Wollar Solar

Submissions Report

WOLLAR SOLAR FARM

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ngh environmental

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NGH Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622)

www.nghenvironmental.com.au e: ngh@nghenvironmental.com.au

Sydney Region
18/21 mary st
surry hills nsw 2010 (t 02 8202 8333)

Canberra - NSW SE & ACT
8/27 yallourn st (po box 62)
fyshwick act 2609 (t 02 6280 5053)

Brisbane
suite 4, level 5, 87 wickham terrace
spring hill qld 4000 (t 07 3129 7633)

Newcastle - Hunter and North Coast
2/54 hudson st
hamilton nsw 2303 (t 02 4929 2301)

Wagga Wagga - Riverina and Western NSW
suite 1, 39 fitzmaurice st (po box 5464)
wagga wagga nsw 2650 (t 02 6971 9696)

Bega - ACT and South East NSW
89-91 auckland st (po box 470)
bega nsw 2550 (t 02 6492 8333)

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TABLES

ACRONYMS AND ABBREVIATIONS

ACHA	Aboriginal Cultural Heritage Assessment
AEP	Annual Exceedance Probability
AFT	Artefact scatter
AHIMS	Aboriginal Heritage Information Management System
ARENA	Australian Renewable Energy Agency
BDAR	Biodiversity Development Assessment Report
BGW	White box- yellow box- Blakely's red gum grassy woodland and derived native grassland
Biosecurity Act	*Biosecurity Act 2015* (NSW)
CCP	Community Consultation Plan
CEC	Clean Energy Council
CEMP	Construction Environmental Management Plan
CHMP	Cultural Heritage Management Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cwth	Commonwealth
DEMP	Decommissioning Environmental Management Plan
DoEE	Department of the Environment and Energy (Commonwealth)
DP	Deposited Plan
DPIE	Department of Planning Industry and Environment, formally Department of Planning and Environment (DPE)
DPI	(NSW) Department of Primary Industries
DRG	(NSW) Division of Resources and Geoscience
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Field
EMP	Environmental Management Plan
EMS	Environmental Management Strategy
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPA	(NSW) Environment Protection Authority
EPL	Environment Protection Licence, issued under the POEO Act *(c.f.)*
ERP	Emergency Response Plan
FRNSW	(NSW) Fire and Rescue
FSS	Fire Safety Strategy
ha	hectares

HAZMAT	Hazardous Materials and Items
HIPAP	Hazardous Industry Planning Advisory Paper
GDG	Grinding Groove
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007* (NSW)
km	kilometres
LALC	Local Aboriginal Land Council
LEMC	Local Emergency Management Committee
LGA	Local Government Area
m	Metres
MNES	Matters of National environmental significance under the EPBC Act (*c.f.*)
MW	Megawatt
MWRC	Mid-Western Regional Council
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
OHS	Occupational Health and Safety
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
PV	Photovoltaic
RAPs	Registered Aboriginal Parties
RET	Renewable Energy Target
RFS	(NSW) Rural Fire Service
RMS	(NSW) Roads and Maritime Services, formerly Roads and Traffic Authority (RTA)
SEAR's	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy (NSW)
SES	State Emergency Services
SF	Solar Farm
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011 (NSW)*
SSD	State Significant Development
SWMP	Soil and Water Management Plan
TEC	Threatened Ecological Community
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
WMP	Waste Management Plan
WSD	Wollar Solar Development

1 INTRODUCTION

1.1 BACKGROUND

The proposed Wollar Solar Farm involves the construction, operation and decommissioning of a ground-mounted photovoltaic (PV) solar farm which would generate approximately 290 MW (AC) of renewable energy to be supplied directly to the national electricity grid. The Solar Farm would be located 7 km south of Wollar, within the Mid-Western Regional Local Government Area (LGA). The proponent is Wollar Solar Development Pty Ltd (WSD), a subsidiary of Solar Megawatt Holding Pty Ltd.

The proposal requires development consent under Part 4 of the *Environmental Planning and Assessment Act 1979 (NSW)* (EP&A Act). The proposal is State Significant Development (SSD) under the EP&A Act as it is development for the purpose of electricity generating works with a capital investment value of greater than $30 million (clause 20, Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011).*

An Environmental Impact Statement (EIS) for the proposal was prepared (NGH, 2019a) on behalf of the proponent and was submitted to NSW Department of Planning, Industry and Environment (DPIE); formerly Department of Planning and Environment (DPE). The EIS was placed on public exhibition from 10 April 2019 to 7 May 2019. During this period, any person was entitled to make submissions in relation to the proposal, including the local community, public authorities and other interested parties and stakeholders.

Key environmental issues investigated in the EIS, based on the requirements of the Secretary's Environmental Assessment Requirements (SEARs), included:

- biodiversity impacts;
- aboriginal heritage impacts;
- land and soil resources;
- compatibility of the proposal with existing land uses; and
- hydrology and flooding impacts.

These issues were assessed in the EIS, including via field assessment and specialists as required.

The Wollar Solar Farm proposal remains generally as detailed in Section 4 of the EIS (NGH, 2019a). However, a change has been made to the development footprint boundary to include an alternative access option (referred to as the "Southern Access Option 2") which is detailed and assessed separately in the Amendment Report (NGH, 2019d).

1.2 PURPOSE OF REPORT

NGH has prepared this Submissions Report on behalf of the proponent to respond to the submissions received in relation to the proposal. The key purpose of the Submissions Report is to:

1) Consider and respond to the issues raised by the public and public authorities, in response to the exhibition of the Wollar Solar Farm EIS.
2) Describe any changes to the proposal, since the exhibition of the EIS.
3) Outline any changes to the mitigation measures proposed to address points 1) and 2), as required.

Seven mitigation measures have been added or modified from those set out in the EIS and now form part of the updated environmental management commitments for the proposal. These include measures to address traffic and transport, road upgrades, accommodation, fire and safety risks, consultation and land use impacts. These changes are set out in Section 7 of this report. A full revised set of proposal commitments is now provided in Appendix A.

2 OBJECTIVES, BENEFITS AND JUSTIFICATION FOR THE PROPOSAL

2.1 PROPOSAL OBJECTIVES

The objectives of the Wollar Solar Farm proposal remain as they were described in the EIS. The proposal objectives are outlined below:

- Develop a profitable, commercial scale solar electricity generation proposal with on-site capability of energy storage to support the high voltage transmission network.
- Support efforts to mitigate the effect of climate change through the transition to renewable energy.
- Work collaboratively with key stakeholders to ensure all relevant requirements are considered in the location, design, construction and operation of the proposal.
- Provide local and regional employment opportunities and other social benefits during the construction and operation of the facility.

The proposal offers a source of renewable source of energy which would:

- Assist the NSW and Commonwealth Governments to meet Australia's renewable energy targets.
- Provide a clean and renewable energy source to assist in reducing greenhouse gas emissions.

2.2 PROPOSAL BENEFITS

The proposed Wollar Solar Farm would result in numerous benefits including:

- Supporting Commonwealth and NSW climate change commitments.
- Contributing enough clean renewable energy to provide electricity to about 104,926 average NSW homes and displace approximately 515,564 metric tonnes of carbon dioxide annually.
- Enhancing electricity reliability and security by contributing 290MW of clean energy to the national grid and supporting the energy transition from coal fired to renewables.
- Direct and indirect employment opportunities during all phases of the proposal, including around 320 construction jobs during the peak construction phase and around 5 equivalent full-time jobs once the proposal is operational.
- Investment of about $430 million in capital expenditure in total.
- Development of a new land use thereby diversifying local land uses within the locality and offering host landholders an alternative income stream.

The proposal site has a high average daily solar exposure of 18MJ/m^2 (DPE, 2016) and proximity to the existing Wollar 500/330kV substation. This greatly reduces the transmission and distribution loss factor risk. The daily solar exposure and large distance to any nearby receivers and makes the site an ideal location for a solar farm.

2.3 PROPOSAL JUSTIFICATION

Electricity generation is the largest single emitter of greenhouse gas in Australia, contributing 35% of Australia's total greenhouse emissions. In 2017, over 84% of NSW's energy needs were derived from fossil fuels, including coal and gas, with only around 16% derived from renewable energy sources. It is to be expected that significant effort will be applied to transition to renewable energy sources of electricity generation in coming years and a number of coal-fired power station operators have already announced closure dates for their power stations. The Independent Review into the Future Security of the National Electricity Market outlines a strategic approach to ensuring an orderly transition from traditional coal and gas fired power generation to renewable energy with lower emissions.

The proposed Wollar Solar Farm will help supports the orderly transition towards renewables as well as supporting Commonwealth and NSW climate change commitments including:

- United Nations Paris Climate Change Agreements which aim to limit global warming to well below 2°C, with an aspirational goal of 1.5°C. Australia's contribution towards this target is a commitment to reduce greenhouse gas emissions by between 26% to 28% below 2005 levels by 2030.
- Renewable Energy Target (RET) Scheme. In order to achieve the targets set under the RET, it is estimated that an additional 5,400 MW of new renewable energy capacity will need to be built by 2020.
- NSW Climate change Policy Framework which sets an aspirational objective for NSW to achieve net zero emissions by 2050.

3 THE PROPOSAL

The Wollar Solar Farm proposal remains generally as detailed in Section 4 of the EIS (NGH, 2019a). However, a change has been made to the development footprint boundary to include an alternative access option (referred to as the "Southern Access Option 2") which is detailed and assessed separately in the Amendment Report (NGH, 2019d).

4 CONSIDERATION OF SUBMISSIONS

4.1 EXHIBITION AND LOCATION

The Wollar Solar Farm EIS was placed on public exhibition from 10 April 2019 to 7 May 2019.

Printed copies of the EIS were available at the Mid-Western Regional Council (MWRC) offices during the exhibition period:

The EIS was also available online at the Major Projects section of the DPIE planning portal website: https://www.planningportal.nsw.gov.au/major-projects/projects/9831

4.2 SUBMISSIONS RECEIVED

DPIE received a total of 31 submissions during the exhibition period.

- 16 submissions were received from members of the public, all of which supported the proposal.
- 7 submissions were received from organisations, all of which supported the proposal.
- 8 submissions were received from public authorities commenting on the proposal.

In addition, a submission from Wilpinjong Coal Pty Ltd (WCPL) was received after the exhibition period.

No objections to the proposal were received.

The issues raised in each submission received are summarised in this document; Section 4 (public and organisation submissions) and Section 5 (public authority submissions).

The full submissions can be found on the Major Projects website:

https://www.planningportal.nsw.gov.au/major-projects/project/9831

Table 4-1 Submissions received.

Category	Number of responses received
Individual members of the public - support	16
Organisations - support • Nature Conservation Council • Central West Environment Council • Doctors for the Environment Australia • Healthy Rivers Dubbo • Ryde Hunters Hill Flora and Fauna Preservation Society • Wollar Progress Association • Ryde Gladesville Climate Change Action Group	7[1]
NSW Public Authority submissions 1. Mid-Western Regional Council (MWRC) 2. NSW DPIE, Division of Resources and Geoscience (DRG)	8

[1] Under advice from DPIE, this number does not include the submission made by Wilpinjong Coal Pty Ltd as the public exhibition period had ceased.

Category	Number of responses received
3. NSW Environmental Protection Authority (EPA) 4. NSW Fire and Rescue (FR) 5. NSW Transport, Roads and Maritime Services (RMS) 6. NSW Office of Environment and Heritage (OEH) 7. Department of Industry (DoI) 8. NSW Rural Fire Service (RFS)	
Total	**31**

4.3 ADDITIONAL CONSULTATION

4.3.1 General community

A Community Consultation Plan (CCP) is in place for the proposed Wollar Solar Farm. The proponent has undertaken consultation with the local community in accordance with the CCP and Australian Renewable Energy Agency's (ARENA) *Establishing the social licence to operate large scale solar facilities in Australia: insights from social research for industry* (ARENA n.d.).

The consultation carried out in the lead up to the preparation and submission of the EIS is outlined in chapter 6 of the EIS.

Following lodgement of the EIS with DPIE, the proponent undertook the following additional consultation activities:

- a formal presentation to MWRC on 17 April 2019 to provide up to date information about the proposal including a question and answer session.
- ongoing consultation with Peabody Pastoral Holdings Pty Limited and Wilpinjong Coal Pty Ltd in relation to proposal status and access requirements across land owned by Peabody Pastoral Holdings Pty Limited in the vicinity of the Wilpinjong Mine.

4.3.2 Other stakeholders: Wilpinjong Coal Pty Ltd

On 29 May 2019, DPIE provided the proponent with comments from Wilpinjong Coal Pty Ltd (WCPL), who operates the Wilpinjong Coal Mine, located approximately 11 km north - west of the proposal site.

While this submission was submitted to DPIE after the submission period ended, the proponent has opted to respond to WCPL comments to ensure the continuation of open and transparent consultation.

The key issues raised by WCPL included the following:

- potential impacts on mining developments in the vicinity of the solar farm; and
- traffic and traffic noise impacts.

These key issues have been separately addressed below.

In addition to these key issues, WCPL also raised issues relating to the following which have been addressed in later sections of this Submissions Report:

- road upgrades;
- bushfire risk (addressed as part of response to Fire and Rescue NSW in Section 6.4); and
- project scale (addressed as part of response to MWRC in Section 6.1).

Potential mining developments in the vicinity of the solar farm

WCPL notes in its submission that it has made an operational allocation application under the *Mining Act 1992* (NSW) with the aim of extending its mining leases for the Wilpinjong Coal Mine to incorporate an additional areas to the north, south and east of the proposal site, currently contained within the exploration licence 6676, into its mining leases. WCPL noted in its submission that this application is yet to be determined and that, assuming it is granted a mining lease over this area, WCPL "intends to seek environmental approvals for [the] development of open cut coal resources in the proposed allocation area".

The proposed solar farm is located outside the operational allocation application area. However, WCPL have raised concerns that an approved solar farm adjacent to these operations may pose a future constraint on open cut mining operations "should a mine extension be approved (i.e. due to general mining operations or blasting activities potentially being constrained by the location and design of the Wollar Solar Farm, or dust deposition concerns)".

Given that the proposal site is located outside the area covered by WCPL's current operational allocation application, the proposal is not expected to interact with any new open cut developments which may ultimately be approved in this area.

No planning applications have yet been lodged by WCPL in relation to the land included in its current operational allocation application. Any future planning application lodged by WCPL would need to assess the potential impacts of any new or expanded open cut coal mine, including on neighbouring land uses such as the proposal. However, subject to any such assessment being undertaken by WCPL, it is considered that general activities and blasting adjacent to a solar farm are unlikely to adversely impact on the ongoing operation of the solar farm. Dust deposition may affect yield and increase operational costs, including panel washing. However, it is noted that array module options include self-cleaning finishes and in this sense are somewhat resilient to dust. Similar to most solar farms being proposed and constructed currently in NSW, the perimeter and inter-panel tracks of the solar farm are not proposed to be sealed and therefore produce a level of dust on the proposal site. The EIS assessed and considered operational water use specifically for solar panel cleaning during operation.

The proponent is committed to continuing to consult with WCPL throughout the development of the proposal and would be prepared to accept the following condition on any SSD consent granted for the proposal to formalise this commitment:

> *Prior to the commencement of construction, the Proponent must consult with the Resources and Geosciences Division of the Department of Planning and Environment and Wilpinjong Coal Pty Ltd with respect to measures to be applied during construction and operation of the proposal so as to minimise the potential for any sterilisation of resources on tenements held by Wilpinjong Coal Pty Ltd.*

Traffic and traffic noise

WCPL notes the following in relation to construction traffic generation:

- Table 8-22 of the EIS provides a sum of 64 average hourly movements (i.e. in and out), which appears to have been the basis of traffic noise calculations including peak hour traffic noise calculations for Barigan Road.
- Table 8-31 of the EIS appears to provide incoming vehicle numbers in the middle column (i.e. one-way movements) with daily trip generation of 192 and peak hour movement generation of 98 in the third column (i.e. both directions is inferred from the text).

- Table 8-33 describes future AM peak hour volumes on Barigan Road of 95 southbound and 25 northbound.

A specialist noise assessment by Renzo Tonin (2018) and a specialist Traffic Impact Assessment (TIA) by Ontoit (2019) were undertaken for the EIS. Both the noise assessment and TIA assessed the peak construction traffic volumes with the aim of developing a worst case scenario.

Specialist advice confirms that the different number of vehicles assumed for these assessments is warranted to ensure a worst-case scenario for noise and traffic impacts:

- In relation to noise, the estimated construction traffic volumes during peak (provided in Table 8-22 of the EIS) were noted as being the average hourly movements (excluding one off delivery and pick up) based on movements per day divided by 11; representing construction hours from 7am to 6pm.
- In relation to the Traffic Impact Assessment, an Addendum TIA (Amber, 2019) has now been prepared (Appendix C). The assessment includes revised traffic generation and distribution volumes that supersede that provided within the EIS (within Table 8-31 and Table 8-33). Traffic generation during the peak construction period (9 months) is provided in Table 4-2. The worst-case scenario for traffic is based on the peak hour vehicle movements.

Table 4-2 Traffic generation during peak construction periods (Amber, 2019).

Vehicle type	Vehicle movements per day		Vehicle movements per peak hour	
	Wollar Road	Ulan – Wollar Road	Wollar Road	Ulan – Wollar Road
Light vehicle (car/4wd)	30	30	8	7
Shuttle bus	28	12	14	6
MRV/HRV	23	23	0	0
AV/B-Double	0	26	0	0
Total	**81**	**91**	**22**	**13**

WCPL also notes that Table 8-33 of the EIS would indicate that peak hour traffic noise generation for private receivers on Barigan Road (i.e. a local road) would appear to be in the night-time period (i.e. before 7am).

Section 4.4.5 of the EIS provides the following construction hours:

- Monday – Friday: 7am – 6pm
- Saturday: 8am – 1pm

No works are proposed outside of these hours (i.e. before 7am). As a result, the construction hours proposed for the proposal remain within the recommended standard hours noted in the NSW *Interim Construction Noise Guideline* (ICNG) (DECC, 2009).

In relation to haulage routes, WCPL notes that its experience with major deliveries from the ports to the Wilpinjong coal mine have typically utilised the Golden Highway, the northern section of Ulan Road and Ulan-Wollar Road (including shipments sourced from Newcastle or from Port Botany).

WCPL therefore suggests that the potential for a significant proportion of Wollar Solar Farm delivery traffic to utilize the northern section of Ulan Road and potentially also Ulan-Wollar Road should be considered, as it may be a preferred delivery route for larger vehicles (e.g. B-Doubles).

The Addendum TIA (Amber, 2019) includes revised traffic distribution over the proposed haulage routes (Appendix C) that supersedes that provided in the Ontoit (2019) updated TIA (Appendix B). It is now proposed that vehicles travelling to/from the port will do so via Ulan-Wollar Road and Ulan Road to reach Newcastle, Gulgong, and the wider State Highway network.

This route is expected to accommodate 13 light vehicle movements during each of the peak hours and approximately 7 vehicle movements per hour during construction times. The majority of the vehicles during regular construction hours will be larger trucks such as AV and B-Double vehicles.

The majority of the northern route has been upgraded as part of the Wilpinjong Mine Expansion and is suitable for use by larger vehicles. South of the upgraded section the road is considered to be in good condition for use by light and heavy vehicles based on on-site observations. Overall, it is concluded that the use of Ulan-Wollar Road to access Ulan Road, as outlined above, is acceptable and will not generate any safety or capacity issues.

WCPL suggests that the MWRC should seek appropriate financial contributions from the Wollar Solar Farm to road maintenance costs on the local road network reflective of its road usage.

Upon determining the haulage route(s) for construction vehicles associated with the proposal the proponent would:

- undertake a Road Dilapidation Report both prior to the commencement of construction and again on completion of construction; and
- repair any damage to the road network which results from the proposal.

4.3.3 Other stakeholders: Mid – Western Regional Council

Mid – Western Regional Council raised a number of concerns in relation to road safety, upgrade requirements, and traffic generation and distribution. As a result, the following tasks were undertaken:

- An updated Traffic Impact Assessment (TIA) was undertaken by Ontoit in June 2019 (Appendix B).
- The proponent and a representative from both Ontoit and NGH met by telephone with representatives from Council on the 11 July 2019. The aim of the meeting was to discuss Council's concerns and come to an in principle agreement in relation to recommendations made within the updated TIA (Ontoit, 2019). The full details of the meeting can be found in Section 4.1 of the Wollar Solar Farm Amendment Report (NGH, 2019).
- Following the meeting, Council was provided with the draft Amendment Report outlining the proposed changes to the project in relation to road upgrades and safety measures.
- Amber, consultant traffic specialists, were engaged in August 2019 to prepare an Addendum TIA to further address specific concerns that were not covered sufficiently in the meeting and updated TIA (Ontoit, 2019). The Addendum TIA assessed these specific concerns and provides recommendations that now supersede those provided in the updated TIA prepared by Ontoit (2019). The concerns addressed in the Addendum TIA (Amber, 2019) are:

    - Assessment of Traffic Generation and distribution volumes across the local road network. The assessment includes revised vehicle volumes and movements throughout the construction period.
    - Assessment of Access routes for haulage and construction workers with particular emphasis on the safety of Wollar Road. This assessment includes revision of the haulage route from the port to include Ulan – Wollar Road.
    - Assessment of Barigan Road and Maree Road access options (referred to as Northern Access, Southern Access Option 1 and Southern Access Option 2 in the Addendum TIA). This assessment includes recommendations for the upgrade of Barigan Road.
- A representative from Amber undertook a site inspection on 22 August 2019 with Mid – Western Regional Council's Development Engineer. The site inspection included a detailed discussion of Council's concerns and a drive through of the access routed proposed.
- Amber provided Council with a swept path assessment (provided in Appendix C) demonstrating areas within Barigan Road proposed for upgrade on 28 August 2019 and 2 September 2019.
- On 3 September 2019, Amber and Council's Development Engineer met by telephone to confirm in principle endorsement of the proposed widening areas provided in the Addendum TIA (Appendix C).
- A draft Addendum TIA was provided by email to Council's Director Development and Development Engineer welcoming feedback and requesting endorsement of the recommendations made in the Addendum TIA prior to lodging the documents with DPIE.

