TRAFFIC IMPACT ASSESSMENT

SOLAR PHOTOVOLTAIC (PV) POWER GENERATING FARM & ASSOCIATED SUPPORTIVE INFRASTRUCTURE

PART LOT 2221 DP 1101864
1570 DANDALOO ROAD, NARROMINE

PREPARED FOR: PROVIDENCE ASSET GROUP

JANUARY 2021

21/002

TRAFFIC IMPACT ASSESSMENT
PROVIDENCE ASSET GROUP

SOLAR PHOTVOLTAIC (PV) POWER FARM
PART LOT 2221 DP1101864
1570 DANDALOO ROAD, NARROMINE

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QUALITY ASSURANCE

This document has been prepared, checked and released in accordance with the Quality Control Standards established by Intersect Traffic Pty Ltd.

Issue	Date	Description	By
A	19/01/21	Draft	JG
B	22/01/21	Edit	JG
C	31/01/21	Final Proof	JG
D	31/01/21	Approved	JG

This document has been authorised by

Date 31st January 2021

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1.0 INTRODUCTION

Intersect Traffic Pty Ltd (Intersect Traffic) has been engaged by Providence Asset Group to prepare a traffic impact assessment report for a proposed Solar Photovoltaic (PV) Power Farm (up to 5MW) on Part Lot 2221 DP 1101864 1570 Dandaloo Road, Narromine.

The proposed development involves installation of solar panel banks, off-load area, inverter and AC combiner area, HV switchboard area, MV power station area, direct connection to a suitable existing power line near the site, on-site car parking and temporary construction office. Vehicular access to the site will be via a new access road with turnaround area off Dandaloo Road approximately 1.3 km's west of Derribong Avenue. The development concept plans are shown in ***Attachment A.***

This report is required to support a development application to Narromine Council and allow the Council to assess the proposal in respect of its impact on the local and state road network.

This report presents the findings of the traffic and parking assessment and includes the following:

1. An outline of the existing situation near the site.
2. Assessment of the additional traffic generated by the proposal, identifies a preferred delivery route and the additional traffic's impact on the local road network.
3. Review of the adequacy of the proposed vehicular access to the site.
4. Review of the suitability and provision of on-site car parking through assessment against Council and Australian Standards requirements.
5. Presentation of conclusions and recommendations.

2.0 SITE DESCRIPTION

The subject site is shown in ***Figure 1*** below. It is located on the northern side of Dandaloo Road, Narromine approximately 1.3 km west of Derribong Avenue and approximately 1.4 kilometre south-west of the Narromine CBD. The site currently contains vacant rural pasture used for agricultural purpose.

The property has the formal title of Part Lot 2221 DP1101864, 1570 Dandaloo Road, Narromine with road frontage access directly off Dandaloo Road. The development area for the proposal is approximately 15 hectares. The site is currently zoned RU1 – Primary Production pursuant to the Narromine LEP (2011).

The proposed vehicular access to the site will be provided off Dandaloo Road approximately 1.3 km west Derribong Avenue adjacent to the eastern boundary of the site. Deliveries to the site will use the identified delivery road shown on ***Figure 1*** being via the New England Highway and Golden Highway or Great Western Highway, Castlereagh Highway, Golden Highway and Mitchell Highway from Newcastle and Sydney respectively and then the northern heavy vehicle detour of Narromine via Manildra Street and Culling Street to the Mitchell Highway and finally McNamara's Lane to Dandaloo Road. The full delivery route is already a designated B-Double route including the heavy vehicle detour route within Narromine. The transport route is therefore suitable to carry these vehicles for the construction and operation of the project. ***Photograph 1*** below shows the existing development site from Dandaloo Road while ***Photograph 2*** shows the proposed vehicular access off Dandaloo Road for the internal access road and turnaround area.

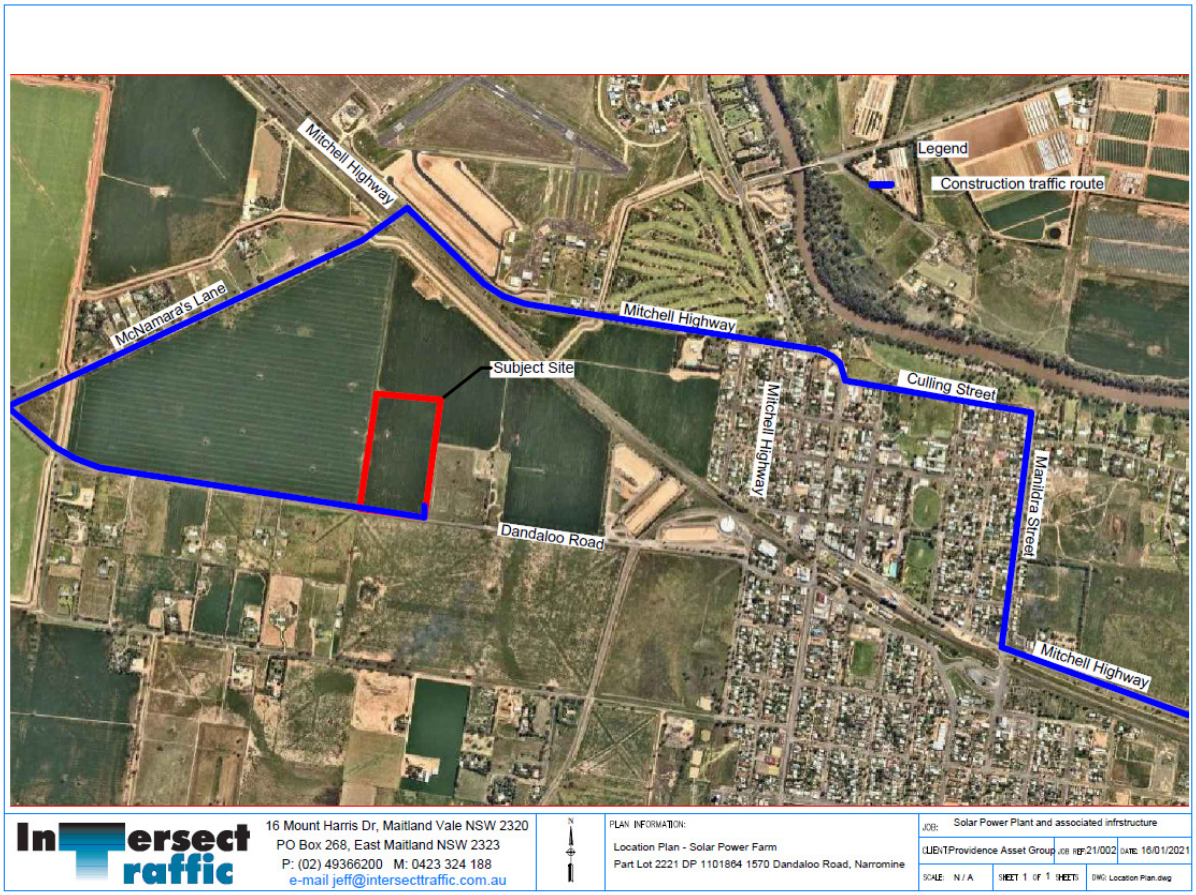


Figure 1 – Site Location

Photograph 1 – Development site from Dandaloo Road.

Photograph 2 – Proposed access location – eastern boundary of the site.

3.0 EXISTING ROAD NETWORK

3.1 Mitchell Highway

The Mitchell Highway is a classified state highway (HW7) with its primary function to connect the Great Western Highway at Bathurst to the Queensland border at Barringun through Orange, Molong, Wellington, Dubbo, Narromine, Trangie, Nevertire, Nyngan, Coolabah, Byrock and Bourke. As such it is an arterial road and major NSW transport route from inland NSW to the NSW Central West area. As a sealed rural arterial road the Mitchell Highway is under the care and control of Transport for NSW (TfNSW).

