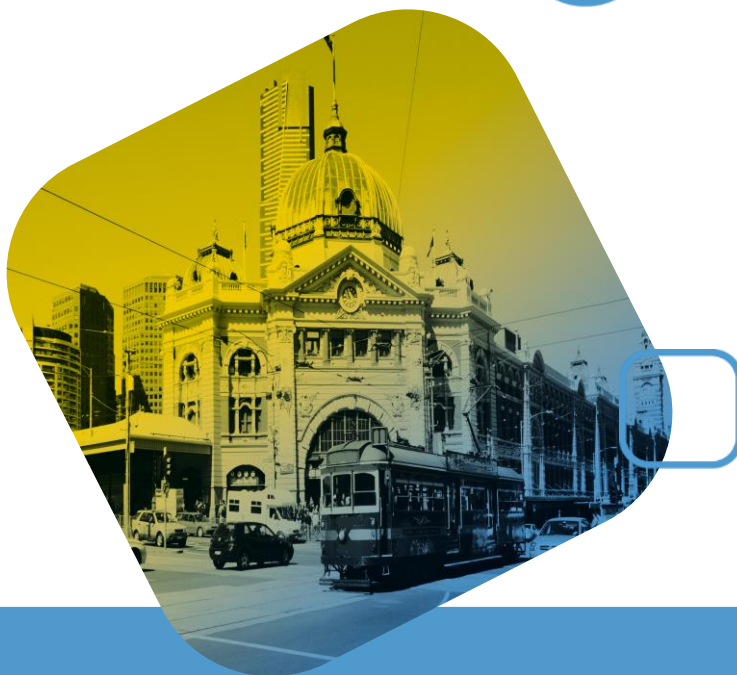


Appendix F: Traffic impact assessment



34°58'50"S
146°42'50"E

Sandigo Solar Farm - Old Mitchells Road, Sandigo



Traffic Impact Assessment

13 February 2018
Prepared for ESCO Pacific

IMP171113REP01F02

Impact

Company Information

Impact Traffic Engineering Pty Ltd

Level 17, 31 Queen Street, Melbourne, Victoria, 3000
ABN: 78 611 424 107

Email create@impactaustralia.com.au

Website www.impactaustralia.com.au

Document Information

Client ESCO Pacific

Report Title Sandigo Solar Farm - Old Mitchells Road, Sandigo

Report Reference IMP171113REP01F02

Date of Issue 13 February 2018

Approved By Brendan Rodgers

This work is exclusively owned by IMPACT Traffic Engineering Pty Ltd and cannot be reproduced, published, stored, copied, adapted, distributed or transmitted either wholly or in part, in any form or by any means whatsoever (graphic, electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of IMPACT Traffic Engineering Pty Ltd.

© IMPACT Traffic Engineering Pty Ltd 2018. All Rights Reserved.

Document Control

Version	Date	Author
Final	13 February 2018	Will Drew

Contents

1	IMPACT® SNAP SHOT.....	5
2	INTRODUCTION	7
2.1	Engagement	7
3	SANDIGO SOLAR FARM.....	7
3.1	Location	7
3.2	Site Context	9
3.3	Existing Road Network.....	9
3.3.1	Sturt Highway	9
3.3.2	Kywong Boree Creek Road	10
3.3.3	Kywong Faithfull Road	10
3.3.4	Mitchells Road	11
3.3.5	RMS Road Network Limits.....	11
3.4	Solar Farm Description.....	12
4	VEHICLE ACCESS	12
4.1	Access Routes.....	12
4.1.1	Coarse Aggregate and Fine Crushed Gravel.....	12
4.1.2	Water Deliveries	12
4.1.3	Solar Module / Substation Components	12
4.1.4	Construction Staff	13
4.2	Site Access	13
4.3	Turning Lane Assessment	13
4.4	Sight Distance Assessment	14
4.4.1	Sight Distance Requirements.....	14
4.4.2	Assessed Intersection Sight Distances.....	15
4.4.3	Sight Distance Summary	18
5	TRAFFIC CONSIDERATIONS	19
5.1	Traffic Generation.....	19
5.1.1	Construction.....	19
5.1.2	Operation and Maintenance	19
5.2	Traffic Impact	19
5.2.1	Nearby Mineral Extraction.....	20
6	TRAFFIC MANAGEMENT PLAN.....	21

Tables

Table 1 Estimated Construction Traffic	19
--	----

Figures

Figure 1	Location of Development Site	8
Figure 2	Development Site Footprint	8
Figure 3	Sturt Highway typical section (January 2018)	9
Figure 4	Sturt Highway / Kywong Boree Creek Road Intersection (January 2018)	9
Figure 5	Kywong Boree Creek Road looking north past Kywong Faithfull Road (January 2018)	10
Figure 6	Kywong Faithfull Road looking east past Mitchells Road (January 2018)	10
Figure 7	Mitchells Road typical cross section (January 2018)	11
Figure 8	RMS General Mass Limits (GML) and Concessional Mass Limits (CML) Network	11
Figure 9	Warrants for turn treatments at unsignalised intersections	13
Figure 10	Guide to measuring SISD for unsignalised intersections	15
Figure 11	Sturt Highway facing south east at its intersection with Kywong Boree Creek Road	16
Figure 12	Kywong Boree Creek Road facing north at its intersection with Kywong Faithfull Road	17
Figure 13	Kywong Faithfull Road facing west of Mitchells Road	17
Figure 14	Mitchells Road facing north from a potential site access point	18