Following MWRCs review of the draft Addendum TIA and Submissions Report v1, an additional meeting was undertaken on 1 October 2019.Those who attended were:

- Julie Robertson (MWRC)
- David Webster (MWRC)
- Gary Hemsworth (MWRC)
- Mike Willson (Amber traffic consultants)
- Rhyson Li (WSD)
- Bruce Howard (WSD)
- Louiza Romane (NGH)
- Nick Graham – Higgs (NGH)

The agenda of the meeting followed a discussion of the following concerns raised by MWRC:

- **Traffic volumes** particularly with relation to:
    - Inconsistencies between the total traffic volumes estimated for the nearby Beryl Solar Farm (currently under construction) and the proposed Wollar Solar Farm.
    - Lack of information surrounding total traffic volumes.
    - Impact on traffic volumes should the quantity of solar panels increase.
- **Haulage route** particularly in relation to:
    - The use of Wollar Road for rigid vehicles (HRV/MRV).
    - The addition of Ulan-Wollar Road to the haulage route.
    - The existing traffic volumes using Ulan – Wollar Road and Wollar Road.
- **Southern access option 2** –particularly in relation to:
    - The proposed upgrade requirements for Barigan Road.
- **Accommodation** particularly in relation to:

- The impact on tourism as a result of construction workers being placed in tourist accommodation.
- **Voluntary contribution** particularly in relation to:
  - The maintenance costs required on the local road network as a result of the construction of the proposal.

Additional issues raised during the meeting were:

- **Waste management** particularly in relation to:
  - The volume of non-recyclable packaging material.
- **Workforce transport** particularly in relation to:
  - Pick up and drop off points.

The outcomes of the meeting were as follows:

Total traffic volumes

- The Traffic Plan containing vehicle volumes and items prepared by Jacobs Pty Ltd (Appendix F) was shared with MWRC. The traffic plan was prepared based on traffic volumes used for the construction of recent solar farm projects and represents the most up to date and comprehensive information available to Jacobs.
- In order to provide MWRC with confidence in relation to these vehicle volumes, NGH committed to undertaking further analysis of the traffic plan prepared for the proposed Wollar Solar Farm and the estimated traffic numbers noted for the Beryl Solar Farm (currently under construction). This issue has been addressed in Section 6.1 (proposal details).

Haulage route (Ulan – Wollar Road)

- The existing traffic volumes along Ulan – Wollar Road are based on the Road Traffic Assessment (GTA, 2015) undertaken for Wilpinjong Coal Mine Extension, with a focus on the AM and PM peak hours of the mine. On the assumption that traffic generated by the Wilpinjong Mine during the peak hours represents the highest volume of traffic on Ulan – Wollar Road, it was noted during the meeting that the construction peak hours for the proposed solar farm would be different to that of the mine and as such, traffic volumes would remain within the capacity of the road (300 – 600 vehicles per hours, in each direction of travel).
- MWRC agreed in principle to the use of Ulan – Wollar Road for traffic generated from port (particularly in relation to AV/B-doubles) as the road is an RMS approved route for heavy vehicles. The proponent acknowledged that upgrades are currently being undertaken on Ulan – Wollar Road and that this would need to be considered during construction of the proposed Wollar Solar Farm.
- A full response to this issue is included in Section 6.1 (haulage route).

Haulage route (Wollar Road)

- The use of Wollar Road for MRV/HRV to access the site was discussed in relation to safety concerns at Munghorn Gap (approximately 5 – 6 km). The Addendum TIA estimates 23 HRV/MRV movements per day, which over an 11 hour work day, equates to 2 HRV/MRV movements an hour.
- Provided that the major risks (including safety and the school bus route) are identified in the Construction Traffic Management Plan that would be developed prior to construction, and that the plan would be endorsed by MWRC, it was agreed that volumes of this nature would be acceptable.
- A full response to this issue is included in Section 6.1 (haulage route).

Southern Access Option 2

- Consultation and outcomes in relation to Southern Access Option 2 are included within the Amendment Report (NGH, 2019d).

Accommodation

- While MWRC recognise the benefits of utilising local accommodation, concerns were raised in relation to use of tourist accommodation, particular during peak tourism events and during overlapping construction of major projects in the region. This issue is addressed in Section 6.1 (Accommodation).

Waste management

- MWRC raised concerns in relation to Styrofoam, soft plastics and treated wood as these items can't be recycled and become a burden on local landfill. This issue has been addressed in Section 6.1 (Waste Management).

Workforce transport

- MWRC sought further information in relation to pick up and drop off points for workforce shuttle buses, and parking for light vehicles associated with the workforce arrival at pick up points. This issue has been addressed in Section 6.5 (Traffic volumes).

Each issue was addressed individually, and agreement reached to ensure major risks have been identified and management measures can be put in place. Consultation and outcomes in relation to Barigan Road are included in the Amendment Report (NGH, 2019d).

This report draws on information and recommendations from the following specialist traffic reports:

- Updated Traffic Impact Assessment (Appendix B) (Ontoit, 2019).
- Addendum Traffic Impact Assessment (Appendix C) (Amber, 2019).
    - Includes revised assessment and recommendations in relation to traffic generation and distribution volumes and movements, access routes for haulage and construction staff and Barigan Road and Maree Road site access. These revisions supersede the assessment and recommendations made within the Updated TIA (Ontoit, 2019).

5 PROPONENTS RESPONSE TO PUBLIC AND ORGANISATION SUBMISSIONS

Sixteen (16) submissions from the public were received and seven (7)[2] submissions from organisations were received. All of the 22 submissions from the public and organisations were letters of support for the proposal.

Table 5-1 Proponents response to issues raised by the community.

Issue	Submission ID.	Detail of issue	Proponent Response
5.1 PUBLIC			
Support	SE-53189 SE-53782 SE-54299 SE-53045 SE-53773 SE-54120 SE-53014 SE-53044 SE-53013 SE-53018 SE-53043 SE-53545 SE-65661	The 16 letters of support generally outlined the following reasons for supporting the proposal: • The development would provide clean energy to the national grid and contribute to the transition to renewable energy and a sustainable future. • Australia's climate change commitments would be supported by contributing to a reduction in greenhouse gas emissions. • The development would provide positive socio-economic benefits through diversification of the economy, training and job opportunities, and increased patronage at the Wollar General Store, especially during the construction period. • Site selection for the proposed solar farm would not result in adverse visual amenity and health impacts or land use conflicts. • Site selection avoids the Aboriginal cultural heritage sites recognised. • Inclusion of battery storage is considered a positive aspect of the proposal. • Minimal land disturbance is required for solar panel modules and although areas of CEEC (Commonwealth Endangered Ecological Community) are proposed to be impacted, the benefits are considered to outweigh this impact.	**Noted.**

[2] Under advice from DPIE, this number does not include the submission made by Wilpinjong Coal Pty Ltd as the public exhibition period had ceased.

Issue	Submission ID.	Detail of issue	Proponent Response
	SE-65662 SE-65663 SE-65664		
5.2 ORGANISATIONS			
Support	SE-54296 SE-54444 SE-54113 SE-54122 SE-53017 SE-65660 SE-120512	The 7 letters of support generally outlined the following reasons for support: • The development would not generate any species credits (relating to impacts on threatened species). • The development footprint avoids land mapped as important Regent Honeyeater Habitat. • The development is consistent with the principles of Ecologically Sustainable Development (ESD). • The proposal is an essential step towards supporting climate change commitments and a low carbon future. • The development would contribute to diversifying NSW energy mix and economy. • The development footprint avoids Aboriginal cultural heritage sites. • Construction of the proposal would contribute to employment opportunities. • The site chosen for the proposed solar farm would result in a low level of amenity impacts.	**Noted.**

6 PROPONENTS RESPONSE TO PUBLIC AUTHORITY SUBMISSIONS

This section considers all issues raised in the public authority submissions. For each submission, the issues are summarised in the left-hand columns and the Proponent's response is provided in the right-hand column.

Table 6-1 Public authority submissions and proponent's response

Issue	Detail of issue	Proponent Response
6.1 MWRC		
Proposal details	During a presentation to the MWRC (Council) by the proponent, Council sought clarification regarding the number of solar panels proposed for the Wollar Solar Farm. The question was asked in reference to a recently approved solar farm in the Mid-Western region which proposed a similar number of panels, but the electricity generated (87 MW) is approximately one third of what is being proposed by the Wollar Solar Farm. It is Council's understanding that the estimated number of panels for the proposal is within the range of 870,000 to 1,392,000.	The proponent has confirmed that the quantity of panels estimated within the EIS is correct. Appendix B of the EIS includes indicative proposal plans for the generation of 290 MW (AC) of electricity. The plans remain subject to detailed design but demonstrate that a typical array block is comprised of 15,904 solar panels and generates 5 MW (AC). The indicative layout presented in Appendix B of the EIS incorporates 58 array blocks, subject to detailed design. As such, the proposal is estimated to require 922,432 solar panels. It is not considered that any updates to the EIS and specialist reports in relation to panel quantity are required. In order to provide MWRC with confidence in relation to the differing vehicle volumes of the recently approved Beryl Solar Farm, NGH undertook further analysis of the traffic plan prepared for the proposed Wollar Solar Farm and the estimated traffic numbers noted for the Beryl Solar Farm (currently under construction). The Beryl Solar Farm estimated 27,720 total vehicle movements comprised of 21,334 vehicle movements (all light vehicles) for transport of workers and the remaining 6,386 movements for all other deliveries. Jacobs Pty Ltd prepared a traffic plan based on vehicle volumes used for the construction of recent solar farms (Appendix F). The Wollar Solar Farm estimates 27,757 total vehicle movements comprised of 16,176 vehicle movements (light vehicles and shuttle buses) for transport of workers and the remaining 11,581 movements for all other deliveries. It should be noted that the vehicle types proposed for use differ between the two proposals. Beryl Solar Farm proposed the use of semi-trailers for transport of solar panels, while the Wollar Solar Farm proposes the use of B-Doubles to transport the solar panels.

Issue	Detail of issue	Proponent Response
	Council raised concerns that the EIS reports have been prepared on the assumption that 922,432 panels would be installed and believes assessment should be based on the maximum number of panels.	In general, carrying capacity of these vehicles is largely based on weight. The National Heavy Vehicle Regulator (NHVR, 2016) provides general mass limits for heavy vehicles. Depending on the size of semitrailer (ie 3 axle, 4 axle or 5 axle), the allowable Gross Vehicle Mass/Gross Combination Mass (GVM/GCM) is between 24 tonnes (t) and 42.5 t. The allowable GVM/GCM for B-Doubles is between 50 t and 62 t depending on the size of the vehicle (ie 7 axle or 9 axle). The weight and dimensions of the final infrastructure selected for construction of solar farms varies from project to project which results in differences in how the vehicles can carry the items. As such, it is reasonable to expect some differences in relation the traffic volumes presented for Beryl Solar Farm and the proposed Wollar Solar Farm.
Traffic Assessment	The Traffic Impact Assessment (TIA) makes several references to a Road Transport Assessment associated with the Wilpinjong Mine Expansion in 2015. The TIA makes assumptions that there are similarities between the traffic impacts of the Wilpinjong Mine Expansion and the potential traffic volumes and movements for the Wollar Solar proposal. Council notes that the traffic study submitted for the Wilpinjong Mine Expansion, also made assumptions based on	The TIA (Ontoit, 2019) provided as Appendix J of the EIS (NGH 2019a) used the Wilpinjong Mine Expansion Road Transport Assessment (GTA Consultants, 2015) to verify observations made during Ontoit's site inspection and to assist in assessing the cumulative impacts on the road network and assisting in establishing a robust baseline in traffic activity in the region over the past three years. The Wilpinjong Mine Expansion Road Transport Assessment (GTA Consultants, 2015) was used to assist in establishing a baseline and to assist in identifying likely traffic distribution on the adjacent road network. Whilst traffic distribution patterns were utilised the impacts were assessed and based on traffic forecasted to result from the Solar Farm development. The Road Transport Assessment (RTA) for the Wilpinjong Mine Extension proposal included comprehensive traffic volume counts conducted 24-hours/7days for one week. The location and timing of these traffic counts were used to enable a comparison between the existing 2015 data and to obtain recent movement and turning data for the Ulan Road – Wollar Road corridor. The traffic counts were undertaken by Ontoit in 2018 and the AM (5am – 6am) and PM (3pm – 4pm) peak hours were determined from the traffic counts undertaken by GTA (2015) to provide a consistent comparison of typical peak periods. Results of traffic counts undertaken by Ontoit (2019) were provided in Figure 10 of the TIA (Appendix J of the EIS) and are shown below. It should be noted that the construction peak hours for the proposed solar farm would be different to that of the Wilpinjong Mine and as such, traffic volumes would remain within the capacity of Ulan – Wollar Road (300 – 600 vehicles capacity per hour in each direction of travel), and Wollar Road (250 – 450 vehicles capacity per hour in each direction of travel).

Issue	Detail of issue	Proponent Response
	projected traffic volumes that were not supported by detailed traffic counts. Accordingly, any reference to existing and projected vehicle numbers could not be regarded as giving a true indication of existing conditions or future traffic impacts.	The use of Ulan – Wollar Road for traffic generated from port (particularly in relation to AV/B-doubles) is considered acceptable as the road is an RMS approved route for heavy vehicles. The proponent acknowledges that upgrades are currently being undertaken on Ulan – Wollar Road and that this would need to be considered during construction of the proposed Wollar Solar Farm.


Church Ln
Church Ln
Ulan Rd
Budgee Creek
Wollar Rd
Wollar Rd
Wollar Rd
Ulan Rd
Ulan Road Southbound
AM Peak:
Through - 131 Cars, 2 Trucks
Left Turn - 0 Cars, 0 trucks
PM Peak:
Through - 140 Cars, 11 Trucks
Left Turn - 0 Cars, 0 trucks
Ulan Road Northbound
AM Peak:
Through - 338 Cars, 5 Trucks
Right Turn - 27 Cars, 0 trucks
PM Peak:
Through - 38 Cars, 1 Trucks
Right Turn - 25 Cars, 2 trucks
Wollar Road
AM Peak:
Right Turn - 20 Cars, 0 Trucks
Left Turn - 0
PM Peak:
Right Turn - 19 Cars, 2 Trucks
Left Turn - 0

<table>
<tr><th>Issue</th><th>Detail of issue</th><th>Proponent Response</th></tr>
<tr><td></td><td>In considering traffic generation and distribution on the local road network, the TIA also relies upon the trip distribution share percentages for visitors, suppliers, workers etc. adopted for the Wilpinjong Mine Expansion. As the Wilpinjong Mine Expansion related to the extension to the mine life, as opposed to the construction of a new major proposal, it is not appropriate to utilise the same percentages. To properly assess the traffic impacts of the Wollar Solar proposal, traffic generation and distribution should be based on actual/expected traffic movements associated with the Wollar Solar proposal particularly during the construction period.

The traffic assessment should demonstrate the type, number and timing of vehicle movements across the entire local network and specifically address those that have been mentioned</td><td>An Addendum TIA was prepared by Amber (2019) in consultation with Mid- Western Regional Council (Appendix C). The report included an updated assessment of traffic generation and distribution on the local road network, summarised below and included in full in Appendix A of the Wollar Solar Farm Amendment Report (NGH, 2019). This assessment of traffic generation and distribution supersedes that provided within the Ontoit (2019) TIA (Appendix B).

Traffic generation

Approximately 30 trucks will access the site per day during typical construction periods. The delivery trucks will predominantly be Medium and Heavy Rigid Trucks (MRV and HRV as defined within AS 2890.2:2009). Articulated Vehicles (AV as defined within AS 2890.2:2009) and B-Doubles will occasionally be used to transport larger plant such as the PV panels.

The peak construction period of the solar farm is 9 months (from month 6 to month 14) with the majority of deliveries occurring during this time. It is anticipated that during peak construction the site could generate up to 72 heavy vehicle and 100 light vehicle movements per day. The table below summarises the traffic movements generated during the peak construction period of the solar farm.

<table>
<tr><th>Vehicle Type</th><th>Vehicle Movements per Day</th></tr>
<tr><td>Light Vehicle (car / 4WD)</td><td>60</td></tr>
<tr><td>Shuttle Bus</td><td>40</td></tr>
<tr><td>MRV/HRV</td><td>46</td></tr>
<tr><td>AV/B-Double</td><td>26</td></tr>
<tr><td>Total</td><td>172</td></tr>
</table>

Accordingly, the proposal is expected to generate approximately 172 vehicle movements per day during the 9-month peak construction period.</td></tr>
</table>

Issue	Detail of issue	Proponent Response
	as potential transport routes throughout the EIS. It should identify where all of the materials and resources for the proposal will be sourced, the proposed transport routes and the estimated number of vehicles utilising each route.	**Traffic distribution** Traffic accessing the site will do so via Wollar Road and via Ulan-Wollar Road to/from the port, respectively. Vehicles will then be able to utilise Ulan Road to access the wider road network. The following provides a breakdown of the access routes for each of the vehicle classifications outlined within the table above: • Light Vehicles: These vehicles will consist of project managers who are provided with their own vehicle and miscellaneous trips made by other contractors. It has been assumed that these trips have been distributed evenly between Wollar Road and Ulan-Wollar Road. This represents staff vehicles located in Mudgee and Gulgong, and trips made to other destinations such as Newcastle or Sydney. • Shuttle Bus: Staff will be located predominantly within the nearby towns of Mudgee and Gulgong. Shuttles travelling to/from Mudgee will utilise Wollar Road, and shuttles travelling to/from Gulgong will utilise Ulan-Wollar Road to limit the number of vehicle movements along Wollar Road. For the purposes of this assessment it has been assumed that 70% of staff will be based in Mudgee and 30% will be based in Gulgong. • MRV/HRV: These vehicles will predominantly be water trucks and vehicles transporting materials such as concrete and fencing supplies. These materials will be sourced within the surrounding area and as such, it has been assumed that these vehicles will be evenly distributed between Wollar Road and Ulan-Wollar Road. • AV/B-Double: All plant will be transported from the port and will utilise Ulan-Wollar Road. The peak hours for the solar farm will occur at the start and end of the day when staff are transported to/from the site. During the morning peak all vehicle movements will be towards the site and in the evening peak all vehicle movements will be away from the site. It has been assumed that 50% of general light vehicles and all shuttle buses will access/egress the site during the peak hours. The remaining light vehicle and heavy vehicle movements will be distributed throughout the day and will be split evenly between inbound and outbound movements. **Summary** The site is expected to generate 35 vehicle movements during each of the morning and evening peak hours. These vehicles will be shuttle buses and light vehicles transporting staff to/from the site. Based on the distribution of staff accommodation, the site is expected to generate an increase of 22 and 13 vehicle movements during each of the peak hours on Wollar Road and Ulan-Wollar Road, respectively. This will result in approximately one additional vehicle every 3 minutes on Wollar Road and approximately one additional vehicle every 4 minutes on Ulan-Wollar Road during each peak hour during peak construction times. A summary of the daily and peak hour traffic volumes for each of the access routes is provided in the table below.

<table>
<tr><th>Issue</th><th>Detail of issue</th><th>Proponent Response</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th rowspan="2">Vehicle Type</th><th colspan="2">Vehicle Movements per Day</th><th colspan="2">Vehicle Movements per Peak Hour</th></tr>
<tr><th>Wollar Road</th><th>Ulan-Wollar Road</th><th>Wollar Road</th><th>Ulan-Wollar Road</th></tr>
<tr><td>Light Vehicle (car / 4WD)</td><td>30</td><td>30</td><td>8</td><td>7</td></tr>
<tr><td>Shuttle Bus</td><td>28</td><td>12</td><td>14</td><td>6</td></tr>
<tr><td>MRV/HRV</td><td>23</td><td>23</td><td>0</td><td>0</td></tr>
<tr><td>AV/B-Double</td><td>0</td><td>26</td><td>0</td><td>0</td></tr>
<tr><td>Total</td><td>81</td><td>91</td><td>22</td><td>13</td></tr>
</table>
Vehicles will also be distributed throughout the day and will generate approximately 9 vehicle movements per hour. Of these vehicle movements, 3 will be light vehicles and 6 will be heavy vehicles. All AV and B-Doubles travelling from the port will utilise Ulan-Wollar Road, whilst the light vehicles and MRV/HRVs will be separated evenly between Wollar Road and Ulan-Wollar Road adding approximately 2 MRV/HRV’s per hour to each of Wollar Road and Ulan – Wollar Road over the work day.
</td></tr>
<tr><td></td><td>Council notes that the site visit referenced in Section 5.3 was of short duration and the reference made to "minimal traffic through the Wollar Road - Barigan Road intersection" and 'A single vehicle was observed using Barigan Road" highlights that construction traffic will have a significant impact on Barigan Road.</td><td>The proponent has acknowledged the potential for impact on Barigan Road during the 9 month peak construction period. In response, an Addendum TIA (Appendix C) was undertaken by Amber Organisation (2019) to assess the current condition of Barigan Road and upgrades and/or traffic controls required to mitigate this impact. The assessment included a site inspection undertaken by Amber together with a Mid – Western Regional Council Traffic Engineer with the aim of reaching an in principle agreement on recommended upgrades, traffic controls and dust mitigation.

