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# ADVERTISED PLAN



## Solar Energy Facility

290 Cosgrove-Caniambo Road, Cosgrove

### Traffic Impact Assessment Report

Client:

Bison Energy Australia

Project No. 190918

FINAL Report – 13/08/2020

# DOCUMENT CONTROL RECORD

Document prepared by:

Trafficworks Pty Ltd

ABN 59 125 488 977

1<sup>st</sup> Floor 132 Upper Heidelberg Rd Ivanhoe Vic 3079

PO Box 417 Ivanhoe Vic 3079


Ph (03) 9490 5900

Fax (03) 9490 5910

[www.trafficworks.com.au](http://www.trafficworks.com.au)

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# EXECUTIVE SUMMARY

Trafficworks has been engaged by Habitat Planning, on behalf of Bison Energy Australia, to undertake a Traffic Impact Assessment (TIA) for the proposed solar energy facility at 290 Cosgrove-Caniambo Road in Cosgrove.

The subject site falls within a Farming Zone – Schedule 1 (FZ1) and forms part of the Greater Shepparton City Council (the Council). The site comprises land between the Cosgrove-Caniambo Road to the east, Kellows Road to the north, Shepparton-Dookie College Road to the south, and farming land to the west.

Vehicular access to the subject site is proposed from Cosgrove-Caniambo Road approximately 450 m north of Shepparton-Dookie College Road.

With a target capacity of 4.95 MW (AC), the proposed development will use solar photovoltaic (PV) technology with sun trackers and ancillary equipment to power over 1,860 homes for 30 years. The project will connect to a Powercor 22 kV line which passes through the subject site.

Based on the information provided it is understood that the peak traffic generation from the development is likely to occur during the construction phase. Therefore, the TIA was carried out primarily focussing on the construction phase of the development.

A TIA was undertaken to:

- estimate the traffic generation and distribution to / from the proposed development
- determine the suitability of the proposed access
- determine the likely traffic impacts on the existing road network
- identify any necessary mitigation works.

It has been identified that the proposed development:

- would not adversely affect traffic conditions on the adjacent road network if the recommendations in this report are implemented
- would generally comply with the relevant traffic requirements set out in Austroads and the Greater Shepparton City Council Planning Scheme.

A summary for the site and the proposed development is shown below.

<b>Address</b>	290 Cosgrove-Caniambo Road, Cosgrove
<b>Existing Zoning</b>	Farming Zone (FZ)
<b>Proposed Development</b>	Solar Energy Facility
<b>Road Network</b>	Cosgrove-Caniambo Road <ul style="list-style-type: none"><li>• 100 km/h rural default speed limit</li><li>• carries approximately 100 vehicles per day</li></ul>

<p><b>Recommendation</b></p>	<ul style="list-style-type: none"> <li>• <b>Recommendation 1:</b> That the subject site access be constructed in accordance with the Council’s Infrastructure Design Manual (IDM) standard drawing for a Rural Entrance Drawing No. SD255</li> <li>• <b>Recommendation 2:</b> Should security gates be proposed for the access to the development the security gate should be setback a minimum of 20 m from the edge of the traffic lane on Cosgrove-Caniambo Road</li> <li>• <b>Recommendation 3:</b> That the Overall Layout Plan includes a designated car parking area to accommodate the anticipated demand for four vehicles during construction.</li> </ul>
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## Referenced Documents

References used in the preparation of this report include the following:

- RTA *Guide to Traffic Generating Developments, Version 2.2, October 2002*
- Austroads:
  - *Guide to Road Design, Part 4: Intersections and Crossings, 2017*
  - *Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2017*
  - *Guide to Traffic Management, Part 6: Intersections, Interchanges and Crossings, 2017*
- VicRoads Supplement to:
  - *Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections, 2011*
- Local Government Infrastructure Design Association’s Infrastructure Design Manual (IDM), Version 5.20 released March 2020
- Greater Shepparton City Council Planning Scheme.

The assessment is based on the following information made available by the client:

- Development Plan: 290 Cosgrove-Caniambo Road Cosgrove SOLAR PROJECT, dated 5 December 2019 (Layout Plan).

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ATTACHMENT A – PROPOSED DEVELOPMENT PLAN

ATTACHMENT B – IDM STANDARD DRAWING

# 1. INTRODUCTION

Trafficworks has been engaged by Habitat Planning, on behalf of Bison Energy Australia, to undertake a traffic impact assessment (TIA) for the proposed solar energy facility at 290 Cosgrove-Caniambo Road in Cosgrove.

The subject site falls within a Farming Zone – Schedule 1 (FZ1) and forms part of the Greater Shepparton City Council (the Council). The site comprises land between the Cosgrove-Caniambo Road to the east, Kellows Road to the north, Shepparton-Dookie College Road to the south, and farming land to the west.

With a target capacity of 4.95 MW (AC), the proposed development will use solar photovoltaic (PV) technology with sun trackers and ancillary equipment to power over 1,860 homes for 30 years. The project will connect to a Powercor 22 kV line which passes through the subject site. The site has an area of 16.28 hectares and is located approximately 20 km east of Shepparton.

Vehicular access to the subject site is proposed from Cosgrove-Caniambo Road approximately 450 m north of Shepparton-Dookie College Road.

Based on the information provided it is understood that the peak traffic generation from the development is likely to occur during the construction phase. Therefore, the TIA was carried out primarily focussing on the construction phase of the development.