Appendices

APPENDIX A	Sandigo Solar Farm Construction Traffic Movements
------------	---

1 IMPACT® Snap Shot

Development Proposition

Location	34° 58' 50" S 146° 42' 50" E	Mitchells Road, Sandigo
Use	Solar Farm	
Access	Access will be from Mitchells Road (via Kywong Faithfull Road, Kywong Boree Creek Road and Sturt Highway)	
Car Parking	A detailed car park design has yet to be determined, however it is assumed that staff vehicles (and mini buses) will be accommodated on-site within an informal gravel parking area.	

Traffic Considerations

Traffic Generation	
Construction	A total of 4,351 vehicle movements are estimated to be generated by the subject site. This translates to a peak of 30 daily vehicle movements (comprising 16 light vehicles movements and 14 heavy / over-dimension vehicle movements).
Operation	It is estimated that the site will have up to two daily vehicle movements associated with routine maintenance; there will also be, on occasion some additional movements associated with more thorough maintenance.
Impact	Being pre-approved General Mass Limit GML and Concessional Mass Limit CML roads, Sturt Highway, Kywong Boree Creek Road and Kywong Faithfull Road are expected to adequately cater for construction traffic and operational traffic. It is expected that upgrades and/or regular maintenance of Mitchells Road will be required during construction. It is expected that traffic during operation will be noticeable, but have no discernible impact on the operation of the surrounding local roads.
Access	
Access Design	We are advised that the site access will be able to cater for 26 metre B-double vehicles into and out of the site. We are also advised that most delivery vehicles into and out of the site will be 19 metres in length.
Turn Warrants	The site triggers the warrants for Basic Right Turn treatments (BAR) and Basic Left Turn (BAL) turn treatments along Sturt Highway, Kywong Boree Creek Road and Kywong Faithfull Road. No upgrades are proposed, which is considered appropriate given the short period of construction traffic and the ability for vehicles to pass using the sealed and unsealed shoulders of these roads (if required).
Sight Distances	A desktop assessment of sight distances along Sturt Highway, Kywong Boree Creek Road and Kywong Faithfull Road has been undertaken and indicates sight distances greater than 300 metres should be available for each of these locations; it is recommended that a physical sight distance assessment be undertaken prior to construction, and (whilst unlikely) that trees be trimmed if necessary. This is considered appropriate and will allow vehicles entering and exiting the site adequate opportunity to pick appropriate gaps in major road traffic.
Recommendations	
Road Condition Audits	We expect Council will require pre-construction road condition audits be undertaken for local roads that will be used extensively for construction (Kywong Boree Creek Road, Kywong Faithfull Road and the southern end of Mitchells Road). We expect Roads & Maritime Services (RMS) (and VicRoads if components imported from Melbourne) will wish to keep maintenance responsibilities for their roads and instead opt for a maintenance fee agreement based on a dollar per kilometre

travelled. This agreement should be negotiated closer to construction (when details are closer to being finalised).

**Traffic
Management Plan**

It is recommended that a detailed Traffic Management Plan (TMP) be prepared once project design is complete and prior to commencement of the project 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 Sandigo Solar Farm (the project) located near Sandigo, New South Wales.

This Traffic and Transport Impact Assessment has been prepared to accompany an Environmental Impact Statement (EIS).

The following Secretary's Environmental Assessment Requirements (SEARs) for this development proposal will be addressed in this Traffic Impact Assessment:

Roads and Maritime Services emphasises the need to minimise the impacts of any development on the existing road network and maintain the level of safety, efficiency and maintenance along the road network. Given the scale of the proposal a Traffic Impact Assessment (TIA) should be submitted with the Development Application. Any Traffic Impact Assessment needs to address the impacts of traffic generated by this development upon the nearby road network.

A Traffic Management Plan to manage the traffic generation during the construction period will be required. Traffic should also be considered and addressed during operation of the facility. The Traffic Management Plan shall detail the potential impacts associated with the phases of the development, the measures to be implemented to maintain the standard and safety of the road network, and procedures to monitor and ensure compliance.

For guidance in the preparation of the TIA the applicant is referred to section 2 of the iGuide to Traffic Generating Developments prepared by the RTA and the Austroads publications, particularly the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development and Part 13: Traffic Studies and Analysis. The TIA should contain information such as the expected traffic generation, vehicle numbers and types of vehicles, and travel routes for vehicles accessing the development site.

3 Sandigo Solar Farm

3.1 Location

The subject site is located on the southern side of Sturt Highway, east of Mitchells Road in Sandigo, which is approximately 27 kilometres south east of the Narrandera township, as illustrated in Figure 1.

