

Stantec Ref: 15862

6 May 2019

Sarah Hillis  
Senior Environmental Consultant  
NGH Environmental Pty Ltd  
WAGGA WAGGA  
NSW 2650

Via email: [sarah.h@nghenvironmental.com.au](mailto:sarah.h@nghenvironmental.com.au)

Dear Sarah,

#### **Proposed Solar Farm, Jindera, NSW - Traffic Assessment**

Stantec has reviewed the proposed access arrangements for the Jindera solar farm, which is located approximately 6.3 kilometres north of Jindera. It is proposed that all construction vehicles will access the site from the south through Albury, via Urana Road and Walla Walla Jindera Road. The concept site layout plan is shown within **Appendix A** and shows three access points for the solar farm along Urana Road and Walla Walla Jindera Road.

The proposed primary construction vehicle access points are as follows:

- Access Point 1 is located along Urana Road, approximately 4.9 kilometres north-west of the intersection of Urana Road / Walla Walla Jindera Road;
- Access Points 2 and 3 are located along Walla Walla Jindera Road, approximately four kilometres north of the intersection of Urana Road / Walla Walla Jindera Road. The two access points are on either side of the road, located opposite each other; and
- Access Point 4 is located along Ortlipp Road, on the south-eastern corner of the site. This access is proposed to be used as a maintenance and emergency access only.

#### **Roads and Maritime Environmental Assessment Requirements**

Roads and Maritime Services (RMS) issued a letter addressed to the Department of Planning & Environment, dated 31 August 2018, regarding the environmental assessment requirements for proposed "Jindera" solar farm. The following traffic and transport related issues were raised:

*Given the scale and operational characteristics of the proposed development RMS considers that the traffic related issues relevant to the development should be considered and addressed in 2 distinct stages as follows:*

- *Construction and decommission phase – the transport of materials and equipment/components for the establishment of the facility and ancillary infrastructure, the movement and parking of construction related vehicles, including personal vehicles, during the construction of the facility;*
- *Operational phase – the ongoing traffic generation due to the operation, maintenance and servicing of the various elements of the project.*

*The TIA 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. Where road safety concerns are identified at a specific location along the haulage route/s, the TIA may be supported by a targeted Road Safety Audit undertaken by suitably qualified persons.*

*For guidance in the preparation of the TIA the applicant is referred to section 2 of the "Guide 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 Austroads Guide to Traffic Management Part 3 – 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.*

An assessment of the traffic and access arrangements of the proposed solar farm is provided below.

## 1 Existing Conditions

### 1.1 Road Network

**Urana Road** is an RMS regional road that runs in a northwest-southeast alignment in the vicinity of the site. It has a sealed road width of approximately eight metres, accommodating one traffic lane in each direction. Urana Road has a posted speed limit of 100 km/h.

**Urana Street** continues on from Urana Road at Quartz Hills Road, through Jindera before continuing on as Urana Road. It has a varying road width through Jindera, accommodating one lane of traffic in each direction and on-street parking along both sides of the road through the town. Urana Street has a posted speed limit of 50km/h.

**Walla Walla Jindera Road** is a local road under the care and management of Greater Hume Council (Council), that generally runs in a north-south alignment. Within the vicinity of the site, it has a sealed road width of approximately 7.5 metres, accommodating one traffic lane in each direction. Walla Walla Jindera Road has a speed limit of 100km/h.

**Ortlipp Road** is a local road under the care and management of Council, that generally runs in a north-south alignment. Within the vicinity of the site, it has an unsealed road surface, with a width of approximately six metres. Ortlipp Road is accessed via Lindner Road, which connects with Walla Walla Jindera Road. The intersection of Ortlipp Road / Lindner Road is designed to cater for heavy vehicles with large radii turns.

### 1.2 Traffic Volumes

Traffic volumes were obtained from RMS traffic volume viewer for Urana Road and Walla Walla Jindera Road, with the most recent volumes available being recorded in 2010. The volumes were recorded at the following locations:

- Urana Road, between Hueske Road and Jelbart Road, recorded an ADT volume of 4,170 vehicles per day (vpd); and
- Walla Walla Jindera Road, between Wehner Road and Five Chain Road, recorded an ADT volume of 889 vpd.

