

# **APPENDIX F TRAFFIC IMPACT ASSESSMENT**



Traffic & Transportation Direction



## **Muskerry Solar Power Station**

Greater Bendigo and Campaspe

Traffic Impact Assessment

October 2022

Reference: 274 rep 221028 final

# Muskerry Solar Power Station

Greater Bendigo and Campaspe

## Traffic Impact Assessment

Prepared for: Edify Energy

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### Contact

Website: [www.amberorg.com.au](http://www.amberorg.com.au)

E: [info@amberorg.com.au](mailto:info@amberorg.com.au)

Phone: 1800 022 363

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### **Appendix A**

*Intersection Design*

### **Appendix B**

*Access Design*



# 1. Background

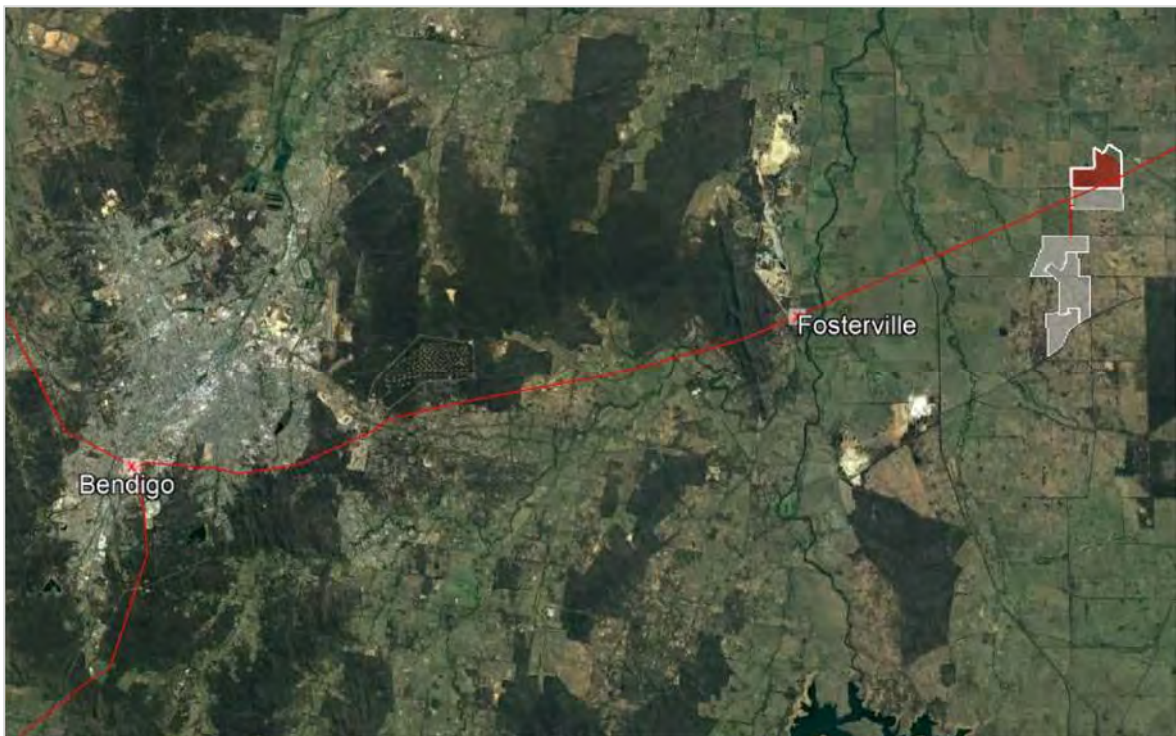
## 1.1 Background

Amber Organisation Pty Ltd has been engaged by Edify Energy to conduct a review of the traffic implications of the Muskerry Solar Power Station (the Solar Power Station) and prepare a Traffic Impact Assessment (TIA).

The Solar Power Station is located approximately 33km east of Bendigo within the Greater Bendigo and Campaspe Local Government Areas, and is proposed to have a 250MW solar capacity and 200MW/800MWh battery energy storage system. Access to the site is proposed via Toolleen-Angle Road which connects with the northern portion of the site and an internal private easement connects the southern portion of the development.

Figure 1 shows the proposed location of the site in relation to the nearby cities of Fosterville and Bendigo.

Figure 1: Site Location



## 1.2 Purpose of Document

This TIA has been prepared to assess the construction, operational and decommissioning traffic impacts, and the access arrangements of the Solar Power Station. The assessment details how road impacts of the project traffic, particularly from heavy vehicle use and oversize and overmass vehicles, will be avoided or managed using road-use management strategies.

More specifically, the report addresses the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes;

- An assessment of the potential traffic impacts of the project on road network function and safety;
- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the project;
- Details of measures to mitigate and / or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control soil erosion and dust generated by traffic volumes; and
- Details of access roads and how these connect to the existing road network and ongoing operational maintenance.

The traffic assessment has been undertaken in conjunction with consultation with Department of Transport, the City of Greater Bendigo Council and Campaspe Shire Council. It also responds to the requirements outlined within the *Department of Environment, Land, Water and Planning Solar Energy Facilities Design and Development Guideline*.

