EIS Volume 1 Chapter 16

Traffic and Transport

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16. Traffic and Transport

This chapter describes how the construction and operation of the Project will generate traffic and provides an assessment of the likely effect on residents and visitors within the existing transport network of the Riverland and Murraylands areas. It is based on the outcomes of the specialist Traffic and Transport Impact Assessment, attached in Appendix M.

16.1. Key Findings

- It is expected that the highest volume of traffic will be experienced during the construction phase, where tower components, construction materials and workers will need to be transported to the site.
- All planned construction and operational phase traffic impacts are comfortably within the capacity of the existing road network. There is ample spare capacity at all affected intersections during the construction of the Project.
- Delays induced from Project construction traffic will be negligible. Delays from oversize loads delivered to site will be small and infrequent.
- An additional access track / road will be required to access the Project corridor via the Goyder Highway near Overland Corner. This is to reduce the concentration of construction traffic utilising the access track along the corridor.
- Oversize deliveries will be scheduled where possible to arrive outside peak hours and avoid potential conflict times with harvest seasons.
- Project traffic will be restricted to specific routes minimising the extent of possible wear on local roads.
- A Traffic Management Plan will be implemented for the construction and operation phases to mitigate the impacts of increased traffic required for the Project.

16.2. Setting the Context

This section provides information needed to explain the context within which impact and risk assessment occurs. It describes:

- relevant EIS Guidelines
- relevant requirements in legislation and other standards
- views of stakeholders and the environmental and social outcomes they would like the project to meet
- the assessment methodology used to identify baseline environmental values and to undertake the impact and risk assessment.

16.2.1. EIS Guidelines

The EIS Guidelines require an assessment of the likely impact of traffic and transport during Project construction and maintenance and measures for controlling these impacts as set out in Table 16-1.

Table 16-1: EIS Guidelines addressed in the Traffic and Transport chapter

EIS Guidelines and Assessment Requirements	Assessment level
Land Use and Economic Effects	
Assessment Requirement 2: The proposal will have an impact on the State's economy during construction and operation and may result in immediate and long term effects on land owners and surrounding uses.	

EIS Guidelines and Assessment Requirements	Assessment level
• 2.6 Outline any mitigation measures to alleviate or avoid impacts on landowners and land uses and refer to any compensation programmes.	Critical
Traffic Effects *Assessment Requirement 14*: The proposal requires access for the transportation of infrastructure and construction material to site and ongoing access for maintenance purposes.	
• 14.1 Describe all components of transport and storage of infrastructure (including towers and substation kit) and construction materials to site. Include reference to anticipating timing, sources of materials, routes, number and methods of transport (e.g. by shipping, vehicle and / or helicopter).	Standard
• 14.2 Describe all traffic increases during construction and operational phases and traffic management measures.	Standard
• 14.3 Describe any construction, operational and maintenance traffic requirements that are outside of the current gazetted heavy vehicle movements.	Standard
• 14.4: Identify any potential effects of construction traffic on communities including noise and dust	Standard
• 14.5 Describe any requirements where traffic infrastructure requires temporary or permanent modifications and access requirements that may be required on arterial and /or local roads to enable / facilitate construction and ongoing associated traffic and vehicles.	Standard
Construction, Operation and Maintenance Effects *Assessment Requirement 15:* The construction and operation of the proposal would require a range of impacts to be minimised, mitigated and monitored through an environmental management plan framework	
• 15.3 Describe the likely impact and measures for the control of dust, vibration, noise, emissions, drag-out (i.e. onto the public roads) and litter during both construction and maintenance.	Standard
Specialist Reports and Details A **transport and access impact assessment** prepared by a suitably qualified traffic and access planner/engineer. The assessment should evaluate current and proposed access arrangements including the effect on the arterial road network and car parking, as well as vehicle interface with the local road network. Any assessment must include the traffic and access impact for the construction period as well as any ongoing operations and maintenance including details of the traffic/transport vehicle sizes/movements outside of normal gazetted heavy vehicles.	

Aspects of assessment requirements identified in Table 16-1 above which are not addressed in this chapter are listed in Table 16-2 together with the applicable chapter.

Table 16-2: Assessment requirements addressed in other chapters

Assessment Requirement	Chapter
2.6 Summary of mitigation measures	Chapter 9 Land Use and Tenure
2.6 Mitigation measures for air quality impacts to landowners	Chapter 14 Air Quality
2.6 Mitigation measures for noise impacts to landowners	Chapter 15 Noise and Vibration
14.4 Potential effects of dust from construction traffic	Chapter 14 Air Quality
14.4 Potential noise effects of construction traffic on communities	Chapter 15 Noise and Vibration
15.3 Dust and emissions impacts during construction and maintenance	Chapter 14 Air Quality
15.3 Noise and vibration impacts during construction	Chapter 15 Noise and Vibration
15.3 Control of litter	Chapter 19 Waste Management

16.2.2. Requirements in legislation and other standards

The key relevant legislation and standards as applicable to traffic and transport in the area of the Project includes the

- Murray and Mallee Region Plan (2011)
- Mid North Region Plan
- AUSTROADS Guide to Road Design
- AUSTROADS Guide to Traffic Management
- Highway Capacity Manual Volume 2 (HCM)

The Heavy Vehicle National Law (HVNL), which came into effect on 10 February 2014, applies to all heavy vehicles over 4.5 tonnes. This law and its associated regulations operate in Queensland, New South Wales, Victoria, Tasmania, South Australia and the Australian Capital Territory. The law covers vehicle standards, mass, dimensions and loadings, fatigue management, the Intelligent Access Program (a national program developed in partnership with all Australian road agencies), heavy vehicle accreditation and on-road enforcement.