It is considered that a growth rate of 1% per annum is an appropriate rate to be applied to approximate the current levels of traffic accommodated by these roads, given the rural nature of the road network. It is therefore estimated that Urana Road and Walla Walla Jindera Road currently carry in the order of 4,600 vpd and 1,000 vpd respectively, which would result in approximate two-way peak hourly volumes of 740 and 160 vehicles per hour (vph)<sup>1</sup> respectively.

Traffic volume data for the remaining roads are unknown, however given the rural and unsealed nature of the road network, it is not expected that daily traffic volumes are of considerable levels.

---

<sup>1</sup> 16% AADT peak hour flow estimate taken from Section 2.3.6 of Austroads' Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings, and represents a conservative approximation of peak hour flows.

## 2 Traffic Generation

### 2.1 Construction Phase

Construction activities would be undertaken during standard daytime construction hours (7:00am to 6:00pm Monday to Friday, and 7:00am to 1:00pm on Saturdays). Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities.

It is anticipated that the delivery of PV panels and associated construction materials will occur over an approximate 12-month construction period, generating up to 100 light vehicles (200 vehicle movements) and 20 trucks (40 vehicle movements) daily during the peak construction period, which is expected to last for approximately three months. The majority of light vehicle movements are expected to occur prior to and following the delivery window, with a tidal flow of arrivals during the morning and departures during the afternoon / evening. It is expected for a total of 27 over-mass vehicles to access the site during the 12-month construction period.

The largest design vehicle expected to access the site is a 26m B-double truck, with the typical mass associated with a vehicle of that size and nature. It is noted that while the majority of construction vehicles are expected to be 19m AVs (Articulated Vehicle as defined in AS 2890.2:2002) or smaller, anything exceeding the general mass limit will require a permit from the National Heavy Vehicle Register (NHVR).

Given the proposed site layout plan has approximately two-thirds of the solar farm to the west of Walla Walla Jindera Road and one-third to the east of Walla Walla Jindera Road, it is expected that the construction heavy vehicle delivery pattern would generally follow this distribution.

It is understood that the heavy vehicle movements will be scheduled throughout the day, resulting in a steady distribution of construction heavy vehicle traffic to/from the site access points, and minimising simultaneous heavy vehicle movements. Assuming an eight-hour delivery window, this results in approximately five heavy vehicle movements to/from the site during peak construction periods, or 5 vph. It is important to note that these movements will be spread across Access Points 1 to 3, resulting in less than 2 vph per access and greatly reducing the potential of conflicting heavy vehicle movements in the vicinity of the site and each access point.

Accordingly, it is expected that during peak construction periods, up to 242 vehicle movements per day will be generated by construction activities across the site, spread across the various access points. This is comprised of up to 200 light vehicle movements (100 vpd in and 100 vpd out of the site) outside of construction hours, 40 heavy vehicle movements regularly scheduled throughout the day, and occasionally one over-mass vehicle.

**Table 2.1** shows the maximum expected daily trip generation during the peak construction and typical operational phases of the proposed development.

*Table 2.1: Expected Trip Generation During Construction and Operation*

Phase	Expected Maximum Number of Vehicles per Day	Maximum Number of Vehicle Movements per Day (vpd)
<b>Construction</b>	20 heavy vehicles	40 vpd
	100 light vehicles	200 vpd
	Average of 1 over-mass vehicle every fortnight	2 vpd
<b>Total</b>		<b>242 vpd</b>
<b>Operation</b>	1 heavy vehicle	2 vpd
	2 light vehicles	4 vpd
<b>Total</b>		<b>6 vpd</b>

## 2.2 Operational Phase

During the operational phase of the project, there is expected to be up to two light vehicles accessing the solar farm, and one heavy vehicle for maintenance purposes on a daily basis. Accordingly, the traffic generated during the operational phase is expected to have negligible impacts to the surrounding road network.