Recommendations within the Addendum TIA (Amber, 2019) included widening in some areas to ensure safe and simultaneous two – way vehicle movements. As such, Barigan Road has now been included within the Development Footprint and has been fully assessed within the Wollar Solar Farm Amendment Report (NGH, 2019). These recommendations supersede those made in the Ontoit (2019) updated TIA (Appendix B) in relation to Barigan Road.</td></tr>
<tr><td>Road Upgrades</td><td>Council has concerns about the use of the Wollar Road between Ulan Road and the</td><td>Section 2.3 of the TIA (Ontoit, 2019) as Appendix J of the EIS (NGH 2019a) reviewed the crash data for the key access roads for the proposal. 14 crashes have been recorded on Wollar Road over the past 5 years, two of which involved fatalities. The predominant cause of the crashes on Wollar Road is people drifting off the road carriageway due to driver</td></tr>
</table>

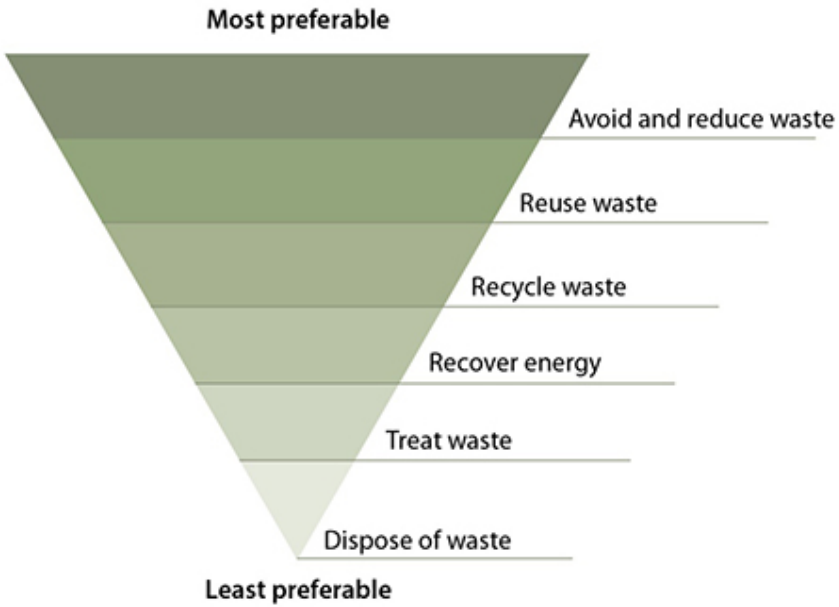
Issue	Detail of issue	Proponent Response
	Wollar village during construction, as this is also a proposed transport route for the Bylong Coal proposal. As the traffic assumptions in the EIS are taken from the Wilpinjong Mine Expansion, there is insufficient detail regarding the specific traffic movements on Wollar Road associated with the Wollar Solar proposal and the cumulative impacts of the Bylong Coal proposal to fully assess overall traffic impacts. It is noted that Council and the NSW Department of Planning & Environment have already identified safety issues on the Wollar Road, particularly around the Munghorn area. A full traffic assessment for Wollar Road should be provided so that the suitability of this route can be assessed, and any road upgrade and/or maintenance requirements can be determined.	fatigue as outlined in Section 2.4 of the TIA (Ontoit, 2019). It is noted that one fatality was due to an animal strike and the second due to drifting off a curve. The Construction Traffic Management Plan (CTMP) outline provided in section A.2 of the updated TIA (Appendix B) addresses driver fatigue and road conditions. The Plan will identify Environmental Control Measures to manage issues around proposal affiliated driver behaviour along Wollar Road including regular toolbox talks to remind drivers to drive to the road conditions. Further consultation with RMS in relation to Wollar Road has been undertaken by Ontoit (2019) and responses in relation to safety issues, upgrade and/or maintenance are included in Section 6.5. A site inspection undertaken by Amber and Mid – Western Regional Council Development Engineer and subsequent Addendum TIA (Amber, 2019) included an assessment of the haulage route. As stated earlier, Wollar Road is now proposed for use during construction by light vehicles, shuttle buses and MRV/HRVs only. A summary of use of this route, referred to as the 'Western Access Route' in the Addendum TIA (Amber, 2019) is summarised below and provided in (Appendix C). Vehicles travelling to/from the west will do so via Wollar Road and Ulan Road to reach Mudgee and the wider State Highway network. The TIA prepared by Ontoit (2019) provides a detailed description of Wollar Road, Ulan Road and the crash history along the access route between Wollar and Mudgee. In addition to the comments made within the Traffic Report, the following provides a summary of the key traffic conditions along the western access route: • Wollar Road is a sealed road which is typically in good condition and provides one lane of traffic in each direction. • The section of Wollar Road that traverses the Munghorn Gap Nature Reserve has a mountainous nature creating a number of tight bends and in some locations the road condition is poor. This section extends for approximately 4-5km. • The intersection of Wollar Road with Ulan Road is provided with dedicated right and left turn lanes from Ulan Road. • Based on the traffic surveys undertaken by Ontoit of the intersection of Wollar Road with Ulan Road, Wollar Road accommodates approximately 40-50 vehicle movements during each of the peak hours. Assuming the peak hour represents approximately 10% of the daily traffic volume, Wollar Road is estimated to currently accommodate 400-500 vehicles per day. • Ulan Road is an approved AV and B-Double route as outlined within the RMS Heavy Vehicles Map. The western access route is expected to accommodate 22 light vehicle movements during each of the peak hours and approximately 3 vehicle movements per hour during construction times. The majority of the vehicles will be shuttle bus

Issue	Detail of issue	Proponent Response
		drivers who know the route well and will not be fatigued such as regular workers. Based on on-site observations, the western route is typically in good condition to accommodate the light vehicles generated during the peak hour and the small number of vehicles generated throughout the day. Whilst it is noted that there is a section of the route that is in poor condition through the Munghorn Gap Nature Reserve, the western route is still considered appropriate for use by the solar farm for the following reasons: • All peak hour vehicles will be light vehicles, with some MRV/HRV vehicles utilising the road during the day. • Skilled shuttle bus drivers will form the majority of vehicle trips. These drivers will know the route well and will not be as fatigued as regular workers. As such, they are expected to be able to traverse the Munghorn Gap Nature Reserve in a safe manner. • The low level of solar farm traffic that will utilise the western route and the current low level of traffic along the route provides a low congestion environment. • Major risks (including school bus routes) will be identified and addressed within the CTMP. The plan will require endorsement by MWRC prior to construction. It should be noted that the Independent Planning Commission (IPC) refused consent to the Bylong Coal Project Development Application on 18 September 2019. Although the Proponent holds the right to challenge the determination at the Land and Environment Court, it is likely this would result in delays. As such, in the event that a Bylong Coal Project appeal is successful and it is approved at a later date, it is unlikely that the construction phases of Wollar Solar Farm and the Bylong Coal Project would be concurrent. However, in the event that construction phases of the Bylong Coal Project and Wollar Solar Farm overlap, an increase in traffic may result along Wollar Road. Further to the above, and even with the increase in traffic volumes generated by the solar farm, there will remain ample road capacity along the western access route. Therefore, it is concluded that the solar farm will still provide ample road capacity along Wollar Road for an increase in traffic movements. Overall, it is concluded that the use of Wollar Road to access Ulan Road, as outlined above, is acceptable and will not generate any safety or capacity issues. It is recommended that all staff, including shuttle bus drivers, be made aware of the road conditions within the Munghorn Gap Nature Reserve and this form part of any future Construction Traffic Management Plan which will be prepared prior to construction of the site. It is noted that the proposed access routes have been determined in consultation with Council. The distribution of traffic on the road network and the use of the Ulan – Wollar Road for heavy vehicles travelling from the port has been chosen to remove heavy vehicles from the Munghorn Gap Nature Reserve. Further, the extensive use of shuttle buses will reduce the chance of driver fatigue and the number of vehicles on the road network.

Issue	Detail of issue	Proponent Response
		It is also noted that the Ontoit Traffic Report notes that a Road Safety Audit will be undertaken in the vicinity of the Wollar Road / Barigan Road intersection in conjunction with RMS.
	It is requested that a Traffic Management Plan be provided for the construction phase for approval by council prior to any works commencing (including pre-construction works).	A CTMP will be developed in consultation with MWRC prior to construction. An outline for this plan is included in the updated TIA by Ontoit 2019 (Appendix B).
	The TIA has identified Barigan Road as a priority consideration for enhancement. Based on the forecast number of traffic movements during construction which may be even greater depending on the number of panels, Council's recommendation is that Barigan Road be upgraded (including widening to accommodate two way traffic, sealing and line marking). This includes, but is not limited to, safe and ease of site access in the case of a bushfire.	The Addendum TIA (Amber, 2019) provides an updated assessment of Barigan Road based on the revised forecast number of traffic volumes (Appendix C). The assessment includes upgrade recommendations which supersede those provided in the Ontoit (2019) updated TIA (Appendix B). Barigan Road is estimated to currently accommodate 60 vehicle movements per day assuming that each of the six dwellings that have access to the road generate 10 vehicle movements per day. The traffic volumes along Barigan Road would increase to 232 vehicle movements per day during peak construction periods (an increase of 172 vehicle movements generated by construction traffic). Therefore, the traffic volumes would marginally exceed the recommended loading for gravel roads. A site inspection was undertaken by Amber in conjunction with a Mid – Western Regional Traffic Engineer. In order to accommodate the traffic volumes generated by the development The Addendum TIA (Amber, 2019) recommended that Barigan Road and Maree Road along the access route be upgraded to have a width of 7 metres to allow two vehicles to pass. In some locations the road is proposed to be widened further to accommodate simultaneous two-way truck movement. These locations are shown within Appendix A of the Addendum TIA (Appendix C). As a result of the recommendations made in the Addendum TIA, a full assessment of Barigan Road was undertaken, and is available within the Wollar Solar Farm Amendment Report (NGH, 2019). The following change is proposed to the mitigation measure provided in the EIS to further address the Council's concerns (changes are shown underlined for ease of reference):

Issue	Detail of issue	Proponent Response
		A Construction Traffic Management Plan would be developed as part of the CEMP and DEMP, in consultation with the MWRC and Roads and Maritime Services. The plan would include, but not be limited to: o Prior to construction, widening be undertaken along Barigan Road in accordance with the swept path assessment and access design providing in the Addendum TIA provided in Appendix C of the Submissions Report. o Prior to construction, sealing of Barigan Road in areas proposed for heavy vehicle use during construction. o A Workforce Travel Plan developed in consultation with MWRC including the designated routes of construction traffic to the site and carpooling/shuttle bus/car parking arrangements to minimise vehicle numbers during construction. o All staff, including shuttle bus drivers, be made aware of the road conditions within the Munghorn Gap Nature Reserve including identification of specific road hazards associated with the area including not limited to fog, wet weather, frost and wildlife. o Pedestrian management – Site access is to be restricted to authorised personnel only and existing employees on site. Pedestrian access to and around the site needs to be maintained at all times. Within the site pedestrian travel paths are to be maintained to key areas such as building entrances and be free from trip hazards. o Scheduling of deliveries. o Construction of temporary car parking facilities. o Community consultation regarding traffic impacts for nearby residents and school bus operators. o Consideration of impacts to the railway. o Traffic control plans (speed limits, signage, etc.). o Procedure to monitor traffic impacts and adapt controls (where required) to reduce impacts to key access road corridors. o Providing a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures.
	The EIS notes that a Dilapidation Report will be prepared prior to the	The following change is proposed to the mitigation measure provided in the EIS to further address the Council's concerns (changes are shown underlined for ease of reference):

Issue	Detail of issue	Proponent Response
	commencement of construction. This should include all of the roads along the proposed transport routes. All of the identified road upgrades and access works should also be implemented prior to the commencement of any site works.	Upon determining the haulage route(s) for construction vehicles associated with the proposal, undertake a Road Dilapidation Report. The report would: o Include a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council. o Describe mechanisms to restore any damage, at the cost of the proponent, that may result due to traffic and transport related to the construction of the Proposal. o Be submitted to the relevant road authority for review prior to the commencement of haulage.
Road Access	Where site access relies upon easements, councils' normal approach is to require legal access arrangements to be established and secured prior to the proposal being determined. This may be achieved by having easements with relevant landowners or obtaining necessary approval from council for the construction of a physical road within the (Maree Road) road reserve.	There is no legal requirement to obtain land tenure for a proposal prior to development consent being granted under the EP&A Act. All required tenure and secondary approvals will be obtained prior to relevant works being carried out. As part of the Addendum TIA (Amber 2019), a site inspection was undertaken by Amber and a Mid – Western Regional Council. The inspection included an assessment of the (Maree Road) road reserve with the aim of reaching in principle agreement with Council in relation to construction of a new road within the road reserve. Should easements over private land not be obtained, a new road would be constructed within the (Maree Road) road reserve. The Wollar Solar Farm Amendment Report (NGH, 2019) provides a full assessment of the (Maree Road) road reserve and includes construction of a new gravel road 7 m in width.
Waste Management	Waste Management Plan to be submitted prior to construction.	In line with the mitigation measure outlined in the EIS, it is proposed that a Waste Management Plan (WMP) will be prepared and submitted prior to construction. The WMP would be prepared in accordance with the waste hierarchy below (NSW EPA, 2019). Where possible, more sustainable packaging material options would be selected (eg reduced insulation/padding thickness and the use of biodegradable starch over cardboard and polystyrene).

Issue	Detail of issue	Proponent Response
		 In the event that MWRC landfill cannot accept the volume of waste generated, commercial landfills and waste management companies (including those which recycle polystyrene) would be engaged to dispose of the material legally at other facilities.

<table>
<tr><th>Issue</th><th>Detail of issue</th><th>Proponent Response</th></tr>
<tr><td>Accommodation</td><td>Analysis of cumulative accommodation impacts is required. Based on other proposals, it is likely that majority of the workers will come from outside the region. Specific information required reflecting the number of beds and types of accommodation that will be required on a monthly basis. Accommodation strategy to be developed that considers various scenarios (i.e. 25% and 50% local workforce and overlapping construction).</td><td>In the EIS, the proponent had estimated that a maximum of 500 workers will be required during the proposal's peak construction period (approximately 9 months). The proponent appreciates the potential strain (as well as economic benefit) that accommodation of workers during any overlapping construction periods of the proposed Wollar Solar Farm and the proposed Bylong Coal Mine could place on businesses, and in particular, accommodation providers and visitors seeking accommodation during this period. It should be noted that the Independent Planning Commission (IPC) refused consent to the Bylong Coal Project Development Application on 18 September 2019. Although the Proponent of the Bylong Coal Project holds the right to challenge the determination at the Land and Environment Court, it is likely this would result in delays. As such, in the event that the Bylong Coal Project appeal is successful and it is approved at a later date, it is unlikely that the construction phases of Wollar Solar Farm and the Bylong Coal Project would be concurrent. If approved at a later date, it is likely the Bylong Coal Project will be constructed significantly later than the Wollar Solar Farm. Accordingly, it is unlikely that material cumulative accommodation impacts will arise from this proposal.

The proponent has now provided further information in relation to approximate staffing requirements over a month by month basis; these are provided below.
<table>
<tr><th>Month of construction</th><th>Total number of workers</th><th>Number of workers (local)</th><th>Number of workers (non-local)</th><th>Non-local workers accommodated in Mudgee</th><th>Non-local workers accommodated in Gulgong</th></tr>
<tr><td>1</td><td>26</td><td>13</td><td>13</td><td>13</td><td>0</td></tr>
<tr><td>2</td><td>43</td><td>22</td><td>21</td><td>21</td><td>0</td></tr>
<tr><td>3</td><td>84</td><td>42</td><td>42</td><td>42</td><td>0</td></tr>
<tr><td>4</td><td>80</td><td>40</td><td>40</td><td>40</td><td>0</td></tr>
<tr><td>5</td><td>102</td><td>51</td><td>51</td><td>51</td><td>0</td></tr>
<tr><td>6 (peak)</td><td>150</td><td>75</td><td>75</td><td>53</td><td>22</td></tr>
<tr><td>7 (peak)</td><td>180</td><td>90</td><td>90</td><td>63</td><td>27</td></tr>
</table>
</td></tr>
</table>

Issue	Detail of issue	Proponent Response

8 (peak)	250	125	125	88	37
9 (peak)	260	130	130	91	39
10 (peak)	260	130	130	91	39
11 (peak)	320	160	160	112	48
12 (peak)	320	160	160	112	48
13 (peak)	200	100	100	70	30
14 (peak)	150	75	75	53	22
15	80	40	40	40	0
16	50	25	25	25	0
17	20	10	10	10	0
18	5	3	2	2	0

An assessment of accommodation options within Mudgee and Gulgong was included within Section 8.5.2 of the EIS. The assessment was undertaken under the assumption that approximately 50% of the workforce would be from the local community. The assessment was based on the Social Impact Assessment for the Bylong Coal Project and current data from real estate and rental websites. In order to provide the most up to date information, current available rental options and capacity have been provided below.

Accommodation type	Number of rental properties available	Total guest capacity (assumes 1 person per room)

Issue	Detail of issue	Proponent Response

Mudgee		
Rental (1 bedroom)	62	167
Airbnb	256	572
Total	**317**	**739**
Gulgong		
Rental	12	39
Airbnb	2	5
Total	**14**	**44**

In additional to rental properties, short term accommodation options are available (approximately 51 options in Mudgee and 8 options in Gulgong).

In consideration of Council's request of further information relating to potential cumulative accommodation impacts relating to peak tourism times and other major projects in the region, an Accommodation and Employment Strategy to ensure that the potential under supply of housing and accommodation in the surrounding communities are mitigated or managed during construction of the project. The following additional mitigation measure is proposed:

- An Accommodation and Employment Strategy would be developed prior to the commencement of construction. It would include but not be limited to:
    - Identification of a strategy to facilitate accommodation of the workforce associated with the concurrent construction of other State Significant developments and during peak tourism times.

Issue	Detail of issue	Proponent Response
		o Development of a program to monitor and review the effectiveness of the strategy over the construction period. o Identification of a strategy to prioritise employment of local workers. A draft table of contents for the Accommodation and Employment Strategy has been included in Appendix E.
Visual & Noise impacts	In keeping with the local agricultural character and scenic value of the rural landscapes in the region, Council's preference is to minimise the view of solar farms from public viewpoints and neighbouring residences. Given the potential sensitivities around visual impacts, a visual representation of the landscape once constructed from viewpoint 6 would assist in alleviating any concerns. Council notes that there is a medium impact for traffic along Tichular Road and Barigan Road and receivers 10, 11 and 12. Concern	It should be noted that the proposed infrastructure would not be visible from receivers 10, 11 and 12. However, the residents of, and visitors to, receivers 10, 11 and 12 would have a view of the infrastructure from viewpoint 6 while travelling along Barigan Road and Tichular Road. Viewpoint 6 has been assessed within Section 8.2 of the EIS in relation to the degree of contrast created by the proposed solar farm infrastructure. Results indicate that Viewpoint 6 has a medium contrast (i.e. the proposed solar farm would be moderately dominant and noticed, the visual change would be partially absorbed). The overall visual impact at viewpoint 6 has been assessed as medium impact. As a result, the contrast is considered acceptable, and mitigation is not considered to be warranted.

Issue	Detail of issue	Proponent Response
	surrounding consultation with 10, 11 and 12. A visual representation (photo montage) of the landscape once constructed from viewpoint 6 would assist in alleviating any concerns.	
Ancillary Buildings	Buildings and ancillary infrastructure should comply with Development Control Plan setback and ideally not be visible from roads.	Clause 11 of State Environmental Planning Policy (State and Regional Development) 2011 provides that DCPs do not apply to State Significant Development.
	Council recommends a condition to require Construction and Occupation Certificates under Part 4 of the EP&A Act, or approvals under Section 68 of the Local Government Act 1993, for all buildings, structures or waste disposal systems placed on the site.	All required certificates and secondary approvals will be obtained for the proposal as required by law.
Post approval management plans	Request for decommissioning and site rehabilitation plan and a land management plan.	An existing mitigation measure is provided in the EIS in relation to preparation of a Rehabilitation Plan, a Groundcover Management Plan and a Weed Management Plan. As part of the EIS, the proponent has committed to the implementation of a Project Environmental Management Strategy (EMS). The EMS would be updated to include a Decommissioning Environmental Management Plan prior to decommissioning occurring.

