Appendix I(a)

Traffic Impact Assessment Report

Prepared for
Neoen Australia Pty Ltd
ABN: 57 160 905 706

Traffic Impact Assessment Report

08-Dec-2021
Great Western Battery

aecom.com

Delivering a better world

Traffic Impact Assessment Report

Client: Neoen Australia Pty Ltd

ABN: 57 160 905 706

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Executive Summary

Neoen Australia Pty Ltd (Neoen) is seeking development consent to construct, operate and maintain a large-scale battery energy storage system (BESS) of approximately 500 megawatts (MW) and approximately 1,000 megawatt-hour (MWh) at Brays Lane, Wallerawang, NSW, as well as a new transmission line that would connect the BESS to the existing Transgrid Wallerawang 330 kilovolt (kV) substation (the Project).

The Project would contribute to deliver system security, grid reliability and a stable energy supply for New South Wales and the National Energy Market (NEM) through its ability to store power and consequently, provide input and output power upon demand.

The Project is considered State Significant Development (SSD) under the Environmental Planning and Assessment Act 1979 (EP&A Act). As such, this Environmental Impact Statement (EIS) has been prepared in accordance with the relevant provisions of the EP&A Act. It has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the Secretary of the Department of Planning, Industry and Environment (DPIE) (now referred to as Department of Planning and Environment (DPE) on 4 February 2021 and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW) (EP&A Regulation).

This Traffic and Access Technical Report is one of a number of technical documents that forms part of the EIS for the Project. This assessment addresses the relevant SEARS, aiming to identify any likely impacts of the Project and to outline mitigation measures, if required, relating to traffic and access during detailed design, construction and operation of the Project.

Existing environment

The Project is located in Wallerawang, west of NSW within the Lithgow City Local Government Area LGA, approximately 110 km west of Sydney.

The Site is comprised of one allotment having an approximately 90 m frontage to Brays Lane. The Site is privately owned and is currently occupied by a residential property. Beyond the residential property the majority of the Site is used for occasional horse grazing.

The Site is located on the western side of Brays Lane. Brays Lane provides local access to the few residential and agricultural land uses and connects to the wider road network via Castlereagh Highway, Pipers Flat Road and Great Western Highway.

The new transmission line would exit from the eastern boundary of the Site, crossing Brays Lane and entering into the vegetated area to the east of Brays Lane. From here, it would travel in a north easterly direction, before passing under Pipers Flat Creek and into the existing rail corridor where it would travel south east along the rail corridor (including its crossing of Main Street) to connect to the north western portion of the Transgrid Wallerawang 330 kV substation.

Construction impacts

The Project is likely to create negligible traffic impacts on the surrounding road network with the peak volume of construction vehicles expected to be up to 20 heavy vehicles and 50 light vehicles per day. During the two months that would comprise the peak construction period, up to 140 vehicle movements a day would be required. Heavy vehicles would be required for the delivery of construction equipment, removal of spoil (if required) and the delivery of the various Project components, including pre-fabricated elements. Light vehicles would be used by the construction workforce. Even when considering the worst-case scenario (i.e. all the vehicles arriving in a single peak hour), the traffic volumes are still considered low (less than 100 vehicles per day) especially as the existing traffic demand on key roads surrounding the Site is low. The additional traffic volumes would result in minimal impacts on existing road network adjoining the Site.

There is generally limited public transport services near the Site. The Site sits adjacent the local town, and is approximately 1.5 km away from the closest local bus network connection and regional coach network connection. As such the Project, including haulage routes and access locations during construction, is unlikely to affect bus services in the vicinity of the Site. Bus services within the town centre would continue to operate as normal during construction activities. There would be no changes

to bus stop locations as a result of the Project. In addition, the Project is not anticipated to require the haulage of construction materials by rail and would therefore not impact the rail network.

There are no pedestrian and cycle infrastructure immediately surrounding the Site. As such, it is not anticipated for the Project to impact the active transport network near the Site. However, despite no formal active transport infrastructure, works would be undertaken within the Site during construction and in a manner that ensures pedestrians/cyclists routes are maintained where available. Minor construction impacts are anticipated to arise from increased heavy vehicle volumes, with a potentially increased safety risks for pedestrians and cyclists near the Site.

1.0 Introduction

1.1 Project overview

AECOM Australia Pty Ltd (AECOM) has been engaged by Neoen Australia Pty Ltd (Neoen) to prepare an Environmental Impact Statement (EIS) to support a State Significant Development application to construct, operate and maintain a battery energy storage system (BESS) of approximately 500 megawatts (MW) and approximately 1,000 megawatt-hour (MWh) at Brays Lane, Wallerawang, NSW, as well as a new transmission line that would connect the BESS to the existing Transgrid Wallerawang 330 kilovolt (kV) substation (the Project).

The proposed location of the BESS is at one lot located at 173 Brays Lane, Wallerawang NSW, 2854 (Lot 4 Deposited Plan (DP) 751651). The Site consists of the majority of this Lot but excludes a residential property and surrounding land in the south-eastern corner (refer to **Figure 2-2**). The Site is located nearby the Transgrid Wallerawang 330 kV substation, accessed via James Parade, Wallerawang 2845 (Lot 91 of DP 1043967). At its closest point, this substation is located about 1.25 kilometres (km) south east from the Site.

The new transmission line connection between the Site and the Transgrid Wallerawang 330 kV substation would traverse:

- Lot 8 and Lot 9 DP 252472
- Lot 2 DP 108089
- Lot 1 DP 108089
- Lot 10 DP 1168824
- Lot 1115 DP 1204803
- Lot 91 DP 1043967.

The purpose of the Project is to store energy in chemical form and generate electrical energy on demand in discharge mode.

1.2 Purpose of this report

1.2.1 Assessment objectives

The overarching objectives of this report are to:

- Support the EIS for the Project by documenting the traffic and transport impact assessment
- Identify potential transport impacts during construction and operation phases of the Project
- Outline mitigation measures, if required, relating to transport during the construction and operation phases of the Project
- Address the relevant SEARs as outlined in **Section 1.2.2**.

1.2.2 Secretary's Environmental Assessment Requirements

Table 1-1 sets out the SEARs relevant to this Traffic Impact Assessment and identifies where the requirements have been addressed in this report.

Table 1-1 SEARs for Traffic and Transport

SEARs requirement	Addressed
The EIS must address the following specific matters: Transport – including: • an assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation	The assessment of traffic generation and construction work transportation is presented in **Section 5.1.1**.

SEARs requirement	Addressed
• an assessment of the likely transport impacts to the Site access route (including, but not limited to Brays Lane and Castlereagh Highway) site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance	The assessment of the transport impacts during construction of the Project is presented in **Section 5.1**. Operational impacts are discussed in **Section 5.2**.
• a cumulative impact assessment of traffic from nearby developments	Addressed in Chapter 18 Cumulative impacts of the EIS
• provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority	Mitigation measures to manage potential impacts associated with traffic and transport are discussed in **Section 6.0.**

1.2.3 Report structure

This report is structured as follows:

- **Section 1.0** introduces the Project and this report.
- **Section 2.0** provides a summary of the Project description.
- **Section 3.0** describes the methodology adopted for the transport assessments and the policy context for the Project.
- **Section 4.0** establishes the existing transport context in the vicinity of the Project, including consideration of the existing road network, public transport and active transport network.
- **Section 5.0** provides an overview of the impact of the additional construction-related traffic on the study area, including consideration of proposed heavy vehicle access, construction routes and construction worker movements. This section also presents an assessment of the operational traffic and access impacts of the Project.
- **Section 6.0** describes the management measures identified to mitigate potential Project impacts.

2.0 Project description

2.1 Summary of the Project

The Project would involve the construction, operation and maintenance of a BESS of approximately 500 megawatts (MW) and approximately 1,000 megawatt-hour (MWh), as well as a new transmission line that would connect the BESS to the existing Transgrid Wallerawang 330 kilovolt (kV) substation. Other key components of the Project would include:

- Site establishment, including installation of fencing, environmental and stormwater controls, grading and other civil works
- Establishment of a new driveway located at the southern boundary of the Site, providing access to the Site from Brays Lane
- Establishment of internal access roads and car parking
- Installation, commissioning, and operation of a large-scale BESS including battery enclosures, inverters, and transformers
- Construction of two permanent operations buildings, including staff amenities
- Construction of lighting and installation of security devices around the perimeter of the BESS compound
- Establishment of noise walls, landscaping and screening vegetation
- Above ground and/or underground transmission line connections from the BESS to the existing Wallerawang substation switchyard
- Upgrades to the Transgrid Wallerawang 330 kV substation switchyard
- Subdivision of Lot 4 DP 751651 to separate the existing residence in the south east portion of the lot from the proposed BESS.