The TIA was undertaken to:

- estimate the traffic generation and distribution to / from the proposed development
- determine the suitability of the proposed access
- determine the likely traffic impacts on the existing road network
- identify any necessary mitigation works.

## 2. EXISTING CONDITIONS

### 2.1 Subject site

The site falls within a Farming Zone – Schedule 1 (FZ1) and comprises land between the Cosgrove-Caniambo Road to the east, Kellows Road to the north, Shepparton-Dookie College Road to the south, and farming land to the west.

The subject site comprises the southern portion (16.28-hectares) of the site which is currently used for agricultural purposes. Existing vehicle access to Cosgrove-Caniambo Road is approximately 600 m north of Shepparton-Dookie College Road.

The location of the site and its surrounding road network is shown in Figures 1 and 2.

Figure 1: Land use plan (courtesy of the VicPlan website)

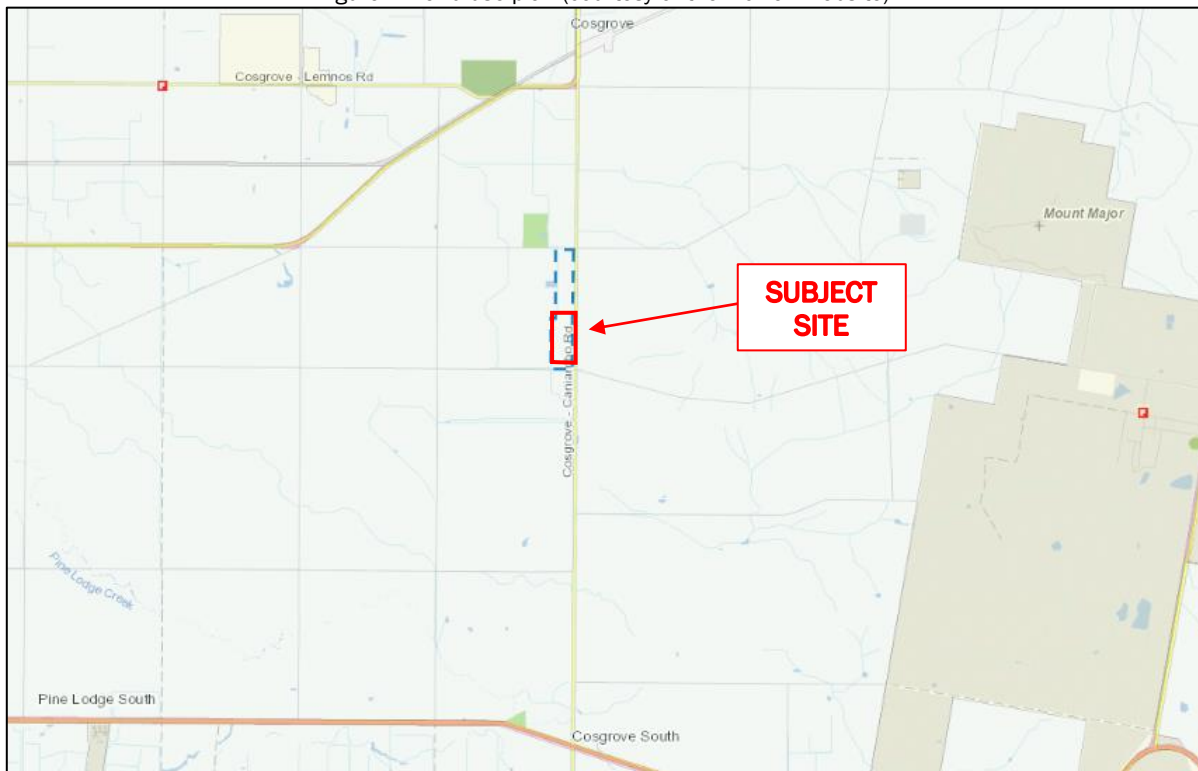
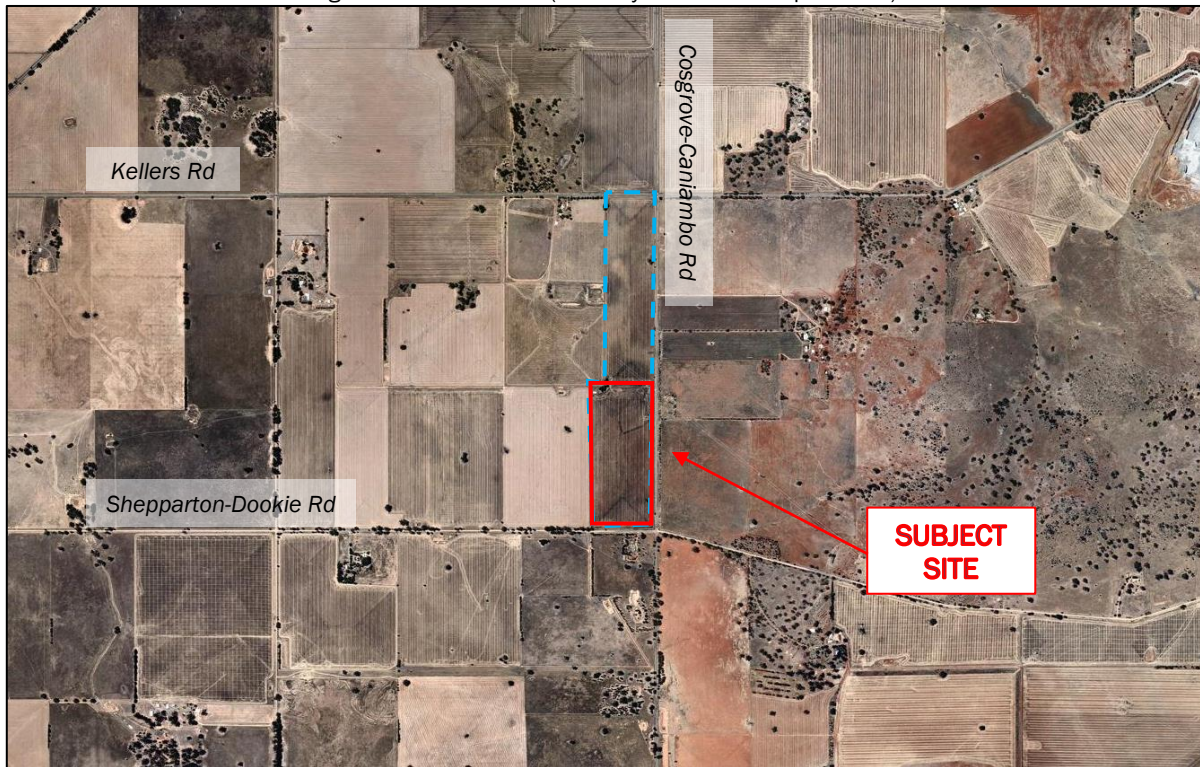




