

Green Gold Energy Pty Ltd

Solar Farm and Battery Energy Storage System 1000 Burkes Creek Road, The Rock

Traffic Impact Assessment

Reference: 305342-00

Final | 15 October 2024



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Contents

1.	Introduction	1
1.1	Purpose of this report	1
1.2	Site location	1
2.	Existing transport conditions	3
2.1	Existing road network	3
2.2	Public transport	4
2.3	Active transport	4
2.4	Crash history	4
3.	The proposal	5
3.1	Overview	5
3.2	Construction	5
3.3	Access arrangements	6
3.4	Parking	6
4.	Traffic impact assessment	7
4.1	Traffic generation	7
4.2	Impacts on parking	7
4.3	Impacts on the public transport network	7
4.4	Impacts on the active transport	7
4.5	Sight distance	7
4.6	Turn provisions	11
5.	Conclusion	12
5.1	Site location	12
5.2	Development proposal	12
5.3	Summary of findings	12

Tables

Table 1: Details of crashes	4
Table 2: SISD parameters for trucks	9

Figures

Figure 1: Site location	2
Figure 2: Existing road network	3
Figure 3: Crash history 2018-2022 (Source: TfNSW)	4
Figure 4: Site layout of the proposal	5
Figure 5: Proposed construction and operational vehicle access route	6
Figure 6: Concept of safe intersection sight distance (Source: Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections)	8
Figure 7: Safe intersection sight distance calculation (Source: <i>Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections</i>)	8

Figure 8: Typical traffic movements (Source: <i>Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections</i>)	9
Figure 9: MGSD requirement (Source: <i>Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections</i>)	10
Figure 10: Warrants for turn treatments on the major road at unsignalised intersections (Source: <i>Austroads Guide to Road Design - Part 4: Intersections and Crossings</i>)	11

1. Introduction

1.1 Purpose of this report

This Traffic Impact Assessment (TIA) report has been prepared on behalf of Green Gold Energy Pty Ltd (GGE) to support a Development Application (DA) for a renewable energy project submitted to Wagga Wagga City Council.

The proposal is for a renewable energy project at 1000 Burkes Creek Road, The Rock 2655 (Lot 107, DP754563). The proposal encompasses a 6.3 MW (megawatt) electricity generating facility, including solar arrays, an 11 MWh Battery Energy Storage System (BESS), and associated infrastructure. Occupying approximately 15 hectares in the north-west corner of the property, the facility aims to supply 6.3 MW of electricity to the local distribution network while preserving the remainder of the land for ongoing agricultural use.

This report provides an outline of the existing transport conditions, a summary of the proposal including parking and access arrangements, an assessment of traffic and transport impacts during the construction and operational phases and mitigation measures (if required).

1.2 Site location

The site is located at the north-western portion of the existing farming property at 1000 Burkes Creek Road, The Rock, NSW 2655, approximately 6 km northeast of The Rock township within the Wagga Wagga City Council area.

GGE has agreed to terms with the current farmer to lease the north-western portion of the property to develop it for a solar farm and BESS for a period of approximately 30 years. The remainder of the lot will continue to be used in accordance with the existing rural uses and will be managed seasonally in accordance with the ongoing agricultural use of the farm.

The proposal site is bounded by Burkes Creek Road to the west, which serves as the primary access to the site. It is surrounded by other farming properties with similar characteristics of minimal vegetation and agricultural infrastructure. There are no immediately visible large-scale industrial or commercial developments in the vicinity. The overall character of the surrounding area is distinctly rural, with a focus on agricultural production and minimal residential development, typical of farming zones in the region.

The location of the site is shown in Figure 1 below.



Figure 1: Site location

2. Existing transport conditions

2.1 Existing road network

The site is accessed by Burkes Creek Road along the western boundary of the site as shown in Figure 2. The key roads surrounding the site are summarised below.

- **Burkes Creek Road** is a single carriageway two-lane, two-way unsealed rural road running between Olympic Highway to the north and Burkes Creek to the south. It forms the western boundary of the site, providing access and separating it from adjacent agricultural lands. Traffic volumes are likely low given the surrounding rural and agricultural land uses. As a rural road with no posted speed limit, the speed limit of Burkes Creek Road is 100km/h.
- **Olympic Highway** is a single carriageway two-lane, two-way arterial road linking The Rock and Wagga Wagga. It services rural communities and links the Hume Highway (M31) with the Sturt Highway (A20). The posted speed limited along Olympic Highway is 100km/h.
- **Byrnes Road** is a single carriageway two-lane, two-way sealed rural road that runs between Burkes Creek Road to the west and Pearson School Lane to the east. It forms the southern boundary of the lot.