Figure 2-1

Regional context of the Project Location

Legend

- Site boundary
- TransGrid Wallerawang 330 kV Substation
- The Project Area
- State Forest
- NPWS Reserve
- Watercourse
- Primary road

N

0 1 2 km

AECOM

Figure 2-2
The Project Area

N 0 200 400 m

AECOM

Legend

- The Site
- Transgrid 330kV Wallerawang Substation
- The Project Area
- Cadastre Boundaries
- Transmission Line
- Railway
- Watercourse

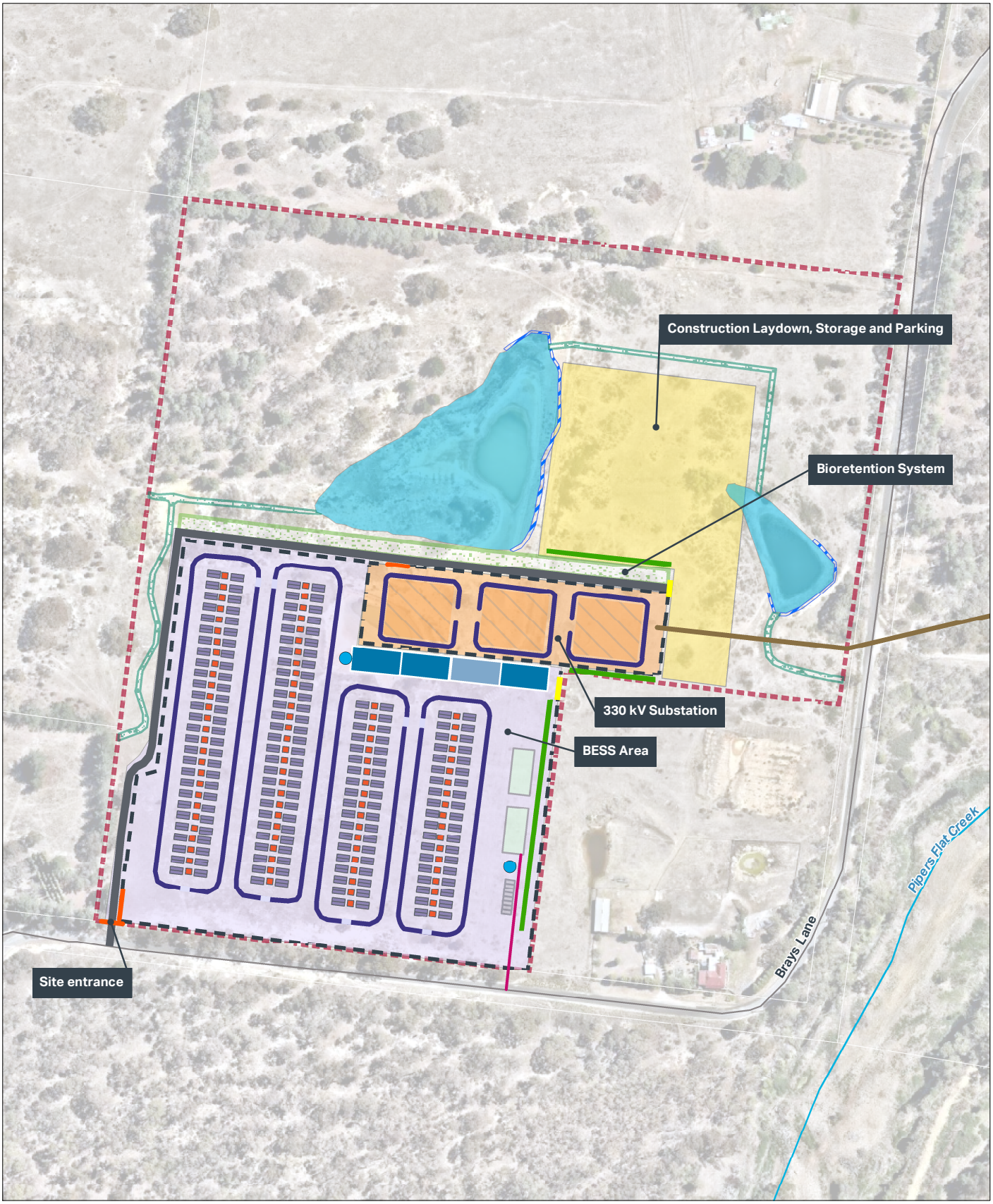

Figure 2-3
Indicative Layout of the Site

Legend

- The Site
- Substation
- Internal access road
- Noise wall
- Access Gate
- Security Fencing
- Water Connection Point
- Transmission Line Alignment
- Watercourse
- Local road
- Water Tank
- Large Transformers
- Battery and Inverter
- Transformers
- Bioretention System
- Dam Walls
- Swales
- 330 kV Substation
- Emergency exit
- Control Room
- Switch Rooms
- Landscape Planting
- O&M Building
- Carpark
- Approx Extent Of Dam Modification
- Construction Laydown, Storage And Parking
- BESS Area

N

0 30 60 m

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Source: Imagery © Nearmap, 2020.

2.2 Construction

2.2.1 Overview

Construction of the Project will take approximately 12 months to complete. Construction works for the Project would involve:

- Enabling works and prefabrication
- Civil, structural, mechanical and electrical works
- Installation of transmission line
- Commissioning
- Finishes and demobilisation.

2.2.2 Construction plant and equipment

During the construction phase of the Project, construction vehicles would be required for transporting materials and equipment along the existing road network to the Site. It is anticipated that up to 20 heavy vehicle and 50 light vehicles movements per day on average would be required to access the Site. In total, during the peak construction period of the Project, up to 140 vehicles per day may be required to access the Site. The peak of the construction period is anticipated to last for about two months.

The final equipment and plant requirements would be determined by the construction contractor. Indicative plant and equipment requirements were categorised for each construction activity for the Project and would include a combination of the following:

Table 2-1 Indicative plant and equipment for the construction of the Project

Construction activity	Indicative plant and equipment
Enabling works and prefabrication	• Security fencing • Temporary construction buildings • Front end loaders • Dump trucks • Road trucks to deliver materials, plant, equipment and pre-fabricated elements of the Project • Water Trucks • Excavators • Graders • Compactors • Light vehicles
Civil, structural, mechanical and electrical works:	• Front end loaders • Bobcat • Dump trucks • Road trucks • Excavators • Graders • Scrapers • Compactors • Water trucks • Hydro Vacuum Excavator • Concrete trucks and pumps • Elevated work platforms • Cranes • Concrete saws and grinders • Compacters and rollers • Scrapers • Backhoe

Construction activity	Indicative plant and equipment
	• Generators (where connection to existing utilities is not available) • Light vehicles, heavy rigid and articulated trucks (including multi trailer) low loaders
Installation of transmission line	• Directional drilling rig truck and associated infrastructure (i.e. drilling fluid recovery and recycling unit) • Pump/s for dewatering • Hydro Vacuum Excavator • Telehandlers • Water Trucks • Excavators/backhoe • Graders • Compactors • Light vehicles • Excavators • Concrete saws and grinders • Crane Truck • Tipper Truck • Cable installation kit: Rollers, crawlers, cable winches, synthetic draw ropes • Concrete supply •
Commissioning	• Elevated work platforms • Cranes • Generators (where connection to existing utilities is not available) • Light vehicles
Finishes and demobilisation.	• Heavy vehicles • Water trucks • Backhoe • Compactors • Light vehicles

2.2.3 Construction traffic and access routes

From the north, the Site can be accessed via the Castlereagh Highway, which feeds traffic directly onto Brays Lane. From the south, traffic can turn from the Great Western Freeway to Barton Avenue, which provides access into the township of Wallerawang. From Barton Avenue, traffic would turn onto Pipers Flat Road, which then leads to Brays Lane, and the Site. Alternatively, they may travel up Castlereagh Highway, then turn onto Main Street Wallerawang before connecting to Pipers Flat Road and Brays Lane. This route would be required for oversized / over mass vehicles. The proposed transmission line would be accessed via Main Street, Wallerawang. The Transgrid Wallerawang 330 kV substation can be accessed via the unnamed road that connects to James Parade, Wallerawang. These proposed construction traffic routes are shown on **Figure 2-4**.