The objectives of the HVNL are:

- to promote public safety
- manage the impact of heavy vehicles on the environment, road infrastructure and public amenity
- promote industry productivity and efficiency in the road transport of goods and passengers by heavy vehicles
- encourage and promote productive, efficient, innovative and safe business practices.

The national regulations prescribe mandatory standards for heavy vehicles using public roads.

16.2.3. Views of stakeholders

During stakeholder consultation, concerns were raised regarding potential for increased traffic movement from the Project, impacts on road quality and who would be responsible for the costs of upgrading / maintaining the roads during construction activities.

16.2.4. Assessment method

The Traffic and Transport Impact Assessment was undertaken using the risk-based assessment procedure set out in Chapter 8 Impact Assessment Methodology. The assessment considers the impacts that are expected to occur as part of the construction and operation of the transmission line (refer Appendix M).

The traffic study area (TSA) focussed on the alignment of the transmission line centred within the preferred corridor with a 500 m buffer zone and an overall buffer of 5 km as shown in Figure 16-1. The westernmost extent of the assessment area is Bright, 10 km north-east of Robertstown, and the easternmost extent was the border between SA and NSW. Access to the full extent of the transmission line corridor was assessed.

To compare construction and operation impacts to existing conditions, baseline traffic and transport conditions for the TSA were determined as follows:

- existing roadway level of service was calculated using the HCM, Chapter 15 Methods for Analysis of Two-Lane Highways (TRB 2010)

- existing road safety was assessed by calculation of crash rates from historical crash records and site inspection
- existing roadway asset road conditions and transport accessibility was assessed by site inspection and information available via Location SA.

Construction stage activities impacting the road network were quantified by calculating the number of material delivery loads based on the number of towers required along the alignment. Incidental material deliveries were estimated based on an assumed number of deliveries per day.

Operations stage activities impacting the road network are considered to be negligible based on the operations and maintenance requirements of the Project.

Having determined both the baseline and Project case conditions, the severity of impacts to the road network within the TSA due to the proposed development were assessed as follows:

- Level of service degradation due to Project traffic generation was calculated according to the US Highway Capacity Manual (HCM) methodology for two lane highways (as referenced in Austroads Guide to Traffic Management).
- Any potential road safety and accessibility concerns were identified by assessing likely traffic generation volumes of different vehicle types against the observed existing road geometry and condition data (sight distances, pavement condition and road widths).