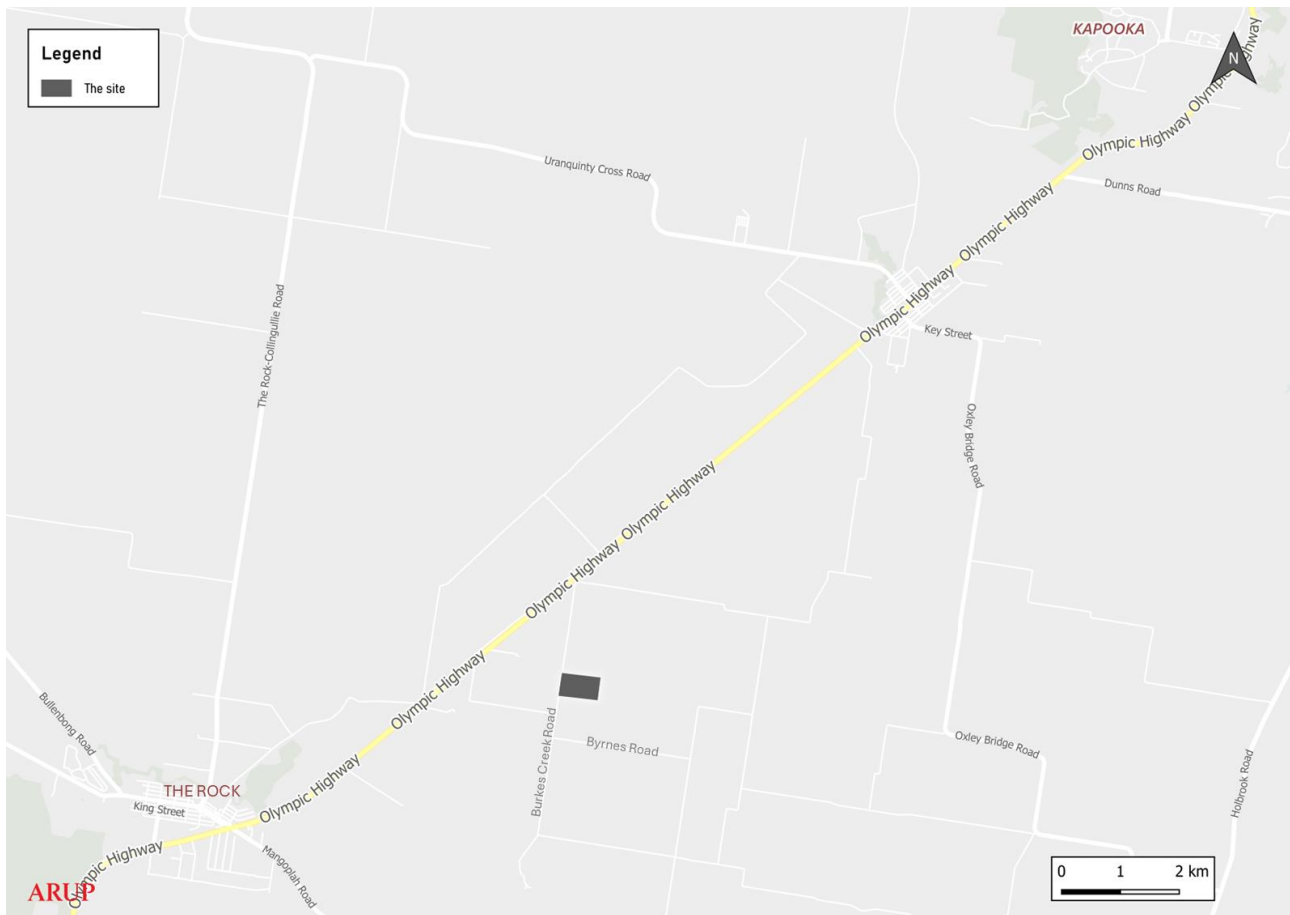


Figure 2: Existing road network

2.2 Public transport

Limited public transport infrastructure is provided near the site. There is currently only one school bus route S123 operated by Busabout running between The Rock and Wagga Wagga High School via Olympic Highway.

2.3 Active transport

Active travel infrastructure surrounding the site is limited. There are no cycling paths and footpaths along Olympic Highway and Burkes Creek Road near the site.

2.4 Crash history

The latest 5-year TfNSW crash data between 2018-2022 for the area surrounding the site is presented in Figure 3. During this period, four crashes were recorded, including one fatal head-on collision on the Olympic Highway in 2021. The remaining crashes resulted in serious and moderate injuries. Notably, all incidents were confined to the Olympic Highway, with no crashes recorded near the site on Burkes Creek Road. The details of the four crashes are presented in Table 1.