Near Narromine the Mitchell Highway is a two-lane two-way sealed rural road generally with a 9-metre wide sealed carriageway consisting of 3.5 metre wide travel lanes and 1 metre wide sealed shoulders though areas with additional seal width exists along its length. Additional turning lanes are provided at major intersections along its length. East and west of Narromine the speed zoning is 100 km/h and 110 km/h respectively while 80 km/h and 50 km/h speed zoning exists through Narromine. At the time of inspection the Mitchell Highway was observed to be in good condition as shown in ***Photograph 3*** below. It is considered suitable for use by heavy vehicle traffic.

Photograph 3 – Mitchell Highway, near site.

3.2 McNamara's Lane

McNamara's Lane is a local sealed rural collector road in Narromine with its primary function to collect and distribute traffic from the south-western areas of Narromine to the arterial road network (Mitchell Highway), as well as provide vehicular access to properties along its length. As a local rural sealed road, it is under the care and control of Narromine Shire Council. McNamara's Lane is a designated B-Double route and considered suitable to carry heavy vehicle traffic associated with the construction of the proposed development.

McNamara's Lane is a two-lane two-way sealed urban road with a pavement width of approximately 6 metres. This comfortably allows two lanes of traffic flow, one in each direction and is compliant with Austroads rural road standards for traffic volumes less than 500 vtph. At the time of inspection McNamara's Lane was found to be in good condition as shown in ***Photograph 4*** below.

Photograph 5 – McNamara's Lane.

3.3 Manildra Street / Culling Street

Manildra Street and Culling Street are local sealed urban collector road with their primary function to act as a heavy vehicle detour route around the Narromine CBD, as well as collect and distribute traffic to the Mitchell Highway. As local urban collector roads they are under the care and control of Narromine Shire Council and a 50 km/h speed zoning would apply to both roads. As part of the heavy vehicle bypass route of Narromine Manildra Street and Culling Street are designated B-Double roads.

Along the northern bypass route Manildra Street / Culling Street is a two-lane two-way sealed rural road with a 10-metre wide sealed carriageway which comfortably allows two-way traffic flow. At the time of inspection Manildra Street and Culling Street were found to be in good condition.

3.4 Dandaloo Road

Dandaloo Road is a local sealed rural collector road with its primary function to collect and distribute traffic from properties in the south-western rural areas near Narromine to the arterial road network (Mitchell Highway) at Narromine, as well as provide vehicular access to properties along its length. It also connects Narromine to the rural township of Tottenham. As a local rural road, it is under the care and control of Narromine Shire Council and 80 km/h and 100 km/h speed zonings

apply to Dandaloo Road near the site. Again Dandaloo Road is already a designated B-Double route and is satisfactory for use by heavy vehicles associated with the construction of the development. Dandaloo Road is a two-lane two-way sealed rural road with a 6-metre wide sealed carriageway. At the time of inspection Dandaloo Road near the site was found to be in good condition as shown in ***Photograph 6*** below.

Photograph 5 – Manildra Street north of Mitchell Highway

Photograph 6 – Dandaloo Road near the site.

4.0 ALTERNATE TRANSPORT MODES

Dubbo Buslines runs a limited public transport (bus) service from Dubbo to Narromine utilising a route that service all the schools within Narromine. The timetable for this service is provided below in ***Figure 2***. This however is not a frequent service and would be of no benefit to construction employees for the development. Therefore it is concluded that the site is not serviced with public transport services.

As a rural area, there are no pedestrian footpaths or on / off road cycleways within the local road network. Near the site, pedestrians are generally required to utilise the grass verges and road shoulders / pavement, while cyclists are required to utilise the road shoulders or share the travel lanes with other vehicles.

Narromine – Dubbo

Bus Timetable

Bus	Time	Morning Bus Routes
	7:35	(L)White, (L)Cobbora - Erskine, (L)Darling
	7:41	(L)Wingewarra, (R)Wheelers
	7:50	Wheelers, (R)Boundary, (R)Macquarie
	7:55	(L)Cobra - Victoria, (L)Whylandra, (R)Baird
	8:00	(R)North, (L)Victoria, (R) Thompson, (L) Bunglegumbie, (R) Mitchell Hwy To Narromine
	8:30	(L)Manildra, (R)Minore, (R)Algalah
	8:35	**Narromine Christian School**
	8:36	Algalah, (L)Manildra, (L)Mitchell Hwy, (R)Dandaloo
	8:40	**St Augustine Parish School**
	8:41	Dandaloo, (R)Culling, (R)Merilba, (L)Meringo
	8:43	**Narromine High School**
	8:44	Continue Meringo
	8:45	**Narromine Public School**

Bus	Time	Afternoon Bus Routes
	3:10	**Narromine Christian School**
	3:10	Continue Algala, (L)Manildra, (L)Mitchell Hwy, (R)Merilba, (R)Meringo
	3:14	**Narromine High School**
	3:14	Continue Meringo
	3:18	**Narromine Public School**
	3:19	Continue Meringo, (L)Manildra, (L)Culling, (R)Merilba, (R)Ellengereh, (R)Dandaloo
	3:25	**St Augustine Parish School**
	3:26	Continue Dandaloo, (R)Culling, (R)Manildra, (L)Mitchell Hwy
	3:45	(L) Bunglegumbie, (R) Thompson, (L) Victoria
	4:00	(R)North, (L)Baird,
	4:03	(L)Whylandra, (R)Victoria - Cobra
	4:08	(R)Darling, (L)Macquarie, (L)Boundary
	4:18	(L)Wheelers, (L)Birch - Wingewarra, (R)Darling, (R)Erskine - Cobbora, (R)White

Note: As seats on this service are limited, please phone office on 68 822 900 before you travel.

Figure 2 – Dubbo Buslines – Dubbo - Narromine service

5.0 DEVELOPMENT PROPOSAL

The proposed development involves the construction of a Solar Photovoltaic (PV) Power Farm on the site. The development concept plans are shown in ***Attachment A*** with the specific works involved in the expansion listed below:

- Installation of temporary construction office and amenities.
- Installation of Solar Panel arrays.
- Earthworks for construction lay-down area, hardstand areas and internal roads.
- Installation of inverters, transformers and switchgear.
- Construction of unsealed access crossing and access road from Dandaloo Road to the construction site.
- Construction of security fence and entrance gate; and
- Drainage and landscaping to Narromine Shire Council requirements.

The development will require a team of 30 construction employees for a period of up to 6 months working 7 am to 5 pm Monday to Friday and 8 am – 1 pm on Saturdays. The majority of traffic movements associated with the development will occur during the construction of the solar power farm. Traffic movements generated by the operation of the development would include a single staff light vehicle movement associated with maintenance inspections as required and specific maintenance work which would be short term and infrequent. Deliveries during construction works would be expected to be within rigid and articulated vehicles. More detail on construction traffic is provided later in this report.

6.0 TRAFFIC IMPACTS

6.1 – Traffic Generation and Trip Distribution

The TfNSW publication "*RTA's Guide to Traffic Generating Developments (2002)*" provides advice on the traffic generating potential of different land uses. However this document does not cover Solar Farms therefore determining traffic generation is reliant on advice from the applicant regarding construction and operation of the development.

From an operational perspective traffic generation is expected to be minimal with only regular daily maintenance inspections carried out when necessary. Therefore based on 1 visit per day per week a peak hour traffic generation of 2 vehicle trips per hour (vtph) has been assumed for this assessment. There may be times when specific maintenance tasks have to be undertaken but these will be infrequent, short-term and undertaken under a construction traffic management plan for the work. Construction traffic estimates for the development are as follows based on the information provided in ***Attachment C***.