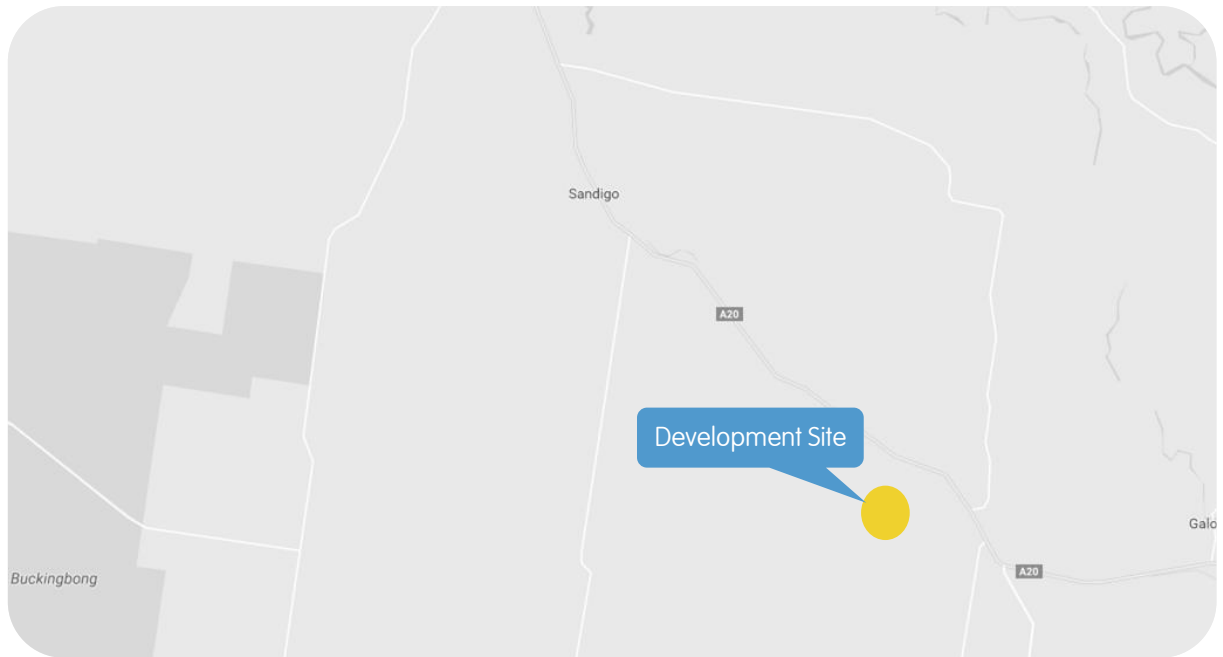


Figure 1 Location of Development Site

The proposed site is expected to be a 100MW solar farm project within a 231 ha disturbance footprint. Figure 2 shows the study area and relevant disturbance footprint.



Figure 2 Development Site Footprint

3.2 Site Context

The site is currently used as farmland for crop raising and grazing purposes. The site is predominantly flat, with some minor localised slopes throughout. The 132kV Yanco and Wagga Wagga transmission line intersects the development site.

3.3 Existing Road Network

3.3.1 Sturt Highway

The Sturt Highway is a State Arterial Road which is aligned generally in an east - west direction and extends east from Gawler in South Australia to the Hume Highway in southern New South Wales.

In the vicinity of the site, the Sturt Highway has been constructed with a central seal in the order of 7.0 metres (two 3.5 metre lanes) plus sealed shoulders measuring approximately 2-3 metres on each side.

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



Figure 3 Sturt Highway typical section (January 2018)

In addition to the above, Figure 4 shows the intersection of the Sturt Highway / Kywong Boree Creek Road intersection.



Figure 4 Sturt Highway / Kywong Boree Creek Road Intersection (January 2018)

3.3.2 Kywong Boree Creek Road

Kywong Boree Creek Road is a local Council road which extends south / south-west from Sturt Highway for approximately 60 kilometres before terminating as a t-intersection at Federation Way in Urana.

In the vicinity of the site, Kywong Boree Creek Road is constructed with a central sealed pavement width in the order of 6 metres, with unsealed gravel shoulders on each side; vehicles can use the unsealed shoulders to pass turning vehicles where necessary.



Figure 5 Kywong Boree Creek Road looking north past Kywong Faithfull Road (January 2018)

3.3.3 Kywong Faithfull Road

Kywong Faithfull Road is a small local access road (Council controlled) which extends west from Lockhart Road through various landholdings, until terminating as a t-intersection at Faithfull Road. It is noted that very limited local traffic (farmers only) would pass through this area, with no households directly accessed from this road.

Kywong Faithfull Road is constructed with an unsealed pavement in the order of 4.5 - 5 metres which allows for two vehicles to pass one another as required.

A view of the Kywong Faithfull Road / Mitchells Road intersection is shown below in Figure 6.



Figure 6 Kywong Faithfull Road looking east past Mitchells Road (January 2018)

3.3.4 Mitchells Road

Mitchells Road is a small access road (controlled by Council) which extends south from Sturt Highway for approximately 3 kilometres until its intersection with Kywong Faithfull Road.



Figure 7 Mitchells Road typical cross section (January 2018)

3.3.5 RMS Road Network Limits

The Roads & Maritime Services (RMS) General Mass Limits (GML) and Concessional Mass Limits (CML)¹ network in the locality of the subject site is reproduced as Figure 8.

