Solar Energy Facility

Tabbita Lane, Tabbita NSW

Traffic Impact Assessment Report

Client:

ACEnergy Pty Ltd

Project No. 210905

Final2 Report – 18/10/2022

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DOCUMENT CONTROL RECORD

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Document Control				
Report Title	Solar Energy Facility – Tabbita Lane, Tabbita NSW – Traffic Impact Assessment			
Project Number	210905			
Client	ACEnergy Pty Ltd			
Client Contact	Jane Bai			
Rev	Date Issued	Revision Details / Status	Prepared by	Authorised by
Draft	10/06/22	For client review	Bernadette Sargeant / Stuart Redman	Bob Citroën
Final	27/06/22	Sent to client	Bernadette Sargeant	Stuart Redman
Final2	18/10/22	Updated site plan	Bernadette Sargeant	Stuart Redman

EXECUTIVE SUMMARY

ACEnergy Pty Ltd has engaged Trafficworks to undertake a Traffic Impact Assessment (TIA) for the proposed Solar Energy Facility in Tabbita near Griffith. The subject site falls within a Primary Production Zone (RU1) and forms part of the Carrathool Shire Council (the Council).

The subject site comprises land bounded by Tabbita Lane to the south and rural production north, east and west. The development is proposed to have direct access to Tabbita Lane.

The proposed development in Tabbita involves constructing a Solar Energy Facility (using photovoltaic (PV) solar trackers), which is connected to the electricity grid providing a reliable power source to the local community.

Based on the information provided, peak traffic generation from the developments will likely occur during the construction phase. Therefore, the TIA was conducted primarily during the development's construction phase.

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 in Austroads and the applicable Council requirements.

A summary of the subject site and the proposed development is shown below.

Address	Tabbita Lane, Tabbita
Existing Zoning	Primary Production Zone (RU1)
Proposed Development	Solar Energy Facility

Road Network	<u>Tabbita Lane</u>
	• 100 km/h speed limit
	• Traffic volumes
	  ○ AM peak hour 35 vehicles per hour (vph)
	  ○ PM peak hour 35 vph

Recommendation	• **Recommendation 1:** Consider clearing vegetation to satisfy Safe Sight Distance requirements measured 5.0 m from the carriageway.
	• **Recommendation 2:** To mitigate the risk of interaction between construction vehicles and school buses, no heavy vehicles will arrive to / depart from the subject site during the following times:
	  ○ 8.00 am to 9.30 am
	  ○ 2.30 pm to 4.00 pm
	• **Recommendation 3:** The subject site access is constructed as per Figure 7.4 in Austroads Guide to Road Design Part 4.
	• **Recommendation 4:** Swept path assessment be undertaken for a 19.0 m semi-trailer to ensure these vehicles can access the proposed facility.

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 3: Geometric Design, 2017*
  - *Guide to Road Design Part 4: Intersections and Crossings, 2017*
  - *Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections, 2017*
- Department of Environment, Land, Water and Planning:
  - *Solar Energy Facilities Design and Development Guidelines, August 2019*

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

- Site Plan: by ACEnergy G-1.1_000530 (Rev A).

TABLE OF CONTENTS

1 INTRODUCTION

ACEnergy Pty Ltd has engaged Trafficworks to undertake a Traffic Impact Assessment (TIA) for the proposed Solar Energy Facility in Tabbita, near Griffith. The subject site falls within a Primary Production Zone (RU1) and forms part of the Carrathool Shire Council (the Council).

The subject site comprises land bounded by Tabbita Lane to the south and rural production east and west. The development is proposed to have direct access to Tabbita Lane.

The proposed development in Tabbita involves constructing a Solar Energy Facility (using photovoltaic (PV) solar trackers), which is connected to the electricity grid providing a reliable power source to the local community.

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 conducted primarily during the development's construction phase.

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 subject site is located approximately 9.5 km west of Tabbita and 16 km south of Goolgowi. It falls within a Primary Production Zone (RU1) of the Council's Local Environmental Plan 2013 (LEP). The subject site comprises land bounded by Tabbita Lane to the south and rural production north, east and west.

The subject site currently has no direct access to Tabbita Lane. The location of the subject site and its surrounding road network is shown in Figures 1 and 2.

Figure 1: Location Plan (courtesy of Google Maps)

