

**APPENDIX 11**

**Amended Traffic Impact Assessment**



## **Tallawang Solar Farm Amended Project**

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**Amended Transport Impact Assessment**

May 2024

**SAMSA CONSULTING**

TRANSPORT PLANNING & TRAFFIC ENGINEERING

**Samsa Consulting Pty Ltd**  
**Transport Planning & Traffic Engineering**

ABN: 50 097 299 717

46 Riverside Drive, Sandringham, NSW 2219, AUSTRALIA

Phone: (+61) 414 971 956

E-mail: [alansamsa@gmail.com](mailto:alansamsa@gmail.com)

Skype: alan\_samsa

Web: [www.samsaconsulting.com](http://www.samsaconsulting.com)

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## Appendices

- A Transport for NSW Submission Issues**
- B Castlereagh Highway: Proposed Intersection Upgrade Strategic Design**

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# 1. Introduction

## 1.1 Project Background

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*RES Australia Pty Ltd* (RES) is seeking to develop the proposed Tallawang Solar Farm ('the Project') in the Central West region of New South Wales (NSW), approximately 8 km north-west of Gulgong, within the Mid-Western Local Government Area (LGA) and the Central West Orana Renewable Energy Zone (CWO-REZ) – refer to *Figure 1.1* following.

The Tallawang Solar Farm Project will involve the construction, operation and decommissioning of a 500-megawatt (MW) solar farm with a Battery Energy Storage System (BESS) and associated infrastructure.

A Traffic Impact Assessment (TIA) was prepared in support of the Environmental Impact Statement (EIS) for the Tallawang Solar Farm (Umwelt, 2022) and was placed on public exhibition in late 2022.

To address community and agency submissions RES is proposing to make amendments to the project as presented in the EIS (hereafter referred to as the Amended Project).

Amendments to the Project include the following:

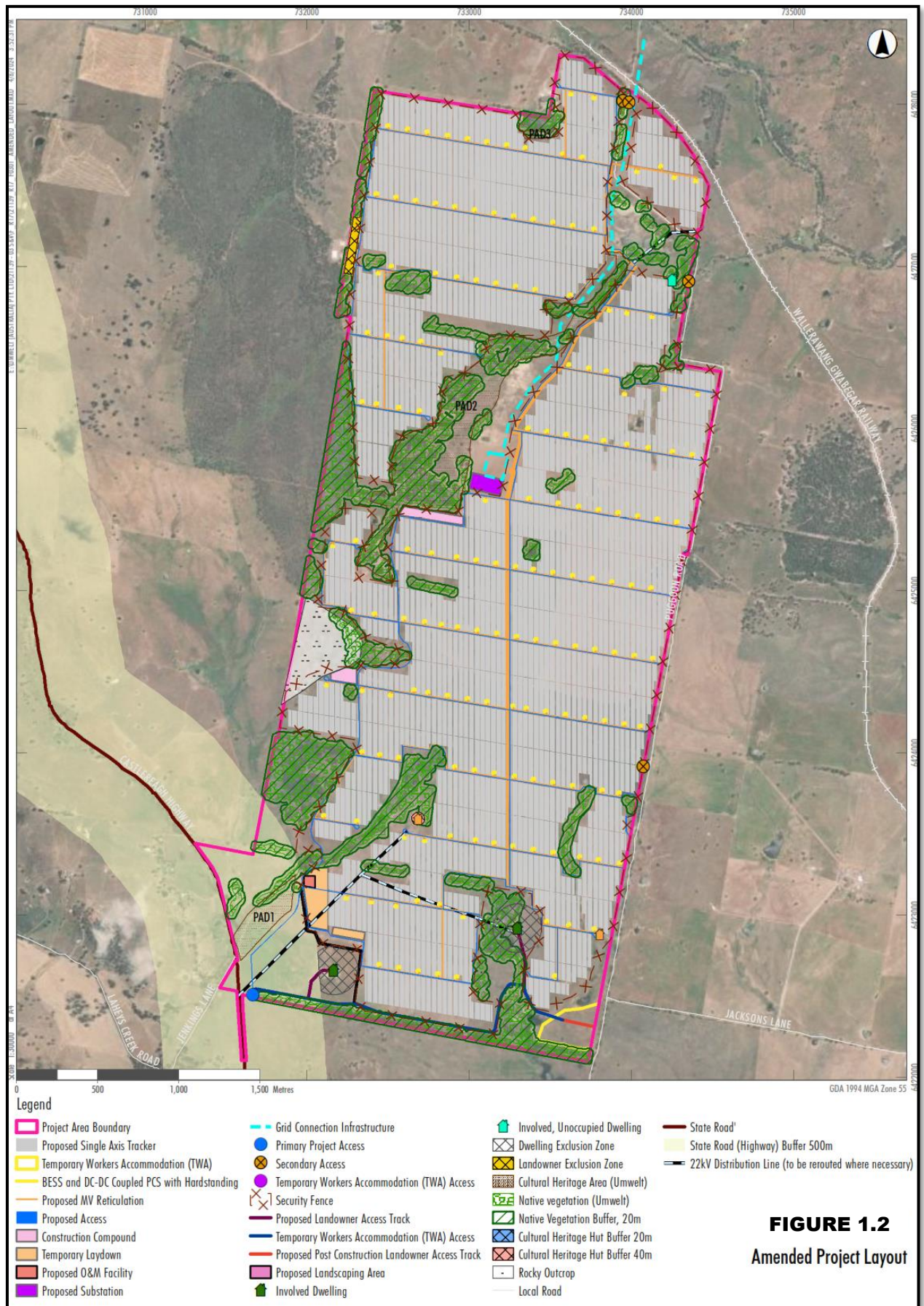
- Provision of a 400-person Temporary Workers Accommodation (TWA) facility, with internal access track to the TWA facility through the solar farm site.
- Updated design for the proposed intersection upgrade on the Castlereagh Highway, in direct response to Transport for NSW's submission.
- Removal of proposed 13 km overhead ETL traversing through Barneys Reef Wind Farm as it is now part of the proposed CWO Transmission project being planned by EnergyCo.
- Increased BESS capacity from 200 MW / 400 MW-h to 500 MW / 1,000 MW-h.
- Minor layout refinements to optimise the solar array layout within already disturbed areas.
- Minor project area boundary adjustments due to some of the above amendments.

The Project's amended layout is shown in *Figure 1.2* following.

Consistent with the Project as presented in the EIS, the Amended Project will have one primary access from the Castlereagh Highway at a newly proposed access location via a local, un-named gravel road – refer to *Figure 1.2* following.

This Amended TIA has been prepared to assess the traffic and transport impacts associated with the Amended Project.





**FIGURE 1.2**  
Amended Project Layout

## **1.2 Transport Assessment**

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This Amended Transport Impact Assessment (TIA) report has been prepared by *Samsa Consulting Pty Ltd*, Transport Planning & Traffic Engineering Consultants, to assess the traffic and transport impacts associated with the Amended Project in a manner consistent with the Secretary's Environmental Assessment Requirements (SEARs) issued by the former Department of Planning and Environment (DPE) – now Dept of Planning, Housing and Infrastructure (DPHI) and with consideration of the submissions relating to the public exhibition of the EIS (addressed in *Appendix A* of this Amended TIA and in Umwelt's Submissions Report (Umwelt, 2024)).

This assessment provides an updated investigation of transportation impacts associated with the construction, operation and decommissioning of the Amended Project, and in particular component and equipment haulage as well as other construction transport considerations including staff transport. The report assesses preferred transportation routes to the proposed site access point. Prevailing transport constraints and impacts are identified and assessed. Appropriate site access locations from the public road network are also identified. The report will serve as a supporting background paper to the Amendment Report (Umwelt, 2024).

## **1.3 Assessment Scope & Methodology**

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The scope of the amended assessment included the following tasks:

- Review of project background information.
- Traffic generation during construction, operation and decommissioning phases of the Project.
- Traffic distribution onto the surrounding local and regional road network.
- Assessment of transport impacts on the surrounding road network including site access, road safety, road capacity and road conditions.
- Discussion of mitigation measures to address potential transport impacts identified.
- Preparation of this TIA report to be used to support the Amendment Report.

## **1.4 Environmental Assessment Requirements**

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NSW DPE issued Secretary's Environmental Assessment Requirements (SEARs), which require the original TIA to assess the construction and operational traffic impacts of the Project. This Amended TIA has addressed the SEARs in a consistent matter in assessing the construction and operational impacts of the Amended Project.

## **1.5 Submissions on the EIS**

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Following exhibition of the EIS, a submission was received from Transport for NSW (TfNSW). A separate Submissions Report has been prepared by Umwelt to provide a response to the TfNSW submission. Where required, the TfNSW submission has been addressed within this Amended TIA. A summary of the issues from the TfNSW submission and how they have been addressed is presented in *Appendix A*.

## **1.6 Consultation With Road Infrastructure / Transport Authorities**

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Further consultation has been undertaken with the Mid Western Regional Council, Warrumbungle Shire Council and Transport for NSW. This is detailed in the Amendment Report prepared by Umwelt (Umwelt, 2024).

## **1.7 Report Structure**

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The remainder of this assessment report is presented as follows:

**Chapter 2** provides a project description including general details of the solar farm equipment and components.

**Chapter 3** describes the existing transport conditions including proposed transport routes and traffic conditions.

**Chapter 4** assesses the transportation impacts during the construction and operation phases of the Project.

**Chapter 5** discusses mitigation measures to address potential transport impacts identified.

**Chapter 6** provides a summary and conclusions to the assessment.

## 2. Project Description

The amended Project has been developed in response to submissions received during the EIS exhibition and through further consultation with key stakeholders and government agencies.

### 2.1 Description of Amended Project

The Tallawang Solar Farm project remains generally as described in the EIS. However, some key design amendments have been made to the Project in response to public and agency submissions received during the exhibition period and based on further consultation with agencies, affected landholders and stakeholders more broadly. These include the following:

- Introduction of a 400-person temporary workers accommodation (TWA) facility.
- Updated treatment for the proposed intersection upgrade on the Castlereagh Highway.
- Removal of proposed 13 km overhead ETL traversing through Barneys Reef Wind Farm.
- Increased BESS capacity.
- Minor layout refinements within already disturbed areas.
- Minor Project Area boundary adjustment.

A comparison between the Project as presented in the EIS and the amended Project is provided in *Table 2.1* following.

**Table 2.1: Comparison Between Original EIS Project and Amended Project**

Project Element	EIS Project	Amended Project
<b>Project access</b>	Project access will be via the Castlereagh Highway at a newly proposed access point from a local un-serviced road directly south of the Project Area.	No change.
<b>Intersection upgrade</b>	A short channelised right turn (CHR) and an auxiliary left turn (AUL) treatment on the Castlereagh Highway.	Standard (full sized) CHR & AUL treatments on the Castlereagh Highway.
<b>Targeted capacity (solar)</b>	500 MW (AC)	No change.
<b>Targeted capacity (BESS)</b>	200 MW / 400 MW-h (DC)	500 MW / 1000 MW-h
<b>Grid connection</b>	A new 330 kV ETL is proposed to connect the Project to the proposed CWO-REZ Transmission Line via the NSW Government's proposed switching station to be located on the adjacent Barneys Reef Wind Farm project.	The Project's grid connection will be via the proposed CWO Transmission Project being developed by the Energy Corporation of NSW (EnergyCo) and the new 330 kV ETL is no longer proposed.