Table 1: Details of crashes

Crash ID	Degree of crash	Crash type
1304488	Moderate	Left off carriageway into object
1265348	Fatal	Head on
1289752	Serious	Right off carriageway into object
1230169	Serious	Out of control on carriageway

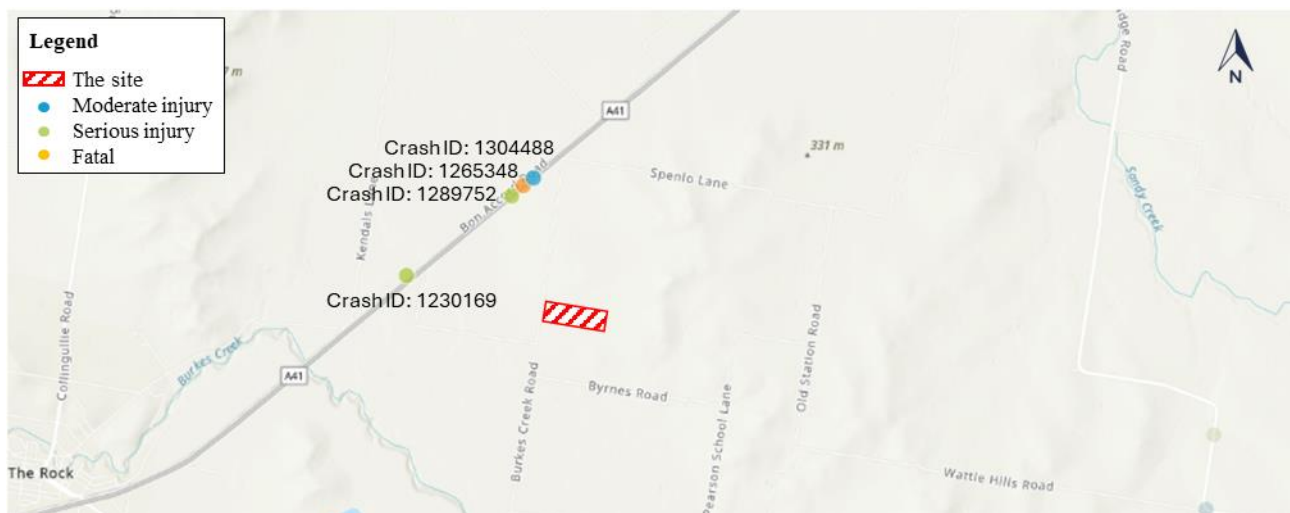


Figure 3: Crash history 2018-2022 (Source: TfNSW)

3. The proposal

3.1 Overview

The proposal aims to develop a 15-hectare portion of the subject land for a solar renewable energy facility with a capacity of up to 6.3 MW. The development will comprise 10,692 solar photovoltaic panels mounted on single-axis trackers, along with a 4-module BESS with 11MWh capacity.

Site infrastructure development involves the construction of internal roads and a parking area to accommodate 20 car parking spaces, which would be used by light and heavy vehicles during the construction and operational phases. The layout of the proposal is shown in Figure 4.

