

## **APPENDIX E UPDATED TRAFFIC IMPACT ASSESSMENT (TIA)**



**Lightsource bp**  
Wellington North Solar Project Development  
Traffic Impact Assessment

October 2020

# Disclaimer

*This report: has been prepared by GHD for Lightsource bp and may only be used and relied on by Lightsource bp for the purpose agreed between GHD and the Lightsource bp.*

*GHD otherwise disclaims responsibility to any person other than Lightsource bp arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

*GHD has prepared this report on the basis of information provided by Lightsource bp and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

# Table of contents

1.	Introduction .....	1
1.1	Overview .....	1
1.2	Study area.....	1
1.3	Study assumptions and limitations .....	3
1.4	Report structure .....	3
2.	Existing conditions .....	4
2.1	The site .....	4
2.2	Existing road network characteristics .....	5
2.3	Existing road network performance .....	12
2.4	Crash data review .....	17
2.5	Public and active transport .....	18
3.	Traffic impact assessment .....	20
3.1	Wellington North Solar Farm life cycle overview .....	20
3.2	Construction traffic generation .....	21
3.3	Mid-block assessment .....	23
3.4	Intersection treatment .....	23
3.5	Oversize vehicles .....	25
3.6	Cumulative construction traffic impacts .....	26
3.7	Operational phase traffic movements .....	29
3.8	Decommissioning phase traffic movements .....	30
4.	Parking provision.....	31
4.1	Parking provision .....	31
4.2	Parking layout .....	31
5.	Mitigation measures .....	32
5.1	Construction activity traffic management.....	32
5.2	Road improvements.....	33
6.	Summary and recommendations .....	34
6.1	Traffic impact .....	34
6.2	Parking.....	34
6.3	Mitigation measures.....	34
6.4	Conclusion .....	35

# Table index

Table 2-1 Cobbora Road key features .....	7
Table 2-2 Goolma Road key features .....	8
Table 2-3 Campbells Lane key features .....	9
Table 2-4 Bela Vista Lane key features .....	10
Table 2-5 Mitchell Highway key features .....	11
Table 2-6 Peak hour average surveyed traffic volume on Cobbora Road .....	14
Table 2-7 Key traffic data summary on Cobbora Road .....	14
Table 2-8 Peak hour average surveyed traffic volume on Goolma Road .....	15
Table 2-9 Key traffic data summary on Goolma Road .....	15
Table 2-10 Peak hour average surveyed traffic volume on Campbells Lane .....	17
Table 2-11 Key traffic data summary on Campbells Lane .....	17
Table 2-12 Crash summary .....	18
Table 3-1 Peak daily trip generation (two-way) .....	21
Table 3-2 Mid-block level of service (peak flows per direction) .....	23
Table 3-3 Peak hour mid-block level of service .....	23
Table 3-4 Goolma Road cumulative peak hour mid-block level of service .....	29

# Figure index

Figure 1-1 Site location .....	2
Figure 1-2 Road network near the subject site .....	2
Figure 2-1 Land zoning .....	4
Figure 2-2 Surrounding road network .....	6
Figure 2-3 Cobbora Road, west of the site (looking south) .....	7
Figure 2-4 Goolma Road, east of the site (looking south) .....	8
Figure 2-5 Campbells Lane, north of the site (looking west) .....	9
Figure 2-6 Bela Vista Lane, north of the site (looking west) .....	10
Figure 2-7 Mitchell Highway, west of the site (looking west) .....	11
Figure 2-8 Traffic survey locations .....	12
Figure 2-9 Daily traffic volumes on Cobbora Road .....	13
Figure 2-10 Weekday and seven day average hourly traffic profile on Cobbora Road (two-way) .....	13
Figure 2-11 Daily traffic volumes on Goolma Road .....	14

Figure 2-12 Weekday and seven day average hourly traffic profile on Goolma Road (two-way) .....15

Figure 2-13 Daily traffic volumes on Campbells Lane.....16

Figure 2-14 Weekday and seven day average hourly traffic profile on Campbells Lane (two-way) .....16

Figure 2-15 Study area crash data.....17

Figure 2-16 Wellington Town Centre bus route .....18

Figure 2-17 School bus routes .....19

Figure 3-1 AM peak hour construction vehicle movements .....22

Figure 3-2 PM peak hour construction vehicle movements .....22

Figure 3-3 Intersection left turn treatment review.....24

Figure 3-4 AUL(S)/BAL turn treatments .....25

Figure 3-5 Oversized vehicle example .....26

Figure 3-6 Existing and future facilities within proximity of Wellington North Solar Farm.....27

# 1. Introduction

## 1.1 Overview

GHD has been engaged by NGH Pty Ltd to undertake a review of the traffic impact assessment to assist with the construction and operation of the proposed Wellington North Solar Farm (WNSF).

The Wellington North Solar Farm (Project) in central-western NSW is currently being developed by Lightsource bp. The project is located approximately seven kilometres northeast of Wellington town centre, off Goolma Road, in the Dubbo Regional Council Local Government Area.

This Traffic and Parking Impact assessment report discusses the following:

- Existing Conditions – a review of existing road features and access, adjacent developments, traffic volumes and crash data;
- Proposed Development – a review of additional traffic generated as a result of the proposed solar plan during construction and operation;
- Development Impact – assessment of the performance of the existing intersections resulting from the proposed solar farm development; and
- Parking and Access Review – a review of the parking provision in relation to relevant local development requirements or future construction / operational activity, and a summary of the transportation routes for access and egress arrangements.

## 1.2 Study area

### 1.2.1 Site location

The subject site is located within the Dubbo Regional Council Local Government Area (LGA), seven kilometres northeast of Wellington town centre between Cobbora Road and Goolma Road. The site shown in Figure 1-1 is located to the west of Goolma Road and consists of approximately 970 hectares of land that is currently used for agricultural purposes.

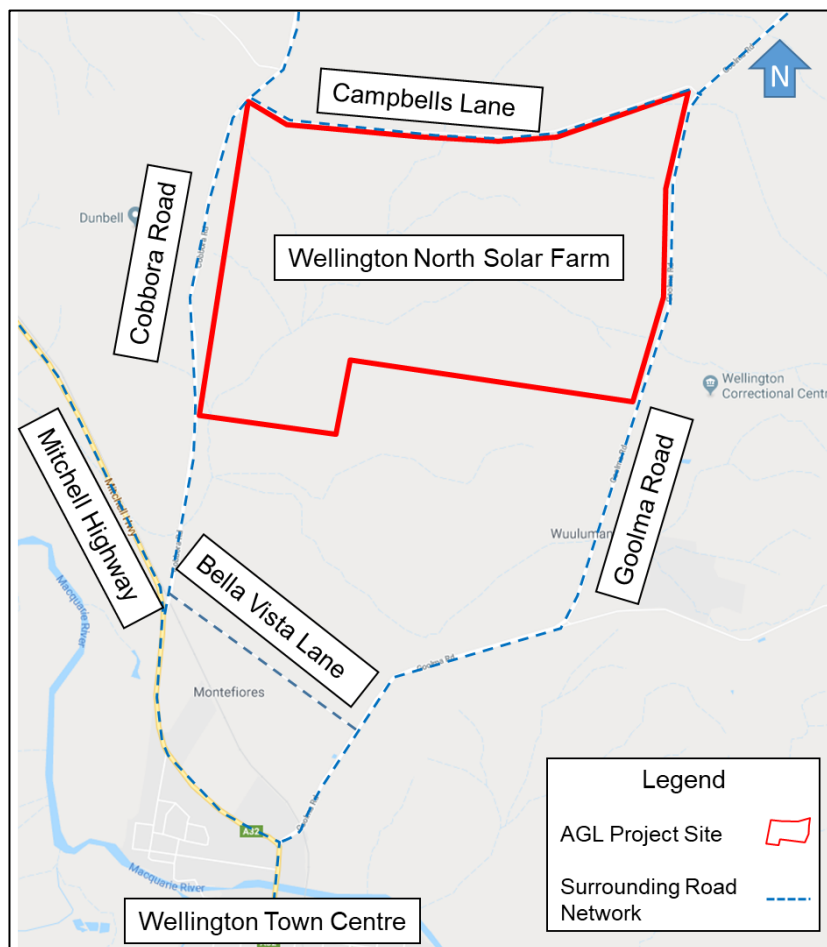
The vehicular access point to the development site is proposed to utilise the existing driveway off Goolma Road that currently leads to the residential dwelling on the property. This report will review the suitability of this access and outline potential upgrades that may be required

The location of the proposed WNSF in relation to the surrounding road network is shown in Figure 1-2.



**Figure 1-1 Site location**

Source: Google Maps – Modified by GHD



**Figure 1-2 Road network near the subject site**

Source: Google Maps – Modified by GHD

### **1.3 Study assumptions and limitations**

This report and assessment for the proposed WNSF are based on the following assumptions and limitations:

- The information provided by NGH and Lightsource bp in relation to expected truck and vehicle generation and arrival-departure locations for the construction and staff personnel is accurate.
- The traffic count survey data based on automatic tube count conducted between 28 February 2018 and 6 March 2018 by Matrix Traffic and Data Solutions is accurate.
- The analysis is a desktop study and no site visits have been undertaken.
- The conditions of the surrounding road network are based on information either supplied by the traffic surveys and Google Maps / Streetview.

### **1.4 Report structure**

The report is structured as follows:

- Section 2 Existing conditions.
- Section 3 Traffic impact and assessment.
- Section 4 Parking provision.
- Section 5 Mitigation measures.
- Section 6 Summary and recommendations.

## 2. Existing conditions

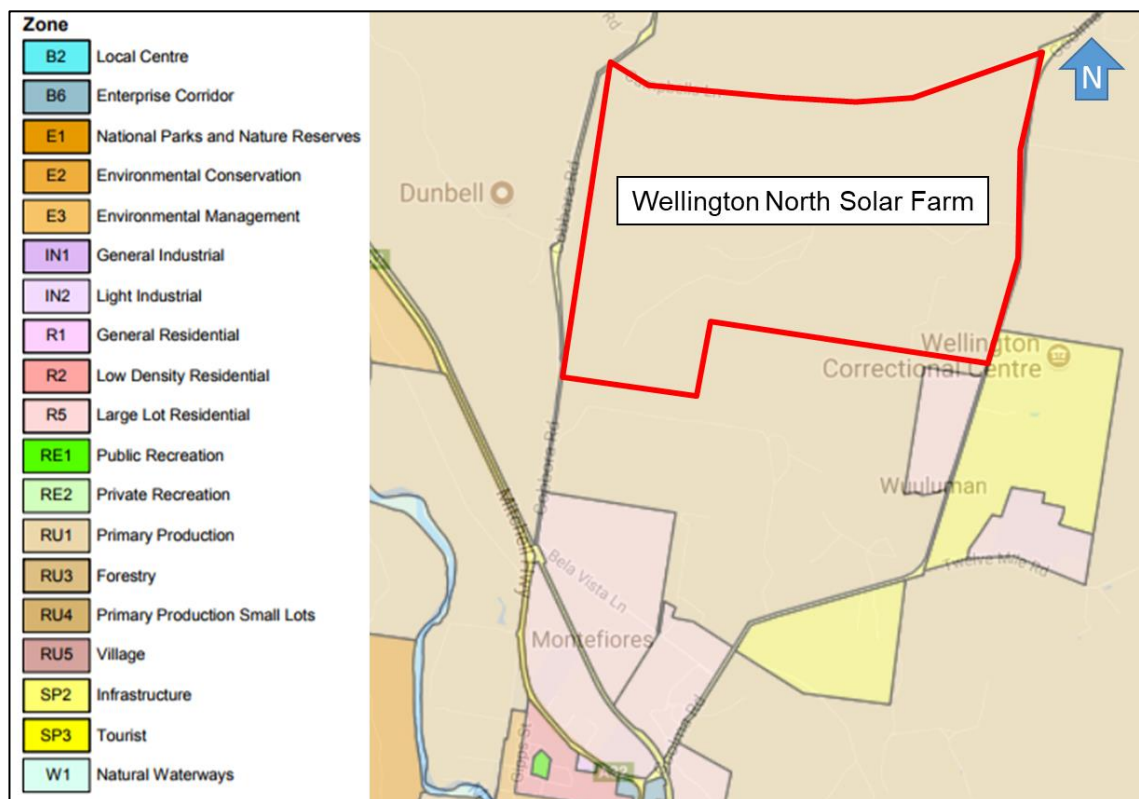
### 2.1 The site

The proposed WNSF is located within Dubbo Regional Council LGA on the western side of Goolma Road, south-west of its intersection with Campbells Lane.