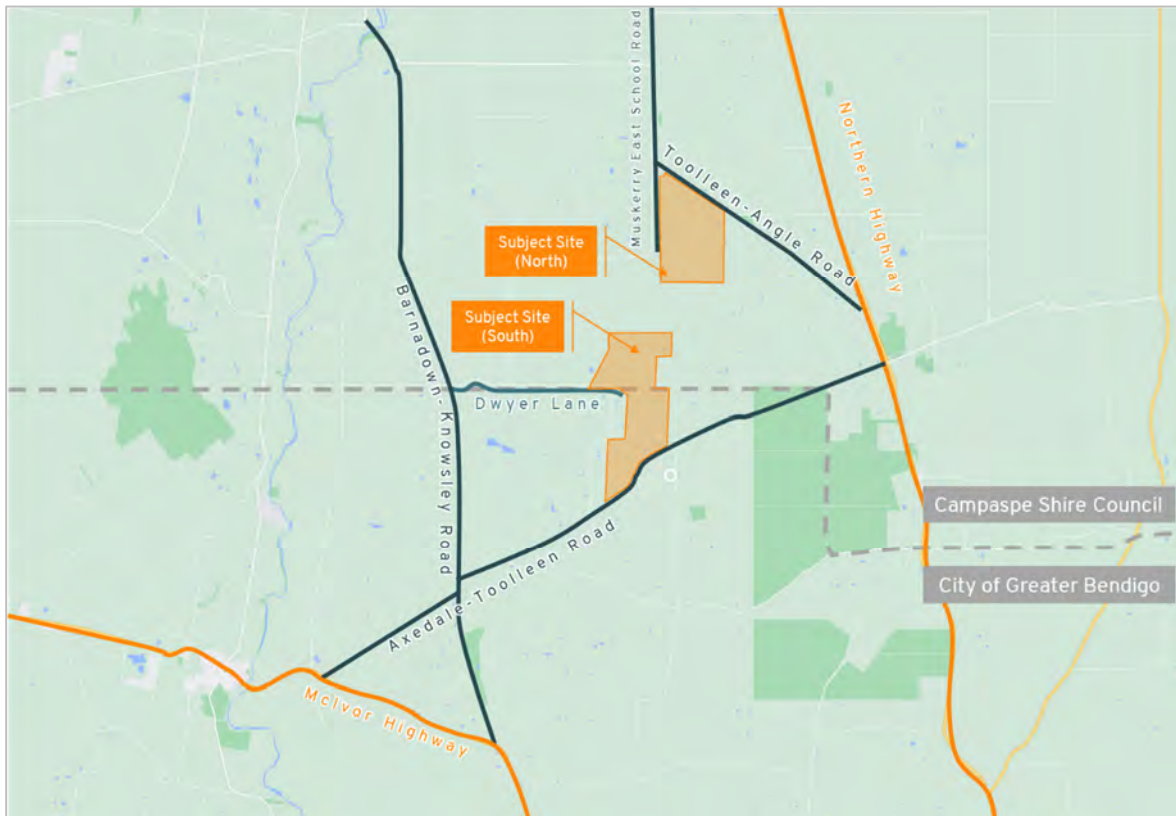


## 2. Existing Conditions

### 2.1 Site Location

The site is located approximately 33km east of Bendigo and is bounded by Axedale-Toolleen Road to the south and Toolleen-Angle Road to the north. The site is situated approximately 5km west of Northern Highway and 8.5km east of Mclvor Highway. The site location in relation to the surround transport network is shown in Figure 2.

Figure 2: Site Location



Source: Google Maps

The site is situated within two local government areas (LGAs), Campaspe Shire Council in the north and the City of Greater Bendigo in the south and is zoned as Farming Zone (FZ) throughout both LGAs. Land use of the site and surrounding areas is predominantly agricultural with most of the land used for sheep grazing and small areas cultivated for fodder cropping.

### 2.2 Road Network

**Northern Highway** is an arterial road that runs in a north-south alignment between Midland Highway and Mclvor Highway. Within the vicinity of the site, it has a carriageway width of 7 metres accommodating one lane of traffic in each direction. It is a sealed road with 2 metre unsealed shoulders on both sides and adopts the default speed limit of 100km/h for non-built-up areas.

**Mclvor Highway** is an arterial highway and a declared state road under the care and management of the Department of Transport. It runs in a general northwest-southeast alignment between Northern Highway in Heathcote and Midland Highway in Bendigo. Within the vicinity of the site, it

has a carriageway width of 7 metres accommodating one lane of traffic in each direction and sealed shoulders on both sides of the road. It has a speed limit of 100km/h.

**Toolleen-Angle Road** is a municipal local road under the care and management of the Campaspe Shire Council. It runs in a northwest-southeast alignment between Northern Highway and Muskerry East School Road. It has a sealed carriageway width of approximately 6.5 metres extending from Northern Highway for approximately 150 metres, which then reduces to a width of approximately 3.5 metres and has 1.5 metre wide unsealed shoulders on both sides of the road. It accommodates two-way traffic and has a speed limit of 100km/hr.

**Axedale-Toolleen Road** is a municipal local road under the care and management of the City of Greater Bendigo. It runs in a northwest-southeast alignment between Northern Highway and Mclvor Highway. Within the vicinity of the site, it has a carriageway width of approximately 6 metres accommodating one lane of traffic in each direction. Axedale-Toolleen Road is a sealed road with 0.5 metre unsealed shoulders on both sides and adopts the default speed limit of 100km/h for non-built-up areas.

**Muskerry East School Road** is a municipal local road under the care and management of the Campaspe Shire Council. It runs in a north-south alignment between Barnadown-Myola Road and Murphys Lane. The northern section has a sealed carriageway width of approximately 5 metres and transitions to an unsealed carriageway 420 metres south of Toolleen-Angle Road. Throughout, Muskerry East School Road accommodates two-way traffic, has unsealed shoulders on both sides, and adopts the default speed limit of 100km/h for non-built-up areas.

The intersection of Toolleen-Angle Road with Northern Highway and Muskerry East School Road are both priority-controlled with Give Way signage and linemarking provided for vehicles exiting Toolleen-Angle Road.

## 2.3 Traffic Volumes

Traffic volume data for nearby roads was obtained from the Victoria State Government Open Data Hub and local Councils and is summarised below in Table 1.

**Table 1: Traffic Volume Data**

Road	Survey Location	Year	Two-way Volume	Northbound/ (Southbound)	Growth Factor	Projected 2022 Two-way Traffic Volume
Northern Highway (HF 7666 & 1472)	Between Bendigo-Murchison Road & Heathcote-Rochester Road	2017	1,790 AADT (350 peak hour)	NB 970 AADT (SB 820 AADT)	1.70%	1,947 vpd (381 Peak hour)
Axedale Toolleen Road	800m West of Northern Highway	2018	354 ADT 87% Light 13% Heavy	-	1.70%	379 vpd
Mclvor Highway	Between Markovich Lane & High Street	2017	1,600 AADT (180 peak hour)	NB 800 AADT (SB 800 AADT)	1.70%	1,740 vpd (196 peak hour)

The Victorian survey data indicates the following:



- Northern Highway currently experiences a moderate level of traffic, well within the capacity of the arterial road. There is a higher-than-normal proportion of heavy vehicles on Northern Highway with approximately one in every five vehicles being a heavy vehicle.
- Mclvor Highway currently experiences a moderate level of traffic that is within the capacity of the arterial road and is expected to experience growth based on surrounding roads.
- Axedale Toolleen Road experiences a low traffic volume that is well within the capacity of the local road.

The data does not provide daily traffic distributions or peak hours, as such it is assumed that the morning peak hour is 7:30am to 8:30am and the evening peak hour is from 4:30pm to 5:30pm which reflects the high heavy vehicle volumes and rural nature of the area.

No traffic data is available for the other local roads within the vicinity of the subject site, all of which are expected to have low traffic volumes.

## 2.4 Public Transport Services

No public transport services are provided within the vicinity of the site.