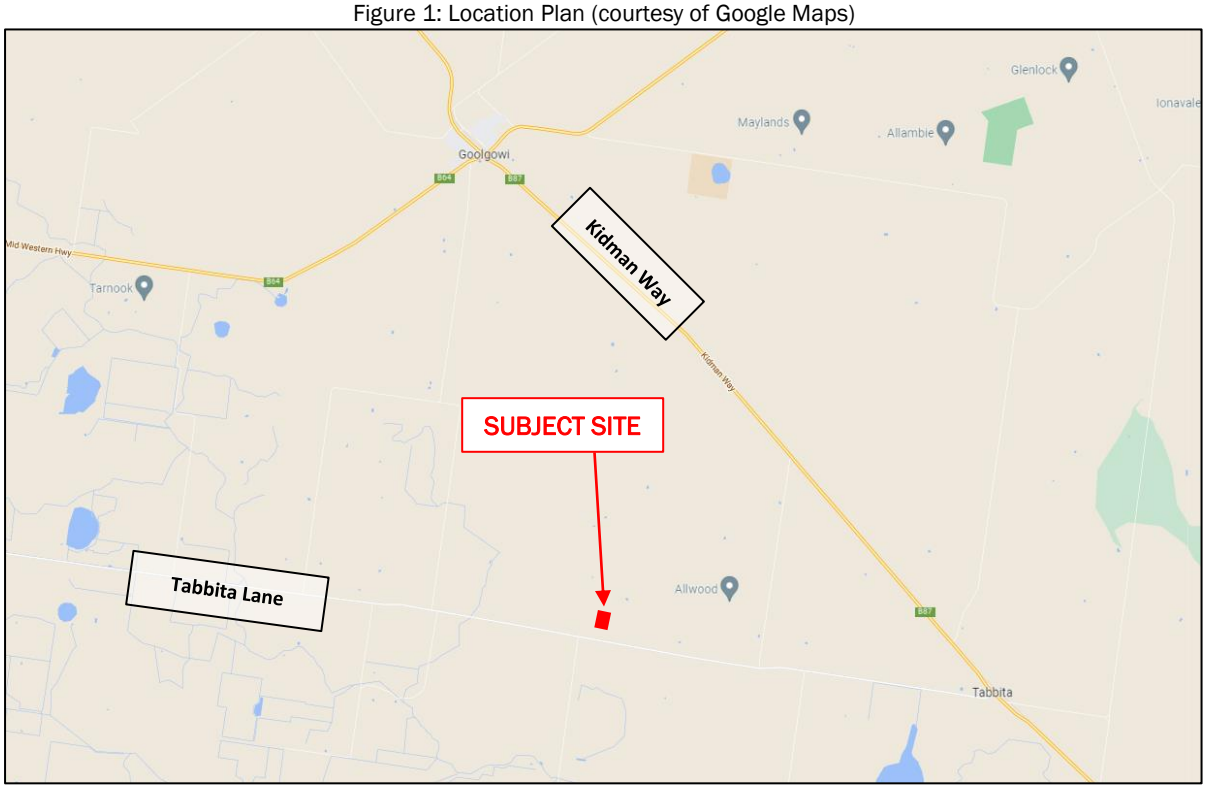
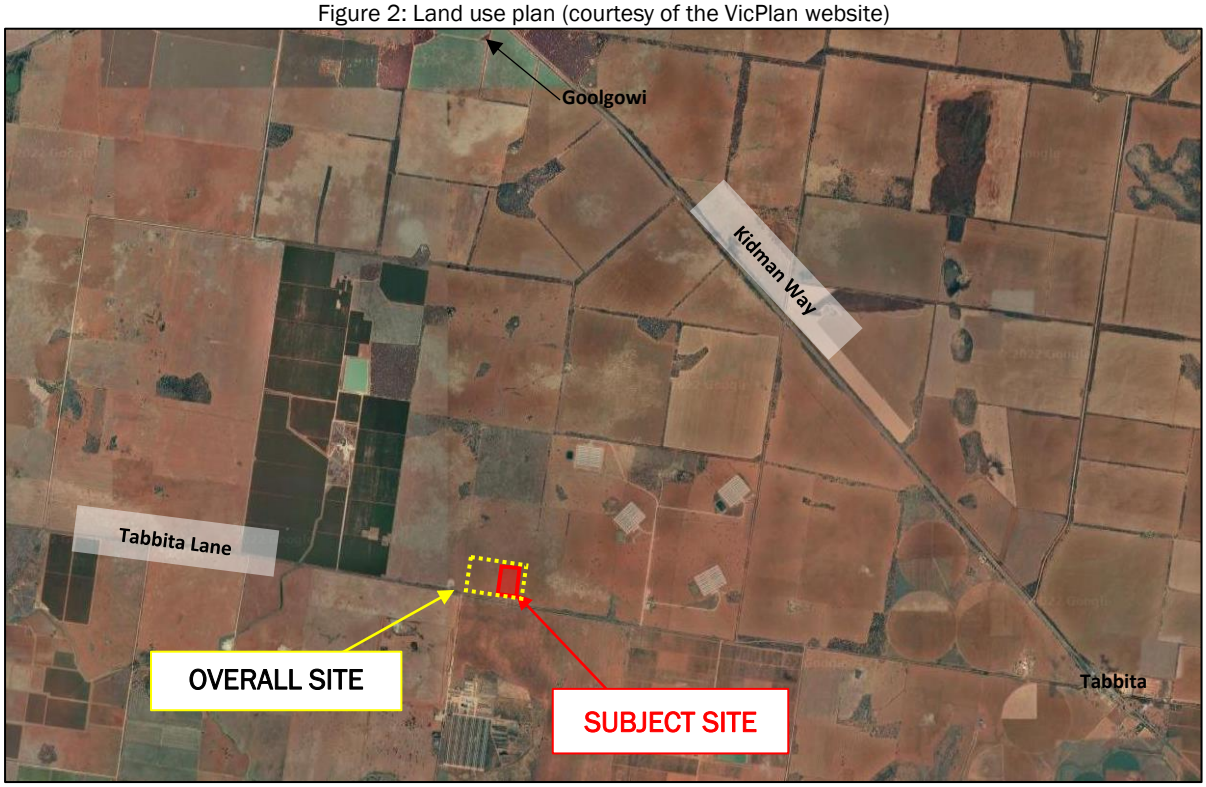


Figure 2: Land use plan (courtesy of the VicPlan website)



2.2 Road network

2.2.1 Tabbita Lane

Tabbita Lane is classified by Transport for New South Wales (TfNSW) as a regional road managed by Council. It is generally aligned in an east to west direction and provides a connection between Kidman Way to the east and Carrathool Road to the west. Tabbita Lane is an authorised B-double and road train route.

Near the subject site, Tabbita Lane is a two-way, two-lane road featuring two 3.6 m wide lanes with 0.5 m sealed shoulders on each side. There is no provision for bicycles and pedestrians along the road.

A posted speed limit of 100 km/h applies along Tabbita Lane.

Photo 1: Tabbita Lane, looking east (from proposed site access)

Photo 2: Tabbita Lane, looking west (from proposed site access)

2.3 Traffic volumes

Traffic surveys undertaken by others in 2021 indicated that Tabbita Lane is carrying peak hour traffic volumes of:

- AM peak hour
  - two-way 35 vehicles per hour (vph)
  - eastbound 14 vph
  - westbound 21 vph
- PM peak hour
  - two-way 35 vph
  - eastbound 22 vph
  - westbound 13 vph

2.4 Crash history

The *NSW Government's Transport for NSW - Crash and casualty statistics* database details all injury crashes on roads throughout the state. Scrutiny of these records indicates that there have been three reported casualty crashes and one reported non-casualty crash along Tabbita Lane between the subject site boundary and Kidman Way in the last five years of available data (2016 – 2020), including:

- struck animal (RUM code 67) type collision occurred approximately 10 km west of Kidman Way (along with the subject site frontage) in 2017 under night conditions, resulting in a non-casualty / towaway
- out of control on bend (RUM code 88) type collision occurred 7.5 km west of Kidman Way in 2020 under daylight conditions, resulting in a minor/another injury
- right off the bend into object (RUM code 85) type collision occurred 300 m west of Kidman Way in 2016 under daylight conditions, resulting in a moderate injury
- off the end of road (RUM code 75) type collision occurred at the Tabbita Lane / Kidman Way intersection in 2016 under dawn conditions, resulting in a moderate injury.

It can be concluded that Tabbita Lane near the subject site does not have a traffic safety problem that requires urgent remedial action.

Conclusion 1: No crash trends were observed near the subject site in the last five years of available data. Hence there are no traffic safety problems that require urgent remedial action.

2.5 Public transport

There is no public transport in the vicinity of the subject site. However, it is noted that a charter school bus service may operate in the area, and this is addressed later in the report.