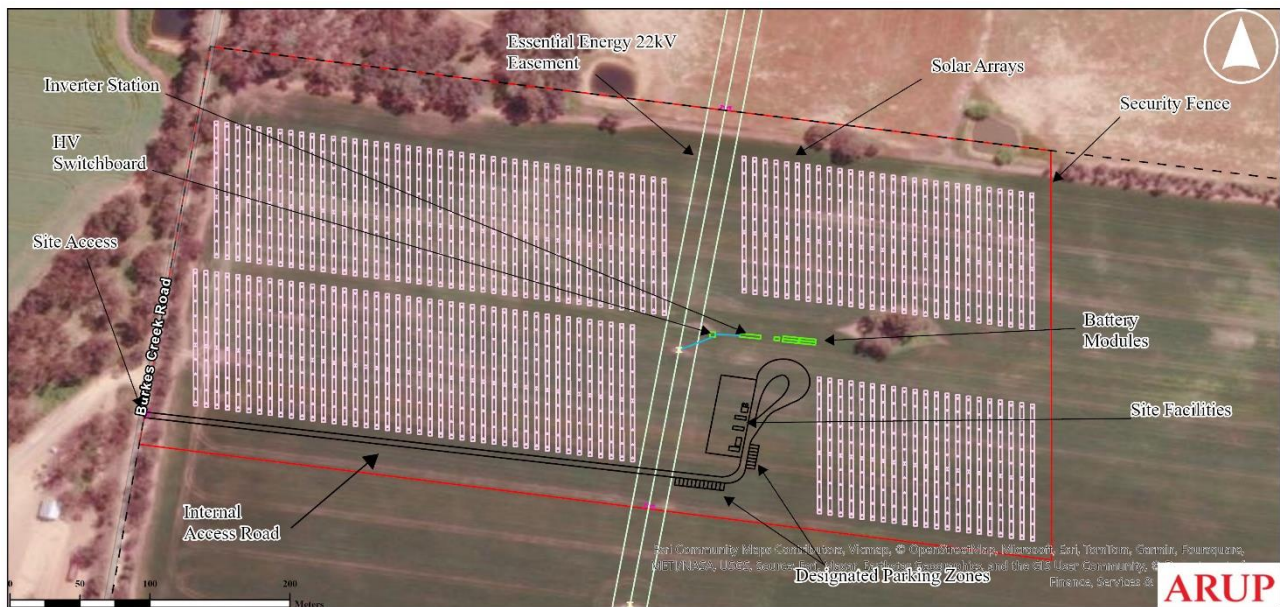


Figure 4: Site layout of the proposal

3.2 Construction

Construction activities are scheduled to commence in 2026, continuing for 6 to 12 months, followed by an operational phase of up to 30 years. After this period, the facility will either continue operations or undergo decommissioning with removal of all components. Construction is proposed to be undertaken as per the following stages:

- **Stage 1 (Civil):** focuses on civil works, including land preparation, road construction, drainage installation, and site establishment.
- **Stage 2 (Mechanical):** involves mechanical works such as foundation piling and installation of solar arrays, trackers and battery modules.
- **Stage 3 (Electrical):** encompasses electrical works, from solar cabling and BESS to grid connection and system commissioning.

Component delivery, scheduled throughout the construction period, will utilise semi-trailer trucks carrying containerised materials. A maximum of three heavy vehicles are expected to access the site per day.

3.3 Access arrangements

Primary access to the solar facility will be via a new gate on Burkes Creek Road, located approximately 1.5km southeast of the Olympic Highway.

Within the site, approximately 600m of internal access tracks approximately 6m wide will be constructed. The main track will extend from the Burkes Creek Road entry to the solar arrays and BESS. These unsealed gravel tracks will support heavy vehicle traffic and allow all vehicles to enter and exit in a forward direction. These internal roads will facilitate both construction activities and ongoing maintenance operations.

An access driveway would be constructed according to the requirements stipulated in AS2890.1 and AS2890.2. The proposed vehicle access routes are shown in Figure 5.