Issue	Detail of issue	Proponent Response
Voluntary contribution.	Suggestion of a contribution of 0.1% CIV to via Voluntary Planning Agreement, or other similar mechanism.	In addition to the strong public benefits which the proposal will secure for NSW by providing sufficient renewable energy to power up to 104,926 homes and avoid greenhouse gas emissions equivalent to displacing 515,564 metric tonnes of carbon dioxide on an annual basis. The proposal will also provide local and regional economic stimulus through jobs and training. Further, the proposal will not increase the demand for public amenities and public services within the Local Government Area. Rather, the proponent has committed to upgrading Barigan Road for which the Council is the roads authority and to making good any damage caused to the local road network by the construction of the project. Discussions between the proponent and MWRC in relation to voluntary contribution are ongoing.
Community consultation.	Council requests that community consultation is ongoing with the aim of providing up to date and accurate information about the proposal. Establishment of a Community Hotline is recommended prior to construction.	Ongoing information will be provided to the community in relation to the proposal and in line with the existing Community Consultation Plan for the proposal. A Community Hotline was established on 1 May 2018, and a website providing ongoing up to date information was established on 25 March 2018.
6.2 NSW DPIE, DIVISION OF RESOURCES AND GEOSCIENCE (DRG)		
Gas resources	Requests further attempts to consult with Hunter Gas regarding the proposal, with a record of authentic consultation included in the EIS.	Consultation with Hunter Gas Pty Ltd was attempted on the 14 November 2018 via the address provided by NSW DRG within the SEARs. To date, no response has been received.
Offsets	The Division notes that there are 'offset options	Offsets for the proposal will be provided in accordance with the mechanisms recognised under the Biodiversity Conservation Act 2016 (NSW). At this stage, the mechanisms proposed to secure offsets are still being determined. The

Issue	Detail of issue	Proponent Response
	under consideration'. To ensure there is no reduction in access to prospective land for mineral exploration, or potential for sterilisation of mineral or extractive resources, consultation with DRG is requested in relation to the proposed location of any biodiversity offset areas (both on and offsite) or any supplementary biodiversity measures.	proponent will consult with DRG in the event that offsets are proposed to be secured by the creation of a new biodiversity offset area at the proposal site.
6.3 NSW ENVIRONMENT PROTECTION AUTHORITY (EPA)		
Environmental Protection Licence	An EPL is not required as the proposal is not a 'scheduled' activity under the POEO Act.	Noted.
Environmental Management Strategy	EPA notes the proponent's intention to prepare a Proposal Environmental Management Strategy which would incorporate a Construction Environmental Management Plan and a Waste Management Plan. EPA recommend preparation of these plans	Noted.

Issue	Detail of issue	Proponent Response
	be a requirement of the conditions of the proposal should approval be granted.	
6.4 NSW FIRE AND RESCUE (FRNSW)		
Fire and safety risks associated with photovoltaic solar	FR NSW requests that a comprehensive Emergency Response Plan (ERP) is developed for the site. The ERP should specifically address foreseeable on-site and off-site fire events and other emergency incidents, (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents). That the ERP detail the appropriate risk control measures that would need to be implemented to safely mitigate potential risks to the health and safety of firefighters and other first responders (including electrical hazards). Such measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection	The proponent has already committed to prepare an ERP for the proposal in consultation with the RFS and FRNSW. In addition, to reflect the comments provided by Fire and Rescue NSW in their detailed submission it is proposed to also undertake a Fire Safety Study for the proposal in line with the updated commitment contained below: A Fire Safety Study (FSS) will be undertaken and developed in accordance with the requirements of Hazardous Industry Planning Advisory Paper No. 2 (HIPAP No.2) and consultation with FRNSW prior to commencement of construction. The FSS will consider the limited operational capacity of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety dependence.

Issue	Detail of issue	Proponent Response
	required, decontamination procedures, minimum excavation zone distances and a safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determine by risk assessment). Other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site should also be included in the ERP Two copies of the ERP are stored in prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point/s. Once constructed and prior to operation, that the operator of the facility contacts the relevant local emergency management committee (LEMC). A comprehensive fire safety study (FSS) is recommended to be undertaken in accordance with HIPAP	

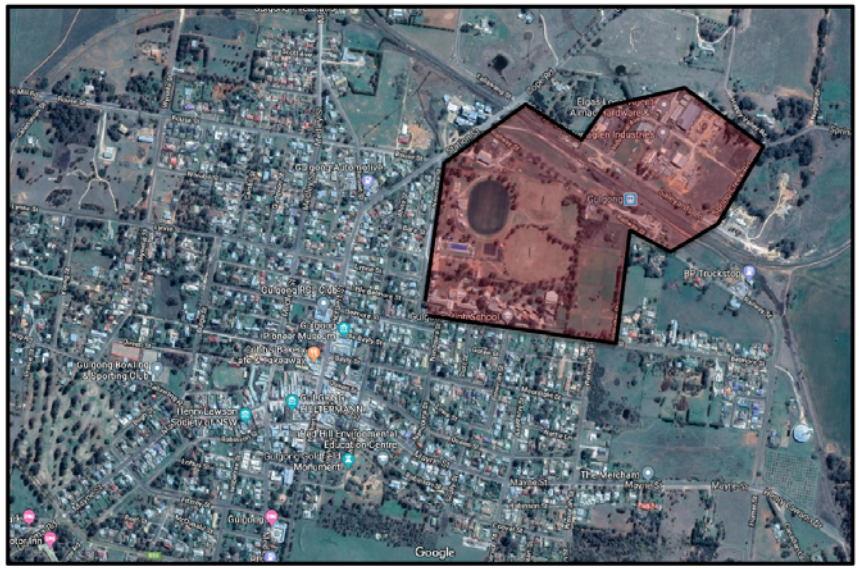
Issue	Detail of issue	Proponent Response
	No.2 and in close consultation with FRNSW. The FSS should consider the limited operational capacity of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety dependence. Approval of the FSS by FRNSW is requested.	

6.5 NSW ROADS AND MARITIME (RMS)

Traffic volumes	Conflicting numbers relating to bus trips in section 3.3.1 and 4.1.1. Further information required relating to transportation of staff on buses and pick up/drop off locations.	The Addendum TIA (Amber, 2019) builds on the updated TIA provided by Ontoit (2019) and provides a revised assessment of shuttle bus distribution across the road network that is summarised below and provided in Appendix C. It is noted that staff will be located predominantly within Mudgee and Gulgong. Shuttle buses will transport approximately 80% of construction staff to the site (up to 256 people during peak construction, from months 6 to 14). A monthly breakdown of the anticipated number of construction staff is provided in the table below. Shuttle buses travelling to/from Mudgee are anticipated to utilise Wollar Road, and shuttle buses travelling to/from Gulgong are anticipated to utilise Ulan-Wollar Road to limit the number of vehicle movements along Wollar Road. For the purposes of the assessment it has been assumed that 70% of staff (224 people) will be based in Mudgee and 30% (96 people) will be based in Gulgong. Based on this assumption, shuttle bus distribution would be comprised of up to

Month	1	2	3	4	5	6	7	8	9
Staff	26	43	84	80	102	150	180	250	260
Month	10	11	12	13	14	15	16	17	18
Staff	260	320	320	200	150	80	50	20	5

Issue	Detail of issue	Proponent Response
		28 movements per day (and up to 14 movements during peak hour) on Wollar Road and up to 12 movements per day (and up to 6 movements during peak hour) on Ulan – Wollar Road. The remaining staff will access the site using private vehicles. Assuming a vehicle occupancy of 2 for workers, the proposal is expected to generate up to 30 light vehicle movements during each the peak construction period. The construction phase is estimated to take 12-18 months and it is proposed to prepare a Workforce Travel Plan to support the number of workers who will be targeted to travel by bus. The travel plan would document a number of elements including (but not limited to): • Bus routes. • Bus pick up and drop off locations. • Bus movement frequencies. • All day parking options. The Workforce Travel Plan would be incorporated within the CTMP and would be monitored and revised if targets are not being met. Ontoit (2019) has provided some preliminary options in relation to bus routes, pick up / drop off locations and parking options from the regional centres of Mudgee and Gulgong. These options, which do not require any constructed infrastructure, do not form part of the proposal but are provided to demonstrate the feasibility of providing pick up / drop off locations and parking near to the regional centres. For workers originating in Gulgong, consideration would be given to including an all-day parking facility in the north-east of the town within the area highlighted in red in the figure below.

Issue	Detail of issue	Proponent Response
		 For workers originating in Mudgee consideration should be given to an all-day parking facility in the north-east of the town within the area highlighted in red in the figure below.

Issue	Detail of issue	Proponent Response
		 Within this area, there are a number of recreation facilities and industrial areas that are in close proximity to major roads through Gulgong and Mudgee. These areas (pending further investigations) would potentially accommodate all-day parking and shuttle bus pick up and drop off locations. The assumption that 80% of the construction workers would be transported to the proposal site by shuttle buses provides a strategy to ensure traffic is managed adequately should the construction of the Bylong Coal Project be concurrent with the proposal. It should be noted that the Independent Planning Commission (IPC) refused consent to the Bylong Coal Project Development Application on 18 September 2019. Although the Proponent of the Bylong Coal

Issue	Detail of issue	Proponent Response
		Project holds the right to challenge the determination at the Land and Environment Court, it is likely this would result in delays. As such, in the event that the Bylong Coal Project appeal is successful and it is approved at a later date, it is unlikely that the construction phases of Wollar Solar Farm and the Bylong Coal Project would be concurrent. If approved at a later date, it is likely the Bylong Coal Project will be constructed significantly later than the Wollar Solar Farm. Accordingly, it is considered highly unlikely that cumulative accommodation impacts will arise from these two proposals. Further consultation with Roads and Maritime and MWRC would be required prior to implementing any travel and parking strategy and would consider any changes required should the construction programs not be concurrent. The following mitigation measure is proposed: • Develop and implement a Workforce Transport Plan in consultation with MWRC prior to construction to be incorporated within the Construction Traffic Management Plan. The plan should include: o Bus routes. o Bus pick up and drop off locations. o Bus movement frequencies. o All day parking options. o Development of a program to monitor and review the effectiveness of the strategy over the life of the development.
	Strategies to be employed to manage driver fatigue and driver behaviour.	A mitigation measure was provided in the EIS in relation to development of a CTMP for the proposal. A.2 of the updated TIA (Ontoit, 2019) includes a proposed CTMP outline incorporating driver fatigue and road conditions (Appendix B). The CTMP will identify Environmental Control Measures to manage issues around driver behaviour including but not limited to: • 80% of the workforce to be targeted for transport by shuttle bus to / from the site (in the event of concurrent construction with Bylong Coal Mine); • Reviewing and implementing adequate and responsible shift patterns; • Promotion of Car Pooling for those driving to / from the site; • Workforce toolbox sessions and training on responsible driving – these will be scheduled in consultation with RMS Western Region who provide toolbox talks and training on responsible driving; • Promotion of regular and scheduled breaks during long-distance driving;

Issue	Detail of issue	Proponent Response
		• Education and promotion on the use and abstinence from alcohol, medications which cause drowsiness, and other drugs that may influence fitness for work; • Promotion of good exercise and diet routines; • Provide employee assistance programs.
Traffic assessment	An assessment including a road safety audit of existing Wollar Rd/Barigan Rd intersection. Particularly an assessment of the current geometry of the intersection, including the narrow single lane bridge in Wollar Rd on approach to the intersection and its ability to safely accommodate increased traffic volumes.	The updated TIA (Ontoit, 2019) includes consideration of the requirement of a Road Safety Audit (RSA) at the Wollar Road/Barigan Road intersection (Appendix B). There are two existing intersections that lead to the main entry for the proposed Wollar Solar Farm being: • Ulan Road / Wollar Road Priority Intersection; and • Wollar Road / Barigan Road Priority Intersection. The Ulan Road / Wollar Road intersection is currently a priority-controlled intersection. The key features include: • Single through lane north and south on Ulan Road; • A right turn pocket lane approximately 100m in length on Ulan Road to accommodate right turns into Wollar Road; • A right and left turn lane out of Wollar Road onto Ulan Road giving way to through and right turn movements; and • The intersection has clear signage on all approaches directing traffic. From the site visit and site photos, the following key observations were made: • No traffic queuing was observed during the site visit; • The intersection has good visibility and site lines for all movements; • The intersection appears to have sufficient storage capacity for turning movements; and • Intersection appears to have undergone a recent upgrade with new line markings evident. • There were no obvious deficiencies with the intersection in its current form. The Wollar Road / Barigan intersection is currently a priority-controlled intersection. The key features include: • No existing line markings at the intersection; • Wollar Road and Barigan Road approaches are approximately 7m in width on approach which would enable vehicles to pass comfortably; • There is a 5m single lane bridge approximately 50m in length on Wollar Road on the eastbound approach lane; and

Issue	Detail of issue	Proponent Response
		• There is no current signage on approaches directing traffic through the bridge or between Wollar Road and Barigan Road. From the site visit and site photos, the following key observations were made: • No traffic queuing was observed during the site visit; • Existing traffic volumes are extremely low; • The intersection has good visibility and site lines for all movements which is assisted by the slow speed on approaches; • The intersection appears to operate within capacity largely due to the very low traffic volume; and • The single lane bridge could potentially be a constraint and temporary traffic management measures may be required to manage traffic flow through the bridge. Further consultation with RMS was undertaken by Ontoit 27 May 2019. RMS stated the following in relation to the request for a Road Safety Audit: *The intersection of Barigan Rd with Wollar Rd should form the main focus incorporating the narrow single lane bridge over Wollar Creek.* It is proposed that a Road Safety Audit (RSA) will be undertaken prior to construction. The scope of the audit has been outlined in Appendix B of the updated TIA (Ontoit, 2019). It is anticipated, that despite the forecasted increase in traffic through this intersection there will be minimal impact on the operation of the intersection and bridge during peak travel periods and if any delays are experienced; they will be minimal and only during the 12 - 18 month construction period. The following additional mitigation measure is proposed to formalise this commitment: • A Road Safety Audit will be undertaken in consultation with RMS on the Wollar Road / Barigan Road intersection prior to commencement of construction**.**
	Further consideration of interaction between haulage vehicles and school buses and children. It is common practice for similar proposals to not undertake haulage and staff	To assist in identifying any school transport demands within the vicinity or leading to the proposed Solar Farm site, Ontoit (2019) undertook consultation with the Department of Education and the regional Director based in Dubbo. Ontoit were advised that the local Wollar School was placed in recess (not in use) at the end of 2018. Further, Ontoit undertook additional research with the Department of Transport and was unable to identify any existing school services within the area or travelling along the key corridors leading to the Solar Farm site including Ulan Road and Wollar Road.

Issue	Detail of issue	Proponent Response
	movements during school bus pick up/drop off times.	
Road access	Additional information required outlining how materials will be transported to the site each day.	The proposed haulage routes from port to site are provided in Appendix D and includes: 1. Port Botany to the proposal site o M5 → M7 → M4 → Great Western Highway → Castlereigh Highway → Ulan Road → Wollar Road → Barigan Road. 2. Port of Newcastle to the proposal site o Newcastle Link Road → Hunter Expressway → New England Highway → Golden Highway → Ulan Road → Ulan – Wollar Road → Castlereigh Highway → Wollar Road → Barigan Road. An updated assessment of the haulage route that was undertaken by Amber (2019) is summarised below and provided in Appendix C. Vehicles travelling to/from port will do so via Ulan-Wollar Road and Ulan Road to reach Newcastle, Gulgong, and the wider State Highway network. The updated Ontoit TIA (2019) provides a detailed description of Ulan-Wollar Road along the access route (Appendix B). In addition to the comments made within the Traffic Report, the following provides a summary of the key traffic conditions along the northern access route: • Ulan-Wollar Road is a sealed road which is in good condition and provides one lane of traffic in each direction. A large proportion of the road has recently or is in the process of being upgraded as part of the Wilpinjong Mine Expansion and is suitable for use by heavy vehicles. • The intersection of Ulan-Wollar Road with Ulan Road is provided with dedicated right and left turn lanes from Ulan Road. • Based on traffic surveys outlined within the Wilpinjong Mine Expansion Traffic Report prepared by GTA, Ulan-Wollar Road is expected to accommodate approximately 130 vehicle movements during each of the peak hours north of the mine site access. • Ulan Road is an approved AV and B-Double route as outlined within the RMS Heavy Vehicles Map. This northern access haulage route is expected to accommodate 13 light vehicle movements during each of the peak hours and approximately 7 vehicle movements per hour during construction times. The majority of the vehicles during regular construction hours will be larger trucks such as AV and B-Double vehicles. Even with the increase in traffic volumes generated by the solar farm there will remain ample road capacity along this haulage route. As outlined above, the majority of this haulage route has been upgraded as part of the Wilpinjong Mine Expansion and is suitable for use by larger vehicles. South of the upgraded section the road is considered to be in good condition for

Issue	Detail of issue	Proponent Response
		use by light and heavy vehicles based on on-site observations. Overall, it is concluded that the use of Ulan-Wollar Road to access Ulan Road, as outlined above, is acceptable and will not generate any safety or capacity issues. A CTMP will be prepared and implemented for the proposal. The CTMP outline included in Appendix 2 of the updated TIA (Ontoit, 2019) includes consideration of proposed delivery routes and delivery of materials and infrastructure (Appendix B). The CTMP would incorporate Environmental Control Measures including but not limited to: o Management of the arrival and departure of goods and haulage vehicles. o Temporary traffic management measures and signage
Road upgrades	Clarification of what road upgrades are required to carry out the proposal in a safe and efficient manner. Prior to commencement of onsite solar farm construction, the proponent is required to upgrade the intersection of Wollar Road (MR208) and Barigan Road to the satisfaction of Mid-Western Regional Council and Roads and Maritime.	Please refer to the further information provided above regarding the proposed Road Safety Audit and the CTMP proposed for the proposal. Upgrade of the Wollar Road and Barigan Road intersection is dependant on the outcome of the road safety audit. Based on the Addendum TIA undertaken by Amber (2019), no further upgrades are required along Ulan Road, Ulan – Wollar Road or Wollar Road. Following a site inspection undertaken by Amber (2019) and a Mid – Western Regional Council Traffic Engineer, recommendations were made in relation to the upgrade requirements along Barigan Road (Appendix C). These recommendations supersede the recommendations made in the Ontoit (2019) updated TIA (Appendix B). The full assessment and upgrade requirements have been included within the Wollar Solar Farm Amendment Report (NGH, 2019) and include widening and sealing of Barigan Road to a 7 m width to ensure safe and simultaneous two-way truck movements.
Haulage route	The proposed haulage route via Wollar Road (MR208), Ringwood Road (local road) and the Golden Highway (HW27) to be used during the construction phase has sections that are unsealed and could not provide consistent access in	The proponent notes that Ringwood Road is not proposed as part of the haulage route. Vehicular traffic associated with the proposal would travel along the routes noted above. This would include the Golden Highway and Ulan – Wollar Road as well as Castlereagh Highway, Ulan Road, Wollar Road and Barigan Road.

Issue	Detail of issue	Proponent Response
	the event of flooding or errant weather. Roads and Maritime does not support the proposed use of this route for the purposes of haulage as part of this proposal. All vehicular traffic associated with the development must travel to and from the project site via the Castlereagh Highway (HW18), Ulan Road (MR214), Wollar Road (MR208) and Barigan Road.	
Traffic Management Plan	Prior to the commencement of construction works, the applicant is to prepare a Traffic Management Plan (TMP in addition to the noted CTMP), to the satisfaction of Mid-Western Regional Council and Roads and Maritime. The CTMP is to outline measures to manage traffic related issues associated with the delivery and construction of the solar plant, ancillary structures, any	Noted.

Issue	Detail of issue	Proponent Response
	construction, operation or decommissioning of the facility.	
Dilapidation survey	A dilapidation survey is required to be undertaken for Wollar Road to assess the damage during construction, upgrading or decommissioning works.	Noted.
Oversize and Over mass heavy vehicles	It is noted 26 metre (B-doubles) will be used during construction with larger Oversize and Over mass (OSOM) heavy vehicle use via special permit only. The vehicle length used for the development (excluding over-dimensional vehicles) is not to exceed 26 metres.	Noted.
6.6 NSW OFFICE OF ENVIRONMENT AND HERITAGE (OEH)		
Credit Report	Credit report in Appendix G is incorrect.	The corrected credit report is attached to the updated BDAR report. The BDAR was updated to include impacts that may result from the development of the Southern Access Option 2; documented in the Amendment Report. The Amendment Report contains the updated BDAR and its credit report in Appendix G. No changes to the proposal or mitigation measures are proposed in response to this issue.

Issue	Detail of issue	Proponent Response
EEC avoidance	No specific discussion regarding alternate locations. Concern regarding good condition EEC impacted in the south-west and near Maree Road.	The proponent reviewed a large number of sites on which to build a solar farm before selecting the Wollar Solar Farm proposal site. While it would have been possible to construct and operate the solar farm at some of the sites investigated, the Wollar Solar Farm proposal site was considered to be the most suitable for the construction of a solar farm due to the following factors: • Connection and capacity: o The site is located approximately 1km from the Wollar 500/330 kV substation which is identified as a Connection Opportunity. o An existing 330 kV transmission line traverses the site which means the that the connection to the high voltage network can be made without the need to construct any transmission lines. • Solar exposure: o The site has high solar exposure measuring 18MJ/m^2 (DPE, 2016). • Stakeholder interest: o Very few non-involved dwellings would be impacted by the development. o Substantial community support in the area for renewable proposals. • Land suitability: o The site has been cleared and disturbed by grazing. o The terrain is relatively flat. The current indicative site layout has not been able to completely avoid all areas of native vegetation. Designing a panel layout to avoid all EEC onsite would essentially render the site unfeasible for solar panels. As a result, some areas of the more degraded EEC still form part of the development footprint. Offsets for all EEC impacted by the proposal will be provided in accordance with one of the mechanisms recognised under the *Biodiversity Conservation Act 2016* (NSW).
Credit requirement	Clarification is required in relation to the credit requirement for BGW (White box- yellow box-Blakely's red gum grassy woodland and derived native grassland) under the EPBC Act.	The vegetation zones areas used to derive the credit obligation under the NSW Biodiversity Assessment Methodology (BAM) are not the same as those used to calculate offsets in accordance with the Commonwealth offset tool. This is due to the different criteria applied under the NSW and Commonwealth Threatened Ecological Community listings. To demonstrate this, Table 7.5 in the BDAR shows the different classifications. Column 9 of this table shows, for the NSW BAM zones, which zones meet the Commonwealth EEC criteria. It can be seen that some NSW zones (1, 2 and 6) contain areas of vegetation that do meet Commonwealth EEC criteria as well as areas that do not. For this reason, the Commonwealth EEC areas do not align with the NSW zones.