## 2.5 Crash History

Amber has conducted a review of the VicRoads Interactive Crashstats database for all serious injury and fatality crashes within 3.5km of the subject site. The crash database provides data for the five-year period from 2015 to 2019. The crash search revealed the following crashes:

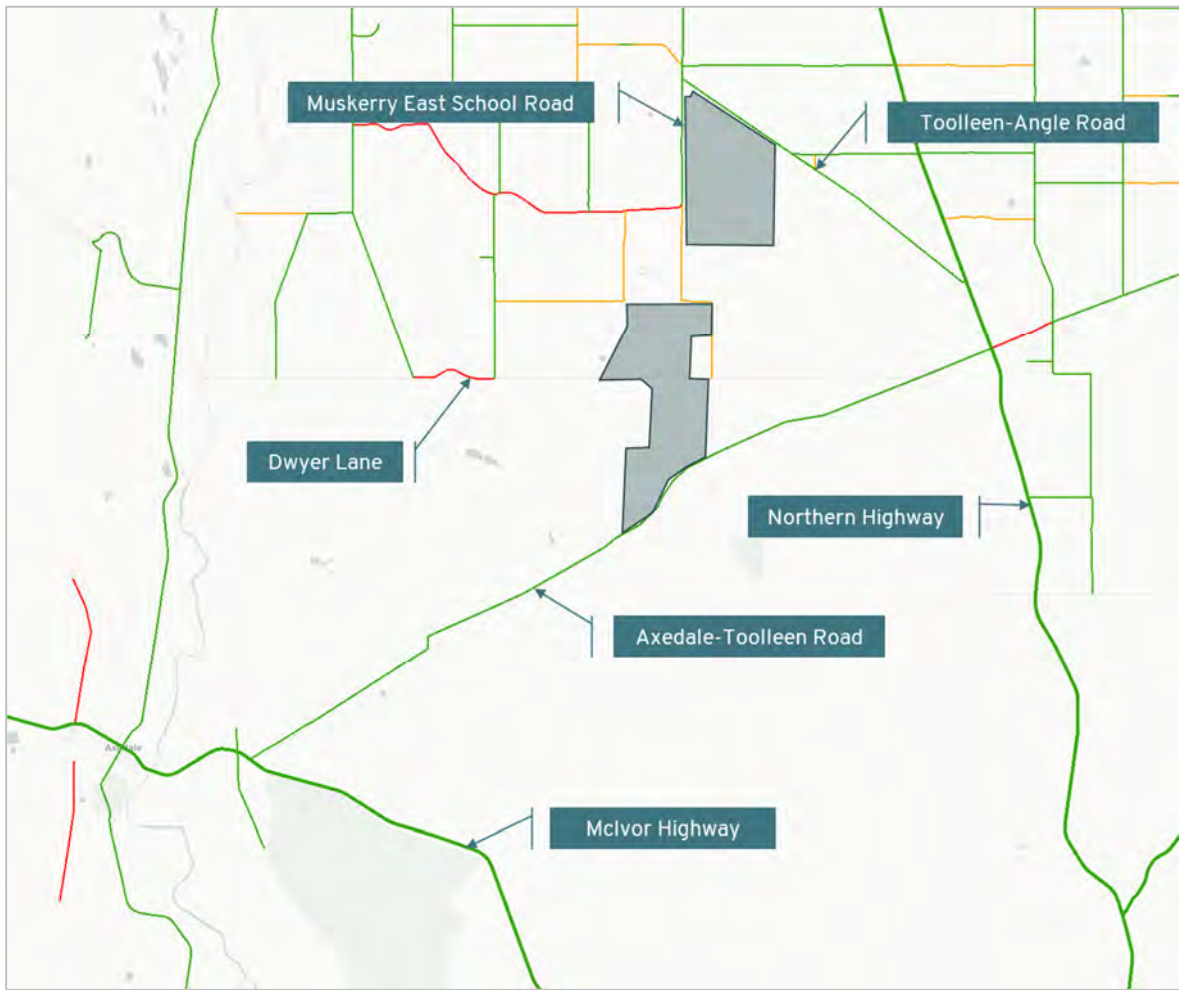
- Axedale-Toolleen Road: 1 x serious injury crash;
- Intersection of Northern Highway and Axedale-Toolleen Road: 1 x serious injury crash;
- Northern Highway: 2 x serious injury crash and 1 x fatal crash.

The crash search indicates that there are no discernible crash trends within the subject site area. Given the low number of crashes and associated traffic volumes on the surrounding roads, it is concluded that the road network is currently operating in a relatively safe manner.

## 2.6 Restricted Vehicle Access

The Victoria's Gazetted Roads for B-doubles network map for the surrounding area is provided within Figure 3. The green lines indicate B-double routes while the orange lines represent approved routes with travel conditions. As can be seen from the figure, the site is well connected from the relevant road frontages by approved and conditionally-approved B-double routes that feed into the wider state road network.

Figure 3: Victoria's Gazetted Roads for B-Double Network Map



Source: [nhvr.maps.arcgis.com](http://nhvr.maps.arcgis.com)

## 3. Traffic Assessment

### 3.1 Traffic Generation

#### 3.1.1 Construction

The Muskerry Solar Power Station construction is expected to take approximately 12-16 months, with a peak construction period of 4-5 months. Construction activities would be undertaken during standard daytime construction hours, as follows:

- Monday to Friday: 7am – 6pm
- Saturday: 8am – 1pm
- No work on Sundays or public holidays.

Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities.

A maximum of 350 staff will be on-site during peak construction periods. It is understood that shuttle buses will be provided that can accommodate the majority of staff, with the remaining staff to access the site using private vehicles.

Construction traffic generated by the Solar Power Station can broadly be separated into the following three categories:

- Light vehicles associated with transporting staff to/from the site, including 20-seater shuttle buses and personal vehicles;
- Medium and Heavy Rigid Trucks (MRV and HRV as defined within AS 2890.2:2018) will be used to deliver raw materials and smaller plant;
- Articulated Vehicles (as defined within AS 2890.2:2018) will be used to transport larger plant and equipment.

Restricted Access Vehicles / oversized and overmass (OSOM) vehicles will be required for the delivery of larger plant to the site and are subject to separate permit applications and regulations. The impacts of the OSOM vehicles are discussed within Section 4 with the following assessment focusing on the impacts of the light and heavy vehicles which generate the bulk of the traffic and represent the typical traffic impact of the project on a day-to-day basis.

A high-level estimate of the construction traffic volumes for the project has been provided by the Applicant. It is understood that traffic volumes will be further refined once an Engineering, Procurement and Construction contractor has been engaged and pre-construction management plans have been developed. At this early state it is anticipated that during peak construction the site could generate up to 70 heavy and 64 light vehicle movements per day. Table 2 summarises the traffic movements generated during the construction period of the Solar Power Station.

**Table 2: Traffic Generation During Construction**

Vehicle Type	Average Vehicle Movements per Day		Peak Vehicle Movements per Day	
	Daily (vpd)	Peak Hour (vph)	Daily (vpd)	Peak Hour (vph)
Light Vehicle (car / 4WD)	30	15	50	25
Shuttle Bus	14	7	14	7
MRV/HRV	16	2	30	4
AV	14	2	40	4
<b>Total</b>	<b>74</b>	<b>26</b>	<b>134</b>	<b>40</b>

Overall, the site is expected to generate approximately 40 vehicle movements during the morning and evening peak hours during the peak construction period.

### 3.1.2 Operational Traffic

During operation the Solar Power Station is expected to generate a minimal level of traffic associated with maintenance and operation services. The Solar Power Station is expected to generate up to 10 vehicle movements per day which would result in a negligible change to the traffic environment.

### 3.1.3 Decommissioning Traffic

At the end of the operational life of the project all above ground infrastructure will be dismantled and removed from the project site. Internal roads, if not required for ongoing farming purposes or fire access, would be removed and the site reinstated as close as possible to its original state.

Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A comprehensive Construction Traffic Management Plan 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.

## 3.2 Traffic Distribution

All vehicles will enter the northern portion of the site via Toolleen-Angle Road. Vehicles accessing the southern portion of the site will do so via the private internal access road. The following provides a breakdown of the access distribution for each of the vehicle classifications outlined within Table 1:

- **Light Vehicles:** It is anticipated that most staff will be local within Bendigo, with all staff travelling to/from the north. These vehicles are likely to utilise the local road network to access Muskerry East School Road and will then enter the site via Toolleen-Angle Road from the north.
- **MRV/HRV:** These vehicles will predominantly be water trucks and vehicles transporting materials such as concrete and fencing supplies which will be sourced within the surrounding area. For the purposes of this assessment, it has been assumed that 75% of vehicles will access the site from the south and 25% will access the site from the north. All vehicle movements will access Toolleen-Angle Road via Northern Highway.

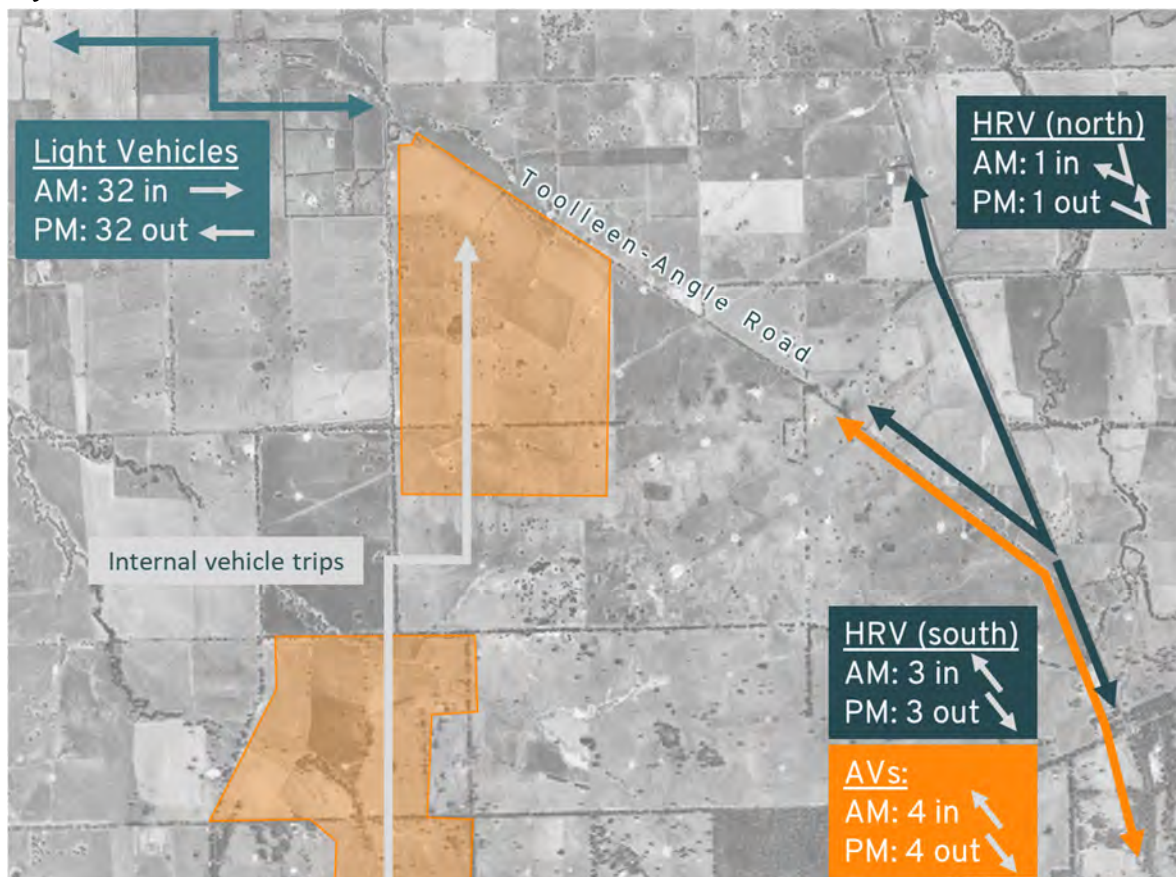
- AV: Plant will be transported via Melbourne and will be to/from the south and enter the site via Northern Highway and Toolleen-Angle Road.

Accordingly, the majority of light vehicle movements are expected to access the site from the north-western end of Toolleen-Angle Road (Muskerry East School Road) and the majority of heavy vehicles are expected to access the site from the south-eastern end of Toolleen-Angle Road (Northern Highway).

The peak hour for the solar farm will occur at the start and end of the day when staff are transported to/from the site. During the morning peak all vehicle movements will be towards the site and in the evening peak all vehicle movements will be away from the site. Heavy vehicle movements will be distributed throughout the day and will be split evenly between inbound and outbound movements.

A summary of the expected traffic distribution during the construction phase is illustrated in Figure 4.

Figure 4: Peak Hour Traffic Distribution



### 3.3 Traffic Assessment

The traffic volumes expected to be accommodated on the surrounding road network during the peak hour are shown within Table 3.

**Table 3: Expected Peak Hour Traffic Volumes During Construction**

Road	Existing Peak Hour Traffic Volume	Expected Peak Hour Traffic Volume
Northern Highway	381 vph	389 vph
Muskerry East School Road	20 vph	52 vph
Toolleen-Angle Road	20 vph	60 vph

These traffic volumes can be readily accommodated on the road network and all roads are expected to continue to operate with a good level of service. Accordingly, it is concluded that the road network is able to accommodate the traffic generated by the Solar Power Station during the construction period.

### 3.4 Cumulative Impacts

The primary traffic impact of the Solar Power Station is generated during construction which is anticipated to start mid-to-late 2023. The assessment outlined previously demonstrates that the road network will continue to operate with ample capacity even during the peak construction period of the Solar Power Station. The following provides an assessment of the cumulative impacts of major projects that are proposed in the surrounding area. The relevant major projects are described below to determine the potential overlap of construction traffic:

- Axedale Solar Farm (150MW) is located 5km west of the subject site and has an approved development application. Construction is yet to commence;
- Corop Solar Farm is located in the Campaspe LGA and is currently under consideration;
- Bendigo Solar Farm (55MW) is located west of Bendigo within the Loddon LGA and is under consideration and feasibility assessment;
- Derby Solar Farm (100MW) is located west of Bendigo and is under consideration and feasibility assessment;
- Ravenswood Solar Farm (63MW) is located south of Bendigo and is under consideration and feasibility assessment; and
- Campbells Forest Solar Farm (200MW) is in the Loddon LGA, north of Bendigo and is under consideration and feasibility assessment.