## 3 Glenellen Solar Farm

The planned Glenellen solar farm is located approximately 600 metres to the south-east of the subject site. A Preliminary Environmental Assessment was prepared by CWP Renewables in August 2018 to explore the potential issues surrounding development of a solar farm in this location. The assessment suggests that the solar farm would be accessed via Walla Walla Jindera Road, Lindner Road and Ortlipp Road, with the route to still be confirmed. The location of the planned Glenellen solar farm and its likely access route is shown in Figure 1.

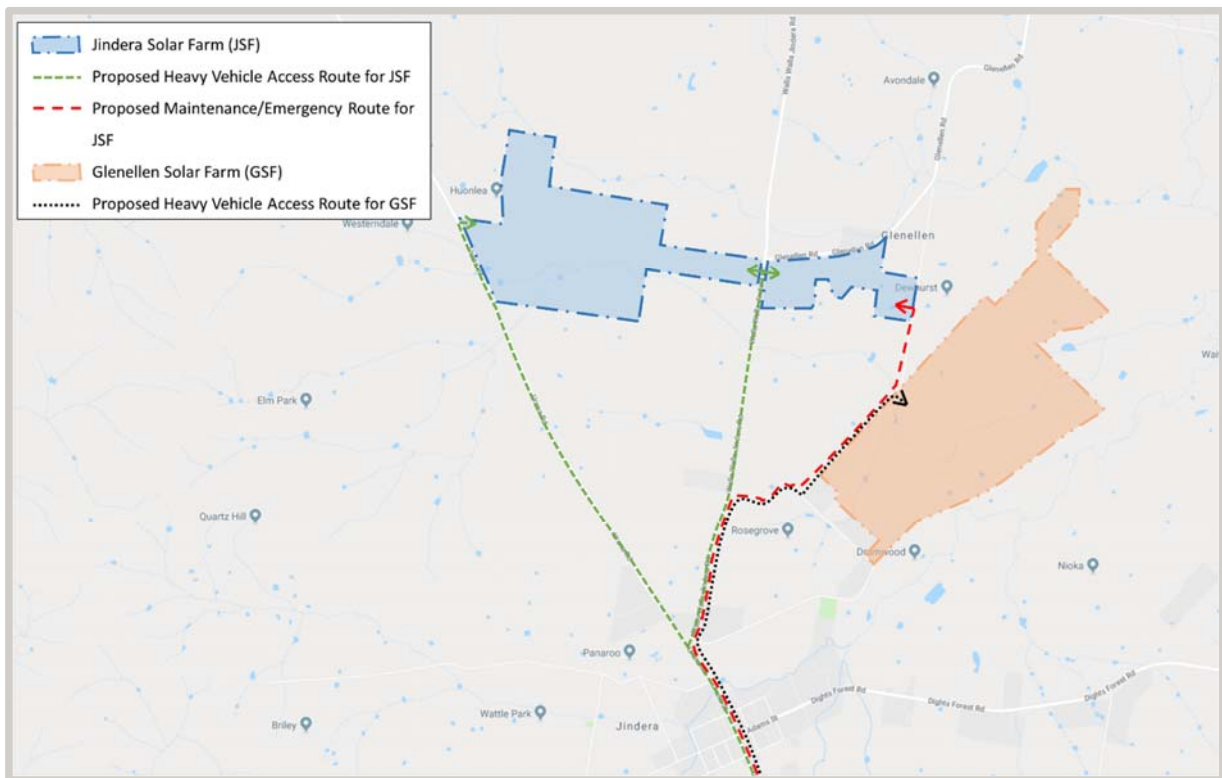


Figure 1: Location of Solar Farms and Construction Vehicle Access Routes

As can be seen in Figure 1, maintenance and emergency vehicles are proposed to access the site via Lindner Road and Ortlipp Road. It is noted that this route may be potentially shared with construction heavy vehicles associated with the construction of the Glenellen solar farm, subject to Development Application approval construction timing across both solar farms. The Lindner Road / Ortlipp Road route is only proposed to be used as a maintenance and emergency vehicle access during both the construction and maintenance phases, with no construction vehicles associated with the Jindera solar farm accessing the site via this route. If the construction periods of both the Jindera and the Glenellen solar farms happen to overlap, it is not expected that the combined traffic generation of both solar farms would have a considerable impact on the operations of Lindner Road or Ortlipp Road.

