL – vehicle delay by time (seconds).

2.8 Crash History

Crash data for the period 2016 to 2020 for the haulage route was accessed through TfNSW Centre for Road Safety. **Figure 2-11** shows the crash location along the proposed haulage route.

2.8.1 Crash Severity

The crash severity is categorised under five classes, which include fatal, serious injury, moderate injury minor/other injuries, and non-casualty tow away. **Table 2-9** provides a detailed summary of the crashes along the haulage route as shown in **Figure 2-11**.

Table 2-9 Crash Severity (2016-2020)

Degree of Crash	Number of Crash	Percentage
Minor/Other Injury	11	12%
Moderate Injury	39	43%
Non-casualty (towaway)	29	32%
Serious Injury	12	13%
Total	91	100%

The majority of crashes observed were of moderate injury and there was no fatal accident on the proposed haulage route for the modification.

2.8.2 Crash Type

Crash types are classified by the Road User Movement (RUM) codes that describe the impact of the crashes based on a number of categories and are a standard code to identify the movements involved in a crash. For

example, a “right through” type accident (RUM code 30) is classified as an accident between two vehicles travelling in the same direction with one vehicle rear-ending the other vehicle.

Figure 2-10 Top RUM Codes

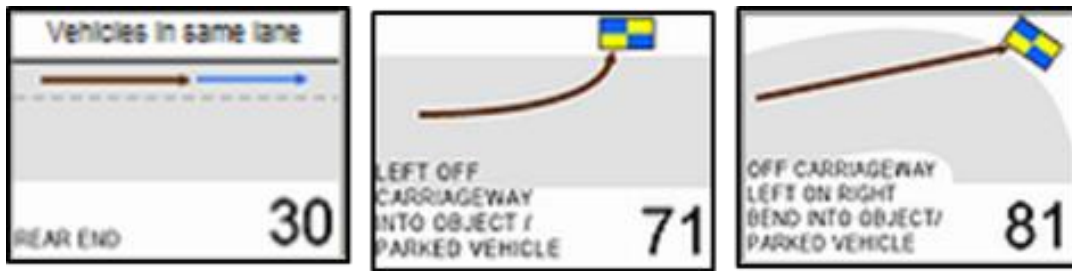


Table 2-10 Crash Based on RUM

RUM Code	Minor/Other Injury	Moderate Injury	Non-casualty (towaway)	Serious Injury	Total	Percentage
30	2	6	3		11	12%
71	1	1	5	3	10	11%
81	2	4	3		9	10%
85		2	3	2	7	8%
87	1	2	3	1	7	8%
20	1		2	2	5	5%
88	1	2	1	1	5	5%
21		4			4	4%
66			3	1	4	4%
73	1	1	1	1	4	4%
10		2			2	2%
13		2			2	2%
16		1	1		2	2%
33		2			2	2%
74			2		2	2%
80		2			2	2%
82		2			2	2%
83	1	1			2	2%
0		1			1	1%
11		1			1	1%
32		1			1	1%
35	1				1	1%
42				1	1	1%
47		1			1	1%
50		1			1	1%
62			1		1	1%
91			1		1	1%
Grand Total	11	39	29	12	91	100%

Analysis of the RUM codes was undertaken and shows that there were 27 different crash types and approximately 30% of the 91 crashes were captured by three RUM codes. These include rear-end collisions

(RUM code 30), left off carriageway into object (RUM code 71), and off carriageway left on right bend into object (RUM code 81) as shown in **Figure 2-10**.

The crash rate for each road is summarised in **Table 2-11**. It is clear from the results below that the existing frequency of crashes is less along the Castlereagh Highway which is now proposed to be utilised for the transport of thermal coal to MPPS under his modification route.

Table 2-11 Road Section Crash Rate (2016-2020)

Road Name	No of Crashes	Percentage
Castlereagh Highway	9	10%
Chifley Road	5	5%
Great Western Highway	77	85%
Total	91	100%

2.8.3 Crashes at Intersections

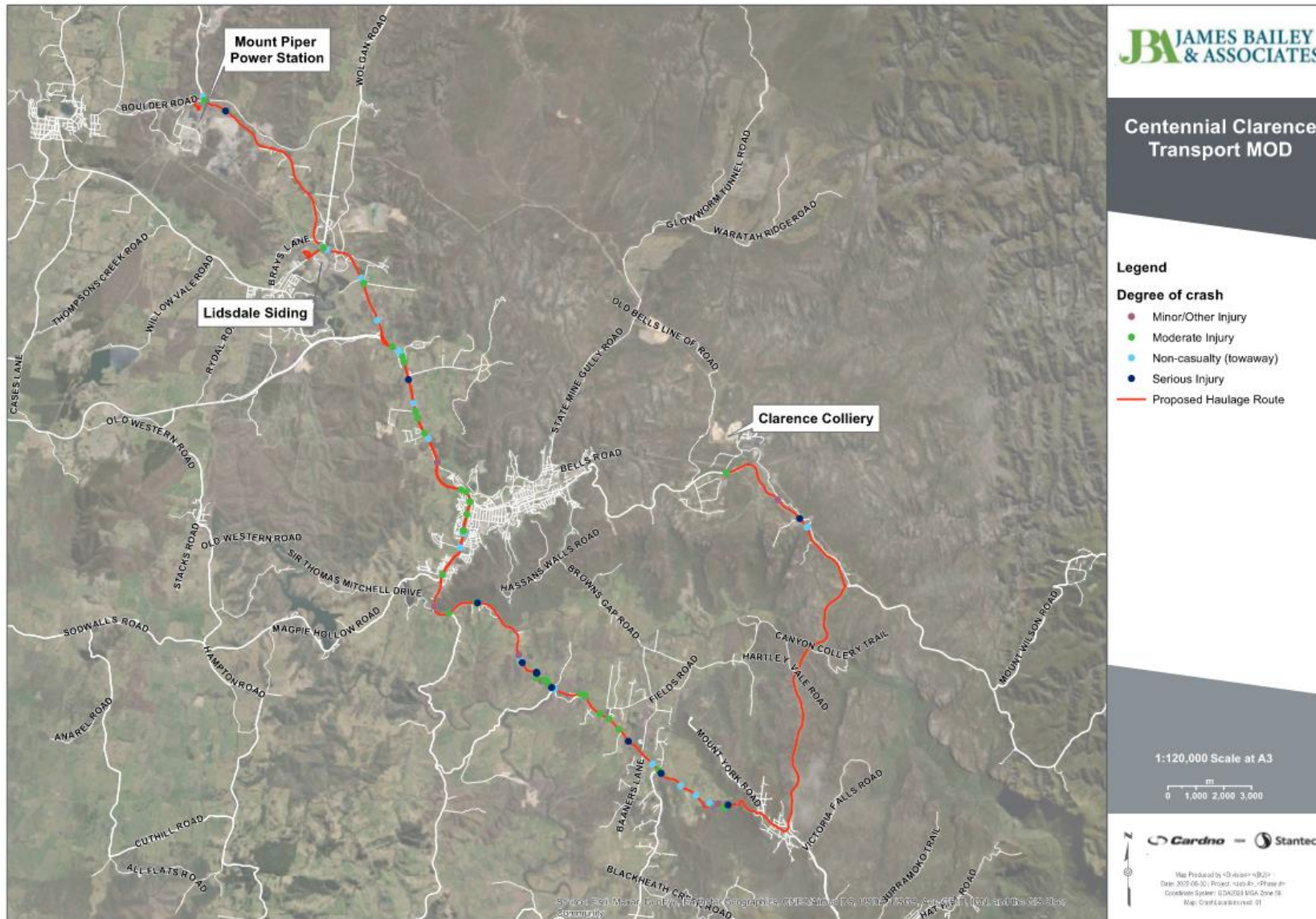
There have been four crashes at the intersections which are presented in **Table 2-12**.

Table 2-12 Intersection Crashes Based on RUM

Intersection	Crash ID	Degree of Crash	RUM Code	RUM Code Description
Castlereagh Highway / Boulder Road	1157234	Non-Casualty (Towaway)	74	Out of Control carriageway
Castlereagh Highway / Main Street / Wolgan Road	1115471	Moderate Injury	82	Off Carriageway Right on Right Bend
	1237380	Non-Casualty (Towaway)	16	Left Near
Clarence Colliery Rd/Chifley Road	1185492	Moderate Injury	81	Off Carriageway Left in Right Bend into Object/Parked Vehicle

It is clear from the results above that the existing frequency of crashes is low at intersections along the proposed haulage route. The few crashes at the intersections recorded do not indicate a safety deficiency or crash clusters that would otherwise need addressing.

Figure 2-11 Crash Locations by Injury Severity 2016-2020



3 Proposed Modification

The current application is for a modification to DA 504-00 for Clarence under Section 4.55(1A) of the Environmental Planning & Assessment Act 1979 (EP&A Act) to allow for:

- > A temporary increase in the total volume of product coal that can be transported from the Clarence by truck from the currently approved 200,000tpa to 300,000tpa until the end of 2023;
- > A temporary increase in the total volume of product coal that can be transported to the west of the Clarence from the currently approved 100,000tpa to 200,000tpa until the end of 2023. The currently approved transport of up to 200,000tpa coal from Clarence to the east will remain unchanged; and
- > Temporary truck transport of up to 200,000tpa of coal from Clarence directly to MPPS and/or to the Lidsdale Siding until the end of 2023. Truck transport will occur via the Castlereagh Highway, with trucks returning to Clarence via the reverse route.

Also, the application is also seeking a modification to MP 08_0223 for Lidsdale Siding under Section 4.55(1A) of the EP&A Act to allow:

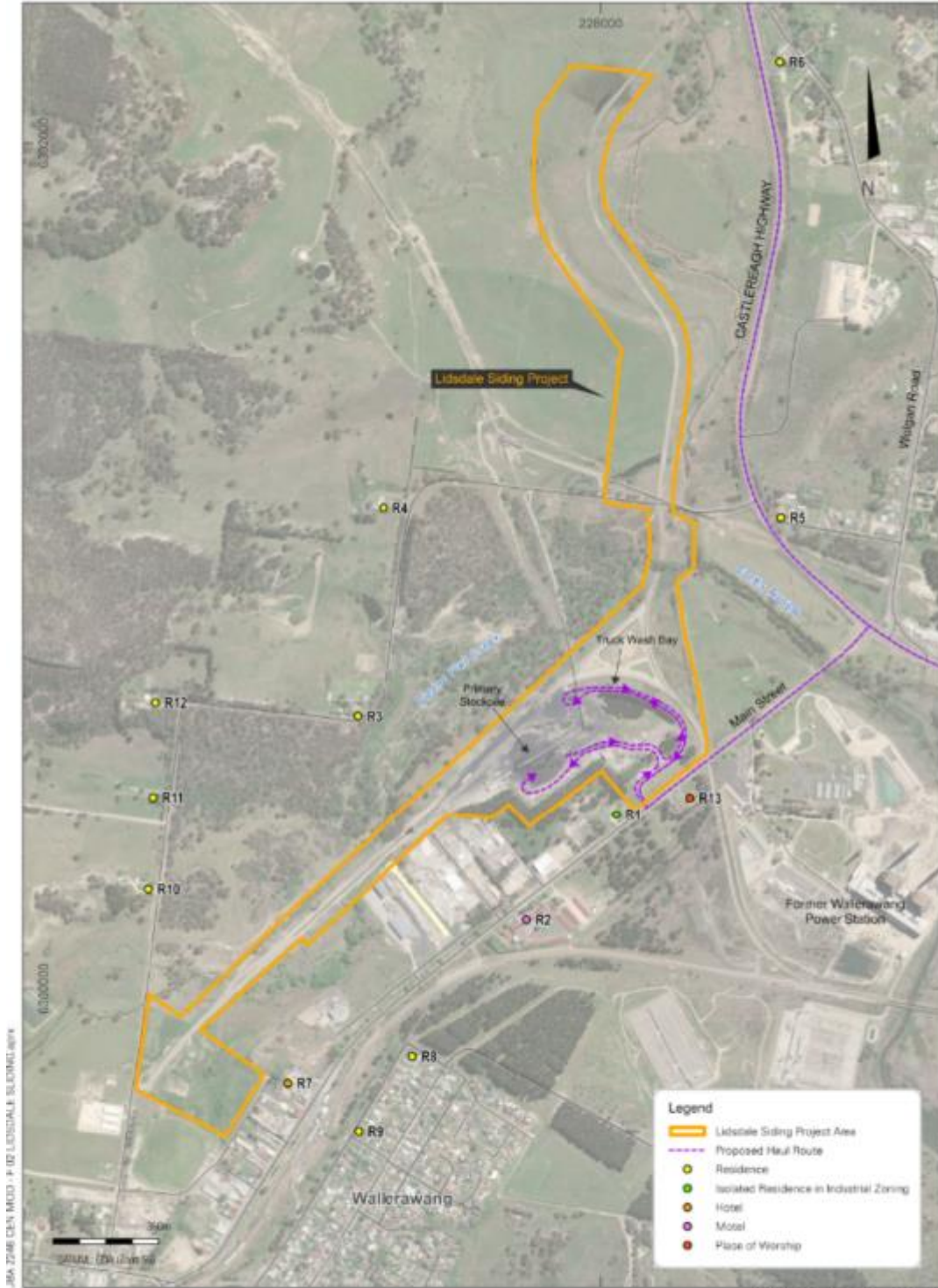
- > Temporary acceptance of up to 200,000tpa of coal from the Clarence by truck into Lidsdale Siding via Castlereagh Highway until the end of 2023.

The proposed haul routes utilised to the west (also shown in **Figure 2-5**) will be Chifley Road - The Darling Causeway - Station Street - Great Western Highway and the Castlereagh Highway to:

- Main Road – Lidsdale Siding; and/or
- Boulder Road – Mount Piper Power Station.

Access to Lidsdale Siding and MPPS is shown in **Figure 3-1** and **Figure 3-2**.

Figure 3-1 Access to Lidsdale Siding



CENTENNIAL COAL

Lidsdale Siding Access

FIGURE 2



Figure 3-2 Access to MPPS



JBA 2188 CEN MOD - F-03 POWER STATION.mxd

CENTENNIAL

JBA JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

CENTENNIAL COAL
Mount Piper Power Station

FIGURE 3

4 Traffic Assessment

4.1 Projected Traffic Generation

Based on the information provided by the client, to achieve the proposed modification to 300,000tpa, there will be the following truck movements:

- > Increase to the maximum daily number of trucks (in any direction) from 25 trucks per day to 40 trucks per day (i.e. 80 truck movements). On these days, the maximum hourly number of trucks dispatched may increase from approximately six loads per hour currently to approximately eight loads per hour, for the duration of the proposed modification;
- > A maximum of 25 trucks per day, (i.e. 50 truck movements) will be required to transport 200,000tpa of coal to the west;
- > A maximum of 25 trucks per day, (i.e. 50 truck movements) will be required to transport 200,000tpa of coal to the east. No change to total coal haulage off-site to the east by road (a maximum of 200,000tpa) is proposed as part of this modification; and
- > Whilst the maximum amount of coal that can be transported east is 200,000tpa and west is 200,000tpa, the total amount transported from site will not exceed the proposed 300,000tpa.