- Construction employees on-site – Maximum 30 transported in up to 10 light vehicles per day arriving between 6 am and 7 am and departing between 5 pm and 6 pm.
- Deliveries – Mainly heavy rigid vehicles and articulated vehicles (AV). Maximum – 8 per day but average of 5 per day between 10 am and 4 pm. Whilst these are likely to mostly arrive outside the peak hour traffic generation periods associated with the arrival and departure of employees, logistically there could be occurrences when due to circumstances out of the control of the contractor, a delivery arrives during the peak hour periods.
- Other vehicles – Some earthworks plant may be required on-site as well as concrete agitators and road base material deliveries during construction of the access. It would be expected a maximum frequency of 3 deliveries within a peak hour is assumed.
- Construction period – up to 6 months

Based on this advice the likely peak hour traffic generation which will occur in the AM peak coinciding with employees arriving on site and in the PM peak coinciding with employees leaving the site is calculated below. It is also noted deliveries involve 2 trips with an inbound trip and an outbound trip.

AM peak = 10 inbound employees + 3 x 2 roadworks and other plant + 1 x 2 deliveries = 18 vtph (14 inbound and 4 outbound).
PM peak = 10 outbound employees + 3 x 2 roadworks and other plant + 1 x 2 deliveries = 18 vtph (14 outbound and 4 inbound).

It is expected that the distribution of trips will be all east towards Narromine and Dubbo, with deliveries being via the Mitchell Highway from south-east originating from either Newcastle or Sydney. In accessing the site, the likely transportation route as envisaged is shown on the location plan (***Figure 1***) in this report with the use of the Mitchell Highway and the northern heavy vehicle detour route of the Narromine CBD, as well as McNamara's Lane.

Existing traffic volumes in the area were recorded by Intersect Traffic at the Mitchell Highway / Dandaloo Street intersection during the likely PM peak hour traffic period (4 pm to 5 pm) and the Dandaloo Street / Derribong Avenue intersection during the AM peak hour traffic period of 8 am to 9 am. These counts showed the PM peak was the critical peak with traffic volumes on Dandaloo Street being nearly 90% higher in the PM peak. The data sheets for these counts are provided in ***Attachment B***.

These traffic counts determined that the relevant peak hour two-way mid-block traffic volumes on the state and local road network in the AM and PM periods during this period were.

- Derribong Avenue / Dandaloo Road west of Dandaloo Street - 72 vtph in the AM peak and 135 vtph in the PM peak.
- Derribong Avenue east of Dandaloo Street – 93 vtph in the AM peak and 174 vtph in the PM peak;
- Mitchell Highway east of Dandaloo Street – 137 vtph in the AM peak and 256 vtph in the PM peak.

Northern Transport Planning and Engineering (NTPE) also installed traffic classifiers on Dandaloo Road near the site and on the Mitchell Highway south-east of Manildra Street from Friday 11th December 2020 until Thursday 17th December 2020, a period of 1 week. This count at Dandaloo Road recorded a peak two-way AM traffic volume of 74 vtph on Thursday 17th December 2020 and a peak two-way PM traffic volume of 49 vtph on Thursday 17th December 2020. It is noted these counts are lower than the intersection counts, which were undertaken remote from the site therefore the classifier counts are considered more relevant for Dandaloo Road. Similarly, the classifier counts for the Mitchell Highway are more relevant for this assessment as they have been undertaken along the delivery route and not at an intersection remote from the haulage route. This classifier count determined a peak AM traffic volume on the Mitchell Highway of 472 vtph on Thursday 17th December 2020 and a PM peak hour traffic volume of 439 vtph on Wednesday 16th December 2020. The classifier counts also determined a heavy vehicle percentage of approximately 10% on Dandaloo Road and 7% on the Mitchell Highway. The traffic classifier summary spreadsheets are also provided in ***Attachment B***. Therefore, based on the traffic data collected, the following existing traffic volumes have been adopted in the report;

- Dandaloo Road – 74 vtph in the AM peak and 49 vtph in the PM peak.
- Mitchell Highway – 472 vtph in the AM peak and 439 vtph in the PM peak.

Given the construction will be completed within a 6 month period and the peak operational traffic volume from the site is only 2 vtph, there is no need to undertake a 2030 (10 year horizon period) assessment of this development.

6.2 – Road Capacity

Table 4.5 of the TfNSW publication "*RTA's Guide to Traffic Generating Developments"* provides some guidance on likely mid-block capacity of two-lane two-way rural roads. This table is reproduced below as ***Table 1***:

Table 1 – Rural Road Mid-Block Capacity Table

Table 4.5
peak hour flow on two-lane rural roads (veh/hr)
(Design speed of 100km/hr)

Terrain	Level of Service	Percent of Heavy Vehicles			
		0	5	10	15
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

The data for Table 4.5 assumes the following criteria:

- *terrain level* with 20% no overtaking.
- *rolling* with 40% no overtaking.
- *mountainous* with 60% no overtaking.
- 3.7 m traffic lane width with side clearances of at least 2m.
- 60/40 directional split of traffic.

Source: - RTA's Guide to Traffic Generating Developments (2002)

It is assumed that the appropriate terrain levels for Dandaloo Road and Mitchell Highway are Level and that a satisfactory level of service (LoS) on the road network is a LoS C. Therefore after adopting a 7% heavy vehicle percentage on traffic volumes on the Mitchell Highway and 10% on McNamara's Lane and Dandaloo Road, the above table suggests the relevant two-way mid-block road capacities for a LoS C are as follows:

- Mitchell Highway – 950 vtph; and
- McNamara's Lane and Dandaloo Road – 920 vtph.

Manildra Street and Culling Road with 50 km/h speed limits are urban roads therefore Table 4.3 the TfNSW publication "*RTA's Guide to Traffic Generating Developments"* provides guidance on the mid-block capacity of these roads. This table is reproduced below as ***Table 2***. This table suggests a one way lane capacity of 900 vtph and a two-way mid-block capacity of 1,800 vtph.

Therefore the two-way mid-block road capacity thresholds adopted in this assessment are.

- McNamara's Lane and Dandaloo Road – 920 vtph.
- Mitchell Highway – 950 vtph; and
- Manildra Street and Culling Road – 1,800 vtph.

As the combination of the two-way mid-block peak hour traffic data and traffic generation figures reported in ***Section 6.1*** in the AM and PM peak hour traffic volumes on the local and state road

network during construction will be well below the existing capacity thresholds determined above, then the local and state road network has sufficient spare two-way mid-block capacity to cater for the construction and operation of the Solar Farm. The addition of up to 18 vtph will not cause the capacity thresholds determined above to be reached. Therefore it can be concluded that the proposed development will not adversely impact on the local and state road network mid-block efficiency.

Table 2 – Urban Road Mid-Block Capacity Table

Table 4.3
Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Source: - RTA's Guide to Traffic Generating Developments (2002)

6.3 – Intersection Capacity

The main intersections impacted by the construction of the development is the Mitchell Highway / McNamara's Lane priority controlled give way controlled T-intersection and the Mitchell Highway / Manildra Street priority controlled give way cross-intersection. However traffic volumes at these intersections are below the thresholds sourced from Austroads *Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings (2010),* reproduced below in ***Table 3*** of this report**.** The Guide states that if traffic volumes are not above these thresholds, then uninterrupted flow conditions can be assumed and little or no delay will be experienced by motorists at these intersections. No further intersection analysis is then required.