As indicated in Figure 2-1, the site is located in a RU1 (Primary Production) zone with the Wellington and Macquarie Correctional Centre to the east of the site zoned as SP2 (Infrastructure). The land south of the site, at the intersection of Mitchell Highway and Goolma Road, is zoned as R5 (Large Lot Residential).

The site currently consists predominately of greenfield area with the land used for agricultural purposes.

Primary access to the proposed WNSF will be off Goolma Road, which currently consists of a residential driveway access located to the east of the site. South of the site is a local road network (Bela Vista Lane) providing access to the residential dwellings located within the R5 Residential Zone.



**Figure 2-1 Land zoning**

Source: [www.planningportal.nsw.gov.au](http://www.planningportal.nsw.gov.au) – Modified by GHD

## 2.2 Existing road network characteristics

This section provides an understanding of the existing road network surrounding the site.

### 2.2.1 Road hierarchy

Roads within NSW are categorised in the following two ways:

- By Classification (ownership); and
- By the function that they perform.

#### Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Transport for NSW to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Transport for NSW has three administrative classes of roads. These are:

- **State Roads** – Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Transport for NSW with maintenance fully funded by Transport for NSW. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Transport for NSW funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Transport for NSW. Regional Roads may own all part of all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by Transport for NSW.
- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Transport for NSW may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Transport for NSW.

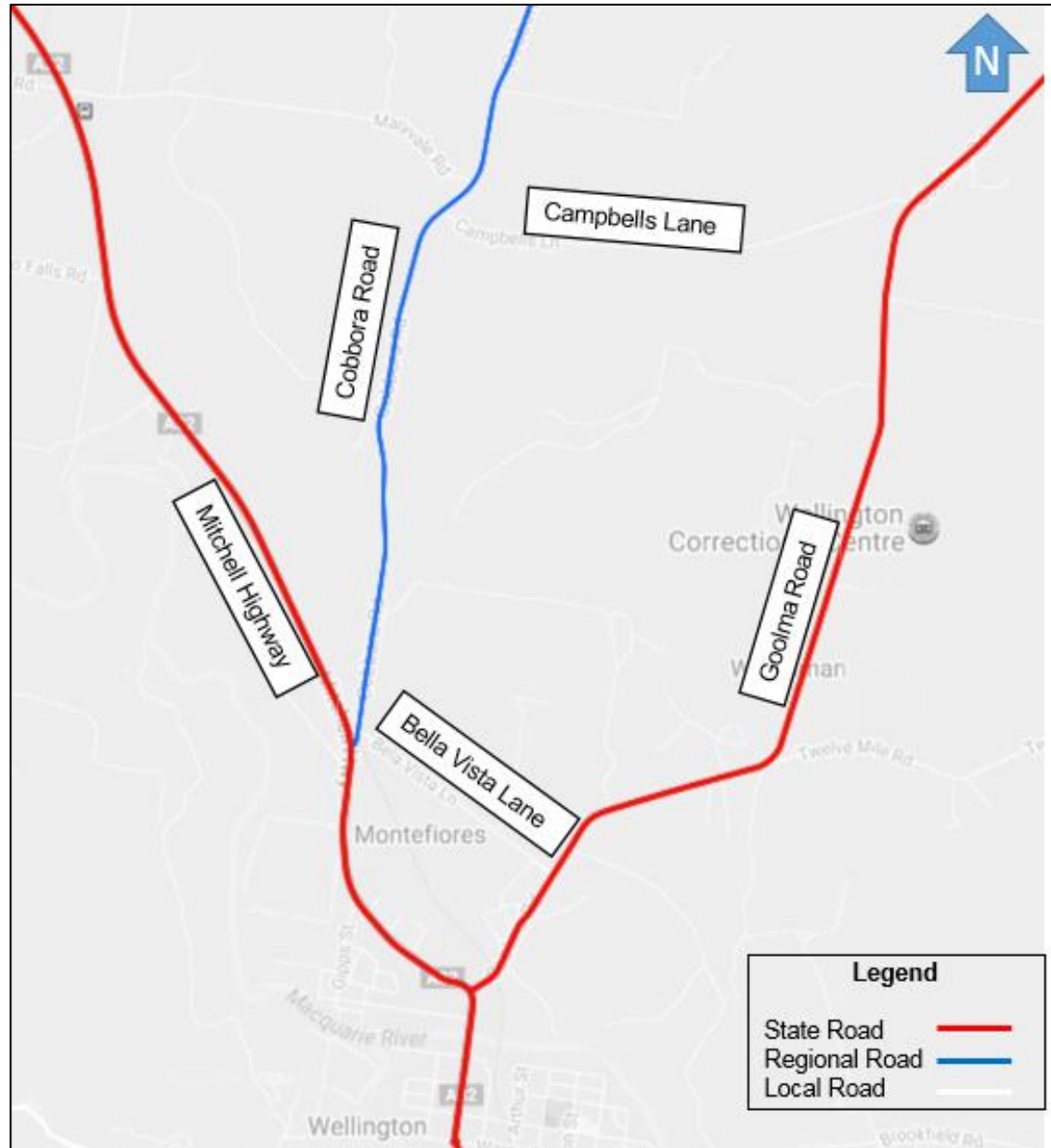
#### Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Transport for NSW define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Transport for NSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Transport for NSW or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).

- **Collector Roads** – provide connectivity between local roads and the arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

The surrounding road network is shown in Figure 2-2.



**Figure 2-2 Surrounding road network**

Source: Transport for NSW maps – Modified by GHD

### 2.2.2 Cobbora Road

Cobbora Road acts as a regional road in the vicinity of the WNSF running in a north-south alignment. Cobbora Road connects to Mitchell Highway to the south and Golden Highway to the north with priority-controlled intersections at both locations. The intersection of Cobbora Road with Campbells Lane is a give-way priority-controlled intersection.

Cobbora Road has the following key features within proximity of site as outlined in Table 2-1 and shown in Figure 2-4.

**Table 2-1 Cobbora Road key features**

Feature	Description
Carriageway	Undivided carriageway, with typically one travel lane in each direction
Parking	Unrestricted
Speed Limit	No sign-posted speed limit (100 km/h)
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities; however a level crossing exists across Cobbora Road approximately 80 m north of the Mitchell Highway



**Figure 2-3 Cobbora Road, west of the site (looking south)**

Source: Google Maps Streetview

### 2.2.3 Goolma Road

Goolma Road functions as a sub-arterial road with a north-south alignment. Goolma Road runs between Gulgong in the north and Wellington in the south, forming priority-controlled intersections at Mitchell Highway and Campbells Lane.

Goolma Road has the following key features within proximity of site as outlined in Table 2-3 and Figure 2-4.

**Table 2-2 Goolma Road key features**

Feature	Description
Carriageway	Undivided carriageway, with a single travel lane in each direction. A right turn lane is provided northbound on Goolma Road to access the Wellington and Macquarie Correctional Centre
Parking	Unrestricted
Speed Limit	100 km/h
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities



**Figure 2-4 Goolma Road, east of the site (looking south)**

Source: Google Maps Streetview

#### 2.2.4 Campbells Lane

Campbells Lane is located along the northern boundary of the WNSF. Campbells Lane is a local road running in an east-west alignment from Goolma Road, east of the site, to Cobbora Road in the west. Campbells Lane forms part of a priority-controlled intersection at both these locations.

Campbells Lane has the following key features within proximity of site as outlined in Table 2-3 and shown in Figure 2-5.

**Table 2-3 Campbells Lane key features**

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction
Parking	Unrestricted
Speed Limit	No sign-posted speed limit (100 km/h)
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities



**Figure 2-5 Campbells Lane, north of the site (looking west)**

Source: Google Maps Streetview

### 2.2.5 Bela Vista Lane

Bela Vista Lane is located south of the WNSF. Bela Vista Lane is a local road running in an east-west alignment from Goolma Road, east of the site, to Cobbora Road in the west. Bela Vista Lane forms part of a priority-controlled intersection at both these locations.

Bela Vista Lane has the following key features within proximity of site as outlined in Table 2-3 and shown in Figure 2-6.

**Table 2-4 Bela Vista Lane key features**

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction; gross load limit of 20 tonne
Parking	Unrestricted
Speed Limit	No sign-posted speed limit (100 km/h)
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities



**Figure 2-6 Bela Vista Lane, north of the site (looking west)**

Source: Google Maps Streetview

### 2.2.6 Mitchell Highway

Mitchell Highway forms part of the arterial road network and runs from Dubbo in the north to Bathurst to the south. In the vicinity of the WNSF, Mitchell Highway has a north-south alignment and forms priority-controlled intersections at Goolma Road and Cobbora Road.

Mitchell Highway is a state road providing access from the WNSF to Wellington town centre. Access to the WNSF via Mitchell Highway is provided through its intersection with Cobbora Road south-west of the site and its intersection with Goolma Road south of the site.

Mitchell Highway has the following key features within proximity of site as outlined in Table 2-5 and shown in Figure 2-7.

**Table 2-5 Mitchell Highway key features**

Feature	Description
Carriageway	Undivided carriageway, with typically one travel lane in each direction. An additional turning lane is provided in both directions on the approach to Cobbora Road and a right turn lane from Mitchell Highway northbound into Goolma Road.
Parking	Unrestricted
Speed Limit	110 km/h with 80 km/h in the southbound direction near its intersection with Cobbora Road and Goolma Road.
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities within the vicinity of the site. Nearest bus stops are located on Mitchell Highway near Gobolion Street, on both sides of the road.



**Figure 2-7 Mitchell Highway, west of the site (looking west)**

Source: Google Maps Streetview

## 2.3 Existing road network performance

This section provides an understanding of the traffic volumes on the key roads in proximity to the subject site.

### 2.3.1 Base (2018) traffic volumes

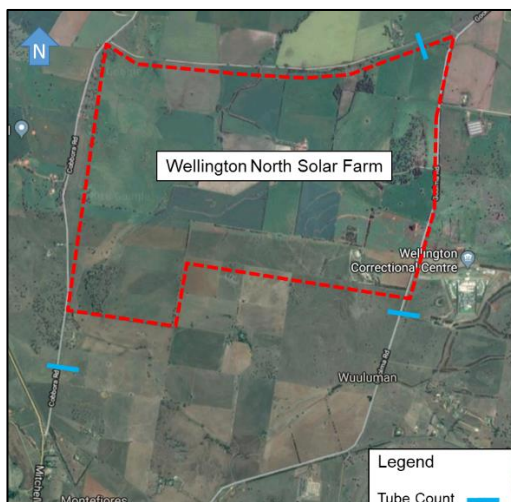
In order to identify the existing traffic volumes in proximity to the site, seven-day tube count was undertaken by Matrix Traffic and Transport Data between 28 February and 6 March 2018 at the following three locations, as shown in Figure 2-8.

- Cobbora Road (approximately 500 m north of Bela Vista Lane).
- Goolma Road (approximately 300 m south of the access point to the Wellington and Macquarie Correctional Centres).
- Campbells Lane (approximately 400 m west of Goolma Road – approximately mid-way between property access and 90 degree curve in the road).

During the 2018 base traffic surveys, the following projects were either in operation, construction or planned for construction within the proximity of the WNSF:

- Bodangora Wind Farm.
- Macquarie and Wellington Correctional Centres.
- Maryvale and Wellington Solar Farms.

The traffic survey volumes on the adjoining road network to the WNSF carried out in February/March 2018 would have included the operation and construction of the existing Macquarie and Wellington Correctional Centres and the construction activity of the Bodangora Wind Farm. Since the completion of these traffic surveys, Macquarie and Wellington Correctional Centres remain in operation and Bodangora Wind Farm has been completed. Bodangora Wind Farm operational traffic impacts would be lighter than construction traffic impacts as outlined in the NSW Bodangora Wind Farm Bodangora, Central Western NSW (MP 10\_0157) Director-General's Environmental Assessment Report by NSW Government Planning and Infrastructure, dated June 2013. Therefore the 2018 survey is anticipated to represent a higher than typical traffic volume along Goolma Road. There have been no significant developments that may contribute to an increase in traffic flows along Cobbora Road and Campbells Lane and therefore the 2018 survey data is anticipated to reflect typical traffic volumes along these road networks.