Table 4-1 Existing and Proposed Daily Truck Movements

	Proposed Maximum Trucks
Maximum Daily Trucks Load (East or West)	40
Maximum Daily Truck Load (West)	25
Maximum Peak Hour Truck Load (West)	4

During the morning and afternoon traffic peak hours there will typically be four peak hourly trucks (i.e. eight peak hourly truck movements) along the western haulage route.

4.2 Operating Hours

As per Schedule 2, Condition 7B of DA 504-00, trucking of coal to the west occurs only between 7:00 am and 10:00 pm Monday to Saturday and between 8:00 am and 10:00 pm on Sundays and public holidays. It is not proposed to modify these hours.

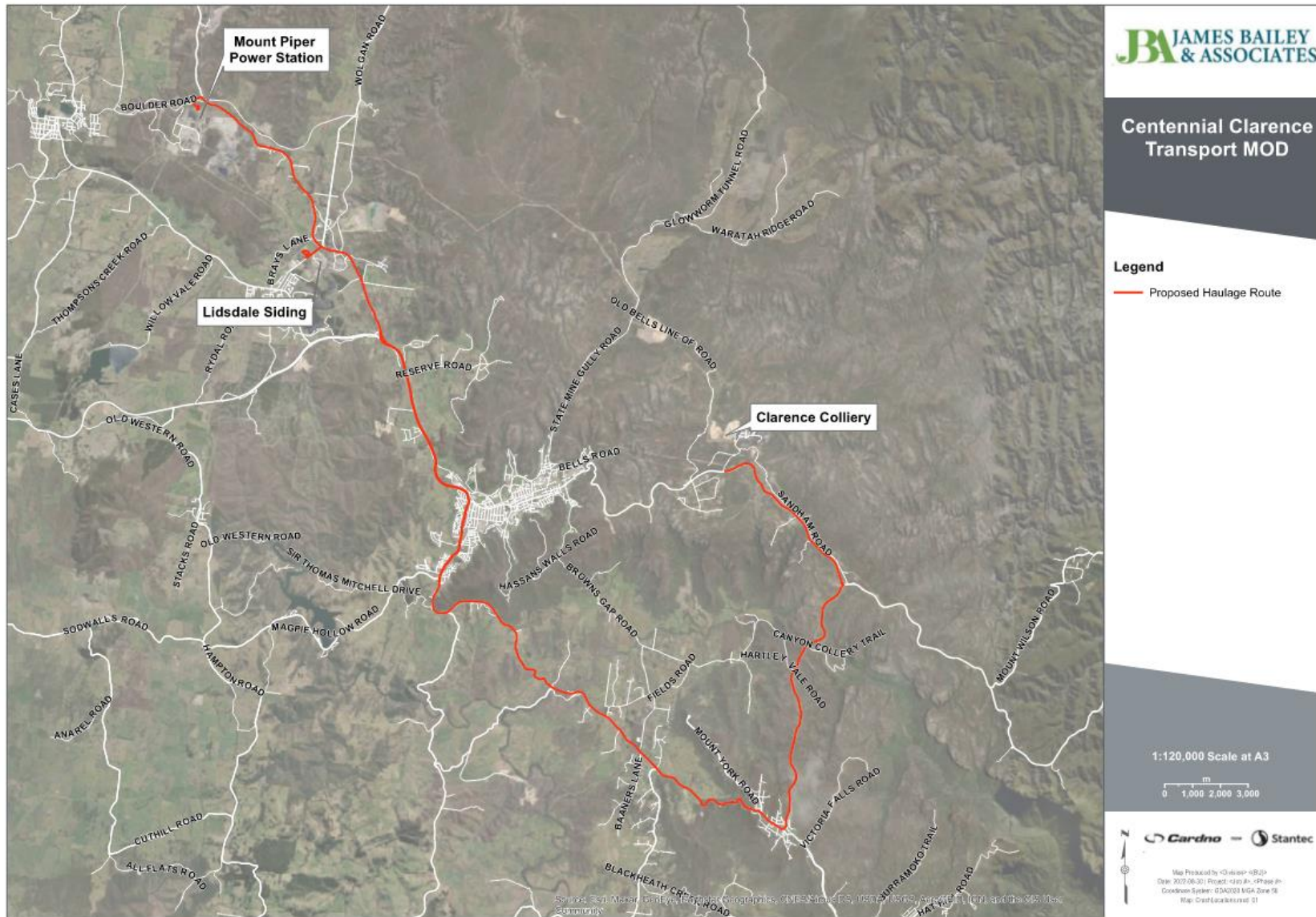
4.3 Haulage Route

Based on the advice provided by the client, the haulage route along the west will primarily be:

- > Chifley Road - The Darling Causeway - Station Street - Great Western Highway and the Castlereagh Highway to:
 - Main Road – Lidsdale Siding; and/or
 - Boulder Road – Mount Piper Power Station.

The proposed haulage route is also shown in **Figure 4-1**.

Figure 4-1 Haulage Route



4.4 Traffic Modelling Scenarios

The traffic modelling detailed in this assessment is based on the following:

- > Baseline (i.e. 2022); and
- > Baseline with proposed modification (i.e. year 2023).

4.5 Intersection Modelling

4.5.1.1 Castlereagh Highway / Boulder Road

The intersection geometry is illustrated in **Figure 2-7**.

The SIDRA Intersection modelling for the design year peak hour respectively, incorporating the additional traffic generated by the proposed modification is summarised in **Table 4-2**.

Table 4-2 Castlereagh Highway / Boulder Road Intersection Performance

Approach	AM Peak				PM Peak			
	DoS	Avg Delay	LoS	Max Queue (m)	DoS	Avg Delay	LoS	Max Queue (m)
Base								
Castlereagh Highway (South)	0.043	5.9	A	-	0.057	5.8	A	0
Castlereagh Highway (North)	0.055	5.8	A	0.1	0.055	5.9	A	0
Boulder Road (West)	0.058	7.2	A	1.9	0.13	7.2	A	4
Total	0.058	7.2	A	1.9	0.13	7.2	A	4
Approach	AM Peak				PM Peak			
	DoS	Avg Delay	LoS	Max Queue (m)	DoS	Avg Delay	LoS	Max Queue (m)
Base + Modification								
Castlereagh Highway (South)	0.043	6	A	-	0.057	5.9	A	0
Castlereagh Highway (North)	0.055	5.8	A	0.1	0.055	5.9	A	0
Boulder Road (West)	0.072	7.8	A	2.8	0.144	7.5	A	4.8
Total	0.072	7.8	A	2.8	0.144	7.5	A	4.8

Intersection performance shows that the performance of Castlereagh Highway / Boulder Road is LoS A in both the AM peak and PM peak for all the scenarios.

The results for Castlereagh Highway / Boulder Road indicate that the additional traffic generated by the modification has a minimal overall impact on the operation of the intersections, with the LoS generally unchanged between the “Base” and “Base + Modification” scenarios.

4.5.1.2 Castlereagh Highway / Main Street / Wolgan Road

The intersection geometry is illustrated in **Figure 2-6**.

The SIDRA Intersection modelling for the design year peak hour respectively, incorporating the additional traffic generated by the proposed modification is summarised in **Table 4-3**.

Table 4-3 Castlereagh Highway / Main Street / Wolgan Road Intersection Performance

Approach	AM Peak				PM Peak			
	DoS	Avg Delay	LoS	Max Queue (m)	DoS	Avg Delay	LoS	Max Queue (m)
Base								
Castlereagh Highway (South)	0.061	3.1	A	0	0.099	6.5	A	0
Castlereagh Highway (North)	0.044	6	A	0.1	0.098	6.3	A	0.3
Main Street (West)	0.175	8.3	A	2.6	0.124	10.1	A	1.7
Wolgan Road (East)	0.029	7.3	A	0.3	0.08	9.2	A	0.9
Total	0.175	8.3	A	2.6	0.124	10.1	A	1.7
Approach	AM Peak				PM Peak			
	DoS	Avg Delay	LoS	Max Queue (m)	DoS	Avg Delay	LoS	Max Queue (m)
Base + Modification								
Castlereagh Highway (South)	0.089	6	A	0.5	0.106	6.6	A	0.5
Castlereagh Highway (North)	0.048	6.1	A	0.1	0.101	6.4	A	0.3
Main Street (West)	0.196	8.9	A	3.1	0.151	11.5	A	2.3
Wolgan Road (East)	0.030	7.4	A	0.3	0.082	9.4	A	0.9
Total	0.196	8.9	A	3.1	0.151	11.5	A	2.3

The results indicate that due to the additional traffic generated by the modification has a minimal overall impact on the operation of the intersections, with the LoS generally unchanged between the “Base” and “Base + Modification” scenarios.

With regard to performance at the site access intersection, Chifley Road/Darling Causeway intersection and Station Street/Harley Avenue intersection reference is made to SIDRA Intersection analysis from the Clarence Colliery Modification Traffic Impact Assessment (EMM Consulting, 2019) which shows the LoS for all movements during the morning and afternoon peak hours is LoS A during the maximum haulage conditions (indicating good intersection operation). Furthermore, the traffic generation assessed within this modification (4 trucks per hour) is a minimal change compared to the EMM assessment.

4.6 Midblock Assessment

In order to compare the potential impacts of the proposed modification on the surrounding road network, the mid-block volumes have been assessed. The mid-block volumes are summarised in **Table 4-4**.

Table 4-4 Mid-Block Volumes

Location	Direction	AM peak hourly volume	AM Peak hourly with MOD	LoS	PM peak hourly volume	PM peak hourly volume with MOD	LoS
Chifley Road (east of site access intersection)	Westbound	88	92	A	121	125	A
	Eastbound	95	99	A	114	118	A
Chifley Road (west of Darling Causeway)	Westbound	95	99	A	160	164	A
	Eastbound	75	79	A	105	109	A
Darling Causeway (south of Chifley Road)	Northbound	30	34	A	38	42	A
	Southbound	50	54	A	44	48	A
Station Street (north of Harley Avenue)	Northbound	47	51	A	50	54	A
	Southbound	64	68	A	64	68	A
Station Street (south of Harley Avenue)	Northbound	22	26	A	38	42	A
	Southbound	19	23	A	42	46	A
Castlereagh Highway (south of Boulder Road)	Northbound	112	116	A	142	146	A
	Southbound	134	138	A	200	204	A
Castlereagh Highway (south of Main Street)	Northbound	182	186	A	200	204	A
	Southbound	166	170	A	211	215	A

Mid-block volumes along the haulage route are within acceptable LoS performance criteria indicating the proposed modification has little to no impact on the road network performance.

The existing daily traffic volumes (based on the intersection traffic surveys) and the predicted increase in daily truck movements (along with a percentage increase in heavy vehicle movements) along the assessed transport route are summarised in **Table 4-5** below.

Table 4-5 Existing and Proposed Daily Truck

Road Section	Existing Daily Traffic	Future Additional Daily Movement	% increase (%increase in HV)
Chifley Road (east of site access intersection)	2090 (12%)	50 truck movement	2% (20%)
Chifley Road (west of Darling Causeway)	2175 (10.6%)	50 truck movement	2% (21.7%)
Darling Causeway (south of Chifley Road)	810 (17.9%)	50 truck movement	6% (34.5%)
Station Street (north of Harley Avenue)	1125 (12.4%)	50 truck movement	4% (35.7%)
Station Street (south of Harley Avenue)	605 (11.6%)	50 truck movement	8% (71.4%)
Castlereagh Highway (south of Boulder Road)	2940 (12.4%)	50 truck movement	2% (15.2%)
Castlereagh Highway (south of Main Street)	3845 (11.6%)	50 truck movement	1% (12.5%)

Heavy Vehicle Percentage in parenthesis

The additional traffic on the haulage route generated by the proposed modification will increase daily total traffic volumes by approximately 1-8%. The heavy vehicle increase on Castlereagh Highway is 12-15%.

4.7 Intersection Geometry

This section will investigate the suitability of Castlereagh Highway / Boulder Road & Castlereagh Highway / Main Street. As a part of this investigation, consideration has been given to the sight distance requirements.

The existing arrangement of the intersections is shown **Figure 4-2**.

Figure 4-2 Intersection Arrangements



4.7.2 Sight Distance Assessment

The Safe Intersection Sight Distance (SISD) was assessed based on the guidelines provided in *Austroads Guidelines: Guide to Road Design Part 4A - Unsignalised and Signalised Intersections (2021)*.

The SISD determines the minimum distance which should be provided on a major road at an intersection and is dependent on a number of factors including the major road speed limit and the type of vehicle travelling on the road.

The following figure outlines the formula used to obtain the SISD value for the subject intersection.

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

Source: *Austroads Guide to Road Design: Part 4A – Unsignalised and signalised Intersections*

The above formula was used to determine the SISD required for a heavy vehicle to obtain safe sight distance during peak hours. In addition, the general minimum reaction time of 2 seconds was adopted for the drivers of heavy vehicles.

The following table outlines the values used in the formula presented above, in order to determine the SISD for the subject intersection.

Figure 4-3 Values Used in SISD Calculation

Coefficient	Description	Value Used
D _T	Decision Time (seconds) = Observation Time + Reaction Time	The Decision Time was established to be 5 seconds using an Observation Time of 3 seconds and a Reaction Time of 2 seconds.
V	Operating Speed (km/h)	80 km/h – The posted speed limit Castlereagh Highway.
d	Coefficient of deceleration	0.24 (as recommended in Table 3.3 in AustRoads Guide Part 4A)

Coefficient	Description	Value Used
a	Longitudinal Grade in %	0% grade as the terrain is assumed to be generally flat.

Using the above values, a SISD of 216m was calculated for the intersection. **Figure 4-4** and **Figure 4-5** outline the SISD sight lines which represent the area to be clear of any permanent visual obstructions so that a driver exiting can obtain sufficient sight distance.

Figure 4-4 Sight Lines for Truck Exiting Main Street - Lidsdale Siding



Figure 4-5 Sight Triangle for Truck Exiting Boulder Road - Mount Piper Power Station



As seen above there is good intersection visibility for trucks exiting the intersections which satisfy the Austroads SISD.

4.8 Road Safety

The review of the history of crashes in **Section 2.8** did not highlight any particular crash causation factors on the proposed haulage routes. There were no fatalities recorded. The additional traffic assessed under the modification is unlikely to have a detrimental impact on the crash rate along the proposed haulage route.