Table 3 – Uninterrupted flow condition thresholds at an intersection

Major road type[1]	Major road flow (vph)[2]	Minor road flow (vph)[3]
Two-lane	400	250
	500	200
	650	100
Four-lane	1000	100
	1500	50
	2000	25

Source: - Austroads Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings (2010)

With traffic flows on the Mitchell Highway being less than 500 vtph and traffic flows on Manildra Street and McNamara's Lane being less than 200 vtph and 100 vtph respectively, then it is clearly seen that these intersections are currently operating with uninterrupted flow conditions, confirmed by observation on site during the traffic counts. The additional 18 vtph generated by the construction of the Solar Farm will not result in the thresholds within the above table being reached. Therefore it can be concluded that during construction and post development, the Mitchell Highway / Manildra Street priority controlled give way cross-intersection and the Mitchell Highway / McNamara's Lane priority controlled give way T-intersection will continue to operate with

uninterrupted flow conditions. Therefore it is reasonable to conclude that the development does not adversely impact on the operation of these intersections or any other intersection on the local and state road network.

6.4 Access Assessment

In terms of width, the access to the development providing access to a user class 1 (long term) car parking facility with less than 25 car spaces fronting a local road is required to be a category 1 access (Table 3.1 of the Standard). Table 3.2 of the Standard then specifies a category 1 access facility as a combined entry / exit between 3.0 to 5.5 metres wide. However the proposed entrance width at the combined entry / exit access at Dandaloo Road will need to be a minimum 12.5 metres wide to cater for the swept turning paths for delivery vehicles during the construction stage and satisfy the requirements of Australian Standard *AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking* and Australian Standard *AS2890.2-2002 Parking Facilities – Part 2 Off-street commercial vehicle facilities.*

Sight distance at the proposed access off Dandaloo Road was observed to be in excess of 250 metres in each direction which therefore complies with the requirements of Figure 3.2 of Australian Standard *AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking (160 metres minimum SSD for 100 km/h*) as well as Austroads *Guide to Road Design – Part 4A – Unsignalised and signalised intersections - Table 3.2 (248 metres for 100 km/h)* for safe intersection sight distance.

It is therefore concluded that the proposed site access is suitably located and satisfactory for use for the Solar Farm as it complies with the requirements of Australian Standard *AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking* and Australian Standard *AS2890.2-2002 Parking Facilities – Part 2 Off-street commercial vehicle facilities.*

The main issue with access for construction vehicles to the site is the suitability of the local road network to safely cater for heavy vehicle deliveries. In this regard it is noted that Dandaloo Road has a sealed pavement approximately 6 metres wide and therefore complies with Austroads Standards for Rural Roads with less than 500 vtph. It would therefore allow two heavy vehicles to pass each other at normal speed. Further, Dandaloo Road is a designated B-Double route. Therefore, it is considered the proposed transportation route to the site is suitable to carry heavy vehicles and is thus suitable to cater for the construction traffic from the Solar Farm construction.

Overall it is considered the local and road network would be suitable to cater for the expected construction traffic associated with the development.

7.0 ON-SITE CAR PARKING

On-site car parking for the proposal is required to comply with the Industrial Development controls of the Narromine Shire Council's Development Control Plan – Chapter 5)e). The rates contained in the DCP are;

- *1 spaces per 100m² GFA plus 1 space per 40 m^2 GFA of office space and 1 space per 37 m^2 GFA of retail space.*

With no building proposed for the Solar Farm the development is theoretically not required to provide any on-site car parking space under the DCP requirements. However with a single maintenance vehicle visit to the site likely to occur at most once a week it would be prudent to provide at least 1 on-site vehicle car park within the development. However it is also the responsibility of the applicant to provide sufficient on-site car parking for construction employees during the duration of the construction of the development for the development to comply with the car parking objectives of the DCP. Construction employee car parking will be provided on the hard stand area identified as the construction lay down area and this is large enough to cater for the

expected storage requirements during construction as well as the provision of at least 10 on-site car parks for construction employees which is the expected traffic generation from employees to the site as well as being in excess of the Industrial land use requirements of the Narromine Shire Council Development Control Plan – Parking Code No. 1. With significant overflow parking areas also on site it is considered reasonable to conclude the development provides sufficient on-site car parking that complies with the objectives and controls related to car parking required within Narromine Shire Council's Development Control Plan.

The employee car parking area would need to comply with the requirements of Australian Standard *AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking* with parking bay sizes 2.4 m x 5.4 m and aisle widths of 5.8 metres. There is sufficient room on-site to ensure compliance with this requirement which could be covered by a suitable condition of consent. Overall it is considered suitable on-site car parking can be provided for the development ensuring all vehicle movements to and from the site off Dandaloo Road will be undertaken in a forward direction.

8.0 ALTERNATE TRANSPORT MODES

The proposed development will not generate any increase in public transport demand during both the construction and operational phases of the development particularly given the site is not currently serviced by convenient public transport. Therefore there is no nexus for the provision of new services or improved infrastructure resulting from the development. Similarly, the development will not generate any additional pedestrian or cycle traffic during both the construction and operation phases of the development therefore no nexus exists for the provision of additional pedestrian paths or cycle ways near the site.

9.0 CONCLUSIONS

This traffic and parking assessment for the proposed Solar Photovoltaic (PV) Power Farm (up to 5MW) on part Lot 2221 DP 1101864 1570 Dandaloo Road, Narromine has determined the following:

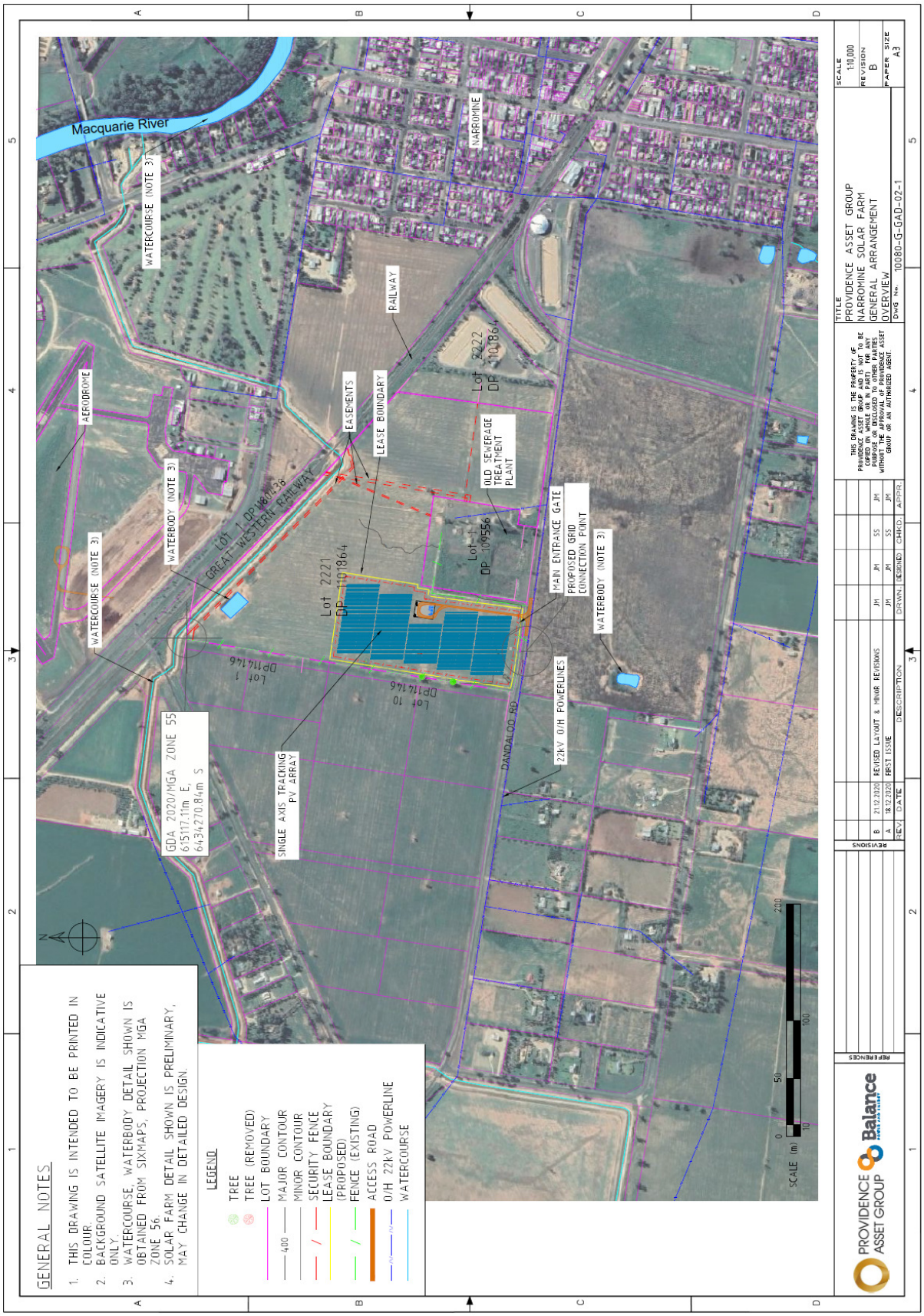
- The development during construction will generate up to an additional 18 vehicle movements to and from the site during the weekday AM and PM peak periods but only 2 vtph during the operation of the Solar Farm.
- The existing peak traffic volumes on the local road network are well below the two-way mid-block capacity thresholds for the local and state road network (LoS C). Traffic volumes will remain below these thresholds during the construction and operation of the development.
- The Mitchell Highway / Manildra Street priority controlled give way cross intersection and the Mitchell Highway / McNamara's Lane priority controlled give way T-intersection will continue to operate with uninterrupted flow conditions during and post construction of the Solar Farm with little if any impact on the operation of these intersections resulting from the development.
- It is also reasonable to conclude the development will not adversely impact on the intersections on the wider local and state road network given the high levels of intersection control on the major intersections and the relatively low traffic generation from the development.
- Therefore, the additional construction and operational traffic generated by this development will not adversely impact on the efficiency or effectiveness of the local and state road network.
- The proposed site access is suitable for use for construction and operation of the development being compliant with Australian Standard and Austroads requirements.
- As the transportation route to the site is already a designated B-Double route, it is considered the local and state road network would be suitable to cater for the expected construction traffic associated with the development.
- There is sufficient area on-site to accommodate the expected peak parking demand generated by the development during both construction and operation with the provision of an AS2890.1-2004 compliant car park within the construction laydown area for a minimum 10 spaces as well as the provision of numerous overflow parking areas on the site.
- The proposed development will not generate any increase in public transport demand therefore no nexus exists for the provision of new services or improved infrastructure resulting from the development. Similarly, the development will not generate any additional pedestrian or cycle traffic. Therefore no nexus exists for the provision of additional pedestrian paths or cycle ways near the site.

10.0 RECOMMENDATION

Having carried out this traffic and parking assessment for the proposed Solar Photovoltaic (PV) Power Farm (up to 5MW) on part Lot 2221 DP 1101864 1570 Dandaloo Road, Narromine, it is recommended that the proposal can be supported from a traffic perspective as the development will not adversely impact on the local and state road network and complies with all relevant requirements of Narromine Shire Council, Austroads, Australian Standards and TfNSW.

