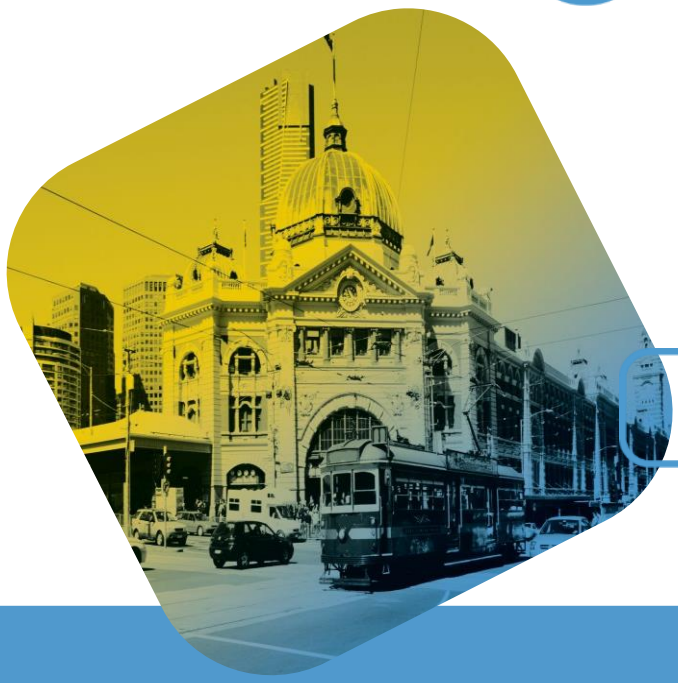
Appendix F: Traffic impact assessment

33°53'23"S
147°19'03"E

Wyalong Solar Farm: Newell Highway, West Wyalong



Traffic Impact Assessment

31 October 2018
Prepared for ESCO Pacific

IMP180936TIA01F01

Impact

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Appendices

1 IMPACT® Snap Shot

Development Proposition

Location	33° 53' 23" S 147° 19' 03" E	1409 Newell Highway, Wyalong, New South Wales
Use	130 MW Solar Farm	
Access	Access to the site will be directly from Newell Highway.	
Car Parking	A detailed car park design has yet to be determined, however it is assumed that: - During construction, vehicles will be parked either at designated laydown areas, storage locations, or where construction activities are occurring; - During operations, operational and maintenance staff vehicles will be accommodated on-site within a vehicle parking area located adjacent to the site office	

Statutory Controls

Access	
Access Design	We are advised that most delivery vehicles into and out of the site during construction will be 19 metres in length. Notwithstanding, we understand that the site access will be able to cater for 26 metre B-double vehicles into and out of the site.
Sight Distances	A desktop assessment of sight distances along Newell Highway has been undertaken and indicates that sight distances greater than 450 metres should be available at the proposed site access. It is recommended that a physical sight distance assessment be undertaken prior to construction, and (whilst unlikely) trees be trimmed if necessary.
Turn Warrants	We are advised that a large majority of site traffic will enter the site from the south west, and a lesser number of traffic from the north east. The site therefore triggers a warrant for a Basic Left Turn treatment (BAL) and Basic Right Turn Treatment (BAR). It is recommended that a BAL and BAR treatment be provided along Newell Highway in accordance with the requirements outlined in AustRoads Guide to Road Design
Traffic Generation	
Construction	A total of 5,290 single trip vehicle movements (i.e. inbound or outbound) are estimated to be generated by the subject site. This translates to a peak of 46 single trip daily vehicle movements (comprising 22 light vehicles and 24 heavy / over-dimension vehicle movements).
Operation	It is estimated that the site will have up to two daily vehicle movements associated with routine maintenance during operations. There will also be, on occasion some additional movements associated with more thorough maintenance.
Impact	Delivery and haulage routes are entirely contained within pre-approved General Mass Limit (GML) and Concessional Mass Limit (CML) roads which are expected to be able to adequately cater for construction traffic and operational traffic. It is expected the RMS will assume responsibility for the maintenance of these roads (which are controlled by RMS) with the site contributing a negotiated maintenance fee during construction.

	It is expected that traffic during the operation will be noticeable but have no discernible impact on the operation of the surrounding local roads.
Recommendations	
Turn Treatments	A BAL and BAR treatment (in accordance with the requirements set out in the AustRoads Guide to Road Design) should be provided for construction traffic entering the site from Newell Highway.
Traffic Management Plan	It is recommended that a detailed Traffic Management Plan (TMP) be prepared once the project design is complete and prior to commencement of the project construction to confirm requirements for mitigation and management works.

Conclusion

— There are no traffic and transport grounds that should prohibit the issue of a permit

2 Introduction

2.1 Engagement

IMPACT® have been engaged by Accent Environmental on behalf of ESCO Pacific to undertake an assessment of the traffic implications of the proposed Wyalong Solar Farm (the project) located near West Wyalong, New South Wales.

This Traffic Impact Assessment has been prepared to accompany an Environmental Impact Statement (EIS) for the project.

3 Wyalong Solar Farm

3.1 Location

The Wyalong Solar Farm (the project) development site is located on the northern side of Newell Highway, approximately seven kilometres north-east of West Wyalong Township and is addressed as 1409 Newell Highway, Wyalong, as illustrated in Figure 1.