5 Mitigation & Management Measures

5.1 Operation

The foregoing assessment has identified that the additional traffic generated by modification would have a negligible impact on the operation of the road network and that there are no specific safety concerns with the existing road transport environment that would be exacerbated by the modification. As a result, there are no specific road or intersection upgrade measures warranted to address the potential adverse impacts of the modification.

Nevertheless, as the site will generate predominantly heavy vehicle traffic/vehicle types, it is appropriate that controls/measures on driver code of conduct and fatigue management be implemented.

The *Centennial Coal Haulage Management Standard* highlights the following measures which remain valid and applicable for operational traffic management:

Rules of Coal Haulage Operation:

- > All personnel conducting vehicle coal haulage must be suitably inducted prior to entering the mine site and appropriately licensed for registered vehicles as required by RMS NSW. Training of this Haulage Management Standard and relevant procedures will be provided at the induction.
- > All persons operating equipment for the purpose of loading coal haulage trucks on the surface must be appointed by the Manager of Mining Engineering;
- > All haulage trucks must be registered and must be roadworthy comprehensively insured and registered in full compliance with all relevant authorities;
- > All coal haulage operators and site contractors must have current Public Liability Insurance and Workers Compensation coverage for their operations;
- > On arrival at the entry gates, truck drivers that have been issued with a gate key are to scan the key to gain entry to the site. If truck drivers have not been issued with a gate key contact must be made with the Control Room Operator via the intercom system to obtain authorised entry;
- > Vehicle operators must comply with the relevant site standards as outlined in the site induction;
- > All drivers shall keep their vehicles as close as practicable to the left side of any road;
- > No person shall drive or operate a vehicle on site while under the influence of alcohol or a drug, or suffering from a condition which may impair ability to operate a vehicle in a safe manner;
- > All vehicles must have a UHF radio and must contact the loader driver on channel 20 or the dozer driver on channel 16 prior to entering any stockpile area;
- > Follow SWP-3192 Loading of Coal onto Road Transport;
- > No vehicle shall be used for tasks for which it has not been designed; and
- > Operators must familiarise themselves with the equipment limitations, as specified by the Original Equipment Manufacturer (OEM).

6 Conclusion

Cardno now Stantec has been commissioned by James Bailey & Associates, to undertake a traffic impact assessment to assess the proposed modification to the Development Consent approvals for Clarence and Lidsdale Siding. The modification is required to enable the delivery of thermal coal to Energy Australia's MPPS.

The following has been identified within this traffic impact assessment:

- > The proportion of heavy vehicle movements using Castlereagh Highway is generally higher during the morning peak hour than the afternoon peak hour. The proportions of heavy vehicle traffic are calculated as ratios of total heavy vehicle numbers to all vehicle numbers during these two peak hours.
- > In order to achieve the proposed modification to 300,000tpa, there will need to be an increase to the maximum daily number of trucks (in any direction) to 40 trucks per day (i.e. 80 truck movements) from Clarence.
- > A maximum of 25 trucks per day, (i.e. 50 truck movements) will be required to transport 200,000tpa of coal to the west.
- > During the morning and afternoon traffic peak hours there will typically be four peak hourly trucks (i.e. eight peak hourly truck movements) along the western haulage route.
- > Intersection performance shows that the performance of Castlereagh Highway / Boulder Road is LoS A in both the AM peak and PM peak for all the scenarios. The results for Castlereagh Highway / Boulder Road indicate that the additional traffic generated by the modification result in an overall minimal impact on the operation of the intersections, with the LoS generally unchanged between the "Base" and "Base + Modification" scenarios.
- > The results indicate that the additional traffic generated by the modification result in an overall minimal impact on the operation of the intersections, with the LoS generally unchanged between the "Base" and "Base + Modification" scenarios.
- > The review of the history of crashes did not highlight any particular crash causation factors on the haulage routes. There were no fatalities recorded. The additional traffic assessed under the modification is unlikely to have a detrimental impact on the crash rate along the haulage route.
- > Mid-block volumes along the haulage route are within acceptable LoS performance criteria indicating the proposed modification has little to no impact on the road network performance. The additional traffic on the haulage route generated by the proposed modification will increase daily traffic volumes by approximately 1-8%.
- > The SISD assessment is undertaken at Castlereagh Highway / Boulder Road & Castlereagh Highway / Main Street indicated that there is good intersection visibility for trucks exiting the intersections which satisfies the Austroads SISD.

Based on the above, it is concluded that the proposed modification will not significantly increase the traffic demand during the peak period and that there are no tangible impacts to traffic operation or road safety as a result of the proposal.

APPENDIX

A

TRAFFIC SURVEYS



now



Location Castlereagh Highway
-
Castlereagh Highway
Boulder Road
Suburb BLACKMAN FLATS

Duration 6:00 - 10:00
14:00 - 18:00
-
Day/Date Monday, 22 August 2022
Weather Dry

All Vehicles Time Per 15 Mins	NORTH Castlereagh Highway								EAST -								TOTAL		TOTAL
	L		I		R		TOTAL	L		I		R		TOTAL	TOTAL	TOTAL			
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ						
6:00 - 6:15				9	0	9	0	1	1	10							35	8	43
6:15 - 6:30				5	2	7	0	0	0	7							45	5	50
6:30 - 6:45				12	1	13	2	0	2	15							62	6	68
6:45 - 7:00				7	3	10	2	2	4	14							40	11	51
7:00 - 7:15				9	2	11	0	0	0	11							37	9	46
7:15 - 7:30				11	3	14	0	0	0	14							36	9	45
7:30 - 7:45				10	8	18	0	1	1	19							29	11	40
7:45 - 8:00				18	5	23	1	0	1	24							60	13	73
8:00 - 8:15				15	5	20	0	0	0	20							44	12	56
8:15 - 8:30				19	2	21	1	0	1	22							54	11	65
8:30 - 8:45				20	6	26	1	0	1	27							48	10	58
8:45 - 9:00				12	3	15	0	0	0	15							39	12	51
9:00 - 9:15				15	6	21	1	0	1	22							47	11	58
9:15 - 9:30				13	5	18	0	0	0	18							37	9	46
9:30 - 9:45				18	1	19	0	0	0	19							45	6	51
9:45 - 10:00				19	3	22	1	0	1	23							60	9	69
Period End				212	55	267	9	4	13	280							718	152	870
14:00 - 14:15				20	1	21	0	0	0	21							51	5	56
14:15 - 14:30				15	3	18	0	0	0	18							45	4	49
14:30 - 14:45				20	3	23	0	0	0	23							51	5	56
14:45 - 15:00				19	4	23	0	0	0	23							59	6	65
15:00 - 15:15				18	3	21	0	0	0	21							87	10	97
15:15 - 15:30				14	2	16	1	0	1	17							82	5	87
15:30 - 15:45				29	4	33	0	0	0	33							86	11	97
15:45 - 16:00				7	2	9	0	0	0	9							40	3	43
16:00 - 16:15				23	3	26	0	0	0	26							57	7	64
16:15 - 16:30				30	3	33	1	0	1	34							69	7	76
16:30 - 16:45				24	3	27	1	0	1	28							58	11	69
16:45 - 17:00				27	3	30	0	0	0	30							57	7	64
17:00 - 17:15				15	6	21	0	0	0	21							47	9	56
17:15 - 17:30				9	1	10	0	1	1	11							34	5	39
17:30 - 17:45				6	2	8	0	0	0	8							38	4	42
17:45 - 18:00				9	4	13	0	0	0	13							35	4	39
Period End				285	47	332	3	1	4	336							896	103	999

All Vehicles Time Per 15 Mins	SOUTH Castlereagh Highway								WEST Boulder Road								TOTAL		TOTAL
	L		I		R		TOTAL	L		I		R		TOTAL	TOTAL	TOTAL			
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ						
6:00 - 6:15	9	1	10	5	6	11	21	0	0	0	12	0	12	12	35	8	43		
6:15 - 6:30	20	1	21	15	1	16	37	0	0	0	6	1	6	6	45	5	50		
6:30 - 6:45	30	1	31	6	3	9	40	1	0	1	11	1	12	13	62	6	68		
6:45 - 7:00	16	0	16	12	6	18	34	0	0	0	3	0	3	3	40	11	51		
7:00 - 7:15	8	0	8	13	6	19	27	1	0	1	6	1	7	8	37	9	46		
7:15 - 7:30	11	2	13	10	3	13	26	0	0	0	4	1	5	5	36	9	45		
7:30 - 7:45	4	1	5	9	1	10	15	0	0	0	6	0	6	6	29	11	40		
7:45 - 8:00	13	3	16	19	4	23	39	0	1	1	9	0	9	10	60	13	73		
8:00 - 8:15	9	0	9	8	4	12	21	0	2	2	12	1	13	15	44	12	56		
8:15 - 8:30	5	4	9	20	4	24	33	0	0	0	9	1	10	10	54	11	65		
8:30 - 8:45	6	1	7	11	1	12	19	0	0	0	10	2	12	12	48	10	58		
8:45 - 9:00	9	2	11	9	3	12	23	0	1	1	9	3	12	13	39	12	51		
9:00 - 9:15	12	0	12	9	3	12	24	0	0	0	10	2	12	12	47	11	58		
9:15 - 9:30	7	1	8	6	2	8	16	0	0	0	11	1	12	12	37	9	46		
9:30 - 9:45	7	3	10	16	1	17	27	0	0	0	4	1	5	5	45	6	51		
9:45 - 10:00	9	0	9	19	4	23	32	1	0	1	11	2	13	14	60	9	69		
Period End	175	20	195	187	52	239	434	3	4	7	132	17	149	156	718	152	870		
14:00 - 14:15	4	0	4	21	4	25	29	0	0	0	6	0	6	6	51	5	56		
14:15 - 14:30	10	0	10	15	0	15	25	0	0	0	5	1	6	6	45	4	49		
14:30 - 14:45	6	0	6	17	2	19	25	1	0	1	7	0	7	8	51	5	56		
14:45 - 15:00	10	0	10	19	2	21	31	0	0	0	11	0	11	11	59	6	65		
15:00 - 15:15	8	2	10	25	3	28	38	0	1	1	36	1	37	38	87	10	97		
15:15 - 15:30	10	2	12	21	0	21	33	1	0	1	35	1	36	37	82	5	87		
15:30 - 15:45	9	1	10	26	4	30	40	0	1	1	22	1	23	24	86	11	97		
15:45 - 16:00	9	0	9	12	1	13	22	0	0	0	12	0	12	12	40	3	43		
16:00 - 16:15	8	1	9	19	3	22	31	2	0	2	5	0	5	7	57	7	64		
16:15 - 16:30	6	0	6	22	2	24	30	0	0	0	10	2	12	12	69	7	76		
16:30 - 16:45	6	0	6	22	5	27	33	0	0	0	5	3	8	8	58	11	69		
16:45 - 17:00	16	2	18	12	1	13	31	0	0	0	2	1	3	3	57	7	64		
17:00 - 17:15	6	0	6	18	2	20	26	0	0	0	8	1	9	9	47	9	56		
17:15 - 17:30	4	0	4	18	2	20	24	0	0	0	3	1	4	4	34	5	39		
17:30 - 17:45	14	0	14	13	1	14	28	1	0	1	4	1	5	6	38	4	42		
17:45 - 18:00	3	0	3	11	0	11	14	1	0	1	11	0	11	12	35	4	39		
Period End	129	8	137	291	32	323	460	6	2	8	182	13	195	203	896	103	999		

Location Castlereagh Highway
-
Castlereagh Highway
Boulder Road
 Suburb BLACKMAN FLATS

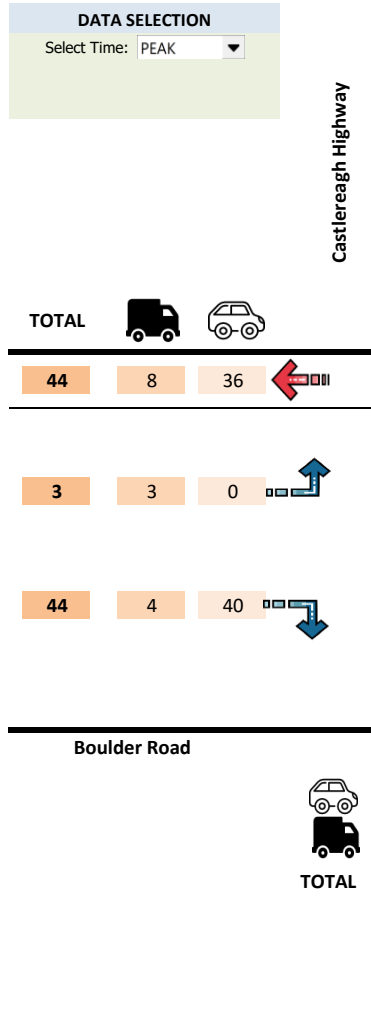
Duration 6:00 - 10:00
14:00 - 18:00
-
 Day/Date Monday, 22 August 2022
 Weather Dry

All Vehicles Time Per Hour	NORTH Castlereagh Highway							EAST -							TOTAL		
	L		T		R		TOTAL	L		T		R		TOTAL	TOTAL	TOTAL	
	LIGHT	HEAVY	LIGHT	HEAVY	LIGHT	HEAVY		LIGHT	HEAVY	LIGHT	HEAVY	LIGHT	HEAVY				
6:00 - 7:00			33	6	39	4	3	7	46						182	30	212
6:15 - 7:15			33	8	41	4	2	6	47						184	31	215
6:30 - 7:30			39	9	48	4	2	6	54						175	35	210
6:45 - 7:45			37	16	53	2	3	5	58						142	40	182
7:00 - 8:00			48	18	66	1	1	2	68						162	42	204
7:15 - 8:15			54	21	75	1	1	2	77						169	45	214
7:30 - 8:30			62	20	82	2	1	3	85						187	47	234
7:45 - 8:45			72	18	90	3	0	3	93						206	46	252
8:00 - 9:00			66	16	82	2	0	2	84						185	45	230
8:15 - 9:15			66	17	83	3	0	3	86						188	44	232
8:30 - 9:30			60	20	80	2	0	2	82						171	42	213
8:45 - 9:45			58	15	73	1	0	1	74						168	38	206
9:00 - 10:00			65	15	80	2	0	2	82						189	35	224
Period End																	
14:00 - 15:00			74	11	85	0	0	0	85						206	20	226
14:15 - 15:15			72	13	85	0	0	0	85						242	25	267
14:30 - 15:30			71	12	83	1	0	1	84						279	26	305
14:45 - 15:45			80	13	93	1	0	1	94						314	32	346
15:00 - 16:00			68	11	79	1	0	1	80						295	29	324
15:15 - 16:15			73	11	84	1	0	1	85						265	26	291
15:30 - 16:30			89	12	101	1	0	1	102						252	28	280
15:45 - 16:45			84	11	95	2	0	2	97						224	28	252
16:00 - 17:00			104	12	116	2	0	2	118						241	32	273
16:15 - 17:15			96	15	111	2	0	2	113						231	34	265
16:30 - 17:30			75	13	88	1	1	2	90						196	32	228
16:45 - 17:45			57	12	69	0	1	1	70						176	25	201
17:00 - 18:00			39	13	52	0	1	1	53						154	22	176
Period End																	