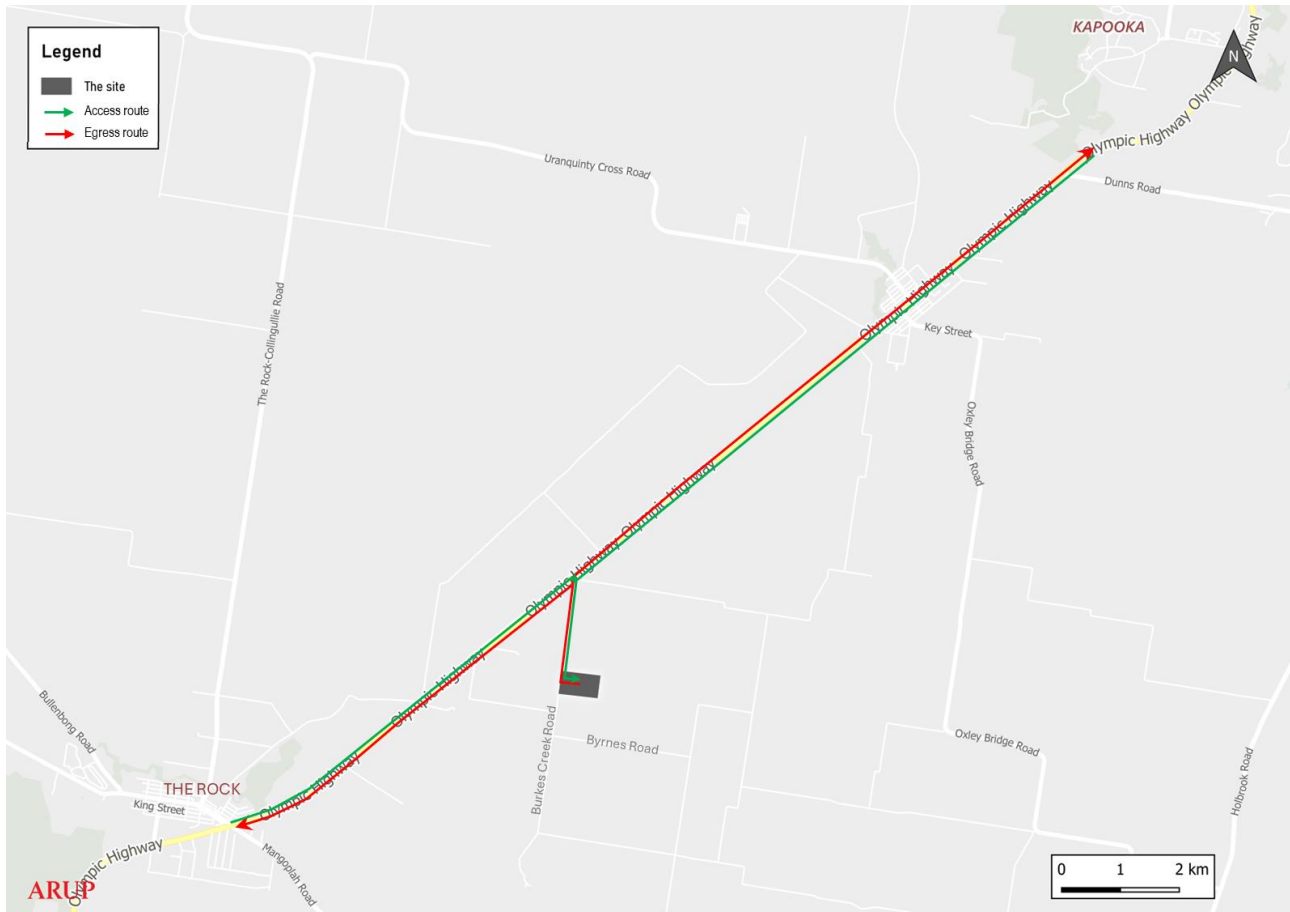


Figure 5: Proposed construction and operational vehicle access route

3.4 Parking

To minimise conflicts between the private vehicles of workers and any plant or machinery moving within the site, off-street parking for the workforce would be consolidated in one area.

A parking area would be provided on-site to accommodate 20 car parking spaces, which would be used by light and heavy vehicles during the construction and operational phases. Parking areas would be designed in accordance with AS2890.1 and AS2890.2.

4. Traffic impact assessment

4.1 Traffic generation

4.1.1 Construction phase

Typical construction would involve up to 20 workers on site at any one time. Workers are expected to commute to the site by car, resulting in up to 20 inbound movements during the morning peak hour and 20 outbound movements during the evening peak hour.

In addition, heavy vehicles would be utilised for transporting equipment and delivering installation materials. Heavy vehicle movements would be generated throughout the construction phase but not on a regular basis. During peak construction periods, up to three heavy vehicles would travel to the site per day resulting in an average of 1 inbound and 1 outbound movement per hour during the interpeak period.

Therefore, during construction, the site is expected to generate a peak of up to 20 light vehicle movements during the morning and evening peak hours. Due to the low traffic generation, the proposed site is expected have a negligible impact on surrounding road network performance (including Olympic Highway) during the construction phase.

4.1.2 Operational phase

During the operational phase, maintenance crew will visit the site several times a year. There will be no permanent staff on site. The vehicle movements associated with site operation will be significantly reduced compared to the construction phase.

Therefore, the proposed site is expected have a negligible impact on surrounding road network performance (including Olympic Highway) during the operational phase.

4.2 Impacts on parking

A parking area would be provided on-site to accommodate 20 car parking spaces, which would be used by light and heavy vehicles during the construction and operational phases.

Sufficient on-site parking for the workforce and construction vehicles would be provided to minimise the need for on-street parking on the surrounding road network. Therefore, minimal impacts to parking on surrounding roads are expected.

4.3 Impacts on the public transport network

Minimal impacts to school bus services are expected given the relatively low volumes of traffic being generated. Additionally, no disruptions to bus stop operations are anticipated.

4.4 Impacts on the active transport

No impacts to pedestrians or cyclists are expected given that footpath or cycleway closures are not proposed during the construction and operational phases.

4.5 Sight distance

4.5.1 Safe Intersection Sight Distance

Safe Intersection Sight Distance (SISD) is the minimum sight distance which should be available along the major road at any intersection. An evaluation of the available SISD was conducted at the proposed Burkes Creek Road / site access road intersection.

The SISD assessment was based on the provisions of *Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections* (AGRD4A). SISD was measured as indicated in Figure 6 for the Burkes Creek Road / site access road intersection.