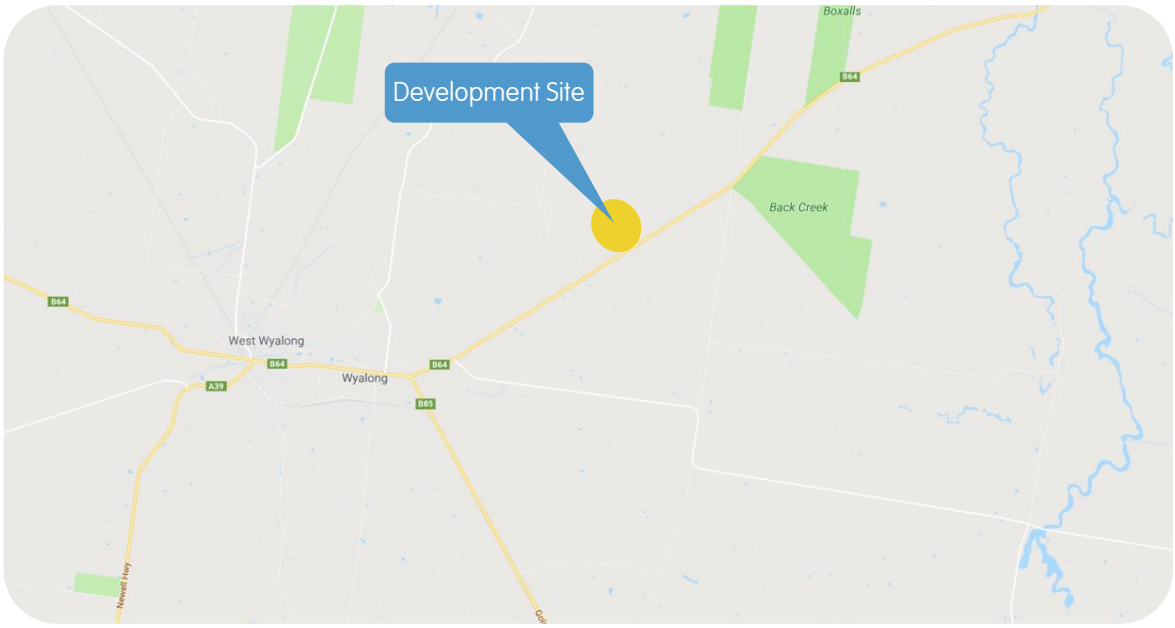


Figure 1 Location of Development Site

The project is expected to be a 130MW solar farm within a 256 ha disturbance footprint. Figure 2 shows the development site and relevant disturbance footprint.

Figure 2 Development Site Footprint

3.2 Site Context

The subject land is comprised mainly of flat-lying open paddocks, which have historically been used for cropping and grazing activities.

The site is bound by the Newell Highway to the south-east and is crossed by a 132 kV power line.

3.3 Existing Road Network

3.3.1 Newell Highway

Newell Highway is a State Arterial Road which is generally aligned in a north-south direction and extends between Goondiwindi in Queensland to Tocumwal in southern New South Wales.

In the vicinity of the site, Newell Highway has been constructed with a central seal in the order of 7.0 metres (two x 3.5 metre lanes) plus sealed shoulders measuring approximately 2.5 metres on each side; additional local widening has been provided at various points along Newell Highway (near the site) to provide for pull out areas for broken down vehicles.

The Newell Highway operates with a posted speed limit of 110 km/hr adjacent to the development site.

Figure 3 represents a typical section of Newell Highway near the subject site.

Figure 3 Views of Newell Highway facing north-east adjacent the subject site

3.3.1.1 Existing Traffic Volumes - Newell Highway East of Nicholson Lane[1]

Data published by the Roads & Maritime Services (RMS), indicates that on average Newell Highway carries in the order of 2,250 vehicles per day in the vicinity of the subject site[2].

A further breakdown of the data reveals an approximate 50/50 northbound-southbound split, with 60% of vehicles classified as light vehicle traffic and 40% heavy vehicle traffic.

3.3.2 RMS Road Network Limits

The RMS General Mass Limits (GML) and Concessional Mass Limits (CML) network in the locality of the development site is reproduced as Figure 4 and the Higher Mass Limit (HML) network in the locality of the development site is shown in Figure 5.

Figure 4 RMS General Mass Limits (GML) and Concessional Mass Limit (CML) Network

[1] Traffic Volume Data Sourced from RMS Traffic Volume Viewer: https://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html#/?z=16&lat=-33.92508563661113&lon=147.26639648780111&yr=2018

[2] Counters were located approximately 6 kilometres west of the site, however it is our view that they are representative of the volumes expected along the relevant section of Newell Highway