Issue	Detail of issue	Proponent Response
		NSW BAM zone areas have been used to calculate the NSW offset requirement and separate polygons (mapped in Figure 5.2 confirmed extent of Box-Gum Woodland and Derived Native Grassland EPBC listed CEEC inside the development site) reflecting the Commonwealth EEC criteria have been used in the Commonwealth offset tool. Refer to the Amendment Report for the final credit requirement, that includes Southern Access Option 2; the offset calculations have been updated to reflect the inclusion of the Southern Access Option 2 as an alternative option to Northern Access and Southern Access Option 2.
Aboriginal Cultural Heritage	OEH considers the ACHA to be adequate and compliant with the proposal SEAR's and accepts the findings of the study. In relation to subsurface testing of Wollar AFT Scatter 11, OEH support the recommendation for limited subsurface testing in principle, but insist on reviewing further information about the proposed test program in the ensuing Heritage Management Plan, should the site be threatened by the proposal construction.	Noted.
6.7 DEPARTMENT OF INDUSTRY – WATER AND NATURAL RESOURCES ACCESS REGULATOR		
Water source reliability	Confirmation should be provided of the ability to access the necessary water volume during the	Water use during construction is addressed in Section 8.1 of the EIS. The EIS states that the water required during the 12 – 18 month construction period is estimated to be approximately 150 – 180 ML and that water sources would be subject to determination by the construction contractor.

Issue	Detail of issue	Proponent Response
	construction period and that this is to be sourced from a reliable and authorised supply.	Further investigation of water requirements and sources has reduced the estimated non – potable water requirements to an estimated 146 ML for the 12 - 18 month construction period. The construction water is currently proposed to be sourced from a combination of: • Onsite dams (10.5% of total water required during construction). • Groundwater bore (capable of supplying more than 100% of total water required during construction). • MWRC standpipe (1% of total water required during construction). • Lower Goulburn River Water Source (establish proposal standpipe), 15 km to the east of Wollar (capable of supplying more than 100% of total water required during construction). All required water licences will be obtained prior to taking water from any water source. The development footprint is approximately 463 ha, of which 255 ha would incorporate solar panels. It is likely that the runoff due to rainfall from the site will be similar despite the addition of solar panels, however additional flows may occur from access roads and hardstands. Based on data collected at Mudgee airport weather station between 1994 and 2018, the area has an average annual rainfall of 663 mm per annum (Bureau of Meteorology 2019). The average annual runoff is about 5% dependent on the year, the timing, intensity and duration of rainfall events. Based on 5% runoff, approximately 153.5 ML is generated by the development footprint over the construction period on average. The harvestable right is 10% of runoff. Based on 10% of 153.5 ML, the harvestable right is approximately 15.4 ML. This represents 10.5% of the total water required for the construction phase. The proposal is located within the Hunter River Catchment and is subject to the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources (Lower Goulburn River Water Source)*. A Water Access Licence (WAL) will be obtained prior to the extraction of any water sources which form part of the Lower Goulburn River Water Source for the purpose of the proposal. The number of Aquifer WALs available for the Lower Goulburn River Water Source as of 5 May 2019 was 28. The water available under these Aquifer WALs was 3086 ML for the 2017/18 financial year. Of this volume 5 ML was used or about 0.2% of the water available. The water required for construction represents 4.7% of the volume available and approximately 4.7% of the water currently not used but available (99.8%) for that financial year. The impact of drawing the 146 ML over the 12 -– 18 month construction period is considered acceptable because ample remaining water is available in the system based on previous year's figures. Goulburn River is about 15 km NE of the proposal. This section of the Goulburn River is also referred to as the Lower Goulburn River Water Source. As the river is only 15 km to the North - East of the proposal, an opportunity exists to establish a standpipe and draw water from the river when flows are sufficient. 13,941 ML of unregulated water was

Issue	Detail of issue	Proponent Response
		made available in 2017/2018. Of this volume 295.3 ML was used or about 2.1% of the water available. The water required for construction represents 1% of the volume available and approximately 1% of the water not used but available (97.9%) for that financial year. Using a proportion of this water would also supplement the proposal's water needs. The aquifers forming the Wollar Creek Water Source underlie the proposal area. A WAL will be obtained prior to the extraction of any water forming part of the Wollar Creek Water Source for the purpose of the proposal. The number of Aquifer WALs available for the Wollar Creek Water Source as of 5 May 2019 was 3. The water available under these Aquifer WALs was 782 ML for the 2017/18 financial year. Of this volume 6.6 ML was used or about 0.8% of the water available. The water required for construction represents 18.8% of the volume available and approximately 18.8% of the water not used but available (99.2%) for that financial year. The impact of drawing the 146 ML over the 12 – 18 month construction period is considered acceptable because ample remaining water is available in the system based on previous year's figures. Construction of onsite bores would be required to access the aquifer within Wollar Creek Water Source. Three water tanks with a capacity of approximately 0.02 ML would be installed allowing for groundwater storage. The Wollar Creek Water aquifer source aquifer flow rates are in the range of 0.5 ML/day. Groundwater would be pumped into tanks overnight (0.5 ML per 24 hours for each bore) to ensure availability of supply for the following day. Each bore would be capable of drawing approximately 274 ML over an 18 month period, accounting for more than 100% of the proposal's construction water requirements. If required, a key can also be purchased for $31 from MWRC allowing access to the Council standpipe. According to Council, the standpipe can provide 1.5 ML over the construction period. This represents 1% of the water requirement for the construction of the proposal. The indicative layout for solar farm infrastructure requires approximately six of the 15 existing dams within the proposal footprint to be filled in prior to construction. The dams to be filled in would be dewatered, and the water would be used for construction or transferred to another dam onsite. The remaining dams may be cleaned or enlarged as required to retain the overall harvestable right volume for the subject land. During construction, grey construction water will be stored and treated in temporary sediment basins. This grey water will be beneficially reused onsite and displace proposal demand for clean and potable water. The combined water sources would be available to supply the construction requirement of the solar farm many times over. The proposal's use of water over the construction period is not anticipated to create shortfall of water supply in the local area or impact other local users of water.

Issue	Detail of issue	Proponent Response
Flood modelling	Clarification is requested on whether the flood modelling has included the potential impact of the perimeter security fence. If this has not occurred, it is requested the modelling be revised and the potential impact on stability of watercourses be addressed.	A Hydrological and Hydraulic Analysis was undertaken for the proposal by Footprint Pty Ltd to define the flood behaviour including depth of inundation and flood velocity, over Wollar Creek within the proposal site and the numerous ephemeral overland flow paths that traverse the site. The report included an analysis of the potential impact of infrastructure on the existing flood behaviour. The analysis made recommendations in relation to perimeter fencing, which when incorporated, will result in the perimeter fencing having no impact on the flow of flood waters across the site. These recommendations were included in the following mitigation measures in Section 7.75 of the EIS: • *The proposed perimeter security fencing would be constructed in a manner which does not adversely affect the flow of floodwater and should be designed to withstand the forces of floodwater or collapse in a controlled manner to prevent impediment to floodwater.* • *Security fencing would be designed to create two separate fenced compounds on either side of Spring Flat Creek.*
Waterfront land	Buffers should be applied to watercourses in accordance with the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018). Where buffers are not proposed, clear justification will be required to support further consideration.	If development consent is granted for the proposal, section 4.41 of the EP&A Act will operate so that a controlled activity approval (other than an aquifer interference approval) is not required for the proposal under section 91 of the *Water Management Act 2000* (WM Act). A 40m buffer has been applied to the centreline of 4th order stream (Spring Flat Creek) and 6th order stream (Wollar Creek). In these areas, the design and construction roads, cables and culverts that cannot avoid the waterway would protect waterfront land by referencing the construction standards and rehabilitation methods set out for: • In-stream works. • Laying pipes and cables in watercourses. • Outlet structures. • Riparian corridors. • Vegetation Management Plans. • Watercourse crossings. No solar array infrastructure or buildings would be in these areas. Specialist assessment identified the remaining waterways to be areas of overland flow. These areas do not meet the definition of waterfront land under the WM Act as they do not exhibit the features of a defined channel with bed and banks.

Issue	Detail of issue	Proponent Response
6.8 DEPARTMENT OF PRIMARY INDUSTRIES - AGRICULTURE		
Decommissioning	NSW DPI Agriculture urges the removal of all underground infrastructure as part of the decommissioning process. The land will still be available for grazing and intermittent cropping options at this time. The 500 millimetre depth cut off will still retain much of the development's cabling at the decommissioning phase, and hence cropping and pasture improvement activities may be impacted.	Section 4.6 of the EIS outlines that all above ground infrastructure with the possible exception of the 330kV substation, would be removed. Any cabling greater than 500mm below the ground may be left in place to minimise surface disturbance during decommissioning activities. No changes to the proposal or mitigation measures are proposed in response to this issue.
6.9 DEPARTMENT OF INDUSTRY – CROWN LANDS		
Landowner consent	It is noted that Lot 7303 DP 1139558 is now within the proposal area, although it is not intended to construct any infrastructure on this site. This parcel of land is part R755430 for Future Public Requirements and requires authorisation from	Section 7.4.2 of the EIS addressed Crown Lands and stated that Lot 7303 DP1139558 is mapped as Crown Land and is located within the eastern portion of the proposal site. No development is proposed to occur within this lot, but the comments made by Crown Lands regarding the need to obtain separate authorisations if any such development were to occur is noted.

Issue	Detail of issue	Proponent Response
	this department prior to any use and / or occupation.	
6.10 NSW RURAL FIRE SERVICE		
Fire risk	The NSW Rural Fire Service (NSW RFS) has considered the information submitted and provides the following advice: The mitigation measures proposed within the Environmental Impact Statement dated 12 March 2019 are reasonable in relation to the risk. Further, the proposal can comply with the Aims and Objectives of Planning for Bush Fire Protection 2006 (PBP)	Noted

7 ENVIRONMENTAL MANAGEMENT CHANGES

In consideration of the submissions received, the following additional mitigation strategies are now proposed, as detailed in Section 6. The full set of revised mitigation measures now committed to by the project is provided in Appendix A (this includes any additional changes made by the Amended Report).

Table 7-1 New or modified mitigation measures, that now form a commitment of the proposal.

PC: Pre-Construction, C: Construction, O: Operation, D: Decommissioning

Safeguards and Mitigation Measures	PC/C	O	D
• **An Accommodation and Employment Strategy would be developed prior to the commencement of construction. It would include but not be limited to:** o **Identification of a strategy to facilitate accommodation of the workforce associated with the concurrent construction of other** State Significant developments **and during peak tourism times.** o **Development of a program to monitor and review the effectiveness of the strategy over the construction period.** o Identification of a strategy to prioritise employment of local workers.	PC		
• A Construction Traffic Management Plan would be developed as part of the CEMP and DEMP, in consultation with the MWRC and Roads and Maritime. The plan would include, but not be limited to: o **Prior to construction, widening be undertaken along Barigan Road in accordance with the swept path assessment and access design providing in the Addendum TIA provided in** Appendix C **of the Submissions Report.** o Prior to construction, sealing of Barigan Road in **areas proposed for heavy vehicle use during construction.** o **A Workforce Travel Plan developed in consultation with** MWRC **including the designated routes of construction traffic to the site and carpooling/shuttle bus/car parking arrangements to minimise vehicle numbers during construction.** o The designated routes of construction traffic to the site. o Carpooling/shuttle bus arrangements to minimise vehicle numbers during construction. o Identify specific road hazards associated with the area including not limited to fog, wet weather, frost and wildlife. o Pedestrian management – Site access is to be restricted to authorised personnel only and existing employees on site. Pedestrian access to and around the site is to be maintained at all times. Within the site pedestrian travel paths are to be maintained to key areas such as building entrances and be free from trip hazards. o Scheduling of deliveries. o Construction of temporary car parking facilities. o Community consultation regarding traffic impacts for nearby residents and school bus operators.	PC		

Safeguards and Mitigation Measures	PC/C	O	D
o Consideration of impacts to the railway. o Traffic control plans (speed limits, signage, etc.). o Procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts to key access road corridors. o Providing a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures.			
• Upon determining the haulage route(s) for construction vehicles associated with the proposal, and prior to construction, undertake a Road Dilapidation Report. The report would: o Include a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council. o Describe mechanisms to restore any damage, at the cost of the proponent, that may result due to traffic and transport related to the construction of the Proposal. o Be submitted to the relevant road authority for review prior to the commencement of haulage.	PC		
• A Fire Safety Study (FSS) will be undertaken and developed in accordance with the requirements of Hazardous Industry Planning Advisory Paper No. 2 (HIPAP No.2) and consultation with FRNSW prior to commencement of construction. The FSS will consider the limited operational capacity of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety dependence.	PC		
• Develop and implement a Workforce Transport Plan **in consultation with MWRC** prior to construction to be incorporated within the Construction Traffic Management Plan. The plan should include: o Bus routes. o Bus pick up and drop off locations. o Bus movement frequencies. o All day parking options. o Development of a program to monitor and review the effectiveness of the strategy over the life of the development.	PC		
• A Road Safety Audit in consultation with RMS focusing on the Wollar Road / Barigan Road intersection will be undertaken prior to commencement of construction.	PC		
• Prior to the commencement of construction, the Proponent must consult with the Resources and Geosciences Division of the Department of Planning and Environment and Wilpinjong Coal Pty Ltd with respect to measures to be applied during construction and operation of the proposal so as to minimise the potential for any sterilisation of resources on tenements held by Wilpinjong Coal Pty Ltd.	PC		

8 CONCLUSION

8.1 SUBMISSIONS RAISED

This Submissions Report has been prepared by NGH on behalf of the proponent, Wollar Solar Development Pty Ltd.

In relation to public, organisation and public authority submissions:

- 16 public submissions were received, all in support of the proposal. General comments included:
    - provision of clean renewable energy;
    - diversification of the economy;
    - contribution to Australia's climate change commitments;
    - appropriate site selection;
    - creation of training and job opportunities;
- Seven submissions from organisations were received, all in support of the proposal. General comments included:
    - no generation of species credits;
    - avoidance of land mapped as important regent honeyeater habitat;
    - consistent with the principles of Ecologically Sustainable Development;
    - avoidance of aboriginal cultural heritage sites;
- Eight submissions from public authorities were received. Key issues, some of which required further assessment and mitigation, included:
    - traffic impacts including cumulative impacts of the Bylong Mine;
    - road access and upgrades;
    - accommodation for workers;
    - waste Management;
    - visual impacts;
    - decommissioning and rehabilitation;
    - restricted haulage operations;
    - ongoing community consultation;
    - bushfire management; and
    - impacts on good condition EEC.
- In addition, a submission from Wilpinjong Coal Pty Ltd (WCPL) was received after the exhibition period. Key comments included:
    - potential impacts on mining developments in the vicinity of the solar farm; and
    - traffic and traffic noise impacts.
    - road upgrades;
    - bushfire risk; and
    - project scale

Seven mitigation measures have been added or modified and now form part of the proposal's environmental management commitments. These address traffic and transport, road upgrades, accommodation, fire and safety risks, consultation and land use impacts.

Note: Please refer to the Amendment Report (NGH, 2019d) which details the Southern Access Option 2 as an alternative option to Northern Access and Southern Access Option 1 and includes assessment and mitigation strategies relevant to this additional project aspect.

8.2 JUSTIFICATION FOR THE PROPOSAL

The benefits of the Wollar Solar Farm remain unchanged. The proposed Wollar Solar Farm would result in numerous benefits including:

- Supporting Commonwealth and NSW climate change commitments.
- Contributing enough clean renewable energy to provide electricity to about 104,926 average NSW homes and displace approximately 515,564 metric tonnes of carbon dioxide annually.
- Enhancing electricity reliability and security by contributing 290MW of clean energy to the national grid and supporting the energy transition from coal fired to renewables.
- Direct and indirect employment opportunities during all phases of the proposal, including around 320 construction jobs during the peak construction phase and around 5 equivalent full time jobs once the proposal is operational.
- Investment of about $430 million in capital expenditure in total.
- Development of a new land use thereby diversifying local land uses within the locality and offering host landholders an alternative income stream.

In consideration of the assessment of the impacts from the proposal contained in the EIS, and the updated assessments contained in this report, it is considered that the proposal offers a number of significant benefits and can be constructed with minimal impact to the existing environment if the updated mitigation measures outlined in Appendix A are implemented.

9 REFERENCES

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APPENDIX A REVISED MITIGATION MEASURES

The complete set of updated mitigation measures are presented below. New/modified measures from this Submission Report are in **Bold.**

PC: Pre-construction, C: Construction, PO: Pre-operation, O: Operation, D: Decommissioning

ID	Safeguards and Mitigation Measures	C	O	D
Biodiversity				
1	• Hollow-bearing trees would not be removed during breeding season (spring to summer) for threatened hollow dependant fauna. • If clearing outside of this period cannot be achieved, pre-clearing surveys would be undertaken to ensure no impacts to fauna would occur	C		
2	• A tree clearing procedure would be implemented to minimise harm to resident fauna.	C		
3	• Procedure for relocation of habitat features to adjacent area for habitat enhancement would be implemented.	C		
4	• Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing. • No stockpiling or storage within dripline of any mature trees. • Access and laydown in areas of Box-Gum Woodland TEC will be minimised to reduce impacts. • Exclusion fencing and signage or similar would be installed around habitat to be retained.	C		
5	• Construction Environmental Management Plan will include measures to avoid noise encroachment on adjacent habitats such as avoiding night works as much as possible.	C		
6	• Avoid Night Works where possible • Direct lights away from vegetation	C	O	
7	Dust management would be implemented as follows: • Daily monitoring of dust generated by construction activities • Construction would cease if dust observed being blown from site until control measures were implemented	C		

ID	Safeguards and Mitigation Measures	C	O	D
	• All activities relating to the proposal would be undertaken with the objective of preventing visible dust emissions from the development site			
8	A Weed Management procedure would be developed for the proposal to prevent and minimise the spread of weeds. This would include: • Management protocol for declared priority weeds under the Biosecurity Act 2015 during and after construction • Weed hygiene protocol in relation to plant, machinery, and fill • Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated, and reported. • The weed management procedure would be incorporated into the Biodiversity Management Plan.	C	O	
9	• Site induction and toolbox talks for ecologically sensitive areas would be undertaken.	C		
10	Preparation of a Biodiversity management plan that would include protocols for: • Protection of native vegetation to be retained • Best practice removal and disposal of vegetation • Staged removal of hollow-bearing trees and other habitat features such as fallen logs with attendance by an ecologist • Weed management • Unexpected threatened species finds • Exclusion of vehicles through sensitive areas. • Rehabilitation of disturbed areas	C		
11	Landscape plantings will be comprised of local indigenous species.		O	
12	• Awareness training during site inductions regarding enforcing site speed limits. • Site speed limits to be enforced to minimise fauna strike.	C	O	
Aboriginal heritage				
1	The development must avoid the possible cultural site (Wollar SF Cultural Site 1). A minimum 20m buffer should be in place around this tree to prevent any inadvertent impacts to the tree canopy and root system.	Design C	O	D

ID	Safeguards and Mitigation Measures	C	O	D
2	The development must avoid the grinding groove (Wollar SF GDG 1). A minimum 15m buffer should be placed around this site to prevent any inadvertent impacts.	Design		
		C	O	D
3	The development would avoid the modified tree (Wollar SF ST 1) and possible modified tree (Wollar SF ST 2). A minimum 15m buffer should be in place around these trees to prevent any inadvertent impacts to the trees canopy and root systems.	Design		
		C	O	D
4	If complete avoidance of the 12 artefacts scatters, 25 isolated finds and the two previously identified AHIMS sites (#36-3-0335 and #36-3-0336) recorded within the proposal site is not possible, the artefacts within the development footprint must be salvaged prior to the proposed work commencing and moved to a safe area within the property that will not be subject to any ground disturbance.	C		
5	The collection and relocation of the artefacts should be undertaken by an archaeologist with representatives of the registered Aboriginal parties and be consistent with Requirement 26 of the *Code of practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* A new site card/s would need to be completed once the artefacts are moved to record their new location on the AHIMS database.	C		
6	The Aboriginal community requests that a Cultural Smoking Ceremony take place to cleanse any artefacts salvaged and the reburial location.	C		
7	If the raised sandy deposits of Wollar SF AFT 11 are to be impacted a subsurface salvage testing/excavation program must be conducted. Excavated material may need to be analysed off site and this is most likely to be undertaken in NGH offices, where the material will be analysed and then subsequently returned to site for reburial.	C		
8	A minimum 5m buffer should be observed around all artefact scatters and isolated find sites that can be avoided, including those outside the development footprint.	C	O	D
9	WSD should prepare a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts during the construction of the Solar Farm and management of known sites and artefacts. The Plan should include the unexpected finds procedure to deal with construction activity. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.	C		
10	In the unlikely event that human remains are discovered during the construction, all work must cease in the immediate vicinity. OEH, the local police and the registered Aboriginal parties should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal.	C		