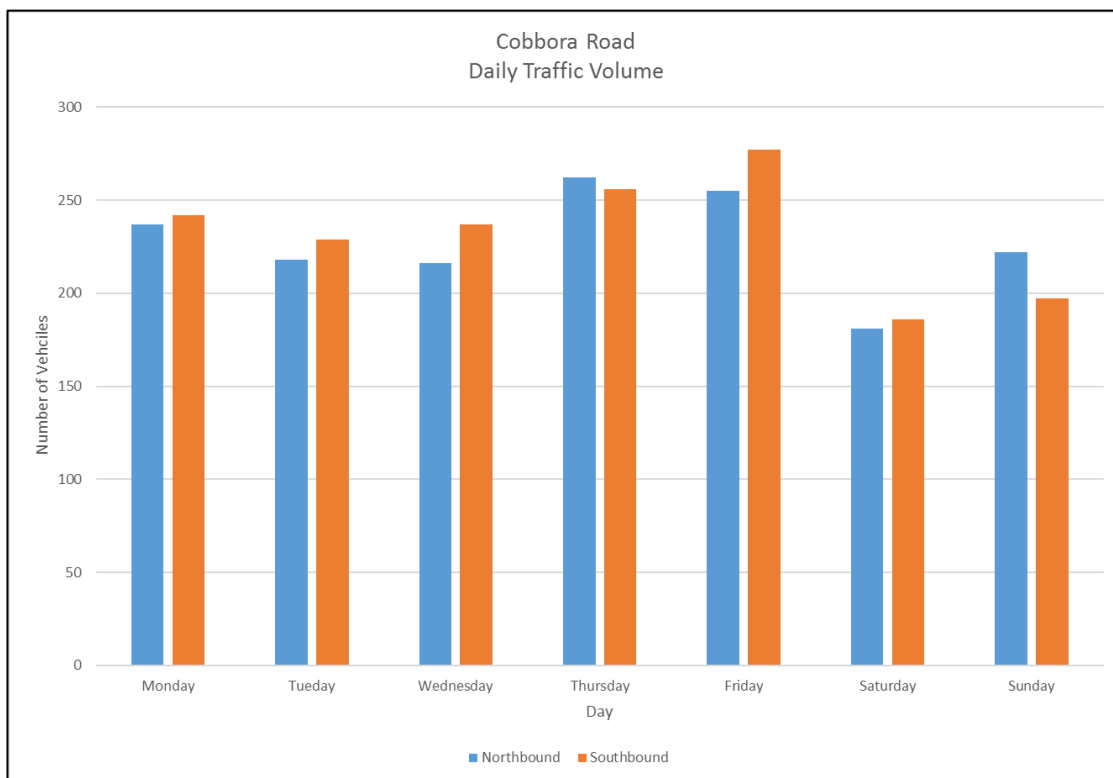


**Figure 2-8 Traffic survey locations**

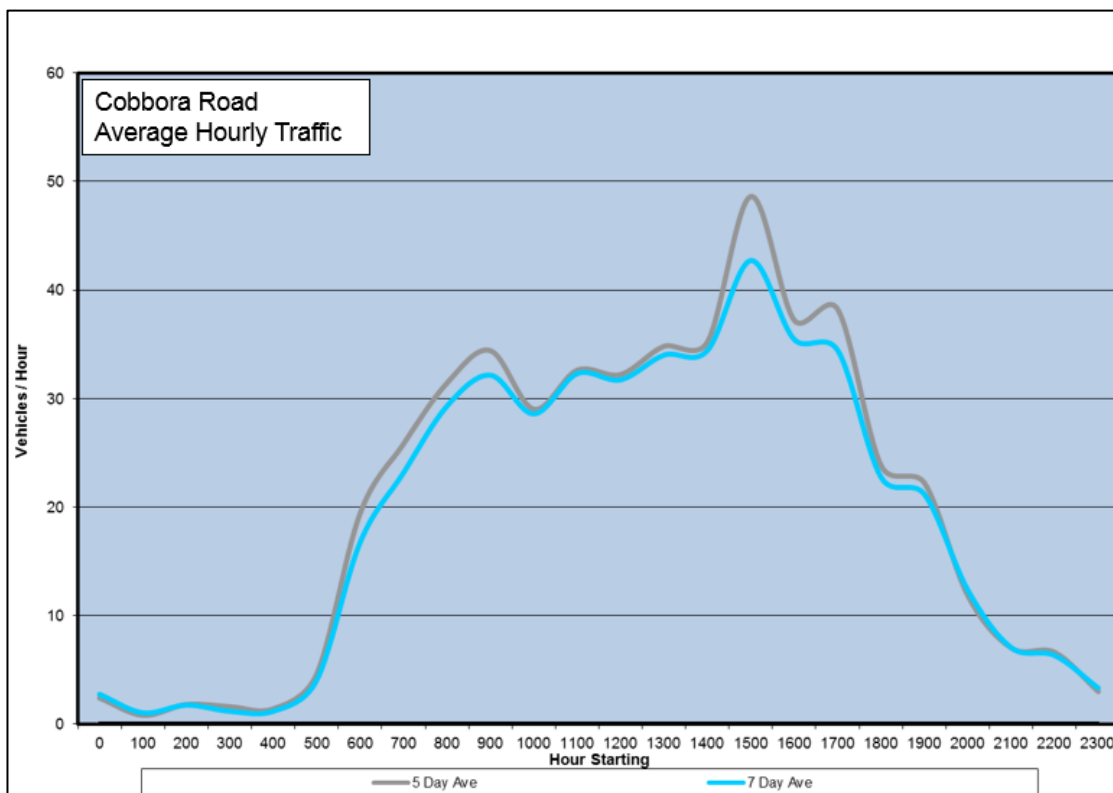
Source: Google Maps – Modified by GHD

### 2.3.1.1 Cobbora Road traffic volumes

The identified daily traffic volumes on Cobbora Road is shown in Figure 2-9 with the surveyed weekday average and seven day average (weekday and weekend) in Figure 2-10.



**Figure 2-9 Daily traffic volumes on Cobbora Road**



**Figure 2-10 Weekday and seven day average hourly traffic profile on Cobbora Road (two-way)**

Table 2-6 outlines the highest recorded vehicle movements within an hour period during the AM and PM periods, while Table 2-7 surmises 85 percentile traffic speeds and the percentage of heavy vehicles on Cobbora Road.

**Table 2-6 Peak hour average surveyed traffic volume on Cobbora Road**

Cobbora Road	Average Weekday AM Peak Hour (veh/h)*	Average Weekday PM Peak Hour (veh/h)*	Saturday Peak Hour (veh/h)*
Northbound	20	19	16
Southbound	14	29	20
<b>Total</b>	<b>34</b>	<b>49</b>	<b>36</b>

Notes:

(\*) veh/h = vehicles per hour

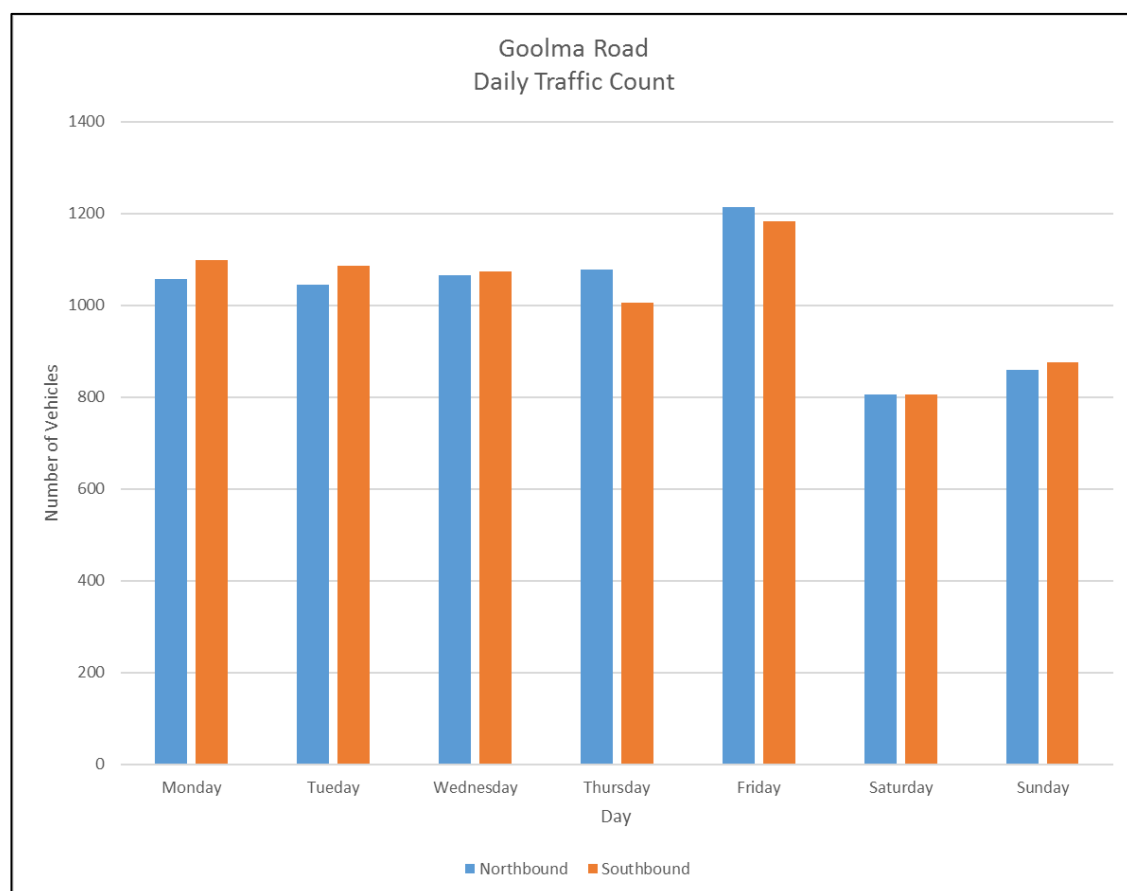
**Table 2-7 Key traffic data summary on Cobbora Road**

Key Data Description	Amount
Weekday % Heavy Vehicles	25 %
Weekend % Heavy Vehicles	12 %
85 percentile speed	98.1 km/h

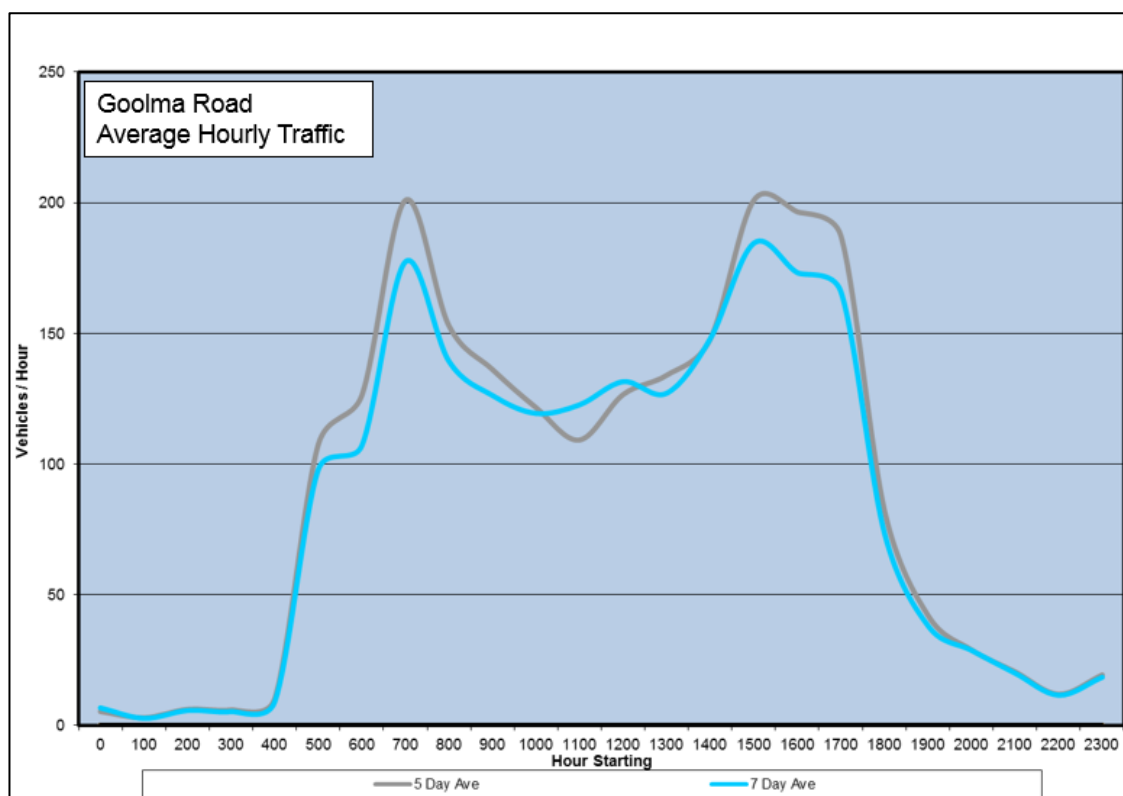
The above traffic data is representative of typical traffic flow and conditions to align with hierarchy of a regional / local road network as described in section 2.2.1.