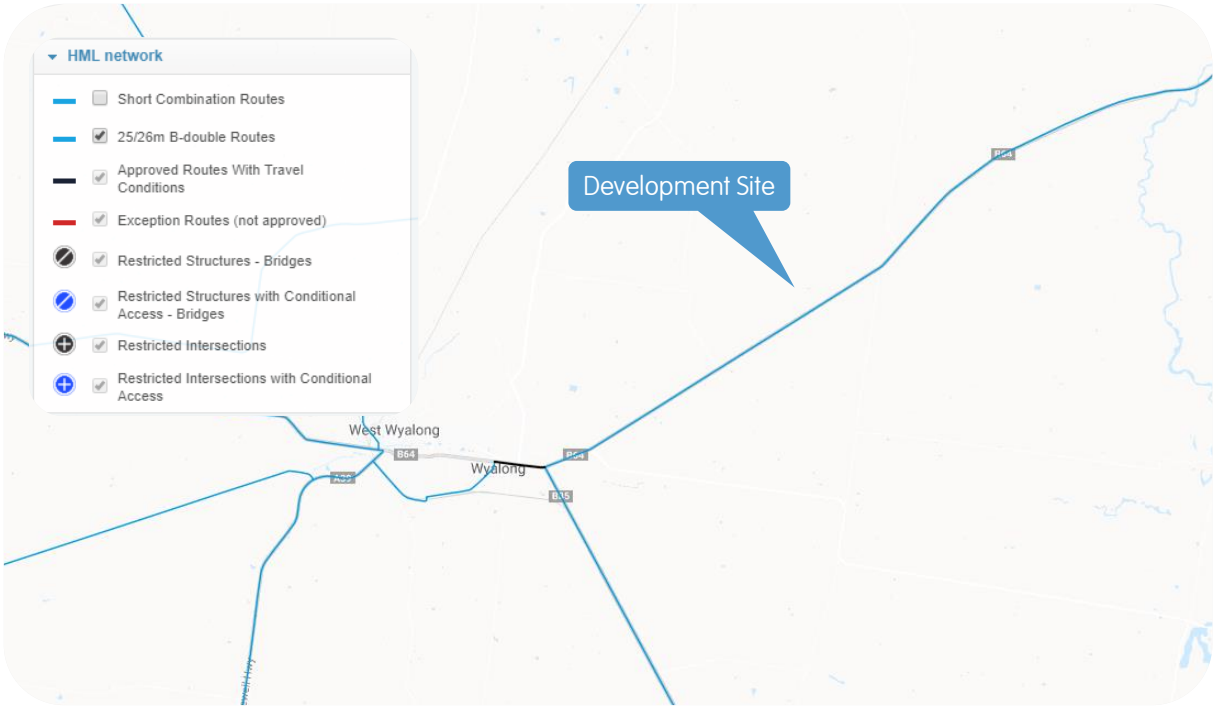


Figure 5 RMS Higher Mass Limits (HML) Network

The RMS network plans confirm that the Newell Highway in the vicinity of the site is approved for GML, CML and HML vehicles.

Furthermore, it is noted that routes approved for GML, CML and HML vehicles are available further afield to both the north-east and south-west.

3.4 Solar Farm Description

IMPACT® have been advised that the project will consist of a solar energy facility comprising approximately 350,000 solar panels (modules) and a capacity to generate up to 130 MW.

It is expected that an on-site substation will be constructed adjacent to and used to connect into the existing 132 kV power line which intersects the site from the north-east towards the south-west.

The site fronts on to Newell Highway, with no other road frontages available. Access to the site will therefore be directly from Newell Highway.

4 Vehicle Access

4.1 Planning Requirements

Clause 101, Subdivision 2, Division 17 of Part 3 of the State Environmental Planning Policy (Infrastructure) 2007 outlines the following objectives:

> 101 Development with frontage to a classified road
>
> *(1)* The objectives of this clause are:
>
> a. to ensure that new development does not compromise the effective and ongoing operation and function of classified roads, and
>
> b. to prevent or reduce the potential impact of traffic noise and vehicle emission on development adjacent to classified roads.
>
> *(2)* The consent authority must not grant consent to development on a land that has a frontage to a classified road unless it is satisfied that:
>
> a. Where practicable and safe, vehicular access to the land is provided by a road other than the classified road, and
>
> b. The safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of:
>
> i. The design of the vehicular access to the land, or
>
> ii. The emission of smoke or dust from the development, or
>
> iii. The nature, volume or frequency of vehicles using the classified road to gain access to the land, and
>
> c. The development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of development arising from the adjacent classified road.

The following assessment has been prepared to demonstrate that the proposed site access to Newell Highway (in lieu of no other practical alternatives) is a practicable and safe vehicular access that meets the objectives of Clause 101.

4.2 Access Routes

4.2.1 Coarse Aggregate and Fine Crushed Gravel

IMPACT® has been advised that both coarse and fine gravel for the construction of hardstand areas and access tracks will be sourced locally, and that access to the site by dump trucks will likely be via Newell Highway from the south-west.

We note that there are some quarries further afield to the north-east which could potentially be a source of aggregate for the project; should these be used, vehicles will approach along Newell Highway from the north-east.

4.2.2 Water Deliveries

We are advised that external water deliveries required for construction and dust suppression will be sourced locally and be via Newell Highway from the south-west.

4.2.3 Solar Module / Substation Components

IMPACT® have been advised that due to the specialised nature of the solar farm components, these materials are likely to be sourced from overseas.

Materials will be imported from either Sydney or Melbourne and then transported to the site by road. It is anticipated that heavy and over-dimensional vehicles will approach the site using the same routes from Melbourne or Sydney. The anticipated route from Sydney is as follows:

Sydney - M1 Motorway - M5 Motorway - Hume Motorway - Hume Highway - Burley Griffin Way - Goldfields Way - Newell Highway - Subject Site

The anticipated route from Melbourne is as follows:

Melbourne - Citylink - Metropolitan Ring Road - Hume Freeway - Goulburn Valley Freeway - Shepparton Truck Bypass (River Road, Boyles Road & Grahamvale Road) - Goulburn Valley Highway - Newell Highway

We note that the route from Melbourne could also take the Wyalong bypass, which would change the route as follows:

Melbourne - Citylink - Metropolitan Ring Road - Hume Freeway - Goulburn Valley Freeway - Shepparton Truck Bypass (River Road, Boyles Road & Grahamvale Road) - Goulburn Valley Highway - Newell Highway - Wyalong Bypass (Showground Road & Compton Road) - Newell Highway

4.2.4 Construction Staff

During the delivery of the project, it is expected that a majority of staff will reside in Wyalong / West Wyalong.

IMPACT® are advised that a majority of staff are to be bussed in from Wyalong, along Newell Highway.

4.2.5 Emergency Vehicle Access

Emergency vehicle access to/from the site will be via the Newell Highway. The site access will provide an appropriate ingress and egress point for emergency service vehicles.

Furthermore, vehicles accessing the site will not impact on emergency vehicles travelling along Newell Highway (see Section 4.5 below)

4.3 Site Access

4.3.1 Access Corridor

Based on the foregoing, we understand that the main access corridor for construction vehicles will be via Newell Highway from the south-west (and left-turn into the site).