Based on the above assessment, the surrounding major projects have the potential to generate a number of staff vehicle movements during the peak periods associated with construction of the Solar Power Station. In particular, a number of staff will be located in Bendigo. Notwithstanding this, the combined increase in traffic generated by the site and these projects is expected to have a minimal cumulative impact on the road network in the surrounding area.



## 4. Route Assessment

### 4.1 Heavy Vehicle Access Route

The Port of Melbourne has been identified as the preferred port where the Solar Power Station plant will be imported. All plant and material deliveries from the Port of Melbourne will arrive to site via Muskerry North where they will be distributed throughout the site via internal private access roads. The proposed construction traffic access route from the Port of Melbourne to the site is shown in Figure 5 and is outlined as follows:

#### Port of Melbourne to Muskerry North

- Cook Street;
- Tullamarine Freeway/M2;
- Sunbury Road/C743;
- Lancefield Road/C325;
- Melbourne-Lancefield Road/C325;
- Lancefield-Tooborac Road/C325;
- Northern Highway/B75; and
- Toolleen Angle Road.

The access route utilises roads that are designated for B-Double vehicles as outlined within the Victoria's Gazetted B-Double Network map. Accordingly, the access route is able to accommodate the loads and type of vehicle movement to be generated during construction of the Solar Power Station.

It is also noted that some oversize and overmass vehicles will be required to deliver larger plant to the site such as the sub-station transformer and earthmoving equipment. The vehicles are subject to specific road permits that will be applied for by the contractor once the dimensions of the load and the specific delivery vehicle are known.

### 4.2 Personnel Traffic Route

Bendigo has been identified as the preferred location where site personnel will be accommodated. Personnel traffic includes private vehicles as well as shuttle buses that will transport personnel to site during the construction phase. All site personnel will access the site via the northern end of Toolleen-Angle Road. The preferred route is outlined as follows:

#### Bendigo to Muskerry Solar Power Station

- Napier Street/Midland Highway;
- Taylor Street;
- Epsom-Barnadown Road;
- Axedale-Goornong Road;
- Epsom-Barnadown Road;
- Barnadow-Knowsley Road;

- Barnadown-Myola Road;
- Muskerry East School Road; and
- Toolleen Angle Road.

The preferred route is considered acceptable for the proposed personnel vehicle trips to site by way of light vehicle or shuttle bus.

### 4.3 Local Road Network

The section of Toolleen-Angle Road between Northern Highway and the site access has a sealed carriageway width of approximately 6.5 metres extending from Northern Highway for approximately 150 metres, which then reduces to a width of approximately 3.5 metres and has 1.5 metre wide unsealed shoulders on both sides of the road. In order to accommodate simultaneous two-way vehicle movement, it is proposed to widen the road to have a sealed width of 6.5 metres.

Vehicles utilising the section of Toolleen-Angle Road between Muskerry East School Road and the site access will be limited to light vehicles and shuttle buses. These vehicles will all be travelling southbound in the morning peak and northbound in the evening peak, with a negligible level of traffic generated outside of peak times. Given the minimal level of existing traffic on the road, the construction traffic is all one-way in the peak times, and the ability of light vehicles to pass each other using the unsealed shoulders, it is concluded that the existing road surface is acceptable to accommodate the increase in light vehicle movements.

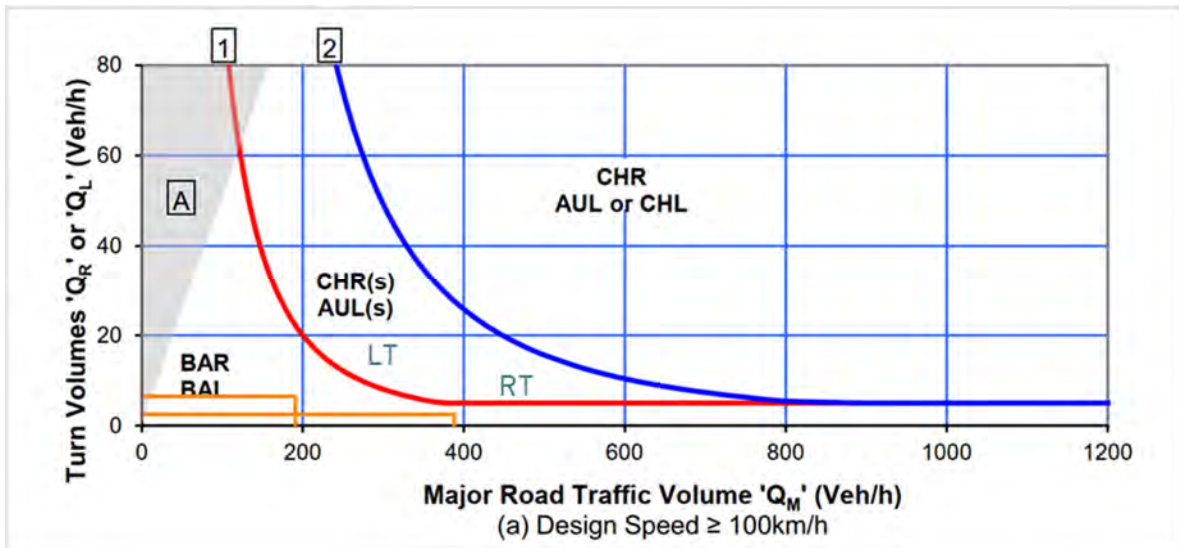
Therefore, it is concluded that the surface of the roads with the inclusion of the proposed upgrades, are suitable to accommodate the future traffic volumes.

## 5. Intersection Assessment

### 5.1 Turn Treatments

*Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings* specifies the turning treatments required at intersections. *Figure 3.25* of the guide specifies the required turn treatments on the major road at unsignalised intersections, and is provided below in Figure 5 for a design speed of greater than or equal to 100km/hr.

Figure 5: Austrroads Guide to Traffic Management Part 6, Figure 3.25



Source: Austrroads

During construction of the Solar Power Station additional vehicle movements will be generated at the intersection of Northern Highway and Toolleen-Angle Road. The requirement to provide turn facilities is primarily generated during the morning peak hour when vehicles are accessing the site. The peak hour turning volumes will be generated by the following heavy vehicles (negligible light vehicle movements are expected via the intersection):

- Left turn: 75% MRV/HRV movements, and 100% AV movements; and
- Right turn: 25% MRV/HRV movements.

Table 3 identifies the required turning treatments based on the expected traffic volumes at the intersection.

Table 4: Turning Volumes for Turn Treatment Calculations

Turning Treatment	Traffic Volume (vph)		Requirement
	Turn Volume	Major Road	
Right Turn	1	388	BAR
Left Turn	7	190	BAL

The intersection has no existing turn treatments. It is proposed to provide both BAL and BAR treatments at the intersection in accordance with the Austrroads Guideline at the intersection. The *Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* specifies the requirements for the design of turn treatments. The proposed design for the intersection is

provided within Appendix A and is based on an AV. A swept path assessment has been prepared for the intersection designs using the software package 'AutoTrack' which shows that the design vehicle is able to access Toolleen-Angle Road in a suitable manner.