Figure 2: Location Plan (courtesy of the Nearmap website)



## 2.2 Road network

The roads surrounding the subject site are explained in the subsequent section.

### 2.2.1 Cosgrove-Caniambo Road

Cosgrove-Caniambo Road is a local road managed by Greater Shepparton City Council and classified a rural access road adjacent to the subject site. It is generally aligned in a north to south direction and provides connection between two state arterial roads: New Dookie Road to the north and the Midland Highway to the south.

Near the subject site Cosgrove-Caniambo is a two-way, two-lane sealed road with a 5.0 m seal and 1.0 m wide unsealed shoulders. the intersection with the Midland Highway, Cosgrove-Caniambo Road is controlled with a give way sign.

There is a crest in Cosgrove-Caniambo Road approximately 250 m north of Shepparton-Dookie College Road. A rural default speed limit of 100 km/h applies along Cosgrove-Caniambo Road (refer to Photos 1 and 2).



Photo 1: Cosgrove-Caniambo Road looking north, the subject site is on the left



Photo 2: Cosgrove-Caniambo Road looking south, the subject site is on the right



## 2.3 Traffic volumes

The *Department of Transport (DoT) Open Data Portal* details traffic volumes for many of the arterial roads in Victoria. Scrutiny of the records indicate that approximately 4,500 vehicles per day (vpd) travel along the Midland Highway near the intersection of Cosgrove-Caniambo Road, split evenly in each direction. Heavy vehicles account for 15% of the daily traffic volume.

There was no traffic data available for Cosgrove-Caniambo Road for this assessment, therefore a two-way daily flow of 100 vpd has been assumed<sup>1</sup>. The existing peak hour traffic volumes are assumed to be 10% of the daily traffic volumes.

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<sup>1</sup> Assumption based on the road classification, in accordance with the IDM, and on observations of traffic during the site inspection

## 2.4 Crash history

The *DoT Open Data Portal* details all injury crashes on roads throughout Victoria. Scrutiny of these records indicates that no casualty crashes have occurred in the vicinity of the site in the last five-years of available data.

**Conclusion 1:** No crashes have occurred in the vicinity of the subject site within the last five years of available data.

## 2.5 Pedestrians / cyclists

There is no provision for bicycles and pedestrians near the subject site. Pedestrian / cyclists are not considered further in this report.

## 2.6 Public transport

There are no public transport services near the subject site. Public transport is not considered further in this report.

## 3 PROPOSED DEVELOPMENT

### 3.1 Development summary

The proposed development on Cosgrove-Caniambo Road involves constructing a solar energy facility (approximately 16,500 solar panels) to generate 4.95 MVA of power to connect into the local electricity grid. The facility will provide a reliable power source to the local community which can supply over 1,860 local households.

Vehicular access to the subject site is proposed to be provided via a new direct connection to Cosgrove-Caniambo Road, approximately 600 m north of Shepparton-Dookie College Road. For a plan of the proposed development refer to Attachment A.

During the operational phase, the proposed facility is expected to generate one visit (or two vehicle movements) per day for maintenance and monitoring purposes, only on an irregular basis (i.e. not daily). This access is also to be via the proposed new driveway.

Based on the information provided by the client, the peak traffic generation from the development will occur during the nine-month construction phase. Therefore, this report's primary focus is on assessing impacts during the peak construction phase of the development.

## 4 TRAFFIC GENERATION AND DISTRIBUTION

### 4.1 Construction traffic generation

Typically, the traffic generation for new developments is estimated using the traffic generation rates provided in the RTA Guide to Traffic Generating Developments – Version 2.2A 2002. However, traffic generation rates for solar energy facilities are unavailable in the RTA Guide.

Therefore, the traffic generation to / from the site for the construction phase of the development was estimated empirically to establish the likely peak traffic generation rates using information provided by the client.