IMPACT® are advised that some vehicles may need to approach the site from the north-east (particularly if sourcing aggregate from this direction) and that access from the North-East should not be precluded.

4.3.2 Pre-Approved Heavy Vehicle Routes

As highlighted in Section 3.3.2 Newell Highway, Showground Road, Compton Road and Central Road are all approved for use by GML and HML vehicles, thus no approvals will be required to use any of these roads to be used as part of the heavy vehicle delivery route.

We also expect that these intersections will be able to physically cater for any proposed oversized vehicles used by the site. These vehicles will require adequate traffic management (including escort vehicles and pilot cars) to the satisfaction of the relevant authority; the extent of the escort will be determined when securing the relevant RMS / VicRoads OD permits.

4.4 Sight Distance Assessment

4.4.1 Sight Distance requirements

A desktop assessment of the sight distance available from the site access point has been undertaken using aerial imagery, Google Street View and images provided by the applicant. We note that an on-site assessment should be undertaken to validate the following sight distance review prior to construction.

AustRoads Guide to Road Design - Part 4A: Unsignalised Intersections sets out the sight distance requirements for unsignalised intersections, including:

- Approach Sight Distance;
- Safe Intersection Sight Distances (SISD); and
- Minimum Gap Sight Distance.

The guide recommends that Safe Intersection Sight Distance (SISD) is the minimum distances that should be provided on the Major Road at any intersection.

SISD is measured as shown in Figure 6.

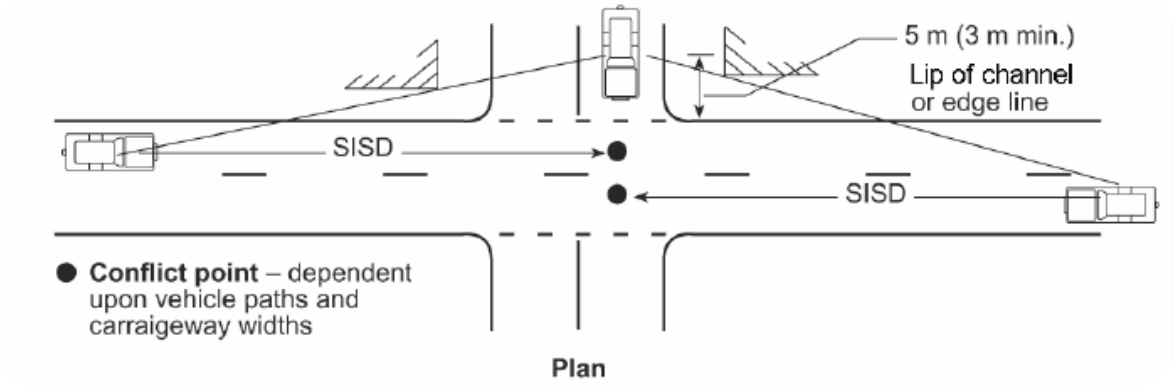


Figure 6 Guide to measuring SISD for unsignalised intersections

The Austroads Guide provides SISD values for commuter vehicles at varying design speeds. For heavy vehicles the SISD values are calculated using the following formulae.

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

where:

SISD	=	safe intersection sight distance (m)
DT	=	decision time (s) = observation time (3 s) + reaction time (s): refer to the Guide to Road Design – Part 3: Geometric Design (Austroads 2009a) for a guide to values
V	=	operating (85th percentile) speed (km/h)
d	=	coefficient of deceleration – refer to Table 3.2 and the Guide to Road Design – Part 3: Geometric Design (Austroads 2009a) for a guide to values
a	=	longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade).

Based on the above formula and adoption of an operating 85thpercentile speed of 110km/h, a minimum SISD of 366 meters is required.

4.4.2 Assessed Site Access Sight Distance

Newell Highway in the vicinity of the site is generally very straight and flat, the trees along the verge of the highway are setback at least 5 - 5.5 metres from the carriageway to the north-east and 6-7 metres in the south west, as generally illustrated in the image below.

Figure 7 Newell Highway facing north-east adjacent the subject site

The SISD measurement is taken from a location 5.0 metres from the edge of the through lane to the middle of the through lanes for approaching vehicles.

Thus, with trees setback approximately 5-7 metres from the through lanes, sight distance at this intersection to the north-east and south-west are expected to comfortably exceed the minimum requirement, as illustrated in Figure 8.