ID	Safeguards and Mitigation Measures	C	O	D
11	Further archaeological assessment would be required if the proposal activity extends beyond the Heritage study area as detailed in this report, including the whole of Lot 24 DP 755430 and an additional portion of Lot 91 DP 755430. This would include consultation with the registered Aboriginal parties and may include further field survey.	C	O	D
Land and soil assessment				
1	Undertake a soil survey prior to construction to inform the CEMP and sub-plans, rehabilitation and operational aspects.	PC		
2	As part of the CEMP, a Soil and Water Management Plan (SWMP) (with erosion and sediment control plans) would be prepared, implemented and monitored during the proposal, in accordance with Landcom (2004), to minimise soil (and water) impacts. These plans would include provisions to: • Install, monitor and maintain erosion controls. • Ensure that machinery leaves the site in a clean condition to avoid tracking of sediment onto public roads which may cause risks to other road users through reduced road stability. • Manage topsoil in all excavation activities, separate subsoils and topsoils and ensure that they are replaced in their natural configuration to assist revegetation. Stockpile topsoil appropriately so as to minimise weed infestation, maintain soil organic matter, maintain soil structure and microbial activity. • Minimise the area of disturbance from excavation and compaction; rationalise vehicle movements and restrict the location of activities that compact and erode the soils as much as practical. Any compaction caused during construction would be treated such that revegetation would not be impaired. • Manage works in consideration of heavy rainfall events; if a heavy rainfall event is predicted, the site should be stabilised, and work ceased until the wet period had passed. • Areas of soil disturbed by the proposal would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.	C		
3	A Groundcover Management Plan would be developed in consultation with an agronomist and to ensure final land use includes perennial grass cover establishment across the site as soon as practicable after construction and maintained throughout the operation phase. The plan would cover: • Soil handling, restoration and preparation requirements. • Plant Species election.	C	O	D

ID	Safeguards and Mitigation Measures	C	O	D
	• Soil preparation. • Establishment techniques. • Maintenance and monitoring requirements. • Perennial groundcover targets, indicators, condition monitoring, reporting and evaluation arrangements – i.e. A target of 70% live grass cover would apply to protect soils, landscape function and water quality. Additional measures would be implemented where practical when live grass cover falls below 70%. Grass cover would be monitored on a fortnightly basis using an accepted methodology. • Contingency measures to respond to declining soil or groundcover condition. I.e. any grazing stock would be removed from the site when cover falls below the target of 70% live ground cover. • Identification of baseline conditions for rehabilitation following decommissioning. • Preserve the native composition as much as possible			
4	The array would be designed to allow sufficient space between panels to establish and promote groundcover beneath the panels and allow for implementation of weed controls.	Design		
5	A Spill and Contamination Response Plan would be developed as part of the overall Emergency Response Plan to prevent contaminants affecting adjacent surrounding environments. The plan would include measures to: • Respond to the discovery of existing contaminants at the site (e.g. pesticide containers or asbestos), including stop work protocols and remediation and disposal requirements. • Requirement to notify the EPA for incidents that cause material harm to the environment (refer s147-153 of the POEO Act). • Manage the storage of any potential contaminants onsite. • Mitigate the effects of soil contamination by fuels or other chemicals (including emergency response and the EPA notification procedures and remediation. • Ensure that machinery arrives on site in a clean, washed condition, free of fluid leaks. • Prevent contaminants affecting adjacent pastures, dams, water courses and native vegetation. • Monitor and maintain spill equipment • Induct and train all site staff.	C	O	D

ID	Safeguards and Mitigation Measures	C	O	D
6	The transformers will be oil-fill, with waterproof bunds built around them to manage oil spills.		Design	
7	A protocol would be developed in relation to discovering buried contaminants within the proposal site (e.g. pesticide containers). It would include stop work, remediation and disposal requirements.	C	O	D
8	A Rehabilitation Plan would be prepared to ensure the array site is returned to at least or better than pre-solar farm land and soil capability. The plan would be developed with reference to the base line soil testing and with input from an agronomist to ensure the site is left stabilised, under a cover crop or other suitable ground cover. The soil survey would be based on: • *Australian Soil and Land Survey Handbook* (CSIRO, 2009) • *Guidelines for Surveying Soil and Land Resources* (CSIRO, 2008) • *The land and soil capability assessment scheme: second approximation* (OEH, 2012)			D
9	A pest and weed management plan would be prepared to manage the occurrence of priority weeds and pest species across the site during construction and operation. The plans must be prepared in accordance with MWRC and NSW DPI requirements.	C	O	
10	Consultation with local community, to minimise impact of the Proposal on adjacent agricultural activities and access.	C	O	D
Compatibility with Existing Land Uses				
1	Consultation would be undertaken with TransGrid regarding connection to the substation and design of electricity transmission infrastructure.	C	O	D
2	Consultation with proposal site exploration licence holders regarding the proposal and potential impacts.	C	O	D
3	Consultation with relevant parties involved in existing or proposed developments associated with the Wilpinjong mine, Ulan mine, Moolarben mine and Bylong mine.	C	O	D
4	**Prior to the commencement of construction, the Proponent must consult with the Resources and Geosciences Division of the Department of Planning and Environment and Wilpinjong Coal Pty Ltd with respect to measures to be applied during construction and operation of the proposal so as to minimise the potential for any sterilisation of resources on tenements held by Wilpinjong Coal Pty Ltd.**	**PC**		
Historic heritage				
1	Should an item of historic heritage be identified, the Heritage Division (OEH) would be contacted prior to further work being carried out in the vicinity.	C	O	D
Water use and water quality				

ID	Safeguards and Mitigation Measures	C	O	D
1	Design waterway crossings and services crossing in accordance with the publications: • *Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge, 2003). • *Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW DPI, 2003). • *Guidelines for Watercourse Crossings on Waterfront Land* (NSW DPI, 2012). • *Guidelines for Laying Pipes and Cable in Watercourses on Waterfront Land* (NSW DPI, 2012).	C	O	D
2	All fuels, chemicals, and liquids would be stored at least 40m from any waterways or drainage lines, not on sloping land and would be stored in an impervious bunded area.	C	O	D
3	The refuelling of plant and maintenance would be undertaken in impervious bunded areas on hardstand areas only.	C	O	D
4	All potential pollutants stored on-site would be stored in accordance with HAZMAT requirements and bunded.	C	O	D
5	Roads and other maintenance access tracks would incorporate appropriate water quality treatment measures such as vegetated swales to minimise the opportunity of dirty water leaving the site or entering the waterways.	C		D
Hydrology and flooding				
1	The design of buildings, equipment foundations and footings for electrical componentry and panel mounts would be designed to avoid the 1% AEP flood level to minimise impacts from potential flooding including: • The solar array mounting piers are designed to withstand the forces of floodwater (including any potential debris loading) up to the 1% AEP flood event plus 500mm freeboard, giving regard to the depth and velocity of floodwaters. • The mounting height of the solar module frames would be designed such that the lower edge of the module is clear of the predicted 1% AEP flood level. • All electrical infrastructure, including inverters, would be located above the 1% AEP flood level. • Where electrical cabling is required to be constructed below the 1% AEP flood level it would be capable of continuous submergence in water. • The proposed perimeter security fencing would be constructed in a manner which does not adversely affect the flow of floodwater and should be designed to withstand the forces of floodwater, or collapse in a controlled manner to prevent impediment to floodwater. • Security fencing would be designed so as to create two separate fenced compound on either side of Spring Flat Creek. • Flood warning signs and flood level indicators would be installed on each approach to the existing low-level crossing at the Southern Access. A weatherproof flood refuge building or structure would be constructed within the site on the western side of Wollar Creek.	Design		

ID	Safeguards and Mitigation Measures	C	O	D
2	An Emergency Response Plan incorporating a Flood Response Plan would be prepared prior to construction covering all phases of the Proposal. The plan would: • Detail who would be responsible for monitoring the flood threat and how this is to be done. • Detail specific response measures to ensure site safety and environmental protection. • Outline a process for removing any necessary equipment and materials offsite and out of flood risk areas (i.e. rotate array modules to provide maximum clearance of the predicted flood level). • Consider site access in the event that some tracks become flooded. • Establish an evacuation point. • Define communication protocols with emergency services agencies.	C	O	D
3	A Business Floodsafe Plan would be prepared prior to construction in general accordance with the NSW SES Business Floodsafe Toolkit and Plan".	C	O	D
Visual amenity and landscape character				
1	The materials and colour of onsite infrastructure would, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape. Where practical: • Proposed new buildings will be non-reflective and in eucalypt green, beige or muted brown. • Pole mounts will be non-reflective. Security fencing posts and wire would be non-reflective; green or black rather than grey would reduce the industrial character of the fence.	Design		
2	During construction, dust would be controlled in response to visual cues.	C		
3	Night lighting would be minimised to the maximum extent possible (i.e. manually operated safety lighting at main component locations).		O	
Noise and vibration				
1	A Noise Management Plan would be developed as part of the CEMP. The plan would include, but not be limited to: • Use less noisy plant and equipment where feasible and reasonable. • Plant and equipment to be properly maintained. • Provide special attention to the use and maintenance of 'noise control' or 'silencing' kits fitted to machines to ensure they perform as intended. • Strategically position plant on site to reduce the emission of noise to the surrounding neighbourhood and to site personnel.	C		

ID	Safeguards and Mitigation Measures	C	O	D
	• Avoid any unnecessary noise when carrying out manual operations and when operating plant. • Any equipment not in use for extended periods during construction work should be switched off. • Complaints procedure deal with noise complaints that may arise from construction activities. Each complaint would need to be investigated and appropriate noise amelioration measures put in place to mitigate future occurrences, where the noise in question is in excess of allowable limits. • Establish good relations with people living in the vicinity of the site at the beginning of proposal and maintain. Keep people informed, deal with complaints seriously and expeditiously. The community liaison member of staff should be adequately experienced.			
Social and economic impacts				
1	Liaison with local industry representatives to maximise the use of local contractors, manufacturing facilities, materials.	C		
2	Liaison with local representatives regarding accommodation options for staff, to minimise adverse impacts on local services.	C		D
3	Liaison with local tourism industry representatives to manage potential timing conflicts with local events.	C		D
4	The Community Consultation Plan would be implemented to manage impacts to community stakeholders, including but not limited to: • Protocols to keep the community updated about the progress of the Proposal and proposal benefits. • Protocols to inform relevant stakeholders of potential impacts (haulage, noise, air quality etc.). Protocols to respond to any complaints received.	C		D
5	The Proponent will consult with local employment agencies and training organisations and where practicable, will consider supporting training and apprenticeships.	C	O	D
6	**An Accommodation and Employment Strategy would be developed prior to the commencement of construction. It would include but not be limited to:** • **Identification of a strategy to facilitate accommodation of the workforce associated with the concurrent construction of other State Significant developments and during peak tourism times.** • **Development of a program to monitor and review the effectiveness of the strategy over the construction period.** • **Identification of a strategy to prioritise employment of local workers.**	**PC**		
Traffic transport and safety				

ID	Safeguards and Mitigation Measures	C	O	D
1	The following upgrade would be completed in consultation with MWRC. • Passing facilities will be implemented at strategic locations between Wollar village and the Northern Access.	C		
2	A Haulage Plan would be developed with input from the roads authority, including but not limited to: • Assessment of road routes to minimise impacts on transport infrastructure. • Scheduling of deliveries of major components to minimise safety risks (on other local traffic). • Consideration of cumulative traffic loads due to other local developments. Traffic controls (signage and speed restrictions etc.).	PC		D
3	**Upon determining the haulage route(s) for construction vehicles associated with the proposal, and prior to construction, undertake a Road Dilapidation Report. The report would:** • **Include a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council.** • **Describe mechanisms to restore any damage, at the cost of the proponent, that may result due to traffic and transport related to the construction of the Proposal.** • **Be submitted to the relevant road authority for review prior to the commencement of haulage.**	**PC**	**PO**	
4	**A Construction Traffic Management Plan would be developed as part of the CEMP and DEMP, in consultation with the MWRC and Roads and Maritime. The plan would include, but not be limited to:** • **Prior to construction, widening be undertaken along Barigan Road in accordance with the swept path assessment and access design providing in the Addendum TIA provided in Appendix C of the Submissions Report.** • **Prior to construction, sealing of Barigan Road in areas proposed for heavy vehicle use during construction.** • **A Workforce Travel Plan developed in consultation with MWRC including the designated routes of construction traffic to the site and carpooling/shuttle bus/car parking arrangements to minimise vehicle numbers during construction.** • **The designated routes of construction traffic to the site.** • **Carpooling/shuttle bus arrangements to minimise vehicle numbers during construction.** • **Identify specific road hazards associated with the area including not limited to fog, wet weather, frost and wildlife.**	**PC/C**		**D**

ID	Safeguards and Mitigation Measures	C	O	D
	• **Pedestrian management – Site access is to be restricted to authorised personnel only and existing employees on site. Pedestrian access to and around the site is to be maintained at all times. Within the site pedestrian travel paths are to be maintained to key areas such as building entrances and be free from trip hazards.** • **Scheduling of deliveries.** • **Construction of temporary car parking facilities.** • **Community consultation regarding traffic impacts for nearby residents and school bus operators.** • **Consideration of impacts to the railway.** • **Traffic control plans (speed limits, signage, etc.).** • **Procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts to key access road corridors.** o **Providing a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures.**			
5	**Develop and implement a Workforce Transport Plan in consultation with MWRC prior to construction to be incorporated within the Construction Traffic Management Plan. The plan should include:** • **Bus routes.** • **Bus pick up and drop off locations.** • **Bus movement frequencies.** • **All day parking options.** • **Development of a program to monitor and review the effectiveness of the strategy over the life of the development.**	**PC**		
6	**A Road Safety Audit in consultation with RMS focusing on the Wollar Road / Barigan Road intersection will be undertaken prior to commencement of construction.**	**PC**		
Bushfire				
1	Copper conductors would be used where necessary to electrically bond the metal structures to earth to protect personnel and equipment in the event of lightning strikes and electrical faults.	Design		

ID	Safeguards and Mitigation Measures	C	O	D
2	Dangerous or hazardous materials would be stored and handled in accordance with AS1940-2004: *The storage and handling of flammable and combustible liquids*.	C	O	D
3	Develop a Bush Fire Management Plan to include but not be limited to: • Specific management of activities with a risk of fire ignition (hot works, vehicle use, smoking, use of flammable materials, blasting). • Incorporation of fire safety and response in staff and contractor induction, training, OHS procedures and Work Method Statements. • Designation of a staff safety officer tasked with ensuring implementation of the plan and regular liaison with firefighting agencies. • Document all firefighting resources maintained at the site with an inspection and maintenance schedule. • Monitoring and management of vegetation fuel loads. • A communications strategy incorporating use of mobile phones, radio use (type, channels and call-signs), Fire Danger Warning signs located at the entrance to the site compounds, emergency services agency contacts. In developing the Bush Fire Management Plan, NSW RFS would be consulted on the volume and location of water supplies, fire-fighting equipment maintained on-site, fire truck connectivity requirements, proposed APZ and access arrangements, communications, vegetation fuel levels and hazard reduction measures.	C	O	D
4	An APZ of minimum 10m would be maintained between remnant or planted woody vegetation and solar farm infrastructure. The APZ around the perimeter of the site would incorporate a 4m wide gravel access track. Average grass height within the APZ would be maintained at or below 5 centimetres on average throughout the October-March fire season. Average grass height outside the APZ, including beneath the solar array, would be maintained at or below 15 centimetres throughout the fire season.	C	O	
5	The overhead powerlines at the site would be managed by maintaining appropriate vegetation clearance limits to minimise potential ignition risks, in accordance with the *ISSC 3 Guideline for Managing Vegetation Near Power Lines*.		O	
6	Appropriate fire-fighting equipment would be held on site to respond to any fires that may occur at the site during construction. This equipment would include fire extinguishers, a 1000 litre water cart retained on site on a precautionary basis, particularly during any blasting and welding operations. Equipment lists would be detailed in Work Method Statements.	C		

ID	Safeguards and Mitigation Measures	C	O	D
7	The NSW RFS and Fire and Rescue would be provided with a contact point for the solar farm, during construction and operation.	C	O	
8	Following commissioning of the solar farm, the local RFS and Fire and Rescue brigades would be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site.		O	
9	The perimeter access track would comply with the requirements for Fire Trails in the PBP guidelines. All access and egress tracks on the site would be maintained and kept free of parked vehicles to enable rapid response for firefighting crews and to avoid entrapment of staff in the case of bush fire emergencies. Access tracks would be constructed as through roads as far as practicable. Dead end tracks would be signposted and include provision for turning firetrucks.	C	O	D
10	A Hot Works Permit system would be applied to ensure that adequate safety measures are in place. Fire extinguishers would be present during all hot works. Where practicable hot works would be carried out in specific safe areas (such as the Construction Compound temporary workshop areas).	C	O	D
11	Machinery capable of causing an ignition would not be used during bushfire danger weather, including Total Fire Ban days.	C	O	D
12	Prior to operation of the solar farm, an Emergency Response Plan (ERP) would be prepared in consultation with the RFS and Fire and Rescue NSW. This plan must include but not be limited to: • Specifically addresses foreseeable on site and off site fire events and other emergency incidents. • Risk control measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum evacuation zone distances and a safe method of shutting down and isolating the PV system (either in its entirety or partially, as determined by risk assessment). • Outline other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site. • Two copies of the ERP are stored in a prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point/s. • Once constructed and prior to operation, the operator of the facility would contact the relevant local emergency management committee (LEMC).		O	
13	Fire risks associated with the lithium-ion energy storage facility would include: • Locating the Energy Storage Facility as far as practicable from any sensitive receptors or large stands of vegetation.		O	

ID	Safeguards and Mitigation Measures	C	O	D
	• Installing reliable automated monitoring (voltage and temperature), alarm and shutdown response systems. • Installing reliable integrated fire detection and fire suppression systems (inert gas). • Ensuring the battery containers are not vulnerable to external heat effects in the event of a bushfire. • Designing appropriate separation and isolation between battery containers and between batteries and other infrastructure, including gravel surfacing around the facility. • Compliance with all relevant guidelines and standards. • Preparation of a specific Battery Fire Response Plan, under the general Bushfire Management Plan, in consultation with fire authorities, fire suppression experts and in reference to relevant standards and guidelines. • Facilitation of first responder training in the management of Lithium-ion battery fires at the site for local brigades.			
14	**A Fire Safety Study (FSS) will be undertaken and developed in accordance with the requirements of Hazardous Industry Planning Advisory Paper No. 2 (HIPAP No.2) and consultation with FRNSW prior to commencement of construction. The FSS will consider the limited operational capacity of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety dependence.**	**PC**		
Electric and magnetic fields				
1	All electrical equipment would be designed in accordance with relevant codes and industry best practice standards in Australia.	C		
2	All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required.	C		
3	Design of electrical infrastructure would minimise EMFs.	C		
Air quality and climate				
1	Track width of internal tracks would be minimised during detailed design.	Design		
2	Dust generation by vehicles accessing the site and earthworks at the site would be suppressed using water applications or other means as required.	C		D
3	Vehicle loads of material which may create dust would be covered while using the public road system.	C		D

ID	Safeguards and Mitigation Measures	C	O	D
4	All vehicles and machinery used at the site would be in good condition, fitted with appropriate emission controls and comply with the requirements of the POEO Act, relevant Australian standards and manufacturer's operating recommendations. Plant would be operated efficiently and turned off when not in use.	C	O	D
5	Fires and material burning is prohibited on the proposal site.	C	O	D
Resource use and waste generation				
1	A Waste Management Plan (WMP) would be developed to minimise wastes. It would include but not be limited to: • Identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy. • Quantification and classification of all waste streams. • Provision for recycling management onsite. • Provision of toilet facilities for onsite workers and identify that sullage would be disposed of (i.e., pump out to local sewage treatment plant). • Tracking of all waste leaving the site. • Disposal of waste at facilities permitted to accept the waste. • Requirements for hauling waste (such as covered loads).	C	O	D
2	Septic system is installed and operated according to the MWRC regulations.	C	O	
Hazardous materials and development				
1	Design of the Energy Storage Facility would be undertaken to address fire risks (spacing and setbacks).		Design	
2	Dangerous or hazardous materials would be stored and handled in accordance with AS1940-2004: *The storage and handling of flammable and combustible liquids*.	C	O	D
3	Protocols would be developed for lithium-ion battery storage, maintenance, and incident response to mitigate Li-ion fire risks.	C	O	D
4	The transportation of new and waste lithium-ion batteries would comply with the requirements of the Dangerous Goods Code, including specific 'special provisions' and 'packing instructions' applying to the transportation of Li-ion batteries.	C	O	D

APPENDIX B UPDATED TRAFFIC IMPACT ASSESSMENT

Ontoit (2019).

12/06/2019 /

Wollar Solar Farm

Traffic Impact Assessment

CREATING CERTAINTY.

ontoit.

Document Information

Contact Details

Name:	Rhys Davies
Title	Executive Director
Email	rhys.davies@ontoit.com
Phone	0410 204 667

Document Control

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4.0	12/06/2019	Rhys Davies	Dave Lavers		Updated to address comments from DPI and RMS
5.0	24/06/2019	Rhys Davies	Dave Lavers		Final Amendments

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1. Introduction

1.1 Background

Ontoit were engaged by NGH Environmental (NGH) to undertake a comprehensive review of the existing and future transport conditions as part of a Traffic Impact Assessment (TIA). The TIA was originally prepared to assist with the completion of an Environmental Impact Assessment for the proposed Solar Farm at Wollar, NSW, and has since been updated to capture feedback and request for additional information from public agencies to feed into the Submission Reporting stage.

The purpose of the study is to examine the operation of the existing traffic network and to assess the traffic and parking impacts that may arise from both the construction and operational activities generated by the proposed Solar Farm. In addition, this report builds upon the work undertaken by NGH in producing the *'Preliminary Environmental Assessment (2018)'* and the resulting agency comments and Secretary's Environmental Assessment Requirements (SEARs).