All Vehicles Time Per Hour	SOUTH Castlereagh Highway							WEST Boulder Road							TOTAL				
	L		T		R		TOTAL	L		T		R		TOTAL	TOTAL	TOTAL			
	LIGHT	HEAVY	LIGHT	HEAVY	LIGHT	HEAVY		LIGHT	HEAVY	LIGHT	HEAVY	LIGHT	HEAVY						
6:00 - 7:00	75	3	78	38	16	54	132	1	0	1			31	2	33	34	182	30	212
6:15 - 7:15	74	2	76	46	16	62	138	2	0	2			25	3	28	30	184	31	215
6:30 - 7:30	65	3	68	41	18	59	127	2	0	2			24	3	27	29	175	35	210
6:45 - 7:45	39	3	42	44	16	60	102	1	0	1			19	2	21	22	142	40	182
7:00 - 8:00	36	6	42	51	14	65	107	1	1	2			25	2	27	29	162	42	204
7:15 - 8:15	37	6	43	46	12	58	101	0	3	3			31	2	33	36	169	45	214
7:30 - 8:30	31	8	39	56	13	69	108	0	3	3			36	2	38	41	187	47	234
7:45 - 8:45	33	8	41	58	13	71	112	0	3	3			40	4	44	47	206	46	252
8:00 - 9:00	29	7	36	48	12	60	96	0	3	3			40	7	47	50	185	45	230
8:15 - 9:15	32	7	39	49	11	60	99	0	1	1			38	8	46	47	188	44	232
8:30 - 9:30	34	4	38	35	9	44	82	0	1	1			40	8	48	49	171	42	213
8:45 - 9:45	35	6	41	40	9	49	90	0	1	1			34	7	41	42	168	38	206
9:00 - 10:00	35	4	39	50	10	60	99	1	0	1			36	6	42	43	189	35	224
Period End																			
14:00 - 15:00	30	0	30	72	8	80	110	1	0	1			29	1	30	31	206	20	226
14:15 - 15:15	34	2	36	76	7	83	119	1	1	2			59	2	61	63	242	25	267
14:30 - 15:30	34	4	38	82	7	89	127	2	1	3			89	2	91	94	279	26	305
14:45 - 15:45	37	5	42	91	9	100	142	1	2	3			104	3	107	110	314	32	346
15:00 - 16:00	36	5	41	84	8	92	133	1	2	3			105	3	108	111	295	29	324
15:15 - 16:15	36	4	40	78	8	86	126	3	1	4			74	2	76	80	265	26	291
15:30 - 16:30	32	2	34	79	10	89	123	2	1	3			49	3	52	55	252	28	280
15:45 - 16:45	29	1	30	75	11	86	116	2	0	2			32	5	37	39	224	28	252
16:00 - 17:00	36	3	39	75	11	86	125	2	0	2			22	6	28	30	241	32	273
16:15 - 17:15	34	2	36	74	10	84	120	0	0	0			25	7	32	32	231	34	265
16:30 - 17:30	32	2	34	70	10	80	114	0	0	0			18	6	24	24	196	32	228
16:45 - 17:45	40	2	42	61	6	67	109	1	0	1			17	4	21	22	176	25	201
17:00 - 18:00	27	0	27	60	5	65	92	2	0	2			26	3	29	31	154	22	176
Period End																			

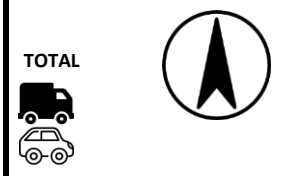
Location Castlereagh Highway
-
Castlereagh Highway
Boulder Road
 Suburb BLACKMAN FLATS

Duration 6:00 - 10:00
14:00 - 18:00
-
 Day/Date Monday, 22 August 2022
 Weather Dry



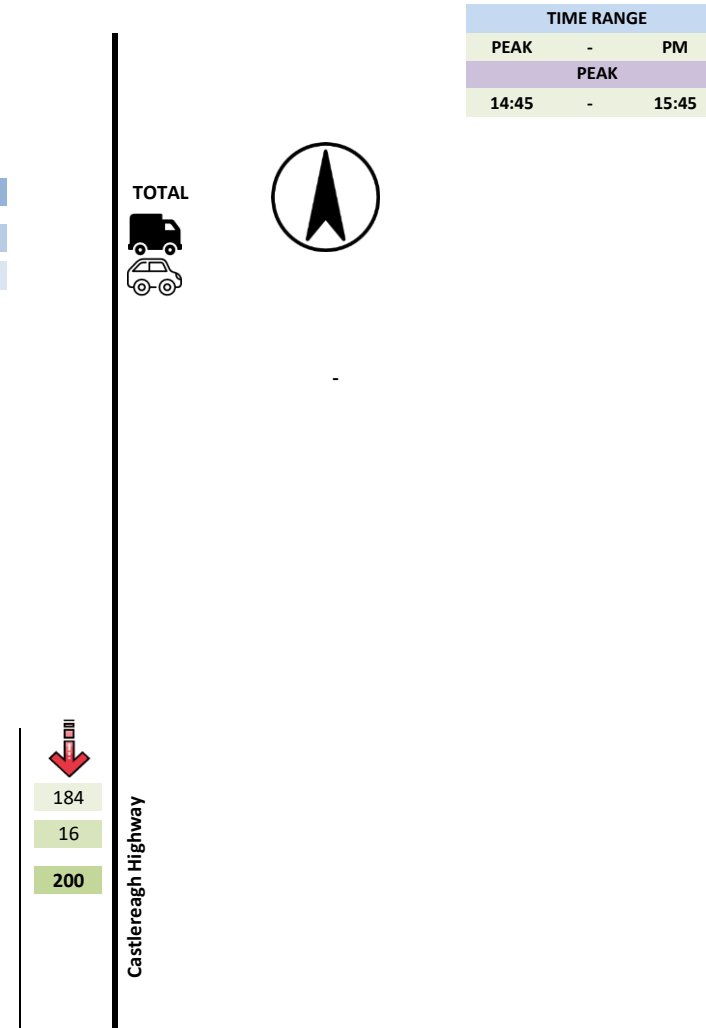
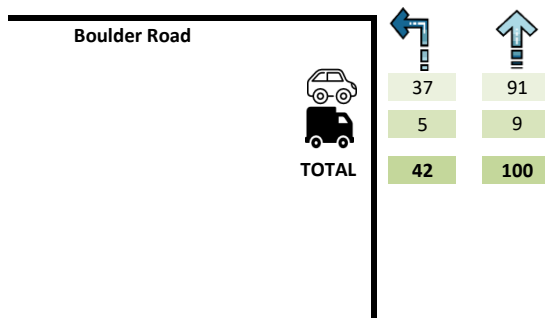
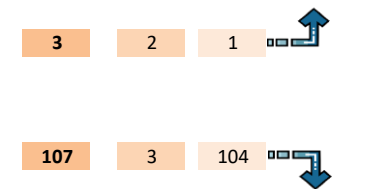
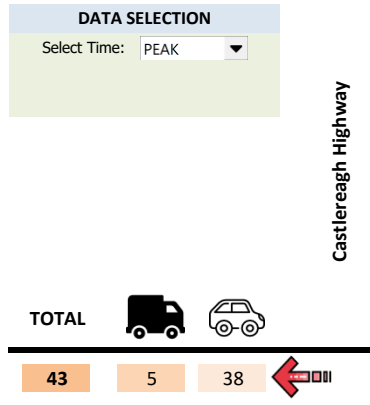
TIME RANGE

PEAK	-	AM
PEAK		
7:45	-	8:45



Location Castlereagh Highway
-
Castlereagh Highway
Boulder Road
 Suburb BLACKMAN FLATS

Duration 6:00 - 10:00
14:00 - 18:00
-
 Day/Date Monday, 22 August 2022
 Weather Dry



Location Wolgan Road
Castlereagh Highway
Main Street
Castlereagh Highway
 Suburb LISDALE

Duration 6:00 - 10:00
14:00 - 18:00
 Day/Date Wednesday, 26 June 2019
 Weather Dry

All Vehicles Time Per 15 Mins	NORTH Wolgan Road									EAST Castlereagh Highway									TOTAL		TOTAL		
	L			I			R			TOTAL	L			I			R			TOTAL		LIGHT	HEAVY
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ				
6:00 - 6:15	1	0	1	2	0	2	0	0	0	3	7	0	7	21	4	25	4	0	4	36	77	7	84
6:15 - 6:30	0	0	0	3	0	3	0	0	0	3	10	1	11	24	2	26	4	1	5	42	78	7	85
6:30 - 6:45	1	0	1	3	0	3	0	0	0	4	6	0	6	23	6	29	10	1	11	46	109	11	120
6:45 - 7:00	0	0	0	4	0	4	3	1	4	8	8	0	8	16	4	20	15	1	16	44	90	15	105
7:00 - 7:15	0	0	0	6	0	6	1	0	1	7	12	0	12	20	6	26	7	5	12	50	81	18	99
7:15 - 7:30	0	0	0	0	0	0	0	0	0	0	7	0	7	15	4	19	7	0	7	33	54	10	64
7:30 - 7:45	0	0	0	0	0	0	1	1	2	2	3	0	3	12	0	12	9	1	10	25	62	14	76
7:45 - 8:00	0	0	0	0	3	3	0	0	0	3	5	1	6	21	7	28	4	2	6	40	74	18	92
8:00 - 8:15	0	0	0	4	0	4	0	0	0	4	5	1	6	18	4	22	5	1	6	34	69	16	85
8:15 - 8:30	3	0	3	5	1	6	0	0	0	9	3	1	4	16	5	21	5	4	9	34	79	14	93
8:30 - 8:45	0	0	0	8	0	8	0	0	0	8	3	2	5	19	2	21	2	0	2	28	75	12	87
8:45 - 9:00	0	0	0	5	1	6	0	0	0	6	11	3	14	12	5	17	11	0	11	42	80	17	97
9:00 - 9:15	0	0	0	5	0	5	0	0	0	5	5	0	5	19	3	22	5	0	5	32	76	12	88
9:15 - 9:30	1	0	1	2	1	3	1	1	2	6	5	2	7	16	1	17	7	0	7	31	70	13	83
9:30 - 9:45	0	0	0	5	0	5	1	0	1	6	6	2	8	24	5	29	6	1	7	44	83	14	97
9:45 - 10:00	0	0	0	4	0	4	1	0	1	5	9	4	13	24	3	27	8	0	8	48	86	12	98
Period End	6	0	6	56	6	62	8	3	11	79	105	17	122	300	61	361	109	17	126	609	1243	210	1453
14:00 - 14:15	0	0	0	9	0	9	1	0	1	10	6	2	8	22	2	24	2	2	4	36	83	11	94
14:15 - 14:30	0	0	0	3	0	3	2	0	2	5	8	1	9	21	1	22	1	2	3	34	70	7	77
14:30 - 14:45	0	0	0	3	0	3	2	0	2	5	5	0	5	25	2	27	5	0	5	37	77	8	85
14:45 - 15:00	0	0	0	8	1	9	1	0	1	10	4	2	6	24	1	25	7	3	10	41	91	13	104
15:00 - 15:15	1	0	1	8	0	8	2	0	2	11	9	2	11	29	7	36	15	1	16	63	130	16	146
15:15 - 15:30	1	0	1	8	0	8	0	0	0	9	14	0	14	28	1	29	5	2	7	50	120	12	132
15:30 - 15:45	1	0	1	12	3	15	1	0	1	17	16	4	20	26	2	28	6	2	8	56	130	13	143
15:45 - 16:00	0	0	0	2	1	3	1	0	1	4	9	2	11	17	2	19	7	1	8	38	90	11	101
16:00 - 16:15	0	0	0	5	0	5	1	0	1	6	6	0	6	30	3	33	7	3	10	49	95	11	106
16:15 - 16:30	0	0	0	8	0	8	0	0	0	8	15	0	15	18	3	21	7	2	9	45	112	11	123
16:30 - 16:45	0	0	0	8	1	9	1	0	1	10	7	0	7	29	3	32	5	0	5	44	102	9	111
16:45 - 17:00	0	0	0	6	0	6	1	0	1	7	12	0	12	28	2	30	12	1	13	55	103	7	110
17:00 - 17:15	1	0	1	5	0	5	0	0	0	6	8	1	9	23	4	27	4	1	5	41	88	14	102
17:15 - 17:30	0	0	0	3	0	3	1	0	0	3	11	1	12	21	0	21	10	0	10	43	77	3	79
17:30 - 17:45	0	0	0	2	0	2	5	0	5	7	8	0	8	26	1	27	11	0	11	46	79	5	84
17:45 - 18:00	1	0	1	4	0	4	1	0	1	6	9	2	11	20	0	20	11	0	11	42	79	5	84
Period End	5	0	5	94	6	100	20	0	19	124	147	17	164	387	34	421	115	20	135	720	1526	156	1681