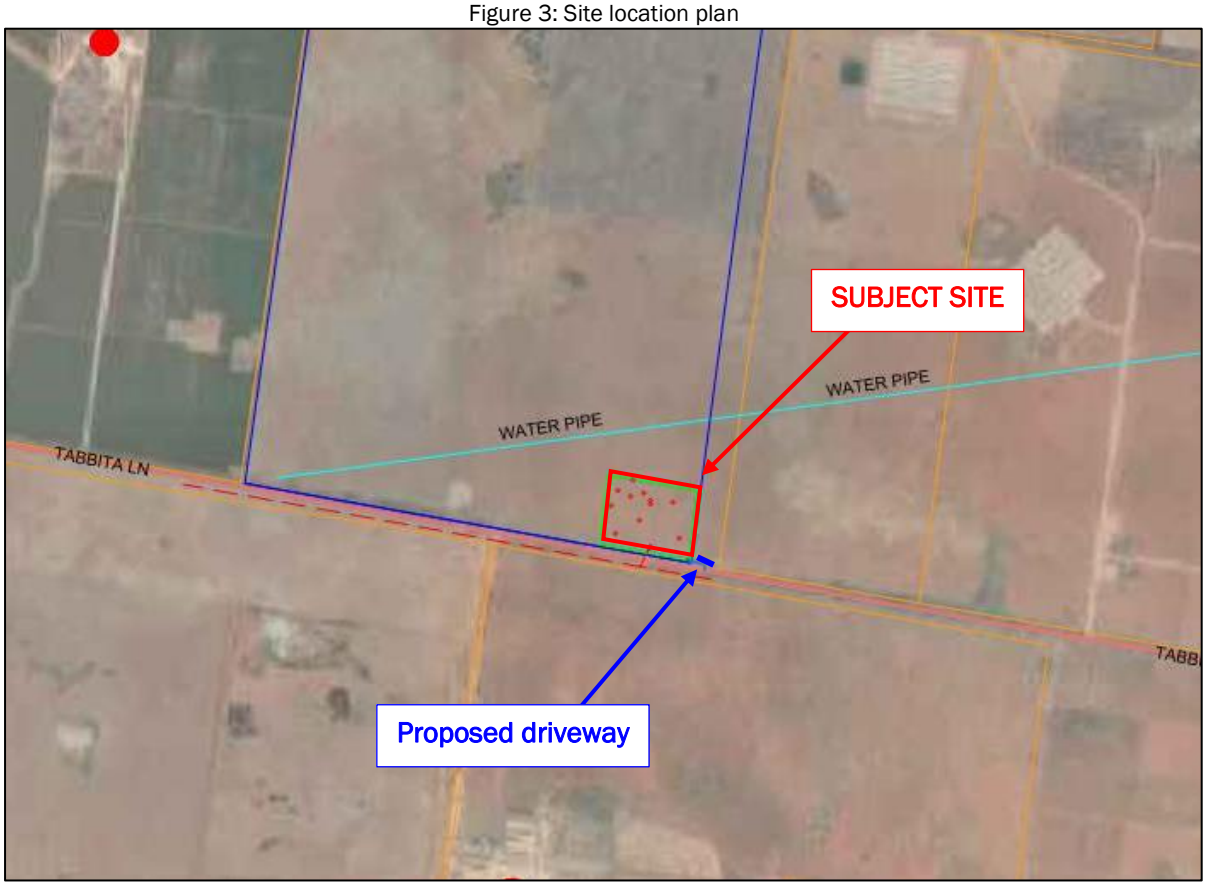
3 PROPOSED DEVELOPMENT

3.1 Development summary

The proposed development in Tabbita involves constructing a Solar Energy Facility to generate power to connect to the local electricity grid. This facility will provide a reliable power source to the local community. A plan of the proposed development is shown in Attachment A, and the location plan is shown in Figure 3.

The proposed facility will be un-staffed, and the period that will generate the most traffic will be the Solar Energy Facility construction phase. The facility is proposed to have direct access onto Tabbita Lane via a driveway east of the subject site.

Figure 3: Site location plan



3.1.1 Construction

On-site construction for the proposed Solar Energy Facility is limited mainly to the assembly and connection of components with the typical solar panels readily transportable via 12.5 m rigid trucks. For the most part, all equipment will be transported to the subject site via rigid trucks, with only the inverter/transformer/power station (in a 40 ft container) required to be delivered to the subject site by a 19 m semi-trailer.

The construction delivery schedule for the proposed Solar Energy Facility is shown in Table 1.

Table 1: Construction Delivery Schedule

	Site Works
Month 1	Civil Earthling works, fencing and landscaping
Months 2 to 4	Delivery of long lead Materials PV panel and LV cable installation
Month 5	HV station installation, testing and commissioning.
Month 6	Site clean-up and demobilisation

There is a 7-month construction phase before the facility's operation.

3.1.2 Heavy vehicle access to the subject site

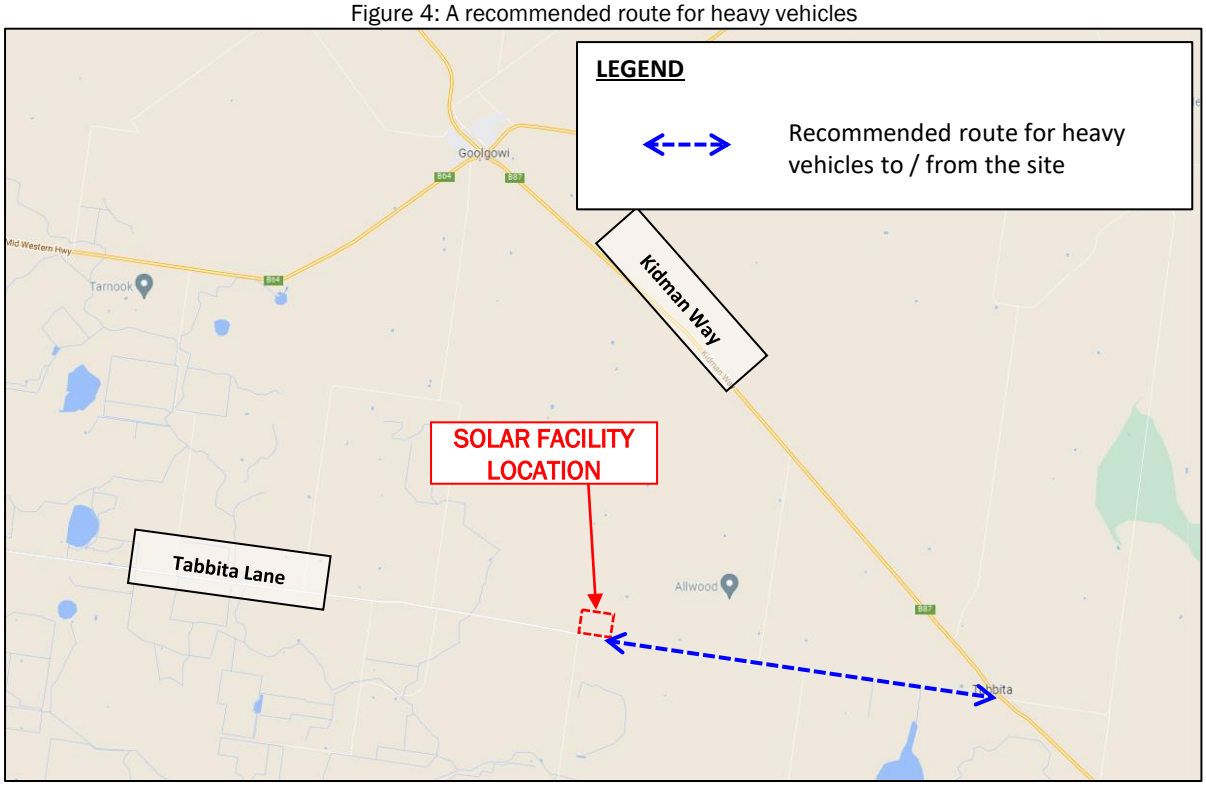
Heavy vehicles are proposed to access the subject site to/from the east via Kidman Way due to the alignment of the shared driveway.