Project Element	EIS Project	Amended Project
<b>Temporary ancillary infrastructure</b>	<p>Temporary ancillary facilities required during construction would typically include the following:</p> <ul style="list-style-type: none"> <li>• Site compound including storage area, offices and meeting room, ablution facilities, canteen and car parking.</li> <li>• Laydown areas involving areas suitable for storing plant and equipment, and deliveries including solar panels and cable drums, and areas to support waste management activities, eg. cardboard and timber.</li> </ul>	No change.
<b>Transport route</b>	Project transport will be via road from the Port of Newcastle, via the Golden Highway and then the Castlereagh Highway to the Project Area.	No change.
<b>Traffic numbers</b>	<p><u>Construction</u></p> <ul style="list-style-type: none"> <li>• Up to 85 heavy vehicles per day (170 heavy vehicle trips per day) with a maximum of 135 heavy vehicles per day (270 heavy vehicle trips) during peak construction (four months) (including all heavy vehicle movements relative to the Project, ie. delivery of equipment, infrastructure and materials such as gravel, sand, concrete, water trucks, etc.). Predominately truck and dog vehicles, including some concrete mixing trucks and articulated vehicles (AVs).</li> <li>• Up to 300 light vehicles per day (600 light vehicle trips per day) during peak for workforce movements to the Project Area, assuming an average of 1.8 persons per vehicle for a conservative 'worse case' scenario.</li> <li>• One OSOM vehicle per day (two OSOM vehicle trips per day) on a designated day, with a maximum of four OSOM vehicles (eight OSOM vehicle trips) over the 34-month construction period.</li> </ul> <p><u>Operation</u> – maximum of 20 trips per day.</p>	<p><u>Construction</u></p> <ul style="list-style-type: none"> <li>• Up to 5 heavy vehicles and 12 light vehicles per day (10 heavy vehicle trips and 24 light vehicle trips per day) for the construction of the TWA facility</li> <li>• Up to 15 heavy vehicles and 50 light vehicles per day (30 heavy vehicle trips and 100 light vehicle trips per day) for the operation of the TWA facility</li> <li>• Average of 100 heavy vehicles per day (200 heavy vehicle trips per day) with a maximum of 145 heavy vehicles per day (290 heavy vehicle trips) during peak construction (nine months) for the solar farm (including all heavy vehicle movements relative to the Project, ie. delivery of equipment, infrastructure and materials such as gravel, sand, concrete, water trucks, etc.). These will be predominately B-double vehicles, including some concrete mixing trucks and articulated vehicles (AVs).</li> <li>• One OSOM vehicle per day (two OSOM vehicle trips per day) on a designated day, with a maximum of six OSOM vehicles (twelve OSOM vehicle trips) over the 36-month construction period.</li> <li>• Up to 20 light vehicles per day (40 light vehicle trips per day) for non-TWA staff during construction of the solar farm during peak construction periods.</li> </ul>

Project Element	EIS Project	Amended Project
		<ul style="list-style-type: none"> <li>On designated fortnightly shift change days (ie. one day per week), up to a maximum of 143 light vehicles per day (286 light vehicle trips per day) for TWA workforce movements between staff origin directions and the TWA facility during construction of the solar farm on peak transit days.</li> </ul> <p><u>Operation</u>: maximum of 20 trips per day.</p>
<b>Workforce numbers</b>	<ul style="list-style-type: none"> <li><i>Construction</i> – approximately 270 direct full-time equivalent (FTE) and 430 indirect FTE jobs. At the Project's peak construction (for up to 6 months) this is expected to increase to about 580 direct FTE jobs.</li> <li><i>Operation</i> – up to 7 direct FTE and 20 indirect FTE jobs.</li> </ul>	<ul style="list-style-type: none"> <li><i>Construction</i> – approximately 380 FTE jobs, with up to 420 workers on site during peak construction.</li> <li><i>Operation</i> – no change.</li> </ul>
<b>Construction period</b>	Up to 34 months.	Up to 36 months.
<b>Construction timing</b>	Commence Q2 2024.	Commence Q4 2026.
<b>Workers Accommodation</b>	Dispersed across nearby towns and villages within the Mid-Western and Warrumbungle LGA's.	Provision of an onsite Temporary Workers Accommodation (TWA) facility.
<b>Project life</b>	35 years	No change.

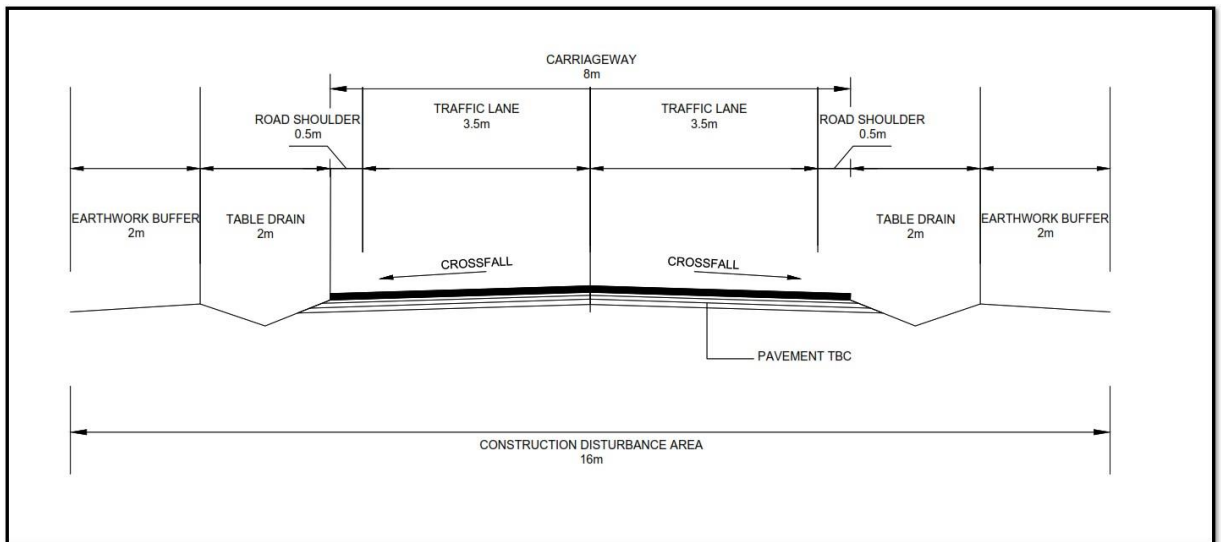
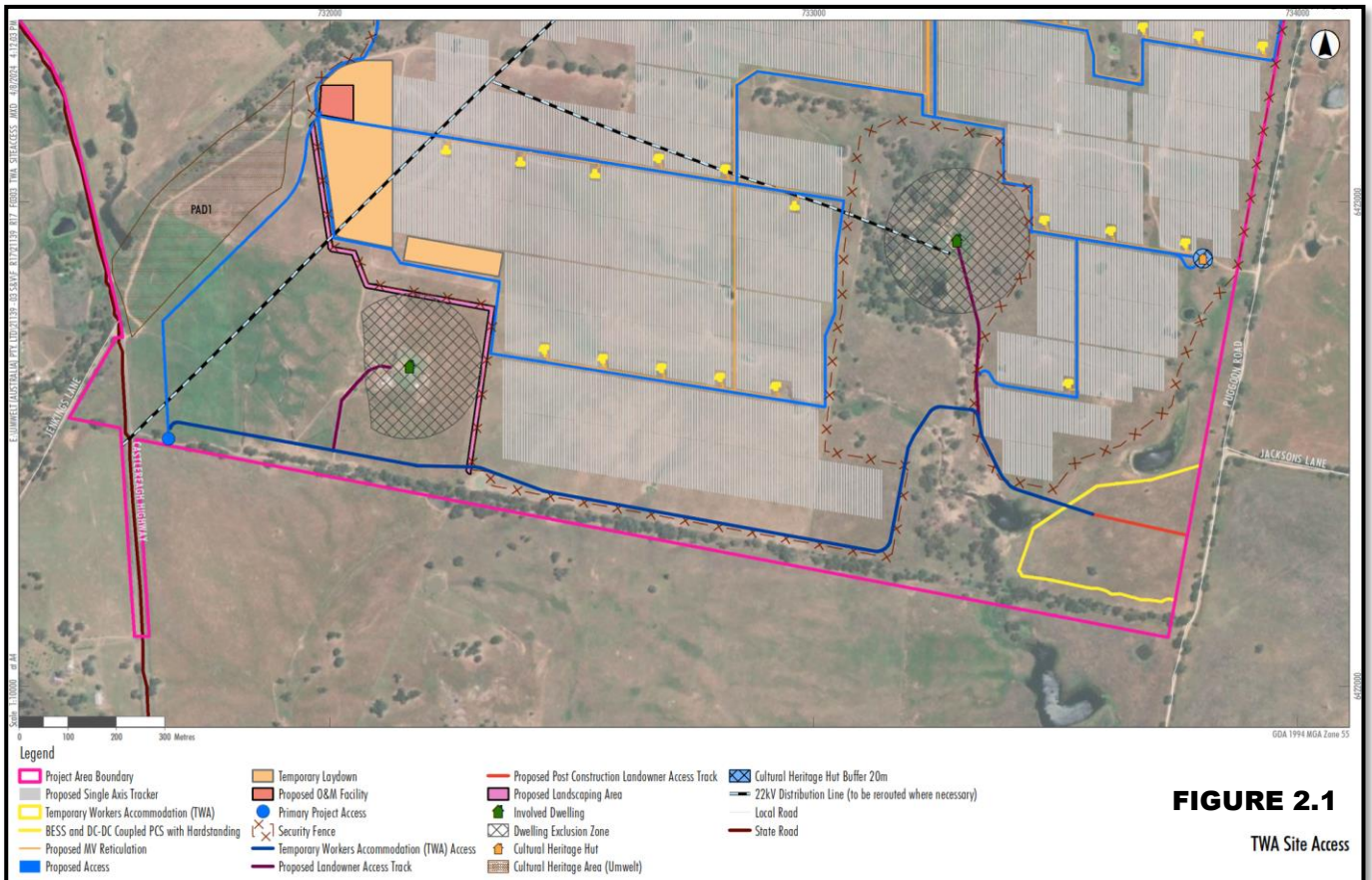
## 2.2 Proposed Transport Route

Consistent with the Project as presented in the EIS, construction materials and equipment would be transported via road to Castlereagh Highway. Over-size / over-mass (OSOM) transport would travel from the Port of Newcastle via Golden Highway to Castlereagh Highway and the Project site access at the newly proposed access point – refer to *Section 3.2* and specifically *Figure 3.1*, for the Project's proposed transport route.

Internal access tracks for the construction phase will be approximately 6 m wide and constructed of compacted gravel.

Access to the TWA facility will be via an internal all weather access track of approximately 8 m wide. The proposed TWA access track is approximately 2.25 km long, starting at the Project's primary access point on the Castlereagh Highway and traversing through the solar farm site as shown on *Figure 2.1* following. The access track will be designed to accommodate B-triple vehicles with a minimum curve radius of 15 m.

Three waterway crossings have been identified along this alignment, requiring single or multi-barrel RCP culvert installations based on flood depth assessments. The number of culverts and their sizes will be determined during detailed design following site investigations. Refer to *Figure 2.2* below for a cross section of the proposed upgrade road.



## **2.3 Construction Phase Details**

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Construction activities would be undertaken during standard construction hours as follows:

- 7 am to 6 pm, Monday to Friday.
- 8 am to 1 pm on Saturday.
- No work on Sunday or public holidays.

Exceptions to the above hours may be required, however these would be limited to low noise generation activities, where practicable.

Following the construction phase, the solar farm is expected to operate for approximately 35 years. It is expected to generate up to 380 full-time equivalent (FTE) direct jobs during the peak construction period and approximately seven direct jobs during the operations and ongoing maintenance phase.

After the initial 35-year operating period, the solar farm would either be decommissioned, removing all infrastructure and returning the site to its existing land capability, or re-purposed with new PV equipment, subject to technical feasibility, landowner discussions and planning consents.

### 3. Existing Conditions

The assessment of transportation existing conditions for the Tallawang Solar Farm project remains generally as described in the EIS with the most likely port of entry for imported solar farm equipment assumed to be the Port of Newcastle and transport routes from the NSW Hunter Coast region – refer to *Figure 3.1* following. The proposed road transport route will apply to all OSOM and other material / component delivery from the Hunter Coast area.

The major and minor road networks, public transport, rail network, parking facilities and active transport infrastructure are generally as described in the EIS.

#### 3.1 Traffic Volumes

Traffic volume data as described in the EIS was for 2023 traffic volumes, which is still considered to be indicative and/or similar to current 2024 volumes. This is because the 2023 traffic volumes were based on 2009 TfNSW ‘*Traffic Volume Viewer*’ data and then a conservative (ie. high) traffic growth of 32% over the 14-year period between 2009 and 2023 (equivalent to an approximate 2% per annum compounded growth rate) was adopted.