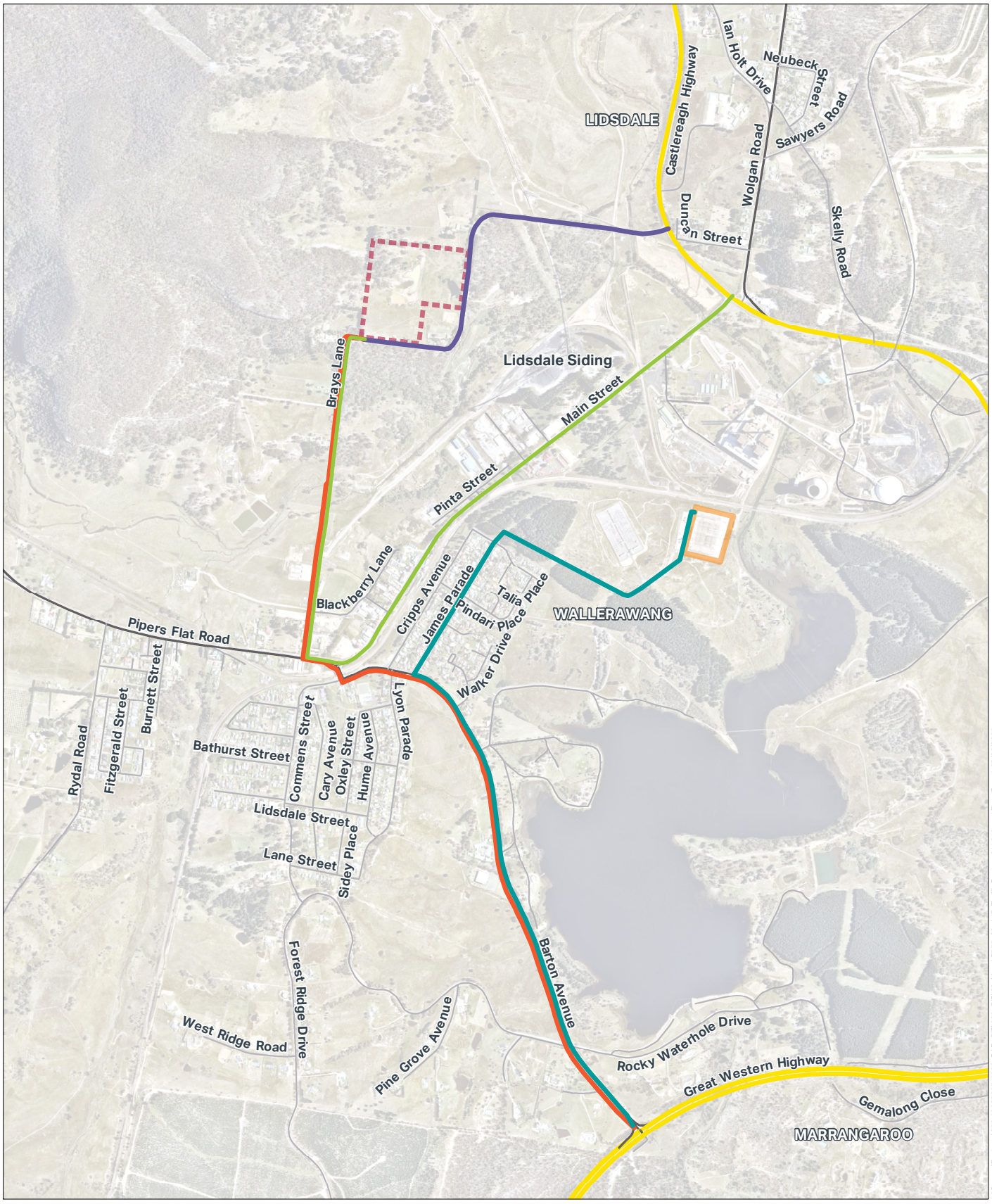

Figure 2-2
Construction Traffic Haulage Routes

Legend

- The Site
- Transgrid 330kV Wallerawang Substation
- Motorway
- Primary Road
- Local Road

Route Options

- Primary light vehicle access
- Secondary light and heavy vehicle access
- Oversized/ Overmass vehicle access and primary heavy vehicle access
- Transgrid Wallerawang 330kV Substation Access

N

0 370 740 m

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Source: Imagery © Nearmap, 2021.

A new access driveway on to the Site would be constructed off Brays Lane, close to the most south west corner of the Site. This new access point would be used for construction and eventually operation. An internal access road would also be provided for construction traffic to navigate to the construction laydown, storage and parking area where vehicles would be able to park, offload deliveries, and turn to exit. Two emergency access gates would be established at the eastern end of the Site internal road and at the eastern boundary of the Site from the BESS area. These emergency access gates would only be used in case of an emergency and vehicles would be required to travel over the paddock to exit onto Brays Lane via the existing paddock gate north of 173 Brays Lane.

While the Project would be located close to the existing Transport for NSW Country Rail Network (CRN) freight line, trains would not be used for haulage of any required construction materials.

During construction, the Project would introduce additional traffic to Brays Lane, generated as a result of the delivery of plant, equipment and materials and the movement of workers. During the peak of construction, this additional traffic would consist of up to 50 light vehicles and 20 heavy vehicles per day. A Construction Traffic Management Plan (TMP) would be prepared as part of the CEMP and would be implemented prior to and during construction.

Heavy vehicles would be required for the delivery of construction equipment, removal of spoil (if required) and the delivery of the various Project components, including pre-fabricated elements. Light vehicles would be used by the construction workforce. The size of vehicles used for haulage would be largely consistent with the access route constraints, safety and identified worksite constraints. Some construction activities may require access by vehicles up to 25/26m long B-doubles. Also, to transport some of the perfricated elements to the Site, such as the transformers (approximately 180 tonnes (T)), switch room (approximately 60 T) and control rooms (approximately 60 T), about eight (8) oversized and overmass vehicles would be required. These would likely comprise prime movers with platform trailers and prime movers with 10x8 - 10x8 beamsets.

2.2.4 Construction workforce and parking

It is anticipated that up to 250 construction workers would be required during the peak construction period. Outside of this peak time, an average of about 50 workers a day would be required. These workers would be preferentially sourced locally where appropriate skill sets are economically available.

During construction, parking would be provided for up to 50 light vehicles within the Site in the construction and storage, laydown and parking area. Overspill parking for workers would be provided at a location that would be determined in consultation with Lithgow City Council. The selection of this site would seek to minimise local parking impacts to the community. Workers would be bussed from this parking overflow location to the Site.

All workers and sub-contractors engaged during the construction phase would be inducted prior to the commencement of works. The induction would identify the construction haulage routes, local speed zones, worksite protocols, parking facilities and emergency and incident management strategies.

2.2.5 Construction duration

Construction of the Project is expected to commence late 2022 and take approximately 12 months to complete, pending development consent. Some of the works described may be undertaken concurrently to reduce the overall construction program.

2.2.6 Construction hours

The construction activities would be primarily carried out during standard construction hours, as defined by the NSW Environment Protection Authority’s (EPA) Draft Construction Noise Guideline (2020), being:

- 7:00 am to 6:00 pm, Monday to Friday
- 8:00 am to 1:00 pm, Saturdays
- No work on Sundays or public holidays.

While it is anticipated that work would primarily take place during standard construction hours, some works may be required to be undertaken outside of standard hours. Where this is required, works would

occur Monday to Saturday, 6am to 6pm. Where work outside of standard hours may be required, the noisiest works would be scheduled to occur during standard hours listed above.

2.3 Operation

2.3.1 Working hours

The Project would operate 24 hours a day, 7 days a week.

The Project would be an unmanned facility that is managed remotely by Neoen. It is anticipated that five to six employees would be required periodically for maintenance activities.

3.0 Assessment methodology

3.1 Overview

The scope of this assessment includes establishing the potential traffic and access impacts of the Project during the construction and operation phases. The scope can be summarised as follows:

- Establish the existing traffic and access conditions, as well as the current status of active transport and public transport networks near the Project
- Confirm the location of access points, anticipated vehicle movements and likely routes during the construction of the Project
- Prepare a qualitative impact assessment of the potential impacts of the Project on the local traffic and access environment during construction and operation of the Project
- Identify the likely impacts or access constraints for heavy vehicles and propose mitigation measures for managing these impacts should they be required for the Project.

3.2 Data sources and assumptions

3.2.1 Data sources

The following data / information sources were used to inform this assessment:

- A desktop assessment of the Project Area and surrounds based on available aerial photography and other GIS mapping information
- Traffic volumes obtained from the Transport for NSW sample classifier located on the Castlereagh Highway
- Construction information for the Project including construction traffic numbers and access arrangements, staging of construction works, work hours and workforce numbers
- Plans showing the Site layout and new transmission line corridor
- Other documents and data, as referenced in this report.

3.2.2 Assumptions

The assessment of the traffic, transport and access impacts were based on the following assumptions:

- The majority of traffic would access the Site via the Castlereagh Highway (light vehicles and small to medium sized trucks). Some of vehicles may access the Site from the south, via the Great Western Highway
- Oversized / overmass vehicles and large trucks (such as B-doubles) would access the Site via the Castlereagh Highway and Main Street
- Traffic operation was determined based on a desktop review of the available traffic information at a sample classifier on the Castlereagh Highway (Station Id 99084) east of the Site to establish the following:
    - Background traffic growth rates near the Site
    - Anticipated background traffic flows in 2021
    - Future traffic flows for the peak construction/opening year in 2023
    - Future traffic flows 10 years after opening in 2033.
- Assessment of the construction impacts using peak construction volumes with all vehicle movements being carried out during standard construction hours
- It is assumed that the majority of traffic movements would be associated with construction works proposed to be undertaken at the Site, as the Site would be subject to the majority of construction activities described in **Section 2.2.1**

- Assessment of operational impacts with the number of staff to be employed onsite and proposed parking provisions.

3.3 Assessment guidelines

The following guidelines were considered during the preparation of this Traffic Impact Assessment report:

- *Guide to Traffic Management – Part 3: Traffic Studies and Analysis Methods* (Austroads, 2020)
- *Guide to Traffic Generating Developments Version 2.2* (RTA, 2002)
- *Technical Direction TDT2013/4a – Guide to Traffic Generating Developments* (Roads and Maritime Services, 2013)
- *Guide to Traffic Management – Part 12: Integrated Transport Assessments for Developments* (Austroads, 2020) and *the complementary Roads and Maritime Supplement* (RMS Austroads Guide Supplements, RMS, 2013).

These guidelines provide an overview of available methods for undertaking transport studies and analysis, aspects of traffic generation considerations relating to developments as well as guidance on identifying, assessing and mitigating traffic impacts. These guidelines have been used to inform this assessment.

4.0 Existing environment

4.1 Context

Wallerawang is located in the west of NSW within the Lithgow City Local Government Area LGA, approximately 110 km west of Sydney. Wallerawang is bounded by Mount Lambie and Rydal to the south, Blackmans Flat and Lidsdale to the north, Bowenfels and Marrangaroo to the east, and Meadow Flat and Portland to the west.