Therefore, the proposed turn facilities meet the requirements of the Austroads Guidelines. Accordingly, the intersection of Northern Highway and Toolleen-Angle Road is expected to be able to accommodate the traffic generated by the Solar Power Station in a safe manner.

## 5.2 Sight Distance

*Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds. Given Northern Highway has a speed limit of 100km/hr, a design speed of 110km/hr has been adopted, which requires a SISD of 285 metres. The available sight distance at the intersection exceeds the Austroads requirements.

## 6. Site Access

The site access is located approximately 4.5 kilometres northwest of Northern Highway on Toolleen-Angle Road on the north edge of the site. At the access Toolleen-Angle Road is sealed throughout and has moderately spaced trees on both sides set back from the carriageway. It is proposed to provide the access based on the Department of Transport Guideline Drawing *AGRD Part 4 - Typical Design to Rural Properties*. The drawing is provided within Appendix B and provides the design requirements for access by an AV. The location of the proposed access is shown in Figure 6.

A sight distance of 139 metres is required at the site access based on a 100km/h frontage road speed and 5 second gap as outlined within AS 2890.2:2018. The sight distance in both directions is in excess of 300 metres and it follows that the sight distance at the access complies with the Standard.

Figure 6: Toolleen-Angle Road Site Access Location



Source: Nearmap

Vehicle access between the sites of Muskerry North and Muskerry South is proposed by an internal private road connecting the two sites. It is intended that internal roads will be designed and constructed appropriately according to their intended use.

## 7. Alternative Route and Access Options

Alternative access and route arrangements have been evaluated as part of the Solar Power Station assessment, including access options from McIvor Highway, Axedale-Toolleen Road East and Axedale-Toolleen Road West. The proposed access arrangements are considered the most appropriate for the development.



## 8. Construction Management Plan

A Construction Traffic Management Plan (CTMP) will be prepared prior to construction commencing by the appointed contractor. The CTMP will provide additional information regarding the traffic volumes and distribution of construction vehicles that is not available at this time, including:

- Road transport volumes, distribution and vehicle types broken down into:
  - Hours and days of construction.
  - Schedule for phasing/staging of the project.
- The origin, destination and routes for:
  - Employee and contractor light traffic.
  - Heavy vehicle traffic.
  - Oversize and overmass traffic.

The following provides recommended measures that should be adopted within the CTMP to minimise the impact of construction traffic along the road network:

- Neighbours of the Solar Power Station be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
- Loading and unloading is proposed to occur within the work area. No street or roads will be used for material storage at any time.
- All vehicles will enter and exit the site in a forward direction.
- Management of vehicular access to and from the site is essential in order to maintain the safety of the general public as well as the labour force. The following code is to be implemented as a measure to maintain safety within the site:
  - Utilisation of only the designated transport routes.
  - Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.
- Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands and laydown areas.
- All permits for working within the road reserve must be received from the relevant authority prior to works commencing.
- A map of the primary haulage routes highlighting critical locations.
- An induction process for vehicle operators and regular toolbox meetings.
- A complaint resolution and disciplinary procedure.
- Local climatic conditions that may impact road safety of employees throughout all project phases (e.g. fog, wet and significant dry, dusty weather).

The above recommendations will ensure the construction traffic will create a minimal impact to the capacity and safety of the surrounding road network.

## 9. Conclusion

Amber has assessed the traffic impacts of the Muskerry Solar Power Station located approximately 33 kilometres east of Bendigo. Access to the site will be provided via Toolleen-Angle Road which connects to the arterial road network via Northern Highway. Staff will primarily be located in Bendigo with all plant expected to be delivered from the Port of Melbourne via the approved B-Double network. The above assessment determined the following:

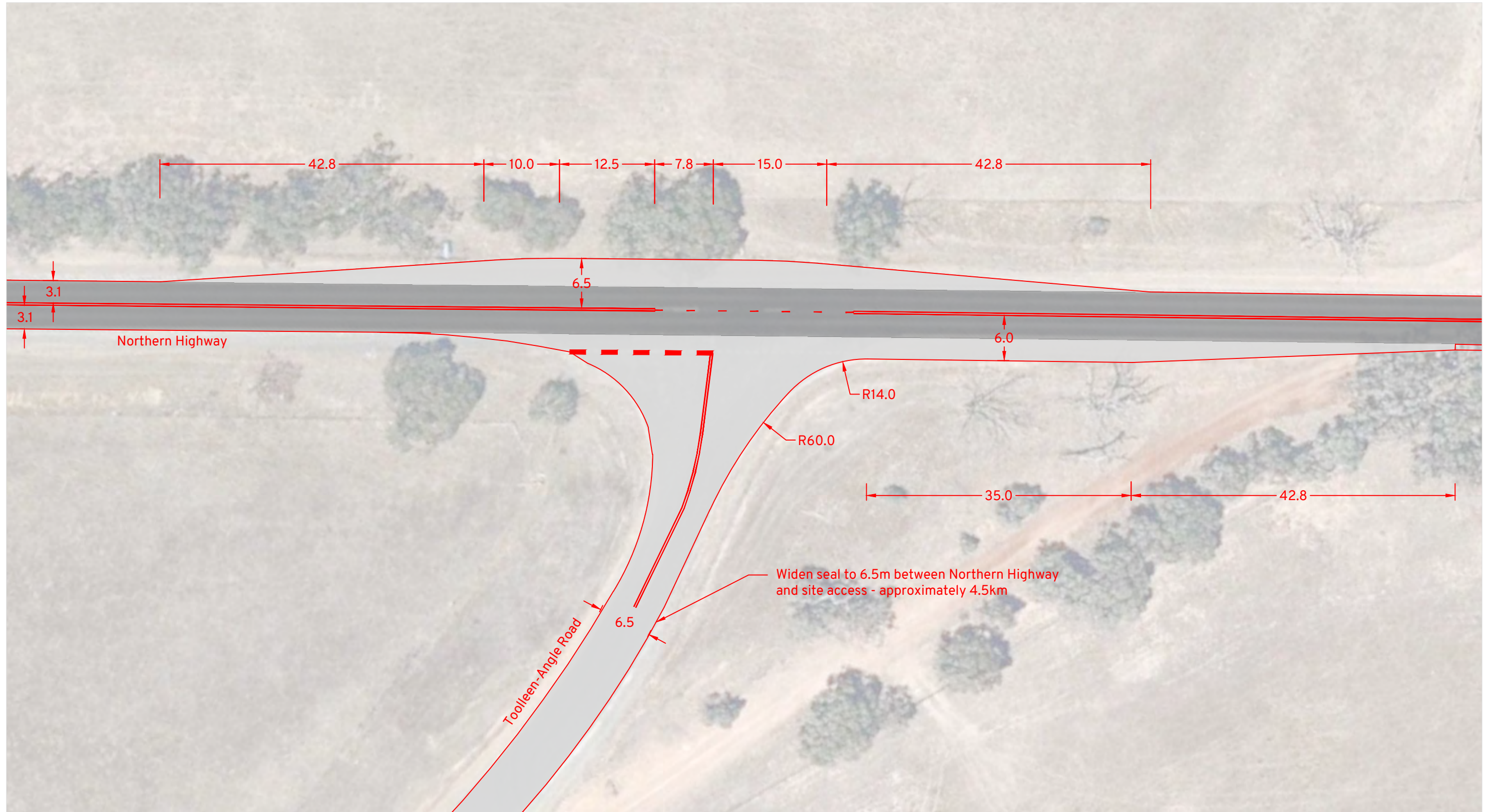
- The site will generate up to 134 vehicle movements per day during peak construction times, including 70 truck movements and 64 light vehicle movements;
- The road network is able to accommodate the traffic generated by the development during the construction, operation and decommissioning stages. Further, the cumulative impacts of the site traffic with nearby developments are expected to be minimal;
- The intersection of Northern Highway and Toolleen-Angle Road is proposed to be provided with a Basic Right Turn and Basic Left Turn treatment to allow for safe vehicle movement from the arterial road network;
- Toolleen-Angle Road is proposed to be widened to a minimum width of 6.5 metres between Northern Highway and the site access to allow for simultaneous two-way vehicle movement;
- Some oversize and overmass vehicles will be required to deliver larger plant to the site. The vehicles are subject to specific road permits that will be applied for by the contractor once the dimensions of the load and the specific delivery vehicle are known; and
- In order to mitigate the impacts of the development during construction a CTMP will be prepared which should include the recommendations provided within this document.