On-site construction for the proposed solar energy facility comprises the preparation of footings, delivery of a prefabricated inverter, construction and fitting of the substation, delivery of solar panels, assembly, and connection of components. For the most part, equipment and materials will be transported to the site via light rigid trucks. Delivery of a power station and inverter will also be by rigid trucks and will not require access to the site by 19 m semi-trailers or 26 m B-Doubles.

The total construction period is estimated to extend over nine months as follows:

- months 1 to 4 will involve preparation of the site for component delivery and generate up to 4 light vehicle entries and 1 heavy vehicle entry per day
- months 5 and 6 represent the peak construction phase that is to generate 4 light vehicle and 4 heavy vehicle entries per day
- months 7 to 9 will involve completion of construction and commissioning that will again only involve up to 4 light vehicle entries and 1 heavy vehicle entry per day.

### 4.2 Traffic distribution

Based on the advice provided by the client, tradesmen working on the site are likely to be accommodated at Shepparton (20 km to the west) or in Benalla to the south, being bused to the site each day. This is assumed to involve one minibus to/from each direction, arriving in the morning and departing in the evening.

Furthermore, it has been assumed that 100% of the heavy vehicle traffic, during the peak construction phase, will access the site from the south as being the most direct route for the delivery of components from Melbourne via Shepparton. These trips are expected to be spread throughout the day, with one arrival during the morning peak hour.

### 4.3 Traffic volumes

It is understood that the proposed solar energy facility will commence construction during 2020 – 2021. Morning peak hour turning from Cosgrove-Caniambo Road into the site during the peak construction phase are:

- right turns from the north (via Kellows Road): 2 vph (1 car + 1 minibus)

- left turns from the south (via the Midland Highway): 2 vph (1 car + 1 minibus) + 1 vph (heavy) = 3 vph.

**Conclusion 2:** peak traffic generation by the development is likely to occur during months 5 and 6 of the construction phase of the development and involve:

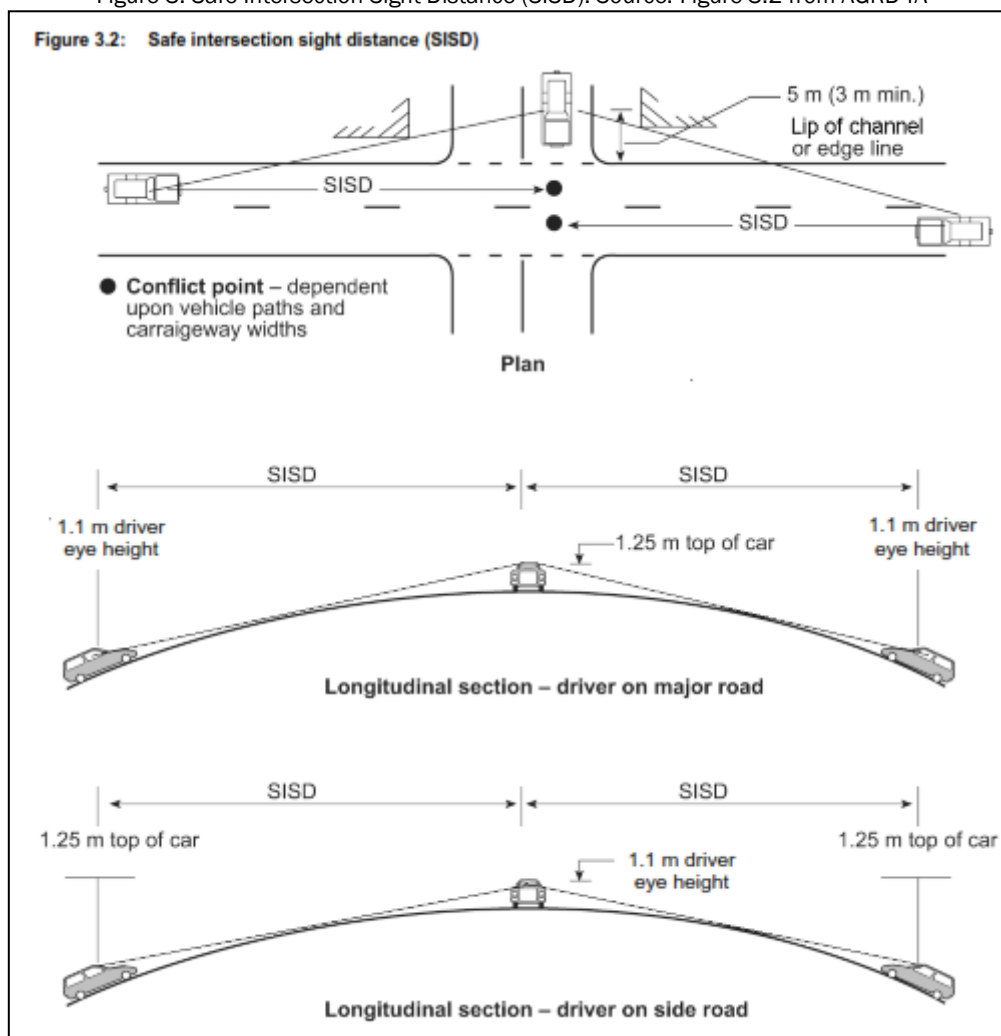
- two right turn entries by light vehicles (1 car + 1 minibus) during the morning peak hour
- three left turn entries (1 car + 1 minibus + 1 heavy vehicle) during the morning peak hour.