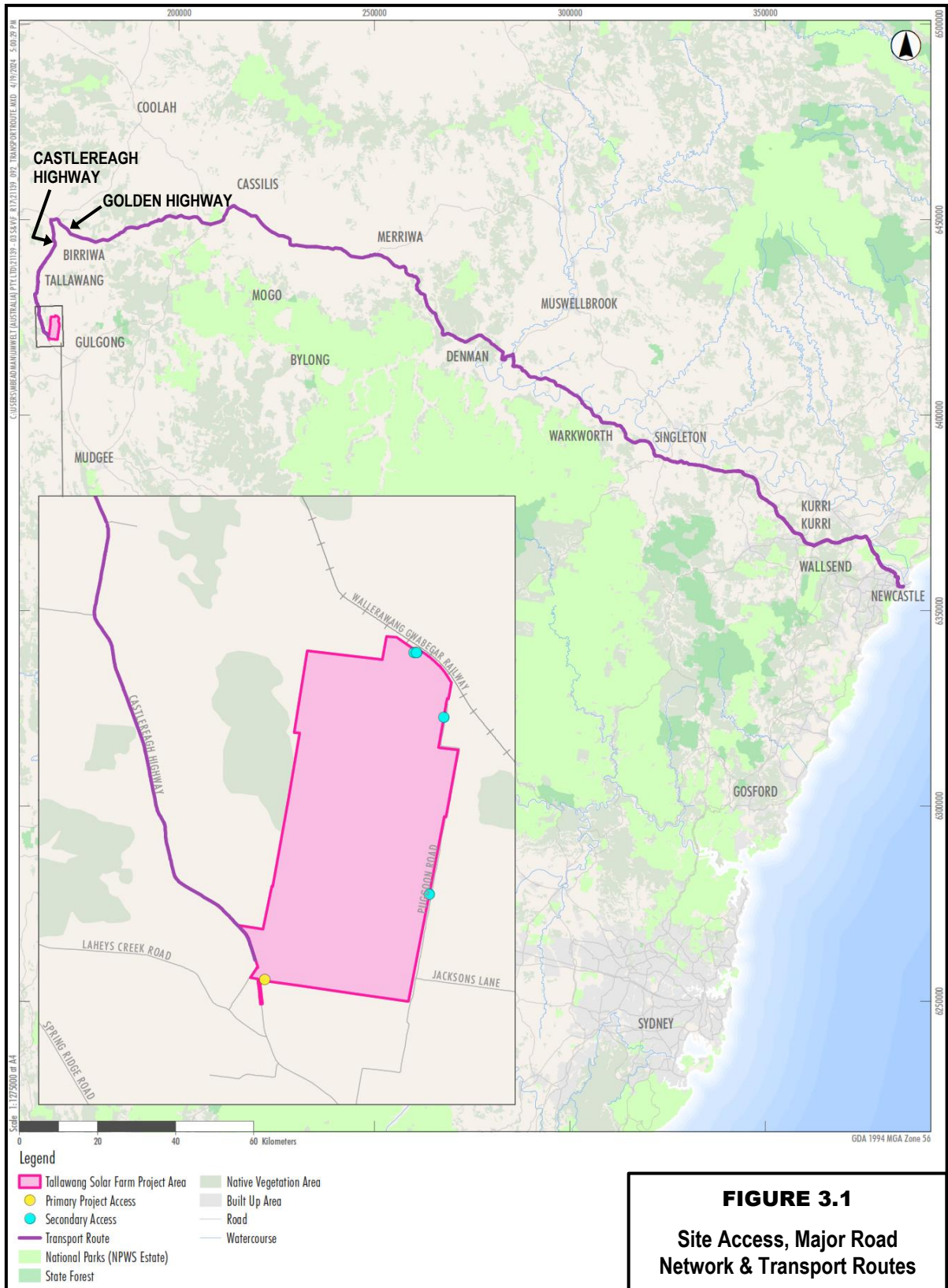
Therefore, existing (estimated) 2023 traffic volumes in vehicles per day (vpd) and vehicles per (peak) hour (vph) for the surrounding road network are shown in *Table 3.1* following. Note that peak hourly traffic flows have been assumed to be between 10% and 15% of daily traffic flows.

**Table 3.1: Current (Estimated) 2023 Traffic Volumes**

Road Section	Vehicles Per Day (vpd)	Vehicles Per Hour (vph)	Traffic Volume Source
Golden Highway	820	100	TfNSW traffic data (2009)
Castlereagh Highway (north)	860	100	TfNSW traffic data (2009)
Castlereagh Highway (south)	1,620	200	TfNSW traffic data (2009)

#### 3.2 Road Safety

The evaluation of road safety is generally as described in the EIS. While the 2015 to 2019 period used for the road safety assessment is not the latest five-year recording period available from the TfNSW Centre for Road Safety’s crash statistics, it is considered that the current updated five-year recording period (to 2022) would likely be non-indicative due to reduced traffic volumes / activity during the Covid pandemic period in 2020 / 21.



## 4. Transport Impact Assessment

Construction of the Amended Project includes all physical works to enable the TWA facility and subsequent solar farm operation including, but not limited to, establishment of the TWA facility (over an 8-week period) and operation of the TWA facility (for a 3-year period), the installation of solar PV modules, installation of the BESS, construction of ancillary Infrastructure including sub-station transformers, road upgrades carried out before the commencement of operation and establishment or construction of any temporary facilities, which were not already established as part of the pre-construction minor works.

It is anticipated that works will commence in Q4 2026. The timing of construction will principally be driven by additional permits and authorisations, post-Development Consent tender, contractor selection, detailed design and procurement processes and a final investment decision. An indicative Project timeline is presented in *Table 4.1* below.

**Table 4.1: Indicative Project Timeline**

Phase	Approximate Duration
Detailed design, contract development and pre-construction	6 months
Construction of TWA facility	8 weeks
Construction and commissioning of solar farm (in conjunction with the operation of the TWA facility)	36 months
Decommissioning of the TWA facility	8 weeks
Operation of the solar farm	35 years
Maintenance of the solar farm	Annual and ongoing
Repowering or decommissioning	At completion of project life

### 4.1 Construction Vehicle Types

The type of construction vehicles proposed to access the Project site depends on the equipment and/or personnel being transported and their function on the site. Access to construction site offices and facilities buildings would generally be available for conventional two-wheel drive vehicles. Access to on-site locations via access tracks may be restricted to four-wheel drive or multiple wheel drive vehicles depending on the internal road network conditions.

Vehicles to be used in the transport of components and deliveries will be heavy vehicle delivery trucks, which will predominantly be B-double vehicles with a number of mixer trucks and articulated vehicles (AVs such as semi-trailers) also being used. The AVs will occasionally be used to transport larger components and plant such as the solar PV panels.

The largest vehicles to be used for the Project will be for transformer transport to the Project's sub-station site. These vehicles will be regarded as OSOM vehicles, resulting in restricted access and requiring special TfNSW operating permits to allow them to travel on public roads.

The OSOM vehicles will typically consist of 16 x 8-wheel platform trailer approximately 43.2

m in length and 4.9 m in width. Typical total installed weight would be 210 tonnes with typical transportation weight of 130 tonnes.

The multiple axle groups would ensure compliance with point load and overall load limits for the road surfaces along the transport route. In this regard, typical axle weights under such configurations are less than 2 tonnes per tyre, which is less than a typical semi-trailer loading of up to 2.75 tonnes per tyre.

Therefore, OSOM vehicles can typically incur less loading stress on the road surface, especially when run under escort with limited speed, than normal heavy vehicle traffic. Furthermore, 'over-size' and 'over-mass' vehicles may feature trailers with steering on some or all rear axles. This technology ensures improved manoeuvrability, minimises stress on the equipment and the load, and reduces or eliminates tyre scrubbing and the associated stresses on the road surface when cornering.

The anticipated vehicles to be used for the solar farm components would typically comprise the following:

- Solar PV modules: B-double (although type A road train or B-triple preferred) with typically 27 modules / pallet and 16 to 18 pallets / container.
- Battery storage: B-double (although type A road train or B-triple preferred) with one unit per trailer.
- Inverters: B-double (40-foot container) with 100-tonne mobile crane for offload and typically two skids, one truck.
- Sub-station transformers, operations and maintenance building and control room: OSOM vehicles anticipated to be used would be 16 x 8-wheel platform trailer approximately 43.2 m in length and 4.9 m in width. Typical total installed weight is 210 tonnes with typical transportation weight of 130 tonnes.

## 4.2 Construction Phase Traffic Generation

Traffic-generating tasks over the life of the Amended Project would typically include:

- Initial site set-up and geotechnical investigations during the pre-construction period.
- Road upgrade works such as the intersection upgrade to establish the Project access and access track to the TWA facility along the southern boundary of the Project Area.
- Installation of the TWA facility accommodation units, communal facilities and other associated infrastructure.
- Construction staff movements, solar farm component deliveries (including OSOM transport), concrete material deliveries and other general deliveries during construction works.
- Operational staff movements during operation and maintenance.
- Decommissioning and reinstatement construction activities.

During the construction phase, several tasks would generate traffic. These are categorised as follows:

- Construction material delivery.
- Operation of the TWA facility.
- Solar farm component delivery.

- Construction staff transport.

The construction phase of the Project will result in increased traffic movements by light vehicles transporting some construction staff and light construction deliveries as well as heavy vehicles transporting the solar farm and BESS infrastructure equipment including OSOM vehicle transport of the sub-station transformers.

#### **4.2.1 Heavy Vehicle Transport**

The transport of solar farm components and construction materials would be undertaken by heavy vehicles including OSOM vehicles. The use of larger capacity B-triples and road trains may be considered by the transport contractor, which would reduce vehicle trip movements and improve transportation efficiency. If the use of these larger capacity vehicles is desired, approval would be sought from the relevant road authorities including Councils.

The Amended Project is expected to generate the following traffic.

##### *Construction of TWA facility*

- Up to 5 heavy vehicles per day (10 heavy vehicle trips per day, ie. in and out).  
Maximum heavy vehicle size would be a 19-m long semi-trailer.
- No OSOM vehicles are required for the TWA construction.

##### *Operation of TWA facility*

- Up to 15 heavy vehicles per day (30 heavy vehicle trips per day, ie. in and out) for deliveries, water trucks, etc.

##### *Construction of Solar Farm*

- Average of 100 heavy vehicles per day (200 heavy vehicle trips per day, ie. in and out) with a maximum of 145 heavy vehicles per day (290 heavy vehicle trips per day, ie. in and out) during peak construction (ie. nine months) for the solar farm (including all heavy vehicle movements relative to the Project, ie. delivery of equipment, infrastructure and materials such as gravel, sand, concrete, water trucks, etc). These will be predominately B-double vehicles, including some concrete mixing trucks and articulated vehicles (AVs). Typically, the heavy vehicles would be split into approximately 25% AVs / low-loaders and 37.5% each rigid trucks and truck'n'dog vehicles.
- There is expected to be four sub-station transformers as well as the operations and maintenance building and control room, delivered to the site via OSOM vehicles. These would be transported to site as single loads on designated days resulting in a maximum of one OSOM vehicle per day (two OSOM vehicle trips per day, ie. in and out), with a maximum of six OSOM vehicle loads (twelve OSOM vehicle trips) over the 36-month construction period.
- Other associated infrastructure and construction materials such as gravel / road base for construction of site access tracks, culverts, concrete, water (up to seven water trucks per weekday from Gulgong) and other miscellaneous materials deliveries for site office operations and the like.

Vehicle movements would peak during nine months of the 36-month construction phase, when most of the photovoltaic modules, BESS and ancillary infrastructure are being delivered to the Project Area and the peak workforce numbers are reached. These traffic generation numbers also include workers accommodation camp vehicle movements and other

construction materials such as gravel, sand, concrete, water trucks, etc.

On either side of this peak period, the vehicle movements would scale up / down. The updated assessment was based on the peak heavy vehicle generation and therefore considers the worst-case scenario. For the majority of the construction phase (up to 27 months), reduced traffic generation would occur.

Whilst it is proposed that heavy vehicles will travel to the Project Area along the proposed transport route and travel from the north along Castlereagh Highway, the traffic assessment has conservatively assumed that standard (non-OSOM) heavy vehicle trip distribution could potentially travel from each direction along Golden Highway, Castlereagh Highway (north) and Castlereagh Highway (south) to the primary site access location, resulting in a maximum of some 145 heavy vehicle (return) trip movements per day from either direction along Castlereagh Highway to the primary Project access location. General heavy vehicle transport could travel from any direction along the surrounding road network depending on the origin of deliveries, eg. from the south (Gulgong-Mudgee area), west (Dubbo area), north (Dunedoo area) and east (Merriwa area).

#### **4.2.2 Construction Staff Traffic** **Solar Farm**

Construction staff numbers for the solar farm will fluctuate over the construction period dependent on the activities being undertaken. During the peak construction period (approximate duration of nine months), it is anticipated that construction workforce would be 420, of which 400 workers will be housed at the TWA facility (typically working in fortnightly rosters, ie. two weeks on / two weeks off).

On designated fortnightly roster change days (ie. one day per week), this would generate up to 143 light vehicles (286 light vehicle trips, ie. in and out) for workforce movements between staff origin directions and the TWA facility – this assumes an average of two persons per vehicle (based on some car-pooling occurring). It is noted that during this fortnightly, roster change, traffic generation would occur over a prolonged period during the shift change day (ie over four hours) rather than concentrated over a typical peak hour period.