All Vehicles Time Per 15 Mins	SOUTH Main Street									WEST Castlereagh Highway									TOTAL		TOTAL		
	L			I			R			TOTAL	L			I			R			TOTAL		LIGHT	HEAVY
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ				
6:00 - 6:15	5	1	6	7	0	7	8	0	8	21	2	0	2	16	2	18	4	0	4	24	77	7	84
6:15 - 6:30	9	0	9	3	0	3	12	1	13	25	0	0	0	13	2	15	0	0	0	15	78	7	85
6:30 - 6:45	11	0	11	7	0	7	22	2	24	42	1	0	1	20	2	22	5	0	5	28	109	11	120
6:45 - 7:00	4	0	4	15	2	17	11	3	14	35	0	0	0	13	4	17	1	0	1	18	90	15	105
7:00 - 7:15	6	0	6	7	2	9	3	2	5	20	1	0	1	16	3	19	2	0	2	22	81	18	99
7:15 - 7:30	5	0	5	1	0	1	1	4	5	11	0	0	0	14	2	16	4	0	4	20	54	10	64
7:30 - 7:45	11	2	13	5	0	5	3	0	3	21	0	0	0	17	10	27	1	0	1	28	62	14	76
7:45 - 8:00	7	1	8	4	0	4	6	0	6	18	1	0	1	23	4	27	3	0	3	31	74	18	92
8:00 - 8:15	3	0	3	1	0	1	5	2	7	11	3	2	5	23	6	29	2	0	2	36	69	16	85
8:15 - 8:30	6	0	6	2	0	2	6	1	7	15	1	0	1	28	2	30	4	0	4	35	79	14	93
8:30 - 8:45	1	1	2	1	0	1	7	2	9	12	0	1	1	31	3	34	3	1	4	39	75	12	87
8:45 - 9:00	4	0	4	7	1	8	5	0	5	17	2	0	2	22	7	29	1	0	1	32	80	17	97
9:00 - 9:15	3	0	3	7	0	7	5	2	7	17	1	0	1	25	7	32	1	0	1	34	76	12	88
9:15 - 9:30	4	0	4	2	0	2	7	2	9	15	0	0	0	22	5	27	3	1	4	31	70	13	83
9:30 - 9:45	3	0	3	4	0	4	7	2	9	16	1	0	1	23	3	26	3	1	4	31	83	14	97
9:45 - 10:00	3	0	3	4	1	5	10	1	11	19	2	1	3	18	2	20	3	0	3	26	86	12	98
Period End	85	5	90	77	6	83	118	24	142	315	15	4	19	324	64	388	40	3	43	450	1243	210	1453
14:00 - 14:15	2	1	3	1	0	1	7	1	8	12	1	0	1	27	3	30	5	0	5	36	83	11	94
14:15 - 14:30	4	0	4	4	0	4	7	1	8	16	0	0	0	20	2	22	0	0	0	22	70	7	77
14:30 - 14:45	3	0	3	3	1	4	6	0	6	13	0	0	0	22	5	27	3	0	3	30	77	8	85
14:45 - 15:00	6	1	7	1	0	1	9	2	11	19	0	0	0	26	3	29	5	0	5	34	91	13	104
15:00 - 15:15	4	0	4	4	2	6	4	0	4	14	5	0	5	42	4	46	7	0	7	58	130	16	146
15:15 - 15:30	5	0	5	6	1	7	8	1	9	21	2	1	3	35	5	40	8	1	9	52	120	12	132
15:30 - 15:45	4	1	5	8	0	8	5	0	5	18	5	0	5	41	1	42	5	0	5	52	130	13	143
15:45 - 16:00	5	0	5	5	0	5	11	1	12	22	0	0	0	20	4	24	13	0	13	37	90	11	101
16:00 - 16:15	4	0	4	7	1	8	10	1	11	23	1	0	1	20	3	23	4	0	4	28	95	11	106
16:15 - 16:30	3	0	3	6	0	6	10	2	12	21	0	0	0	40	4	44	5	0	5	49	112	11	123
16:30 - 16:45	5	0	5	6	0	6	14	0	14	25	1	0	1	23	5	28	3	0	3	32	102	9	111
16:45 - 17:00	2	0	2	4	0	4	4	0	4	10	1	0	1	28	4	32	5	0	5	38	103	7	110
17:00 - 17:15	2	0	2	10	0	10	8	0	8	20	0	0	0	23	8	31	4	0	4	35	88	14	102
17:15 - 17:30	2	0	2	9	0	9	6	0	6	17	0	0	0	13	2	15	1	0	1	16	77	3	79
17:30 - 17:45	2	0	2	3	0	3	9	0	9	14	0	0	0	10	4	14	3	0	3	17	79	5	84
17:45 - 18:00	1	0	1	2	0	2	7	1	8	11	3	0	3	15	2	17	5	0	5	25	79	5	84
Period End	54	3	57	79	5	84	125	10	135	276	19	1	20	405	59	464	76	1	77				

Location Wolgan Road
Castlereagh Highway
Main Street
Castlereagh Highway
Suburb LISDALE

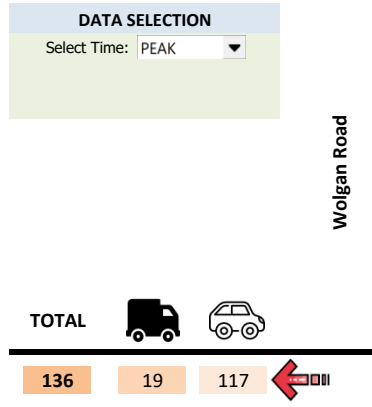
Duration 6:00 - 10:00
14:00 - 18:00
-
Day/Date Wednesday, 26 June 2019
Weather Dry

All Vehicles Time Per Hour	NORTH Wolgan Road									EAST Castlereagh Highway									TOTAL		TOTAL			
	L			I			R			TOTAL	L			I			R			TOTAL		LIGHT	HEAVY	TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ					
6:00 - 7:00	2	0	2	12	0	12	3	1	4	18	31	1	32	84	16	100	33	3	36	168	354	40	394	
6:15 - 7:15	1	0	1	16	0	16	4	1	5	22	36	1	37	83	18	101	36	8	44	182	358	51	409	
6:30 - 7:30	1	0	1	13	0	13	4	1	5	19	33	0	33	74	20	94	39	7	46	173	334	54	388	
6:45 - 7:45	0	0	0	10	0	10	5	2	7	17	30	0	30	63	14	77	38	7	45	152	287	57	344	
7:00 - 8:00	0	0	0	6	3	9	2	1	3	12	27	1	28	68	17	85	27	8	35	148	271	60	331	
7:15 - 8:15	0	0	0	4	3	7	1	1	2	9	20	2	22	66	15	81	25	4	29	132	259	58	317	
7:30 - 8:30	3	0	3	9	4	13	1	1	2	18	16	3	19	67	16	83	23	8	31	133	284	62	346	
7:45 - 8:45	3	0	3	17	4	21	0	0	0	24	16	5	21	74	18	92	16	7	23	136	297	60	357	
8:00 - 9:00	3	0	3	22	2	24	0	0	0	27	22	7	29	65	16	81	23	5	28	138	303	59	362	
8:15 - 9:15	3	0	3	23	2	25	0	0	0	28	22	6	28	66	15	81	23	4	27	136	310	55	365	
8:30 - 9:30	1	0	1	20	2	22	1	1	2	25	24	7	31	66	11	77	25	0	25	133	301	54	355	
8:45 - 9:45	1	0	1	17	2	19	2	1	3	23	27	7	34	71	14	85	29	1	30	149	309	56	365	
9:00 - 10:00	1	0	1	16	1	17	3	1	4	22	25	8	33	83	12	95	26	1	27	155	315	51	366	
Period End																								
14:00 - 15:00	0	0	0	23	1	24	6	0	6	30	23	5	28	92	6	98	15	7	22	148	321	39	360	
14:15 - 15:15	1	0	1	22	1	23	7	0	7	31	26	5	31	99	11	110	28	6	34	175	368	44	412	
14:30 - 15:30	2	0	2	27	1	28	5	0	5	35	32	4	36	106	11	117	32	6	38	191	418	49	467	
14:45 - 15:45	3	0	3	36	4	40	4	0	4	47	43	8	51	107	11	118	33	8	41	210	471	54	525	
15:00 - 16:00	3	0	3	30	4	34	4	0	4	41	48	8	56	100	12	112	33	6	39	207	470	52	522	
15:15 - 16:15	2	0	2	27	4	31	3	0	3	36	45	6	51	101	8	109	25	8	33	193	435	47	482	
15:30 - 16:30	1	0	1	27	4	31	3	0	3	35	46	6	52	91	10	101	27	8	35	188	427	46	473	
15:45 - 16:45	0	0	0	23	2	25	3	0	3	28	37	2	39	94	11	105	26	6	32	176	399	42	441	
16:00 - 17:00	0	0	0	27	1	28	3	0	3	31	40	0	40	105	11	116	31	6	37	193	412	38	450	
16:15 - 17:15	1	0	1	27	1	28	2	0	2	31	42	1	43	98	12	110	28	4	32	185	405	41	446	
16:30 - 17:30	1	0	1	22	1	23	3	0	2	26	38	2	40	101	9	110	31	2	33	183	370	33	402	
16:45 - 17:45	1	0	1	16	0	16	7	0	6	23	39	2	41	98	7	105	37	2	39	185	347	29	375	
17:00 - 18:00	2	0	2	14	0	14	7	0	6	22	36	4	40	90	5	95	36	1	37	172	323	27	349	
Period End																								

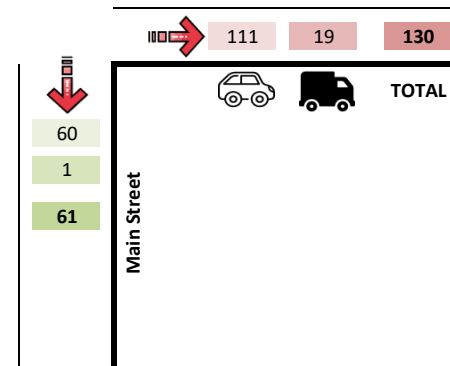
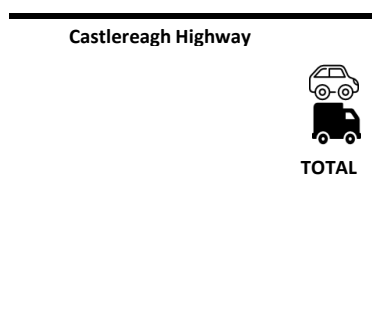
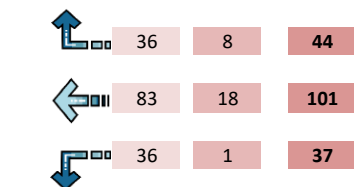
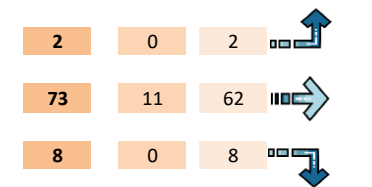
All Vehicles Time Per Hour	SOUTH Main Street									WEST Castlereagh Highway									TOTAL		TOTAL			
	L			I			R			TOTAL	L			I			R			TOTAL		LIGHT	HEAVY	TOTAL
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ					
6:00 - 7:00	29	1	30	32	2	34	53	6	59	123	3	0	3	62	10	72	10	0	10	85	354	40	394	
6:15 - 7:15	30	0	30	32	4	36	48	8	56	122	2	0	2	62	11	73	8	0	8	83	358	51	409	
6:30 - 7:30	26	0	26	30	4	34	37	11	48	108	2	0	2	63	11	74	12	0	12	88	334	54	388	
6:45 - 7:45	26	2	28	28	4	32	18	9	27	87	1	0	1	60	19	79	8	0	8	88	287	57	344	
7:00 - 8:00	29	3	32	17	2	19	13	6	19	70	2	0	2	70	19	89	10	0	10	101	271	60	331	
7:15 - 8:15	26	3	29	11	0	11	15	6	21	61	4	2	6	77	22	99	10	0	10	115	259	58	317	
7:30 - 8:30	27	3	30	12	0	12	20	3	23	65	5	2	7	91	22	113	10	0	10	130	284	62	346	
7:45 - 8:45	17	2	19	8	0	8	24	5	29	56	5	3	8	105	15	120	12	1	13	141	297	60	357	
8:00 - 9:00	14	1	15	11	1	12	23	5	28	55	6	3	9	104	18	122	10	1	11	142	303	59	362	
8:15 - 9:15	14	1	15	17	1	18	23	5	28	61	4	1	5	106	19	125	9	1	10	140	310	55	365	
8:30 - 9:30	12	1	13	17	1	18	24	6	30	61	3	1	4	100	22	122	8	2	10	136	301	54	355	
8:45 - 9:45	14	0	14	20	1	21	24	6	30	65	4	0	4	92	22	114	8	2	10	128	309	56	365	
9:00 - 10:00	13	0	13	17	1	18	29	7	36	67	4	1	5	88	17	105	10	2	12	122	315	51	366	
Period End																								
14:00 - 15:00	15	2	17	9	1	10	29	4	33	60	1	0	1	95	13	108	13	0	13	122	321	39	360	
14:15 - 15:15	17	1	18	12	3	15	26	3	29	62	5	0	5	110	14	124	15	0	15	144	368	44	412	
14:30 - 15:30	18	1	19	14	4	18	27	3	30	67	7	1	8	125	17	142	23	1	24	174	418	49	467	
14:45 - 15:45	19	2	21	19	3	22	26	3	29	72	12	1	13	144	13	157	25	1	26	196	471	54	525	
15:00 - 16:00	18	1	19	23	3	26	28	2	30	75	12	1	13	138	14	152	33	1	34	199	470	52	522	
15:15 - 16:15	18	1	19	26	2	28	34	3	37	84	8	1	9	116	13	129	30	1	31	169	435	47	482	
15:30 - 16:30	16	1	17	26	1	27	36	4	40	84	6	0	6	121	12	133	27	0	27	166	427	46	473	
15:45 - 16:45	17	0	17	24	1	25	45	4	49	91	2	0	2	103	16	119	25	0	25	146	399	42	441	
16:00 - 17:00	14	0	14	23	1	24	38	3	41	79	3	0	3	111	16	127	17	0	17	147	412	38	450	
16:15 - 17:15	12	0	12	26	0	26	36	2	38	76	2	0	2	114	21	135	17	0	17	154	405	41	446	
16:30 - 17:30	11	0	11	29	0	29	32	0	32	72	2	0	2	87	19	106	13	0	13	121	370	33	402	
16:45 - 17:45	8	0	8	26	0	26	27	0	27	61	1	0	1	74	18	92	13	0	13	106	347	29	375	
17:00 - 18:00	7	0	7	24	0	24	30	1	31	62	3	0	3	61	16	77	13	0	13	93	323	27	349	
Period End																								

Location Wolgan Road
Castlereagh Highway
Main Street
Castlereagh Highway
 Suburb LISDALE

Duration 6:00 - 10:00
14:00 - 18:00
 -
 Day/Date Wednesday, 26 June 2019
 Weather Dry

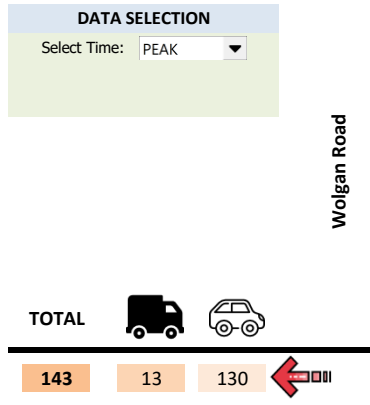


TIME RANGE		
PEAK	-	AM
PEAK		
6:15	-	7:15

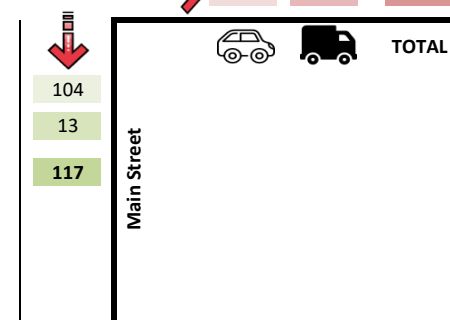
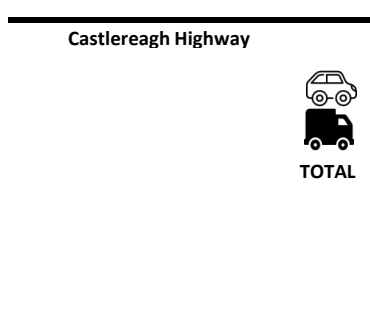
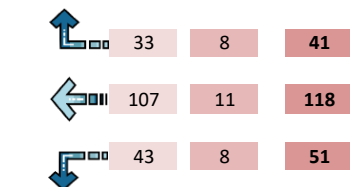
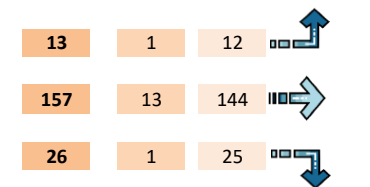