### 2.3.1.2 Goolma Road traffic volumes

The identified daily traffic volumes on Goolma Road is shown in Figure 2-11 with the surveyed weekday average and seven day average (weekday and weekend) in Figure 2-12.



**Figure 2-11 Daily traffic volumes on Goolma Road**



**Figure 2-12 Weekday and seven day average hourly traffic profile on Goolma Road (two-way)**

Table 2-8 outlines the highest recorded vehicle movements within an hour period during the AM and PM periods, while Table 2-9 surmises 85 percentile traffic speeds and the percentage of heavy vehicles on Goolma Road.

**Table 2-8 Peak hour average surveyed traffic volume on Goolma Road**

Goolma Road	Average Weekday AM Peak Hour (veh/h)*	Average Weekday PM Peak Hour (veh/h)*	Saturday Peak Hour (veh/h)*
Northbound	157	66	57
Southbound	44	135	94
<b>Total</b>	<b>201</b>	<b>201</b>	<b>151</b>

Notes:

(\*) veh/h = vehicles per hour

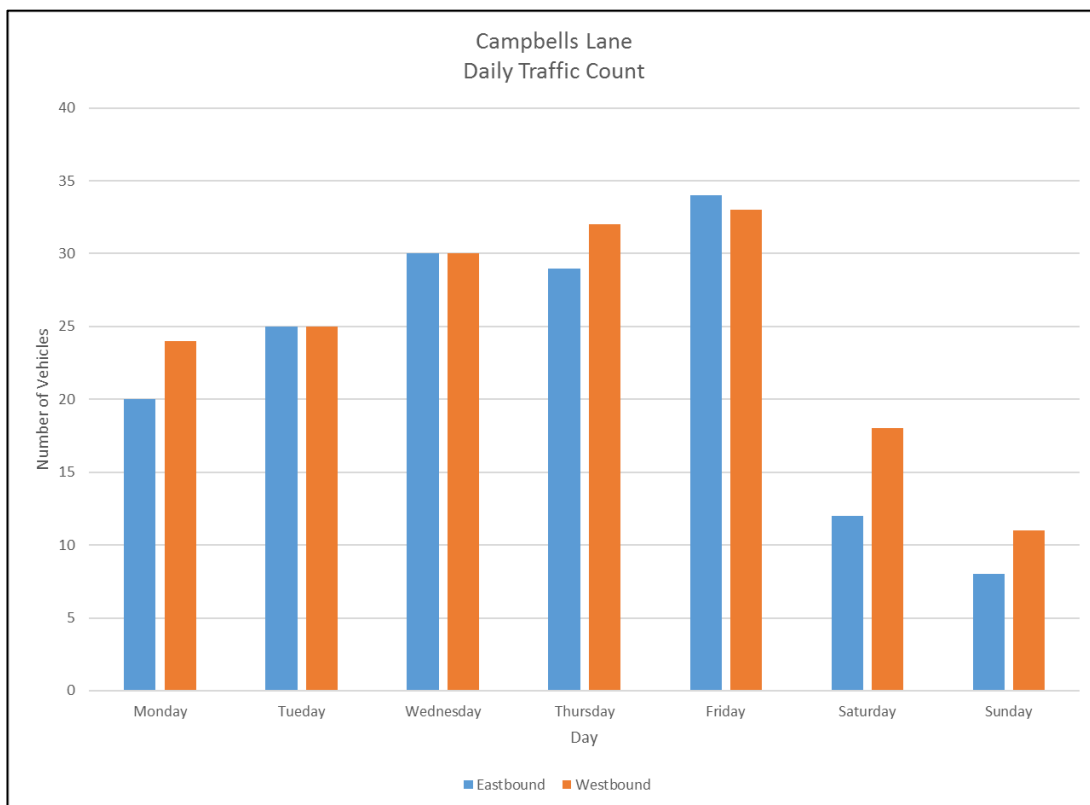
**Table 2-9 Key traffic data summary on Goolma Road**

Key Data Description	Amount
Weekday % Heavy Vehicles	18 %
Weekend % Heavy Vehicles	11 %
85 percentile speed	104.7 km/h

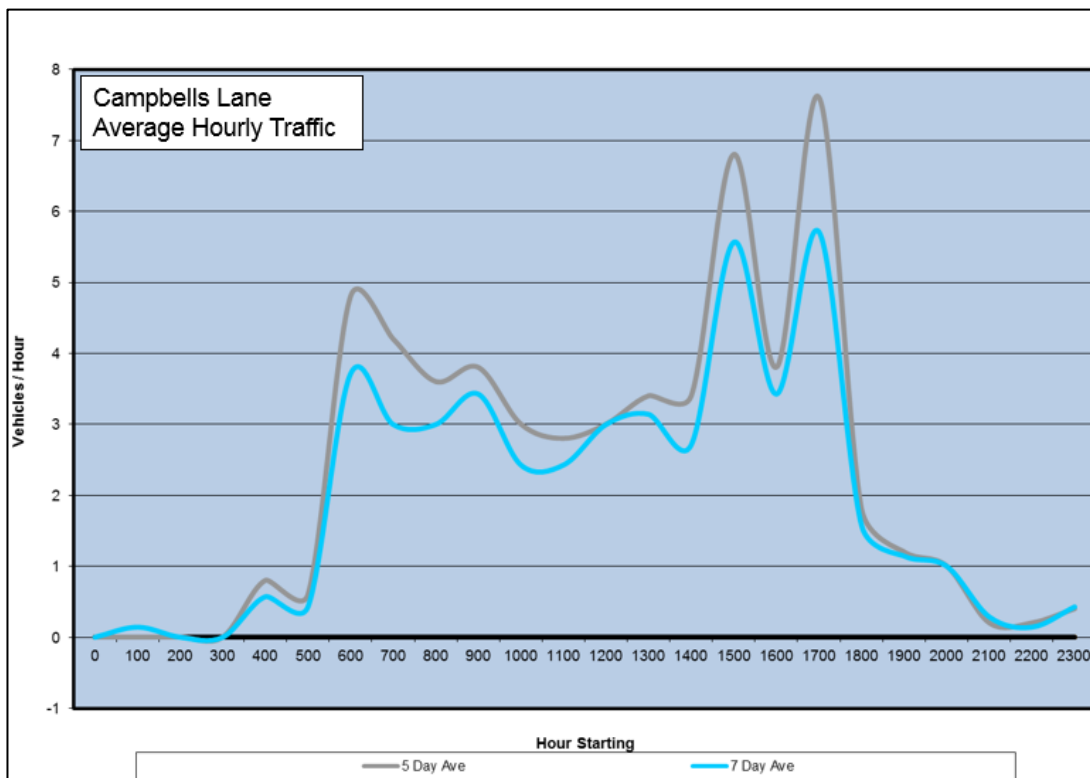
The above traffic data is representative of typical traffic flow and conditions to align with hierarchy of a regional / collector road network as described in section 2.2.1.

### 2.3.1.3 Campbells Lane traffic volumes

The identified daily traffic volumes on Campbells Lane is shown in Figure 2-13 with the surveyed weekday average and seven day average (weekday and weekend) in Figure 2-14 .



**Figure 2-13 Daily traffic volumes on Campbells Lane**



**Figure 2-14 Weekday and seven day average hourly traffic profile on Campbells Lane (two-way)**

Table 2-10 outlines the highest recorded vehicle movements within an hour period during the AM and PM periods, while Table 2-11 surmises 85 percentile traffic speeds and the percentage of heavy vehicles on Campbells Lane.

**Table 2-10 Peak hour average surveyed traffic volume on Campbells Lane**

Campbells Lane	Average Weekday AM Peak Hour (veh/h)*	Average Weekday PM Peak Hour (veh/h)*	Saturday Peak Hour (veh/h)*
Eastbound	4	3	1
Westbound	1	5	4
<b>Total</b>	<b>5</b>	<b>8</b>	<b>5</b>

Notes:

(\*) veh/h = vehicles per hour

**Table 2-11 Key traffic data summary on Campbells Lane**

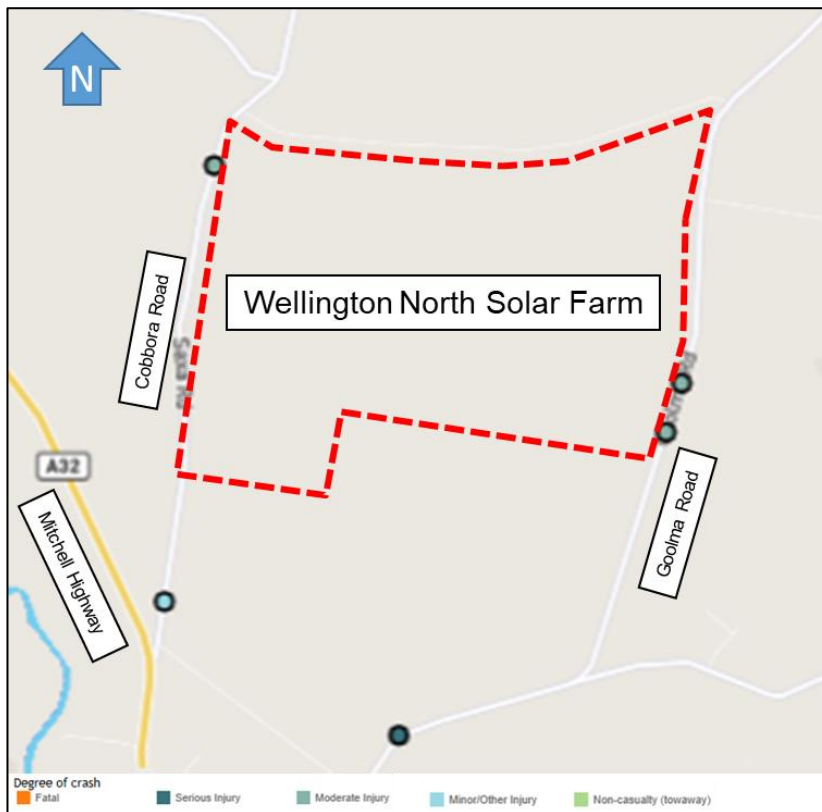
Key Data Description	Amount
Weekday % Heavy Vehicles	12 %
Weekend % Heavy Vehicles	7 %
85 percentile speed	91.9 km/h

The above traffic data is representative of typical traffic flow and conditions to align with hierarchy of a local road network as described in section 2.2.1.

## 2.4 Crash data review

GHD utilised the Transport for NSW Centre for Road safety website to review the crash statistics for a five-year period (2012-2016) for roads within proximity of the proposed WNSF.