## 4 Proposed Access Routes

The proposed heavy vehicle access route is described below and illustrated above in Figure 1.

The proposed route heading toward the site from Lavington is as follows:

- Urana Road through Jindera;
- Continue along Urana Road until Access Point 1; OR
- Right turn onto Walla Walla Jindera Road at the intersection of Urana Road / Walla Walla Jindera Road for Access Points 2 and 3.

For all heavy vehicle egress movements from the site, the reverse of the above routes is proposed.

## 5 Appropriateness of Access Roads

The *Unsealed Roads Manual: Guidelines to Good Practice* (2009) states that the average traffic volumes for gravel roads usually varies between 20 and 200 vehicles per day. The document also notes that roads may warrant paving when maintenance costs increase to unacceptable levels, in wet climates, or when economic or social benefits are evident.

Ortlipp Road is estimated to accommodate well under 200 vehicle movements per day, and it is expected that the condition will remain during peak construction periods. It is therefore considered that traffic volumes along Ortlipp Road will remain within acceptable levels for gravel roads throughout the construction period.

It is recommended that the following form part of the Construction Traffic Management Plan (CTMP) to minimise the impact of construction traffic along the unsealed roads:

- Prior to construction, a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council. During construction, the sections of the road network utilised by the proposal are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the proposal would be rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road network is left in the consistent condition as at the start of construction;
- It is expected that during the construction phase, traffic volumes will only slightly increase along Ortlipp Road, with infrequent maintenance and emergency vehicle traffic generated by the site. Water treatment of the road to minimise dust generation may be implemented; and
- To assume safe and efficient movement along the priority-controlled intersection between Walla Walla Jindera Road, Access Points 2 and 3, appropriate traffic management is to be carried out. This can be done via phone or two-way radio, and should be done in consultation with RMS.

## 5.1 Access Roads

The following roads along the proposed construction traffic route described above are approved RMS routes for 26m B-double trucks (General Mass Limits Network):

- Urana Road / Urana Street; and
- Walla Walla Jindera Road;

The following roads are also approved RMS routes for 26m B-double trucks, however as discussed previously, construction heavy vehicles are not proposed to use these roads for the Jindera solar farm:

- Lindner Road; and
- Ortlipp Road.

## 5.2 Urana Road / Walla Walla Jindera Road Intersection

Heavy vehicles accessing the site via Walla Walla Jindera Road (Access Points 2 and 3) are required to travel through the Urana Road / Walla Walla Jindera Road intersection, performing a right turn manoeuvre in the northbound direction and a left turn manoeuvre in the southbound direction. A swept path assessment has been undertaken using the AutoTurn software package to assess the appropriateness of the existing intersection layout for these movements. The assessment is included in Figure 3 of **Appendix B**, and it is considered that the intersection in its current layout can satisfactorily accommodate two-way simultaneous movements for 26m B-double trucks.

Notwithstanding the above, the temporary addition of construction heavy vehicle traffic through the intersection associated with both the proposed solar farm as well as the nearby planned Glenellen solar farm is expected to have enough of an impact to warrant a closer assessment of the operation of the intersection. Existing peak hour traffic volumes indicate that the intersection should have turning facilities on Urana Road, however there is understood to be no apparent existing safety or crash history at the intersection. It is recommended that the proponents of both solar farms, Council and RMS discuss the most appropriate course of action to cater for all vehicle movements through the intersection.

## 6 Site Accesses

### 6.1 Access Point 1 (Urana Road)

*Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings* specifies the turning treatments required at intersections. In particular, Figure 2.26(a), shown below in **Figure 2**, specifies the required turn treatments on the major road at unsignalised intersections, and is provided below for a design speed of greater than or equal to 100km/hr.