The proposed route is as follows:

- Access from the east via Tabbita Lane, turning right in / left out of the subject site

Figure 4 indicates the proposed recommended route for all heavy vehicles.

Figure 4: A recommended route for heavy vehicles



It is expected that workers for the subject site will come from the surrounding areas, as follows (travel time estimate):

- Goolgowi (16 minutes) to/from the east
- Griffith (28 minutes) to/from the east

All the heavy vehicle traffic will arrive at the subject site from Sydney (to the east) and access the subject site via the designated route.

3.1.3 Operation / decommissioning

The proposed use is based on a 31-year lease. Upon completion of this leasing period, if the lease is not renewed, it will be incumbent upon the operator of the facility to decommission the facility, remove all installations, and remediate the subject site back to its pre-existing state.

Upon approval of this application, the responsible authority may stipulate a requirement for a decommissioning and rehabilitation plan to be submitted for endorsement.

4 TRAFFIC GENERATION AND DISTRIBUTION

4.1 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, the RTA Guide's traffic generation rates for solar energy storage facilities are unavailable.

Therefore, the traffic generation to/from the proposed development was estimated empirically. Traffic generation analysis was undertaken for the development's construction and operational phases to establish the likely peak traffic generation.

4.1.1 Construction phase traffic volumes

Based on the information provided, the peak light vehicle traffic generation is likely to occur from the start of the second month of the construction phase to the completion of this phase.

This is when ten construction staff vehicles per day will access the subject site, resulting in a total daily traffic generation of 20 vpd (ten vpd arriving and ten vpd departing at the end of the shift). Assuming the construction work will be undertaken during regular working hours, it is anticipated that ten vehicles will access the subject site during peak hours (at the start of the morning shift).

Assessment of the heavy vehicles accessing the subject site during the construction phase revealed that the peak traffic generation is likely to occur in the second month to the fifth month of the construction phase. This four-month period includes a three-week window of major deliveries when up to three heavy vehicles could access the subject site daily. This would result in a total daily traffic generation of six vpd (three vpd arriving and three vpd departing). Outside, up to one heavy vehicle will access the subject site daily.

Assuming the construction work will be undertaken during regular working hours of the day, it is anticipated that the three heavy vehicles will be accessing the subject site outside of the peak hours of operation. It is understood that not more than one heavy vehicle will access the subject site during peak hours. Therefore, the impact of heavy vehicles is considered negligible. However, conservatively for this assessment, it has been assumed that a single heavy vehicle will access the subject site during the AM or the PM peak hour.

The heavy vehicles accessing the subject site are likely to be 12.5 m rigid or 19 m semi-trailers (i.e. there will be no B-double trucks) accessing the subject site via a right turn from Tabbita Lane. As noted above, heavy vehicle movements (major deliveries) are expected to occur during a three-week window, with up to three trucks per day.

4.1.2 Operational phase traffic volumes

The proposed Solar Energy Facility will have remote monitoring in real-time, allowing for constant surveillance and monitoring of the facility without the requirement for staffing on-site. The compound contains critical infrastructure that requires a high degree of security. Upon identifying potential issues, action can be taken indirectly from the control centre or directly using chosen contractors on-site.

Two light vehicles will attend the subject site every six months during the operational phase for general maintenance.

4.1.3 Peak traffic generation

Assessment of the likely traffic generation volumes during the development's construction and operational phases revealed that the proposed facility's peak traffic generation would occur during the construction phase of the development. Therefore, the TIA has been undertaken to determine the traffic implications during the construction phase of the development.

Conclusion 2: The peak traffic generation will likely occur during the facility's construction phase, where ten light vehicles (generating 20 trips per day) and three heavy vehicles (generating six trips per day) will access the subject site during a peak construction day.

4.2 Traffic distribution

Based on the surrounding road network, it has been assumed that 100% of the light vehicle traffic will be accessing the subject site to/from the east (Griffith and Goolgowi). Furthermore, it has been assumed that 100% of the heavy vehicle traffic will access the subject site to/from the east (via the recommended route).

It has been assumed that during the AM peak of the construction phase, 100% of the light vehicles will be entering the subject site, 0% will be leaving the subject site, and 100% of the heavy vehicles will be entering the subject site, and 0% will be leaving the subject site. During the PM peak of the construction phase, 0% of the light vehicles will be entering the subject site, and 100% will be leaving the subject site; 100% of the heavy vehicles will be entering the subject site, and 100% will be leaving the subject site.

4.3 Anticipated traffic volumes

Given that the proposed Solar Energy Facility will have peak traffic generation during the construction phase, the anticipated traffic volumes for 2022 (when the facility is under construction) are summarised in Table 2.