JR Garry BE (Civil), Masters of Traffic
Director
Intersect Traffic Pty Ltd

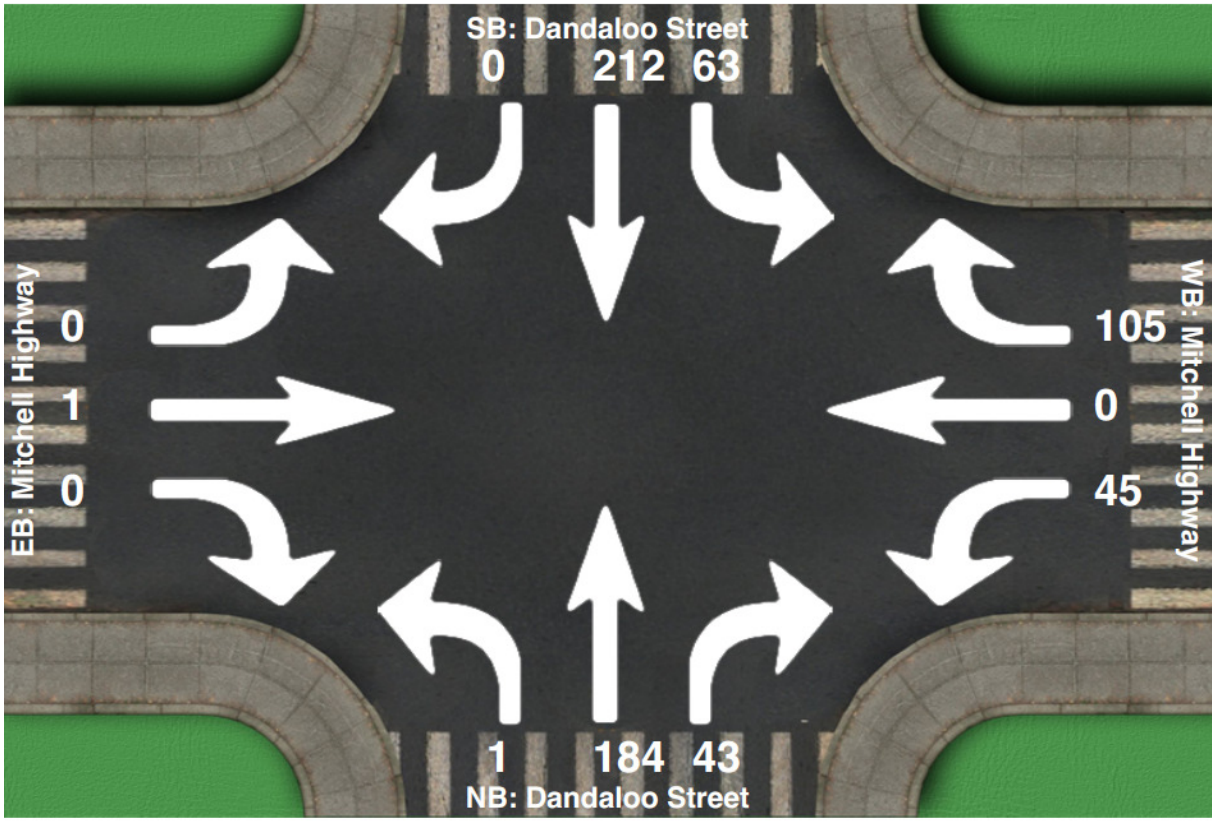
ATTACHMENT A
DEVELOPMENT PLANS


Macquarie River
NARROMINE
WATERCOURSE (NOTE 3)
RAILWAY
AERODROME
EASEMENTS
LEASE BOUNDARY
Lot 2222 DP 1107864
OLD SEWERAGE TREATMENT PLANT
WATERBODY (NOTE 3)
Lot 1 DP1180128 GREAT WESTERN RAILWAY
Lot 2221 DP 1107864
Lot 1 DP 109556
MAIN ENTRANCE GATE
PROPOSED GRID CONNECTION POINT
WATERBODY (NOTE 3)
WATERCOURSE (NOTE 3)
Lot 1 DP711746
Lot 10 DP711746
GDA 2020/MGA ZONE 55
615117.11m E,
6434270.84m S
SINGLE AXIS TRACKING PV ARRAY
22KV O/H POWERLINES
DANDALOO RD
N
SCALE (m)
0
50
100
200
10
GENERAL NOTES
1. THIS DRAWING IS INTENDED TO BE PRINTED IN COLOUR.
2. BACKGROUND SATELLITE IMAGERY IS INDICATIVE ONLY.
3. WATERCOURSE, WATERBODY DETAIL SHOWN IS OBTAINED FROM SIXMAPS, PROJECTION MGA ZONE 56.
4. SOLAR FARM DETAIL SHOWN IS PRELIMINARY, MAY CHANGE IN DETAILED DESIGN.
LEGEND
TREE
TREE (REMOVED)
LOT BOUNDARY
400 MAJOR CONTOUR
MINOR CONTOUR
SECURITY FENCE
LEASE BOUNDARY (PROPOSED)
FENCE (EXISTING)
ACCESS ROAD
O/H 22KV POWERLINE
WATERCOURSE
REFERENCES
REVISIONS
REV DATE DESCRIPTION DRWN DESIGNED CHKD APPR
B 21.12.2020 REVISED LAYOUT & MINOR REVISIONS JH JH SS JH
A 18.12.2020 FIRST ISSUE JH JH SS JH
PROVIDENCE ASSET GROUP
Balance
THIS DRAWING IS THE PROPERTY OF PROVIDENCE ASSET GROUP AND IS NOT TO BE COPIED IN WHOLE OR IN PART OR FOR ANY PURPOSE OR DISCLOSED TO OTHER PARTIES WITHOUT THE APPROVAL OF PROVIDENCE ASSET GROUP OR AN AUTHORISED AGENT.
TITLE
PROVIDENCE ASSET GROUP
NARROMINE SOLAR FARM
GENERAL ARRANGEMENT
OVERVIEW
DWG No. 10080-G-GAD-02-1
SCALE 1:10,000
REVISION B
PAPER SIZE A3

ATTACHMENT B
TRAFFIC COUNT DATA

Intersection Peak Hour

Location: Dandaloo Street at Mitchell Highway,
GPS Coordinates:
Date: 2021-01-18
Day of week: Monday
Weather:
Analyst: Jeff



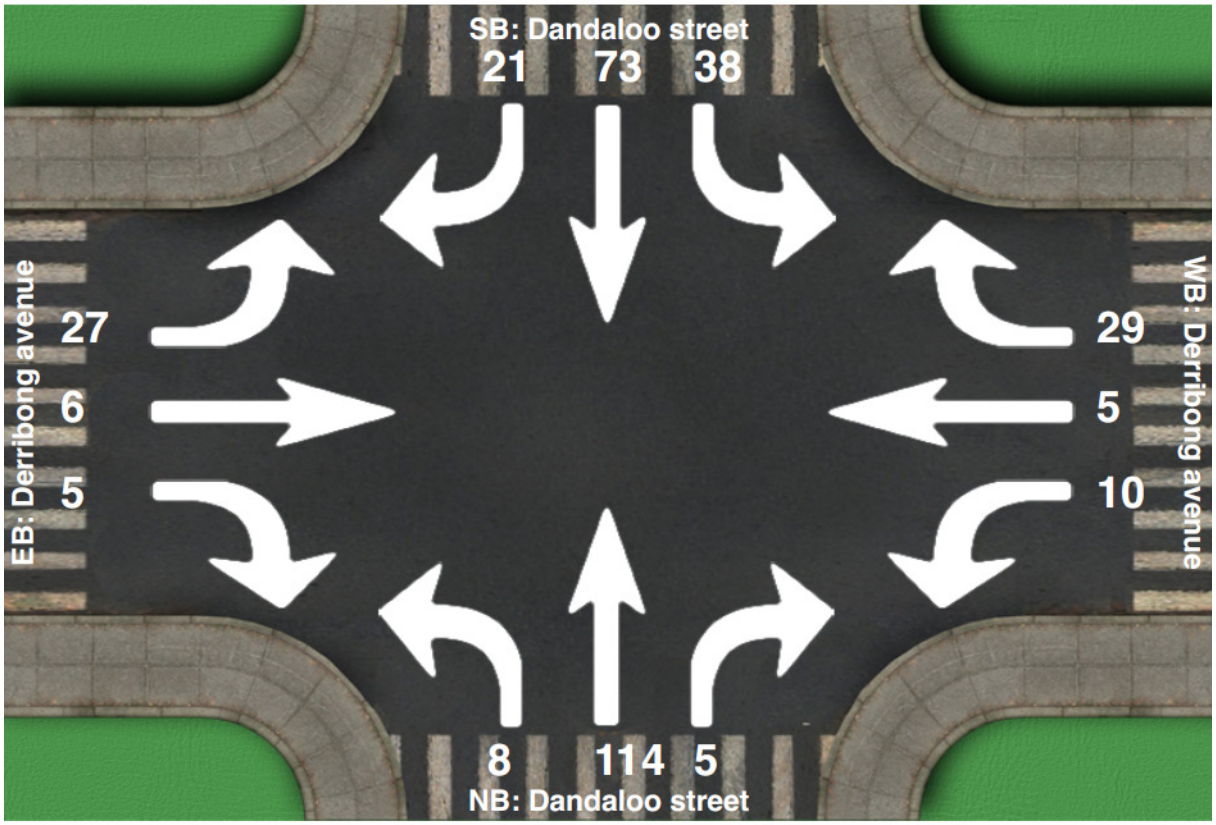
Intersection Peak Hour

16:00 - 17:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	63	212	0	45	0	105	1	184	43	0	1	0	654
Factor	0.83	0.91	0.00	0.75	0.00	0.85	0.25	0.84	0.83	0.00	0.25	0.00	0.91
Approach Factor	0.89			0.85			0.86			0.25			

Intersection Peak Hour

Location: Dandaloo street at Derribong avenue,
GPS Coordinates:
Date: 2021-01-19
Day of week: Tuesday
Weather:
Analyst: Jeff



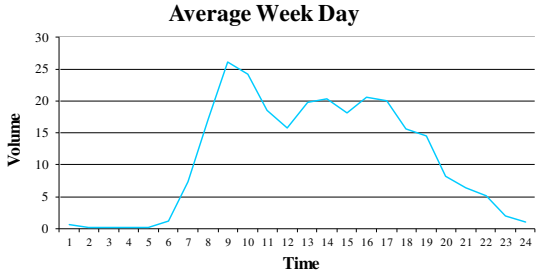
Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	38	73	21	10	5	29	8	114	5	27	6	5	341
Factor	0.68	0.65	0.66	0.62	0.42	0.81	0.29	0.77	0.42	0.68	0.75	0.62	0.86
Approach Factor	0.80			0.85			0.77			0.79			