Accordingly, it is concluded that the proposed access arrangements for the Muskerry Solar Power Station are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction, operation and decommissioning phase of the project.

# Appendix A

## Intersection Design





The following design details have been taken from Austroads Guide to Road Design Part 4A:

Basic Right-turn Treatment (BAR) Section 7.5.1.

- 1: Design speed of 110km/h.
- 2: Lane widths of 3.1m have been used.
- 3: Road widening to 6.5m.
- 4: Minimum lateral movement (A) is 42.8m.
- 5: Storage length is 12.5m for one Heavy Rigid Vehicle.

Basic Left-turn Treatment (BAL) Section 8.2.

- 1: Design speed of 110km/h.
- 2: Lane widths of 3.1m have been used.
- 3: Road widening to 6.0m.
- 4: Diverge length is 42.8m.
- 5: Setback distance is 6.0m



Muskerry Solar Power Station  
Northern Highway/Toolleen-Angle Road Intersection  
Concept Plan

DRAWN: CT  
DATE: 19/01/2022  
SCALE: 1:500m @ A3  
DWG NO: 274 S03B







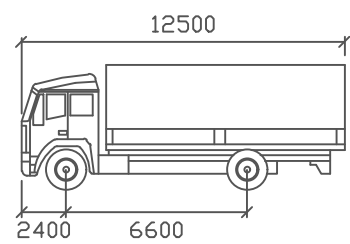
Northern Highway

Toolleen-Angle Road

Vehicle Envelope

300mm Clearance

HRV



Width : 2500  
 Track : 2500  
 Lock to Lock : 6.0s  
 Steering Angle : 35.2



Muskerry Solar Power Station  
 Northern Highway/Toolleen-Angle Road Intersection  
 Concept Plan

DRAWN: CT  
 DATE: 19/01/2022  
 SCALE: 1:500m @ A3  
 DWG NO: 274 S03B



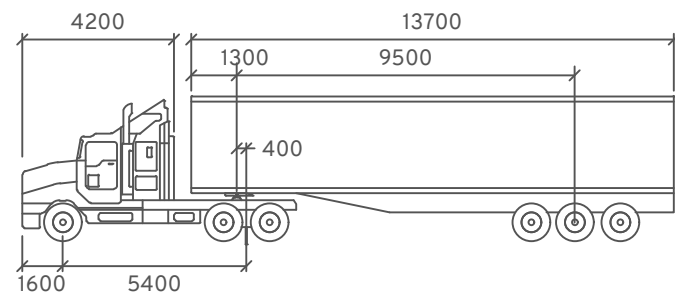




Vehicle Envelope

300mm Clearance

AV



Tractor Width :	2500	mm
Trailer Width :	2500	
Tractor Track :	2500	
Trailer Track :	2500	
Lock to Lock :	6.0s	
Steering Angle :	28.3	
Articulating Angle :	70.0	