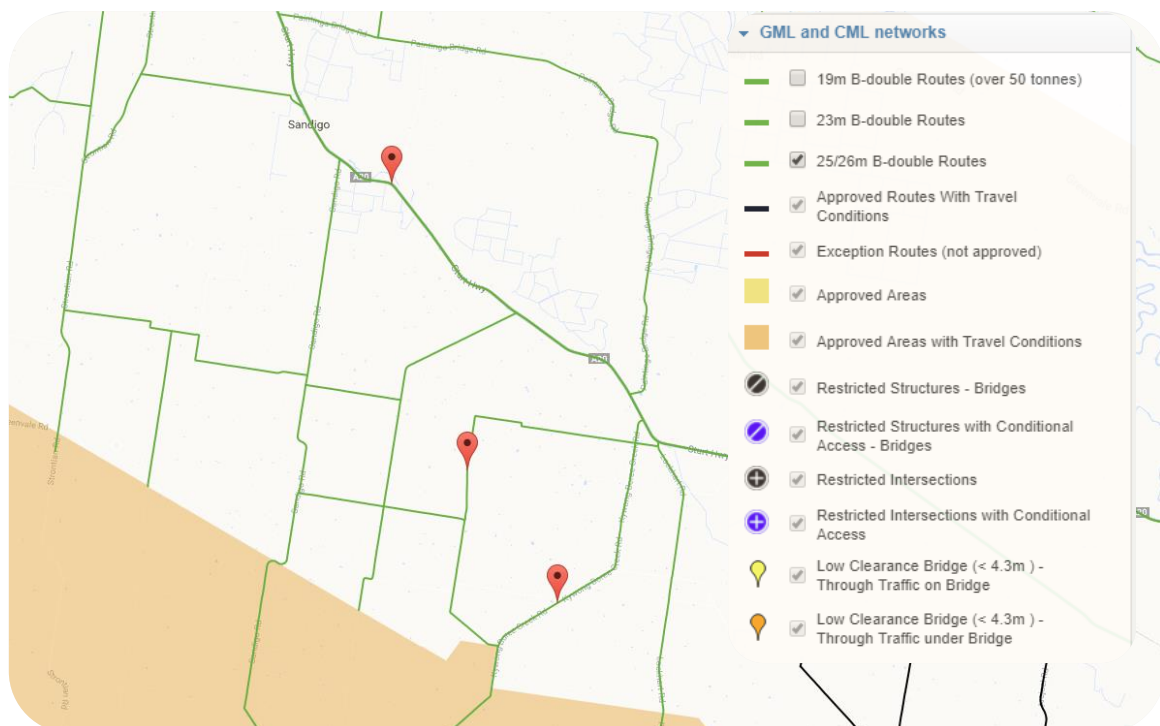


Figure 8 RMS General Mass Limits (GML) and Concessional Mass Limits (CML) Network

¹ Concessional Mass Limits (CML) allows an operator to operate at mass limits above the national general limits provided the operator is accredited under the National Heavy Vehicle Accreditation Scheme (NHVAS)

The RMS network plan confirms that the following roads in the vicinity of the site are all approved for GML and CML heavy vehicles:

- Sturt Highway (A20).
- Kywong Boree Creek Road.
- Kywong Faithfull Road.

It is noted that Mitchells Road along the sites western boundary is not an approved GML or CML heavy vehicle route, thus approvals will be required if this road is to be used as part of the heavy vehicle delivery route.

3.4 Solar Farm Description

IMPACT® have been advised that the project will consist of a solar energy facility comprising approximately 310,000 solar panels and a capacity to generate up to 100MW.

It is expected that an on-site substation will be used to connect into the existing 132kV power line which intersects the northern end of the site.

Access to the site will be from the east, via Sturt Highway, Kywong Boree Creek Road, Kywong Boree Faithfull Road and the southern end of Mitchells Road.

4 Vehicle Access

4.1 Access Routes

4.1.1 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 may be sourced locally, and that access to the site will be:

Sturt Highway - Kywong Boree Creek Road - Kywong Faithfull Road - Mitchells Road

4.1.2 Water Deliveries

We are advised that any water deliveries required for construction and road dust suppression will generally be sourced on-site. Should sufficient water not be available on-site, deliveries will be sourced locally and generally use the following access route:

Sturt Highway - Kywong Boree Creek Road - Kywong Faithfull Road - Mitchells Road

4.1.3 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 (OD) vehicles will follow the same routes from Melbourne or Sydney. The anticipated route from Sydney is as follows:

Sydney - Hume Motorway - Hume Highway - Sturt Highway - Kywong Boree Creek Road - Kywong Faithfull Road - Mitchells Road

The anticipated route from Melbourne is as follows:

Melbourne - Citylink - Metropolitan Ring Road - Hume Freeway - Hume Highway - Olympic Highway - Sturt Highway - Kywong Boree Creek Road - Kywong Faithfull Road - Mitchells Road

4.1.4 Construction Staff

During the delivery of the project, it is expected that the majority of staff will travel from surrounding regional centres, including Narrandera (township located approximately 27 kilometres north west of the site) or Wagga Wagga (approximately 60 kilometres south east of the subject site) and will access the site via the:

Sturt Highway - Kywong Boree Creek Road - Kywong Faithfull Road - Mitchells Road.