Any remaining staff not being housed at the TWA would travel from various directions to / from site. This is assumed to be a maximum of 20 staff (5%) that would not be housed at the TWA. Assuming conservatively, that there will be no shared journey-to-work trips by the 20 construction staff during peak staffing periods (nine months), traffic generation would be some 20 light vehicles (cars) or 40 light vehicle trips per day (ie. in and out) along the surrounding road network. This staff traffic generation would occur for the majority of the construction time, ie. during the fortnights between staff shift changeover days.

Based on the above, it is estimated that the total peak workforce would generate up to 163 light vehicles per day on peak transit days (326 light vehicle trips per day, ie. in and out).

It should be noted that all the above traffic generation is considered to be a conservative (high traffic generating) case scenario and that if car occupancy was able to be increased (resulting from car-pooling and similar initiatives), staff traffic generation has the potential to be significantly less. Consequently, impacts from traffic on the surrounding road network would be reduced.

It is assumed that construction staff trip distribution would be split equally from each direction along Golden Highway / Castlereagh Highway (north) and Castlereagh Highway (south) to

the primary site access location. Construction staff origins travelling along Castlereagh Highway (north) include the Dunedoo area while origins travelling along Castlereagh Highway (south) include the Gulgong-Mudgee and Dubbo areas. This would result in approximately 40 construction staff vehicle trip movements per day along each of these routes.

**Temporary Workers Accommodation (TWA)**

Construction of the TWA Facility (proposed layout shown in Figure 4.1 below) will require a peak of up to approximately 25 construction workers over an eight-week period at the start of the total 36-month construction period anticipated for the solar farm. Construction of the TWA facility may be staggered to adapt to the solar farm construction needs. The construction period will be determined once a supplier has been selected. It is estimated that the TWA workforce would generate up to 12 light vehicles per day (24 light vehicle trips per day, ie. in and out).

Once the TWA facility is operational, and the solar farm construction is underway, it is estimated that the operation of the TWA facility will require approximately 20 staff.

The TWA facility will operate 24/7 for the entire construction period (approximately 36 months). Traffic movements from the TWA site will align with construction hours associated with the Project (peak morning at 7 am, peak evening at 6 pm).

It is estimated that the operation of the TWA facility would generate up to 50 light vehicles per day (100 light vehicle trips per day, ie. in and out).



**Figure 4.1: Proposed 400 Room Temporary Workers Accommodation**

Following the construction of the Project, the TWA facility may be maintained for use by the construction workforce associated with other REZ projects in the region (such as the nearby Barneys Reef Wind Farm), if this is approved as part of the other projects' development applications. Alternatively, the TWA facility would be decommissioned, and the area would be cleared of any temporary infrastructure and equipment and rehabilitated to its previous condition.

#### **4.2.3 Total Traffic Generation**

The above sections provide the basis for estimating the peak traffic generation over the construction period. Traffic generation used in this transport assessment adopts the worst case for each of the heavy vehicle and light vehicle (construction staff) trip generation to provide a conservative (high) figure. The worst-case scenario traffic generation also assumes that peak heavy vehicle generation coincides with peak construction staff numbers.

It should be noted that typically, the peak traffic generation would apply for only nine months out of the total 36-month construction period. This peak 9-month period would coincide with the installation of the solar panels, BESS, sub-stations and ancillary infrastructure. For the remaining 27 months (majority of the construction phase), reduced traffic generation would occur.

Total peak traffic generation for the Amended Project is shown in *Table 4.2* following and has been classified into total daily two-way trips (ie. entering and exiting), shown as vehicles per day (vpd) and peak hour trips (where applicable), shown as vehicles per hour (vph).

In estimating the peak hour trips presented in *Table 4.2* following, the following assumptions were made:

- The workforce not residing on site and travelling by private vehicles will all arrive between 6 am and 7 am, before the background morning peak period of 7 am to 8 am, and depart between 5 pm and 6 pm, after the background afternoon peak period.
- Approximately 10% of the daily heavy vehicle trips are made in the peak hour periods.

**Table 4.2: Total Project Traffic Generation**

Traffic Generating Activity		Golden Highway	Castlereagh Highway (north)	Castlereagh Highway (south)
<i>Construction of TWA Facility</i>				
Construction staff (light vehicles only)	vpd	24	24	24
	vph	12	12	12
OSOM vehicle transport	vpd	0	0	0
	vph	0	0	0
Standard heavy vehicle transport	vpd	10	10	10
	vph	5	5	5
<i>Operation of TWA Facility</i>				
Construction staff (light vehicles only)	vpd	100	100	100
	vph	50	50	50
OSOM vehicle transport	vpd	0	0	0
	vph	0	0	0
Standard heavy vehicle transport	vpd	30	30	30
	vph	15	15	15
<i>Construction of Solar Farm only</i>				
Construction staff (light vehicles only)	vpd	40 (326)*	40 (326)*	40 (326)*
	vph	20 (40)*	20 (40)*	20 (40)*
OSOM vehicle transport	vpd	2	2	0
	vph	1	1	0
Standard heavy vehicle transport	vpd	290	290	290
	vph	32	32	32
<i>Combined total of solar farm construction including operation of TWA facility</i>				
Construction staff (light vehicles only)	vpd	140 (326)*	140 (326)*	140 (326)*
	vph	70 (40)*	70 (40)*	70 (40)*
OSOM vehicle transport	vpd	2	2	0
	vph	1	1	0
Standard heavy vehicle transport	vpd	320	320	320
	vph	47	47	47

\* Figures in brackets show additional traffic generation from the TWA facility that occurs on designated fortnightly shift change days, ie. one day per fortnight.

### 4.3 Effect of Construction Phase Traffic Generation

In order to assess the potential impacts on road network capacity, the traffic generation of heavy vehicles and the staff traffic generation (refer to *Table 4.2* previously) have been added to current daily and peak hour traffic flows to obtain future traffic flows along the affected road network.

Future traffic volumes in vehicles per day and vehicles per hour for roads along the preferred access route are shown in *Table 4.3* following. The traffic volumes are broken up into light vehicles (LV) and heavy vehicles (HV) with the heavy vehicle proportion assumed to be between 10% and 15% of the total traffic volume.

**Table 4.3: Future Traffic Volumes**

Traffic Scenario		Golden Highway	Castlereagh Hwy (north)	Castlereagh Hwy (south)
<b><i>Daily Traffic – vehicles per day</i></b>				
Current traffic #	LV	720	750	1,415
	HV	100	110	205
Solar farm traffic generation	LV	140 (326)*	140 (326)*	140 (326)*
	HV	322	322	320
Combined future traffic	LV	860 (1,186)*	890 (1,216)*	1,555 (1,881)*
	HV	422	432	525
<b><i>Hourly (Peak) Traffic – vehicles per hour</i></b>				
Current traffic #	LV	85	85	175
	HV	15	15	25
Solar farm traffic generation	LV	70 (40)*	70 (40)*	70 (40)*
	HV	48	48	47
Combined future traffic	LV	155 (195)*	155 (195)*	245 (285)*
	HV	63	63	62

# Current traffic derived from *Table 3.1*: HV % assumed to be between 10% and 15% of total traffic volume.

\* Figures in brackets show additional / total traffic generation from the TWA facility that occurs on designated fortnightly shift change days, ie. one day per fortnight.

### 4.3.1 Road Capacity

Road capacity can be expressed and qualified along a section of the rural road network as its 'level of service' (LoS). Typically, the LoS is based on road capacity analysis as described in Austroads' "Guide to Traffic Engineering Practice, Part 2 – Roadway Capacity". Road capacity can be expressed in total vehicles per day and/or vehicles per hour.

The level of service descriptions are as follows:

- LOS A: Free flow conditions, high degree of freedom for drivers to select desired speed and manoeuvre within traffic stream. Individual drivers are virtually unaffected by the presence of others in the traffic stream.
- LOS B: Zone of stable flow, reasonable freedom for drivers to select desired speed and manoeuvre within traffic stream.
- LOS C: Zone of stable flow, but restricted freedom for drivers to select desired speed and manoeuvre within traffic stream.
- LOS D: Approaching unstable flow, severely restricted freedom for drivers to select desired speed and manoeuvre within traffic stream. Small increases in flow generally cause operational problems.
- LOS E: Traffic volumes close to capacity, virtually no freedom to select desired speed or manoeuvre within traffic stream. Unstable flow and minor disturbances and/or small increases in flow would cause operational break-downs.
- LOS F: Forced flow conditions where the amount of traffic approaching a point exceeds that which can pass it. Flow break-down occurs resulting in queuing and delays.

Road capacity for two-lane, two-way sections of a rural road network is largely based on a combination of design speed, travel lane and shoulder width, sight distance restrictions, traffic composition, directional traffic splits and terrain<sup>1</sup>. This provides a basic level of service and associated service flow rate under prevailing road and traffic conditions. Based on their road and traffic characteristics, the levels of service and flow rates for the affected sections of the rural road network along the preferred access route is shown in *Table 4.4* following.

**Table 4.4: Rural Road Network Service Flow Rates**

Road Section	Level of Service (LoS)				
	A	B	C	D	E
Golden Highway	240 vph 1,800 vpd	420 vph 3,500 vpd	660 vph 5,800 vpd	1,020 vph 9,900 vpd	1,760 vph 16,500 vpd
Castlereagh Highway (north / south)	250 vph 1,900 vpd	490 vph 3,700 vpd	800 vph 6,100 vpd	1,290 vph 10,400 vpd	2,310 vph 17,600 vpd

Based on the above service flow rates, the current traffic volumes and additional Project generated construction traffic volumes of the rural roads along the transport access routes (conservative scenario peak volumes used as a worst-case scenario), 'before and after' levels of service can be expected as shown in *Table 4.5* following.

<sup>1</sup> Austroads "Guide to Traffic Engineering Practice: Part 2 – Roadway Capacity", Section 3

**Table 4.5: Rural Road Network – Current and Future Levels of Service**

Road Section	Current LoS	Future LoS
Golden Highway	A	A (A / B)*
Castlereagh Highway (north)	A	A (A / B)*
Castlereagh Highway (south)	A	B (B)*

\* LoS values in brackets show future service levels with the additional traffic generation from the TWA facility that occurs on designated fortnightly shift change days, ie. one day per fortnight.

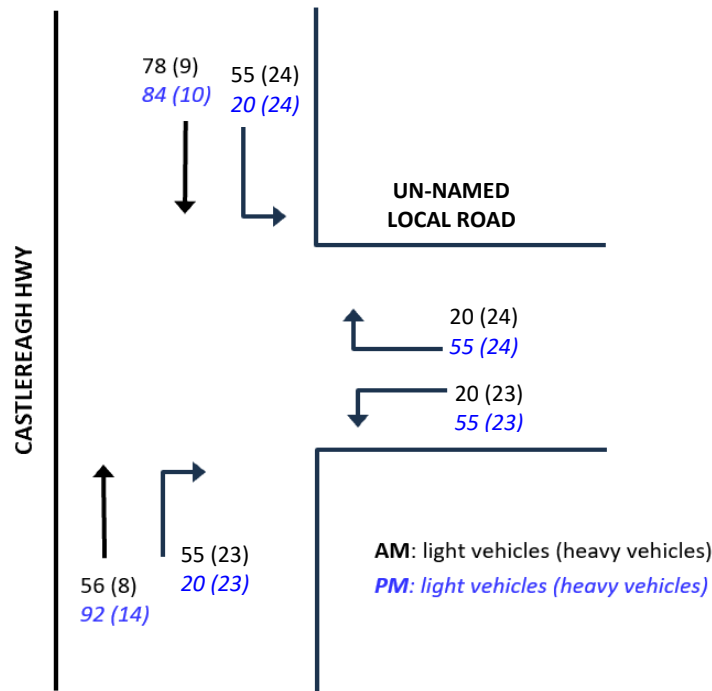
From the above table it is clearly evident that operating conditions (levels of service) along the rural road network would only change marginally from existing conditions, even after the addition of the conservative scenario (maximum peak) solar farm generated construction traffic. It is also noted that road network operating conditions would be maintained during the one day per fortnight that the shift change occurs and TWA facility movements increase.

The majority of the rural road network under consideration has significant spare capacity and is operating at high levels of service (LoS A or B). At these enhanced levels of service with the significant spare capacity available along the road network, intersection performance at the other rural intersections in the vicinity of the site can also be anticipated to be insignificantly impacted by the addition of the Project's traffic generation.

In summary, the addition of heavy vehicles and construction staff traffic during peak construction periods is able to be absorbed by the relevant road networks and intersections subject to appropriate road infrastructure upgrades and construction traffic management (discussed in *Section 5* below).