## 5 ASSESSMENT

### 5.1 Sight distance

The visibility criterion normally applied to intersections is Safe Intersection Sight Distance (SISD). The minimum SISD criteria along major roads are outlined in Table 3.3 of the *Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (AGRD4A). This document provides information in relation to the minimum distance which should be provided along major road to allow sufficient distance for a driver on a major road to observe a vehicle approaching from a minor road into collision situation (e.g. in the worst case, stalling across the traffic lanes) and to decelerate to a stop before reaching the collision point (refer Figure 3).

Figure 3: Safe Intersection Sight Distance (SISD). Source: Figure 3.2 from AGRD4A



The minimum SISD criterion specified in Table 3.2 of the AGRD4A requires clear visibility for a desirable minimum distance of 285 m, relating to the general reaction time  $R_T$  of 2 seconds and a design speed of 110 km/h (design speed = posted speed + 10km/h). This sight distance is applicable to the proposed access location on Cosgrove-Caniambo Road.

SISD for trucks should also be considered along Cosgrove-Caniambo. SISD for trucks can be established from SSD (stopping sight distance) for trucks (given in Table 5.6 in the *Austrroads Guide to Road Design Part 3: Geometric Design*) plus 3 seconds observation time. This equates to SISD for trucks of 274 m for a 100km/h approach speed. The 85<sup>th</sup> percentile operating speed for trucks is typically the posted speed limit for situations such as occur at the subject site.

Minimum SISD criterion requires clear visibility for desirable minimum distances shown in Table 1.

Table 1: SISD values for cars and trucks at design speeds of 100 km/h and 110 km/h

DESIGN VEHICLE	DESIGN SPEED (km/h)	DESIRABLE SISD (m)
Car	110	285
Truck	100	274

Assessment of the sight distance on both approaches to the proposed site access from Cosgrove-Caniambo Road is provided in Table 2. Available sight lines were measured at both 5.0m (desirable) and 3.0m (minimum) offset from the edge of the through lane, at these locations.

Table 2: Comparison of SISD requirements and available sight lines for the subject site (design speed 110 km/h for cars and 100 km/h for trucks)

LOCATION	MINIMUM SISD REQUIRED (m)		SISD Available at 3m offset (m)		SISD Available at 5m offset (m)	
	CAR	TRUCK	CAR	TRUCK	CAR	TRUCK
Site Access	285	274	>300 <sup>2</sup>	>300 <sup>1</sup>	>300 <sup>1</sup>	>300 <sup>1</sup>

Note: Green indicates the sightline requirement is met, red indicates that the sightline requirement is not met.

**Conclusion 3:** Safe Intersection Sight Distance requirements are satisfied for the site access.

## 5.2 Turn provisions

Separate turn lanes are normally provided to avoid congestion and/or delays to through traffic and to improve safety for traffic movements at intersections and significant access points, such as the driveway to the proposed development. The type of turn treatment is determined, based on speed environment and the combination of through and turning traffic volumes. Figure 2.26(a) of AGTM6 (reproduced in Figure 4) is used for the selection of treatment types at locations with a design speed of 100 km/h or more.

From Section 3.5 of this report, current two-way traffic in each direction during the daily peak hours is estimated at:

- 10 vph on Cosgrove-Caniambo Road

Superimposed over these peak traffic flows are the additional traffic movements generated by the development construction traffic. These are estimated to represent 2 vph right turn movements from the north and 3 vph left turns from the south during the AM peak. In accordance with Figure

<sup>2</sup> For both directions



4.10 from AGRD4A (reproduced in Figure 8), these volumes have been used in Table 3 to derive the QL and QR values and the major road traffic parameters QM that reflect the worst-case conditions at the start of the day's construction.