Location Wolgan Road
Castlereagh Highway
Main Street
Castlereagh Highway
 Suburb LISDALE

Duration 6:00 - 10:00
14:00 - 18:00
-
 Day/Date Wednesday, 26 June 2019
 Weather Dry



TIME RANGE		
PEAK	-	PM
PEAK		
14:45	-	15:45



APPENDIX

B

SIDRA OUTPUTS



now



MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Wolgan Road PM (Site Folder: PM)]

Network: N101 [PM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
2	T1	178	11.2	178	11.2	0.099	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	43	19.5	43	19.5	0.040	6.5	LOS A	0.1	0.5	0.30	0.59	0.30	51.5
Approach		221	12.9	221	12.9	0.099	1.3	NA	0.1	0.5	0.06	0.11	0.06	56.9
East: Wolgan Road														
4	L2	3	0.0	3	0.0	0.080	6.2	LOS A	0.1	0.9	0.48	0.70	0.48	51.1
6	R2	46	9.1	46	9.1	0.080	9.2	LOS A	0.1	0.9	0.48	0.70	0.48	46.6
Approach		49	8.5	49	8.5	0.080	9.0	LOS A	0.1	0.9	0.48	0.70	0.48	47.0
North: Castlereagh Highway														
7	L2	14	7.7	14	7.7	0.008	3.1	LOS A	0.0	0.0	0.00	0.53	0.00	51.8
8	T1	165	8.3	165	8.3	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		179	8.2	179	8.2	0.089	0.2	NA	0.0	0.0	0.00	0.04	0.00	59.2
All Vehicles		449	10.5	449	10.5	0.099	1.7	NA	0.1	0.9	0.08	0.15	0.08	56.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway / Boulder Drive AM (Site Folder: AM)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
1	L2	41	8	43	19.5	0.030	5.9	LOS A	0.0	0.0	0.00	0.52	0.00	54.0
2	T1	71	13	75	18.3	0.043	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		112	21	118	18.8	0.043	2.2	NA	0.0	0.0	0.00	0.19	0.00	57.6
North: Castlereagh Highway														
8	T1	90	18	95	20.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	3	0	3	0.0	0.002	5.8	LOS A	0.0	0.1	0.17	0.52	0.17	53.1
Approach		93	18	98	19.4	0.055	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.7
West: Boulder Road														
10	L2	4	3	4	75.0	0.005	6.7	LOS A	0.0	0.0	0.00	0.49	0.00	51.5
12	R2	44	4	46	9.1	0.058	7.2	LOS A	0.2	1.9	0.36	0.60	0.36	51.9
Approach		48	7	51	14.6	0.058	7.2	LOS A	0.2	1.9	0.33	0.59	0.33	51.9
All Vehicles		253	46	266	18.2	0.058	2.4	NA	0.2	1.9	0.07	0.20	0.07	57.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Main Street AM (Site Folder: AM)]

Network: N101 [AM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
1	L2	39	2.7	39	2.7	0.022	3.1	LOS A	0.0	0.0	0.00	0.53	0.00	52.0
2	T1	106	17.8	106	17.8	0.061	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		145	13.8	145	13.8	0.061	0.8	NA	0.0	0.0	0.00	0.14	0.00	57.6
North: Castlereagh Highway														
8	T1	79	14.7	79	14.7	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	8	0.0	8	0.0	0.007	6.0	LOS A	0.0	0.1	0.25	0.55	0.25	52.4
Approach		87	13.3	87	13.3	0.044	0.6	NA	0.0	0.1	0.02	0.05	0.02	58.5
West: Main Street														
10	L2	32	0.0	32	0.0	0.175	6.0	LOS A	0.3	2.6	0.37	0.63	0.37	52.1
12	R2	97	13.0	97	13.0	0.175	8.3	LOS A	0.3	2.6	0.37	0.63	0.37	48.2
Approach		128	9.8	128	9.8	0.175	7.7	LOS A	0.3	2.6	0.37	0.63	0.37	49.6
All Vehicles		361	12.2	361	12.2	0.175	3.2	NA	0.3	2.6	0.14	0.29	0.14	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway / Boulder Drive PM (Site Folder: PM)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: Castlereagh Highway														
1	L2	42	5	44	11.9	0.028	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	54.4
2	T1	100	9	105	9.0	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		142	14	149	9.9	0.057	1.7	NA	0.0	0.0	0.00	0.15	0.00	58.2
North: Castlereagh Highway														
8	T1	93	13	98	14.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	1	0	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.21	0.51	0.21	53.0
Approach		94	13	99	13.8	0.055	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
West: Boulder Drive														
10	L2	3	2	3	66.7	0.004	6.5	LOS A	0.0	0.0	0.00	0.50	0.00	51.8
12	R2	107	3	113	2.8	0.130	7.2	LOS A	0.5	4.0	0.39	0.62	0.39	52.2
Approach		110	5	116	4.5	0.130	7.2	LOS A	0.5	4.0	0.38	0.62	0.38	52.2
All Vehicles		346	32	364	9.2	0.130	3.0	NA	0.5	4.0	0.12	0.26	0.12	56.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Wolgan Road AM (Site Folder: AM)]

Network: N101 [AM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
2	T1	145	13.8	145	13.8	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	46	18.2	46	18.2	0.038	6.0	LOS A	0.1	0.5	0.19	0.56	0.19	51.8
Approach		192	14.8	192	14.8	0.082	1.5	NA	0.1	0.5	0.05	0.14	0.05	56.5
East: Wolgan Road														
4	L2	1	0.0	1	0.0	0.029	5.5	LOS A	0.0	0.3	0.08	0.59	0.08	52.4
6	R2	22	4.8	22	4.8	0.029	7.3	LOS A	0.0	0.3	0.08	0.59	0.08	48.7
Approach		23	4.5	23	4.5	0.029	7.2	LOS A	0.0	0.3	0.08	0.59	0.08	49.0
North: Castlereagh Highway														
7	L2	77	15.1	77	15.1	0.046	3.1	LOS A	0.0	0.0	0.00	0.52	0.00	51.2
8	T1	2	0.0	2	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		79	14.7	79	14.7	0.046	3.0	NA	0.0	0.0	0.00	0.51	0.00	51.4
All Vehicles		294	14.0	294	14.0	0.082	2.3	NA	0.1	0.5	0.04	0.27	0.04	54.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Main Street PM (Site Folder: Network: N101 [PM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
1	L2	54	15.7	54	15.7	0.036	3.1	LOS A	0.0	0.0	0.00	0.52	0.00	50.7
2	T1	124	9.3	124	9.3	0.068	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		178	11.2	178	11.2	0.068	0.9	NA	0.0	0.0	0.00	0.16	0.00	56.8
North: Castlereagh Highway														
8	T1	179	8.2	179	8.2	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	27	3.8	27	3.8	0.025	6.3	LOS A	0.0	0.3	0.30	0.58	0.30	52.1
Approach		206	7.7	206	7.7	0.098	0.9	NA	0.0	0.3	0.04	0.08	0.04	57.9
West: Main Street														
10	L2	22	9.5	22	9.5	0.124	6.4	LOS A	0.2	1.7	0.41	0.67	0.41	50.6
12	R2	54	11.8	54	11.8	0.124	10.1	LOS A	0.2	1.7	0.41	0.67	0.41	46.7
Approach		76	11.1	76	11.1	0.124	9.0	LOS A	0.2	1.7	0.41	0.67	0.41	48.4
All Vehicles		460	9.6	460	9.6	0.124	2.2	NA	0.2	1.7	0.09	0.21	0.09	55.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Main Street PM (Site Folder: Network: N101 [PM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
1	L2	58	21.8	58	21.8	0.042	3.1	LOS A	0.0	0.0	0.00	0.52	0.00	50.1
2	T1	128	12.3	128	12.3	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		186	15.3	186	15.3	0.071	1.0	NA	0.0	0.0	0.00	0.16	0.00	56.5
North: Castlereagh Highway														
8	T1	183	10.3	183	10.3	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	27	3.8	27	3.8	0.025	6.4	LOS A	0.0	0.3	0.32	0.58	0.32	52.0
Approach		211	9.5	211	9.5	0.101	0.9	NA	0.0	0.3	0.04	0.08	0.04	57.9
West: Main Street														
10	L2	22	9.5	22	9.5	0.151	6.4	LOS A	0.2	2.3	0.45	0.70	0.45	49.9
12	R2	58	18.2	58	18.2	0.151	11.5	LOS A	0.2	2.3	0.45	0.70	0.45	45.5
Approach		80	15.8	80	15.8	0.151	10.1	LOS A	0.2	2.3	0.45	0.70	0.45	47.3
All Vehicles		477	12.8	477	12.8	0.151	2.4	NA	0.2	2.3	0.09	0.21	0.09	55.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway / Boulder Drive AM (Site Folder: AM)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
1	L2	45	12	47	26.7	0.036	6.0	LOS A	0.0	0.0	0.00	0.51	0.00	53.6
2	T1	71	13	75	18.3	0.043	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		116	25	122	21.6	0.043	2.3	NA	0.0	0.0	0.00	0.20	0.00	57.3
North: Castlereagh Highway														
8	T1	90	18	95	20.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	3	0	3	0.0	0.002	5.8	LOS A	0.0	0.1	0.17	0.52	0.17	53.1
Approach		93	18	98	19.4	0.055	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.7
West: Boulder Drive														
10	L2	4	3	4	75.0	0.005	6.7	LOS A	0.0	0.0	0.00	0.49	0.00	51.5
12	R2	48	8	51	16.7	0.072	7.8	LOS A	0.3	2.8	0.39	0.62	0.39	51.1
Approach		52	11	55	21.2	0.072	7.7	LOS A	0.3	2.8	0.36	0.61	0.36	51.2
All Vehicles		261	54	275	20.7	0.072	2.6	NA	0.3	2.8	0.07	0.22	0.07	56.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Main Street AM (Site Folder: AM)]

Network: N101 [AM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
1	L2	43	12.2	43	12.2	0.028	3.1	LOS A	0.0	0.0	0.00	0.52	0.00	51.0
2	T1	111	21.0	111	21.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		154	18.5	154	18.5	0.064	0.9	NA	0.0	0.0	0.00	0.15	0.00	57.1
North: Castlereagh Highway														
8	T1	83	19.0	83	19.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	8	0.0	8	0.0	0.007	6.1	LOS A	0.0	0.1	0.27	0.56	0.27	52.4
Approach		92	17.2	92	17.2	0.048	0.6	NA	0.0	0.1	0.02	0.05	0.02	58.6
West: Main Street														
10	L2	32	0.0	32	0.0	0.196	6.1	LOS A	0.3	3.1	0.40	0.65	0.40	51.7
12	R2	101	16.7	101	16.7	0.196	8.9	LOS A	0.3	3.1	0.40	0.65	0.40	47.6
Approach		133	12.7	133	12.7	0.196	8.2	LOS A	0.3	3.1	0.40	0.65	0.40	49.1
All Vehicles		378	16.2	378	16.2	0.196	3.4	NA	0.3	3.1	0.15	0.30	0.15	54.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Wolgan Road AM (Site Folder: AM)]

Network: N101 [AM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
2	T1	154	18.5	154	18.5	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	46	18.2	46	18.2	0.038	6.0	LOS A	0.1	0.5	0.20	0.56	0.20	51.8
Approach		200	18.4	200	18.4	0.089	1.4	NA	0.1	0.5	0.05	0.13	0.05	56.6
East: Wolgan Road														
4	L2	1	0.0	1	0.0	0.030	5.5	LOS A	0.0	0.3	0.08	0.59	0.08	52.3
6	R2	22	4.8	22	4.8	0.030	7.4	LOS A	0.0	0.3	0.08	0.59	0.08	48.5
Approach		23	4.5	23	4.5	0.030	7.3	LOS A	0.0	0.3	0.08	0.59	0.08	48.8
North: Castlereagh Highway														
7	L2	79	17.3	79	17.3	0.048	3.1	LOS A	0.0	0.0	0.00	0.52	0.00	51.0
8	T1	2	0.0	2	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		81	16.9	81	16.9	0.048	3.0	NA	0.0	0.0	0.00	0.51	0.00	51.2
All Vehicles		304	17.0	304	17.0	0.089	2.3	NA	0.1	0.5	0.04	0.27	0.04	54.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway / Boulder Drive PM (Site Folder: PM)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: Castlereagh Highway														
1	L2	46	9	48	19.6	0.034	5.9	LOS A	0.0	0.0	0.00	0.52	0.00	54.0
2	T1	100	9	105	9.0	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		146	18	154	12.3	0.057	1.9	NA	0.0	0.0	0.00	0.16	0.00	57.9
North: Castlereagh Highway														
8	T1	93	13	98	14.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	1	0	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.21	0.51	0.21	53.0
Approach		94	13	99	13.8	0.055	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
West: Boulder Drive														
10	L2	3	2	3	66.7	0.004	6.5	LOS A	0.0	0.0	0.00	0.50	0.00	51.8
12	R2	111	7	117	6.3	0.144	7.5	LOS A	0.6	4.8	0.40	0.64	0.40	51.8
Approach		114	9	120	7.9	0.144	7.5	LOS A	0.6	4.8	0.39	0.63	0.39	51.8
All Vehicles		354	40	373	11.3	0.144	3.2	NA	0.6	4.8	0.13	0.27	0.13	56.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
 Delay Model: SIDRA Standard (Geometric Delay is included).
 Queue Model: SIDRA Standard.
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Castlereagh Highway/Wolgan Road PM (Site Folder: PM)]

Network: N101 [PM (Network Folder: General)]

New Site
 Site Category: (None)
 Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: Castlereagh Highway														
2	T1	186	15.3	186	15.3	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	43	19.5	43	19.5	0.040	6.6	LOS A	0.1	0.5	0.31	0.59	0.31	51.4
Approach		229	16.1	229	16.1	0.106	1.3	NA	0.1	0.5	0.06	0.11	0.06	57.0
East: Wolgan Road														
4	L2	3	0.0	3	0.0	0.082	6.2	LOS A	0.1	0.9	0.49	0.71	0.49	50.9
6	R2	46	9.1	46	9.1	0.082	9.4	LOS A	0.1	0.9	0.49	0.71	0.49	46.3
Approach		49	8.5	49	8.5	0.082	9.2	LOS A	0.1	0.9	0.49	0.71	0.49	46.8
North: Castlereagh Highway														
7	L2	14	7.7	14	7.7	0.008	3.1	LOS A	0.0	0.0	0.00	0.53	0.00	51.8
8	T1	169	10.6	169	10.6	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		183	10.3	183	10.3	0.093	0.2	NA	0.0	0.0	0.00	0.04	0.00	59.2
All Vehicles		462	13.0	462	13.0	0.106	1.7	NA	0.1	0.9	0.08	0.15	0.08	56.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C
ACOUSTIC IMPACT ASSESSMENT



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CLARENCE COLLIERY AND LIDSDALE SIDING

COAL TRANSPORTATION MODIFICATION

NOISE IMPACT ASSESSMENT

REPORT J0254-11-R1

6 SEPTEMBER 2022

Prepared for:
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1 INTRODUCTION

Clarence Colliery (Clarence) is an underground coal mine within the Western Coalfield of NSW approximately 10 km east of Lithgow in the Lithgow local government area (LGA). Clarence is a joint venture operation managed by Clarence Colliery Pty Ltd, a wholly owned subsidiary of Centennial Coal Company Pty Ltd (Centennial), and has been operating since 1979.