Figure 8 Sight Distance Assessment - Proposed Site Access

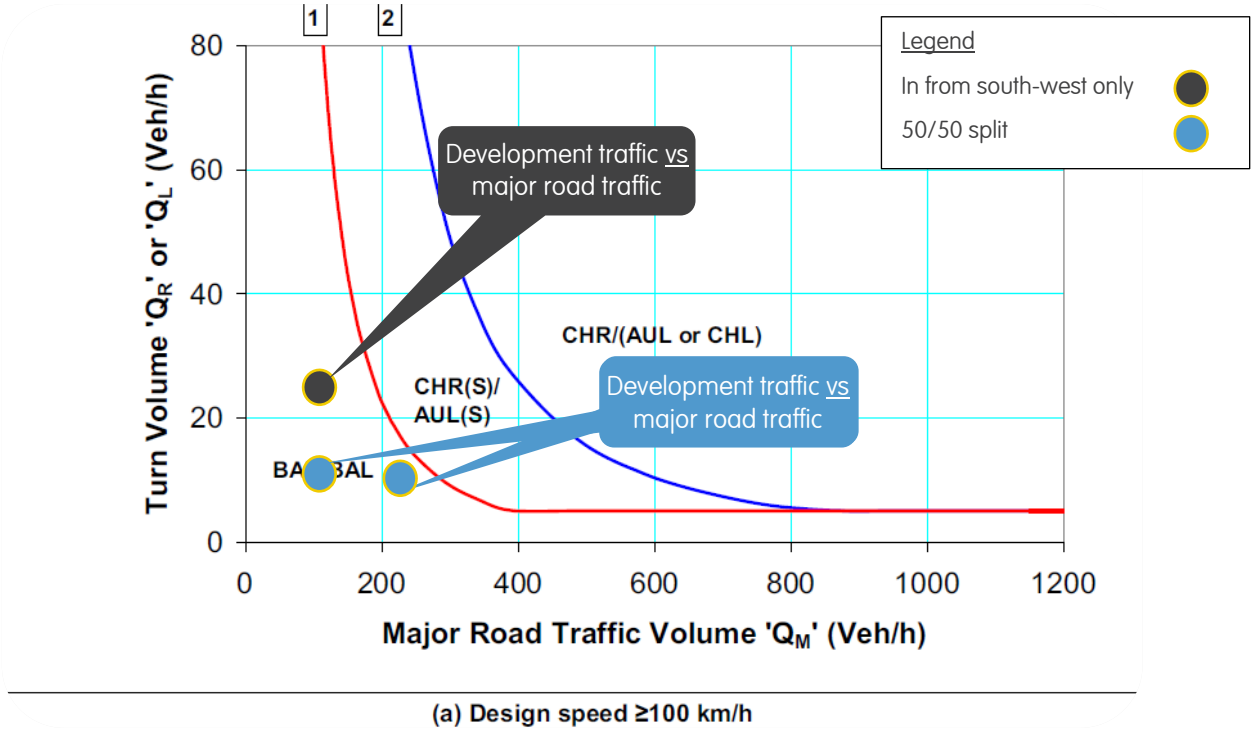
Based on the above, sight distances available along Newell Highway are more than sufficient to meet the minimum SISD requirements (assessed sight distances exceeding 450 metres in both directions).

Prior to construction, an on-site assessment should be undertaken to confirm that there is no vegetation impeding on the integrity of the available SISD's (minor trimming could be undertaken if required).

Furthermore, supplementary 'trucks crossing' signs could also be used to provide advanced warning for vehicles travelling along Newell Highway if desired.

4.5 Turning Lane Assessment

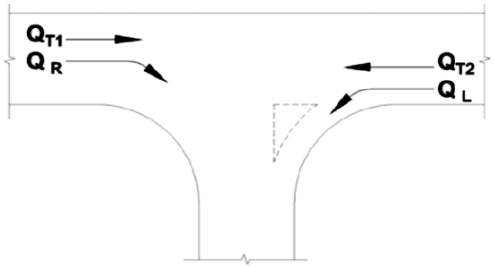
Reference has been made to AustRoads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings[3] (AGTM Part 6). This document provides guidance on the warrants for various turn treatments at unsignalised intersections, these warrants are reproduced as Figure 9.



(a) Design speed ≥100 km/h

Figure 9 Warrants for turn treatments at unsignalised intersections

Note: Q_m (or major road traffic volume) is calculated using the method outlined in Figure 2.27 of the AGTM Part 6, which has been replicated below as Figure 10.



Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= Q_{T1} + Q_{T2} + Q_L
		Yes	= Q_{T1} + Q_{T2}
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x Q_{T1} + Q_{T2} + Q_L
		Yes	= 50% x Q_{T1} + Q_{T2}
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x Q_{T1} + Q_{T2} + Q_L
		Yes	= 33% x Q_{T1} + Q_{T2}
	Left	Yes or no	= 33% x Q_{T2}

Figure 10 Calculation of the major road traffic volume Q_m

[3] AustRoads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings, AustRoads 2017 Edition)

These warrants provide guidance on where a full-length deceleration lane must be used and where a shorter lane, designated Auxiliary Left Turn Lane (AUL) and Channelised Right Turn (CHR), may be acceptable based on traffic volumes.

The warrants apply to turning movements from the major road only, with the applicable traffic flows being peak hour flows. It has conservatively been assumed that peak site traffic will coincide with peak traffic along Newell Highway.

As discussed in Section 3.3.1.1, traffic counts undertaken by the RMS indicate that Newell Highway carries in the order of 2,200 vehicles per day on average. It is a 'rule of thumb' that peak hour traffic flows are approximately 10% of daily traffic volumes. Accordingly, about 220 vehicles (combined north and south) are expected during peak hours on average, with approximately 110 in each direction.

The proposal is projected to generate in the order of 92 daily vehicle movements during the peak construction period, of which 46 are expected to be inbound vehicle movements. (see Section 5.1 below). It is conservatively assumed that 50% of these movements will occur during the peak period, equating to approximately 23 vehicles going into the site.

As discussed above, we expect a majority of traffic will approach from the south west (as advised), however the warrants for traffic split evenly between north and south has also been shown (i.e. 12 in from each direction).