Table 2: Directional split of peak traffic flow

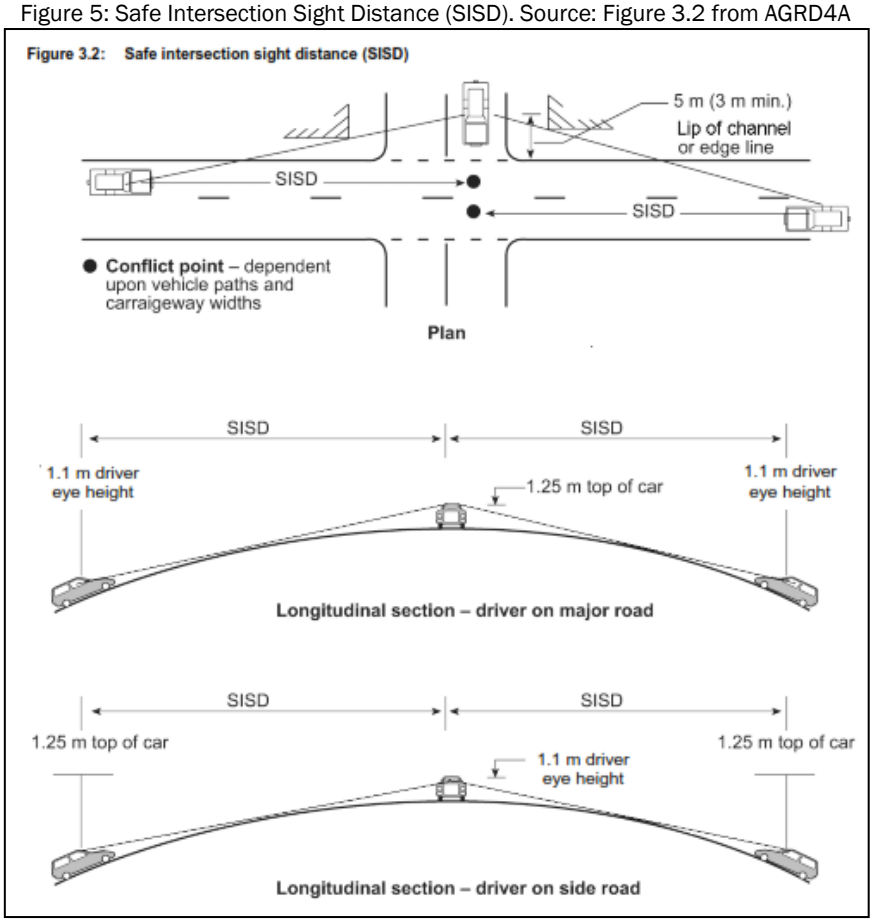
Period	Type	Left In	Right In	Left Out	Right Out	Total
AM Peak	Light	0	10	0	0	10
	Heavy	0	1	0	0	1
	TOTAL	**0**	**11**	**0**	**0**	**11**
PM Peak	Light	0	0	10	0	10
	Heavy	0	0	1	0	1
	TOTAL	**0**	**0**	**11**	**0**	**11**

5 ASSESSMENT

5.1 Sight distance

The visibility criterion commonly applied to intersections is Safe Intersection Sight Distance (SISD). The minimum SISD criteria along major roads are outlined in Table 3.3 of the *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* (AGRD4A). This document provides information about the minimum distance that should be provided along a major road to allow sufficient distance for a driver on a major road to observe a vehicle approaching from a minor road into a 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 5).

Figure 5: 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 100 km/h.

SISD for trucks should also be considered. SISD for trucks can be established from SSD (stopping sight distance) for trucks (given in Table 5.6 in the *Austroads Guide to Road Design Part 3: Geometric Design*) plus 3 seconds of observation time. This equates to SISD for trucks of 274 m for a 100 km/h approach speed. The 85th percentile operating speed for trucks[1] is typically the posted speed limit for situations such as occurring at the subject site.

[1] It should be noted that the heavy vehicles are speed limited to 100 km/h

The longitudinal formation grade of the common property site access intersection with Tabbita Lane requires no grade corrections, and the minimum SISD criterion for vehicular access to the subject site is shown in Table 3.

Table 3: 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	100	248
Truck	100	274

Photo 3: Looking east along Tabbita Lane (from the proposed common property site access location)

Photo 4: Looking south along Tabbita Lane (from the proposed common property site access location)

Clear sight lines of at least 400 m are available from the proposed common property site access location along Tabbita Lane, measuring 3.0 m from the main carriageway (Photos 3 and 4). Adequate sight lines would be available from 5.0 m from the carriageway with the clearing of the roadside vegetation.

Conclusion 3: The minimum Safe Intersection Sight Distance requirements would be satisfied at the proposed common property site access location with Tabbita Lane.

Recommendation 1: Consider clearing vegetation to satisfy Safe Sight Distance requirements measured 5.0 m from the carriageway.

5.2 Impact on the existing road network

Potential conflict between delivery vehicles and school buses

Noting that there may be school buses on Tabbita Lane, it is recommended that no heavy vehicles arrive to / depart from the facility during the following times to mitigate the risk of interaction between delivery vehicles and school buses:

- 8.00 am to 9.30 am
- 2.30 pm to 4.00 pm

It should be noted that the staff arrivals/departures will occur outside these times, and the development traffic is expected to have a negligible impact on school bus travel.

Recommendation 2: To mitigate the risk of interaction between construction vehicles and school buses, no heavy vehicles will arrive to / depart from the subject site during the following times:

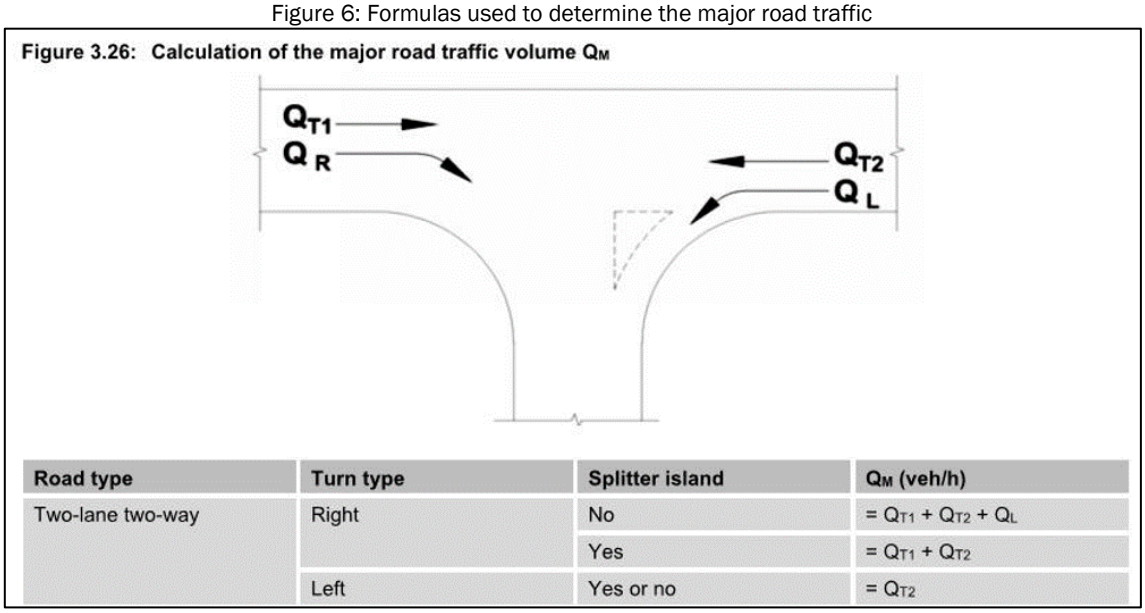
- 8.00 am to 9.30 am
- 2.30 pm to 4.00 pm

5.3 Turn provisions

The traffic turning from major roads into minor roads should not delay through traffic. Turn treatments from major roads into minor roads at sign-controlled intersections are generally provided for safe and efficient intersection operation.