Site 2 132 Dandaloo Rd [100] **Eastbound** **Lane 1**

Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	W/Day	W/End	7 Day
Time	11/12/20	12/12/2020	13/12/2020	14/12/2020	15/12/2020	16/12/2020	17/12/2020	Ave.	Ave.	Ave
0:00	0	1	0	1	1	1	0	1	1	1
1:00	0	0	0	0	0	1	0	0	0	0
2:00	0	1	0	0	1	0	0	0	1	0
3:00	1	0	0	0	0	0	0	0	0	0
4:00	0	0	0	1	0	0	0	0	0	0
5:00	1	0	0	4	0	0	1	1	0	1
6:00	12	0	4	8	5	7	5	7	2	6
7:00	16	8	4	20	19	15	16	17	6	14
8:00	25	27	10	28	17	28	33	26	19	24
9:00	33	22	13	22	27	21	18	24	18	22
10:00	20	24	15	16	23	14	20	19	20	19
11:00	21	20	12	19	9	12	18	16	16	16
12:00	22	8	8	14	21	14	28	20	8	16
13:00	19	7	13	11	19	23	30	20	10	17
14:00	26	9	4	10	12	20	23	18	7	15
15:00	28	5	11	16	14	22	23	21	8	17
16:00	21	15	17	20	20	18	21	20	16	19
17:00	13	14	12	20	16	17	12	16	13	15
18:00	14	16	8	23	15	10	11	15	12	14
19:00	13	9	7	5	6	10	7	8	8	8
20:00	5	4	5	6	9	9	3	6	5	6
21:00	7	5	7	3	5	9	2	5	6	5
22:00	3	2	2	0	3	2	2	2	2	2
23:00	4	0	0	0	0	1	0	1	0	1
Total	**304**	**197**	**152**	**247**	**242**	**254**	**273**	**264**	**175**	**238**

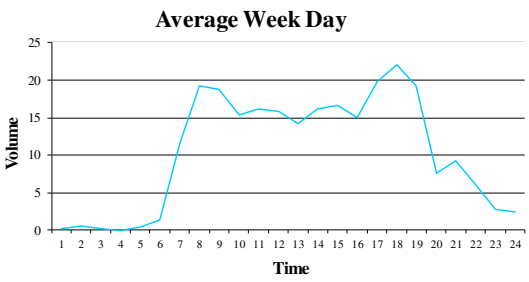


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**33**
PM Peak	1:00 PM	2:00 PM	**30**
Week Day Average			**264**
Weekend Day Average			**175**
7 Day Average			**238**

Site 2 132 Dandaloo Rd [100] **Westbound** **Lane 1**

Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	W/Day	W/End	7 Day
Time	11/12/20	12/12/2020	13/12/2020	14/12/2020	15/12/2020	16/12/2020	17/12/2020	Ave.	Ave.	Ave
0:00	1	0	1	0	0	0	0	0	1	0
1:00	1	0	0	0	1	0	1	1	0	0
2:00	1	0	1	0	0	0	0	0	1	0
3:00	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	1	1	0	0	0	0
5:00	0	0	0	2	1	3	1	1	0	1
6:00	14	5	1	17	14	7	6	12	3	9
7:00	24	9	4	19	18	18	17	19	7	16
8:00	16	14	5	12	13	12	41	19	10	16
9:00	17	15	10	13	10	21	16	15	13	15
10:00	26	8	16	17	13	12	13	16	12	15
11:00	17	13	5	20	20	7	15	16	9	14
12:00	16	13	18	7	15	18	15	14	16	15
13:00	24	14	10	13	14	11	19	16	12	15
14:00	21	25	6	18	13	14	17	17	16	16
15:00	19	8	17	17	11	12	16	15	13	14
16:00	19	17	11	20	20	22	18	20	14	18
17:00	23	20	11	23	22	24	18	22	16	20
18:00	19	7	10	20	18	23	16	19	9	16
19:00	9	6	5	5	8	9	7	8	6	7
20:00	7	3	7	7	9	9	14	9	5	8
21:00	7	2	5	7	4	4	8	6	4	5
22:00	3	1	2	0	3	5	3	3	2	2
23:00	5	1	1	1	2	2	2	2	1	2
Total	**289**	**181**	**146**	**238**	**230**	**234**	**263**	**251**	**164**	**226**

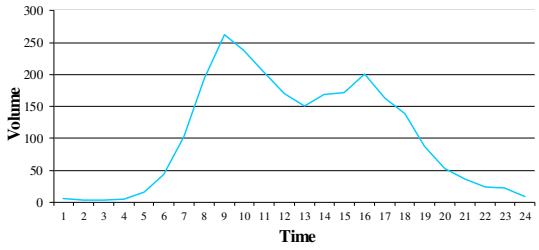


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**41**
PM Peak	1:00 PM	2:00 PM	**24**
		Week Day Average	**251**
		Weekend Day Average	**164**
		7 Day Average	**226**

Site 3 Mitchell Hwy SE of Manildra St [50] **Eastbound** **Lane 1**

Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	W/Day	W/End	7 Day
Time	11/12/20	12/12/2020	13/12/2020	14/12/2020	15/12/2020	16/12/2020	17/12/2020	Ave.	Ave.	Ave
0:00	3	5	13	6	7	8	4	6	9	7
1:00	5	4	4	4	2	6	2	4	4	4
2:00	4	5	3	1	2	3	5	3	4	3
3:00	6	3	1	2	6	2	5	4	2	4
4:00	15	6	5	15	16	11	22	16	6	13
5:00	52	14	9	49	44	32	39	43	12	34
6:00	102	36	27	111	104	104	90	102	32	82
7:00	187	106	32	199	194	204	186	194	69	158
8:00	284	197	86	255	239	262	274	263	142	228
9:00	220	233	134	239	233	229	265	237	184	222
10:00	247	217	140	190	177	197	205	203	179	196
11:00	162	197	120	157	167	164	204	171	159	167
12:00	172	158	142	127	123	148	186	151	150	151
13:00	180	116	115	150	148	159	206	169	116	153
14:00	201	113	91	136	153	172	195	171	102	152
15:00	212	91	117	200	187	200	207	201	104	173
16:00	166	88	111	165	166	155	163	163	100	145
17:00	150	106	92	121	135	127	161	139	99	127
18:00	113	72	62	69	86	72	100	88	67	82
19:00	76	53	50	47	58	45	42	54	52	53
20:00	41	34	36	27	31	36	45	36	35	36
21:00	31	42	25	14	19	37	20	24	34	27
22:00	19	19	13	17	22	24	32	23	16	21
23:00	10	17	6	10	6	9	9	9	12	10
Total	**2658**	**1932**	**1434**	**2311**	**2325**	**2406**	**2667**	**2473**	**1683**	**2248**

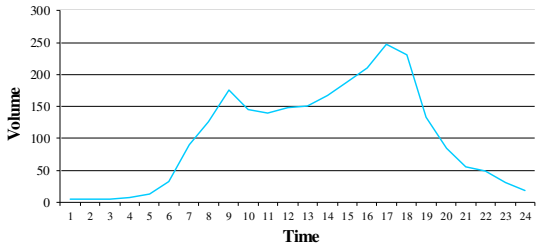


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**284**
PM Peak	3:00 PM	4:00 PM	**212**
		Week Day Average	**2473**
		Weekend Day Average	**1683**
		7 Day Average	**2248**

Site 3 Mitchell Hwy SE of Manildra St [50] **Westbound** **Lane 1**

Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	W/Day	W/End	7 Day
Time	11/12/20	12/12/2020	13/12/2020	14/12/2020	15/12/2020	16/12/2020	17/12/2020	Ave.	Ave.	Ave
0:00	6	7	12	4	6	4	5	5	10	6
1:00	6	6	9	4	2	5	7	5	8	6
2:00	5	8	4	4	5	4	3	4	6	5
3:00	5	5	4	7	7	7	11	7	5	7
4:00	14	7	4	10	14	17	10	13	6	11
5:00	35	11	10	40	41	20	25	32	11	26
6:00	105	42	17	91	89	88	80	91	30	73
7:00	108	66	42	135	126	137	128	127	54	106
8:00	160	112	63	183	187	152	198	176	88	151
9:00	134	114	87	160	151	152	133	146	101	133
10:00	147	141	104	157	143	114	142	141	123	135
11:00	156	148	112	143	140	147	158	149	130	143
12:00	150	177	138	181	132	150	144	151	158	153
13:00	198	150	120	161	140	170	170	168	135	158
14:00	235	190	136	187	160	192	167	188	163	181
15:00	206	174	136	227	208	185	222	210	155	194
16:00	246	163	147	245	230	284	236	248	155	222
17:00	217	120	107	240	221	270	208	231	114	198
18:00	127	96	71	135	146	121	139	134	84	119
19:00	89	50	63	81	85	66	101	84	57	76
20:00	69	40	42	45	50	49	65	56	41	51
21:00	49	57	28	41	46	38	68	48	43	47
22:00	42	44	22	27	25	33	30	31	33	32
23:00	28	28	11	15	13	17	18	18	20	19
Total	**2537**	**1956**	**1489**	**2523**	**2367**	**2422**	**2468**	**2463**	**1723**	**2252**



Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**198**
PM Peak	4:00 PM	5:00 PM	**284**
		Week Day Average	**2463**
		Weekend Day Average	**1723**
		7 Day Average	**2252**

ATTACHMENT C
TRAFFIC GENERATION INFORMATION

PROVIDENCE ASSET GROUP

Preliminary Solar Farm Vehicle Movement Guidance

27/03/2020

1 Traffic Generated by Construction Works

During the construction of the solar farm, it is estimated that approximately 50 x 40 ft containers will be transported to site. Added to these containers are waste traffic, equipment, temporary installations and workforce transport to and from site. A logistics agent will be engaged to manage the freight from the delivery port [TBC] to the solar farm site.

An estimation of the traffic created by the worksite is provided in Figure 1, below.

The vehicular traffic for the transport vehicles is based on a 3-axle rigid truck. The General Mass Limit (GML) for a 3-axle load is assumed to be 20 tonnes based on The Australian Trucking Association's 'Technical Advisory Procedure for Truck Configurations' [24]. Depending on the availability of vehicles it may be possible that a conventional B-doubles will transport equipment to site. The GML for this vehicle is 40 tonnes. In this case the vehicular traffic for the container loads will reduce by a factor of 2 for each B-double transporting equipment to site.

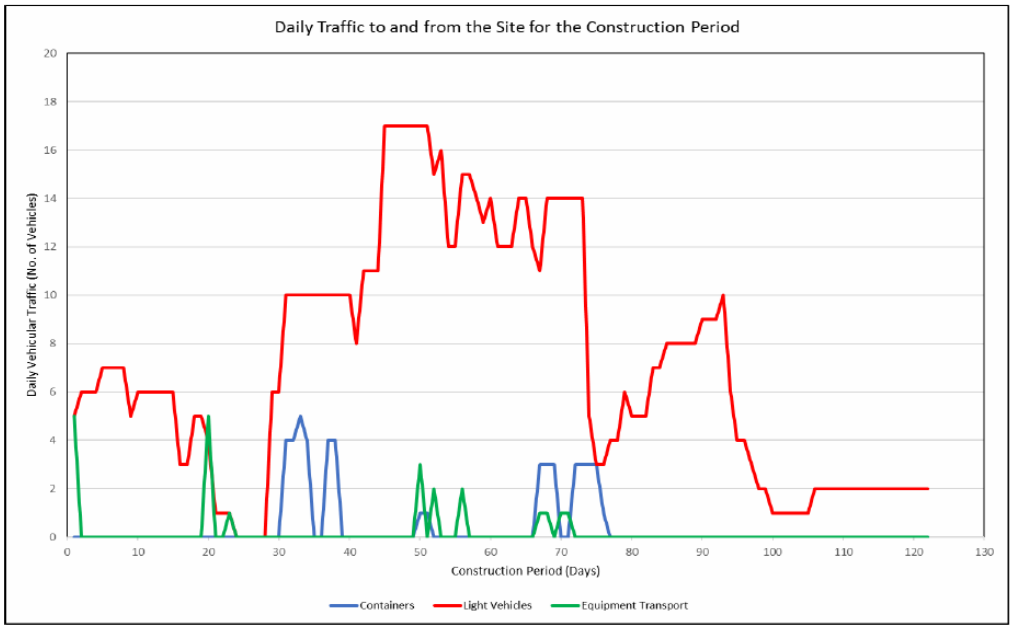


Figure 1 - Daily Traffic to and from Site for the Construction Period

At the peak of the equipment supply, the number of transport vehicles entering and leaving the solar farm site will be 4 to 5 daily for a period of just over a month into the construction period. There will be another busy week midway through the construction period where there will be approximately 3 transport vehicles entering and leaving the site daily.

All heavy transport to and from the site will predominantly be on standard working days between 8am and 4pm.

It is anticipated that there will be up to 30 personnel working on the site during the construction period that will generate the anticipated light vehicle traffic.

The light traffic will be concentrated at the beginning and the end of the day around 6-7am and 4-5pm. The container transport will be concentrated between 10am and 3pm.

2 Impact on Existing Traffic

With a maximum of eight to ten light vehicles and six to eight heavy vehicles travelling to and from the site daily, it is not anticipated that the increased traffic due to construction works will have any significant impact on the existing traffic.

3 Additional Road Signage of Existing Road

It is suggested that road signage is provided for the proposed site entrance on Manilla Road. The recommended locations of the warning signs be placed at distances of 200 metres approaching the intersection to the north and south. The warning signs will indicate that it is a construction site entrance. The entrance to the site on Mannum Road will be designed for the anticipated heavy transport loads volumes during the construction period that are detailed in Section 1. A Traffic Control Plan will be submitted to the DPTI Traffic Management Centre for approval, with all signage to be placed and maintained to the satisfaction of the Commissioner of Highways.

4 Parking

All parking for site personnel will be on site. This will be sign posted at the site entrance. Balance will not permit parking on Mannum Road and will incorporate this in the site induction.

5 O&M Traffic

Once the solar farm has been constructed and has entered the “operations and maintenance” stage the traffic onto site will consist of light vehicles, with few exceptions, at a frequency of 1 to 5 visits per fortnight.

5MW Solar Farm - Typical Vehicle Movements			
Construction - Major Equipment	Load	Quantity	Comments
Piling & Tracker Components	40' Container / Trailer	24	Doubles if permitted / practical
PV Modules	40' Container / Trailer	26	Doubles if permitted / practical
Switchgear	20' Container / Trailer	1	
Inverters	20' Container / Trailer	2	
Cranes	~50T	3	
Cables	40' Container / Trailer	2	Doubles if permitted / practical
Balance of Plant (BOP)	40' Container / Trailer	3	
Civil Plant	Float or Drop Deck	8	4ea at mob / demob
Piling Plant	Float or Drop Deck	4	2ea at mob / demob
Site Facilities	Float/Drop Deck/40' Trailer	8	4ea at mob / demob
Light trucks - 6 wheelers	local deliveries - sand, gen fteight etc	10	
Light trucks - 4 wheelers	local deliveries - sand, gen fteight etc	10	
		101	
Construction - Light Vehicles / Other	Load	Quantity	Comments
Light Vehicle - 4WD ute or similar	Personell / tools	384	Average 4 per day
Light Vehicle - ?	Workforce private vehicles	576	Average 6 per day - depends on engagement of workforce
		960	
O&M	Load	Quantity	Comments
Light Vehicle - 4WD ute or similar	fortnightly inspection	30	1 per fortnight, plus additional
Light Vehicle - 4WD ute or similar	3 monthly Inspections	8	2 visits, 4 times per year
Light Vehicle - 4WD ute or similar	Faults	4	
Light trucks - 4 wheelers	PV Module cleaning	2	Once per Year
		44	