### 4.3.2 Highway Intersection Analysis

To determine the intersection operations of the proposed new site access road off Castlereagh Highway, SIDRA intersection analysis was undertaken. The analysis was undertaken for both the morning and afternoon peak periods and incorporated existing Castlereagh Highway traffic passing the proposed new site access as well as future (projected) construction traffic turning into and out of the proposed new site access – refer to *Figure 4.2* following. As a worst-case scenario, the future (projected) construction traffic included the additional traffic generation from the TWA facility that is anticipated to occur on designated fortnightly shift change days, ie. one day per fortnight.



**Figure 4.2: Future Traffic Movements at Castlereagh Hwy / Un-named Local Rd**

The results of the SIDRA intersection analysis indicate that the intersection would perform well during future construction operations with levels of service (LoS) of A during both morning and afternoon peak hourly periods. The average delay (worst movement) was 10.0 secs in the AM (right-turn into un-named local road from Castlereagh Highway south) and 11.0 secs in the PM (right-turn into un-named local road from Castlereagh Highway south). The maximum queue lengths for this right-turn movement via the proposed channelised right-turn bay averaged less than one vehicle length.

A summary of the SIDRA results follows.

### AM PEAK HOUR

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] veh/h	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
South: Castlereagh Hwy (S)														
8	T1	64	8	67	12.5	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
9	R2	78	23	82	29.5	0.081	10.0	LOS A	0.3	2.9	0.32	0.65	0.32	55.9
Approach		142	31	149	21.8	0.081	5.5	NA	0.3	2.9	0.18	0.36	0.18	69.8
East: Jackson Lane														
10	L2	43	23	45	53.5	0.136	5.7	LOS A	0.5	5.5	0.31	0.57	0.31	46.2
12	R2	44	24	46	54.5	0.136	9.1	LOS A	0.5	5.5	0.31	0.57	0.31	45.9
Approach		87	47	92	54.0	0.136	7.4	LOS A	0.5	5.5	0.31	0.57	0.31	46.1
North: Castlereagh Hwy (N)														
1	L2	79	24	83	30.4	0.055	8.2	LOS A	0.0	0.0	0.00	0.66	0.00	64.5
2	T1	87	9	92	10.3	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		166	33	175	19.9	0.055	3.9	NA	0.0	0.0	0.00	0.31	0.00	79.2
All Vehicles		395	111	416	28.1	0.136	5.2	NA	0.5	5.5	0.13	0.39	0.13	65.6

### PM PEAK HOUR

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total veh/h	HV ] veh/h	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
South: Castlereagh Hwy (S)														
8	T1	106	14	112	13.2	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
9	R2	43	23	45	53.5	0.048	11.0	LOS A	0.2	2.0	0.30	0.64	0.30	55.4
Approach		149	37	157	24.8	0.062	3.2	NA	0.2	2.0	0.09	0.19	0.09	81.1
East: Jackson Lane														
10	L2	78	23	82	29.5	0.216	5.4	LOS A	0.9	8.0	0.33	0.58	0.33	49.4
12	R2	79	24	83	30.4	0.216	8.4	LOS A	0.9	8.0	0.33	0.58	0.33	49.8
Approach		157	47	165	29.9	0.216	6.9	LOS A	0.9	8.0	0.33	0.58	0.33	49.6
North: Castlereagh Hwy (N)														
1	L2	44	24	46	54.5	0.035	8.6	LOS A	0.0	0.0	0.00	0.66	0.00	58.3
2	T1	94	10	99	10.6	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		138	34	145	24.6	0.055	2.7	NA	0.0	0.0	0.00	0.21	0.00	81.4
All Vehicles		444	118	467	26.6	0.216	4.4	NA	0.9	8.0	0.14	0.33	0.14	66.3

### **4.3.3 Site Access and Road Safety**

Construction traffic is proposed to access various parts of the Project site via an internal site access network off the primary access at a newly proposed access point from the Castlereagh Highway at an un-named local road.

In addition, the Project would require access from Lot 105 of DP 750762 across Puggoon Road to get access to Lots 74, 96 and 105 of DP 750762 in the north-eastern corner of the Project site. The crossing design and location will be finalised in consultation with Council during the detail design phase.

All OSOM vehicle transport will travel to the proposed primary Project access along Castlereagh Highway from the north. For non-OSOM vehicle transport, access would also be available from the south to allow local service and/or resource suppliers located south of the Project site the opportunity to participate in the Project.

Available sight distance to / from the proposed primary Project site access location along Castlereagh Highway is over 300 m (2.5 sec reaction time) in both directions, which is satisfactory for the 100 km/h speed limit along the highway (adopting a 110 km/h design speed).

Local intersection widening will be required at the primary Project access and the intersection will be designed to allow relevant construction vehicles (including OSOM vehicles) to safely exit from and re-enter the public road network (Castlereagh Highway) whilst minimising disruption to traffic and maintaining road safety. Thorough consultation will be undertaken with Council and TfNSW when developing the detailed designs for intersections with public roads and in the preparation of the CTMP for the Project.

During Project construction, the increased traffic generation and in particular, the higher turning movements to / from the highway at the Project's primary access location would warrant auxiliary and/or protected (channelised) turn lane intersection treatments.

The proposed intersection at Castlereagh Highway will consist of a three-way junction with an un-named local road extending along the southern portion of the Project area. The proposed intersection upgrade would provide an auxiliary and/or protected (channelised) turn lane intersection treatment to accommodate the swept path turning movement by the largest types of trucks requiring access to the Project area – refer to *Appendix B* for the proposed intersection upgrade strategic design at Castlereagh Highway.

The proposed access intersection requirements have been discussed with the Mid-Western Regional Council and Transport for NSW and agreed in principle. Mid-Western Regional Council and Transport for NSW will be consulted further in relation to the detailed design requirements for the intersection works prior to construction and for the purposes of securing approval under the Roads Act.

It is considered that no road network upgrades would be required along Puggoon Road because the road is only to be used as a crossing to get access from Lot 105 of DP 750762 to Lots 74, 96 and 105 of DP 750762 in the north-eastern corner of the Project site. The crossing design and location will be finalised in consultation with Council during the detail design phase.

#### **4.3.4 Internal Site Access and Parking**

Suitable on-site manoeuvring areas would be available so that larger vehicles are able to safely manoeuvre into the Project site off the public road network, around the Project site and exit the Project site onto the public road network. All vehicles would enter and exit the Project site to / from the public road network in a forward direction only. All vehicles generated by construction staff would be accommodated within on-site parking areas.

The standard design vehicle for swept path adequacy in the provision of intersections and the design of parking and turning areas would generally be (as a minimum) the Austroads single unit truck / bus of 12.2 m length. However, provision would be made, where possible, to allow for an articulated vehicle swept path, which requires a wider area allowing for manoeuvring by semi-trailers. The design of access roads and junctions would need to allow for widths of up to 4.5 m and weights complying with TfNSW maximum loading.

The construction and maintenance of the solar farm will require the construction of an internal site access network to reach all the solar panel and BESS locations as well as other infrastructure.

The internal site access network will consist of private access tracks and will not be accessible to the public, ie. access will be controlled by lockable gates. The internal site access network will generally be a minimum 3.0 m wide with regular passing bays and turning heads as required to accommodate construction vehicles. These areas would also provide turning / manoeuvring and passing opportunities for delivery vehicles.

The internal accesses will comprise an all-weather graded surface. Ongoing operational maintenance of on-site accesses would be undertaken by the solar farm operator.

All vehicle parking associated with the solar farm construction and TWA facility will be accommodated on-site. Parking bays for 200 light vehicles and some busses will be provided at the TWA facility.

#### **4.3.5 Rail Crossings**

There will be no rail impacts as the Project no longer requires access over two railway level crossings along the Wallerawang Gwabegar Railway line.

### **4.4 Operational Phase Traffic Generation**

The operational phase of the Project includes the general operation of the solar farm, with monitoring both by on-site staffing and via remote monitoring. Aspects of the Project operation to be dealt with by on-site staff would include safety management, environmental condition monitoring, landowner management, routine servicing, malfunction rectification and site inspections. Those functions to be overseen by remote monitoring include solar panel and BESS performance assessment, solar farm reporting, remote resetting and maintenance co-ordination. Pro-active computer control systems monitor the performance of the solar panels and BESS and ensure that any issues are dealt with by on-site staff or contractors, as appropriate.

Maintenance staff will be on-site throughout the year, making routine checks of the solar farm infrastructure on an ongoing basis. Major planned servicing would be carried out intermittently and involve a number of service vehicles (typically two technicians per vehicle) on-site.

Traffic generation during operations would be relatively minor. There is proposed to be up to seven operational / maintenance staff servicing the solar farm infrastructure, likely to be based in the surrounding, local areas. Typically, this would comprise an estimated seven direct, permanent jobs with others engaged in employment on the site on a periodic basis.

It is understood operational traffic would consist of 4WD-type service vehicles travelling within the Project site's internal access track network after gaining access off the public road network from the Project access location. It is envisaged that with journey-to-work and home trips, this would amount to a maximum of 20 trips per day, which would occur during peak maintenance periods and on an intermittent basis. This maximum (peak) traffic generation would readily be absorbed into the spare capacity of the existing road network.

#### **4.5 Effect of Operation Phase Traffic Generation**

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Based on the relatively minor traffic generation during operations described above, traffic and road network impacts would be negligible. The current road network has significant spare capacity and is used by 4WD-type vehicles, which are anticipated to be used for servicing the various sites.

All vehicles generated by operations staff would be accommodated within on-site parking areas.

#### **4.6 Cumulative Impacts**

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The Project site is located within an REZ and therefore, there are a number of other existing and proposed renewable energy projects within the region including the proposed Barneys Reef Wind Farm project planned directly north of the Tallawang Solar Farm project site.

A cumulative impact assessment, presented in *Table 4.6* following, was conducted in relation to nearby developments that may overlap or interact with the Project, including the approved Stubbo and Dunedoo Solar Farms, the operational Beryl Solar Farm and the proposed (not yet approved) Barneys Reef Wind Farm, which were referenced in the SEARs.

For the purposes of the future combined (cumulative) traffic assessment, it has been conservatively assumed that the abovementioned approved and proposed developments would have some overlap of construction with the proposed Tallawang Solar Farm. This presents the worst-case scenario, as realistically the construction periods for these developments would be staggered and are not likely to occur concurrently.

**Table 4.6: Renewable Energy Projects in Surrounding Region**

<b>Renewable Development</b>	<b>Status</b>	<b>Distance to the Project</b>	<b>Potential for Cumulative Impact</b>
Beryl Solar Farm (Banpu Australia)	Operational	5 km south	Cumulative impacts would be limited as the solar farm is operational. This development's <u>operational traffic has been allowed for and incorporated into the background traffic.</u>
Barneys Reef Wind Farm (RES Australia)	In planning – Prepare EIS	Directly north	Developed by the same proponent – it is proposed that construction for Barneys Reef Wind Farm is to commence Q1 2028. The construction period would be approximately 28 months with peak construction in months 7 to 14, overlapping with Tallawang Solar Farm peak construction.  Barneys Reef Wind Farm will utilise a similar construction transport route along Golden Highway and Castlereagh Highway.
Stubbo Solar Farm (UPC\AC Renewables)	Approved – under construction	7 km east	Construction for Stubbo Solar Farm commenced in early 2023 and is expected to be completed by mid to late 2025. Should the development proceed to that timetable, construction activities would not overlap with Tallawang Solar Farm's construction period.
Dunedoo Solar Farm (ib vogt)	Approved	30 km north to north-west	Construction is planned to commence late 2023 and is expected to be operational by 2025. It is unlikely that construction periods would overlap, so <u>no cumulative construction traffic-related impacts are anticipated.</u>
Bellambi Heights BESS - Vena Energy	Approved	Directly south	Construction may be undertaken in either one or two stages, which will determine the construction schedule. Construction in a single stage will take 13 to 20 months. If constructed in two stages, the first stage construction period will be 13 to 18 months, followed by a second construction period of 12 to 15 months (commencing approximately 6 to 12 months after the initial stage).  Potential cumulative traffic impacts on Golden Highway and Castlereagh Highway.
Mavis Solar Farm	In planning – Prepare EIS	Directly south east	Potential cumulative traffic impacts on Golden Highway and Castlereagh Highway due to initial transport routes identified.
Mayfair Solar Farm- Elgin Energy	In Planning - Prepare EIS	2 km east	Construction projected to commence Q2 2025. Construction expected to take 12 months and operational by Q3 2026.  <u>No cumulative traffic impacts.</u>

<b>Renewable Development</b>	<b>Status</b>	<b>Distance to the Project</b>	<b>Potential for Cumulative Impact</b>
Beryl BESS- Ratch Australia	In Planning – Prepare EIS	10 km south	12 months anticipated for construction. Construction anticipated to commence Q1 2025 and to be operational by Q1 2026. Construction timing does not fall within Tallawang’s construction phase – <u>no cumulative construction traffic-related impacts anticipated.</u>
Birriwa Solar and Battery Project – ACEN Australia (Birrawa Solar Farm)	In planning – Under Assessment	15 km north east	Construction is expected to take 28 months, commencing early 2024. Potential cumulative traffic impacts on Golden Highway and Castlereagh Highway.
Spicers Creek Wind Farm – Squadron Energy	In Planning - Under Assessment	38 km west	EIS published August 2023. Construction period of 40 months. Construction will begin within 1 to 5 years of development consent. No information available about construction timing. Cumulative traffic impacts along Golden Highway only.
Valley of the Winds Wind Farm – UPCAC Renewables	In Planning – Under Assessment	39 km north-east	Construction will occur over a four year period. Construction expected to commence in Q1 2023 for 24 to 42 months with up to 400 workers during peak construction. Cumulative traffic impacts along Golden Highway only.
CWO REZ transmission infrastructure – EnergyCo (Project Energy Connect)	In Planning – Under assessment	Directly north	Minor overlap of construction periods anticipated. Whilst there is potential for cumulative traffic impacts on Golden Highway and Castlereagh Highway, these will be <u>minor</u> as the CWO REZ transmission project would be wide spread.