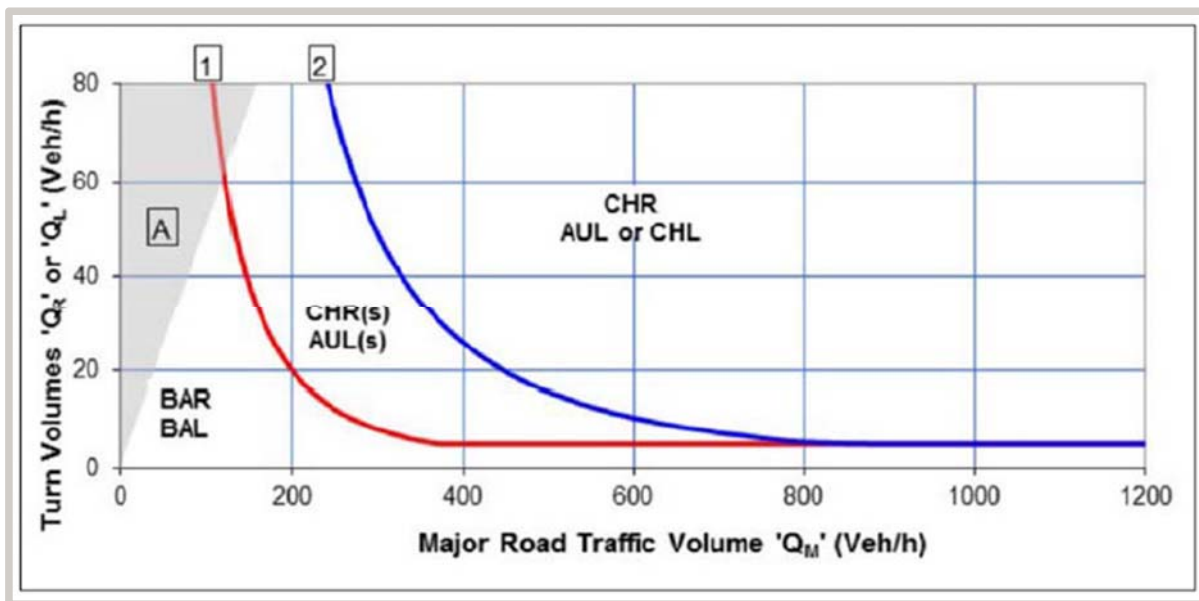


Figure 2: Figure 2.26(a) of Austroads Guide to Traffic Management Part 6

As discussed above, it is estimated that Urana Road currently carries in the order of 740 vph during peak hours. The turning volume per hour ( $Q_R$ ) is approximated to be a combined 5 vph across all site accesses, and as such would be expected to be less than 5 vph for the Urana Road access (total movements into and out of the site). Accordingly, it is recommended that the site access provides a Basic Right Turn (BAR) turning treatment.

Figure 4 in Appendix B shows the proposed intersection design, which is based on a 26 metre B-double as the design vehicle. The swept path assessment, created using the software package 'AutoTurn', is shown in Figure 5 within Appendix B. Accordingly, the proposed intersection turning treatments have been appropriately designed and in accordance with the Austroads dimensional requirements.

## 6.2 Access Points 2 and 3 (Walla Walla Jindera Road)

It is proposed to provide a site access on both sides of Walla Walla Jindera Road to the south of Glenellen Road. The two accesses are proposed to be located directly opposite from one another. As mentioned above, heavy vehicle construction traffic is proposed to be regulated throughout each day via delivery scheduling and radio / phone communication. One vehicle movement per 12 minutes is expected throughout each day, divided across each of the three primary access points (Access Points 1, 2 and 3). Vehicle movements are expected to be coordinated such that inbound vehicle movements have priority over outbound vehicle movements, thereby reducing any queuing impacts on the local road network.

All vehicles would be arriving from and departing to the south, and as such a situation involving simultaneous right turn movements out of or into the site would not occur. In the rare event whereby two vehicles would be simultaneously exiting from Access Points 2 and 3, the movements would be coordinated to allow each vehicle to turn out onto Walla Walla Jindera Road safely.