The anticipated traffic volumes during the peak hour (outlined in Table 2) were used to determine the turning warrants at the access to the subject site. The formulas shown in Figure 3.26 of the AGTM6, reproduced in Figure 6, were used to determine the major road volume (Q_M). The results were then applied to Figure 3.25 of the AGTM6 (reproduced in Figure 7) to determine the turning warrants for the access.

Figure 6: Formulas used to determine the major road traffic

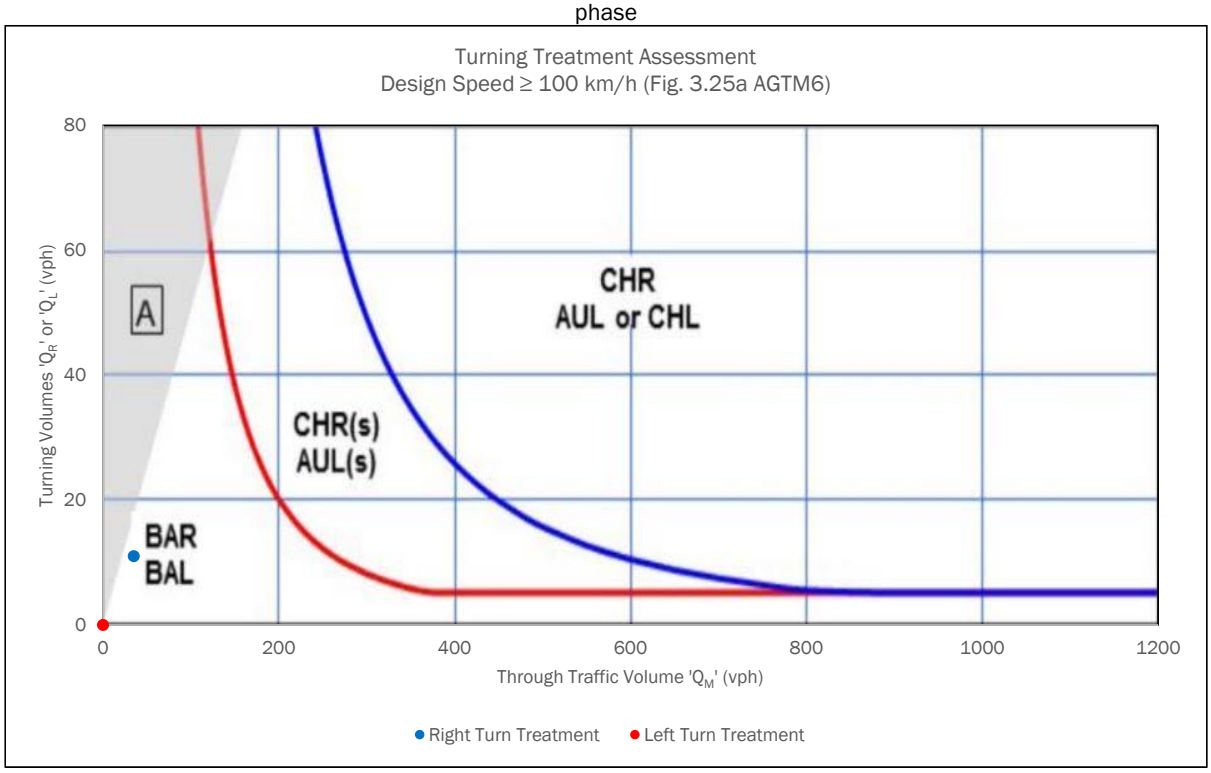


Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= Q_{T1} + Q_{T2} + Q_L
		Yes	= Q_{T1} + Q_{T2}
	Left	Yes or no	= Q_{T2}

Table 4: Turn warrants at the proposed site access / Tabbita Lane intersection – construction phase

Major	Minor Road	Peak Period	Left Turn Q_L (vph)	Right Turn Q_R (vph)	Through Q_T (vph)		Q_M Left Turn	Q_M Right Turn
Tabbita Lane	Site access	AM	0	11	Q_{T1}	21	0	35
					Q_{T2}	14		
		PM	0	0	Q_{T1}	13	0	0
					Q_{T2}	22		

Figure 7: Graph used to determine the warrants at the proposed site access / Tabbita Ln intersection – construction phase



The assessment revealed that the proposed site access intersection with Tabbita Lane meets the warrants for a rural Basic Right (BAR) type treatment.

It is considered onerous to provide formal turn treatments at the subject site access intersection with Tabbita Lane due to the following:

- the turning traffic associated with the proposal will be low
- the existing through traffic volume is low
- the construction phase will occur for six months.