4.2 Site Access

Based on the foregoing, the main access corridor for heavy vehicles is:

Sturt Highway - Kywong Boree Creek Road - Kywong Faithfull Road - Mitchells Road

The typical length of any delivery vehicles (except for oversized vehicles) used for the development is not expected to exceed 19 metres. We are advised that the site access will be able to adequately cater for B-double vehicles into and out of the site.

The intersections shown in Figure 4, Figure 5 and Figure 7 (Sturt Highway / Kywong Boree Creek Road, Boree Creek Road / Kywong Faithfull Road and Kywong Faithfull Road / Mitchells Road intersections) are also able to cater for B-double vehicles.

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 at the time of the movement.

4.3 Turning Lane Assessment

Reference has been made to AustRoads Road Design Guidelines Part 4A: Unsignalised and Signalised Intersections². This document provides guidance on warrants for various turn treatments. These warrants are reproduced as Figure 9.

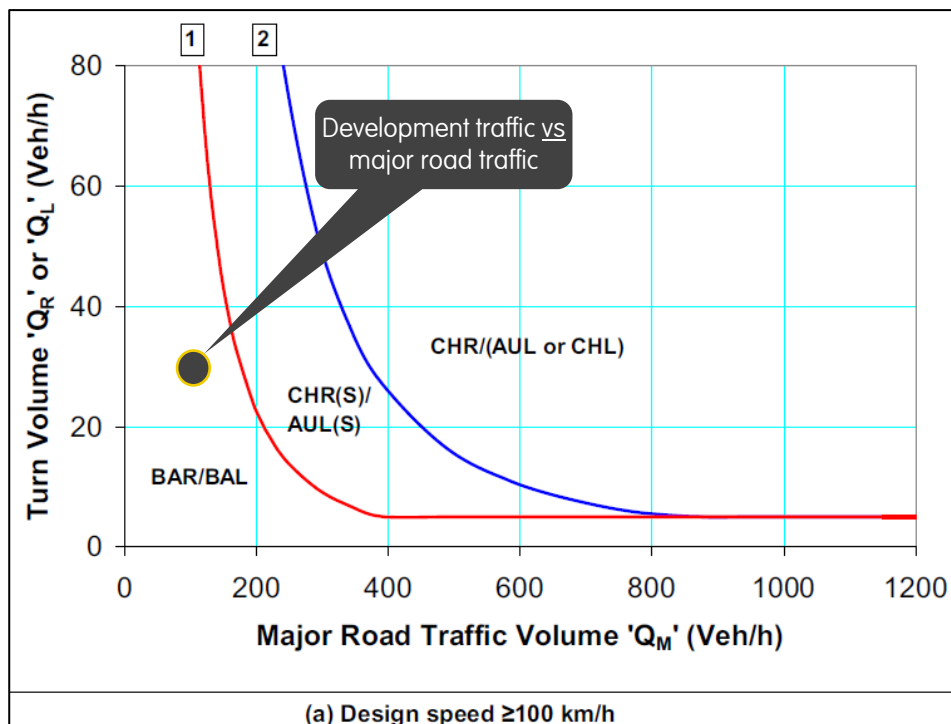


Figure 9 Warrants for turn treatments at unsignalised intersections

² AustRoads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, AustRoads, 2009 Edition)

The 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 volume.

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

Traffic counts undertaken by the RMS indicate that Sturt Highway carries approximately 1200 vehicles per day on average³. It is a 'rule of thumb' that peak hour traffic flows are approximately 10% of daily traffic volumes. Accordingly, about 120 vehicles are expected during peak hours on average.

The proposal is projected to generate in the order of 30 daily vehicle movements (or 60 trips to/from the site) during the peak construction period (See Section 5.4 below). It is conservatively assumed that 50% of these movements will occur during peak hour and from the same direction, equating to approximately 30 peak hour vehicles either into or out of the site.

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 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.

As shown above, Sturt Highway has been constructed with sealed shoulders, which are wide enough to allow vehicles to pass those waiting to turn if required, Kywong Boree Creek Road has unsealed gravel shoulders which will also allow passing if necessary. Given the construction period is relatively short (approximately 8 months only) it is considered appropriate to utilise the shoulders for passing where required in place of more formal BAL and BAR treatments during this time.

4.4 Sight Distance Assessment

4.4.1 Sight Distance Requirements

A desktop assessment of the sight distances has been undertaken using aerial imagery⁴, Google Street View where available and images provided by the client; we note that an on-site assessment should be undertaken to validate the following sight distance review.

AustRoads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections⁵ sets out Sight Distance Requirements for unsignalised intersections.

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

SISD is measured as shown in Figure 10.

³ Counters were located just to the west of Narrandera, however it is our view that they are representative of the volumes expected along the relevant section of Sturt Highway.