As such, it is considered that the access arrangements on Walla Walla Jindera Road are satisfactory to accommodate the proposed construction heavy vehicle activity.

## 7 Construction Traffic Management

It is recommended that the following form part of the Construction Traffic Management Plan (CTMP) to minimise the impact of construction traffic along the proposed access route:

- All heavy vehicle movements to/from each access point are to be managed to ensure that only one inbound or outbound vehicle is travelling along the access route in the vicinity of the site at a time. The

estimated volume of heavy vehicle traffic indicates that one vehicle movement would occur approximately every 12 minutes. This can be implemented by use of delivery scheduling and radio / mobile phone communication.

- Prior to construction, a pre-condition survey of Urana Road and Walla Walla Jindera Road is proposed to be undertaken in consultation with Council. During construction, the sections of the road proposed to be utilised by the construction vehicles associated with the solar farm are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the PV plant required to be rectified. At the end of construction, a post-condition survey would be undertaken to ensure that the road network is left in a similar condition as per the start of construction.
- Heavy vehicle movements into and out of Access Points 2 and 3, accessed via Walla Walla Jindera Road, will be controlled via traffic management means, including a traffic controller, temporary lowered speed limit and additional road signage alerting vehicles of truck movements in the area.
- A Traffic Control Plan (TCP) be prepared detailing any traffic management measures required at each site access for the duration of the construction period.

The adoption of the above recommendations will assist to mitigate any impact to the road surface and surrounding road network.

## 8 Access Design

### 8.1 Construction Phase

It is proposed to provide access to/from the site via Urana Road and Walla Walla Jindera Road, in the three locations identified in Appendix A. The proposed site accesses will be designed to accommodate the largest vehicle expected to access the site, which is understood to be an 26m B-double truck.

Due to the scheduling of construction across the site, it is anticipated that only one of the three primary access points will be required to cater for deliveries at any one time, such that there would be no conflicting movements between heavy vehicles at different site accesses. All of these movements will be regulated as described previously, in order to minimise simultaneous opposing heavy vehicle movements. As outlined in Section 5 above, all heavy vehicle movements will be arriving to the access points via Urana Road (from the south) and exiting via the same route (toward the south).

The accesses and on-site facilities will be designed such that all construction vehicles will be able to enter and exit the sites in a forward direction. Traffic management processes are proposed to be implemented to coordinate movements into and out of each site, specifically at the Walla Walla Jindera site accesses where a priority-controlled cross junction will be formed. It is anticipated that these movements would be controlled via a traffic controller to safely allow heavy vehicle movements to/from Walla Walla Jindera Road. These processes will be further detailed in the CTMP.

## 9 Conclusion

Stantec has assessed the proposed construction heavy vehicle access arrangements of the proposed solar farm, located along Urana Road and Walla Walla Jindera Road to the north of Jindera, NSW. The assessment determined the following:

- During peak construction periods, expected to last for approximately three months, the site is expected to generate up to 40 heavy vehicle movements per day, or approximately five vehicle movements per hour. This represents one heavy vehicle movement per 12 minutes across the site. These additional heavy vehicle movements are expected to be readily accommodated by the surrounding road network;
- The total number of heavy vehicle movements generated during construction is expected to be spread evenly across Access Points 1, 2 and 3;
- The new junction formed by Access Point 1 on Urana Road is recommended to comprise a Basic Right Turn (BAR) treatment to safely accommodate heavy vehicle access into the site from the south. The



egress for all access points will be designed in such a way that all exit movements for B-doubles will allow all vehicles will exit the site in a forward direction;

- A swept path assessment demonstrates that simultaneous turning movements into and out of Walla Walla Jindera Road from Urana Road (south) are able to be made by 26m B-doubles;
- All construction heavy vehicle movements to/from the site will be scheduled and managed to minimise simultaneous inbound/outbound heavy vehicle movements travelling along the access route in the vicinity of the site at a time;
- All construction staff vehicles are expected to arrive to and depart from each site outside of construction hours commencing, and park in dedicated parking areas on-site; and
- As highlighted within the RMS letter mentioned above, a Construction Traffic Management Plan is required to address the temporary increase in traffic from the construction activities during the construction period.