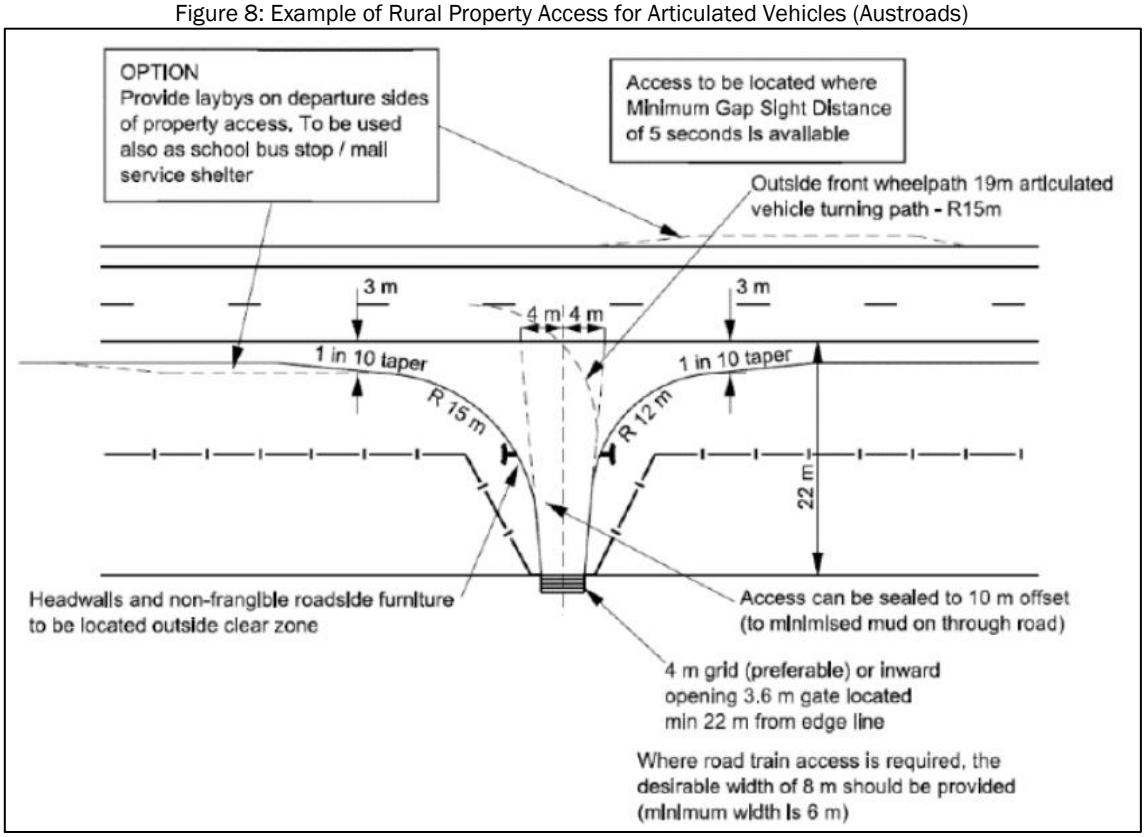
Based on the above, no turn lane treatments are required at the subject site access intersection with Tabbita Lane for the construction phase.

Conclusion 4: No turn lane treatments are required at the subject site access intersection with Tabbita Lane for the construction phase of the development.

5.4 Access location & operation

To ensure that a 19 m semi-trailer can access the subject site, the access point should be constructed as per Figure 7.4 in *Austroads Guide to Road Design Part 4: Intersections and Crossings*, shown below in Figure 8.

Figure 8: Example of Rural Property Access for Articulated Vehicles (Austroads)



Recommendation 3: The subject site access is constructed per Figure 7.4 in *Austroads Guide to Road Design Part 4*.

The proposed shared property driveway has a 90-degree bend in the alignment approximately 12 m from the Tabbita Lane carriageway. This turn may be difficult to navigate for 19 m semi-trailers.

Recommendation 4: Swept path assessment be undertaken for a 19.0 m semi-trailer to ensure these vehicles can access the proposed facility.

5.5 Site security

The proposed facility will likely include site security installation to restrict access to authorised vehicles only. These gates will be installed off the driveway and will not impact Tabbita Lane.

Conclusion 5: Proposed security gates will be located off the driveway and will not impact the Tabbita Lane carriageway.

5.6 Parking

The RTA Guide provides car parking rates for new developments. However, the parking requirement for solar energy storage facilities is currently unavailable. Therefore, the car parking demand for the proposed development was estimated empirically.

As discussed in Section 4 of the report, approximately ten light vehicles will likely access the overall site during the construction phase of the proposed facility. Assuming all ten vehicles will be at the subject site simultaneously, the subject site will have a car parking demand of ten spaces during the construction phase of the development.

The development plan indicates a designated car parking area within the proposed solar facility to accommodate the car parking demand during construction. Furthermore, should more parking be required, the subject site has sufficient space to accommodate any additional car parking demand for the proposed development.

Conclusion 6: The car parking demand for the subject site during the construction phase of the development is likely to be ten spaces, and the car parking demand for the subject site during the operational phase of the development is expected to be one space.

Conclusion 7: The development plan indicates a designated car parking area within the proposed solar facility to accommodate the car parking demand during construction. Furthermore, the subject site has sufficient space if additional car parking is required.

6 CONCLUSION

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

- No crash trends were observed near the subject site in the last five years of available data. Hence there are no traffic safety problems that require urgent remedial action.
- The peak traffic generation is likely to occur during the facility's construction phase, where ten light vehicles (generating 20 trips per day) and three heavy vehicles (generating six trips per day) will access the subject site during a peak construction day.
- The minimum Safe Intersection Sight Distance requirements would be satisfied at the proposed common property site access location with Tabbita Lane.
- No turn lane treatments are required at the subject site access intersection with Tabbita Lane for the construction phase of the development.
- Proposed security gates will be located off the driveway and will not impact the Tabbita Lane carriageway.
- The car parking demand for the subject site during the construction phase of the development is likely to be ten spaces, and the car parking demand for the subject site during the operational phase of the development is expected to be one space.
- The development plan indicates a designated car parking area within the proposed solar facility to accommodate the car parking demand during construction. Furthermore, the subject site has sufficient space if additional car parking is required.

The key recommendations of the TIA are summarised below.

- **Recommendation 1:** Consider clearing vegetation to satisfy Safe Sight Distance requirements measured 5.0 m from the carriageway.
- **Recommendation 2:** To mitigate the risk of interaction between construction vehicles and school buses, no heavy vehicles will arrive to / depart from the subject site during the following times:
    - 8.00 am to 9.30 am
    - 2.30 pm to 4.00 pm
- **Recommendation 3:** The subject site access is constructed as per Figure 7.4 in Austroads Guide to Road Design Part 4.
- **Recommendation 4:** Swept path assessment be undertaken for a 19.0 m semi-trailer to ensure these vehicles can access the proposed facility.