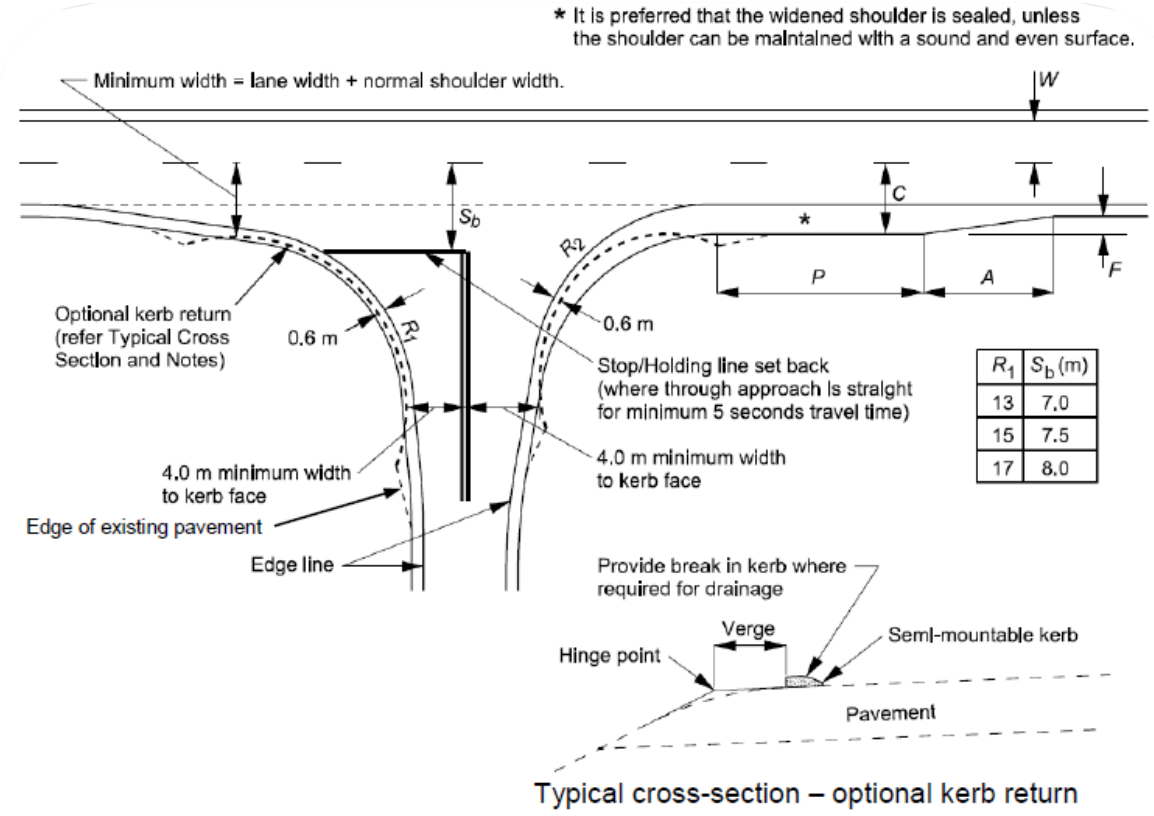
Consideration of these volumes against the warrants reveals that the following turn treatments are triggered:

- Basic left-turn treatment (BAL)
- Basic right-turn treatment (BAR)

We therefore recommend that a BAL and BAR treatment be provided for vehicles entering the site from the Newell Highway in accordance with Figure 7.6 and 8.2 of AustRoads Guide to Road Design Part 4A - Unsignalised and Signalised Intersections[4] which is reproduced as Figure 11 and Figure 12.

We note that these volumes do not take into consideration an increase in traffic due to peak harvesting seasons, however we do not expect the increase in traffic volumes associated with this peak to change the warranted turn treatment.

[4] AustRoads Guide to Road Design Part 4a: Unsignalised and Signalised Intersections, AustRoads 2017 Edition)



R_1	S_b (m)
13	7.0
15	7.5
17	8.0

Notes:

- *R_1 and R_2 are determined by the swept path of the design vehicle.*
- *The dimensions of the treatment are defined thus:*

W = *Nominal through lane width (m) (including widening for curves).*

C = *On straights – 6.0 m minimum.*
On curves – 6.0 m plus curve widening (based on widening for the design turning vehicle plus widening for the design through vehicle).

$A = \frac{0.5VF}{3.6}$

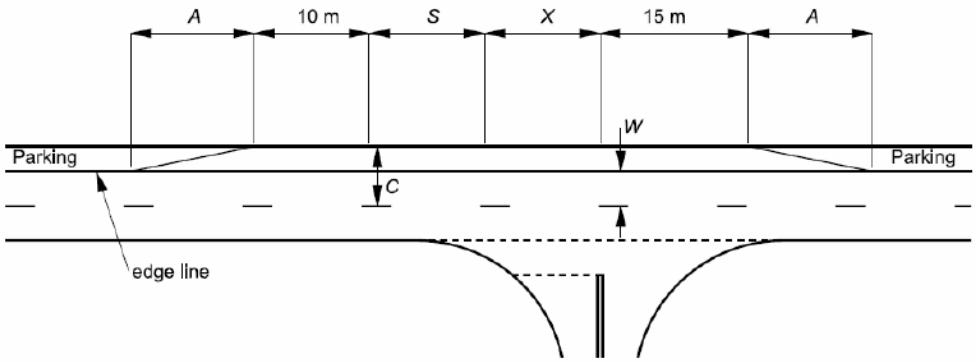
V = *Design speed of major road approach (km/h).*

F = *Formation/carriageway widening (m).*

P = *Minimum length of parallel widened shoulder (Table 8.1).*

S_b = *Setback distance between the centre of the major road and the give way or stop line in the minor road.*

Figure 11 Basic Left-Turn Treatment (BAL)



Notes: This diagram does not show any specific bicycle facilities. Where required bicycle facilities should be provided in accordance with this Part.

The dimensions of the treatment are defined thus:

W = Nominal through lane width (m) (including widening for curves). Width to be continuous through the intersection.

C = On straights – 6.0 m minimum
– 6.5 m minimum for 19 m semi-trailers and B-doubles
– 7.0 m minimum for Type 1 and Type 2 road trains
On curves – widths as above + curve widening (based on widening for the design turning vehicle plus – widening for the design through vehicle).

$$A = \frac{0.5V(C-W)}{3.6}$$

Increase length A on tighter curves (e.g. where side friction demand is greater than the maximum desirable). Where the design through vehicle is larger than or equal to a 19 m semi-trailer, the minimum speed used to calculate A is 80 km/h.