Crash locations on Goolma Road and Cobbora Road near the proposed WNSF are shown in Figure 2-15



**Figure 2-15 Study area crash data**

Source: Transport for NSW Centre for Road Safety – Modified by GHD

There was a total of five (5) crashes recorded within proximity to the WNSF over the five year period between 2014 – 2018. Of the five crashes, three (3) were recorded on Goolma Road and two (2) was located on Cobbora Road. Of the recorded crashes resulted in one (1) serious injury, three (3) moderate injuries and one minor/other injuries. All recorded crashes occurred within the daylight period and summarised by crash type in Table 2-12.

**Table 2-12 Crash summary**

Location	Rum Code	Description	Number of Injuries
Goolma Road	80	Vehicle steered off road to the left /right	1 serious
	71	Vehicle steered off road to the left and struck an object	1 moderate
	47	Vehicle emerging from driveway	1 moderate
Cobbora Road	55	Vehicle pulling out resulting in rear end	1 moderate
	22	Rear end	1 minor/other injury

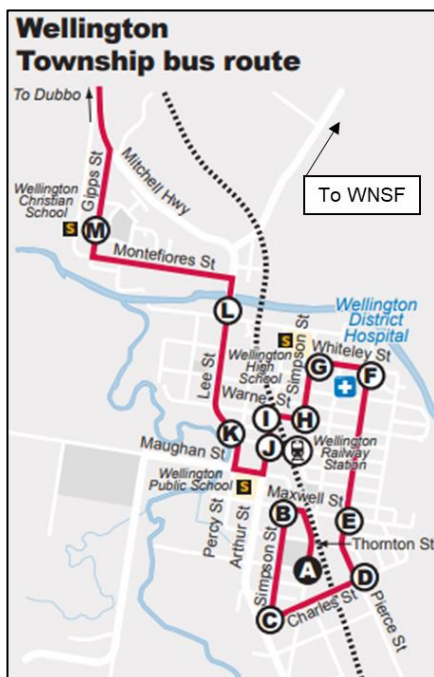
## 2.5 Public and active transport

Given the rural nature of the location, there are no formalised pedestrian or cycle facilities on the road network surrounding the site.

Wellington Railway Station, located approximately 7 km south of the site, is serviced by regular train services to Dubbo, Orange, Bathurst, Lithgow and Sydney. Charter coach services also operate between Wellington and major centres.

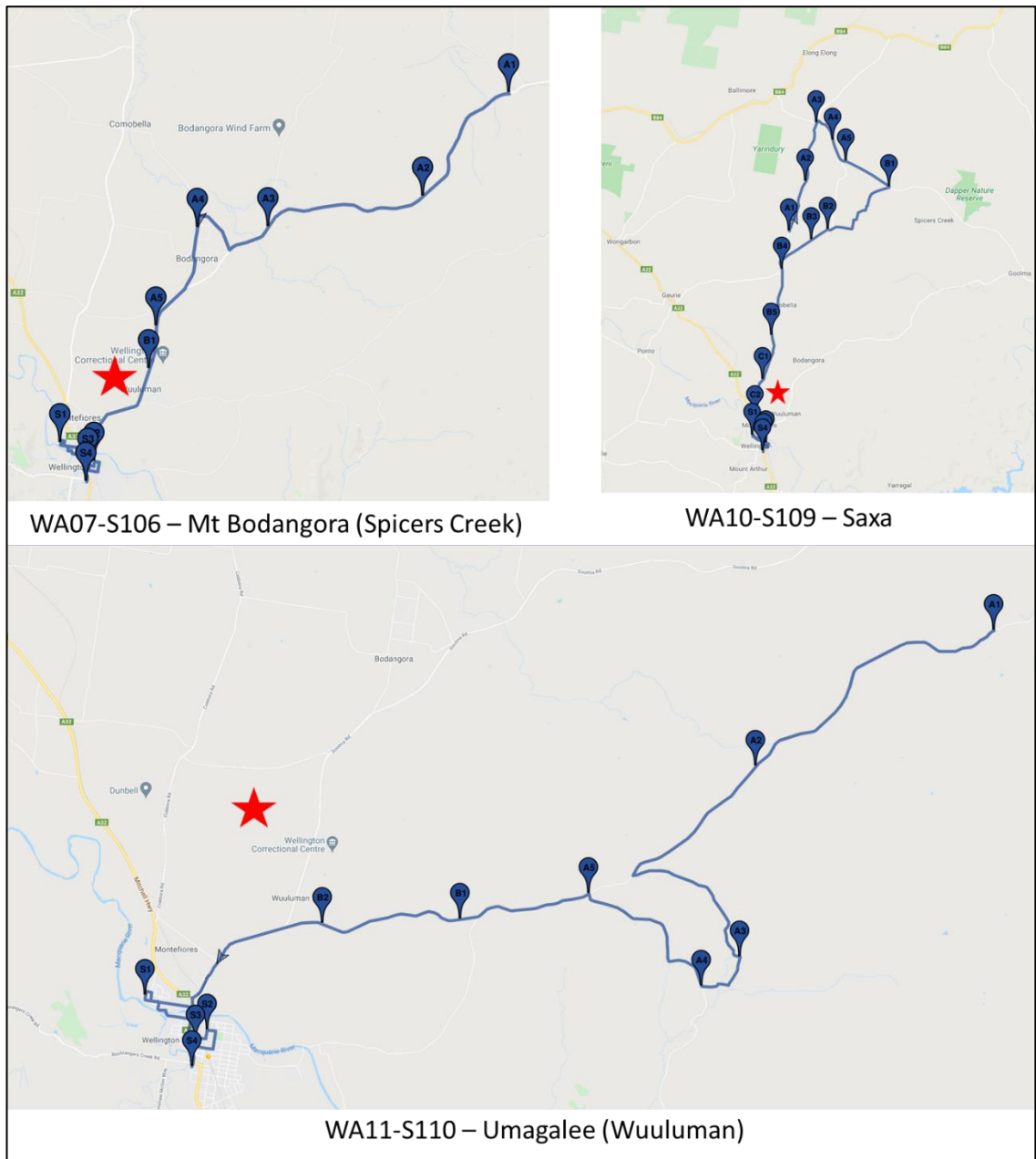
A local bus service (TLDW – Wellington to Dubbo) operates around the town of Wellington, as shown in Figure 2-16, operates four daily services Monday to Friday.

There are no public transport services that run along Goolma Road or Cobbora Road to the site. Accordingly, the vast majority of trips generated by the construction activity and workers are expected to occur using private vehicles or arranged coach / transport services to and from the site. There are three designated school bus routes that run within proximity of the site, as shown in Figure 2-17.



**Figure 2-16 Wellington Town Centre bus route**

Source: Ogden Coach Services – Modified by GHD



**Figure 2-17 School bus routes**

Source: Ogden Coach Services – Modified by GHD

### 3. Traffic impact assessment

This section of the report provides details and assessment of the estimated traffic generation during the construction of the WNSF, based upon estimated staffing numbers and heavy vehicle movements. Vehicle movements were estimated by Lightsource bp based on a review of actual construction traffic generation across its Australian portfolio and extrapolated based on the data to reflect WNSF potential trip generation during construction.

Construction activity is proposed to operate from 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday. No construction activity will occur on Sunday and public holidays without prior approval. However, it is noted that during the COVID-19 pandemic, the permitted construction hours have been granted an exemption on the nearby Wellington Solar Farm, with construction activity permitted 7 am to 6 pm, seven days per week. This might be replicated at the WNSF.

The internal access and parking arrangement for the proposal are currently unknown and have therefore, has not been assessed as part of the traffic study.

#### 3.1 Wellington North Solar Farm life cycle overview

The WNSF is expected to proceed through mobilisation, construction, commissioning, operation and decommissioning stages typical of Photovoltaic (PV) generation facilities.

Mobilisation would be expected to occur for the first 1-3 months of the project delivery timeframe and traffic movements might include:

- Light vehicles to mobilise workers (daily) to and from site.
- Shuttle bus services to facilitate workers to and from the site on a daily basis from nearby population centres (i.e. Wellington, Dubbo and Orange).
- Delivery of infrastructure including temporary offices and associated equipment, power generation equipment, ablutions.
- Delivery of equipment and machinery for civil construction, clearing (if required) and general site establishment.
- Delivery of structural components and some PV equipment.

More intense construction would be expected to follow during months 3-14 to achieve mechanical completion with the following traffic movements:

- Light vehicles to mobilise workers (daily) to and from site – numbers ramping up from mobilisation.
- Shuttle bus services to facilitate workers to and from the site on a daily basis from nearby population centres (i.e. Wellington, Dubbo and Orange).
- Delivery of equipment and machinery for structural, electrical and civil construction activities.
- Ongoing delivery of PV and electrical equipment including deliveries of major equipment such as inverters, switchgear, transformer etc.
- Trucks for removal of waste.

Following mechanical completion, the site will move into a commissioning phase estimated from months 15-18 where equipment deliveries are significantly reduced and the workforce is also reduced. During commissioning the majority of traffic would be expected to be light vehicles for personnel movement.

Following commissioning the site will move to operations phase which would be expected to extend for the life of the asset with very limited light vehicle movements predominately for routine operations and maintenance personnel and activities.

At the end of the useful life of the asset, it is envisaged that decommissioning would take place which would involve mobilisation of a workforce and additional temporary facilities, and then move to the removal of equipment and infrastructure. At this time it is expected that significant movements of light vehicles and trucks for transporting waste will occur. The decommissioning phase would be expected to last less than eight months.

## 3.2 Construction traffic generation

### 3.2.1 Daily traffic

Daily construction traffic generation provided by Lightsource bp was based upon the current construction activity across Lightsource bp's Australian portfolio and extrapolated to be representative of the WNSF.

During its peak construction period, consideration was given to the workforce (consisting of some 400 workers) will be transported to and from the site and nearby population centres (i.e. Wellington, Dubbo and Orange) via a shuttle bus system. Such system aims to reduce traffic generation within the surrounding road network, reduction of parking demand on site and improved safety for the workers and the public, by reducing the fatigue of workers that would generally be required to drive between accommodation and the site.

Based on the information estimated by the client, the daily vehicle two-way trips outlined for the project during the peak construction activity is summarised in Table 3-1

**Table 3-1 Peak daily trip generation (two-way)**

Vehicle Type	Number of Trips (two-way)
Light Vehicles	132
Staff Shuttle Buses	80
Heavy Vehicles	55
<b>Total</b>	<b>267</b>

The client has advised that at the peak of the construction, it is anticipated that up to 400 site personnel will be required to undertake the works. They have advised that a shuttle bus system will be in place to transport workers to the site consisting of a typically 20 seater buses. Based on an anticipated modal split of 80 percent of the workers travelling by shuttle bus, it is estimated that this could generate 16 inbound and 16 outbound trips during each of the AM and PM peak periods. Additionally, the remaining 20 percent of workers travelling by private means would potentially car-pool. Assuming a rate of 1.2 persons per private vehicle, it is anticipated that such would generate up to 66 inbound trips in the AM peak period and visa-versa in the PM peak period (total of 132 daily trips).

Heavy vehicle movements will be spread throughout the day.