Accordingly, it is considered that the heavy vehicle access route and site access arrangements for the proposed solar farm to the north of Jindera are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction phase, and all vehicle access during the operational phase. If you have any queries, please feel free to contact us.

Yours sincerely  
**Stantec Australia Pty Ltd**



Desmond Ang  
**Traffic Engineer**

desmond.ang@stantec.com



Tom Guernier  
**Senior Traffic Engineer**

tom.guernier@stantec.com

Appendix A: Concept Site Plan  
Appendix B: Swept Path Assessment

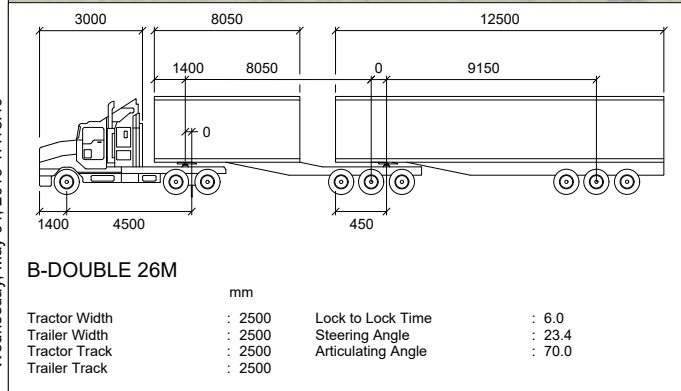
## Appendix A: Concept Site Plan







## Appendix B: Swept Path Assessment



Wednesday, May 01, 2019 17:18:10

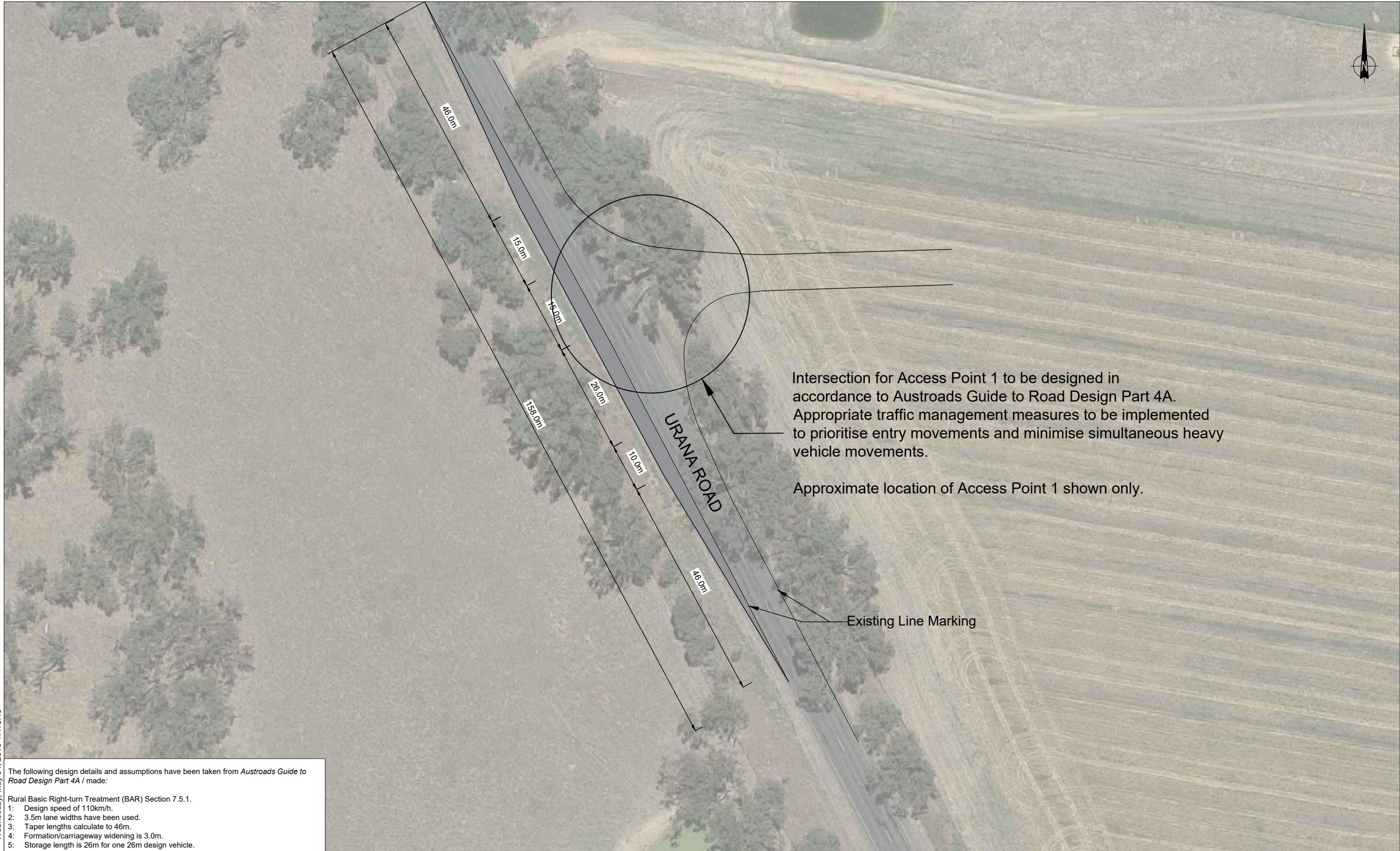
REV	DATE	DRN	CHK	DESCRIPTION
00	02/05/19	DA	----	----