V = Design speed of major road approach (km/h).

S = Storage length to cater for one design turning vehicle (m) (minimum length 12.5 m).

X = Distance based on design vehicle turning path, refer to Design Vehicles and Turning Path Templates (Austroads 2013f).

Figure 12Basic Right -Turn Treatment (BAR)

5 Traffic Considerations

5.1 Traffic Generation

5.1.1 Construction Traffic

Construction is expected to occur for a total of approximately nine months, with estimated project traffic and peak daily traffic summarised in Table 1, the full traffic volume estimations are shown attached as Appendix A.

Table 1 Estimated One-Way Construction Traffic

Type of Vehicle	Total Vehicle Movements	Peak Daily Movements
Heavy Vehicles	Approximately 2,320 total HV movements	Peak of 24 daily HV movements
Light Vehicles	Approximately 2,970 total LV movements	Peak of 22 daily LV movements
Total	5,290 total movements	Peak of 46 daily movements

We note that movements shown above are for single trips to or from the site, i.e. inbound (or outbound) movements. The total traffic generation for the site, and each of the peak hours would be twice that shown in the table.

5.1.2 Operation and Maintenance Traffic

For the majority of the time, solar farms operate with limited staff and generate minimal traffic movements.

Accordingly, apart from the initial construction phase, the proposal is anticipated to have a negligible impact upon traffic on the local road network. Details of likely traffic generation during the operation are estimated as follows:

- Daily routine maintenance to be carried out by one to two people. It is assumed that the daily traffic generation will not exceed two vehicle movements per day to the local road network, with all other movements being internal to the site.
- Occasional maintenance will occur when components of the development need to be replaced, such as replacing solar panels or tracker systems. This is expected to occur only very occasionally, and will have no discernible impact on the external road network.
- Visitors to the site such as office based staff and courier deliveries etc.

In the context of the solar farm construction traffic and background traffic along Newell Highway, operating traffic will be minimal.

5.2 Traffic Impact

The proposed development will generate up to 46 daily vehicle movements (comprising 22 light vehicles and 24 heavy / OD vehicles) during the peak construction periods and about two vehicle movements per day during operation.

This traffic will be entirely accommodated along Newell Highway. The impact of this additional traffic is expected to be minimal, as discussed below.

5.2.1 Newell Highway Impacts

As discussed in Section 3.3.2, the proposal seeks to utilise the existing RMS approved GML, CML and HML heavy vehicle routes which have been designed to cater for such vehicles as proposed.

Data provided by the RMS indicates that the Newell Highway generally carries in the order of 2,200 vehicles per day in the locality of the subject site.

Traffic during the peak construction periods equates to an approximate increase of 5% when compared against the existing traffic along Newell Highway. It is expected that these volumes will be comfortably absorbed on Newell Highway with no detrimental impacts to performance.

BAR and BAL treatments are recommended at the site access point to ensure that inbound movements do not compromise performance and safety along Newell Highway.

5.3 Other Impacts

5.3.1 Visual Amenity / Glare

Consideration of the visual amenity implications of the solar farm are provided within the visual impact assessment which has been prepared by Accent Environmental Pty Ltd.

5.3.2 Nearby Mineral Extraction

IMPACT® are advised that there are a number of quarries and mineral extraction sites which have been identified within 20 kilometres of the subject site; a list of these quarries is provided attached as Appendix B. In addition, the Cowal Gold Mine is located slightly further afield approximately 30 kilometres north of the development site.

Given the proposed construction vehicle routes (as discussed in Section 4.2) it is possible that a portion of construction traffic will drive past a some of these quarries / pits on their way to and from the development site.

We do not expect that construction traffic will have any significant impact on the operation of these pits, particularly given the relatively low number of total vehicle movements; 92 trips are expected across an entire day conservatively assuming all construction traffic passes a particular pit.

6 Traffic Management Plan

Subject to the appointment of a supplier / construction contractor and other considerations, aspects of the Wyalong Solar Farm (the project) may be subject to review.

In addition, construction / work programs for the project will not be fully resolved until closer to the project commencement. As such, subject to commencement timeframes, there is potential for changes to the existing road conditions and Solar Farm haulage assumptions as considered within this report.

Based on the foregoing, and our experience with similar projects, we expect that a detailed Traffic Management Plan (TMP) will need to be prepared prior to the commencement of the project to confirm any mitigation measures and management works required at that time.

The TMP would be implemented as a condition of any Development Consent issued for the Solar Farm and would be developed in consultation with the Bland Shire Council, RMS, ESCO Pacific and any other relevant stakeholders to provide a more accurate indication of traffic impacts and generally identify responsibilities for road maintenance and upgrades throughout the construction period.

In general, the TMP should include:

- Confirmation of the Solar Farm construction timeframe and work stages;
- Confirmation of expected traffic volumes generated by the solar farm for all work stages
- Identification of all HV and OD vehicle haulage routes for all work stages
- A mechanism to review identified haulage route road conditions prior to the commencement of works
- Mechanisms/agreements (if deemed necessary) to maintain haulage route roads and road infrastructure, including local public roads used by site traffic, during construction works and to reinstate roads to at least pre-construction conditions
- Qualify any requirement for specific work stage construction traffic management plans;
- Qualify and identify any relevant mechanisms for OD vehicle permits and traffic management requirements;
- Confirm on-site the adequacy of available sight distances along the Newell Highway from the site access.

Please note that this is not an exhaustive list, and that the final TMP requirements will be as per those outlined in the Development Consent.