⁴ Aerial images taken from Nearmap 01 January 2005

⁵ AustRoads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, AustRoads, 2009 Edition)

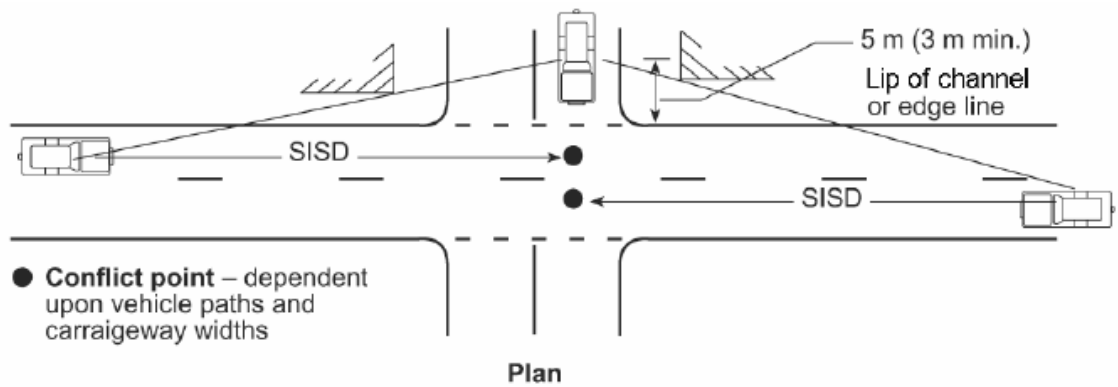


Figure 10 Guide to measuring SISD for unsignalised intersections

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 85th percentile speed of 100km/h, a minimum SISD of 285 meters is required.

4.4.2 Assessed Intersection Sight Distances

4.4.2.1 Intersection 1: Sturt Highway - Kywong Boree Creek Road

Sturt Highway is generally flat, and trees along the verge of the highway are setback approximately 8 metres from the carriageway⁶, as generally illustrated in the image below.

⁶ Based on aerial image measurements taken from Nearmap 01 January 2005, Google Street View images May 2015 and images taken January 2018

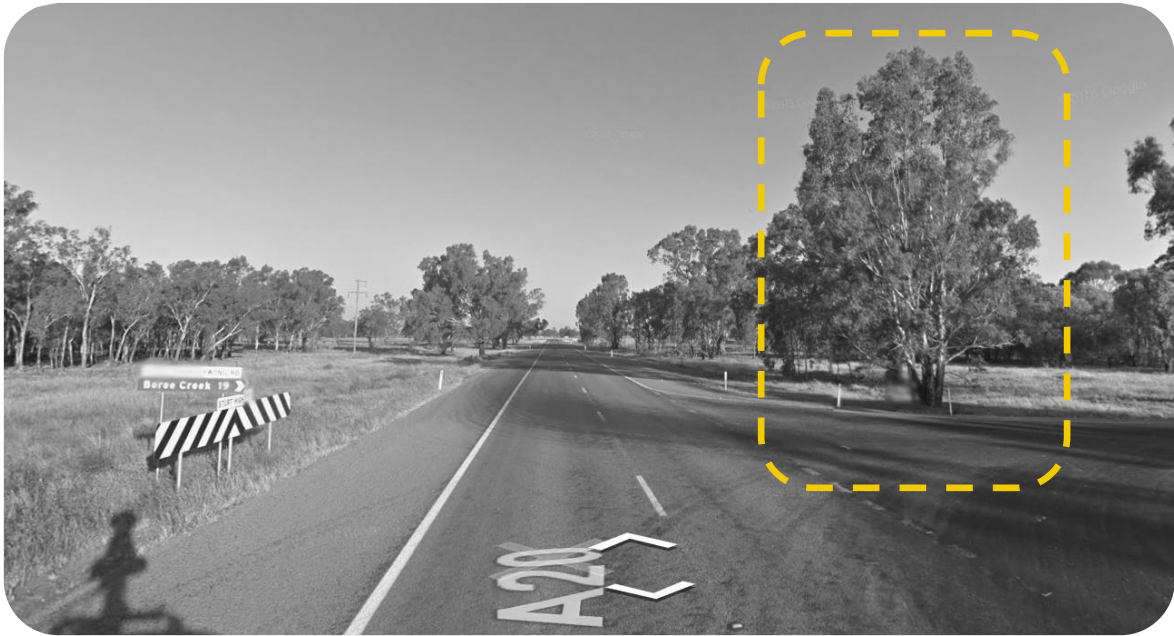


Figure 11 Sturt Highway facing south east at its intersection with Kywong Boree Creek Road

The SISD measurement is taken from a location 5.0 metres from the edge of the through lane.

Thus, with trees setback ~ 8 metres from the through lane, sight distance at this intersection to the north west and south east are expected to comfortably exceed the minimum requirement.

Note: The branches of the tree at the south west corner of the intersection, highlighted in Figure 11 above, have the potential to obscure sight lines. An on-site assessment would need to be undertaken, and branches trimmed as required to maintain the integrity of the SISD.

4.4.2.2 Intersection 2: Kywong Boree Creek Road - Kywong Faithfull Road

Kywong Boree Creek Road is generally flat, with sparse vegetation along the western side of the carriageway.

Within 50 metres of the intersection, trees are setback more than 9 metres from the carriageway. To the north of the intersection, at a point approximately 80 metres from the intersection there is a cluster of trees setback approximately 5 metres from the carriageway⁷.

Sight distance to the north and south are expected to comfortably exceed the minimum requirement.