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

ATTACHMENT A – PROPOSED DEVELOPMENT PLAN

Figure A1: Overall site plan

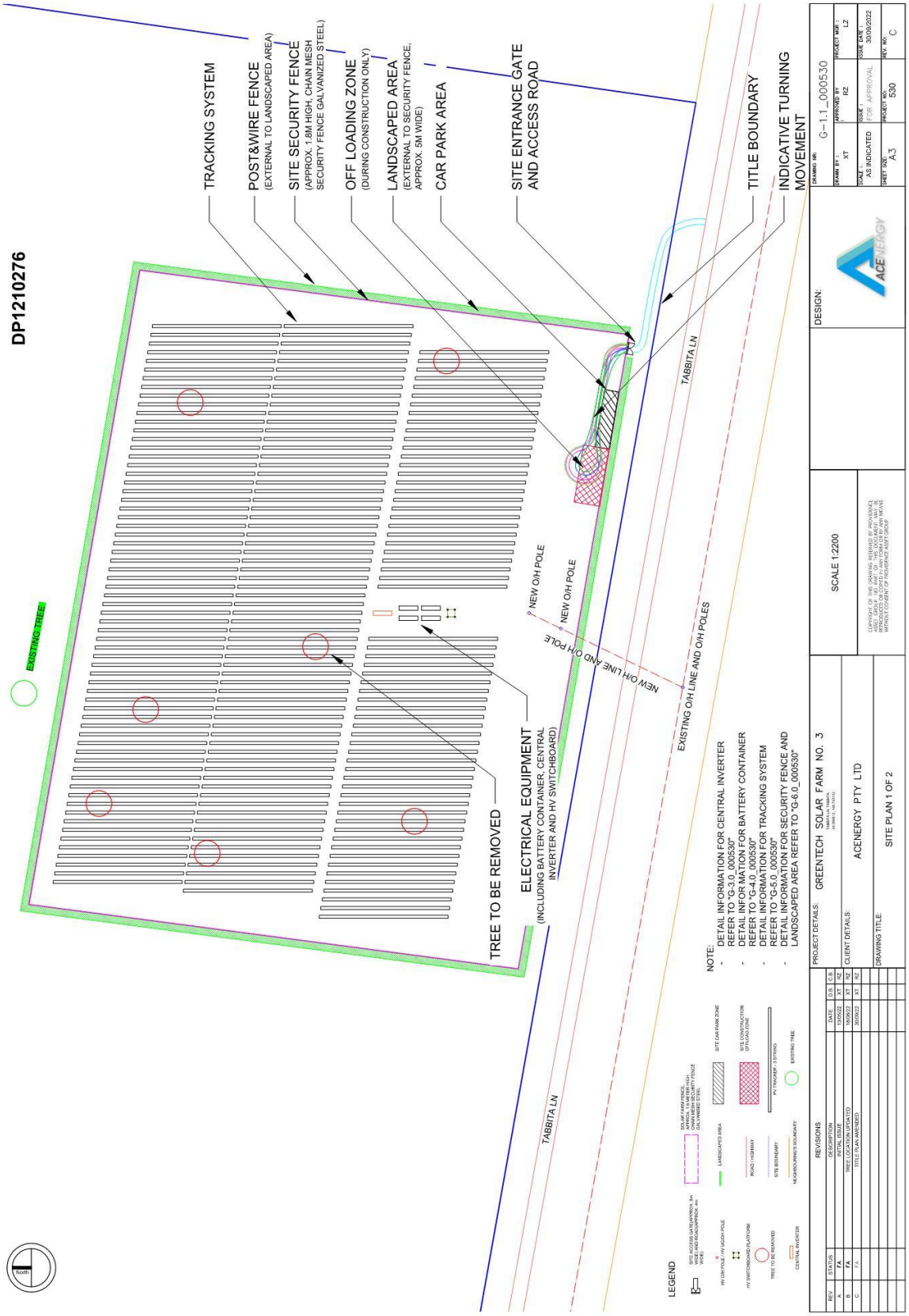
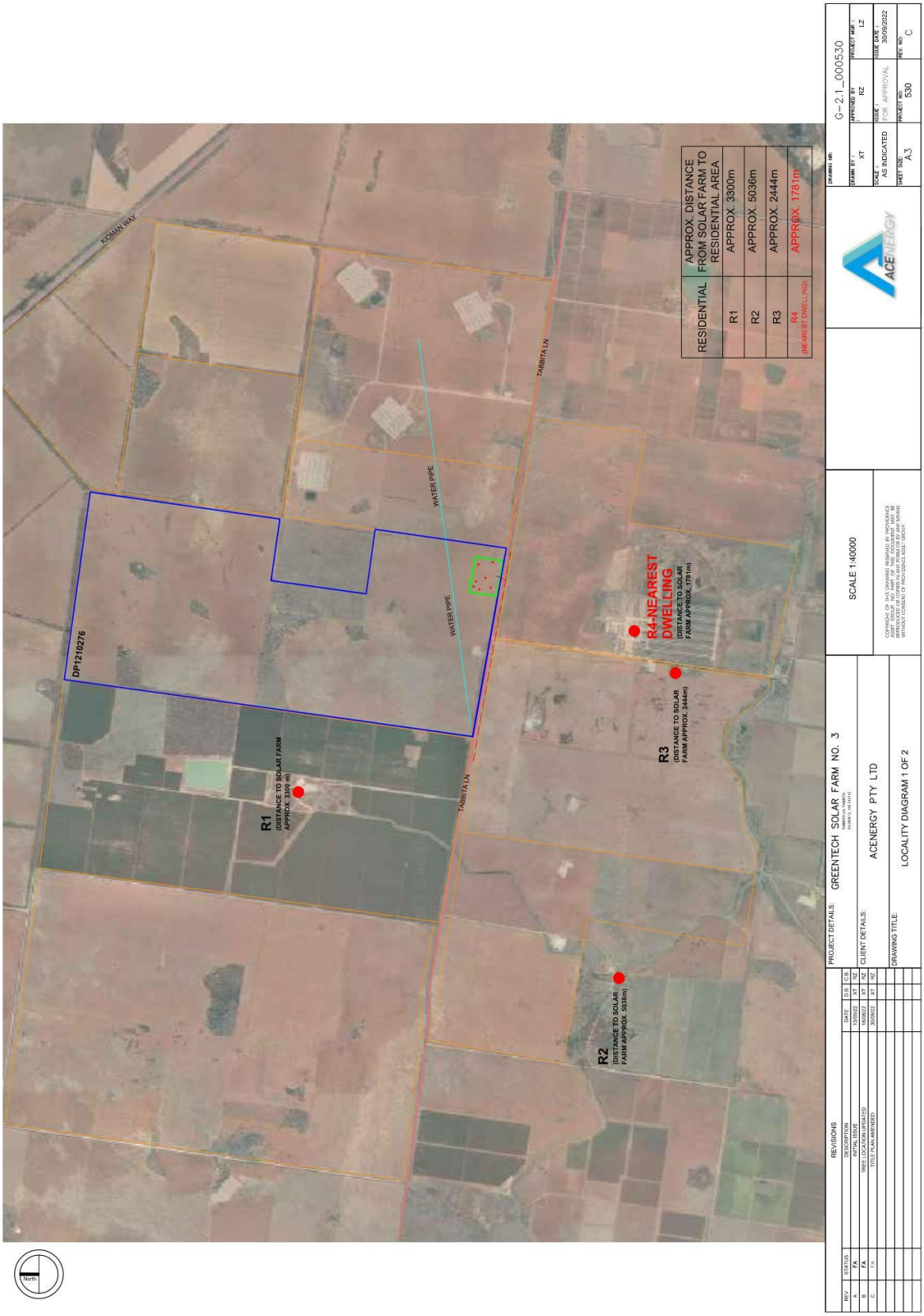


Figure A2: Locality plan



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