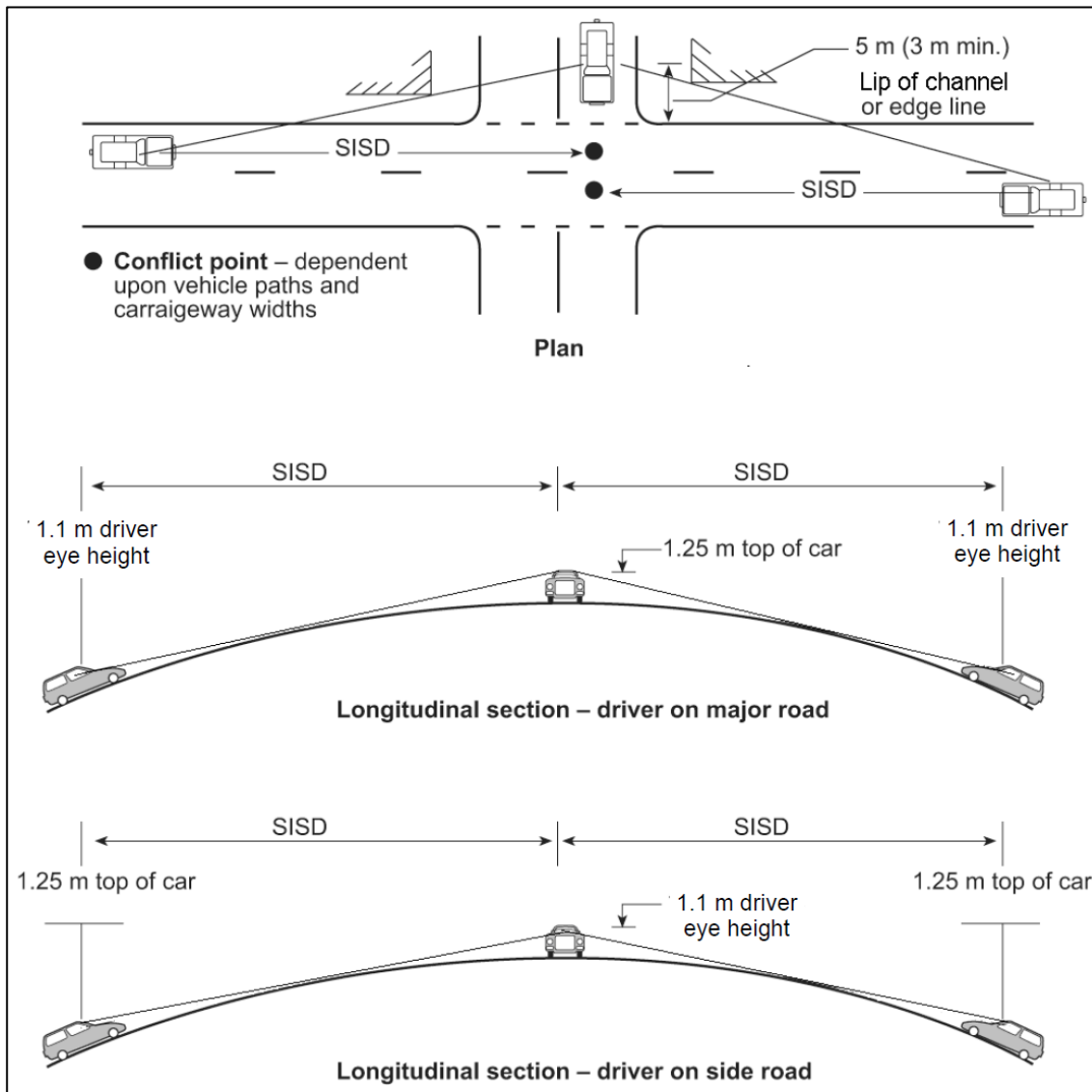


Figure 6: Concept of safe intersection sight distance (Source: Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections)

The required SISD was determined based on the following equation in Figure 7 with parameters indicated in Table 2.

$$SISD = \frac{D_T \times V}{3.6} + \frac{V^2}{254 \times (d + 0.01 \times a)}$$

where

SISD = safe intersection sight distance (m)

D_T = decision time (sec) = observation time (3 sec) + reaction time (sec) – refer to *AGRD Part 3* (Austroads 2016b) for a guide to values

V = operating (85th percentile) speed (km/h)

d = coefficient of deceleration – refer to Table 3.3 and *AGRD Part 3* for a guide to values

a = longitudinal grade in % (in direction of travel: positive for uphill grade, negative for downhill grade)

Figure 7: Safe intersection sight distance calculation (Source: Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections)

Table 2: SISD parameters for trucks

Parameter	Burkes Creek Road (South approach)	Burkes Creek Road (North approach)
Decision time (sec)	5.5 (high speed road with unaltered driving conditions)	5.5
Operating (85 th percentile) speed (km/h)	100	100
Coefficient of deceleration	0.29 (trucks)	0.29
Longitudinal grade (%)	0.6	-0.5
SSID required (m)	286	291

The minimum SISD required for trucks according to the AGRD4A is 286m and 291m for south and north approaches along Burkes Creek Road respectively. Therefore, the site access would be designed according to this SISD requirement.