This report presents the analysis and results that have been undertaken as part of the TIA and will support the broader Environmental Impact Assessment for the proposed Solar Farm. The assessment of traffic and parking impacts generated by the proposed development is based on the following information and guidelines:

- Proposed development plans and designs provided by NGH;
- The NSW Roads and Maritime (RMS) *Guide to Traffic Generating Developments* (Version 2.2, October 2002);
- The Mid Western Regional Council Development Control Plan (DCP) 2013 (Amendment No.2, Dec 2014); and
- Review of existing traffic and parking conditions in the surrounding road network.

This report has been updated in response to feedback from the Department of Planning and Environment (DPE), RMS Western Region and Mid-Western Regional Council.

1.2 Site Context

Ontoit understands the proposed Solar Farm site is located 7km south of Wollar Village and is situated to the west of Barigan Road (see **Figure 1** red circle). The Village of Wollar is located within the Mid-Western Regional Local Government Area (LGA) and is approximately 54km north-east of Mudgee (38kms as the crow fly's). Primary access to the village is via Wollar Road from the east and west and Ulan-Wollar Road from the north which connects to the Golden Highway via Ulan Road.

The land immediately surrounding the proposal site is a mix of grazed and Crown Land. We understand that the grazed land is currently occupied by approximately 200 head of cattle and 18 sheep; and forms one of the primary industries of the area. Coal mining is another predominant industry and employer within the area and the nearest mine is located at Wilpinjong, which is approximately 11km north west of the proposed Solar Farm site.

The village of Wollar is the nearest inhabited area which had a recorded population of 69 people in 2016. The town boasts a number of facilities including a general store (including Post Office and fuel), community hall, Rural Fire Services and a public primary school. We understand the predominant industry for local residents is farming which includes cattle and cropping for feed. In addition, the Wilpinjong Mine is located approximately 5km north east of the village and was established in 2006. Since establishment, the operator Peabody Energy has received further approval (April 2017) for expansion of the facility to the north east of the existing site.

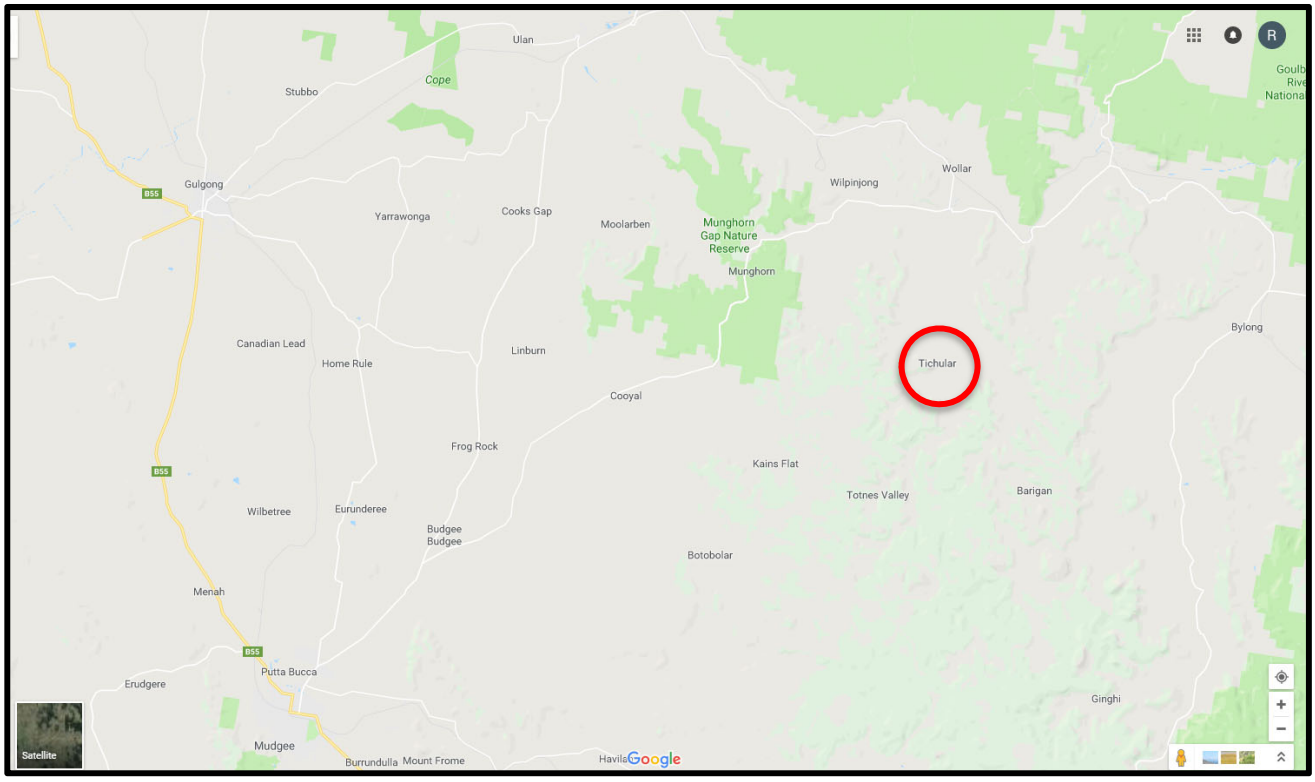


Figure 1 Proposed Solar Farm location in Mid-Western Regional Council

The area of Wollar is further serviced through the regional centre of Mudgee located approximately 38km south west of the proposed Solar Farm site. Wollar residents have access to all the major services including banks, supermarkets, accommodation, post office, medical centres and a hospital at Mudgee. Based on the 2016 Census, Mudgee currently has a population of 10,923 which is an increase of 9.7% since 2006 and currently makes up 44.4% of the Mid-Western Regional LGA. Access to Mudgee from Wollar is via Wollar Road and Ulan Road which provide direct access into the Town Centre of Mudgee.

1.3 Report Structure

This report provides advice and analysis on the potential future traffic and transport conditions that will result from the proposed Solar Farm. The report has been structured as follows:

- Chapter 2 – Existing Situation – this section provides an overview of the current traffic and transport conditions in the vicinity of the proposed development site;
- Chapter 3 – The Development Proposal – this section provides an overview of the development proposal and associated transport and traffic infrastructure;
- Chapter 4 – Traffic and Parking Generation – this section outlines the traffic and parking generation associated with the proposed development;
- Chapter 5 – Traffic and Transport Impact Assessment – this section of the report assesses the impacts that are likely to result from the proposed development;
- Chapter 6 – Options and Mitigation Measures – this section outlines a number of potential mitigation measures to assist in minimising the impacts associated with the additional traffic generated by the proposed development; and
- Chapter 7 – Summary and Conclusion – this section summarises the analysis and key conclusions / recommendations of the study.

2. Existing Conditions

A comprehensive review of the transport and traffic network in the vicinity has been undertaken to establish a baseline of conditions. This section outlines and summarises the findings from this review.

2.1 Road Network

The area of Wollar is located within the Mid-Western Regional LGA and is accessed via three primary road corridors:

- Wollar Road from the west which connects to Ulan Road to access the Regional Centre of Mudgee;
- Wollar Road from the east which connects to Ringwood Road to access the Golden Highway or alternatively continues to access the Bylong Valley Way to access Bylong and Murrumbo; and
- Ulan-Wollar Road from the north that connects to Ulan Road and the Golden Highway to the north or alternatively to Gulgong via Cope Road in the west.

Figure 2 illustrates the location of Wollar noting the major regional towns of Mudgee and Gulgong to the west.

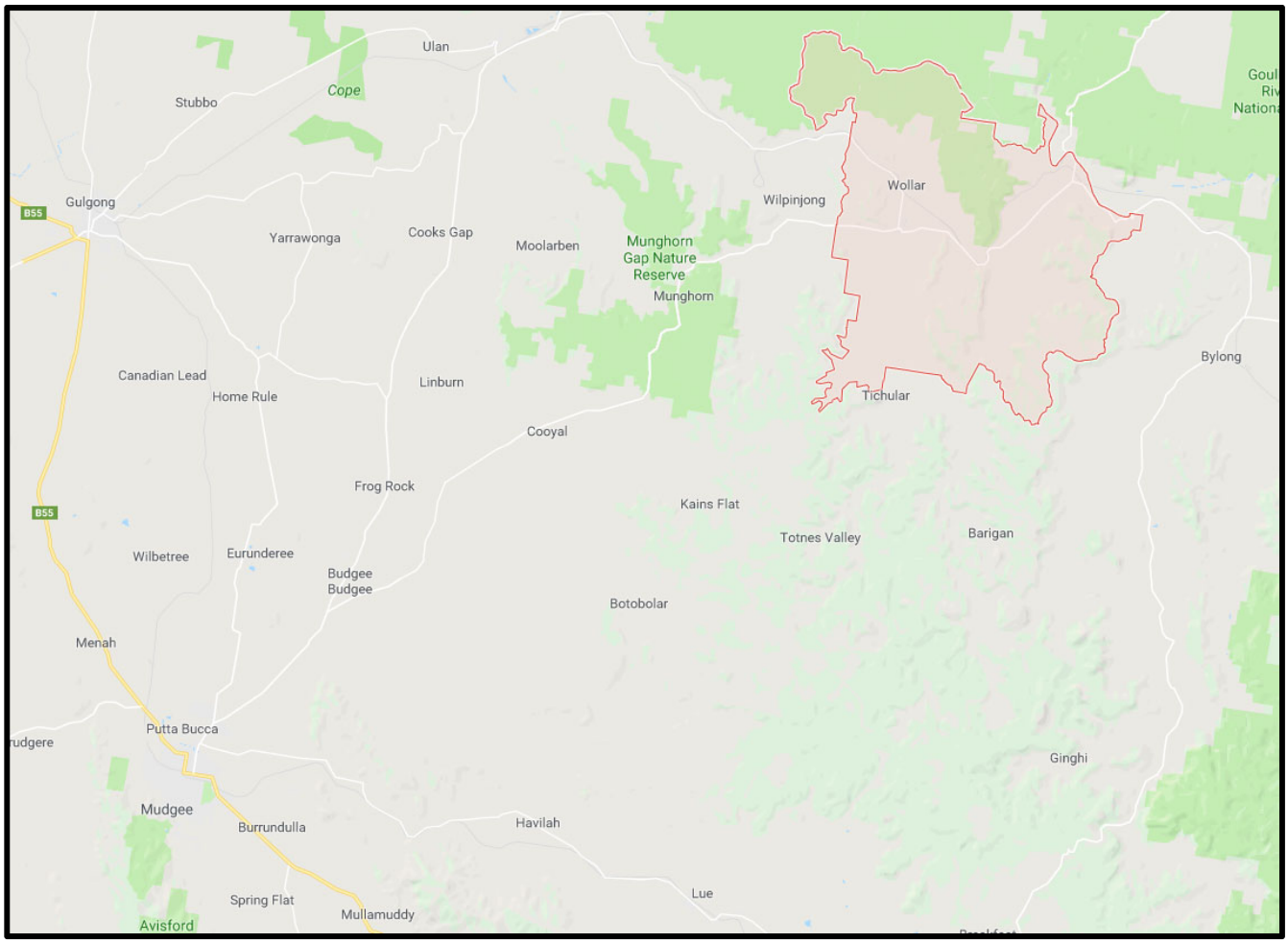


Figure 2 The area of Wollar obtained via Google Maps

The area of Wollar is centred around Wollar Village which is the closest inhabited area to the proposed Solar Farm. The proposed Solar Farm site under investigation is located approximately 7km south of Wollar Village and is accessed via Barigan Road. **Figure 3** illustrates the location of the proposed Solar Farm and key access corridors.

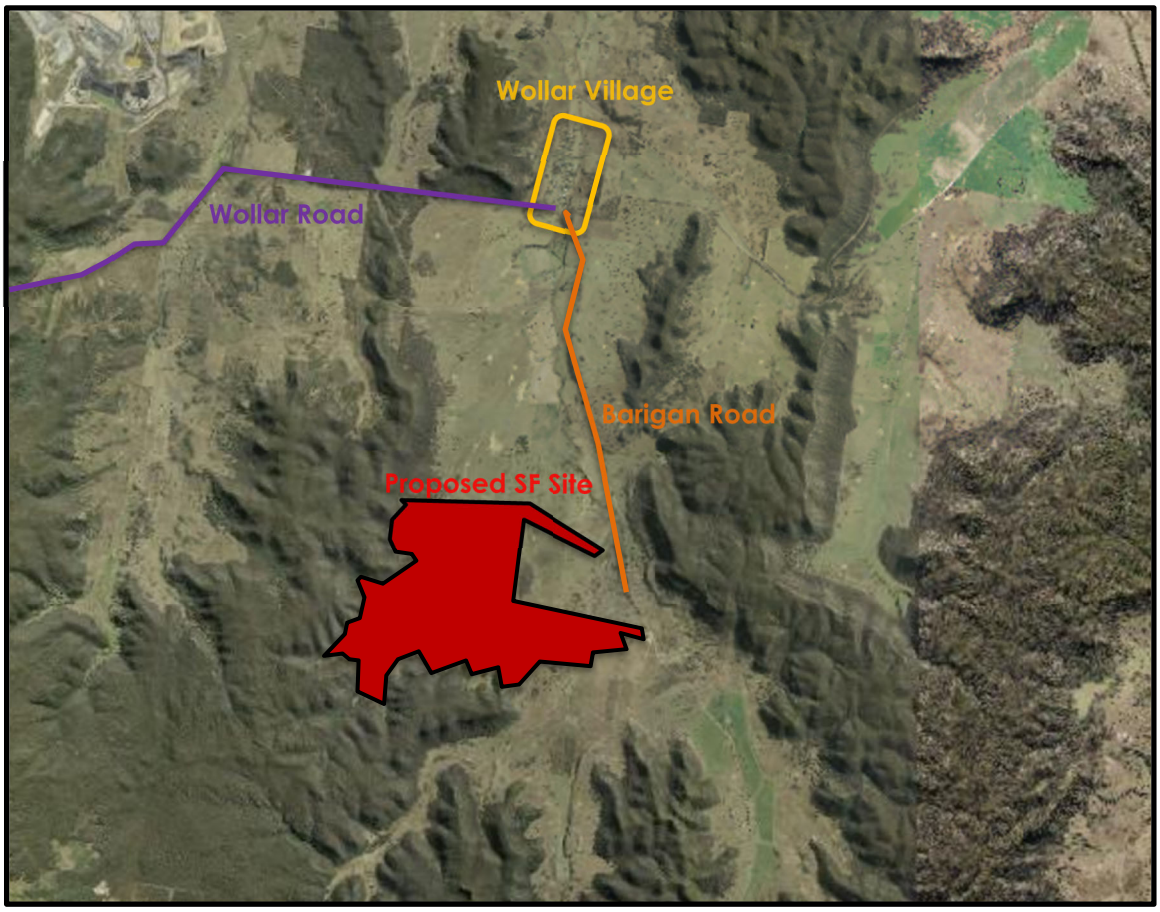


Figure 3 Proposed Solar Farm site and key access corridors sourced from NSW Six Maps

Access to the proposed Solar Farm site is via the three primary access corridors that connect to Wollar Village. From the village access to the site is via Barigan Road which links the proposed access roads to the site. Characteristics for each of these roads are different and are briefly described below:

– Wollar Road (east and west of Wollar Village) is classified as a Regional Road in the RMS Road Classification Hierarchy and consists of:
  > Sealed bitumen road with approximate carriageway width of 7m (see **Figure 4** and **Figure 5**);
  > Single traffic lane in each direction;
  > Line marking in the form of centre lines and in some cases road edges;
  > Regular property and commercial development accesses directly off the roads;
  > Posted speeds on open road and in built up areas;
  > Regular unsignalised priority-controlled intersections with local roads; and
  > An existing roadway capacity of approximately 600-900 vehicles per hour, per lane.

Figure 4 Wollar Road between Ulan Road and Hayes Gap Road

Figure 5 Wollar Road between Mahons Road and O'Brien's Lane

- Ulan-Wollar Road is not a classified road within the RMS Road Classification Hierarchy and is therefore a local council access road, key characteristics include:
  - > Sealed bitumen road with approximate carriageway width of 7m;
  - > Single traffic lane in each direction;
  - > No regular Line marking in the form of centre lines and in some cases road edges;
  - > Regular property and commercial development accesses directly off the roads;
  - > A number of rail crossings;
  - > Posted speeds 100kph on open road and 50kph in built up areas;
  - > Regular unsignalised priority-controlled intersections with local roads; and
  - > An estimated existing roadway capacity of approximately 300-500 vehicles per hour, per lane.
- Barigan Road is not a classified road within the RMS Road Classification Hierarchy and is therefore a local council access road, key characteristics include:
  - > Unsealed road with approximate carriageway width of 6-7m (see **Figure 6** and **Figure 7**);
  - > Single carriageway road with no formal line marking, requires vehicle to slow and move to one side to enable safe passing;
  - > Regular property and commercial development accesses directly off the roads;
  - > Regular unsignalised priority-controlled intersections with local roads; and
  - > An existing roadway capacity of approximately 300-500 vehicles per hour.

Figure 6 Barigan Road immediately after Wollar Village

Figure 7 Barigan Road 2-3km south of Wollar Village

The proposed Solar Farm is accessed via Barigan Road which connects the proposed development site to Wollar Village. Barigan Road is accessible via a number of RMS State and Regional Roads as illustrated in **Figure 8**.

Figure 8 RMS NSW Regional Road Map (red dot denotes approximate location of proposed Solar Farm)

From a broader regional perspective, the proposed Solar Farm site is easily accessible via the regional road network that connects to the regional centres of Mudgee and Gulgong. Both Mudgee and Gulgong are accessible via Wollar Road and Ulan Road. Further to this, Ulan Road provides direct connections to both the Castlereagh Highway, which provides a direct connection to Sydney; Port Botany, and the Golden Highway, which provides direct access to Newcastle and the Port of Newcastle. These regional connections will likely play a critical role during the establishment of the Solar Farm which is discussed further in **Section 4**.

2.1.1 Vehicle Volumes

Local area traffic data was sourced from two locations:

- The 2015 Wilpinjong Extension Project – Road Transport Assessment (GTA Consultants); and
- A site visit conducted on Tuesday 7th of August 2018.

Figure 9 illustrates the location of survey traffic data that was collected during the 2015 counts and from the recent site visit.

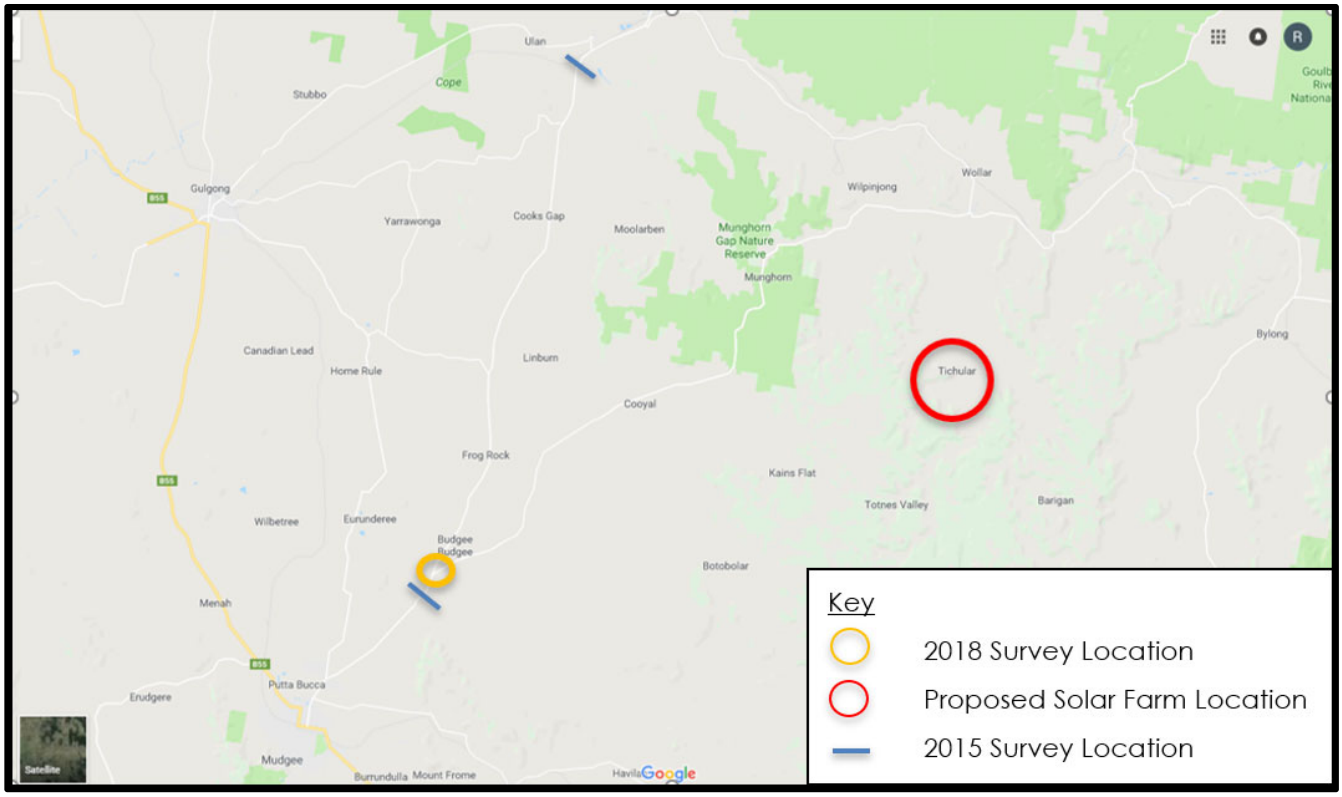


Figure 9 Traffic survey data collection

Traffic surveys were focussed to capture traffic flows along primary access corridors, as advised by the client, which are anticipated to be to the west of the proposed Solar Farm location. Ontoit was advised that:

- Equipment and materials will largely be imported and therefore arrive at either Port Botany, Sydney or the Port of Newcastle. Key access roads from these locations include:
  - The Castlereagh Highway linking to Mudgee then onto Ulan Road and Wollar Road for goods arriving from Port Botany; and
  - From the Port of Newcastle, multiple routes are available however the Golden Highway will form the primary access corridor. Access to Wollar can be gained via Bylong Valley Way and Wollar Road, Ringwood Road and Wollar Road or alternatively Ulan Road, which all connect to the Golden Highway.
- Workers and staff are likely to come from local regional towns, key access corridors include:
  - From Mudgee – Ulan Road onto Wollar Road, which connects to Barigan Road;
  - From Gulgong – Multiple routes are available; however, two routes are considered to provide the most direct access, these include:
    - Cope Road to connect to Ulan Road, then onto Ulan-Wollar Road, which connects to Barigan Road; and
    - Henry Lawson Drive – Mudhut Creek Road – Ulan Road – Linburn Lane, which connects to Wollar Road and provides access to Barigan Road.