In addition to the above developments, several large, non-renewable projects are also located near the Project area, including the operational Ulan Coal Mine Complex (located approximately 25 km east of the Project site), Moolarben Coal Complex (36 km east of the Project site) and Wilpinjong Mine (30 km south east). Cumulative traffic from these currently operating mining ventures have been allowed for and incorporated into the existing background traffic.

With respect to a possible, worst-case scenario of cumulative traffic generation from proposed / approved developments, *Table 4.7* following, shows potential total daily traffic generated along the relevant, surrounding road network as well as a corresponding level of service for each applicable road section (peak hourly traffic and corresponding LoS in brackets).

**Table 4.7: Potential Total Cumulative Traffic Generation**

Road Section	Golden Highway	Castlereagh Highway (north)	Castlereagh Highway (south)
<b>Current Traffic<sup>1</sup></b>	820 (100)	860 (100)	1,620 (200)
<b>Tallawang SF</b>	462 (118)	462 (118)	462 (117)
<b>Barneys Reef WF<sup>2</sup></b>	506 (231)	290 (145)	0 (0)
<b>Bellambi Heights BESS<sup>3</sup></b>	462 (118)	462 (118)	462 (117)
<b>Mavis Solar Farm<sup>3</sup></b>	462 (118)	462 (118)	462 (117)
<b>Birriwa S&amp;B Project<sup>3</sup></b>	462 (118)	462 (118)	462 (117)
<b>Spicers Creek WF<sup>4</sup></b>	228 (95)	0	0
<b>Valley of the Winds WF<sup>4</sup></b>	228 (95)	0	0
<b>Total Traffic</b>	3,630 (993)	2,998 (717)	3,468 (668)
<b>Future LoS<sup>5</sup></b>	C (D)	B (C)	B (C)

- 1 Current traffic derived from *Table 3.1*, shown as vehicles per day (peak vehicles per hour).
- 2 Based on traffic generation estimates from Barneys Reef Wind Farm assessment.
- 3 Based on traffic generation from Tallawang Solar Farm assessment.
- 4 Based on traffic generation estimates from Spicers Creek Wind Farm assessment.
- 5 Future level of service (LoS) based on rural road network service flow rates in *Table 4.4* and totalling the current traffic with traffic generation from all projects. Shown as LoS for daily traffic (peak hourly traffic).

The total cumulative traffic flows shown in *Table 4.7* above, indicate that operating conditions (levels of service) along the rural road network would generally be adequate, even in the unlikely event that all surrounding proposed / approved developments are operating (being constructed) simultaneously and after the addition of total cumulative traffic generation.

It should be noted that the above total cumulative traffic suggests there is potential for cumulative traffic impacts to occur, eg. resulting in an hourly (peak) LoS of D for Golden Highway. However, it is considered that this worst-case scenario is unlikely to occur due to a number of factors including staff / material resourcing and component manufacture as well as collaboration between projects to avoid transport scheduling conflicts. This would also need to be considered in the development of detailed construction traffic management plans (CTMPs) for each project.

Once the construction dates / timetables are finalised for the Tallawang Solar Farm Project (currently anticipated to start in Q4 2026 for a period of approximately 36 months) as well as for the above projects, the cumulative impact of all concurrent projects (including any other potential future projects) would need to be considered with respect to transport and traffic operations.

Generally, any transport-related impacts would initially need to be considered as part of a CTMP to minimise cumulative construction impacts. This is particularly relevant for wind farm projects such as Barneys Reef, which generate the great majority of their transport impacts during the construction phase.

Typical mitigation measures would include:

- Independent scheduling of construction activities and deliveries for each project so that they do not overlap in order to minimise road transport movements.
- Region-wide traffic management.
- Shared road infrastructure upgrade works.
- Targeted dilapidation and reinstatement programs.
- Collective community consultation programs.

## **4.7 Decommissioning Phase**

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At the end of the operational life of the Project, should the Project be decommissioned, all infrastructure will be dismantled and removed from the Project site. This may not include the connection infrastructure which may be essential to be retained.

Internal roads, if not required for ongoing farming purposes or fire access, would be removed and the Project site reinstated as close as possible to its original condition and use. Access gates, if not required for farming purposes, would also be removed. Individual landowners will be involved in any discussion regarding the removal or hand-over of infrastructure on their property.

All decommissioning work would be the responsibility of the Proponent and provision for this will be included in the lease arrangements agreed with the landowners.

Traffic generation during decommissioning is estimated to be approximately 30% less than the peak traffic generation during construction – refer to the traffic generation volumes shown in *Table 4.2* above.

Based on the assessment of the intersection and road capacity during the construction phase (detailed above in *Section 4.3.1* and *Section 4.3.2*), traffic and road network impacts would be minimal with only marginal changes from existing conditions. Although the road network conditions at the end of the Project's life in 35 years are unknown, it is considered that based on current conditions, the road network would have significant spare capacity and be able to accommodate the necessary heavy vehicles to be used during the decommissioning.

As per the construction phase, a comprehensive CTMP would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

## **5. Mitigation Measures**

The general management of potential impacts including the preparation and implementation of a comprehensive Project CTMP with Drivers' code of conduct, dilapidation reporting, road authority approvals and OSOM transport permits remains generally as described in the original TIA and EIS.

### **5.1 Potential Road Infrastructure Upgrades**

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As well as the construction of an internal on-site access network that connects the various parts of the solar farm site and associated infrastructure, local intersection widening works to accommodate the increased heavy vehicle volumes and OSOM transport vehicles would be required at the primary Project access off Castlereagh Highway and an un-named local road directly south of the Project site.

The proposed Castlereagh Highway intersection will consist of a three-way junction with a connecting access road extending onto the Project area. The proposed intersection upgrade would provide a protected (channelised) turn lane intersection treatment to accommodate the swept path turning movement by the largest types of trucks requiring access to the Project area – refer to *Appendix B* for the proposed intersection upgrade strategic design at Castlereagh Highway.

The intersection upgrade works described above would be developed and implemented in consultation with and to the satisfaction of the local Council(s) and TfNSW and designed to their satisfaction and approval.

## 6. Summary & Conclusions

The following pertinent issues summarise the transport assessment for the Amended Project:

- The solar farm would be located in the Central West region of NSW, approximately 8 km north-west of Gulgong, within the Mid-Western LGA and the Central West Orana Renewable Energy Zone.
- The Project will involve the construction, operation and decommissioning of a 500-MW solar farm with a BESS of approximately 500 MW / 1,000 MW-hours.
- The Project will include a 400-person Temporary Workers Accommodation (TWA) facility, including upgrading an un-named local road along the southern portion of the solar farm Project area to provide dedicated access to the TWA facility.
- The primary Project access provides a newly proposed access location from the Castlereagh Highway and along a local un-named road south of the Project area, for all transportation including OSOM vehicles and standard light and heavy vehicles.
- The preferred transport route for OSOM vehicles is via Golden Highway and Castlereagh Highway to the Project's primary site access off the highway.
- The major road network and standard heavy vehicle road network provides transport routes directly to the Project's primary access off Castlereagh Highway.
- The source of resources for construction is a commercial procurement decision which will occur post-Development Consent. The routes used to move the resources through the surrounding towns and road network will be along the major road network and standard heavy vehicle road network, or alternatively along routes permitted by the resource suppliers' permitting and approvals process.
- The major and minor road networks in the vicinity of the proposed solar farm project all have significant spare capacity.
- All solar farm component locations and ancillary infrastructure would be able to be accessed from the primary Project access point via an internal project site road network.
- During the construction phase, several tasks would generate traffic including solar farm component delivery, construction material delivery and construction staff transport. During peak construction activities, the maximum daily traffic generation along the external road network would generally be up to 140 light vehicle trips (in and out) and approximately 320 heavy vehicle trips (in and out). There would be a total maximum of 12 OSOM vehicle trips (in and out) during the entire duration of the Project's construction period.
- During peak construction activities, all affected roads on the road network would maintain satisfactory levels of service and adequately absorb construction-generated traffic. Similarly, the proposed Castlereagh Highway / Project site access intersection will operate satisfactorily.
- Traffic generation during operations would be minimal resulting in a maximum of up to 20 trips per day (in and out). Consequently, traffic and road network impacts would be negligible during the operational phase.

- During Project construction, the increased traffic generation and in particular, the higher turning movements to / from the highway at the Project's site access would warrant an intersection upgrade with protected (channelised) turn lane intersection treatments, which is proposed to be undertaken prior to construction.
- A comprehensive CTMP would be prepared by the Proponent in conjunction with the transport contractor and relevant road authorities and all aspects would be implemented in co-ordination with the local Council and TfNSW.
- The use of licensed and experienced contractors for transporting solar farm equipment and components would ensure a minimisation of transport-related impacts. They would operate closely with road authorities and arrange all required permits for undertaking the transport tasks, as well as carry out detailed transport route assessments and confirm the requirement for any road infrastructure upgrades.
- Traffic generation during decommissioning is estimated to be approximately 30% less than the peak traffic generation during construction. Traffic and road network impacts are anticipated to be minimal with only marginal changes from existing conditions. A comprehensive CTMP would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities to ensure adequate road safety and road network operations are maintained.
- While there are a number of nearby major projects that may result in cumulative impacts, once the construction dates / timetables are finalised for the Tallawang Solar Farm Project, the cumulative impact of all concurrent projects (and potentially other future projects) would need to be considered with respect to transport and traffic operations.

In conclusion, it is considered that with the appropriate intersection upgrade at Castlereagh Highway / Project site access road, the upgrade along the Project site access road and suitable construction traffic management, the proposed Tallawang Solar Farm Project would not create any significant adverse impacts with respect to transport issues such as traffic operations, road capacity on the surrounding road network, site access and road safety. The management of heavy vehicle movements during construction would be appropriately covered by a CTMP to be prepared prior to construction starts, while the use of a specialised and licensed transport contractor would ensure that the transport tasks would be undertaken in an appropriate manner.