4.5.2 Minimum Gap Sight Distance

Minimum gap sight distance (MGSD) is based on distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. The MGSD required for the driver of an entering vehicle is to see a vehicle in the conflicting stream to safely commence the desired manoeuvre. Typical traffic movements are illustrated in Figure 8 and the MGSD requirements from the AGRD4A are shown in Figure 9.

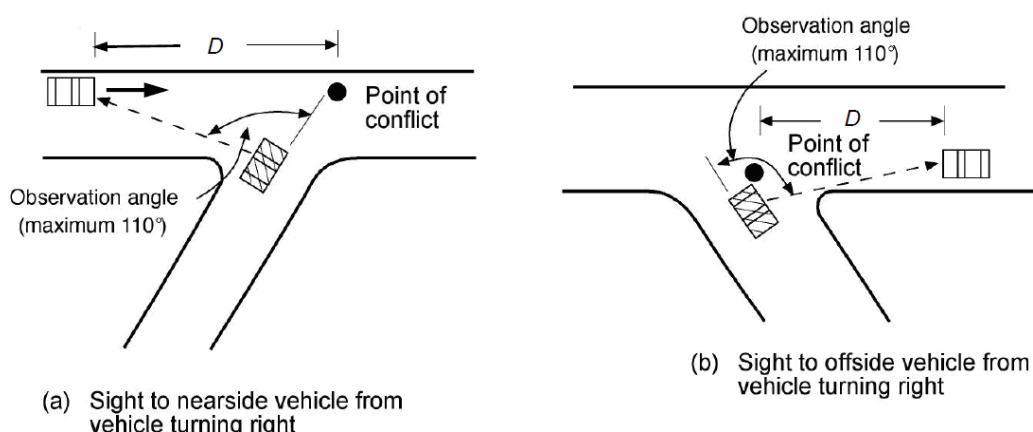


Figure 8: Typical traffic movements (Source: Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections)

Movement	Diagram	Description	$t_a^{(1)}$ (sec)	$t_r^{(2)}$ (sec)
Left turn		Not interfering with A Requiring A to slow	14–40 5	2–3 2–3
Crossing		Two lane/one way Three lane/one way Four lane/one way Two lane/two way Four lane/two way Six lane/two way	4 6 8 5 8 8	2 3 4 3 5 5
Right turn from major road		Across one lane Across two lanes Across three lanes	4 5 6	2 3 4
Right turn from minor road		Not interfering with A One way Two lane/two way Four lane/two way Six lane/two way	14–40 3 5 8 8	3 3 3 5 5
Merge		Acceleration lane	3	2

1 t_a = critical acceptance gap (sec).

2 t_r = follow-up headway (sec).

Note: For a description of the follow-up headway and its uses, refer to Guide to Traffic Management Part 3: Traffic Studies and Analysis (Austroads 2013e).

Critical gap acceptance time (t_a) (secs)	85 th percentile speed of approaching vehicle (km/h)										
	10	20	30	40	50	60	70	80	90	100	110
4	11	22	33	44	55	67	78	89	100	111	122
5	14	28	42	55	69	83	97	111	125	139	153
6	17	33	50	67	83	100	117	133	150	167	183
7	19	39	58	78	97	117	136	155	175	194	214
8	22	44	67	89	111	133	155	178	200	222	244
9	25	50	75	100	125	150	175	200	225	250	275
10	28	56	83	111	139	167	194	222	250	278	305

Figure 9: MGSD requirement (Source: Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections)

A minimum gap sight distance of 139m is required for both left and right turn movements to Burkes Creek Road. Therefore, the site access would be designed according to this MGSD requirement.

4.6 Turn provisions

A turn lane warrant assessment has been considered to determine the need of a basic (BA), auxiliary lane (AU) or channelised (CH) treatment at the site access according to Section A.8 of the *Austroads Guide to Road Design - Part 4: Intersections and Crossings* as shown in Figure 8.