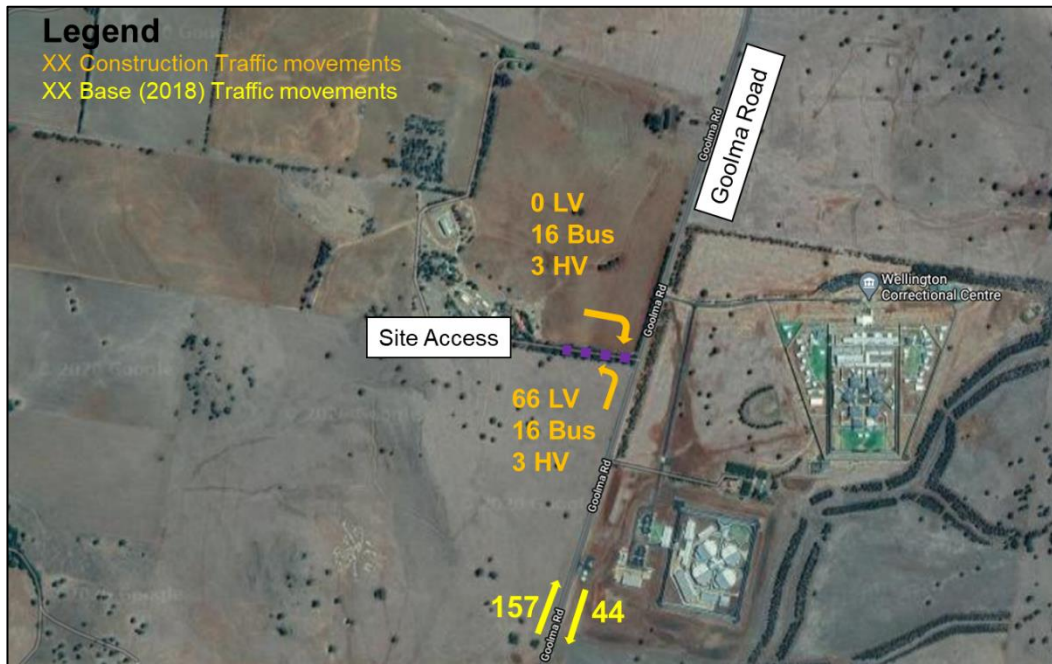
### 3.2.2 Peak hourly traffic generation and distribution

For a worst-case scenario for the impacts of the road network, it has been assumed that the peak traffic associated with construction activity would be during the arrival and departures of the site workers and occur within the road network AM and PM peak hour period. However, while the assessment has been undertaken with comparison to the road network peak periods, it is noted that staff arrival and departure pattern may not necessarily coincide with the road network peak.

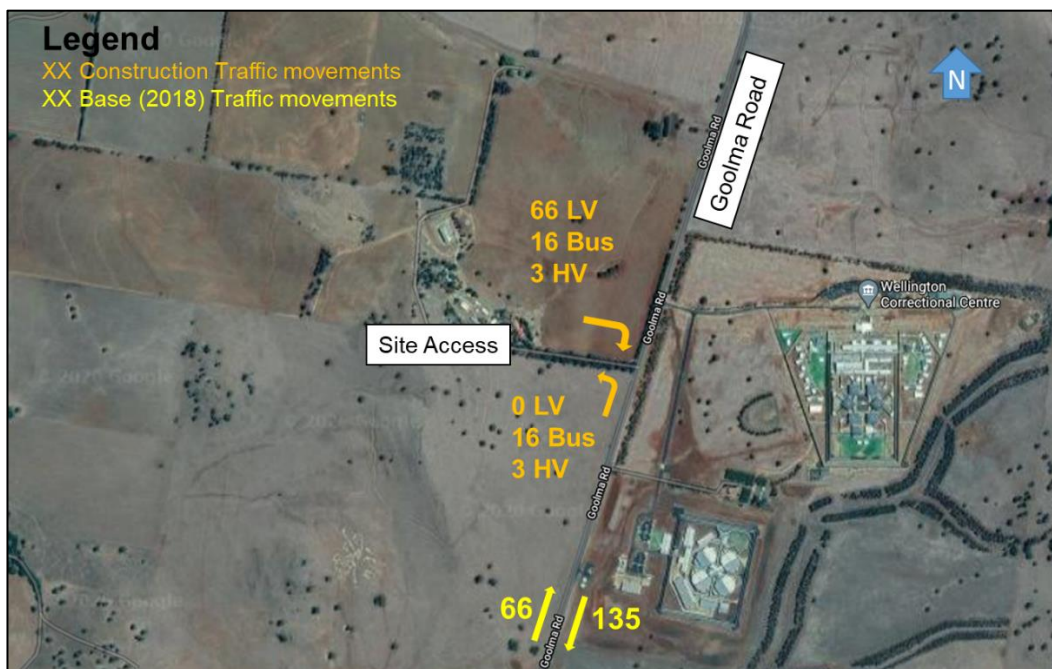
It is expected that the heavy vehicle movements (55 two way trips) generated by the construction activity would be spread throughout the day with up to 6 (approximately 10 percent) two-way trips occurring within the same peak hour of the workers arrival and departure period.

Lightsource bp has advised that all construction traffic is proposed to arrive and depart at the location of the existing domestic driveway access on Goolma Road located on the eastern site boundary (approximately 195 m south of the entry to Wellington Correctional Centre). Travel to the Goolma Road is via the Mitchell Highway located south to the site (to/from Wellington).

The 2018 peak hour AM and PM movements and construction traffic approach routes trip generation within the vicinity of the site access are outlined in Figure 3-1 and Figure 3-2, respectively. The AM and PM peak hour has been reviewed for a worst-case scenario.



**Figure 3-1 AM peak hour construction vehicle movements**



**Figure 3-2 PM peak hour construction vehicle movements**

### 3.3 Mid-block assessment

Based on the above information summary of estimated construction vehicle movements, a review of the existing peak traffic and combined construction movement was undertaken with reference to Roads and Maritime Services Guide to Traffic Generating Developments (2002). This outlines mid-block road capacity Levels of Service based on traffic flows per direction per lane to guide road capacity Level of Service as outlined in Table 3-2.

**Table 3-2 Mid-block level of service (peak flows per direction)**

Level of Service	Peak Hour Volume (veh/h*) One Lane	Peak Hour Volume (veh/h*) Two Lane
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

\*Note veh/h = vehicles per hour

Table 3-3 outlines the Level of Service of the road network with respect to the mid-block level of service.

**Table 3-3 Peak hour mid-block level of service**

Location	Base (2018) vehicles (each-way)	Additional vehicles (each-way)	Total Vehicles (each-way)	Level of Service
<b>AM peak hour</b>				
Goolma Road				
- Northbound	157	85	242	B
- Southbound	44	19	63	A
<i>Total</i>	<i>201</i>	<i>104</i>	<i>305</i>	
<b>PM peak</b>				
Goolma Road				
- Northbound	66	19	85	A
- Southbound	135	85	220	B
<i>Total</i>	<i>201</i>	<i>104</i>	<i>305</i>	

The above review shows that the mid-block level of service is good. However, it is recommended that the existing road environment pavement conditions be reviewed within the proximity of the site and access configuration.

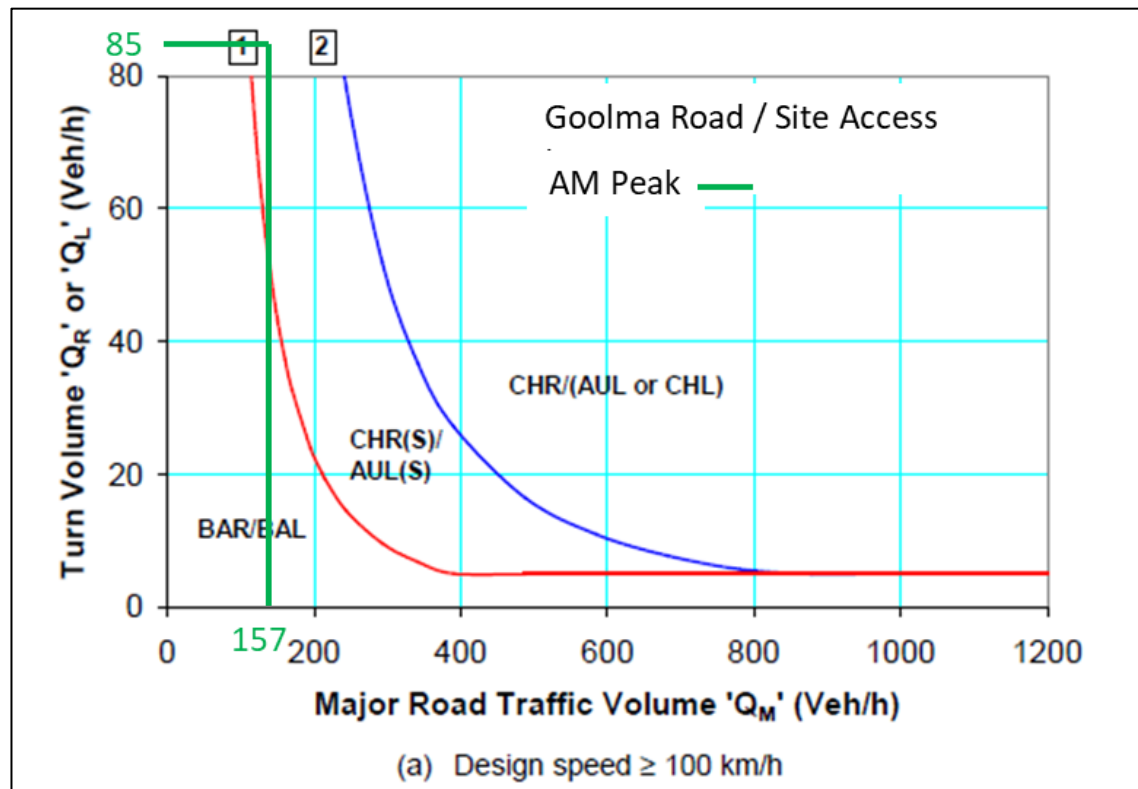
### 3.4 Intersection treatment

#### 3.4.1 Turn treatment

The *Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* provides warrants that apply to major road turn treatments with respect to the provision of basic, auxiliary and channelised lanes along the major road. For the purpose of this assessment, the graph for a speed of higher than or equal to 100 km/h has been applied.

A review was undertaken at the intersection of Goolma Road and the proposed site access as shown in Figure 3-3. This was established on the base 2018 traffic survey and the construction traffic volumes, notably for the left turn movement from the major road (considered as the worst turn movement) as vehicles will be arriving from the south during the AM period. Vehicles

exiting the site (primarily in the PM period) will exit via the access road (minor road) and will be required to give way to through travelling vehicles along Goolma Road. Any such queuing that may result, will be within the site and any proposed intersection upgrade is to ensure suitable visibility is maintained from the site, refer to section 3.4.2.



**Figure 3-3 Intersection left turn treatment review**

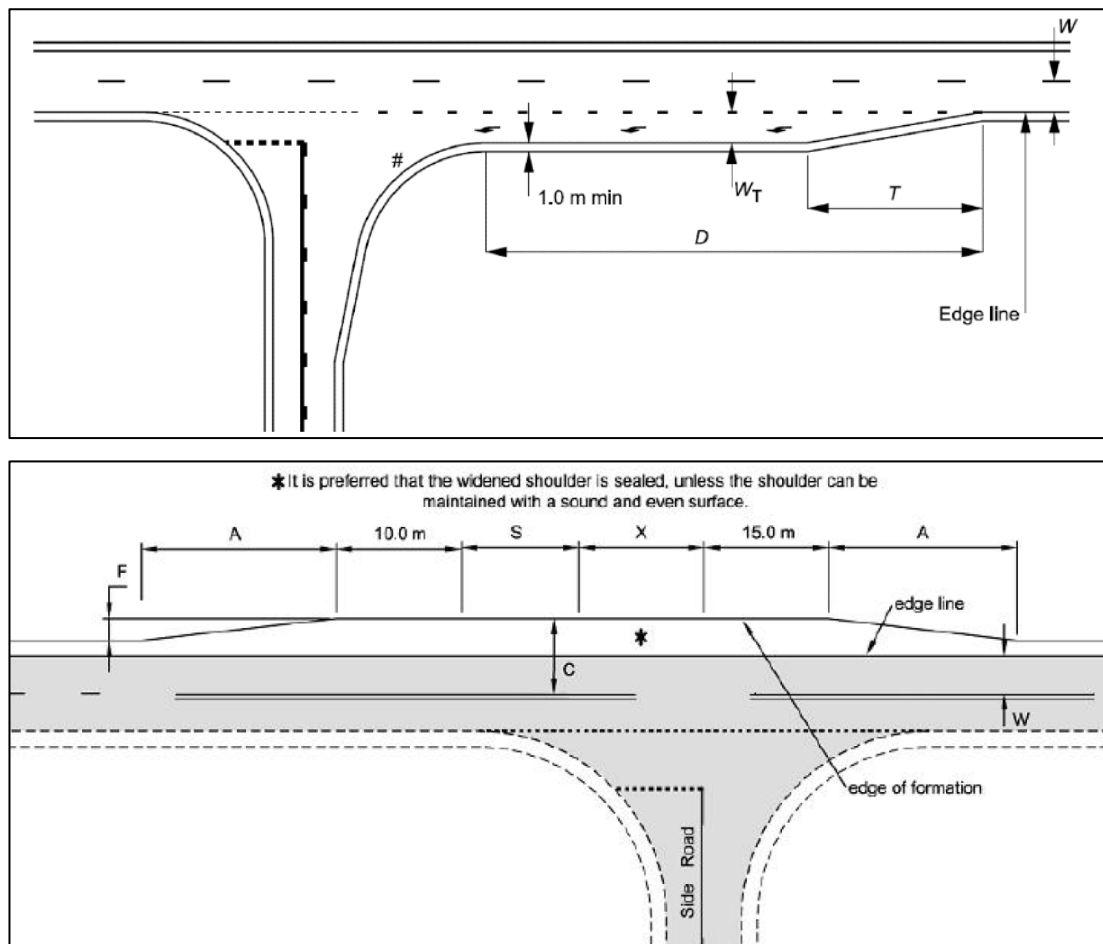
Source: Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections – modified by GHD -

Based on the warrants, it is supposed that consideration could be given to the provision of a short auxiliary left turn lane (AUL(S)) from Goolma Road into the site. Although it is anticipated that all vehicles will be travelling to and from the south, incorporating shoulder widening on the eastern verge (i.e. BAR type treatment), would facilitate improved safety for southbound movement as well as facilitating the turn path of larger vehicles exiting the site, if required.