The Site is located north of the Wallerawang town centre. The Site is located on part of one allotment (the Lot) which has an approximate 800 m frontage to Brays Lane. The proposed transmission line is accessed by an unnamed roadway used for the existing rail corridor and coal conveyer belt.

The area surrounding the Project is characterised by its dominant land uses of agriculture, industry, infrastructure and mining. The Lot within which the Site is located is privately owned and is currently occupied by a residential property. Beyond the residential property most of the Lot is used for occasional horse grazing. The Lot, and therefore the Site, is located on the western side of Brays Lane.

The proposed transmission line would be installed underground and would be located within the vegetated area to the east of Brays Lane, as well as within the existing rail corridor. The transmission line would exit the rail corridor to connect to the Transgrid Wallerawang 330 kV substation.

Brays Lane primarily provides local access to the few residential properties on this road. South of the Site, Brays Lane provides access to a local sporting field, a self-storage facility, and the Wallerawang Sewage Treatment Plant. North of the Site, Brays Lane provides access to the unnamed road used to access the rail corridor and the coal conveyor belt. Brays Lane connects to the wider road network via Castlereagh Highway, Pipers Flat Road and Great Western Highway.

In addition to the unnamed access road from Brays Lane, the proposed transmission line may also be accessed via Main Street, Wallerawang, however it is not anticipated that this would be used as a primary access route for the construction of the transmission line. Main Street provides the main route through the township of Wallerawang.

The Transgrid Wallerawang 330 kV substation can be accessed via the unnamed road that connects to James Parade, Wallerawang.

Figure 2-1 and **Figure 2-2** illustrate some key roads and land use features surrounding the Project Area.

4.2 Road network

4.2.1 Key roads

The road network in the vicinity of the Site includes Brays Lane, Castlereagh Highway, Pipers Flat Road, Main Street, Barton Avenue and Great Western Highway. **Figure 2-1** and **Figure 2-2** shows the road network surrounding the Site.

Brays Lane

Brays Lane provides access to the Site. Brays Lane is fed by the Castlereagh Highway to the north and Pipers Flat Road to the south. No other formal roads can be accessed from Brays Lane. Brays Lane is an undivided carriageway with a sign posted speed limit of 50 km per hour.

Brays Lane is a local road generally aligned in a north-south direction. In addition to the Site, Brays Lane provides access to the few residential properties with frontages on Brays Lane, and mostly rural residential land uses. It also provides informal access (in the form of an unsealed and unnamed small dirt track) to the nearby coal conveyer belt which also crosses above Brays Lane, about 140 m from its intersection with the Castlereagh Highway. A roadside convex mirror is provided to provide forward visibility around the blind corner.

No formal parking or footpaths are provided on either side of the road.

Castlereagh Highway

Castlereagh Highway is a classified State Road (State Road 18) generally aligned in a north-south direction north of the Site. The highway connects South West Queensland in the north to the Northwest Slopes, Orana and Central West regions of North South Wales in the south. The highway connects to Brays Lane north of the Site. Near the Site the highway is an undivided carriageway, with one lane in each direction. The posted speed limit is 80 km per hour for vehicles travelling southbound and 100 km per hour for vehicles travelling northbound. No parking or footpaths are provided on either side of the highway.

Main Street

Main Street is a local road generally aligned in a north-south direction near the Site. The road connects to Castlereagh Highway in the north and Pipers Flat Road in the south. The road is an undivided carriageway, with one lane in each direction and some turning lanes at intersections. The posted speed limit is 50 km per hour in each direction. Parking on both sides and footpaths on one of side road are provided within the town centre.

Pipers Flat Road

Pipers Flat Road is a local road aligned in an east-west direction near the Site. The road provides access to the Portland town centre to the west and the Wallerawang town centre to the east. The road connects to Barton Avenue in the east. The road is an undivided carriageway, with one lane in each direction and some turning lanes at intersections. The posted speed limit is 50 km per hour in each direction near the town centres and 100 km per hour outside of the town centres. There are very limited footpaths to cater for pedestrians on one of side road. While there are no ‘no parking’ or ‘no stopping’ signs along this road, on-street parking on the road verges would be limited (due to the condition of the road verges).

James Parade

James Parade is a local road generally aligned in a north-south direction. The road connects to Barton Avenue in the south and to the unnamed road that provides access to the Transgrid Wallerawang 330 kV substation in the north. The road is an undivided carriageway, with one lane in each direction. The posted speed limit is 50 km per hour in each direction. There are no footpaths along this road. Parking is provided on either side of the road in the form of informal, untimed parking.

Barton Avenue

Barton Avenue is a local road generally aligned in a north-south direction. The road connects to Pipers Flat Road in the north and Great Western Highway in the south. The road is an undivided carriageway, with one lane in each direction and some turning lanes at intersections. Closer to its intersection with the Great Western Highway, the posted speed limit is 80 km per hour. Closer to the township of Wallerawang, the posted speed limit becomes 50 km per hour in each direction. Where Barton Avenue runs past Wallerawang Public School, 40 km per hour speed limits apply during standard school-zone hours (8:00 am to 9:30 am and 2:30 am to 4:00 pm on school days). There are very limited footpaths to cater for pedestrians on one side of the road, and a school crossing zone is located outside the public school. While there are no ‘no parking’ or ‘no stopping’ signs along this road, on-street parking on the road verges would be limited (due to the condition of the road verges).

Great Western Highway

Great Western Highway is a classified State Road (State Road 5) generally aligned in an east-west direction south of the Site. The highway connects Sydney in the east to Bathurst in the west. The highway connects to Barton Avenue south of the Site. Near the Site the highway is a divided carriageway, with two lanes in each direction separated by a large median. The posted speed limit is 110 km per hour in each direction. No parking or footpaths are provided on either side of the highway.

4.2.2 Road safety

Transport for NSW (TfNSW) provides interactive crash and casualty statistics by LGA. This data was reviewed to obtain a general understanding of crash statistics in close proximity of the Site. These interactive crash statistics provided an overview of all crashes for the four-year period between 2015

and 2019. The location of these crashes within the local area near the Project Area is shown in **Figure 4-1**.

The review of the crash data indicates that only a small proportion of crashes occurred near the Site location and on the road network immediately surrounding the Project Area.

One crash occurred on Brays Lane, resulting in serious injury and a vehicle veering off the carriageway during a bend into an object / parked vehicle. Two crashes occurred on Main Street, resulting in moderate injury and serious injury. The two crashes were result of a collision of two vehicles at an intersection and a vehicle veering off the carriageway into an object / parked vehicle.

Outside these locations, a relatively larger proportion but small number of crashes occurred on the State Roads, Castlereagh Highway and Great Western Highway, that provide connections to the Wallerawang town centre.

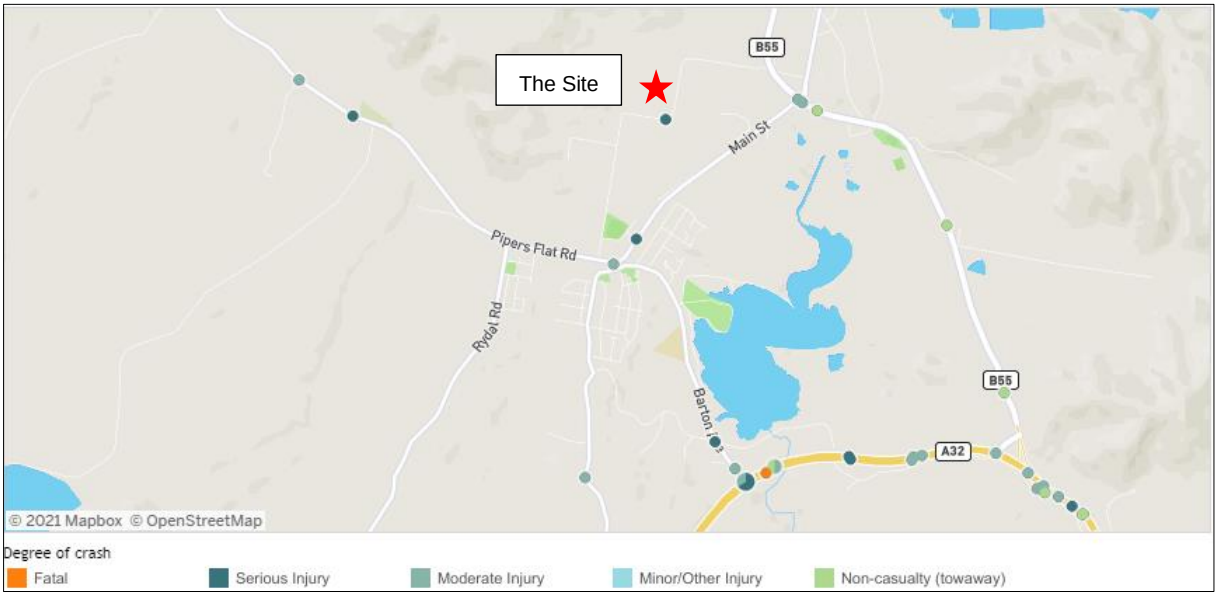

Figure 4-1 Crashes near the Site, Source: TfNSW, 2021 (modified by AECOM)

4.2.3 Traffic demand and growth rates

The Project is located in a regional area, characterised with low traffic volumes, and there are no significant trip attractors or generators located near the Project. As such, it has been determined that traffic counts are not required for the assessment of existing traffic demand of the road network near the Site.