## Muskerry Solar Power Station

Northern Highway/Toolleen-Angle Road Intersection

Concept Plan

DRAWN: CT  
 DATE: 19/01/2022  
 SCALE: 1:500m @ A3  
 DWG NO: 274 S03B

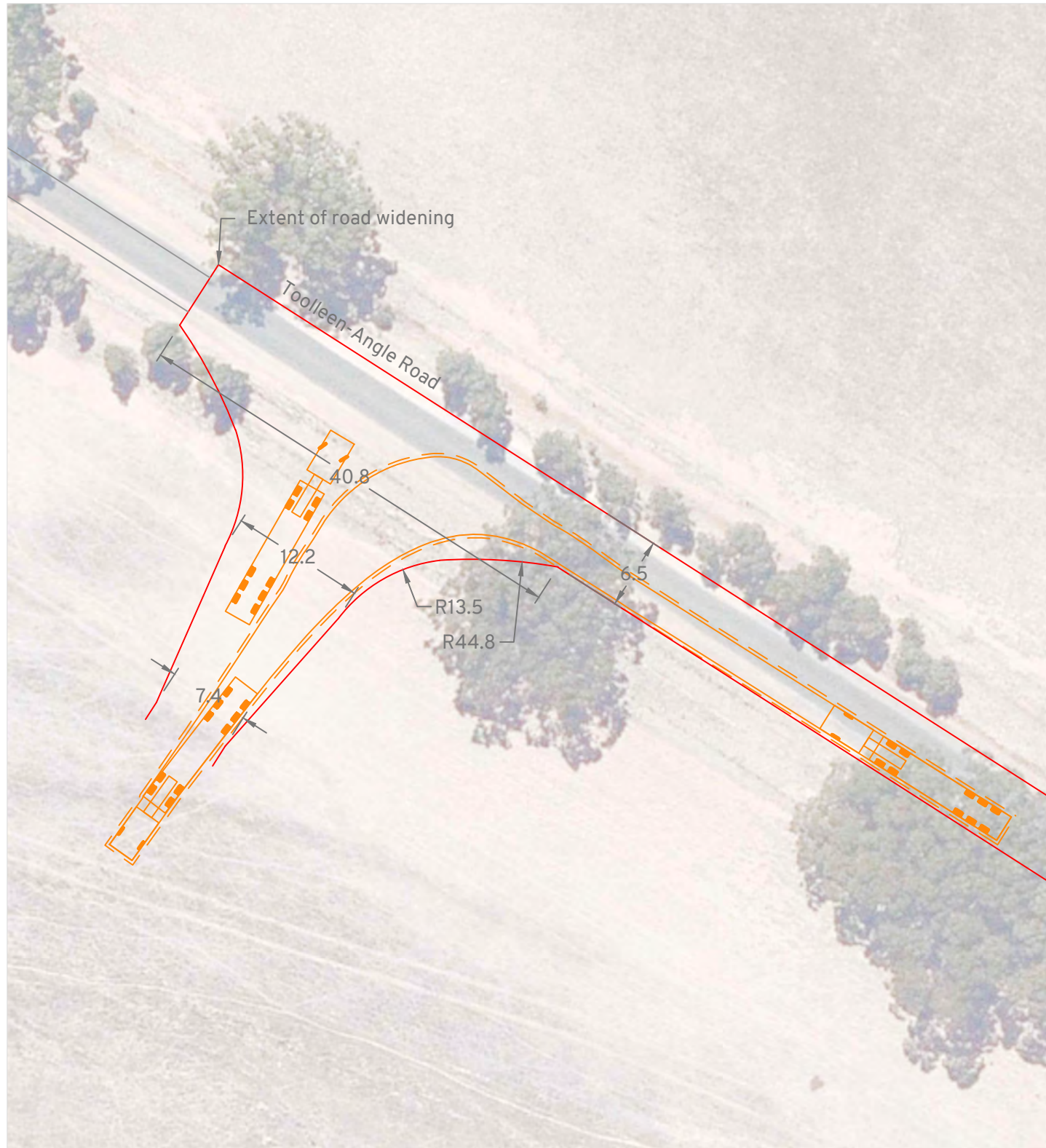




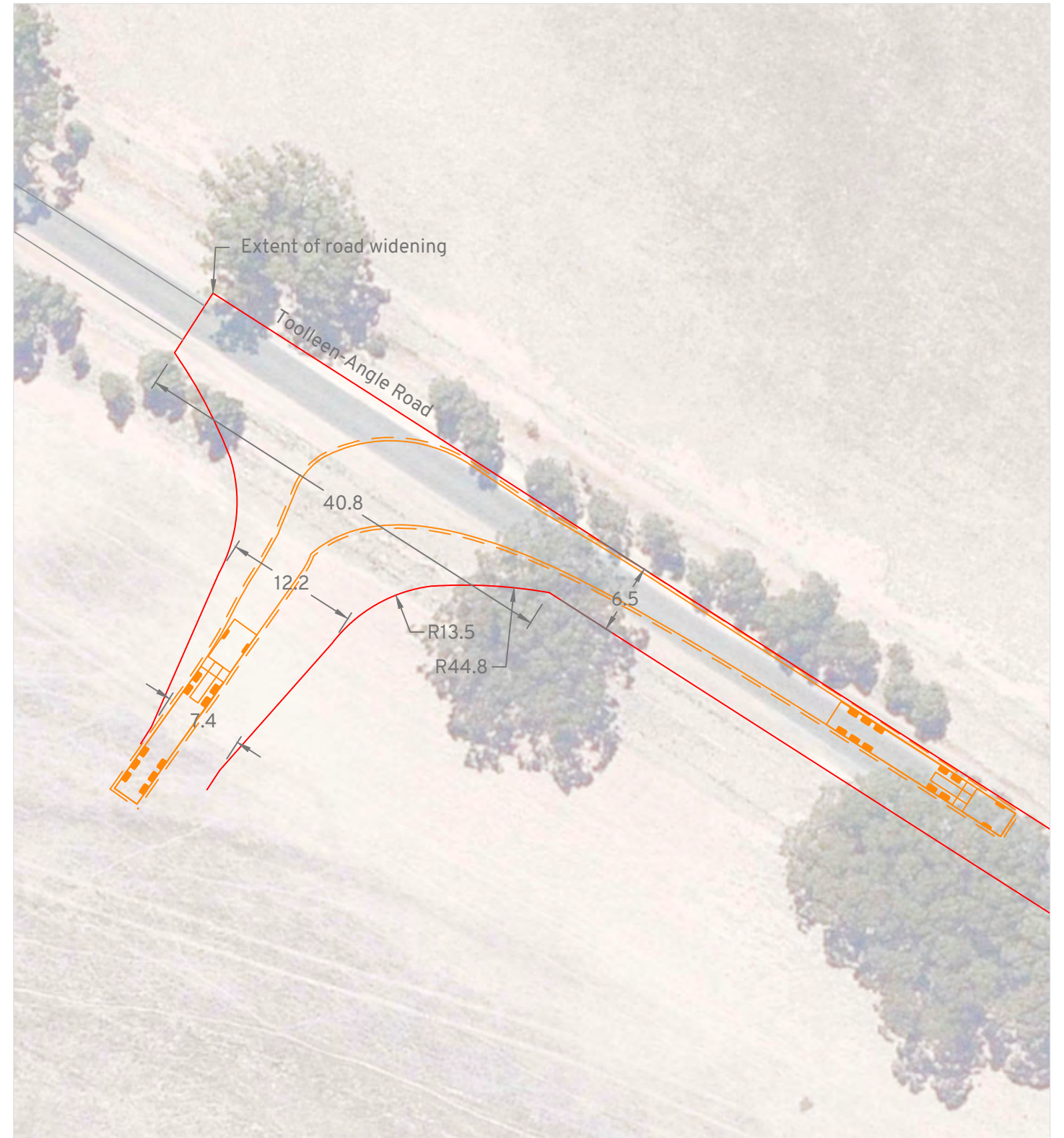
# Appendix B

## Access Design

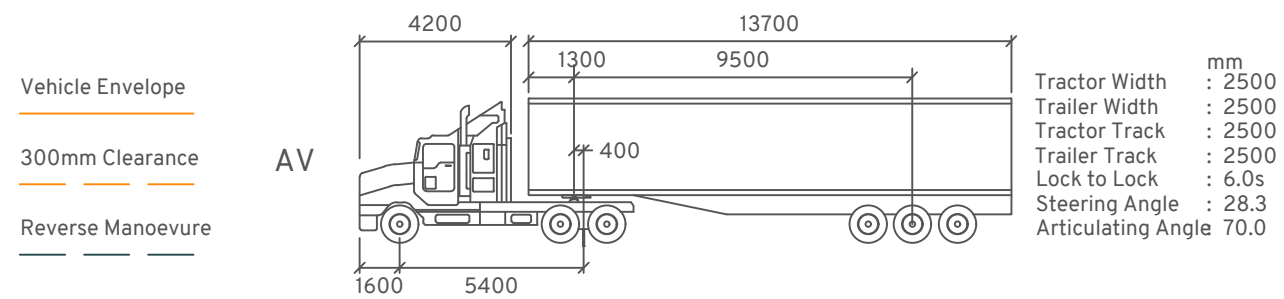




Entry Manoeuvre



Exit Manoeuvre



Muskerry Solar Farm  
Access Layout Plan  
Swept Path Assessment

DRAWN: CT  
DATE: 28/10/2022  
DWG NO: 274 S04B  
SCALE at A3: 1:200