In conjunction with the AUL(S)/BAR treatment, it is recommended to advise travelling motorists of the potential increase in turning movements at the site access. This may incorporate truck-turning advance warning signs provided on both the northern and southern approaches to the intersection.

Currently, the site access intersection does not provide the AUL(S)/BAR treatment, with no shoulder or road widening provided on the major road. It is considered that Goolma Road, at the site access, be constructed in line with an AUL(S)/BAR treatment as shown in Figure 3-4. This is to include an auxiliary lane and shoulder widening on the western and eastern road alignment, respectively.

The treatments should be designed to accommodate articulated vehicles up to 19 m in length (anticipated typical maximum vehicle length). Larger vehicles will require special permit and traffic management when required.



**Figure 3-4 AUL(S)/BAL turn treatments**

Source: Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections -

### 3.4.2 Sight lines

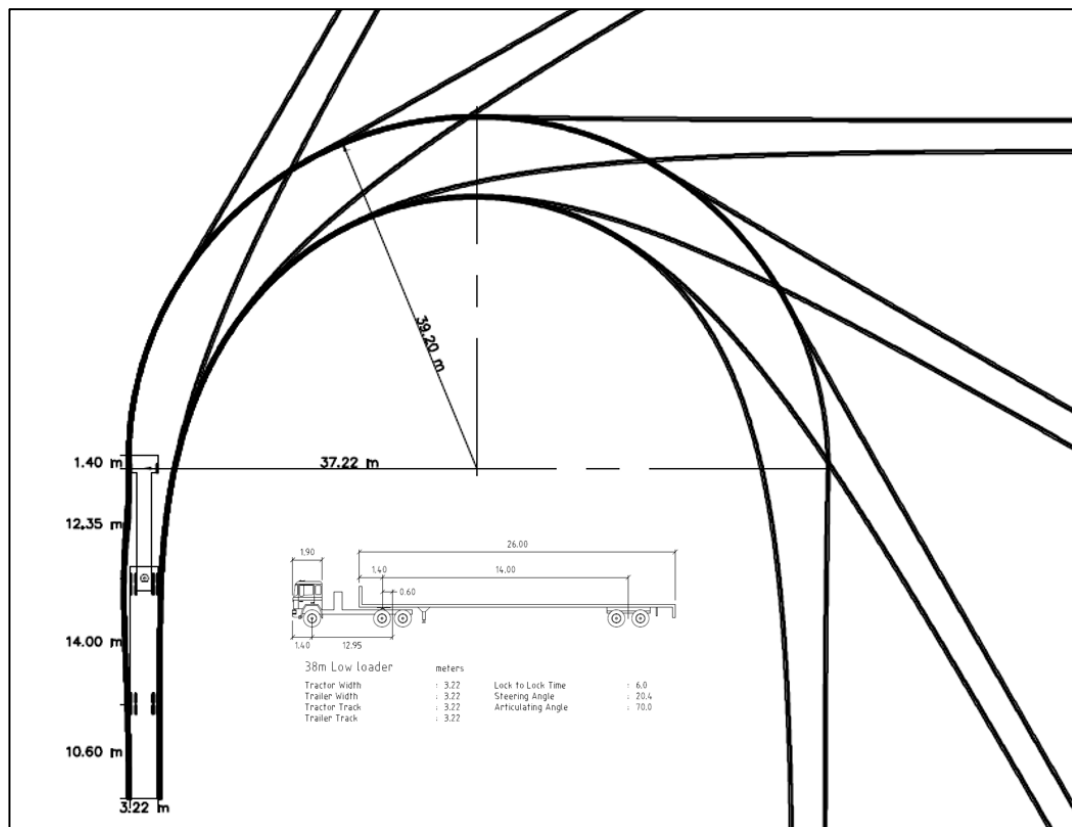
The Austroads *Guide to Road Design Part 3: Geometric Design* (Table 5.5: Truck stopping sight distances) specifies that (accounting for a reaction time of two seconds) for roads with an operating speed of 100 km/h, a minimum sight distance of 191 metres should be provided. A desktop review using Google imagery indicates that these sight lines can be achieved. This would be subject to further assessment when developing a concept and detailed intersection plan and review of current on-site conditions (e.g. vegetation growth).

### 3.5 Oversize vehicles

The number of oversize vehicles is anticipated to be low for the construction of the WNSF. Oversize vehicles will require permits from Transport for NSW and suitable traffic management subject to the transportation of the type of oversized vehicles that will need to be used. Oversize vehicle routes are to be carried out where possible on designated heavy vehicle routes or routes approved by Transport for NSW. It is proposed that such routes will be via the Golden Highway (north of the site) or the Mitchel Highway (south of the site), Goolma Road and the site access.

Additionally, oversize traffic movements should be carried out, where possible, outside peak road network periods where possible minimising the impacts on the road network.

An example of the potential oversize vehicle that would be required to transport the transformers is a flatbed trailer as shown in Figure 3-5. The vehicle type and size is to be coordinated to be suitable for transportation of the plant and agreed with the governing authority.



**Figure 3-5 Oversized vehicle example**

Source: AutoTurn computer aided program

### 3.6 Cumulative construction traffic impacts

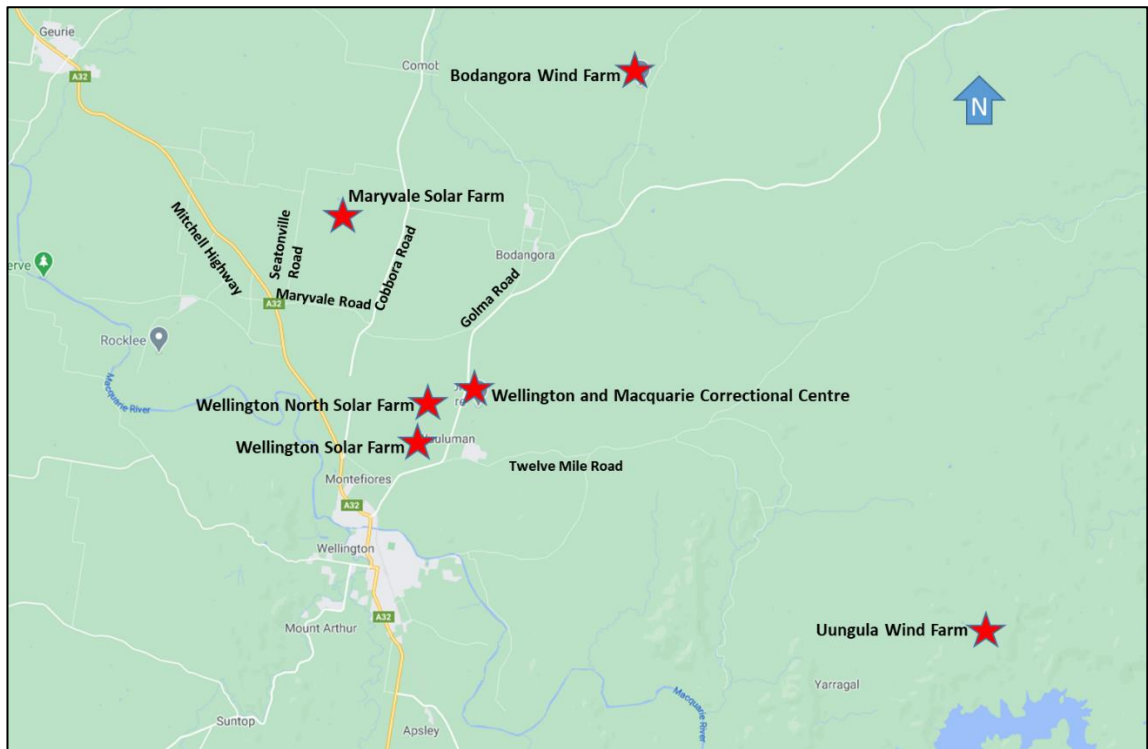
During the 2018 base traffic surveys, the following projects were either in operation, construction or planned for construction within the proximity of the WNSF.

- Bodangora Wind Farm.
- Macquarie and Wellington Correctional Centres.
- Maryvale and Wellington Solar Farms.

The traffic surveys volumes on the adjoining road network to the WNSF carried out in February/March 2018 would have included the operation and construction of the existing Macquarie and Wellington Correctional Centres and the construction activity of the Bodangora Wind Farm. Since the completion of these traffic surveys, Macquarie and Wellington Correctional Centres remains in operational and Bodangora Wind Farm has been completed. Bodangora Wind Farm operational traffic impacts would be lighter than construction traffic impacts as outlined in the NSW Bodangora Wind Farm Bodangora, Central Western NSW (MP 10\_0157) Director-General's Environmental Assessment Report by NSW Government Planning and Infrastructure, dated June 2013e, therefore the 2018 survey is represent a higher than typical traffic volume along Goolma Road.

During the construction of the WNSF, the Wellington Solar Farm is anticipated to be completed, with Maryvale Solar Farm and the recently submitted Uungula Wind Farm due for construction which are anticipated to commence construction is late 2021. Such construction of these facilities could coincide with the WNSF construction activities.

Locations of the existing and future facilities within proximity of the WNSF is shown in Figure 3-6.



**Figure 3-6 Existing and future facilities within proximity of Wellington North Solar Farm**

Source: Google Maps – Modified by GHD

A summary of the traffic impacts associated with the construction activity of the facilities that may occur concurrently with WNSF is summarised below.

#### **Maryvale Solar Farm**

Source: Maryvale Solar Farm Environmental Impact Statement prepared by Pitt & Sherry Pty Ltd dated 12 November 2018.

- Access routes within vicinity of the WNSF site include:
  - Mitchell Highway from Dubbo to Wellington.
  - Cobbora Road and Maryvale Road.
  - Maryvale Solar Farm site Access off Seatonville Road.
- Period of construction: 12 months.
- Staff numbers: Up to 150 personnel.
- Estimated typical vehicle movements:
  - Light vehicles: 75 vehicle movements per day.
  - Heavy vehicles: 20 vehicle movements per day.
  - Use of a shuttle bus for workers to travel to and from site.

It is noted that construction vehicle activity is to utilise Cobbora Road to access the site. The WNSF proposes to use Goolma Road, therefore it is anticipated that there will be no cumulative impacts on the local road network associated with these two sites.

However, it is noted that the construction activity for Maryvale Solar Farm and the proposed WNSF both utilise the Mitchell Highway as a common route to access each proposed development. The Mitchell Highway is a state-designated road which has the capacity to cater for regional and state traffic flow. It is considered that the cumulative impact from both proposed

development's construction activity will have a minimal adverse impact on the network efficiency of the state road network. This assumption is supported by the Department of Planning Environment Maryvale Solar Farm State Significant Development Assessment (SSD 8777) report dated December 2019, which outlines:

*“Other than the Wellington North Solar Farm, no other approved or proposed project in the Wellington area shares a common haulage route, except for sections of Mitchell Highway, which is part of the State road network and has sufficient capacity to absorb the associated construction traffic. For this reason, the Department considers that there would be negligible cumulative traffic impacts on the State road network and no road upgrades would be required in relation to cumulative traffic volumes.”*

### **Uungula Wind Farm**

Source: Uungula Wind Farm Transport Assessment prepared by Samsa Consulting dated April 2020.