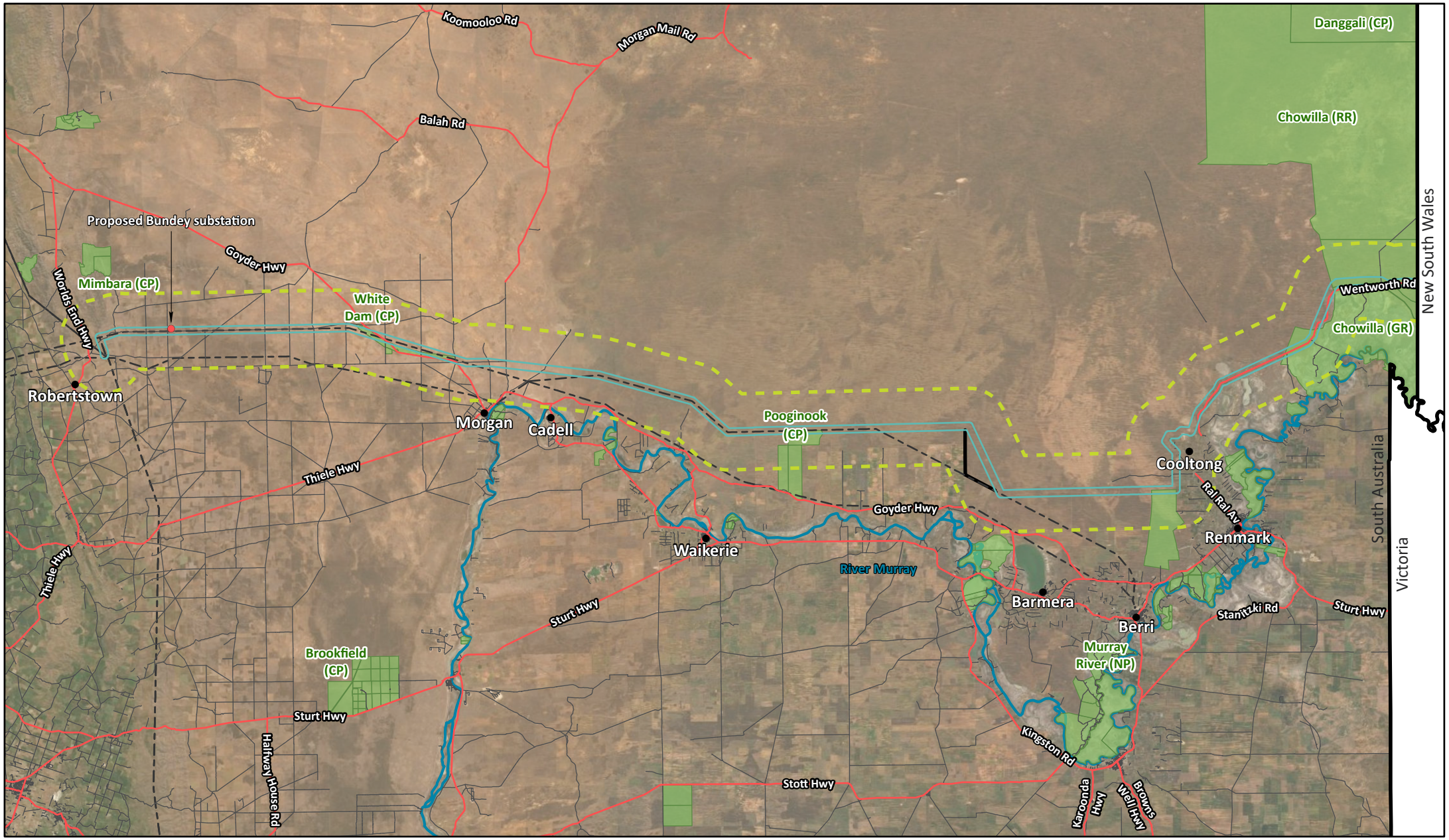


Figure 16-1
Traffic assessment study area

16.3. Description of Existing Environment

Transport within the TSA is generally limited to road or air. No passenger rail services operate in the TSA, however there are passenger bus services connecting from Adelaide to Renmark and from Loxton to Adelaide. The bulk of rural movements are for freight transport and commuter travel. The area has a low population density and as such traffic volumes, even on some rural highways in the TSA, are low and well below road capacity thresholds. The exception to this is the Sturt Highway, with some sections approaching 12,000 vehicles per day in Renmark. This is still below road capacity thresholds.

The detailed traffic assessment included the State road network, local road network and bus transport within the TSA.

16.3.1. State road network

There are seven State-maintained roads across the TSA that may be utilised by Project personnel commuting to and from work or for Project-related materials being delivered to site (Figure 7-20). Details of each of these roads are provided in Table 16-3.

16.3.2. Local road network

There are 17 locally maintained roads across the TSA that may be utilised by Project personnel commuting to and from work or Project-related materials being delivered to site. Details of each of these roads are provided in Table 16-4 and shown in Figure 7-20.

The proposed interconnector alignment will largely be accessed directly from the local roads as the final leg of the journey. Once the alignment is accessed, where required a track 5 – 6 m wide will be constructed along the alignment to facilitate access by construction vehicles.

Table 16-3: Overview of State-maintained roads within the traffic study area

Road Name	Class	Description	Typical Form	Photo
Goyder Highway	B64	• Provides east-west connectivity from Crystal Brook through the Mid North region, right through to the Riverland.	• Sealed single carriageway with one lane in each direction.	
Sturt Highway	A20	• Forms part of the Australian National Highway Network, linking Adelaide to Sydney. Nearest the Traffic Study Area, it provides connectivity between a number of towns, including Barmera, Waikerie and Renmark. • A number of overtaking lanes are provided at regular intervals.	• Sealed single carriageway with one lane in each direction	

Road Name	Class	Description	Typical Form	Photo
Renmark Avenue	-	• Provides a link between the Sturt Highway and Ral Ral Avenue in the town centre of Renmark. • Provides access to a number of commercial businesses fronting the road.	• Sealed, dual carriageway separated by a wide landscaped median with two lanes in each direction. • Angled parking is provided on both carriageways	
Ral Ral Avenue	-	• Provides a link between the town centre of Renmark and the north-eastern portion of the study area.	• Predominantly consists of a sealed single carriageway with one lane in each direction. • A short section within the town centre of Renmark consists of sealed, dual carriageway separated by a wide landscaped median with two lanes in each direction.	

Road Name	Class	Description	Typical Form	Photo
Wentworth-Renmark Road	-	• The State maintained section of the Wentworth-Renmark Road provides a link between the northern outskirts of Renmark and the SA / NSW border. • Runs along the centre of the alignment for the far eastern portion of the TSA. • Provides access to several pastoral stations and conservation / reserve areas.	• Unsealed formed and sheeted, two-way single carriageway, 10 m wide.	
World's End Highway	-	• Provides north-south connectivity between the town of Eudunda and the intersection of Goyder Highway.	• Sealed single carriageway with one lane in each direction.	

Road Name	Class	Description	Typical Form	Photo
Thiele Highway	B81	• Provides a link between the Horrocks Highway and a number of regional towns including Freeling, Kapunda, Eudunda, terminating at Morgan.	• Sealed single carriageway with one lane in each direction.	