**Appendix A**

**Transport for NSW Submission Issues**

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Issue / Requirement	Where Addressed
<p><b>Proposed Intersection Upgrade and Site Access</b></p> <p><i>Appendix 19 - Concept Drawings</i> for Project access, includes a BAR / BAL design in addition to a (short) CHR / AUL. It is unclear why the BAR / BAL has been provided, as it is not addressed in the TIA or the EIS. Notwithstanding this, TfNSW does not consider a CHR(s) is sufficient to provide the required storage length, to accommodate the proposed turning (construction) traffic volumes.</p> <p><i>Appendix 19</i> further shows a section of unsealed road between the site access and the Castlereagh Highway intersection proposed upgrades along Jacksons Lane. TfNSW requires Jackson Lane be sealed between the site access and intersection connection to the Castlereagh Highway (inclusive of all proposed works), to reduce the extent of wear and road damage.</p> <p>As the proposed works are within the classified (state) road reserve, TfNSW concurrence (with Council as the Roads Authority) will be required, under <i>Section 138 of the Roads Act 1993</i>. Further to this, the developer will be required to enter into a 'Works Authorisation Deed' (WAD) with TfNSW, or other suitable arrangement as agreed to by TfNSW.</p>	<p>RES has consulted with Transport for NSW following the exhibition of the EIS to discuss their submission. This is discussed in further detail in <i>Section 5 of the Amendment Report (Umwelt, 2024)</i>.</p> <p>In response to Transport for NSW's submission, the proposed intersection treatment has been updated to a standard (full size) CHR &amp; AUL treatment, as shown in <i>Appendix B</i> of this TIA. The updated intersection treatment has been assessed in <i>Section 4.3.2</i> of this TIA.</p> <p>Should the Project be approved, relevant approvals under <i>Section 138 of the Roads Act 1993</i> will be sought from Council and Transport for NSW for the proposed intersection upgrade and site access works.</p>
<p><b>Cumulative Impacts</b></p> <p>A number of large scale / renewable developments within proximity to the project site either recently approved or in planning stages, have been included within <i>Appendix 17 – Cumulative Impact Assessment</i>, a comparative assessment table, identifying where potential cumulative impacts may need to be considered. <i>Table 4.7 - Potential Total Cumulative Traffic Generation</i> of the TIA, directly address ('worst case') cumulative traffic impacts along the transport route/s (in particular) Golden Highway and north and south of the site on the Castlereagh Highway. Only a limited number of developments (Barneys Reef Wind, Stubbo Solar Farm and Dunedoo Solar Farm) have been included. TfNSW notes further consideration of the cumulative impacts needs to be given to other nearby projects such as Birriwa Solar Farm (EIS exhibition completed), Bellambi Heights Solar Farm &amp; the Liverpool Ranges Wind Farm (approved), which may potentially have overlapping construction timeframes with Tallawang Solar Farm.</p> <p>Furthermore, the assessment undertaken primarily focuses on the cumulative impacts of traffic passing the key intersection and the Golden Highway transport route, however additional assessment is required to consider additional cumulative impacts, such as</p>	<p>An updated cumulative impact assessment has been completed in <i>Section 4.6</i> of this TIA.</p>

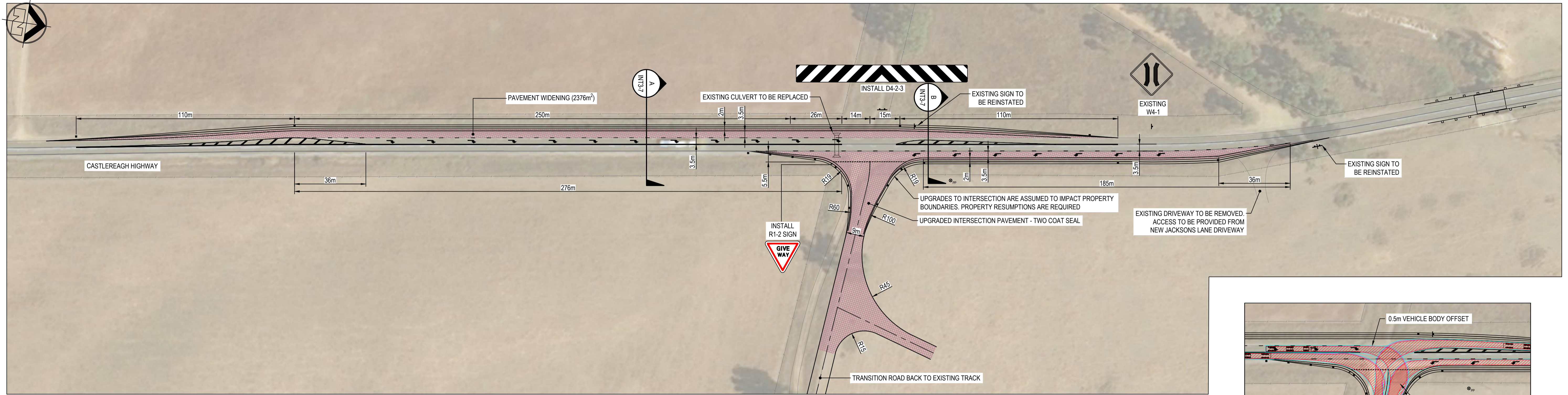
Issue / Requirement	Where Addressed
<p>accommodation availability, infrastructure, services, worker transportation (shuttle buses).</p>	
<p><b>OSOM and Largest Design Vehicles</b></p> <p>The project proposes a maximum of four (4) 16-axle OSOM vehicle movements to site over the 36-month construction period, with the potential for two (2) OSOM vehicles to arrive to site on the same day. TfNSW note, the swept paths of OSOM turn movements into Jacksons Lane from the Castlereagh Highway demonstrate the need to use the opposing travel lanes, which will need to be addressed further in the Traffic Management Plan (TMP), and a Traffic Guidance Scheme (TGS), detailing how the key movement will be managed under approved traffic control conditions. TfNSW require further details regarding the dimension and mass of the proposed loads.</p> <p>Section 4.2.1 in the TIA proposes B-Doubles (size unknown) as the largest design vehicle (excluding OSOM), furthermore it is stated that the use of 'Type A road trains or B-triples for transport' is preferred and may be considered by the transport contractor. However, the proposed intersection upgrade is demonstrated to accommodate the swept paths of a B-Double (size unknown) only. Further clarification needs to be provided to clearly identify the vehicle type and dimensions of the largest design vehicle/s proposed by the development.</p>	<p>Refer to <i>Section 4.1</i> of this TIA.</p>
<p><b>Rail Impacts</b></p> <p>Section 4.3.4 of the TIA refers to a (yet to be appointed) transport contractor undertaking (future) detailed assessment of the construction transport impacts to the Wallerawang – Gwabegar Railway line. TfNSW understand the proponent has commenced consultation with ARTC, the Rail Infrastructure Manager (RIM) for this location, to address rail impacts of the development. The Consent Authority should ensure ARTC has had the opportunity to review and provide comment on this application regarding any rail related matters to determine if any actions are required and if applicable, captured in any future consent conditions.</p>	<p>The original TIA identified that the Project would require access over two railway level crossings along the Wallerawang Gwabegar Railway line (maintained by ARTC). However, amendments to the Project have removed the overhead transmission line from the Project as this is now the responsibility of the electricity network operator, ie. EnergyCo. As a result, the Amended Project will no longer require access over the rail corridor.</p>

Issue / Requirement	Where Addressed
<p><b>Traffic Management Plan (TMP)</b></p> <p>Further to the proposed inclusions in a TMP (<i>Section 5.1</i> of the TIA), the TMP is to be prepared and implemented, in accordance with <i>Australian Standard 1742.3, Work Health and Safety Regulation 2017</i> and in consultation with relevant Councils and TfNSW. The TMP needs to identify strategies to manage the impacts of project related traffic.</p>	<p>A commitment to develop and implement a Construction Traffic Management Plan (CTMP) in consultation with the Mid-Western Regional Council and Transport for NSW is included in the EIS and original TIA as a management measure should the Project be approved. The CTMP will include a Drivers Code of Conduct and will be designed to minimise the impact of Project construction traffic (including OSOM vehicles) on the external road network.</p>
<p><b>Intersection and Site Access Upgrade</b></p> <p>As identified above in the preceding points, amendments and / or additional information is required to address the impacts of the development on the classified road network in particular the intersection of the Castlereagh Highway &amp; Jacksons Lane.</p> <p>TfNSW highlights that in determining the application under <i>Part 4 of the Environmental Planning &amp; Assessment Act, 1979</i>, it is the Consent Authority's responsibility to consider the environmental impacts of any road works which are ancillary to the development, such as (inter alia) removal of trees, relocation of utilities, stormwater management, etc.</p> <p>It is recommended that the Consent Authority request the applicant to provide an updated scaled strategic design of the proposed access addressing the below points for consideration, showing:</p> <ul style="list-style-type: none"> <li>- Updated plans, cross sections and long sections, demonstrating the full scope of works required for any upgrade to the Castlereagh Highway and Jacksons Lane intersection.</li> </ul>	<p>Further consultation with Transport for NSW was undertaken following the exhibition of the EIS to discuss their submission. This is discussed in <i>Section 5 of the Amendment Report (Umwelt, 2024)</i>.</p> <p>In response to Transport for NSW's submission, the proposed intersection treatment has been updated to a standard (full size) CHR &amp; AUL treatment. Refer to <i>Appendix B</i> of this TIA for the updated scaled strategic design of the proposed access and cross sections as requested in Transport for NSW's submission.</p>

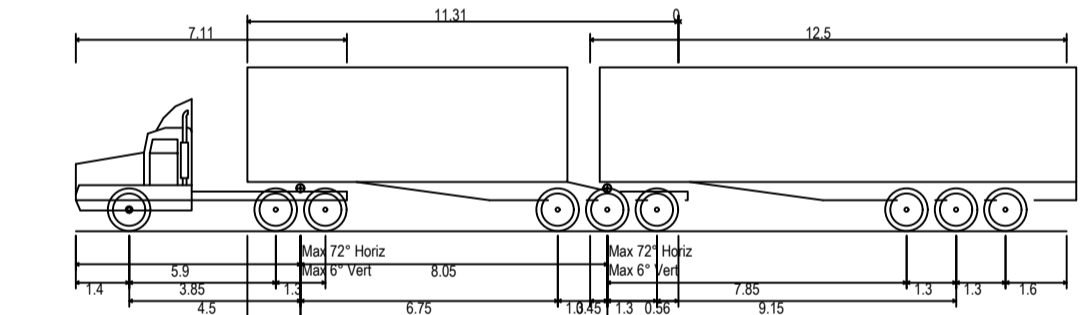
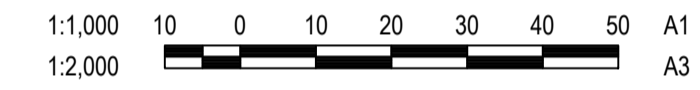
Appendix B

**Castlereagh Highway: Proposed  
Intersection Upgrade Strategic Design**

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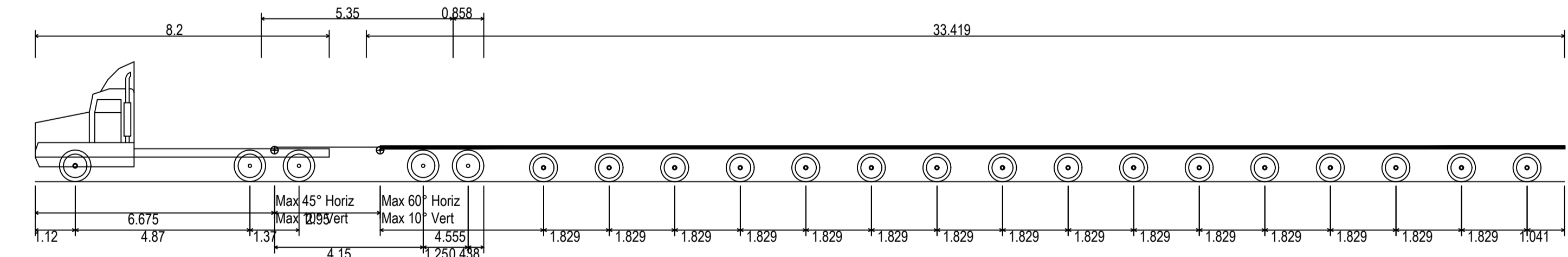
**CASTLEREAGH HIGHWAY / SOLAR FARM ACCESS INTERSECTION PLAN - CHR / AUL**



**B-Double (26.0m)**  
 Overall Length 26.000m  
 Overall Width 2.500m  
 Overall Body Height 4.300m  
 Min Body Ground Clearance 0.540m  
 Track Width 2.500m  
 Lock-to-lock time 6.00s  
 Curb to Curb Turning Radius 15.000m

**26.0m B-DOUBLE**

NTS



**DRAKE 16 (4.3m Wide)**  
 Overall Length 42.656m  
 Overall Width 4.900m  
 Overall Body Height 3.341m  
 Min Body Ground Clearance 0.368m  
 Max Track Width 2.900m  
 Lock-to-lock time 6.00s  
 Wall to Wall Turning Radius 24.047m