Figure 4: Formulas used to determine the major road traffic

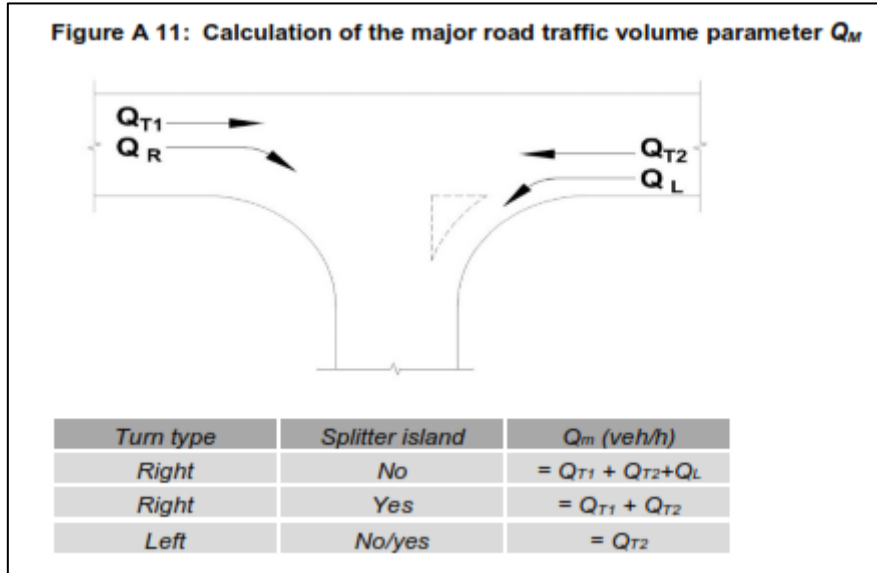
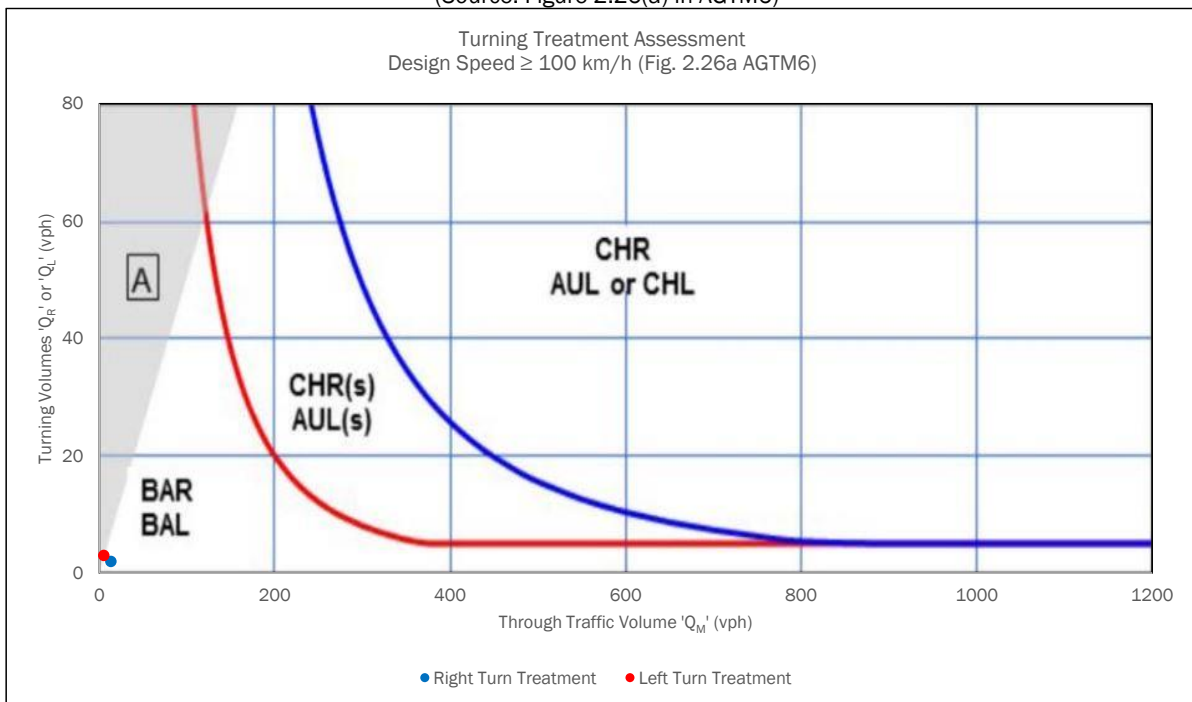


Table 3: Warrants for turn treatments – AM in peak construction phase

Major Road	Minor Access	Left Turn	Right Turn	Thru $Q_T$		$Q_M$ Left Turn	$Q_M$ Right Turn
		$Q_L$	$Q_R$	$Q_{T1}$	$Q_{T2}$	$Q_M = Q_{T2}$	$Q_M = Q_{T1} + Q_{T2} + Q_L$
Cosgrove-Caniambo Road	Site driveway	3	2	5	5	5	13

Figure 5: Warrants for turn treatments at site access - design speed >100km/h  
(Source: Figure 2.26(a) in AGTM6)



The assessment indicates that existing traffic plus construction traffic turning into the site access during the AM peak hour during the peak construction period requires the provision of a basic Type BAL left turn treatment and a basic Type BAR right turn treatment in Cosgrove-Caniambo Road.

Given that the construction phase of the development is only likely to occur within a nine-month period and that existing traffic volumes along Cosgrove-Caniambo Road are low, it is considered onerous to construct turn treatments at the site access to Cosgrove-Caniambo Road. It is anticipated that turning traffic would not impede through vehicles on Cosgrove-Caniambo Road and therefore there is no need for turn lanes at the site access from a safety or operational perspective.

**Conclusion 4:** There is no need for turn lanes on Cosgrove-Caniambo Road at the site access from a safety or operational perspective.

The additional traffic generated to / from the Midland Highway / Cosgrove-Caniambo Road intersection during the construction phase is anticipated to have negligible impact on the operation of the intersection during the AM and PM peak hours due to the low volumes (up to additional three vehicles).

### 5.3 Access Location & Operation

This report has recommended that because the pre and post construction traffic volumes are low, turn lanes should not be required for the development. It is recommended that the site access is constructed in accordance with the Council's Infrastructure Design Manual (IDM) standard drawing for a Rural Entrance Drawing No. SD255, as shown in Attachment B.

**Recommendation 1:** That the subject site access be constructed in accordance with the Council's Infrastructure Design Manual (IDM) standard drawing for a Rural Entrance Drawing No. SD255.

### 5.4 Site Security

The proposed development is likely to include the installation of site security to restrict access for both pedestrians and vehicular traffic. This will involve the provision of security gates being installed at the recommended access to Cosgrove-Caniambo Road.

Should the development include security gates they should be installed to cater for all queuing vehicles. The information provided by the client indicates only one truck is expected to queue at any time.

If the gate for the site access was setback 20 m from Cosgrove-Caniambo Road this would allow for a 19 m semi-trailer waiting for clearance to enter the subject site.