Table 16-4: Proposed entry and exit points on local access roads

Road link to access	Location	Description	Typical Form and width	Photo
Powerline Road	Between Worlds End Highway and Goyder Highway	• Forms an east-west link between the Worlds End Highway and Goyder Highway. • Generally follows the alignment of the western portion of the TSA for approximately 35 km. • Western portion is maintained by Goyder Regional Council and the eastern portion by Mid Murray Council. • Provides direct access to approximately 42 km of the Project corridor and the proposed Bundey substation.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition, with some isolated sections of minor corrugations. • 6 – 8 m wide.	
Lower Bright Road	500 m from Worlds End Highway	• Local access road off Powerline Road providing access to the existing substation at the western most section of the TSA. • Maintained by Goyder Regional Council. • Will provide direct access to the start of the alignment at the western end and existing substation at Robertstown.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 6 – 8 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Schomburgk Road	Secondary access	• Local access road running perpendicular to Powerline Road. • Will primarily provide access from Powerline Road to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 5 – 6 m wide.	
Old Redcliffe Road	Secondary access	• Local access road off Goyder Highway. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 6 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Lindley Cemetery Road	Secondary access	• Local access road off Goyder Highway. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 6 m wide.	
Samsons Well Road	Secondary access	• Local access road off Goyder Highway. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 8 – 10 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Controversial Road	Secondary access	• Local access road off Goyder Highway linking Goyder Highway to Bungunnia Road. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 6 – 8 m wide.	
Go-Kart Road	Secondary access	• Local access road off Controversial Road. • Will primarily provide access from Controversial Road to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, unformed two–way single carriageway. • Generally in okay condition. • 6 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Bungunnia Road	Secondary access	• Provides a north-south link from the Goyder Highway to several pastoral stations in the north. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA. • Maintained by the Mid Murray Council.	• Unsealed, formed and sheeted, two-way single carriageway. • Generally in good condition. • 10 m wide.	
Woods and Forest Road	Approximately 4 km from Morgan	• Provides a link from Goyder Highway to an existing sub-station and pastoral properties to the north. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA. • Maintained by the Mid Murray Council. • Provides access to the existing substation off Goyder Highway.	• Unsealed, formed and sheeted single carriageway. • Generally in good condition with some minor corrugations. • 10 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Lunn Road	Approximately 30 km from Morgan, 60 km from Sturt Highway / Goyder Highway intersection.	• Local access road from Goyder Highway which provides access to a number of adjoining properties. • Will primarily provide access from Goyder Highway to part of the alignment within the TSA where it intersects the alignment. • Maintained by the District Council of Loxton Waikerie.	• Unsealed, formed and sheeted single carriageway. • Portion is unformed and unsheeted. • Condition varies from good to poor. • 6 – 8 m wide formed and sheetd road. Narrows to 3 – 4 m track on private property.	
Loffler Road	Secondary access	• Local access road from Goyder Highway. • Primarily provides access to several adjoining properties. It potentially could provide access from Goyder Highway to part of the alignment within the TSA; however, it does not quite intersect it. • Maintained by the District Council of Loxton Waikerie.	• Unsealed, formed and sheeted two-way single carriageway. • Portion is unformed and unsheeted. • Condition varies from good to poor. • 4 – 6 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Cooltong Avenue	Secondary access	• Local road providing access to several irrigated properties. • Can be accessed via Ral Ral Avenue to the northwest. • Potentially could provide access from Ral Ral Avenue to part of the alignment within the TSA. • Maintained by the Renmark Paringa Council.	• Sealed, single carriageway with one lane in each direction. • Considered to be in good condition. • 6.2 m wide.	
Old Cooltong Road	Secondary access	• Local road providing access to several irrigated properties. • Can be accessed via Ral Ral Avenue to the north and Government Road to the south. It may be used to access part of the alignment within the TSA. • Maintained by Renmark Paringa Council.	• Sealed, single carriageway which is currently not line marked.	

Road link to access	Location	Description	Typical Form and width	Photo
Cooltong Boundary Track	Secondary access	• Aaccess and fire track for the Cooltong Conservation Park. • Can be accessed via a number of different locations in the Renmark area.	• Unsealed track which is unlikely to be all weather access. • ~3 – 4 m wide.	
Stoney Pinch Road	Secondary access	• Local road providing access to several irrigated properties. • Can be only be accessed via Old Cooltong Road.	• Unsealed, single carriageway • 4 – 5 m wide.	

Road link to access	Location	Description	Typical Form and width	Photo
Ral Ral Avenue	Secondary access	• Local road providing access to several irrigated properties. • This section of Ral Ral Avenue is the continuation of the State Maintained section of Ral Ral Avenue.	• A small section of Ral Ral Avenue consists of a sealed, single carriageway with one lane in each direction. The remaining section is narrow and unsealed. • 4 – 7 m wide.	
Wentworth-Renmark Road	Starts at Ral Ral Avenue in Renmark. Furthest point (SA-NSW border) approx. 45 km from Ral Ral Avenue.	• Provides a link between Ral Ral Avenue and the State-maintained section of Wentworth-Renmark Road. • Will primarily provide access to the northeastern part of the alignment. • Maintained by the Renmark Paringa Council.	• Sealed, single carriageway with one lane in each direction. • Sealed section of Wentworth-Renmark Road considered to be in good condition. • 6.5 – 7.2 m wide.	

16.3.3. Road traffic volumes

Traffic volumes are estimated from Annual Average Daily Traffic Estimates (AADT) 24-hour, two-way flows (Location SA 2019). The AADT of each of the highways within the TSA varies over segments between towns and intersections. Existing AADT varies between approximately 60 along the Story Avenue to SA-NSW border segment (on Wentworth-Renmark Road) to 12,200 at the Nineteenth Street to Eighteenth Street (on Sturt Highway) segment.

Heavy vehicle data indicates that heavy vehicles generally account for approximately 2.5 % – 32.5% of all vehicle traffic (Location SA 2019).

Traffic volumes of local roads expected to be used as part of the haulage routes are not readily available due to the fact they are owned and maintained by the local Councils. However, as they only provide access to a finite number of properties, volumes are expected to be between 100 to 300 vehicles per day or less. The gazetted vehicles for each of the highways in the TSA are detailed in Appendix M.

16.3.4. Road conditions

Assessment of the existing road asset conditions for the State-maintained roads indicates that the roads are in reasonable condition relative to traffic volumes (Table 16-3). The exception to this is the Wentworth-Renmark Road (currently unsealed) which has large areas of failed pavement contributing to a high roughness.