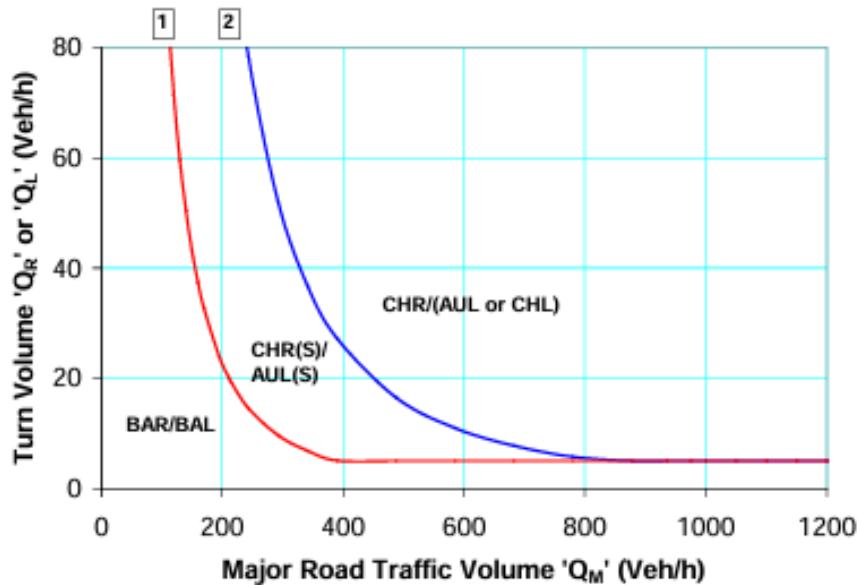


Figure 10: Warrants for turn treatments on the major road at unsignalised intersections (Source: *Austroads Guide to Road Design - Part 4: Intersections and Crossings*)

As discussed in Section 4.1, the peak volume of traffic turning in and out of the site is expected to be 20 light vehicles during construction. Given that traffic volumes at Burkes Creek Road are likely low given the surrounding rural and agricultural land uses, a basic left turn (BAL) treatment and basic right turn (BAR) treatment are expected to be sufficient for the site access during the construction and operational phases.

5. Conclusion

5.1 Site location

The site is located at the north-western portion of the existing farming property at 1000 Burkes Creek Road, The Rock, NSW 2655, approximately 6 km northeast of The Rock township within the Wagga Wagga City Council area. It is bounded by Burkes Creek Road to the west, which served as the primary access to the site. It is surrounded by other farming properties with similar characteristics of minimal vegetation and agricultural infrastructure with limited active and public transport facilities.

5.2 Development proposal

The proposal aims to develop a 15-hectare portion of the subject land for a solar renewable energy facility with a capacity of up to 6.3 MW. The development will comprise 10,692 solar photovoltaic panels mounted on single-axis trackers, along with a 4-module BESS with 11MWh capacity.

A parking area would be provided on-site to accommodate 20 car parking spaces, which would be used by light and heavy vehicles during the construction and operational phases to minimise the need for on-street parking on the surrounding road network. Parking areas would be designed in accordance with AS2890.1 and AS2890.2.

Construction activities are scheduled to commence in 2026, continuing for 6 to 12 months, followed by an operational phase of up to 30 years. After this period, the facility will either continue operations or undergo decommissioning with removal of all components.

5.3 Summary of findings

- During construction, the site is expected to generate a peak of up to 20 light vehicle movements during the morning and evening peak hours. In addition, up to three heavy vehicles would travel to the site per day, resulting in an average of 1 inbound and 1 outbound movement per hour during the interpeak period. Due to the low traffic generation, the proposal is expected have a negligible impact on surrounding road network performance (including Olympic Highway) during the construction phase.
- During operation, maintenance crew will visit the site several times a year. Therefore, the proposal is expected have a negligible impact on surrounding road network performance (including Olympic Highway) during the operational phase.
- Sufficient on-site parking for the workforce and construction vehicles would be provided to minimise the need for on-street parking on the surrounding road network. Therefore, minimal impacts to parking on surrounding roads are expected.
- Minimal impacts to school bus services are expected given the relatively low volumes of traffic being generated. Additionally, no disruptions to bus stop operations are anticipated.
- No impacts to pedestrians or cyclists are expected given that footpath or cycleway closures are not proposed during construction and operation.
- Desktop analysis of the SISD and MGSD has been conducted at the proposed Burkes Creek Road / site access road intersection. The minimum SISD required for trucks is 286m and 291m for south and north approach along Burkes Creek Road respectively. A minimum gap sight distance of 139m is required for both left and right turn movements to Burkes Creek Road. The site access road would be designed according to the SISD and MGSD requirements.
- Given that traffic volumes at Burkes Creek Road are likely low given the surrounding rural and agricultural land uses, a BAL treatment and BAR treatment are expected to be sufficient for the site access during the construction and operational phases.