Note: An on-site assessment would need to be undertaken to ensure that the branches of the cluster of trees located about 80 metres north of the intersection, as highlighted in Figure 12, do not obscure sight lines to the north. These branches should be trimmed as required to maintain the integrity of the SISD.

⁷ Based on aerial image measurements taken from Nearmap 01 January 2005, Google Street View images July 2008 and images taken January 2018



Figure 12 Kywong Boree Creek Road facing north at its intersection with Kywong Faithfull Road

4.4.2.3 Intersection 3: Kywong Faithfull Road - Mitchells Road

To the east, Kywong Faithfull Road is flat with limited vegetation on either side of the carriageway, with sight distances in excess of 300 metres available from the Mitchells Road intersection. This is considered appropriate and will allow vehicles travelling from the site to pick a gap in traffic along Kywong Faithfull Road.

To the west of Mitchells Road, there appears to be a crest in Kywong Faithfull Road which could potentially influence available sight distances, see Figure 13.

Based on measurements taken from aerial imagery⁸ the available sight distance to the west should still exceed 300 metres, however this should be confirmed through an on-site assessment.



Figure 13 Kywong Faithfull Road facing west of Mitchells Road

⁸ Based on aerial image measurements taken from Nearmap 01 January 2005, images taken in January 2018

4.4.2.4 Intersection 4: Mitchells Road / Sight Access

At the time of writing this report, the exact sight access location and design has yet to be confirmed, however given the relatively straight horizontal alignment of Mitchells Road and limited vegetation along this road, sight distances more than 300 metres are available from the indicative site access locations⁹. This is considered appropriate and will allow vehicles entering and exiting the site adequate opportunity to pick a gap in traffic.

Note: Once the access location has been confirmed, an on-site assessment should be undertaken to confirm that there isn't any vegetation impeding on the integrity of the available SISD.



Figure 14 Mitchells Road facing north from a potential site access point

4.4.3 Sight Distance Summary

Based on the desktop assessment above, sight distances available along Sturt Highway, Kywong Boree Creek Road, Kywong Faithfull Road and Mitchells Road appear to be adequate. Prior to construction, an on-site assessment should be undertaken to confirm that there is not any vegetation impeding on the integrity of the available SISD's (minor trimming could be used if required).

Supplementary 'trucks crossing' signs could also be used to provide advanced warning for vehicles travelling along Sturt Highway, Kywong Boree Creek Road and Kywong Faithfull Road if desired.

⁹ Based on aerial image measurements taken from Nearmap 01 January 2005, images taken in January 2018

5 Traffic Considerations

5.1 Traffic Generation

5.1.1 Construction

Construction is expected to occur for a total of approximately eight 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 Construction Traffic

Type of Vehicle	Total Vehicle Movements	Peak Daily Movements
Heavy Vehicles	Approximately 1,570 total HV movements	Peak of 14 daily HV movements
Light Vehicles	Approximately 2,816 total LV movements	Peak of 16 daily LV movements
Total	4,351 total movements	Peak of 30 daily movements

We note that movements shown above are for 'round trips' to the site and are inclusive of both the inbound and outbound vehicle trips. 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

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 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 only occur 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 and background traffic along Sturt Highway, operating traffic will be minimal. By virtue of the minimal existing use of other local roads (Kywong Boree Creek Road, Kywong Faithfull Road and Mitchells Road) operating traffic will be noticeable, but will have no material impact.

5.2 Traffic Impact

The proposed development will generate up to 60 daily vehicle movements (comprising 32 light vehicles and 28 heavy / OD vehicles) during peak construction periods and about two vehicle movements per day during operation.

This traffic will primarily be accommodated along Sturt Highway, Kywong Boree Creek Road and Kywong Faithfull Road. The impact of this additional traffic is expected to be minimal, as discussed in the following sections.

Sturt Highway, Kywong Boree Creek Road and Kywong Faithfull Road

As discussed in Section 3.2.1 and Section 4, the proposal seeks to use the existing RMS approved GML and CML heavy vehicle routes which have been designed to cater for such vehicles.

Data provided by RMS indicates that Sturt Highway generally carries in the order of 1,200 vehicles per day in the locality of the subject site. Traffic during peak periods equates to an approximate increase of 5% when compared against the existing traffic along Sturt Highway. It is expected that these volumes will be comfortably absorbed by Sturt Highway, with no detrimental impacts to performance.

Kywong Boree Creek Road and Kywong Faithfull Road have been designed to accommodate heavy vehicles and are approved for this use (as indicated by the RMS heavy vehicle routes). Whilst construction traffic represents a significant increase to the volumes on roads of this order, they will have sufficient capacity to cater for such movements, particularly given the short term nature of construction. Thus the construction traffic is not expected to have any significant impact on the operation or safety of Kywong Boree Creek Road or Kywong Faithfull Road.

It is expected that Council will require a pre-construction condition audit of both Kywong Boree Creek Road and Kywong Faith Road, and that they be restored to their pre-construction condition once construction is complete.

Mitchells Road

Mitchells Road is not pre-approved for heavy vehicle deliveries, and will require Council's approval for use as required; we note that only the southern portion of Mitchells Road is expected to be used by heavy vehicles.