Clarence currently operates under three separate development consents including IRM.GE.76 issued by Blaxland Shire Council (now Lithgow City Council), DA 174/93 issued by Lithgow City Council and DA 504-00 issued by the Department of Planning and Environment.

The Lidsdale Siding is an existing rail loading facility that has been operating since 1974 and automates the transfer and dispatch of coal from Centennial's Western Coal Services (WCS) Project. The facility is approximately 500 m north of Wallerawang and approximately 9 km north-west of Lithgow within the Lithgow LGA.

The Lidsdale Siding is owned and operated by Ivanhoe Coal Pty Ltd, a subsidiary of Centennial. Lidsdale Siding operates under Major Project (MP) 08_0223 issued on 3 May 2013.

Centennial is seeking a modification to DA 504-00 for Clarence under Section 4.55(1A) of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to permit:

- A temporary increase in the total volume of product coal that can be transported from Clarence by truck from the currently approved 200,000 tonnes per annum (tpa) to 300,000 tpa until the end of 2023;
- A temporary increase in the total volume of product coal that can be transported to the west of Clarence by truck from the currently approved 100,000 tpa to 200,000 tpa until the end of 2023. This does not increase or affect currently approved coal transport to the east; and
- Temporary truck transport of up to 200,000 tpa of coal to Mount Piper Power Station (MPPS) or to the Lidsdale Siding until the end of 2023. Truck transport will occur via the Castlereagh Highway.

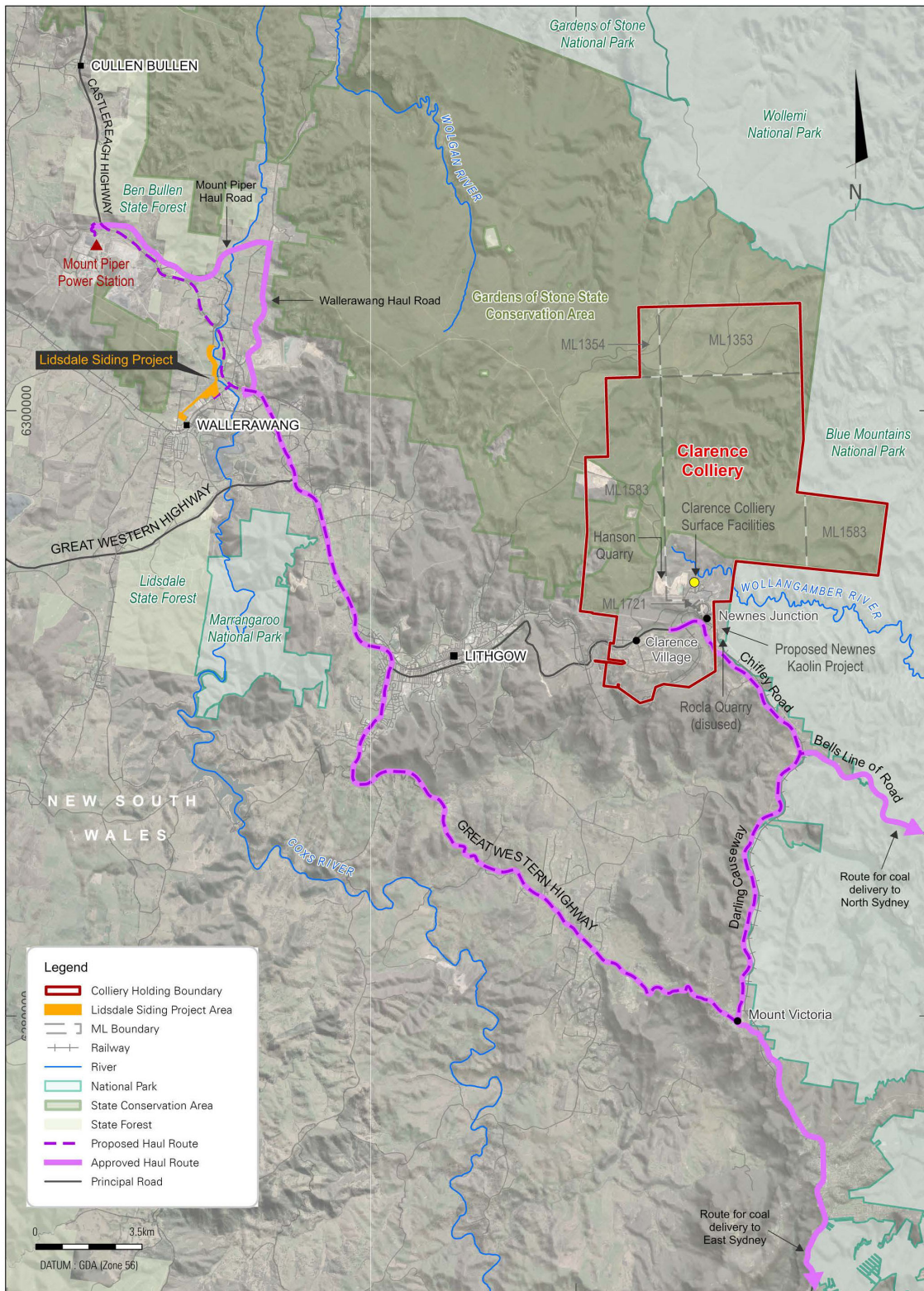
Centennial is also seeking a modification to MP 08_0223 for the Lidsdale Siding under Section 4.55(1A) of the EP&A Act to permit:

- Temporary acceptance of up to 200,000 tpa of coal from Clarence to the Lidsdale Siding by truck via the Castlereagh Highway until the end of 2023.

This noise impact assessment has been commissioned by James Bailey & Associates on behalf of Centennial, to inform the Modification Report being prepared in support of the Modification applications.

A locality plan in Figure 1 indicates the location of Clarence, the Lidsdale Siding, MPPS, the currently approved haul route and the proposed haul route. Figure 2 shows more details within and around the Lidsdale Siding site, including the proposed truck route through the site including the truck wheel wash. Both figures were provided by JBA for inclusion in this report, however Figure 2 has been marked up to indicate the location of an existing earth bund generally east and south of the Lidsdale Siding coal stockpile area. This bund reduces noise levels to the majority of receptors and is considered in the predicted noise level calculations in Section 3.4 of this report.

Figure 1: Locality Plan

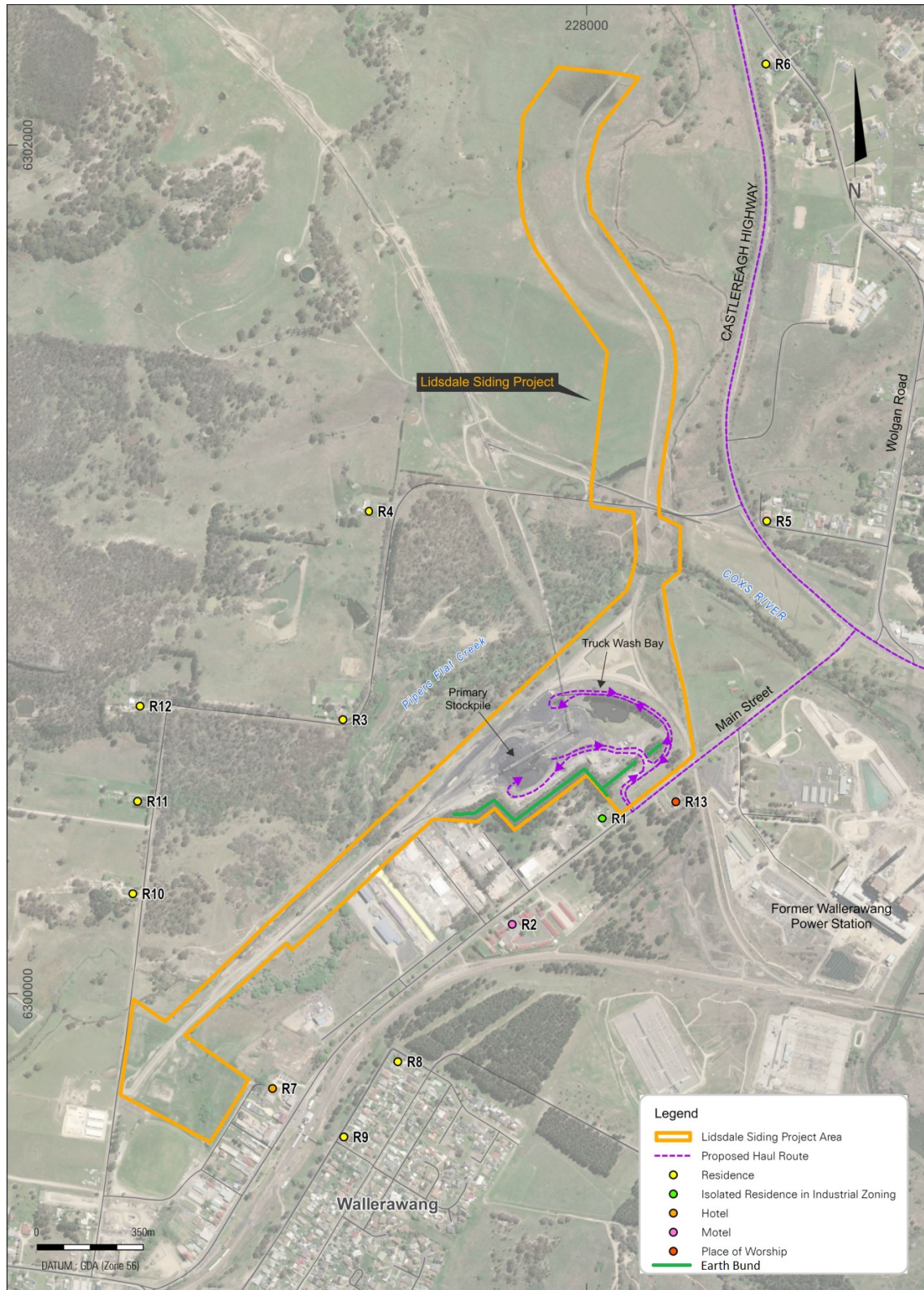


CENTENNIAL COAL



Regional Locality

Figure 2: Lidsdale Siding Access Plan



CENTENNIAL COAL

Lidsdale Siding Access



1.1 Environmental Noise Policies

The NSW government has developed or adopted policies and recommended procedures to assess environmental noise levels from various noise source categories. The following policy documents are relevant to this assessment:

- The *NSW Noise Policy for Industry* (NPI) (EPA, 2017) is intended to guide noise investigations for existing or proposed industrial developments, including vehicle movements within industrial developments. The NPI recommends procedures to determine:
 - background noise levels at receptor properties;
 - existing noise levels from an industrial site;
 - recommended, not mandatory, noise criteria for existing and proposed operations;
 - predicted noise levels from proposed developments; and
 - negotiation options if recommended noise criteria are not or may not be met.
- The *NSW Road Noise Policy* (RNP) (EPA, 2011) includes recommended traffic noise criteria for highways and other road categories, for various situations including additional traffic due to proposed developments or projects.

2 NOISE CRITERIA

Noise from truck movements within the Clarence, the Lidsdale Siding and MPPS industrial sites is assessed as industrial noise, while noise from truck traffic on public roads is assessed as traffic noise, as required by the NPI and RNP.

2.1 Clarence

DA 504-00 for Clarence includes noise criteria in Schedule 3 Condition 15 which is reproduced below.

Noise Impact Assessment Criteria

15. *The Applicant shall ensure that the noise generated by the development, excluding train loading and rail operations, does not exceed the noise impact assessment criteria presented in Table 6 at any residence on privately owned land.*

Table 6: *Noise impact assessment criteria dBA LAeq,15min*

<i>Location</i>	<i>Day</i>	<i>Evening</i>	<i>Night</i>
<i>Residences on privately owned land</i>	38	36	35

Notes:

- (a) For the purposes of these noise criteria, 5 dBA must be added to the measured level of the noise is substantially tonal or impulsive in character.*
- (b) The noise criteria do not apply where the Applicant and the affected landowner have reached a negotiated agreement in regard to noise, and a copy of the agreement has been forwarded to the Planning Secretary and the EPA.*
- (c) Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 m of a dwelling (rural situations) where the dwelling is more than 30 m from the boundary, to determine compliance with the LAeq,15min noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Noise Policy for Industry). The*

modification factors in Section 4 of the NSW Noise Policy for Industry shall also be applied to the measured noise levels where applicable.

- (d) *The noise criteria apply under prevailing meteorological conditions (winds up to 3 m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:*
- *Documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions; and*
 - *Where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversion conditions shall be developed and implemented.*

2.2 Lidsdale Siding

MP 08_0223 for Lidsdale Siding includes noise criteria in Schedule 3 Condition 2 which is reproduced below.