**16 ROW - WITH DOLLY**

NTS

**NOTES**

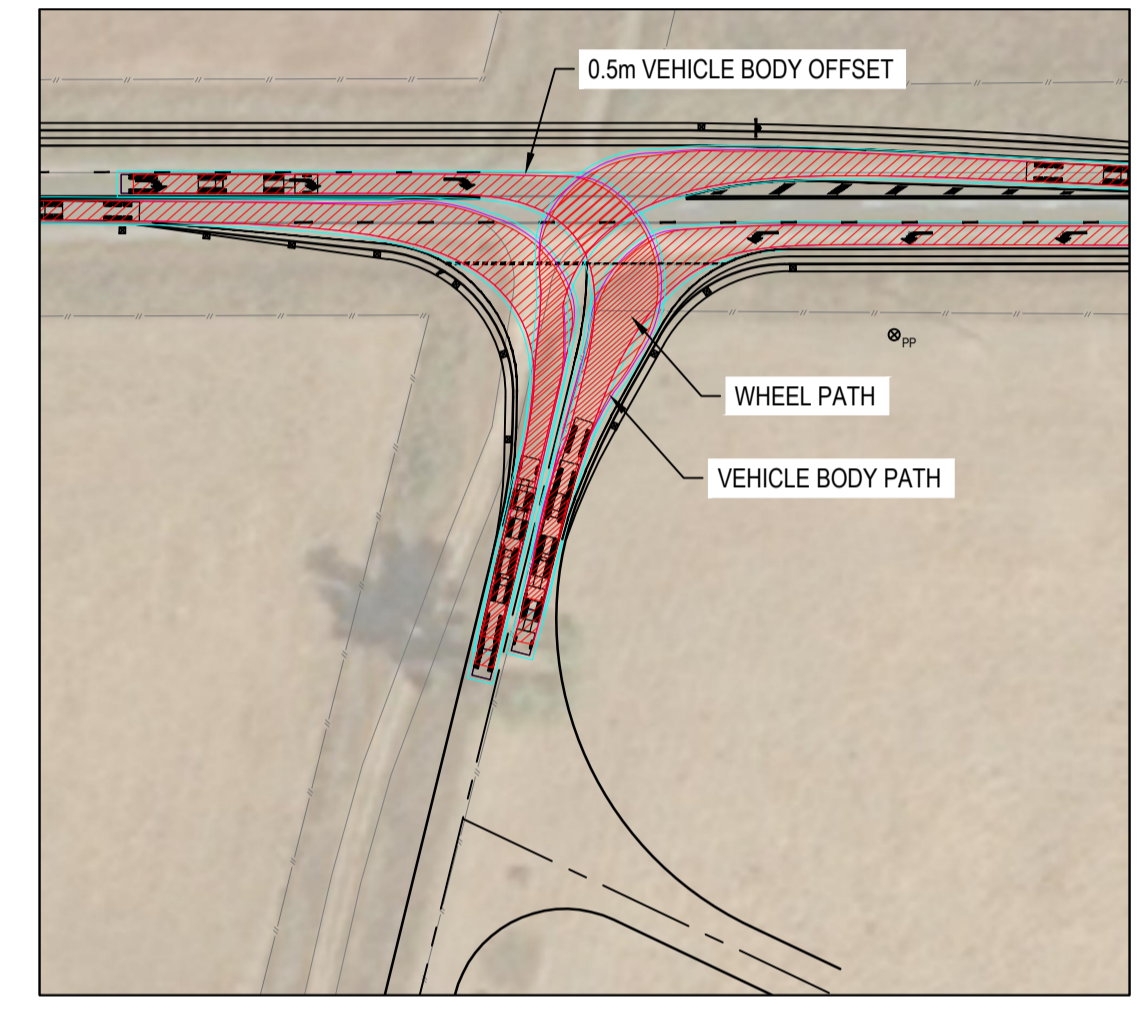
- CLEARING OF VEGETATION SHALL ONLY BE PERFORMED AFTER RELEVANT AUTHORITY APPROVALS ARE OBTAINED, IF REQUIRED FOR ROAD UPGRADE
- SURVEY OF HEIGHT CLEARANCES ALONG TRANSPORTATION ROUTE SHALL BE COMPLETED BY THE APPOINTED TRANSPORTATION CONTRACTOR
- POTENTIAL CLASHES OF EQUIPMENT TRANSPORT VEHICLE WITH GUARDRAILS, TRAFFIC SIGNALS AND STREET LIGHTING TO BE CONFIRMED BY THE APPOINTED TRANSPORTATION CONTRACTOR
- TOPOGRAPHICAL FEATURE AND CADASTRAL SURVEY TO BE CARRIED OUT ADJACENT TO INTERSECTION PRIOR TO DETAILED DESIGN

**LEGEND**

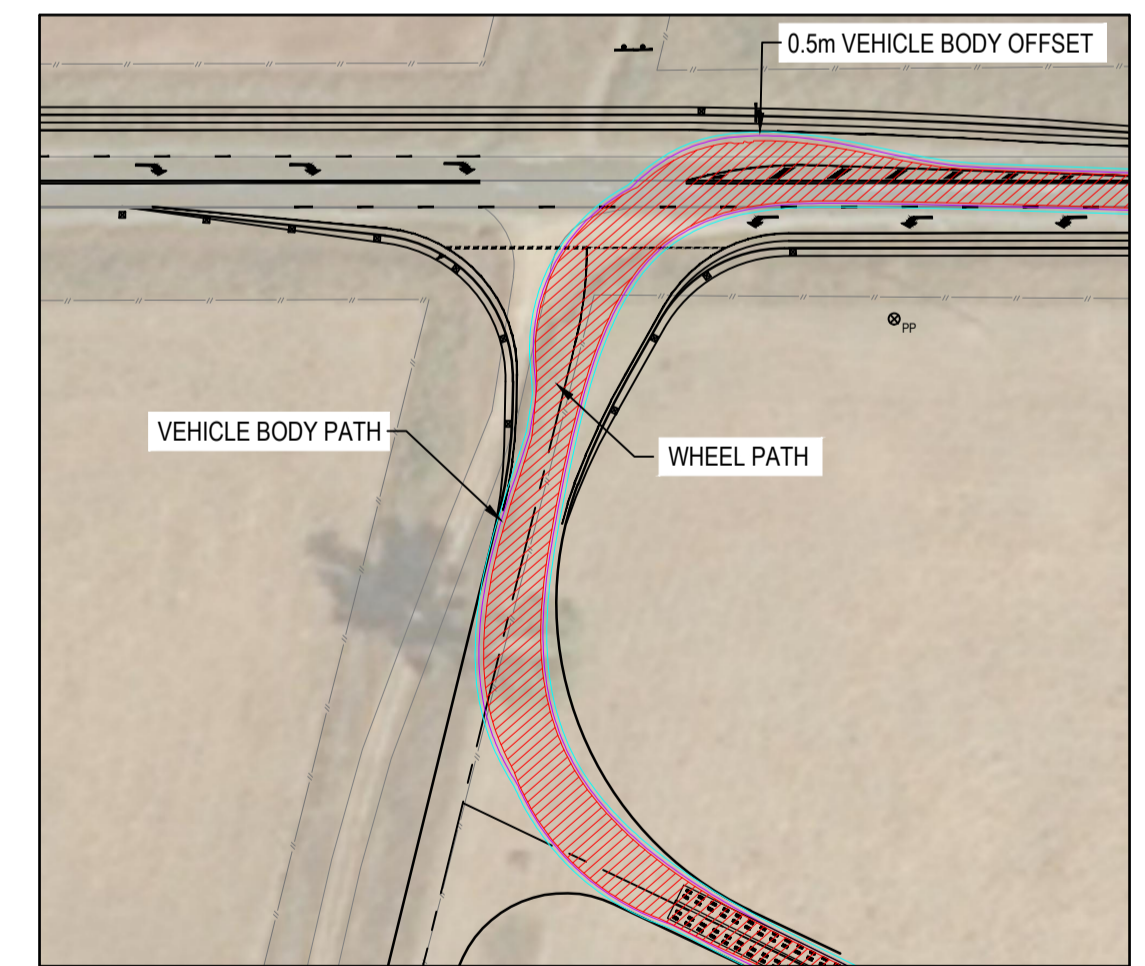
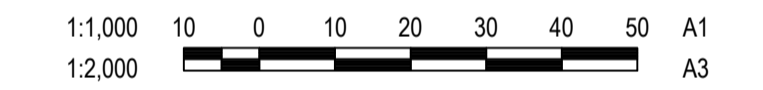
- EXISTING FENCE LINE
- REMOVABLE GUIDE POST
- REMOVABLE SIGN
- EXISTING POWER POLE
- PROPOSED SEALED WIDENING
- PROPOSED UNSEALED ROAD UPGRADE

**PAVEMENT MARKINGS**

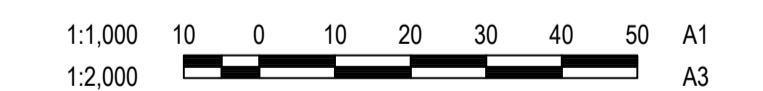
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BARRIER LINES	BS	3000 STRIPE AND 9000 GAP	100
GIVE WAY LINES	TB	600 STRIPE AND 600 GAP	300
GIVE WAY LINES	TB1	600 STRIPE AND 600 GAP	150
SEPERATION LINE	S1	3000 STRIPE AND 9000 GAP	100
EDGE LINES	EL	1000 STRIPE AND 3000 GAP	150
CONTINUITY LINE	CL	1000 STRIPE AND 3000 GAP	150
DIVIDING LINE	DL	1000 STRIPE AND 3000 GAP	100



**SWEPT PATH - B DOUBLE**



**SWEPT PATH - 16 ROW**



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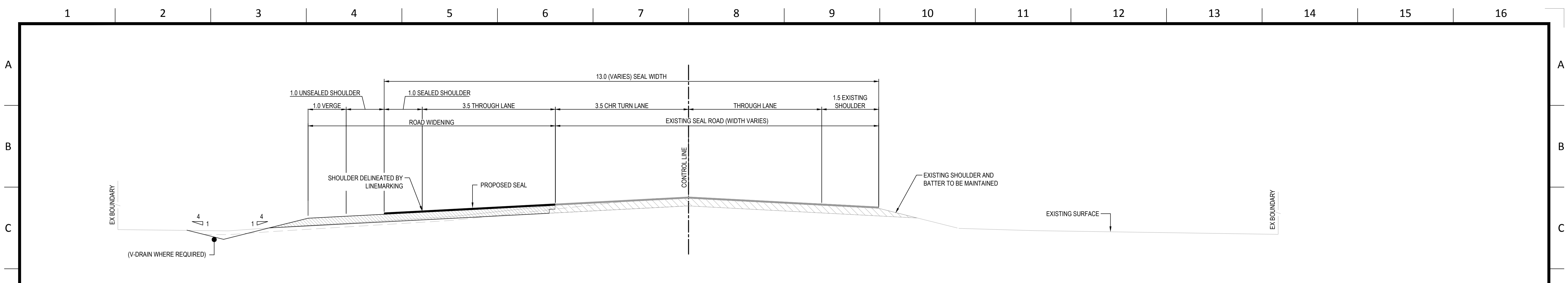
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D	FOR APPROVAL	A.P.	A.P.	J.M.	J.M.	29.02.2024
C	RFI RESPONSE	L.K.	L.K.	T.J.S.	T.J.S.	19.12.2023
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A	FOR APPROVAL	L.K.	L.K.	T.J.S.	T.J.S.	16.11.2023

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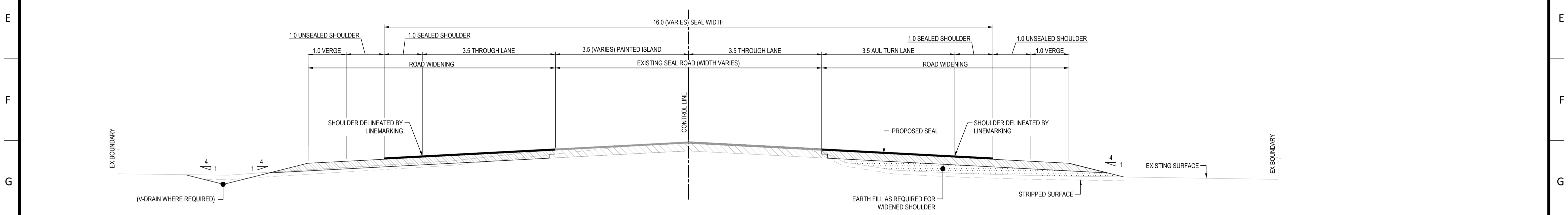
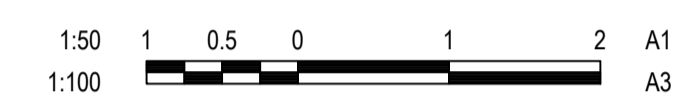
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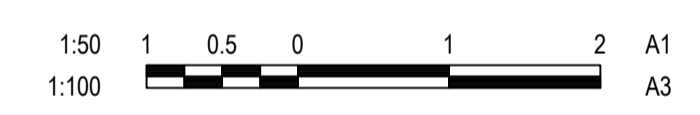
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DRAWING No.	20-010-INT3-4
REV	E



TYPICAL CROSS SECTION - CHR TURN LANE



TYPICAL CROSS SECTION - AUL TURN LANE



TO BE PRINTED  
IN COLOUR

No	DESCRIPTION	DES	DRN	CHK	APP	DATE
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A	FOR APPROVAL	A.P.	A.P.	J.M.	J.M.	29.02.2024

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**RES**  
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STATUS	FOR APPROVAL NOT FOR CONSTRUCTION
COORDINATE REFERENCE SYSTEM	GDA2020 MGA Z55

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