Traffic demand of the road network near the Project has been obtained based on publicly available information taken from the TfNSW sample classifier located on Castlereagh Highway east of the Site (Station Id 99084) and traffic count location on the Great Western Highway, west of the Site (Station Id 99001). The location of stations 99084 and 99001 are shown relative to the Site on **Figure 4-2** and **Figure 4-3**, respectively.

As stated above, TfNSW sample classifier (Station Id 99084) is located on the Castlereagh Highway, east of the Site and the Wallerawang town centre. This classifier is located approximately 6 km (or about 6 minutes drive) from the Site. TfNSW sample classifier (Station Id 99001) is located on the Great Western Highway, west of the Site and the Wallerawang town centre. This classifier is located approximately 14 km (or about 17 minutes drive) from the Site.

Given the regional nature of the Project Area, the traffic flows observed at these station locations are considered representative of the traffic levels of the road network near the Site.

The historical annual average daily traffic (AADT) at the Station Id 99084 and Station Id 99001 (sample classifier stations) have been obtained and presented in **Table 4-1** and **Table 4-2**, respectively. These flows take into account holiday and seasonal variations and provide an accurate representation of background traffic flows throughout the year.

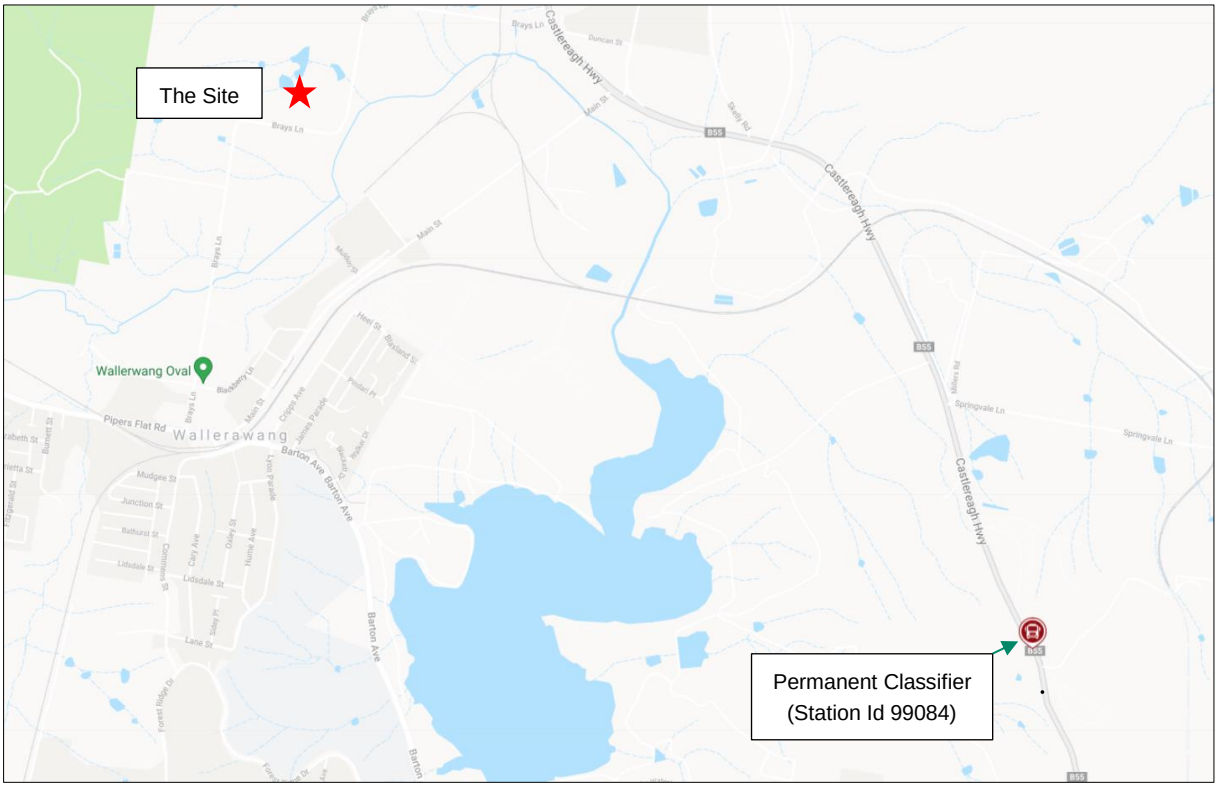

Figure 4-2 TfNSW sample classifier location Station Id 99084 (Source: TfNSW, 2021)

Figure 4-3 TfNSW sample classifier location Station Id 99001 (Source: TfNSW, 2021)

Table 4-1 Historical AADT growth trends at Station Id 99084

Direction	Annual average daily traffic (AADT)[1]			
	2009	2010	2011	2012[2]
Southbound	2,389	2,797	2,802	2,616
Northbound	2,394	2,789	2,830	2,468
Combined	4,783	5,586	5,632	5,084

1. Station ID 99084 is a sample classifier and the AADT shown is in vehicles. (Source: TfNSW, 2021).
2. Station ID 99084 contains data from 2009 – 2012 only. More recent data was not available at the time of writing.

Table 4-2 Historical AADT growth trends at Station Id 99001

Direction	Annual average daily traffic (AADT)[1]							
	2012	2013	2014	2015	2016	2017	2018	2019
Eastbound	3926	3963	3989	3989	4078	4049	4259	4225
Westbound	3941	3977	4036	4120	4074	4052	4272	4241
Combined	7867	7940	8025	8109	8152	8101	8531	8466

1. Station ID 99001 is a sample classifier and the AADT shown is in vehicles. (Source: TfNSW, 2021)

The traffic flows presented in the tables above were used to determine the average annual growth rates in traffic at each location, which are summarised in **Table 4-3** and **Table 4-4**.

Table 4-3 Background traffic - growth rates Station Id 99084

Station	2008	2009	2010	2011	2012	Average[2]
Annual growth rate at Station Id 99084 [1]	-	2.05%	16.79%	0.82%	-9.73%	2.48%

1. The annual growth rates have been rounded to the nearest integer.
2. For Station ID 99084, average annual growth rate excluding 2010 and 2012 would be 1.44%, including 2010 and 2012 would be 2.48%, the higher growth rate was selected to provide a more conservative assessment

Table 4-4 Background traffic - growth rates Station Id 6105

Station	2013	2014	2015	2016	2017	2018	2019	Average[2]
Annual growth rate at Station Id 99001	0.93%	1.07%	1.05%	0.53%	-0.63%	5.31%	-0.76%	1.07%

1. The annual growth rates have been rounded to the nearest integer.
2. This average excluded the non-typical traffic numbers from 2020 associated with travel restrictions put in place during the COVID19 pandemic.

The review of the historical AADT data obtained from the TfNSW for Station ID 99084 is presented in **Table 4-3.** For the Castlereagh Highway, this data indicates that the average annual increase in background traffic over the available five years is around 2.48%. The review of the historical AADT data obtained from the TfNSW for Station ID 99001 is presented in **Table 4-4**. For the Great Western Highway, this data indicates that the average annual increase in background traffic over the eight years is around 1.07%. This average excluded the non-typical traffic numbers from 2020 associated with travel restrictions put in place during the COVID19 pandemic.

Current traffic demand

In order to estimate the current background traffic flows of the road network near the Site, namely at the Castlereagh Highway, the average annual background growth rate of 2.48% was calculated using the traffic flows observed at the sample classifier location (Station Id 99084) in 2012. **Table 4-5** provides an estimate of traffic flows during 2021 along the Castlereagh Highway, east of the Site. The estimates indicate that that the average combined AADT on the Castlereagh Highway in 2021 is likely to be

approximately 6,076 vehicles. Traffic counts indicate that peak period flows nearby the Project Area for the morning peak are between 6am and 7am and for the afternoon peak between 3pm and 4pm.

In order to estimate the current background traffic flows of the road network near the Site at the Great Western Highway, the average annual background growth rate of 1.07% was calculated using the traffic flows observed at Station Id 99001 in 2019. **Table 4-6** provides an estimate of traffic flows during 2021 along the Great Western Highway, nearby the Site. The estimates indicate that that the average combined AADT on the Great Western Highway in 2021 is likely to be approximately 8188 vehicles. Traffic counts indicate that peak period flows nearby the Project Area for the morning peak are between 6am and 7am and for the afternoon peak between 3pm and 4pm.

Table 4-5 Estimate of current traffic flows on the Castlereagh Highway near the Site

Castlereagh Highway				
Year	**Direction**	**AADT [1]**	**AM Peak[2] (8am-9am)**	**PM Peak[2] (3pm-4pm)**
2012[2]	Southbound	2,468	68	274
	Northbound	2,616	282	173
	Combined	5,084	350	447
2021	Southbound	3,077	85	342
	Northbound	3,262	352	216
	Combined	6,340	436	557

1. AADT shown is in vehicles.
2. Traffic volumes are based on traffic flows at Station ID 99084 in 2012.

Table 4-6 Estimate of current traffic flows on the Great Western Highway near the Site

Great Western Highway				
Year	**Direction**	**AADT [1]**	**AM Peak (8am-9am)**	**PM Peak (3pm-4pm)**
2019	Eastbound	4049	1024	1102
	Westbound	4052	911	1226
	Combined	8101	1935	2328
2021	Eastbound	4092	1035	1114
	Westbound	4095	921	1239
	Combined	8188	1956	2353

1. AADT shown is in vehicles.

Some construction traffic would travel to the Site via the Great Western Highway. However, construction traffic generated by the Site is proposed to arrive primarily from the Castlereagh Highway which feeds directly onto Brays Lane. Large, oversized and overmass vehicles would access the Site via the Castlereagh Highway, Main Street, Pipers Flat Road and Brays Lane.