Local road asset conditions vary significantly. All sealed local roads are in reasonable condition. Most unsealed roads have variable conditions due to their nature, with some isolated areas of roughness (e.g. corrugations).

16.3.5. Road users

Apart from general road users, the major users of roads within the TSA include:

- Farm and rural residences: In many locations, access to farms and rural residences to roads within the Project Area is via private driveways. In some cases, sight distances at these junctions do not comply with road standards.
- School bus routes: School buses are operated by various schools within the Traffic Study Area, including several schools in Renmark, Barmera, Waikerie, Morgan and other surrounding areas. School bus routes are generally revised annually depending on the requirements of the school population.
- Public Transport: Public transport within the Traffic Study Area is limited. Stateliner operates regular bus services between Adelaide and regional centres including:
    - a service between Adelaide and Loxton with six buses each way per week. Buses leave Adelaide and Loxton Sunday to Friday
    - a service between Adelaide and Renmark with 13 buses each way per week. Buses leave Adelaide and Renmark seven days a week with two services a day (each way) Sunday to Friday, and one service a day (each way) on Saturdays.
- Local industry: As most of these roads exist within primary production areas (e.g. agriculture, horticulture and livestock areas), there is likely to be some seasonal variation in traffic volumes along the local road networks. There is likely to be higher volumes of heavy vehicles associated with vintage during late summer / early autumn and increased heavy vehicle activity associated with harvest associated with agriculture land use. This is heavier within some areas of the Riverland and nearest the western portion of the Traffic Study Area.

- Vulnerable road users: Proposed routes will have to negotiate town centres. Some of these roads exist where there is higher pedestrian activity. This occurs when the route forms part of the main street though the town. Travel through these town centres is often unavoidable, as the route forms part of approved and gazetted roads for heavy vehicle movements. Within the Traffic Study Area, town centres where this will apply include Renmark (on Sturt Highway / Renmark Avenue and Ral Ral Avenue) and, to a lesser extent, Morgan, Eudunda and Robertstown.

16.3.6. Road safety

Crash data obtained from DataSA (2019) was mapped and compared with traffic volumes to determine the number of crashes per vehicle kilometre travelled.

Roads with a crash rate under 50 crashes per 100 million vehicle kilometres travelled are considered to have an average or better crash history. The roads with the highest crash rates per 100 million vehicle kilometres travelled are:

- Goyder Highway – Morgan to Taylorville Road
- Wentworth-Renmark Road - End of seal to SA-NSW border.

The higher crash rates per vehicle kilometre on the above sections of road can be attributed to the low background traffic volumes. The Wentworth-Renmark Road is currently unsealed from the Renmark Paringa Council boundary all the way to the SA-NSW boundary with traffic volumes in the order of 60 vehicles per day.

These roads will provide the main access to the eastern portion of the proposed transmission line and therefore their use by construction traffic is unavoidable.

Crash types were also assessed for the various roads within the Traffic Study Area. The most commonly reported types of crashes that occur are ‘hit fixed object’, ‘right angle’, ‘roll over’ and ‘hit animal’.

Given that the Traffic Study Area is located within a regional area with predominately high-speed rural roads, this is considered consistent with the type of crashes expected. A high proportion of the ‘right-angle’ crashes occurred within the built-up areas of the Sturt Highway near Barmera and Renmark. A high proportion of the ‘hit animal’ crashes occurred at night.

16.4. Impact Assessment

The following aspects of the Project have been identified as sources of traffic and transport impacts on the local traffic and road infrastructure:

- movements and volume of construction traffic
- heavy vehicle movements during construction.

The potential impact events resulting from these aspects of the Project are discussed below. Predicted impact categories and an evaluation of uncertainty are also discussed for each impact event.

16.4.1. Impacts on existing transport network

Traffic movements and volume during construction and operation

Traffic movement and increased volumes is not expected to affect the existing transport network.

The expected increase in traffic movements on local roads during the construction phase has the potential to disrupt local traffic networks and normal community activities.

Construction of the substation, towers and transmission lines is expected to occur within an 18 – 24 month timeframe. As a worst-case scenario, it has been assumed that construction will occur over an

18-month timeframe, this representing the greatest concentration of traffic on the road network. Construction is expected to occur in a linear fashion along the length of the alignment, with work occurring concurrently on several fronts.

Construction traffic volumes of heavy vehicles (HV) will increase during peak construction with between 13% – 53% of HVs travelling on the Wentworth-Renmark Road and sections of the World's End Highway (see Table 5-6 in Appendix M). This can be attributed to the already low traffic volumes of these roads. There is also expected to be construction traffic added to the various local roads identified in the study area. The Sturt Highway, from Truro to Eighteenth Street Renmark, will experience the most increase in HV movements within the area of the Project.

During the construction period, the highest number of HV movements per hour is estimated to be 157 along the Old Sturt Highway (Renmark Avenue) to Twenty Third Street, which includes both Project and existing traffic. This equates to a minor increase from current average of 151 HV movements per hour. The greatest difference from current HV numbers is expected along Story Avenue to the SA-NSW border (Wentworth-Renmark Road) where the estimate is for an increase to 6 HVs per hour during construction from the current base of 1 HV per hour. The road sections with the highest potential HV movement increases described are shown in Figure 16-2.