**Recommendation 2:** Should security gates be proposed for the access to the development the security gate should be setback a minimum of 20 m from the edge of the traffic lane on Cosgrove-Caniambo Road.

## 5.5 Parking

The statutory car parking requirement for new and existing development is outlined in Clause 52.06 of the Council Planning Scheme. However, the parking requirement for solar energy facilities is currently unavailable. Therefore, the car parking demand for the proposed development was estimated empirically.

As discussed in Section 4 of the report, during the construction phase of the development approximately 2 light vehicles and 2 minibuses are likely to access the site. Assuming all vehicles will be at the site at the same time, the subject site will have a car parking demand of 4 spaces during the construction phase of the development. The car parking demand for the site post construction is likely to be one space.

The proposed development plan indicates no provision of a formal on-site car parking within the site compound.

**Conclusion 5:** The development plan does not include formal parking on-site.

**Recommendation 3:** That the Overall Layout Plan includes a designated car parking area to accommodate the anticipated demand for four vehicles during construction.

## 6 CONCLUSION

A TIA was undertaken for the proposed Solar Energy Facility in Cosgrove. The following conclusions were made in the assessment.

- no crashes have occurred in the vicinity of the subject site within the last five years of available data
- peak traffic generation by the development is likely to occur during months 5 and 6 of the construction phase of the development and involve:
  - two right turn entries by light vehicles (1 car + 1 minibus) during the morning peak
  - three left turn entries (1 car + 1 minibus + 1 heavy vehicle) during the morning peak.
- Safe Intersection Sight Distance requirements are satisfied for the site access
- there is no need for turn lanes on Cosgrove-Caniambo Road at the site access from a safety or operational perspective
- the development plan does not include formal parking on-site.

The key recommendations of the TIA are summarised below.

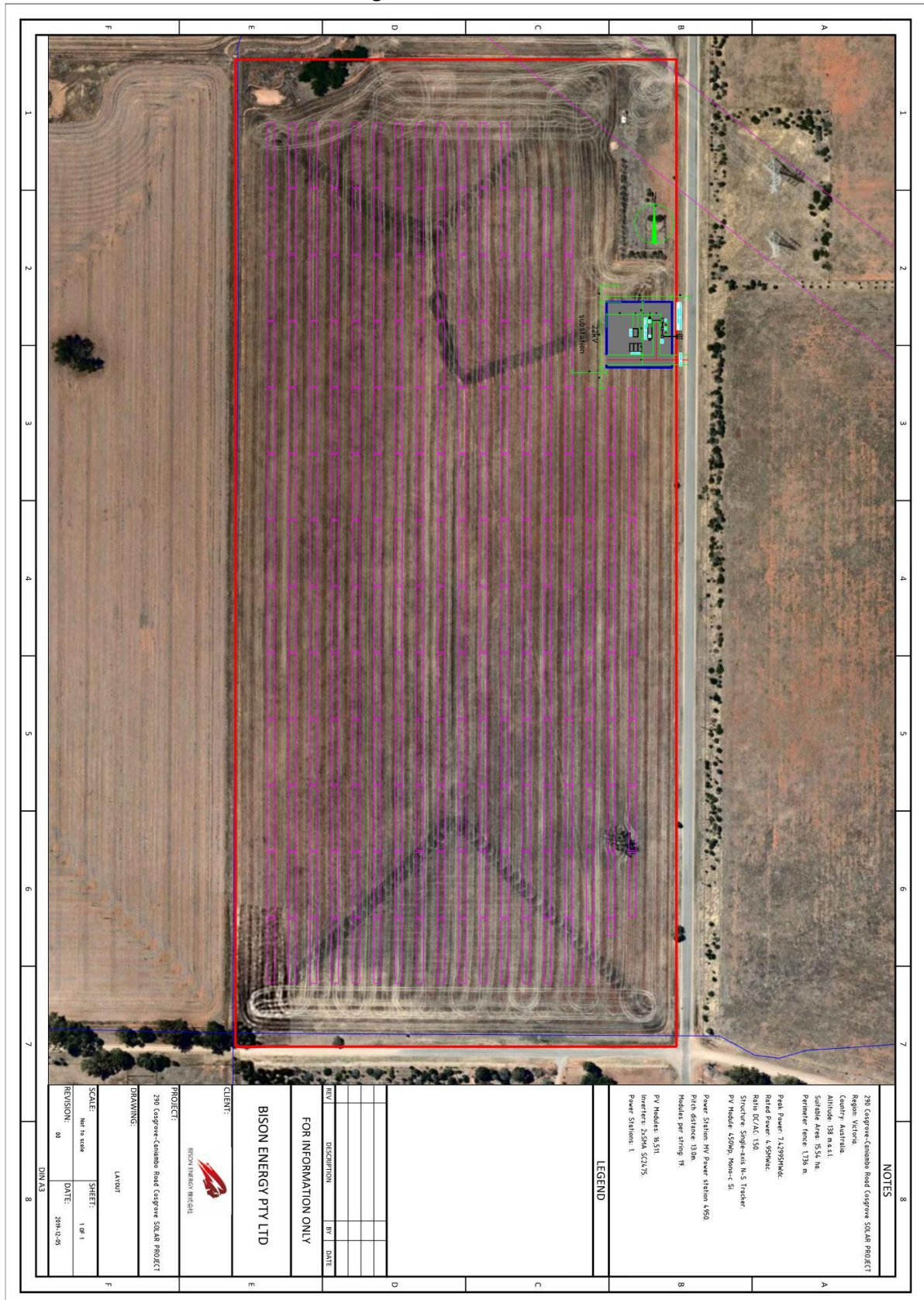
- **Recommendation 1:** That the subject site access be constructed in accordance with the Council's Infrastructure Design Manual (IDM) standard drawing for a Rural Entrance Drawing No. SD255
- **Recommendation 2:** Should security gates be proposed for the access to the development the security gate should be setback a minimum of 20 m from the edge of the traffic lane on Cosgrove-Caniambo Road
- **Recommendation 3:** That the Overall Layout Plan includes a designated car parking area to accommodate the anticipated demand for four vehicles during construction.