- Access routes within vicinity of the WNSF site include:
  - From Golden Highway along Saxa Road (also known as Cobbora Road to Mitchell Highway.
  - Mitchell Highway to Goolma Road.
  - Goolma Road to Twelve Mile Road.
  - Twelve Mile Road to the Uungula Wind Farm site.
- Period of construction: 24 to 30 months.
- Staff numbers: Up to 250 personnel.
- Estimated typical vehicle movements (Goolma Road):
  - Light vehicles: 240 vehicle movements per day (120 vehicles during peak hour).
  - Heavy vehicles: 90 vehicle movements per day (16 vehicles during peak hour).
  - Oversize/Overmass (OSOM) vehicles: Low volume and only on demand at specific times when required.
  - Possible use of a shuttle bus for workers to travel to and from site.

It is noted that the construction activity for Uungula Wind Farm and the proposed WNSF both utilise Goolma Road for a section between the Mitchell Highway and Twelve Mile Road.

A summary of the cumulative traffic impact on Goolma Road between the Mitchell Highway and Twelve Mile Road is outlined in Table 3-4 and is also compared to the mid-block level of service as defined in Table 3-2.

**Table 3-4 Goolma Road cumulative peak hour mid-block level of service**

Location	Base (2018) vehicles (each-way) *	Additional vehicles (each-way) WNSF	Additional vehicles (each-way) Uungula Wind Farm ^	Total Vehicles (each-way)	Level of Service
<b>AM peak hour</b>					
Goolma Road					
- Northbound	157	85	136	378	B
- Southbound	44	19	0	63	A
<i>Total</i>	<i>201</i>	<i>104</i>	<i>136</i>	<i>441</i>	
<b>PM peak</b>					
Goolma Road					
- Northbound	66	19	0	85	A
- Southbound	135	85	136	356	B
<i>Total</i>	<i>201</i>	<i>104</i>	<i>136</i>	<i>441</i>	

Notes:

(\*) The 2018 traffic survey data which is located north of Twelve Mile Road. It is noted that Twelve Mile Road is a low volume road, it is therefore considered that the 2018 survey data can be representative of potential traffic volumes on Goolma Road south of Twelve Mile Road.

(^\*) Assumes all the Uungula Wind Farm peak hour traffic volumes from the Samsa Consulting Transport Assessment are inbound from Wellington in the AM peak and outbound to Wellington the PM peak.

Based upon the mid-block assessment of the road network and of the project traffic generation and the WNSF and cumulative impacts associated with Uungula Wind Farm, the major road network (Goolma Road) has additional capacity to cater for additional traffic flow.

With reference to the intersection of Goolma Road and Twelve Mile Road, the Uungula Wind Farm Transport Assessment prepared by Samsa Consulting outlined that:

*“Under current traffic volumes, the current Goolma Road / Twelve Mile Road intersection layout (BAR: basic right-turn / BAL: basic left-turn) is considered to be adequate. Sight distance is more than satisfactory in all directions and the T-junction is quite wide with separate turn areas for east and west movements.*

*During Project construction, the increased traffic generation and in particular, the higher turning movements at the subject intersection may warrant auxiliary and/or protected (channelised) turn lane intersection treatments, eg. AUR: auxiliary right-turn / AUL: auxiliary left-turn or CHR: channelised right-turn / CHL: channelised left-turn”*

It should be noted that the WNSF does not contribute to the higher turn movements within the intersection, with vehicles associated with WNSF travelling along the major road (Goolma Road) straight through the intersection.

### 3.7 Operational phase traffic movements

It is considered that the traffic generated during operation will consist of minor traffic movements in association with the maintenance of the WNSF. Although no specific details of on-site vehicle movements have been provided by the client, it is anticipated that traffic movement required during maintenance and monitoring of the WNSF would be less than construction traffic. Therefore, the road network would continue to operate satisfactorily post-construction, subject to the recommendations outlined in the construction traffic generation assessment being carried out.

### **3.8 Decommissioning phase traffic movements**

If the WNSF is decommissioned by the client in the future, it is considered that the traffic generated during decommissioning will consist of less daily vehicular movements than the construction of the WNSF. Therefore, the road network would continue to operate satisfactorily during the demolition phase, subject to a future review of demolition impacts and implementation of a suitable construction traffic management plan.

## 4. Parking provision

The internal access and parking arrangement for the proposal are currently unknown at this stage of the application and therefore have not been assessed as part of this traffic study. However, the following outlines the items for consideration during the development the site arrangement and associated parking.

### 4.1 Parking provision

Neither the Dubbo Regional Council DCP nor Roads and Maritime Services Guide to Traffic Generating Developments outline recommended parking provisions for solar farm developments. Therefore, the parking required should be based on a first principles approach dependent upon site personnel required, to carry out the construction works and ongoing maintenance required post-construction.

Given the rural nature of the site, it should be assumed that all site personnel during the operational phase will arrive by private vehicle on an individual basis, with the parking provision to be accommodated on-site near the main administration/office/maintenance area.

Construction parking should be allocated within close proximity to the site office, suitable to accommodate the estimate peak light vehicles (minimum of approximately 60 to 70 vehicles based upon the information provided) on-site and the number of shuttle buses utilised.

### 4.2 Parking layout

In line with *AS2890.1 – Off Street Car Parking*, the parking area should be designed to accommodate the specific design vehicle. For light vehicles, the parking space dimensions and associated aisle widths for a Class 2 (generally medium-term parking) facility classification are presented in AS2890.1 include:

- Spaces: 2.5 m x 5.4 m
- Aisle Width: 5.8 m

Additionally, allowance should be made to accommodate larger design vehicles such as a truck, should it be required for the use of maintenance vehicles.

## 5. Mitigation measures

### 5.1 Construction activity traffic management

#### 5.1.1 Construction traffic management objective

A Construction Traffic Management Plan (CTMP) will need to be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity of the site and the following are the primary objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network.
- To provide continuous, safe and efficient movement of traffic for both the general public and construction workers.
- Installation of appropriate advance warning signs to inform users of the changed traffic condition.
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site.
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site.
- Establishment of a safe pedestrian environment in the vicinity of the site.

#### 5.1.2 Traffic management

Public access to the site is to be maintained on the surrounding road network. Vehicles will be permitted to travel past the worksite with traffic signage in accordance with a Traffic Control Plan (TCP) to be developed in accordance with *RMS Traffic Control at Works Sites and AS1742.3 – Traffic Control for Works on Roads*. This is to advise motorists of changes in the road network or vehicle movements to/from the site including “Truck turning” activity.

It is not anticipated to implement road closures within the public road network as part of the construction activity.

Traffic Control Plans will need to be developed as part of the CTMP prior to commencing of construction activity on the site.

#### 5.1.3 Traffic activity and parking provisions

It is anticipated that access and egress for site personnel may occur during the AM and PM peak hour periods of the surrounding road network. For a worst-case perspective, the intersection and mid-block review has been based on peak hour traffic volumes.

Encouraging carpooling between workers will decrease traffic activity and parking demand in conjunction with the shuttle bus system proposed.

Parking for construction personnel is to be accommodated within the site. The area is to be allocated to accommodate the peak site personnel. Parking within the public road network should not be permitted. Details of the proposed parking were not available at the time of this assessment, however, given the large greenfield site, it is anticipated adequate parking area can be provided to facilitate the parking of workers and visitors to the site.

#### **5.1.4 Pedestrian and cycle management**

Site access is to be restricted to authorised personnel only and existing employees on site. Pedestrian and cycle access to and around the site is to be maintained at all times. It is anticipated the pedestrian and cycle activity in public areas surrounding the site will be low due to the rural nature of the surrounding properties and no formalised pedestrian facilities.

Within the site, pedestrian travel paths are to be maintained to key areas such as building entrances and be free from trip hazards.

#### **5.1.5 Road hazards**

The CTMP should identify specific road hazards associated with the area, including but not limited to:

- fog and frost
- wet weather
- heat
- wildlife
- school and local bus routes
- coordination with other development construction activity (i.e. Ungulu Wind Farm and Maryvale Solar Farm)

### **5.2 Road improvements**

#### **5.2.1 Intersection treatments**

The following intersections treatments are recommended:

- The intersection of Goolma Road and site access be upgraded to provide a short Auxiliary Left turn lane AUL(S) northbound and a Basic Right turn lane (BAR) southbound.
- Intersection treatment should be designed to accommodate articulated vehicles of 19 m in length. Note: larger vehicles will require permits and traffic management.

## 6. Summary and recommendations

### 6.1 Traffic impact

The construction of the project is estimated to generate at peak periods 267 two-way movements daily and up to 104 two-way movements during the peak hour during the peak construction period, with the predominate traffic flow associated with the access and egress for workers to and from the site daily. This is minimised by implementation of a shuttle bus system and car-pooling. It is estimated that the operational phase traffic generation would be much less than the peak construction period.

The construction, operational and decommissioning traffic generation can be accommodated within the existing road network within the vicinity of the site subject to the recommended intersection treatment at the site access on Goolma Road outlined in the mitigation measures.

Based upon the mid-block assessment of the road network and of the project traffic generation and the WNSF, the background traffic along the major road network has additional capacity to cater for additional traffic flow as a result of surrounding projects or fluctuations in traffic volumes.

### 6.2 Parking

The internal access and parking arrangement for the proposal are currently unknown at this stage of the application and therefore have not been assessed as part of this traffic study, however the following outlines the items for considerations during the development the site arrangement and parking.

- Parking provision to be provided on a first principles approach, with parking provided within the site boundary assuming all personnel post construction will travel individually by private vehicles to the site.
- Recommended parking dimensions:
  - Spaces: 2.5 m x 5.4 m
  - Aisle Width: 5.8 m
- Additional allowance should be made to accommodate larger design vehicles such as a truck, should it be required for the use of maintenance vehicles.
- Construction parking to be provided within the site suitable to accommodate peak light vehicles provision, shuttle bus parking and heavy vehicle waiting areas.
- Given the greenfield site, it is assumed such provisions can be accommodated within the site boundary.

### 6.3 Mitigation measures

#### 6.3.1 Construction traffic management plan

A Construction Traffic Management Plan (CTMP) will need to be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity site. The plan can include such items as:

- Vehicle approach routes.
- Traffic management and traffic control plans.
- Workers transportation (shuttle bus and car pooling).

- Pedestrian management.
- Oversize vehicle permit requirements.
- Road hazards (including fog, wet weather, frost, wildlife etc.).
- Cumulative impacts from nearby development proposals.

The CTMP will be developed in consultation with Dubbo Regional Council and Roads and Maritime Services.

### **6.3.2 Road improvements**

The following road improvements are recommended to facilitate construction and post-construction traffic movements:

- The intersection of Goolma Road and site access be upgraded to provide a short Auxiliary Left turn lane AUL(S) northbound and a Basic Right turn lane (BAR) southbound.
- Intersection treatment should be designed to accommodate articulated vehicles of 19 m in length. Note: larger vehicles will require permits and traffic management.

## **6.4 Conclusion**

Based on the investigations undertaken by GHD, the proposed WNSF development does not have an adverse impact on the road system subject to the recommended mitigation measures being applied.



GHD

Level 15

133 Castlereagh Street

T: 61 2 9239 7100 F: 61 2 9239 7199 E: sydmail@ghd.com

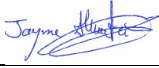
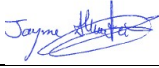
© GHD 2020

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

12538291-26903-

4/[https://projectsportal.ghd.com/sites/pp15\\_01/wellingtonnorthsolar/ProjectDocs/12538291-REP\\_Traffic Impact Assessment\\_Wellington North Solar Plant.docx](https://projectsportal.ghd.com/sites/pp15_01/wellingtonnorthsolar/ProjectDocs/12538291-REP_Traffic Impact Assessment_Wellington North Solar Plant.docx)

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Rev 0	S. Clarke	J. Akstein		J. Akstein		30/10/20

[www.ghd.com](http://www.ghd.com)