Load deliveries to the site for large volumes are assumed to occur in the most economic vehicle type legally permitted to undertake the journey on the relevant road. For most deliveries this will be on 19 m semi-trailers. Where the quantity to be transported is much smaller than the load capacity of a semi-trailer, smaller rigid trucks or light commercial vehicles (LCV) will be used. It is also expected there will be oversize loads required for the delivery of materials for the substation primary plant and control buildings at Bundey, near Robertstown.

Over-dimensional loads may impact on road capacity during construction. These loads however are expected to be minimal and will be managed via permit.

The following construction vehicles are expected to generate traffic movements as detailed in Table 16-5.

Table 16-5: Estimated traffic to be generated during construction

Vehicle type	Total number of loads during construction phase (18-month duration)	Expected number of movements per day on the road network
Semi-trailer	990	Up to 20 (i.e. 10 trips / day)
Crane	-	Minimal – cranes will largely move about within the construction areas and along the access track between tower sites
Concrete truck	2780 (based on a total of 450 towers, 6 trucks per tower and 80 trucks for the sub-station)	16
General rigid trucks	Approximately 10 vehicles per day	20
Dozers, graders, excavators	Movements occur within the site only; these vehicles to be transferred to and from site via semi-trailer	Nil
Light vehicles	20 – 40 per day	40 – 60

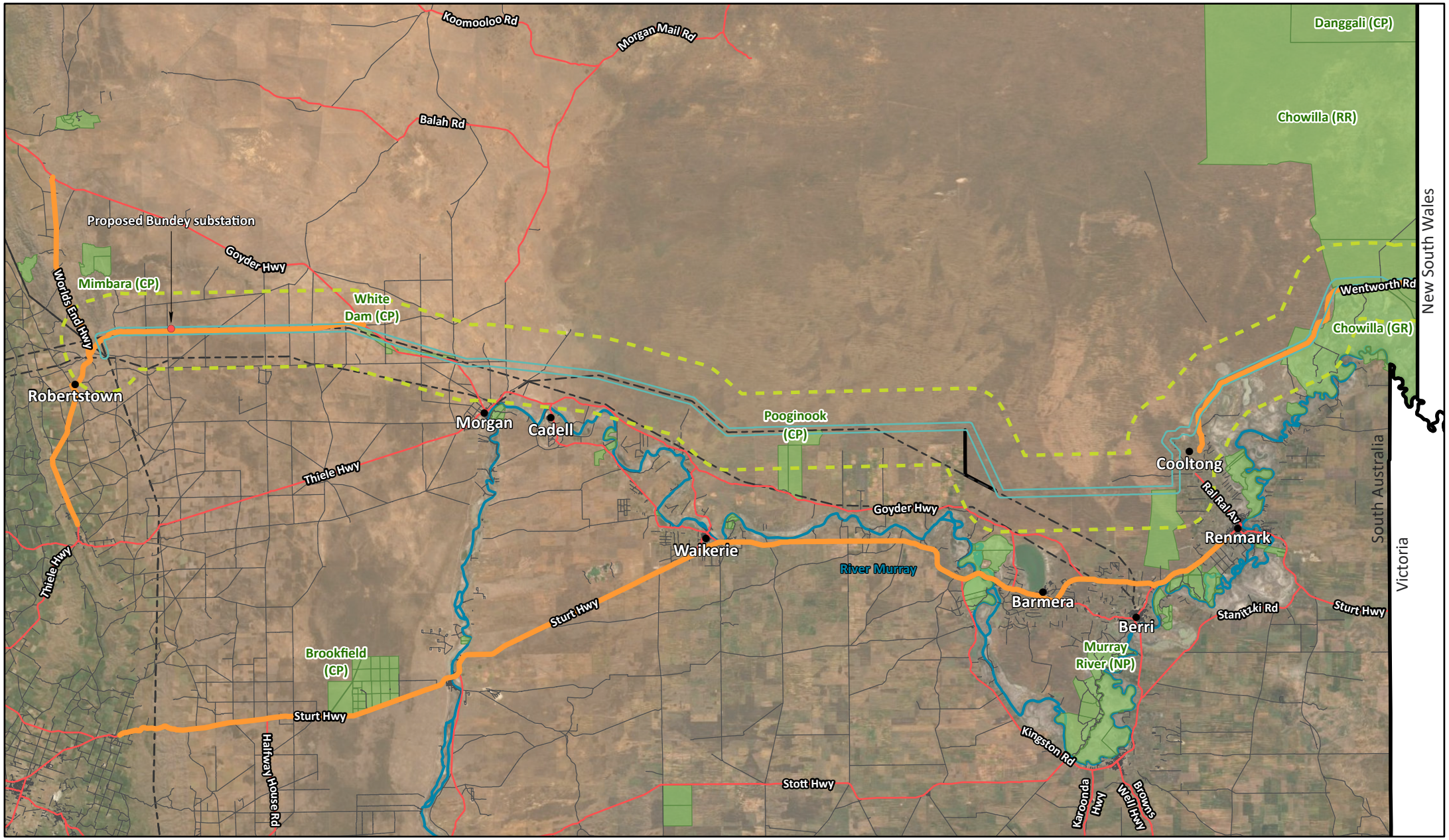
The use of a large twin-engine helicopter or sky crane for the transportation of preassembled towers will be investigated during detailed design as an alternative for tower assembly and erection. Should a helicopter be utilised, it is anticipated that it will transport small sections of towers to tower locations on Taylorville Station, Hawks Nest Station and Calperum Station. Other sections of the alignment may also be considered for helicopter use during detailed design. Preassembly and helicopter transport of

towers, rather than constructing towers at each tower location will significantly reduce traffic volumes at each tower pad out along the proposed alignment.