The proposed development would not adversely impact on the safety or operation of the surrounding road network, provided the recommended mitigations works are undertaken.



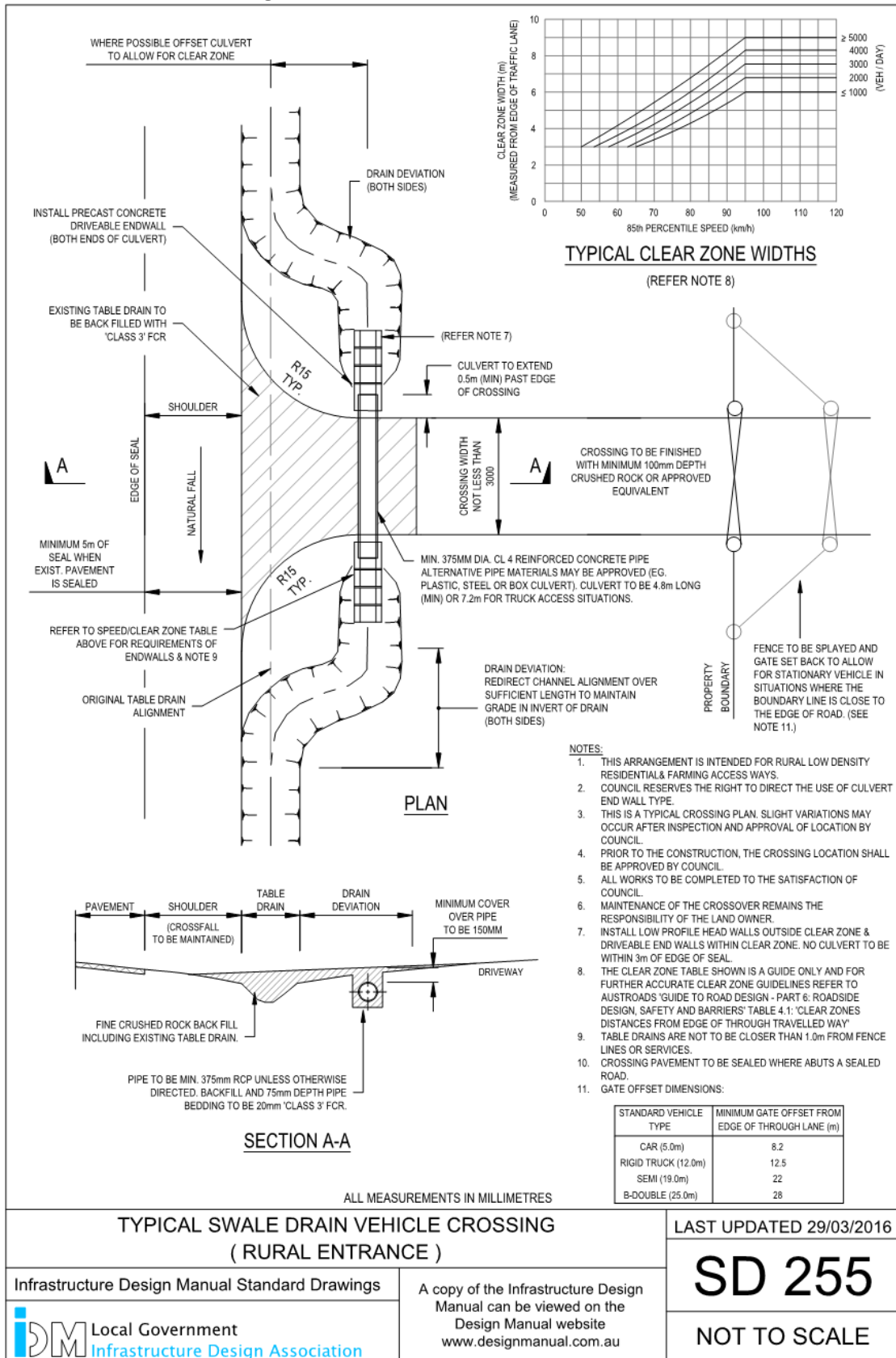
# ATTACHMENT A – PROPOSED DEVELOPMENT PLAN

Figure A1 – Overall Site Plan



# ATTACHMENT B – IDM STANDARD DRAWING

Figure B1 - FOR RURAL ENTRANCE - DRAWING NO. SD255



1<sup>st</sup> Floor 132 Upper Heidelberg Rd Ivanhoe Vic 3079  
PO Box 417 Ivanhoe Vic 3079  
ABN: 59 125 488 977  
Ph: (03) 9490 5900 Fax: (03) 9490 5910  
[www.trafficworks.com.au](http://www.trafficworks.com.au)