Therefore, it is concluded that traffic flows included in **Table 4-5** and **Table 4-6** are likely to best represent a worst-case scenario for the background traffic of the road network near the Site.

4.2.4 Road network performance

Midblock capacity assessment – Interrupted flow facilities

The *Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis Methods* (the Guide) provides the following information on capacity analysis for interrupted flow facilities.

Interrupted flow facilities are facilities on which traffic flow conditions are subject to the influence of fixed elements such as traffic signals, stop signs, give-way signs, roundabouts or other controls which cause

traffic to stop periodically, irrespective of the total amount of traffic; examples include urban streets, unsignalised and signalised intersections.

The Guide sets out typical mid-block capacities for various types of urban roads with interrupted flow, with unflared major intersections and with interruptions from cross and turning traffic at minor intersections, as summarised in **Table 4-7**.

Table 4-7 Typical theoretical mid-block capacities for urban roads with interrupted flows

Type of Lane	One-way mid-block capacity (pc/h)*
Median or inner lane	
Divided road	1,000
Undivided road	900
Median lane (of a three-lane carriageway)	
Divided road	900
Undivided road	1,000
Kerb lane	
Adjacent to parking lane	900
Occasional parked vehicles	600
Clearway conditions	900

*pc/h = passenger car per hour

Source: Table 6.1 of Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis Methods

The mid-block capacity of the Castlereagh highway as indicated in **Table 4-7**, would be in the order of 900 passenger car (pc) per hour (pc/h) per traffic lane based on urban roads with interrupted flows, with clearway conditions for kerb lanes.

Peak-period mid-block traffic volumes may increase to 1200 to 1400 pc per hour per lane on any approach road where provisions have been made to limit traffic flow disruptions. This is the case for the Great Western Highway in the vicinity of Wallerawang where slip lanes are provided for right and left turns. As the Great Western Highway provides two lanes in each direction in the vicinity of Wallerawang, peak-period mid-block traffic volumes may be between 2400 and 2800 pc per hour in each direction.

Midblock capacity assessment – Uninterrupted flow facilities

The Guide also provides the following information on capacity analysis for uninterrupted flow facilities. Uninterrupted flow facilities are facilities on which traffic flow conditions are the result of interactions between vehicles in the traffic stream, and between vehicles and the geometric characteristics of the road. In uninterrupted flow facilities, there are no fixed elements external to the traffic stream, such as traffic control signals, that cause interruptions to traffic flow.

The Guide provides guidance on the assessment of capacity for single-lane traffic flow without overtaking and assumes a linear relationship between the average speed and the density of vehicles.

The Guide indicates that the traffic capacity for these facilities can be estimated as per the equation below:

$$C = k_j V_f / 4$$

Where: C is the capacity (passenger cars per hour – pc/h), Vf is the free speed (km/h) and kj is the jam density (pc per km)[1].

The theoretical capacity for the two highways has been calculated based on the Austroads Guide assessment methodology using the following values:

[1] Source: Section 5.1 of Based Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis Methods

Vf = 80% of the sign posted speed limits along the Castlereagh highway and Great Western Highway as a conservative estimate of the free speed

kj = based on a queue length of 7 metres per vehicle (142.86 pc per km for a single lane)

The resultant theoretical capacity of the Castlereagh Highway and Great Western Highway per available lane is presented in **Table 4-8**.

Table 4-8 Typical theoretical mid-block capacities per lane for urban roads with uninterrupted flows

Location	Direction	Capacity (pc/h)
Castlereagh Highway	Southbound	2,857
	Northbound	2,286
Great Western Highway	Eastbound	3,143
	Westbound	3,143

The mid-block capacity (based on urban roads with uninterrupted flows) as indicated in **Table 4-8**, would be in the excess of 2,200 pc per hour per traffic lane for the Castlereagh Highway and 3,100 for the Great Western Highway. Noting the Great Western Highway is a 2-lane carriageway in each direction near Wallerawang, the capacity here would be greater. The assessment of Castlereagh Highway and Great Western Highway based on the Guide for both interrupted flows indicate that a conservative peak hour mid-block capacity would be 900 pc per hour and 2,400 respectively, in each direction.

The existing year 2021 traffic volumes, as estimated on the Castlereagh Highway east of Wallerawang town centre near the Site, is estimated between 85 to 352 vehicles during the AM or PM peak hour for each direction. For the Great Western Highway existing year 2021 traffic volumes have been estimated between 911 to 2,328 vehicles during the AM or PM peak hour for each direction.

As such, both the Castlereagh Highway and the Great Western Highway have sufficient capacity to accommodate current traffic flows observed on the road. Therefore, it was concluded that intersection modelling is not required to assess road network performance.

4.3 Public transport

4.3.1 Overview

Wallerawang has generally limited public transport services due to the low population density, combination of rural and industrial land uses, and consequently low demand for public transport services. However, the area around Wallerawang town centre still has a limited public transport network comprising bus services connecting to surrounding town centres and Sydney.

Regional coaches operate from Wallerawang and the town centre. Buses also operate within the town centre, serving the local catchments. The Wallerawang train station is no longer operational for passenger trains.

4.3.2 Coaches and Rail

Coach services operate at the Wallerawang town centre, connecting the town centre to Lithgow, Coonabarabran, Gulgong, Orange, Parkes and Bathurst. Regional trains service Lithgow, linking it to the wider regional network and Sydney.

The number of coach services servicing the Wallerawang the town centre during the AM and PM, two-hour peak periods is shown in **Table 4-9**. Coach services at the Wallerawang town centre provide regional access to the wider rail network and Sydney.

Table 4-9 Regional coach services at Wallerawang Station

Direction	Stop location	Weekday AM (6am – 9am)	Weekday PM (3pm – 6pm)
539 – Lithgow to Coonabarabran	Wallerawang Town Coach Stop	-	-
540 – Coonabarabran to Lithgow	Wallerawang Town Coach Stop	-	1
543 – Lithgow to Gulgong	Wallerawang Town Coach Stop	-	-
546 - Coonabarabran to Lithgow	Wallerawang Town Coach Stop	-	1
562 – Orange to Lithgow	Wallerawang Town Coach Stop	1	-
563 – Lithgow to Orange	Wallerawang Town Coach Stop	-	-
564 – Orange to Lithgow	Wallerawang Town Coach Stop	-	-
565 – Lithgow to Orange	Wallerawang Town Coach Stop	-	-
566 - Orange to Lithgow	Wallerawang Town Coach Stop	-	1
568 - Orange to Lithgow	Wallerawang Town Coach Stop	-	-
571 – Lithgow to Parkes	Wallerawang Town Coach Stop	-	1
575 - Gulgong to Lithgow	Wallerawang Town Coach Stop	-	-
576 – Gulgong to Lithgow	Wallerawang Town Coach Stop	-	-
580 – Bathurst to Lithgow	Wallerawang Town Coach Stop	-	-

4.3.3 Bus network

A number of bus routes operate at Wallerawang, connecting the town centre to the local and regional network.

Lithgow Buslines a part of the Buslines Group, a local bus operator, operates two bus routes in the area. The bus services that operate in and around the Wallerawang town centre are:

- Route 600: Lithgow to Portland via Wallerawang and Return
- Route 636: Bathurst to Lithgow via Wallerawang, Portland & Meadow Flats

Bus routes operating in Wallerawang are shown in **Figure4-4**.

The frequency of public bus services in Wallerawang is relatively limited. This is reflected in the low public transport mode-share for the area. Service frequencies are shown in **Table 4-10**.