Delays induced from Project construction traffic including oversize loads will be negligible and infrequent. The implementation of controls will further minimise the impact of increased traffic on the existing road network. Management measures may include:

- scheduling of oversize deliveries to arrive outside peak hours and potential conflict times with harvest seasons
- avoiding peak traffic periods to minimise traffic delay to the public if required
- liaising with local schools to discuss any impacts to bus routes due to traffic movements. Where possible, construction traffic to be timed to avoid school bus services.

The predicted impacts are in the **Minor** category. Uncertainty in the predicted impact (due to uncertainty in the effectiveness of control measures) has been evaluated in Appendix O and the level of risk is **Low**.



Transmission line corridor
Traffic assessment study area (10 km)
Parks and reserves
Cultural heritage avoidance alignment
Increased proportion of heavy vehicles
State maintained road
Local road
Existing ElectraNet transmission line
River Murray
Proposed Bundey substation

Figure 16-2
Increased proportion of heavy vehicles during peak construction on State roads

0 20
Kilometres
N

ElectraNet
energy connect
JBS&G

Condition of the existing transport network

Construction traffic may result in some damage to road pavement and road furniture, however, damage will be remediated to pre-construction condition where required.

The increase in traffic and in particular heavy vehicle movements has the potential to damage road pavements, and require road upgrades and / or repairs.

Estimated Project traffic will be forecast for construction, operations, decommissioning and rehabilitation. ElectraNet will develop and implement a Traffic Management Plan (TMP). This will include:

- the expected traffic outcomes for each phase of the Project and potential management measures
- forecasting road traffic volumes to ensure that the potential impact of road traffic on the Level of Service (LoS), capacity, road safety and road condition can be assessed prior to each project phase.

Impact of heavy vehicles on local roads

The heavy vehicles proposed for use during the construction phase may result in incidental damage to the road pavement and / or road furniture, in particular on unsealed roads. The Project will develop a construction phase pavement management plan to manage these impacts. This will involve undertaking a condition survey (also known as a dilapidation survey) of the local roads intended to be used by construction traffic prior to construction. The survey would document and identify the different types of road and pavement damage and a strategy for inspection frequencies, intervention levels and required treatments will also be developed. At completion of the Project, a post construction condition survey will be undertaken to determine the level of impact to existing local road pavements has occurred and any required remediation to restore to pre-construction condition where required.

The extent by which the Project will increase average daily traffic during the construction period varies however most increases are from a very small base traffic volume and the quantum of daily traffic increase would not be more than 126 vehicles per day. The estimated increase in daily axle loadings from heavy commercial vehicles on the haul route pavements also varies from a very small base over the same period. The impact of this additional loading on pavement condition is unknown and will depend on the existing condition and remaining life of the pavement.

Project traffic will be restricted to specific routes minimising the extent of possible wear on local roads. Restricting construction traffic to specified routes will allow consideration for aspects such as, but not limited to sensitive ecological areas, areas of higher resident density, upgrade requirements, and journey time.

ElectraNet have standard environmental operating requirements for all its operations, including the environmental aspects of moving vehicles. Project traffic will control drag out onto public roads by ensuring all vehicles, plant and earthmoving equipment are inspected and clear of significant soil / vegetative matter etc. prior to site mobilisation and moving between properties.

Road restrictions are currently in place on roads in the Murraylands and Riverland for certain vehicles, restricting total length of vehicle and width of vehicles on certain routes, however this is not expected to be an issue for delivery of Project materials.

Road Upgrades

Upgrades may be required to the recommended route to suit restricted access vehicles, and intersections may also need to be upgraded to meet the requirements of the design vehicle. Road and intersection upgrades for safe access will be undertaken in consultation with DIT and in accordance with DIT standards.

Construction of an additional access track / road to access the Project corridor via the Goyder Highway near Overland Corner is proposed. This will reduce the concentration of construction traffic utilising the access track along the corridor and provide additional emergency access/egress. The Traffic Management Plan will address vehicle movements and any road treatments in this location following further consultation with DIT.

Operation traffic will be minimal. During the operational phase passenger and truck movements to the site will be negligible therefore no additional traffic or pavement management measures are expected to be required. Due to the very low traffic volumes likely to be generated during the operations phase of the Project, the traffic impact on the existing road network is considered to be negligible.

Monitoring and remediation measures will be implemented to reduce the risk of deterioration of the existing transport network. Modelling has shown that construction traffic is within the capacity of the existing road network. Consequently, the risk of deterioration of the existing transport network during construction or operation of the Project is considered **Low**.

The predicted impacts are in the **Minor** category. Uncertainty in the predicted impact (due to uncertainty in the effectiveness of control measures) has been evaluated in Appendix O and the level of risk is **Low**.

Road network safety and efficiency

The increase in construction traffic is expected to have a minimal impact on the safety and efficiency of the local road network.

The increase in both traffic volume and the nature of the heavy vehicles which will be utilised has the potential for negative impacts to the safety of both community and Project road users.

Traffic impact assessment concludes expected traffic volumes will not affect level of service or safety for any roads used by the Project. Additional traffic generated during the construction period would include a core range of vehicle types, dependent on the type of load being carried. This includes delivery of construction materials, workers transportation and, heavy machinery transport to the site. An assessment of traffic capacity was measured using level of service (LoS). The analysis demonstrated that with the Project construction traffic added, most roads in the study area remain operating at LOS for single lane roads.