APPENDIX A
Wyalong Solar Farm Construction Traffic Movements

Indicative Traffic Movements Provided by ESCO

West Wyalong- Indicative Construction Traffic Movements

H-Tracking System		
Expected MWp	**130**	
Expected MVA	**125**	
PCU	Schneider CS2400	
Material Delivery	MWp per load	Movements
Modules (40' Container)	0.21	619
Inverter Stations (40' Container)	4.40	28
Tracking System (40' Container)	0.40	325
Piles (40' container)	0.46	283
33kV Switchgear + O&M Facilties (Oversized)	130.00	3
220kV Transformer (Oversized)	130.00	1
Balance of System (40' Container)	1.00	130
Civil Construction (Semi-trailer)	0.15	867
Constuction Plants (Semi-trailer)		64
Total Heavy Vehicle Movements		2,320

Monthly Construction Traffic - Heavy Vehicles

	Month									
Material Delivery	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Total
Modules (40' Container)				124	124	124	124	124		619
Inverter Stations (40' Container)						9	9	9		28
Tracking System (40' Container)			81	81	81	81				325
Piles (40' container)		94	94	94						283
33kV Switchgear + O&M Facilties (Oversized)						3				3
220kV Transformer (Oversized)							1			1
Balance of System (40' Container)				43	43	43				130
Civil Construction (Semi-trailer)	173	173	173	173	173					867
Constuction Plants (Semi-trailer)	7	7	7	7	7	7	7	7	7	64
Total Heavy Vehicle Movements	181	275	356	523	429	268	141	140	7	2,320
Daily Average Heavy Vehicle Movements	9	13	17	24	20	13	7	7	1	

Construction Labour	
Daily on Site Labour	150
Mini Bus Capacity	15
Daily Mini Bus Activity	10
Construction Period (work days)	198
Total Mini Bus Movements	1,980
Additional Daily Cars	5

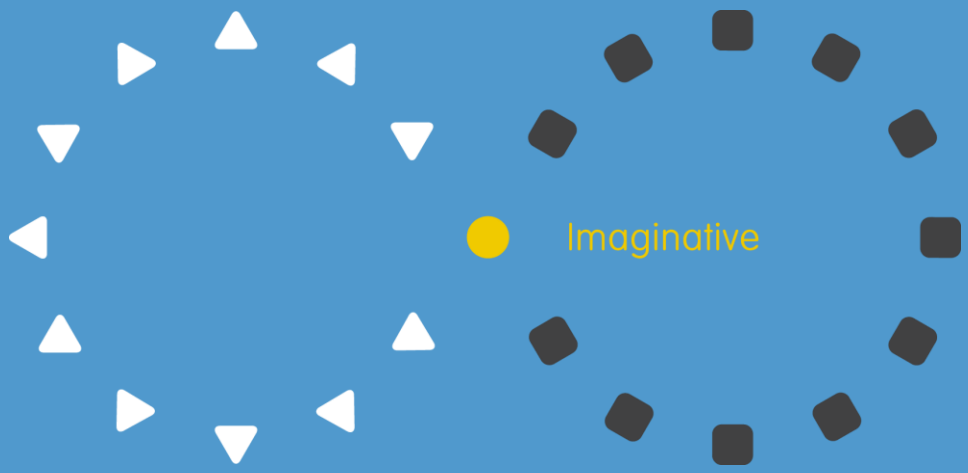
Monthly Construction Traffic - Light Vehicles

	Month									
Construction Labour	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Total
Total Light Vehicle Movements	193	223	373	478	448	415	340	310	193	2,970
Daily Average Light Vehicle Movements	9	10	17	22	20	19	15	14	9	

APPENDIX B
Mineral Resources

Quarry / Pit Locations (provided by Accent Environmental)

Quarry name	Identification number	Status	Distance and direction from site	Material quarried
Blacks Pit	217210	Operating - intermittent	1.3 km north-west	Siltstone
Unnamed	103930	Not operating	5.7 km south-west	Unprocessed construction materials
Blandview Pit	217198	Operating - intermittent	5.8 km north-east	Manna Conglomerate
Markeith Pit	217196	Operating - intermittent	6.1 km north-east	Manna Conglomerate
Lows Pit	217195	Operating - intermittent	7.1 km south-east	Manna Conglomerate
Unnamed	109065	Not operating	7.3 km south-west	Construction material
Unnamed	109066	Not operating	7.3 km south-west	Construction material
Unnamed	109067	Not operating	7.3 km south-west	Construction material
Millers Pit	216102	Not known	8.5 km west	Narragudgi Volcanics
Barbers Pit	217197	Operating - intermittent	8.6 km north-east	Manna Conglomerate
Unnamed	103931	Not operating	8.6 km north-east	Not known
Millers Quarry	104013	Operating - continuous	9.6 km south-west	Coarse aggregate quarry in Bland Diorite
Yiddah South Road Pit	216064	Not operating	10.4 km south	Yiddah Formation
Narragudgil Trig Pit	216062	Operating - intermittent	10.5 km south	Manna Conglomerate
Unnamed	104028	Not operating	10.6 km north-west	Not known
Unnamed	104027	Not operating	10.7 km north-west	Unprocessed construction materials
Unnamed	104026	Not operating	11.9 km north-west	Unprocessed construction materials
Unnamed	103929	Not operating	12.4 km south-west	Not known
Unnamed	108988	Not operating	14.0 km south-west	Not known
Unnamed	103928	Not operating	14.7 km south-west	Not known
Unnamed	216074	Not known	16.7 km west	Ungarie Granite
Rodmere Pit	217208	Operating - intermittent	17.4 km west	Humbug Sandstone
Wyalong South Pit	217181	Operating - intermittent	18.7 km west	Not known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