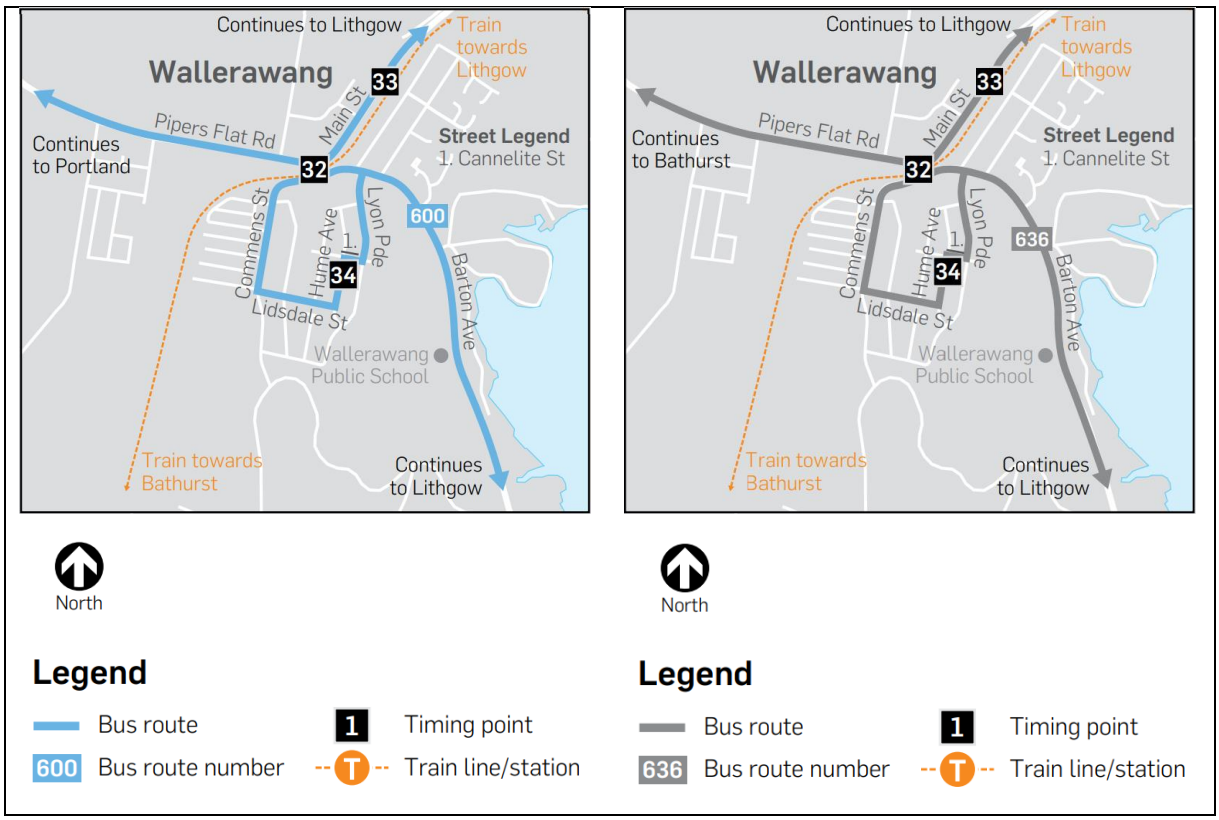

Figure4-4 Existing bus services (Source: Buslines Group, 2021)

Table 4-10 Frequencies of local bus services Wallerawang

Route	Description	Weekday AM (6am – 9am)	Weekday PM (3pm – 6pm)
600	Lithgow to Portland via Wallerawang and Return	3	4
636	Bathurst to Lithgow via Wallerawang, Portland & Meadow Flats	1	1

4.4 Active transport

There are no walking and cycling facilities in the immediate vicinity of the Site.

Walking and cycling facilities are primarily provided at the Wallerawang town centre. Footpaths are generally provided on only one side of the road on local roads within the town centre. There are minor cycleway facilities traversing the town centre which includes trails and bicycle friendly roads. **Figure 4-5** shows the existing active transport facilities surrounding the Wallerawang town centre. Further afield, there are some dedicated cycle lane facilities along Great Western Highway and Castlereagh Highway. However, given the low population in the area, these are not frequently used.

Figure 4-5 Draft Lithgow Active Transport Plan (Source: Lithgow City Council, 2019)

5.0 Impact assessment

5.1 Construction phase

As previously noted, the majority of construction works for the Project would be at the Site. Construction traffic to the Site and to the proposed transmission line would primarily utilise the intersection of Castlereagh Highway/ Brays Lane for access. Construction laydown areas and site offices would be established within the Site.

5.1.1 Road network

Construction of the Project is expected to commence late 2022 and take approximately 12 months to complete. As such, it is assumed that peak construction would occur in 2023.

The traffic flows for the peak construction year in 2023 without the Project construction traffic were based on the existing traffic flows determined for 2021 outlined in **Section 4.2.3**, using an annual average background traffic growth rate of around 2.48% for the Castlereagh Highway and 1.07% for the Great Western Highway.

The anticipated peak background traffic flows in 2023 without the Project are presented in **Table 5-1**.

Table 5-1 2023 peak traffic flows on the Castlereagh Highway and Great Western Highway

Road, 2023	Direction	AADT [1]	AM Peak (8am-9am)	PM Peak (3pm-4pm)
Castlereagh Highway	Southbound	3,232	89	359
	Northbound	3,426	369	227
	Combined	6,658	458	585
Great Western Highway	Eastbound	4225	1069	1150
	Westbound	4228	951	1273
	Combined	8454	2019	2429

1. AADT shown is in vehicles.

In 2023 the traffic volumes without the Project would marginally increase. Traffic introduced by the Project would be mainly limited to construction and is expected to comprise up to 20 heavy vehicles and 50 light vehicles per day during the peak of construction. Based on the capacity analysis in **Section 4.2.4,** Castlereagh Highway and Great Western Highway would still have sufficient capacity to accommodate the background traffic flows. Therefore, it was determined that only a qualitative assessment is sufficient to assess the road network and intersection performance.

Traffic generated by construction vehicles, including construction trucks and construction workers, is expected to be low given the nature of the construction of the Project, and would likely fluctuate depending on the Project construction stage, the peak of which would be about two months in duration. in order to consider a worst-case scenario for assessing the construction traffic impacts, it is assumed that all construction worker vehicles arrive during the same peak hour. This would represent a combined total traffic volume of up to 70 vehicles during the AM or PM peak hour for each direction.

The majority of construction traffic (comprising light vehicles) is expected to access the Site via the Castlereagh Highway, onto Brays Lane. Between this intersection and the proposed Site access driveway, Brays Lane only provides access to the informal unsealed road used to access the existing rail corridor and coal conveyer belt, and two residential properties. The majority of traffic travelling to the township of Wallerawang via the Castlereagh Highway would typically exit the Highway at the Main Street intersection and head towards the centre of Wallerawang and would not use Brays Lane for this purpose.

Heavy vehicles (up to 20 per day during peak construction) would be required for the delivery of construction equipment, removal of spoil (if required) and the delivery of the various Project components, including small pre-fabricated elements. Oversized / over mass vehicles are expected to be required to deliver large pre-fabricated elements for the construction of the Project. This is likely to

include eight (8) oversized vehicles to transport the transformers, switch rooms and control room to the Site. The transformers are expected to weigh approximately 180 tonne (T) each. The switch rooms would be about 23 m long x 4.5 m wide x 4 m high and would weigh about 60T.

Heavy vehicles and oversized / overmass vehicles would travel up Castlereagh Highway, then turn onto Main Street Wallerawang before connection to Pipers Flat Road and Brays Lane. This route would be required for oversized / over mass vehicles.

Traffic approaching the Castlereagh Highway / Brays Lane intersection from the north would be required to turn right into Brays Lane. Traffic queuing to turn right across an intersection has the potential to interrupt traffic flow by halting the traffic in the direction of travel while waiting for a safe gap in oncoming traffic. However, as a dedicated passing lane is provided at this intersection for traffic to navigate around vehicles turning right into Brays Lane, and as these vehicles would be few in number, delays as a result of right-turning traffic onto Brays Lane is not anticipated at this intersection.

As the peak hour mid-block capacity of Castlereagh Highway and Great Western Highway (in each direction) is over 2400 pc per hour, and over 3100 pc per hour, respectively, there would be sufficient capacity to accommodate the construction traffic on these roads (when comparing likely traffic flows for the 2023 scenario provided in **Table 5-1**. On a typical day, given that construction activities are proposed to be carried out over 11 hours per day and assuming construction heavy vehicle movements are equally distributed across the day, around two heavy vehicles would access the Site during peak hours. Given the existing capacity of the Castlereagh Highway and Great Western Highway, and the existing limited use of Brays Lane in particular, the addition of the proposed volumes of construction traffic to the local road network during the peak period of construction is not expected to significantly impact local traffic. In addition, the construction workforce is likely to be sourced locally, and shuttle buses would be considered, if required, to transport construction workers from the town centre to the Project Area, further reducing the impacts of the Site on the surrounding road network.

Local traffic impacts on Brays Lane as a result of construction are expected to be minor, short-term and temporary. A Construction Traffic Management Plan (TMP), would be prepared for implementation during the construction of the Project to manage minor impacts to traffic during construction.

A Route Study has been prepared for the Project to assess the suitability of the proposed construction traffic routes (Rex J Andrews Engineered Transportation, 2021). This study has been based on the successful implementation of the transportation of oversized and overmass elements during the recent decommissioning of the Wallerawang Power Station, as investigated and recommended by Rex J Andrews Engineered Transportation. As noted in the Route Study, the Castlereagh Highway and Great Western Highway are classified as 25/26m B-double routes. Barton Avenue, Main Street and Pipers Flat Road are approved routes with travel conditions.

The Route Study identified the following sections of road within 20 km of the Site that would require special access measures to allow for the egress of oversized / over mass vehicles:

- Main Street onto Pipers Flat Road (right hand turn) – A spotter would be required to guide the loads through this section of road
- Pipers Flat Road onto Brays Lane (right hand turn) -– A spotter would be required to guide the loads through this section of road
- Brays Lane - Vegetation trimming is likely to be required in an isolated area comprising the corner of Brays Lane at the Site entrance to allow for the passage of loads. The extent of this vegetation trimming would be minimal and would be finalised during detailed design. There are two culverts on Brays Lane that may not have the existing weight capacity for heavy loads. If the culverts are determined to not be suitable for oversized / over mass vehicles to pass over then measures such as the use of temporary bridging beams may be required. These measures would be confirmed in the TMP for the Project.