The exception is some sections of the Sturt Highway which already have high volumes of traffic (e.g. up to 9,000 vehicles a day on two lane sections and up to 12,200 vehicles a day on the four lane sections). The increase in daily traffic on these sections represents an increase of only 1 – 2% of existing traffic volumes and is unlikely to change the existing LoS.

Over-dimensional loads

Over-dimensional loads may impact on road capacity during construction. Locations being considered include Port Adelaide and Port Melbourne. These loads however are expected to be minimal and will be managed via permit. Management of the movement of these loads will ensure opportunity is provided for traffic to pass at suitable intervals and locations along the haul route.

Traffic management measures including improved delineation and lowering speed limits may be considered to improve safety and awareness of changes in traffic during the construction period.

Oversize deliveries will be scheduled where possible to arrive outside peak hours and avoid potential conflict times with harvest seasons. There will be instances where oversized deliveries will be necessary, especially in and around the township of Robertstown. It has been estimated that the percentage of heavy vehicles during peak construction travelling on the Wentworth-Renmark Road and section of the World's End Highway will vary between 13% – 53% (equates to 6 – 17 heavy vehicles per hour).

As oversized movements can cause disruptions to the existing traffic, it will be necessary for these movements to occur during the off-peak hours where traffic volumes are typically at their minimum. In addition, notification would be given to the road authority and local community prior to oversize vehicle movements occurring. The required permits will be sought on rotes which are currently not designated as oversize approved routes in addition to piloting requirements and discussions with DIT and relevant councils.

Peak traffic periods will be avoided, as far as practicable, to minimise traffic delay to the public if required. Delivery of materials during peak hours may cause slight delay to existing traffic travelling on roads (although level of service expected to remain the same). Modelling indicates that peak traffic generation for the Project will occur within the 3 to 12-month stage of the construction phase.

To minimise the potential effects of any major sources of delay, any works which would significantly reduce the performance of the road network in the project area would be scheduled for periods of typically lower traffic volumes where possible. The TMP will include guidelines, general requirements and procedures to be used when construction activities would have a potential impact on existing traffic arrangements.

Driver safety

Driver fatigue will be managed and incorporated into the Safety and Health Management System. ElectraNet will develop and implement the TMP. This will include:

- driver fatigue management plan and policies
- objectives to increase work, health and safety understanding in relation to fatigue, vehicle operation in public areas and obligation to the general public
- operating standards for work and rest.

Safety measures will be in place within the Project traffic network so that vehicle movements are conducted in a safe manner, minimising risk to workers and the community.

Consequently, the risk of reduced road network safety and efficiency is considered **Medium.**

The predicted impacts are in the **Minor** category. Uncertainty in the predicted impact (due to uncertainty in the effectiveness of control measures) has been evaluated in Appendix O and the level of risk is **Low**.

16.4.2. Summary of key mitigation measures

Table 16-6: Key mitigation measures – traffic and transport

Mitigation measure	Construction	Operation
Design and construction of transmission line at crossings of DIT roads in accordance with DIT requirements	✓	
Intersections with the Goyder Highway constructed to appropriate standards established in consultation with DIT	✓	
BAR and BAL treatments (if required) will be designed as per *The Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings*	✓	
Development of a Traffic Management Plan prior to construction. including designated speed limits and routes, appropriate constraints on travel at dawn and dusk, vehicles restricted to tracks, and effective signage where potential ecological constraints exist to raise awareness and further control speeds in these areas	✓	
Upgrade required routes to suit restricted access vehicles, and intersections to meet the requirements of the design vehicle.	✓	
Implement area-specific and site inductions and training	✓	
Consult prior to construction with the appropriate roads authority regarding works which may affect roads or traffic	✓	

Mitigation measure	Construction	Operation
Consult with ElectraNet and relevant Council during development of the Traffic Management Plan	✓	
Undertake road pre-condition surveys on construction haulage routes prior to the commencement of construction in consultation with relevant councils and road owners. This will include identification of existing conditions and mechanisms to repair damage to the road network caused by construction vehicles associated with the proposal.	✓	
Implement procedures for oversize loads including: • scheduling of oversize deliveries to arrive outside peak hours and potential conflict times with harvest seasons • avoiding peak traffic periods to minimise traffic delay to the public if required • liaising with local schools to discuss any impacts to bus routes due to traffic movements. Where possible, construction traffic to be timed to avoid school bus services.	✓	
Obtain permits from the National Heavy Vehicle Regulator (NHVR) where required to provide oversized and overmass vehicles access during construction.	✓	
Ensure all vehicles, plant and earthmoving equipment are inspected and clear of significant soil / vegetative matter etc. prior to site mobilisation and moving between properties	✓	
Provide access to properties for emergency vehicles at all times.	✓	✓
Maintain access to properties or consult alternative arrangements with landholders.	✓	✓
Following completion of construction, undertake condition surveys. Any damage as a result of Project construction vehicles would be repaired following the completion of construction (and as needed through the construction period to maintain safe road conditions).		✓

16.5. Conclusion

ElectraNet's key finding is that Project construction or operational activities will not lead to significant traffic impacts. Most of the proposed alignment is adequately distant from sensitive receivers that no adverse impacts are anticipated during construction or operation of the Project. Where the few receivers are in proximity to the alignment, the impacts will be negligible to minor predominantly due to the transient nature of construction activities. Relevant landholders will be consulted, and impacts mitigated where practicable. Traffic and transport measures will be implemented in accordance with the CEMP.