Noise Impact Assessment Criteria

2. *The Proponent must ensure that the noise generated by the project does not exceed the criteria in Table 1.*

Table 1: Noise criteria dBA

<i>Location</i>	<i>Day</i>	<i>Evening</i>	<i>Night</i>	
	<i>L_{Aeq},15min</i>	<i>L_{Aeq},15min</i>	<i>L_{Aeq},15min</i>	<i>L_{A1},1min</i>
<i>1- Lot 2 Main Street, Wallerawang</i>	50	50	50	55
<i>2- Black Gold Cabins, Main St, Wallerawang</i>	48	46	46	49
<i>3- "Killarney", Brays Lane, Wallerawang</i>	48	47	47	56
<i>4- "Fairview", Brays Lane, Wallerawang</i>	43	43	43	54
<i>5- Duncan Street, Lidsdale</i>	46	46	46	57
<i>6- Old Castlereagh Highway, Lidsdale</i>	43	43	43	56
<i>7- Royal Hotel, Main St, Wallerawang</i>	44	41	41	49
<i>8- Cnr Heel St & Cripps Ave, Wallerawang</i>	43	40	40	45
<i>9- Cnr Cripps Ave & Pindari Pl, Wallerawang</i>	40	39	39	45
<i>10- Brays Lane South, Wallerawang</i>	45	45	45	50
<i>11- "Tara", Brays Lane, Wallerawang</i>	45	45	45	51
<i>12- Brays Lane Corner, Wallerawang</i>	43	43	43	51

Notes:

- *To interpret the locations referred to in Table 1, see the figure in Appendix 3;*
- *Criteria applicable to a particular residence are those criteria for the nearest specified location in Table 1; and*
- *After the first review of any EPL granted for this project under Section 78 of the POEO Act, nothing in this approval prevents the EPA from imposing stricter noise limits on the operations on site under the EPL.*

Noise generated by the project must be monitored and measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry (EPA, 2017).

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

The closest receptor is Lot 2 Main Street, assigned a noise criterion of 50 LAeq,15min during the day and evening.

The next closest receptor is a church on the south-eastern side of Main Street opposite the Lidsdale Siding access road which has not been assigned noise criteria in MP 08_0223. A criterion of 40 LAeq inside the church, equivalent to 50 LAeq outside the church with windows and doors open, is assigned to this receptor as recommended in Table 2.2 of the NPI.

2.3 Road Traffic Noise

Section 2.3 of the RNP specifies noise criteria for road traffic noise from public roads, to both residential and non-residential land uses, for various situations. For additional traffic on public roads caused by land use developments, which is the most relevant situation for this assessment, the RNP recommends:

- 60 LAeq,15hr during the day (7 am to 10 pm) and 55 LAeq,9hr during the night (10 pm to 7 am) from arterial and sub-arterial roads to 1 m from the external façade of residences;
- 55 LAeq,1hr during the day and 50 LAeq,1hr during the night from local roads to 1 m from the external façade of residences;
- 40 LAeq,1hr inside school classrooms during the day when the classrooms are occupied;
- 35 LAeq,1hr inside hospital wards during the day and night;
- 40 LAeq,1hr inside places of worship during the day when the space is occupied;
- 60 LAeq,15hr during the day within the boundary of active open spaces such as sporting fields; and
- 55 LAeq,15hr during the day within the boundary of passive open spaces such as picnic grounds.

The haul route from Clarence to the Lidsdale Siding includes Clarence Colliery Road, Chifley Road, the Darling Causeway, Great Western Highway, Castlereagh Highway and Main Street. Clarence Colliery Road and Main Street are considered local roads, while the remaining haul route includes arterial roads. Trucks continuing past the Lidsdale Siding on the Castlereagh Highway to MPPS would also travel on Boulder Road, which is considered a sub-arterial road.

Table 6 of the RNP also recommends a maximum traffic noise increase of 12 LAeq,15hr during the day due to increased traffic from a development.

3 ASSESSMENT

3.1 Existing and Proposed Truck Movements

Schedule 2 of DA 504-00 for Clarence includes truck transport limits relevant to this assessment, reproduced below.

Limits on Approval

7. *Except for the period referred to in condition 7AA, the Applicant may transport up to 200,000 tonnes of coal per calendar year in total, with a maximum of 100,000 tonnes per calendar year transported to the west, via the Darling Causeway and Great Western Highway haulage route shown in Appendix 5.*

7AA. *Until 31 December 2020, the Applicant may transport up to 300,000 tonnes of coal by road per calendar year in total, including 200,000 tonnes of coal by road per calendar year to the Mount Piper Power Station or to locations north of Sydney or Eastern NSW using the haulage routes shown in Figure 1 of Appendix 5.*

7A. *Other than via the haulage route shown in Appendix 5, the Applicant shall not cause any coal truck movements through the City of Lithgow without prior approval of the Council.*

7B. *Haulage of coal to the west shall only take place between the hours of 7 am to 10 pm Monday to Saturday and between 8 am to 10 pm on Sunday and public holidays.*

According to Schedule 2 Condition 7 of DA 504-00, Clarence is currently permitted to transport up to 100,000 tpa of coal by road to destinations to the west, including to MPPS via the haulage route shown in Appendix 5 of DA 504-00. Part of the currently approved haulage route includes private haul roads that are no longer accessible to Centennial for this purpose.

DA 504-00 does not currently include daily or hourly truck trip limits. Centennial has proposed a maximum of 40 truck trips per day from Clarence and a maximum of 25 truck trips per day and 4 truck trips per hour to the west, equivalent to 50 movements per day and 8 movements per hour to the west. Up to approximately 950 t of coal can be transported per day assuming truck and trailer combinations carry an average of 38 t of coal per trip. At the maximum daily transportation rate, approximately 210 days would be required to transport 200,000 t to the Lidsdale Siding or to MPPS. The proposed limit of 25 truck trips per day is therefore sufficient to transport 200,000 t of coal in a calendar year.

3.2 Truck Noise Levels

Centennial would engage a haulage contractor to transport coal from Clarence to either the Lidsdale Siding and/or to MPPS. The contractor would be required by Centennial to use trucks that comply with current Australian Design Rules for heavy vehicles, including vehicle noise limits, and would require truck drivers to comply with Clarence's Haulage Management Standard. The trucks would therefore be maintained in good condition and would produce an average sound power level of 105 dBA while manoeuvring at slow speed within Clarence, the Lidsdale Siding and MPPS sites, consistent with previous similar assessments.

3.3 Clarence Noise Levels

Truck movements within Clarence are considered industrial noise sources and are subject to the noise criteria in Schedule 3 Condition 15 of DA 504-00 which are 38 LAeq,15min during the day and 36 LAeq,15min during the evening. Trucks are currently not permitted to haul coal during the night according to Schedule 2 Condition 7B of DA 504-00, therefore the night noise criteria do not apply.

Trucks currently visit Clarence to load and transport coal as considered in previous acoustic assessments, therefore the current noise criteria include noise from coal trucks visiting Clarence in a

representative 15 minute period. As haul routes to the east and west are relatively long, each truck can make only a few trips per day and truck visits to Clarence occur intermittently rather than continuously. The proposed maximum of 40 trucks per day at Clarence is equivalent to an average of less than one truck visit per 15 minute period.

The proposed additional trucks would therefore not increase noise levels in a 15 minute assessment period, rather they would increase the number of 15 minute periods per day in which a truck visits Clarence and some truck noise occurs, and/or the number of days per year in which trucks operate.

Noise levels from Clarence to receptors, expressed as a LAeq,15min level for direct comparison with the DA 504-00 noise criteria, would therefore remain unchanged.

3.4 Lidsdale Siding Noise Levels

The following operations are currently approved at the Lidsdale Siding according to MP 08_0223:

- Receiving coal from mines in the area by conveyor;
- Dispatching coal by conveyor to MPPS and to Centennial’s Western Coal Services (WCS);
- Loading up to 7 trains per day with coal; and
- Unloading coal from trains, initially approved as Mod 1.

The proposed truck route within the Lidsdale Siding site, from the site access road to the coal stockpile area then via the wheel wash facility before exiting the site, is approximately 1.7 km long. A truck speed in the range 10 to 20 km/hr is likely within the site, requiring approximately 6 minutes for a truck to enter, unload coal and leave the Lidsdale Siding. A maximum of 4 trucks per hour proposed by Centennial results in a maximum of approximately 24 minutes of coal truck noise per hour from the Lidsdale Siding site, resulting in a duration correction of -4 dBA to convert a maximum truck noise level to an average LAeq noise level.

Truck noise would be reduced to receptors located generally east to south-west of the Lidsdale Siding by an existing earth bund located along the southern side of the coal stockpile area as shown in Figure 2. The bund is approximately 4 to 5 m high and would therefore provide a noise reduction of at least 5 dBA to receptors protected by the bund. In the case of R13, the bund shields truck noise over half of the route within the site, reducing LAeq noise levels by approximately 2 dBA but not affecting maximum noise levels.

Calculated truck noise levels to the nearest receptors in each direction from the Lidsdale Siding are presented in Table 1, conservatively considering only a reduction of noise over distance to each receptor and the effect of the existing earth bund.

Table 1: Calculated Truck Noise Levels to Receptors, Lidsdale Siding, dBA.

Receptor	Truck Sound Power Level, dBA	Distance Attenuation		Barrier dBA	Duration dBA	Received Noise Level, dBA	
		Metres	dBA			Maximum	LAeq
R1 Main St	105	160	-52	-5	-4	48	44
R2 Black Gold Cabins		390	-60	-5		40	36
R3 Killarney Brays Ln		570	-63	-		42	38
R5 Duncan St		640	-64	-		41	37
R13 Church		190	-54	-2		51	45

Existing noise levels from the Lidsdale Siding are required to determine total noise levels from existing operations and proposed truck movements combined. The three most recent Annual Reviews were therefore reviewed to determine existing noise levels at the closest receptors. Total noise levels

were then calculated in Table 2, with the total level based on the highest measured noise level over the last three years combined with truck noise levels calculated in Table 1.

Table 2: Calculated Receptor Noise Levels, Lidsdale Siding, dBA.

Receptor	Existing Noise Level by Year, LAeq			Truck Noise Level, LAeq	Total Noise Level, LAeq	Noise Criteria, LAeq
	2019	2020	2021			
R1 Main St	40	45	46	44	48	50
R2 Black Gold Cabins	30	43	46	36	46	48
R3 Killarney Brays Ln	35	34	-	38	40	46
R5 Duncan St	39	39	43	37	44	44

Table 2 indicates combined noise from existing operations, as measured in the last three years, and proposed truck movements would comply with the noise criteria at the closest receptors to the Lidsdale Siding site in all directions. Table 2 also shows truck noise levels would be lower than existing noise levels at all receptors.

Ongoing monthly noise monitoring at potentially affected receptors near the Lidsdale Siding will continue to be undertaken in accordance with the approved Noise Management Plan to ensure noise levels from the site, including the proposed truck movements, remain within relevant criteria. Noise monitoring will also continue to be used to identify particularly noisy operations and the requirement for further noise management measures as required.

3.5 Road Traffic Noise Levels

Modification 4 to DA 504-00, approved in August 2019, included up to 200,000 tpa of coal transported by truck from Clarence to MPPS via Chifley Road, the Darling Causeway, Station Street, Great Western Highway and Castlereagh Highway. Coal trucks approved by Modification 4 completed the journey to MPPS via a private haul road intersecting the Castlereagh Highway in the vicinity of the previous (now decommissioned) Wallerawang Power Station, rather than continuing on the Castlereagh Highway to Boulder Road and MPPS. Proposed temporary coal truck traffic from Clarence to the intersection of the Castlereagh Highway and the private haul road has therefore been previously assessed and approved. The previous assessment concluded negligible road noise impacts would be experienced to privately owned receptors and this conclusion continues to be relevant for the proposed modification.

As Centennial no longer has access to the private haul road, coal trucks are proposed to continue on the Castlereagh Highway to either Main Street or Boulder Road. This section includes an assessment of traffic noise levels from this section of the Castlereagh Highway, and from Main Street, to potentially affected receptors.

3.5.1 Castlereagh Highway

Estimated traffic flows on the Castlereagh Highway are provided in Table 2-2 of *Traffic Impact Assessment, Centennial Clarence Transport Modification* (TIA Report) (Stantec, August 2022). The TIA Report estimated 2940 vehicles per day including 12% heavy vehicles south of Boulder Road.

Table 3 presents calculated traffic noise levels for the existing situation and for the proposed situation with an additional 50 truck movements to MPPS during the day. Assessed receptors include the closest residences to the Castlereagh Highway between Main Street and Boulder Road, with 25 Duncan Street also representing a number of other residences at a similar distance from the road.

Table 3: Calculated Traffic Noise Levels to Receptors, Castlereagh Highway, LAeq,15hr.

Residence	Distance	Existing Traffic		Proposed Traffic		Increase
	Metres	Vehicles, Light/ Heavy	LAeq,15hr	Vehicles, Light/ Heavy	LAeq,15hr	LAeq,15hr
25 Duncan St	25	2587/353	56	2587/403	56	0.2
1385 Castlereagh	18		58		58	0.3

Table 3 indicates existing and proposed traffic noise levels are below the 60 LAeq,15hr traffic noise criterion for the day period. The proposed additional truck movements would result in an increase of approximately 0.3 LAeq,15hr to all residences which is well below the recommended maximum increase of 12 dBA.

3.5.2 Main Street

Table 2-2 of the TIA Report reported hourly peak traffic flows of 189 vehicles per hour, including 11% heavy vehicles.

Table 4 presents calculated traffic noise levels for the existing situation and for the proposed situation with an additional 8 truck movements per hour to Lidsdale Siding during the day. The only noise sensitive receptor near this section of Main Street is the church opposite the Lidsdale Siding access road.

Table 4: Calculated Traffic Noise Levels to Receptors, Main Street, LAeq,1hr.

Residence	Distance	Existing Traffic		Proposed Traffic		Increase
	Metres	Vehicles, Light/ Heavy	LAeq,1hr	Vehicles, Light/ Heavy	LAeq,1hr	LAeq,1hr
Church	40	168/21	53	168/29	54	0.9

Table 4 indicates existing and proposed traffic noise levels are 53 to 54 LAeq,1hr outside the church’s northern façade. Internal noise levels would be approximately 10 dBA lower than external noise levels with windows and doors open, therefore internal noise levels of approximately 43 to 44 LAeq,1hr are predicted. While the predicted traffic noise levels are above the recommended 40 LAeq internal level, the proposed truck movements are not expected to increase existing traffic noise levels by more than 1 dBA which is considered insignificant. The proposed traffic noise levels are therefore considered acceptable at this receptor.

4 CONCLUSION

This assessment has shown the proposed road transportation of up to 200,000 tpa of coal from Clarence to either the Lidsdale Siding or MPPS, during the day and evening from 7 am to 10 pm and from 8 am on Sundays and public holidays, is expected to result in acceptable noise levels to all noise sensitive receptors. For the majority of receptors along the haul route, the proposed truck movements would produce similar traffic noise levels that occurred under DA 504-00 Schedule 2 Condition 7AA, up to 31 December 2020.

Noise from proposed truck movements within the Lidsdale Siding, combined with existing noise levels from trains, mobile plant and conveyors within the site, is predicted to comply with current noise criteria at all receptors.

Traffic noise levels would be similar to currently and previously approved levels, particularly for Modification 4 to DA 504-00, at residences along the haul route. As for the previously approved

Modification 4, the proposed additional truck movements are more likely to result in additional coal transportation days per year rather than increased noise levels during a day in which coal trucks operate.

Based on the results in this assessment, the proposed road transportation of coal from Clarence to either the Lidsdale Siding or MPPS is considered acoustically acceptable.