The installation of a temporary bridge would be undertaken in consultation with Lithgow City Council and would be removed as soon as practical. The installation of a temporary bridge would be very short term in duration, and would not be expected to result in any long term changes to the existing condition of Brays Lanes or the culverts, this action is not considered to represent a local road upgrade. Once complete the bridging beams would be removed and the road and culverts would be checked to confirm

they were not damaged and are of the same condition and integrity as they were prior to the oversized movements.

As the Castlereagh Highway and Great Western Highway and are approved B-double routes they are considered to be in an appropriate condition to accommodate heavy and oversized / over mass vehicles required of the construction of the Project.

With the implementation of suitable measures to accommodate the egress of heavy and over-sized vehicles on local roads, and given that traffic volumes associated with the Project are low, the Project is not anticipated to have a significant impact on the condition of existing haulage routes.

No temporary diversions are proposed to accommodate the construction of the Project. If required, the potential locations of temporary diversions would need to be identified through a TMP. Road Occupancy Licence (ROL) and Traffic Control Plans (TCP) would also be prepared, as required.

These movements are not expected to affect access to Brays Lane, but during these movements along the southern section of Brays Lane may be restricted. Brays Lane provides access to both Wallerawang and the Castlereagh Highway so residents and business owners would still be able to access the wider road network. Residents and business owners along Brays Lane would be consulted prior to oversized movements occurring.

5.1.2 Access and parking

Some short-term localised impacts have the potential to occur at the proposed Site access point off Brays Lane in the form of delay to road users. These potential impacts would be temporary and localised, and likely only affect one road user at a time due to the low traffic levels on Brays Lane.

For any works that would be required to be undertaken in the road corridor (such as utility connections) these would be carried out such that one lane would remain open at all times. As such access is not expected to be impacted by these works.

No impacts are anticipated at the access gate point to the rail corridor, located off Brays Lane that would be used to access the proposed transmission line or at James Parade (which can be used to access the Transgrid Wallerawang 330 kV substation) due to low construction traffic volumes likely to be generated by this work and the fact the substation can also be accessed via the rail corridor

Accesses, including the new internal access road off Brays Lane would be reviewed during subsequent design stages to ensure construction vehicles can safely enter the Site and turning paths can safely be accommodated on Site.

Construction of the Project would require a workforce of up to 250 workers during peak construction periods. During construction, parking would be provided for up to 50 light vehicles within the Site. Overflow parking for workers would be provided at a location that would be determined in consultation with Lithgow City Council. The selection of this site would seek to minimise local parking impacts to the community.

If required, shuttle bus movements would be considered from the Wallerawang town centre to the Site to limit car parking impacts on the road network immediately surrounding the Site. No parking of workers vehicles would be allowed to occur along the verges of Brays Lane.

The Project would not impact accesses to other properties near the Site during the construction.

5.1.3 Road safety

Construction traffic volumes are expected to be low during peak construction periods with up to 20 heavy vehicles and 50 light vehicles per day anticipated. During the course of the construction period, about eight (8) oversized / over mass vehicles would be required to transport pre-fabricated elements to the Site. These volumes are low, especially when compared with the traffic volumes on key arterial roads connecting to the construction site.

In addition, the review of crashes on the road network immediately surrounding the Site that propose to be used for access by construction vehicles indicates that there is a low incident rate. There was a serious injury crash recorded in 2016, which involved a run-off road crash at the bend during the hours of darkness. Construction workers accessing the Site will be provided with information on driving conditions along Brays Lane.

Given the lack of pedestrian and cyclists facilities, low population, and low traffic counts in the vicinity of the Project, there is a low risk of construction vehicles interacting with pedestrians, cyclists and motorists on the road network surrounding the Site, including when construction vehicles are entering and exiting the Site.

Potential impacts on road safety for all users during construction would be mitigated through the implementation of a TMP and other measures, as discussed in **Section 6.0**.

5.1.4 Public transport

Bus services in the vicinity of the Site are unlikely to be impacted during construction. Bus services at the Wallerawang centre would continue to operate as normal during construction activities and bus routes would not be impacted during the construction of the Project, given construction activities would be mostly within the Site. No changes to bus stop locations are anticipated as a result of the Project.

5.1.5 Active transport

During construction, works would be undertaken to maintain pedestrian and cyclist movements around the Site. However, given there are no existing formal walking or cycling facilities bordering the Site, temporary disruptions are not anticipated. Therefore, the Project is not anticipated to cause impacts to pedestrian and cyclist movements.

Appropriate signage, line marking and/or traffic controllers would be positioned to notify pedestrians and cyclists of temporary arrangements. Impacts during construction would be managed through the development of a TMP. The community along Brays Lane would be notified in advance of planned works which would impact pedestrian or cycle infrastructure.

5.2 Operational phase

The Project is anticipated to require between five to six staff members during the operational stage. These workers would only be onsite intermittently, as required. Heavy vehicles are not anticipated to regularly access the Site during operation, with heavy vehicle access only required for maintenance work or battery unit replacements, on the rare occasion that this should be required. As a result, the traffic generation during operations would be very low, and as such is not expected to impact the road network surrounding the Site.

Up to eight car parking spaces would be provided once the Project is operational. Given between five and six employees would be present on-site intermittently, the amount of parking proposed to be provided for the Project is considered appropriate. As such, the Project is not forecast to impact the availability of parking.

6.0 Mitigation and management measures

6.1 Overview

This chapter describes the environmental management approach for traffic, transport and access during the construction of the Project. Due to low staffing requirements during the operation of the Project and given there are no operational impacts likely due to the Project, mitigation and management measures have not been identified for the Project during operations.

The construction focused mitigation and management measures described would be included in a TMP which would form part of the Construction Environmental Management Plan (CEMP) for the Project.

6.2 Mitigation and management measures

The potential impacts identified in **Section 5.0** of this report, and the mitigation and management measures that would be implemented to avoid or minimise their effects during the construction phase of the Project are summarised in **Table 6-1**.

Table 6-1 Mitigation and management measures

Ref	Mitigation measures	Timing

T1	A Construction Traffic Management Plan (TMP) would be prepared, in consultation with Lithgow City Council and other relevant stakeholders. The TMP would include:
	• Details of the transport route to be used for all development-related traffic
	• Details of the temporary onsite construction car park
	• Details of the measures that would be implemented to minimise traffic impacts during construction including:
	  ○ Temporary traffic controls, including detours, signage etc.
	  ○ Notifying the local community along Brays Lane about development-related traffic impacts
	  ○ Procedures for receiving and addressing complaints from the community about development-related traffic;
	  ○ Minimising potential for conflict with other road users as far as practicable, including preventing queuing on the public road network.
		Construction

T2	The TMP would include the following measures: • Vehicle access to and from the Site would be designed and managed to minimise safety risk to pedestrians, cyclists and motorists and to provide that construction vehicles can safely enter the Site. • All trucks would enter and exit the Site in a forward direction. Truck deliveries would be scheduled to arrive at Site outside of peak periods, where this is feasible, to minimise traffic impacts on the surrounding network during the peak periods • • Near the Site access, appropriate signage, line marking and/or traffic control measures would be used to direct and guide pedestrians, cyclists and motorists past the Site during high usage times. • Construction workers accessing the Site will be provided with information on driving conditions along Brays Lane. • No construction worker parking along Brays Lane would be allowed. • Where parking on the Site would be exceeded, additional measures to reduce parking demand (e.g. shuttle buses) would be implemented. Overflow parking for workers would be provided at a location that would be determined in consultation with Lithgow City Council. The selection of this site would seek to minimise local parking impacts to the community. • No temporary diversions are proposed to accommodate the construction of the Project. However, if required, the potential locations of temporary diversions would need to be identified in the TMP. Road Occupancy	Construction

Ref	Mitigation measures	Timing
	Licence (ROL) and Traffic Control Plans (TCP) would be prepared, as required. • Spotters would be used to guide oversized / over mass loads as required and vegetation trimming on Brays Lane would be carried out to allow for safe egress. • If the culverts on Brays Lane are determined to not be suitable for the weight of heavier loads, a temporary bridge would be installed. Any installation of a temporary bridge would be undertaken in consultation and with the approval with Lithgow City Council under the Roads Act 1993 and would be removed as soon as practical • Reference to or inclusion of the approach to consulting with the residents and business owners along Brays Lane prior to oversized vehicles movements occurring. This consultation would occur at least 14 days prior to these movements occurring.	

7.0 References

Austroads, 2020, *Guide to Traffic Management – Part 3: Traffic Studies and Analysis*

Austroads, 2020, *Guide to Traffic Management – Part 12: Integrated Transport Assessments for Developments*

Buslines Group, 2021, *Maps and Timetables*

Lithgow City Council, 2019, Draft Lithgow Active Transport Plan

NSW Environmental Protection Authority, 2020, Draft Construction Noise Guideline

Roads and Maritime Services (RMS), 2013, *RMS Austroads Guide Supplements*

Roads and Maritime Services (RMS), 2013*, Technical Direction TDT2013/4a – Guide to Traffic Generating Developments*

Roads and Traffic Authority, 2002, *Guide to Traffic Generating Developments Version 2.2*

Transport for NSW, 2021, *Wallerwang Coach Stop timetable*