Given the short-term nature of the construction traffic, it is expected that this road will be able to adequately cater for project traffic. Upgrades (if required) and/or any regular maintenance will be considered in a detailed Traffic Management Plan which will be developed with the EPC in consultation with the local and state road authorities as appropriate.

It is expected that Council will require a pre-construction condition audit of Mitchells Road, and that it be restored to its pre-construction condition once construction is complete.

5.2.1 Nearby Mineral Extraction

This section addresses the following comment provided by NSW Department of Planning and Environment & Resources and Geoscience as part of the SEARs:

This requires the proponent to identify any of the above in the Environmental Impact Statement (EIS) and consult with the operators and/or titleholders to establish if the proposal is likely to have a significant impact on current or future extraction of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources).

There are two quarries in the vicinity of the development site, the Mimosa Pit and Wrights Pit. An assessment of the development site's impact on these pits is discussed below.

Mimosa Pit

Mimosa Pit is the nearest of the two, located on the opposite side of the Sturt Highway, approximately 2 kilometres north of the subject site.

We are advised that Mimosa pit is not currently in operation, and there are no approvals pending for this pit to be used at present. The development site construction and operation should therefore have minimal impact on the Mimosa Pit.

Wrights Pit

Wrights Pit is located approximately 7 kilometres north west of the subject site and is accessed from the Sturt Highway.

It is noted that a majority of heavy delivery vehicles (components and aggregate) are anticipated to access the site from the east and hence will have minimal impact or interaction with vehicles travelling to / from Wrights Pit.

Staff will potentially be staying in Narrandera during the construction period and hence will travel past Wrights Pit on their way to and from work. It is not expected that staff vehicles will have any significant impact on the operation of Wrights Pit, particularly given the relatively low number of staff vehicles (32 across an entire day) and short period of time where they will be passing the site (morning and evening)

6 Traffic Management Plan

Subject to an appointment of a supplier / construction contractor and other considerations, aspects of the Sandigo Solar Farm project may be subject to review. In addition, construction / work programs for the project will not be resolved until closer to project commencement. As such, subject to commencement timeframes, there is potential for changes to existing road conditions and Solar Farm haulage assumptions as considered within this report.

The following comment was provided by RMS as part of the SEARs:

A Traffic Management Plan to manage the traffic generation during the construction period will be required. Traffic should also be considered and addressed during operation of the facility. The Traffic Management Plan shall details the potential impacts associated with the phases of the development, the measures to be implemented to maintain the standard and safety of the road network, and procedures to monitor and ensure compliance.

Therefore, a detailed Traffic Management Plan (TMP) would need to be prepared prior to commencement of the project to confirm any mitigation 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 developed in consultation with Narrandera Shire Council, RMS, ESCO Pacific and any other relevant stakeholders to provide 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; and
- Qualify and identify any relevant mechanisms for OD vehicle permits and traffic management requirements
- Confirm adequacy of available sight distances for Mitchells Road, Kywong Faithfull Road, Kywong Boree Creek Road and Sturt Highway

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

Sandigo Solar Farm Construction Traffic Movements

Indicative Traffic Movements Provided by ESCO

Sandigo Solar Farm - Indicative Construction Traffic Movements

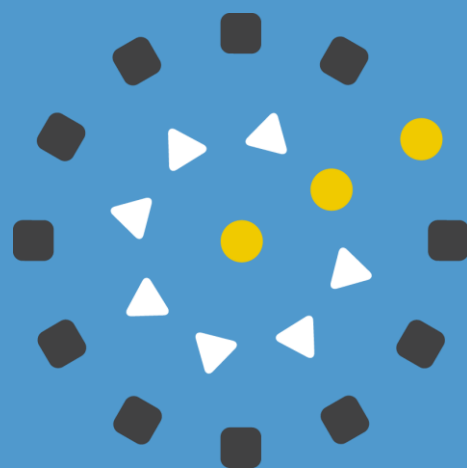
H-Tracking System		
Expected MWp	100	
Material/Equipment Delivery	MWp per Container	Movements
Modules	0.18	556
Inverter Stations	4.00	25
Fixing System	0.15	667
33kV Switchgear (oversized)	100.00	1
66kV Transformer (oversized)	100.00	1
O&M Building (oversized)	100.00	1
Construction equipment such as crane trucks (oversized)	100.00	80
Balance of System	0.75	134
Aggregate for Civil Construction	1.43	70
Total Heavy Vehicle Movements		1,535
Construction Labour		
Daily on Site Labour		160
Mini Bus Capacity		15
Daily Mini Bus Activity		11
Additional Daily Cars		5
Total Daily Labour related movements		16
Construction Period (work days)		176
Total Light Vehicle Movements		2,816

Monthly Construction Traffic

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Total
				5	5	5	5	5	25
	134	134	134	134	131				667
							1		1
							1		1
	10	10	10	10	10	10	10	10	80
	17	17	17	17	17	17	17	17	134
		35	35					35	105
	161	196	196	166	302	171	174	206	1,570
Average Daily Movement (round trip)	8	9	9	8	14	8	8	10	
	352	352	352	352	352	352	352	352	2,816

Average Daily Light Vehicles (round trip)

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8
	16	16	16	16	16	16	16	16



Purposeful