Jindera Solar Farm  
Existing Urana Road / Walla Walla Jindera Road Intersection  
Swept Path Assessment - 26m B-double truck

DRAWN: DA	---	---
DATE: 15-04-19	STATUS: ---	
SCALE: 1:750 @ A3		
DWG NO:15862-01SC 190412		







Wednesday, May 01, 2019 17:18:10

The following design details and assumptions have been taken from *Austroads Guide to Road Design Part 4A* / made:

Rural Basic Right-turn Treatment (BAR) Section 7.5.1.

- 1: Design speed of 110km/h.
- 2: 3.5m lane widths have been used.
- 3: Taper lengths calculate to 46m.
- 4: Formation/carriageway widening is 3.0m.
- 5: Storage length is 26m for one 26m design vehicle.

REV	DATE	DRN	CHK	DESCRIPTION
00	02/05/19	DA	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----

Jindera Solar Farm  
Urana Road / Access Road  
Proposed Basic Right Turn Treatment (BAR)

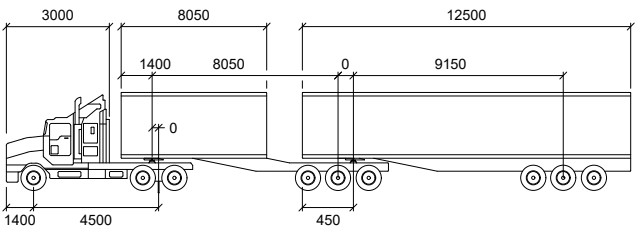
DRAWN: DA	---	---
DATE: 01-05-19	STATUS: ---	
SCALE: 1:750 @ A3		
DWG NO:15862-01SC 190412		







Wednesday, May 01, 2019 17:18:10



B-DOUBLE 26M			
mm			
Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 2500	Steering Angle	: 23.4
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailer Track	: 2500		

REV	DATE	DRN	CHK	DESCRIPTION
00	02/05/19	DA	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----
----	----	----	----	----

Jindera Solar Farm  
Urana Road / Access Road  
Swept Path Assessment - B-Double Entry

DRAWN: DA	---	---
DATE: 01-05-19	STATUS: ---	
SCALE: 1:750 @ A3		
DWG NO:15862-01SC 190412		