Given the above information, traffic survey data was collected to establish a robust baseline for the primary road corridors; Ulan Road and Wollar Road. In addition, comprehensive 24-hour, 7-day data was collected in 2015 (see **Attachment A.1**) which was utilised to determine the location and timing of the 2018 surveys. As such, the 2018 surveys were focused at the Ulan Road / Wollar Road intersection; to enable a comparison between the existing 2015 data and to obtain recent movement and turning data for the Ulan Road – Wollar Road corridor. The 2018 surveys were focused on:

- The AM Peak Period – determined to be 5am-6am consistently from the 2015 traffic counts; and
- A PM Count – the 2015 traffic surveys had varying PM peak periods which were dependent on location. Therefore, the 2018 count was undertaken between 3pm and 4pm to obtain a typical weekday PM traffic volume count (*this was also consistent with the southbound Ulan Road, south of Wollar Road 2015 count PM peak Period)*.

The results of the 2018 traffic surveys are illustrated in **Figure 10**.

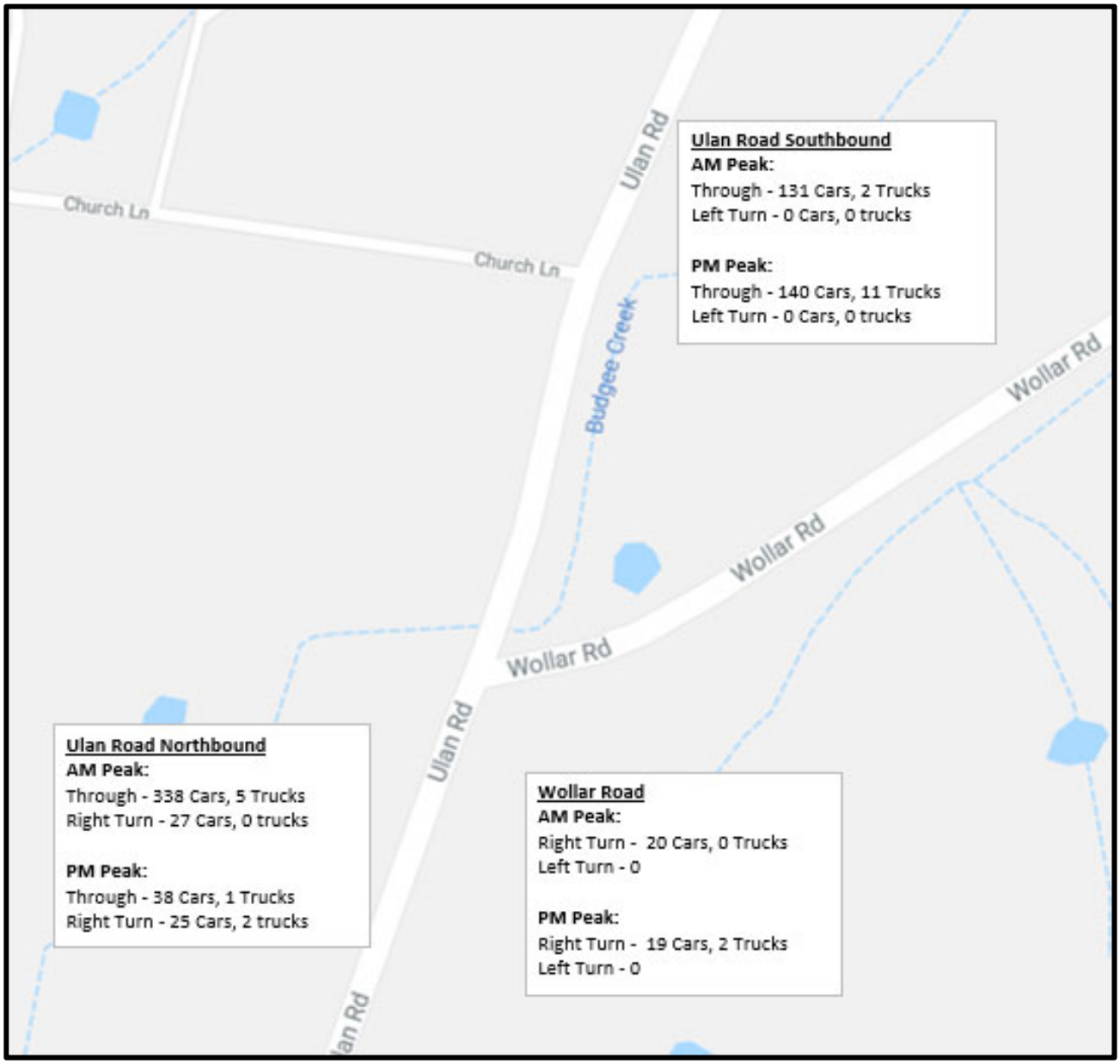


Figure 10 Summary of the 2018 traffic survey counts for AM and PM peak periods

2.1.2 2015 vs 2018 Traffic Volume Observations

A comparison on the 2018 vs 2015 traffic surveys was undertaken for Ulan Road to assist in establishing a robust baseline in traffic activity in the region over the past three years. In addition, the comparison was undertaken to identify any impacts associated with adjacent development / land uses such as the Wilpinjong Mine Extension.

In 2015, the *'Wilpinjong Extension Project – Road Transport Assessment' (WEP RTA)*, see Table 6.1, identified an increase of 200 vehicles in the AM peak hour along Ulan Road south of the intersection with Wollar Road by 2017. The 2018 count identified a growth of 135 vehicles, approximately 40% increase, in northbound traffic and a further 66 additional vehicles southbound, approximately 100% increase. This equates to a total growth of 201 vehicles along Ulan Road in the AM Peak period which is consistent with the forecasts presented in the WEP RTA. It is therefore a reasonable conclusion that all the growth along Ulan Road can be attributed to the expansion of the Wilpinjong Mine.

In the PM peak the WEP RTA identified an additional 163 vehicles. The 2018 surveys indicated a decrease of 83 vehicles northbound, approximately 60% decrease and an increase of 17 vehicles southbound, approximately 11% increase. Whilst the 2018 counts are not consistent with the WEP RTA forecasted traffic growth, it should be noted that this could be explained by our PM traffic count focusing on 3-4pm as opposed to the 6-7pm noted in the RTA. Overall, we can conclude that the primary impact of the expansion of the mine has been on the AM peak period.

2.1.3 Historic Origin and Destination Data

The 2015 Road Transport Assessment for the Wilpinjong Extension Project undertook analysis of the existing distribution of visitor, delivery and workers for the existing mine operations. Whilst the proposed Solar Farm does not have an existing operation, the trip distribution for the Wilpinjong Mine operation provides a good indicator of the potential trip distributions for the Solar Farm. In 2015, the existing mine operations had a trip distribution of:

- 89% to/from Mudgee utilising Ulan Road and Ulan – Wollar Road;
- 9% to/from Newcastle utilising the Golden Highway and Ulan – Wollar Road; and
- 2% to/from Orange, utilising Mitchell Highway to Wellington and Gulgong, then Cope Road to Ulan Road (GTA, 2015).

This trip distribution data will be utilised to assist in determining the trip distribution for the proposed Solar Farm in **Section 4**.

2.2 Intersection Layouts and Geometry

There are two existing intersections that are leading to the main entry for the proposed Wollar Solar Farm, these include:

- Ulan Road / Wollar Road Priority Intersection; and
- Wollar Road / Barigan Road Priority Intersection.

The following section touches briefly on the existing layouts, geometries and features of each intersection.

Ulan Road / Wollar Road

The Ulan Road / Wollar Road intersection is currently a priority-controlled intersection. The key features include:

- Single through lane north and south on Ulan Road;
- A right turn pocket lane approximately 100m in length on Ulan Road to accommodate right turns into Wollar Road;

- A right and left turn lane out of Wollar Road onto Ulan Road giving way to through and right turn movements; and
- The intersection has clear signage on all approaches directing traffic.

Figure 11 illustrates the existing layout of the Ulan Road / Wollar Road intersection.

Figure 11 Ulan Road / Wollar Road intersection

From the site visit and site photos the key observations can be made:

- No traffic queuing was observed during the site visit;
- The intersection has good visibility and site lines for all movements;
- The intersection appears to have sufficient storage capacity for turning movements; and
- Intersection appears to have undergone a recent upgrade with new line markings evident.

There were no obvious deficiencies with the intersection in its current form.

Wollar Road / Barigan Road

The Wollar Road / Barigan intersection is currently a priority-controlled intersection. The key features include:

- No existing line markings at the intersection;
- Wollar Road and Barigan Road approaches are approximately 7m in width on approach which would enable vehicles to pass comfortably;
- There is a 5m single lane bride approximately 50m in length on Wollar Road on the eastbound approach lane; and
- There is no current signage on approaches directing traffic through the bridge or between Wollar Road and Barigan Road.

Figure 12 illustrates the existing layout of the Ulan Road / Wollar Road intersection.

Figure 12 Wollar Road / Barigan Road intersection (credit: six maps)

From the site visit and site photos the key observations can be made:

- No traffic queuing was observed during the site visit;
- Existing traffic volumes are extremely low;
- The intersection has good visibility and site lines for all movements which is assisted by the slow speed on approaches;
- The intersection appears to operate within capacity largely due to the very low traffic volume; and
- The single lane bridge could potentially be a constraint and temporary traffic management measures may be required to manage traffic flow through the bridge.

In consultation with RMS, a Road Safety Audit has been requested specifically for this intersection, the RSA will be completed prior to the construction activity commencing.

2.3 Access

Existing accesses in the vicinity of the proposed Solar Farm are all off Barigan Road. There are a number of potential accesses to the site including:

- The unnamed access to the existing substation (see **Figure 13,**
- **Figure** 14 and **Figure 15**), this is currently an unsealed road approximately 4-5m in width; and
- Maree Road is an existing unsealed road approximately 4-5m in width (see **Figure 16 and Figure 17**).

Figure 13 Existing substation access road aerial (Credit: Google Maps)

Figure 14 Existing Substation access road

Figure 15 Existing substation access toad intersection with Barigan Road

Figure 16 Existing Maree Road access

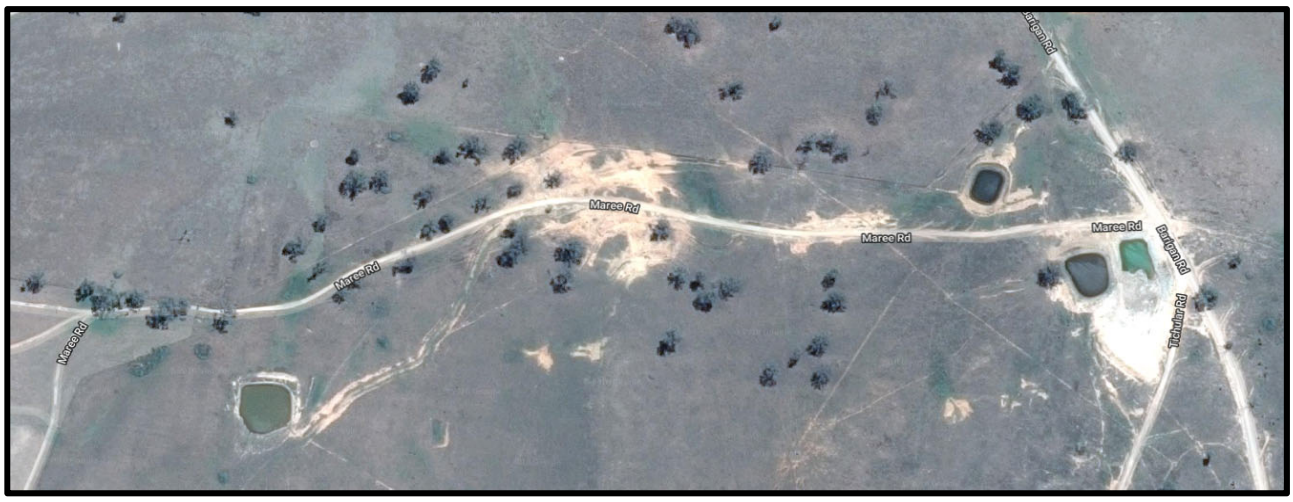


Figure 17 Maree Road

2.4 Crash Data

Existing road crash data was sourced from the Transport for NSW road safety website, available from: *http://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4*. A review of historic crash data (between 2011 and 2016) was undertaken focussing on the primary corridors to and from the proposed Solar Farm site at Wollar. Crash data was analysed for:

- Ulan Road between Mudgee and Golden Highway;
- Wollar Road between Ulan Road and Barigan Road; and
- Ulan-Wollar Road between Ulan Road and Wollar Village.

No crashes have been recorded on Ulan-Wollar Road therefore analysis focused on Ulan Road and Wollar road. **Figure 18** illustrates a summary of the road crashes between 2013 and 2017 within the Mid-Western Region of NSW.

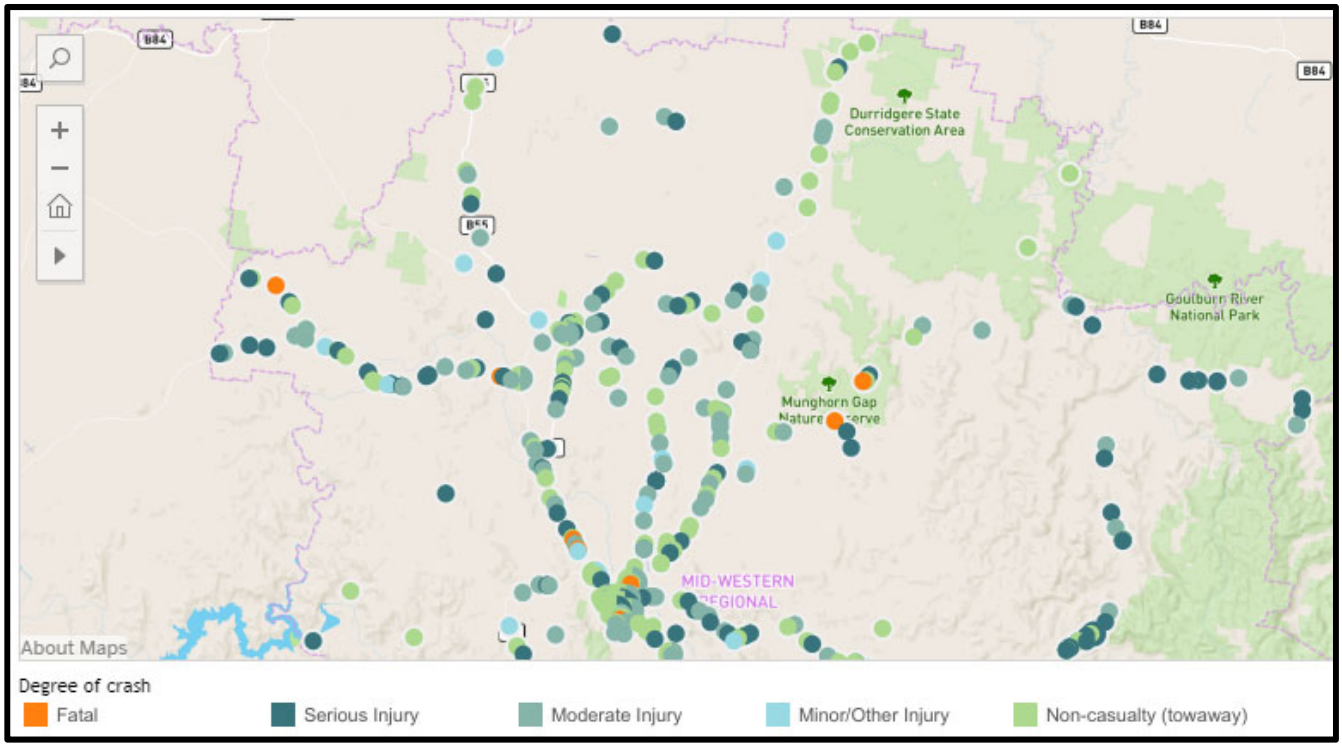


Figure 18 Summary of road crashes by severity between 2013 and 2017 for the Mid-Western Region

Figure 18 illustrates that there are a number of crashes along the key corridors to the proposed Solar Farm Site. Of particular interest is the number of Serious and Fatal crashes recorded on Ulan Road and Wollar Road. Subsequently, the crash data was further refined by road corridor, severity and year. For Ulan Road, **Table 1** provides a summary of the crashes along Ulan Road between Mudgee and the Golden Highway between 2013 and 2017.

Table 1 Detailed crash data for Ulan Road

Severity	2013	2014	2015	2016	2017	TOTAL
Fatal	0	2	0	0	0	2
Serious Injury	2	1	0	1	1	5
Moderate Injury	4	6	2	4	3	20
Minor Injury	1	0	1	0	0	2
Non-Casualty	7	7	4	4	0	22
TOTAL	**14**	**16**	**7**	**9**	**4**	**51**

Further analysis of the fatal and serious injury crashes concluded:

- 2 serious incidents occurred in 2013. One was caused by a collision with an object after drifting off the road after a 'S' bend, resulting in one serious injury. The other was due to one car being rear ended during the night, this also resulted in one serious injury. Both incidents occurred during the night;
- 2 Fatal incidents occurred in 2014. One was due to a loss of control by the driver, resulting in the loss of one life. The other was due to one car being rear ended, also resulting in the loss of one life. Both of these incidents occurred during the day;

- 1 serious incident occurred in 2016, due to drifting off the road after a sharp left bend, this resulted in one injury and occurred during the day; and
- 1 serious incident occurred in 2017, due to collision with a pedestrian. This resulted in one injury and occurred during the day.

We can conclude from the above analysis that the majority of serious and fatal crashes occurred due to driver error or drivers not driving to the conditions of the road carriageway. Despite the number of crashes over the last five years along Ulan Road the overarching trend is declining year on year.

For Wollar Road, **Table 2** provides a summary of the crashes between Ulan Road and Wollar Village between 2013 and 2017.

Table 2 Detailed crash data for Wollar Road

Severity	2013	2014	2015	2016	2017	TOTAL
Fatal	0	0	0	2	0	2
Serious Injury	1	0	0	0	2	3
Moderate Injury	1	0	1	2	0	4
Minor Injury	0	1	0	0	1	2
Non-Casualty	0	3	0	0	0	3
TOTAL	**2**	**4**	**1**	**4**	**3**	**14**

Further analysis of the fatal and serious injury crashes concluded:

- 2 Fatal incidents occurred in 2016, with 3 casualties. One was caused by collision with an object after drifting off the road during an 'S' bend occurring in the day, resulting in one fatality. The other crash was due to an animal collision during the night, which resulted in 2 fatalities;
- 1 serious incident occurred in 2013 due to collision with an object after drifting off the road during a sharp right bend occurring during the day, resulting in two people being injured; and
- 2 serious incidents occurred in 2017 due to collisions with objects after drifting off the road after 'S' bends, these occurred in very close proximity to each other. These crashes resulted in 3 injuries

We can conclude from the above analysis that the majority of serious and fatal crashes occurred due to driver error or drivers not driving to the conditions of the road carriageway. There is no overarching trend for Wollar Road based on the total yearly crashes as they have remained fairly consistent over the last five years.

2.5 Rail Crossings

There are no existing rail crossings along the primary approach route which includes Ulan Road, Wollar Road and Barigan Road.

Whilst there are a number of rail crossings along Ulan-Wollar Road, the volumes of traffic expected to approach from this route is minimal and will therefore have a negligible impact on their operation. In 2015, GTA consultants undertook a comprehensive assessment of the rail crossing capacity along Ulan-Wollar Road corridor. They also estimated the probability of vehicles encountering a train at a crossing point and therefore the probability of delays. In all cases apart from one crossing which measured just over 2%, the probability was measured to be less than 1%. This result indicates that the chances of a vehicle encountering a train along this corridor is very low.

The current train timetable for the corridor is understood to be 1 train every 30 minutes or up to 3 trains an hour. Given the low volume of train activity on the line, as well as the low traffic volume increase along the Ulan-Wollar Road corridor, we envisage minimal impact on vehicular traffic using this corridor to access the Solar Farm.

2.6 Parking

No existing formal parking facilities at the proposed Solar Farm location were identified during the August 2018 site visit.

2.7 Active Travel

During the August 2018 site visit, no active travel infrastructure or use was observed. No formal facilities exist on the primary approaches or at the proposed Solar Farm location.

2.8 Public Transport

No regular public transport routes have been identified linking to the Village of Wollar. However, there is an existing School Route that provides a service for Wollar Village children to access Mudgee School. The existing route is illustrated in **Figure 19**. This service is currently provided once during the AM commencing at 7:30am on Araluen Road and one in the PM returning to Wollar Village at 4:45pm.

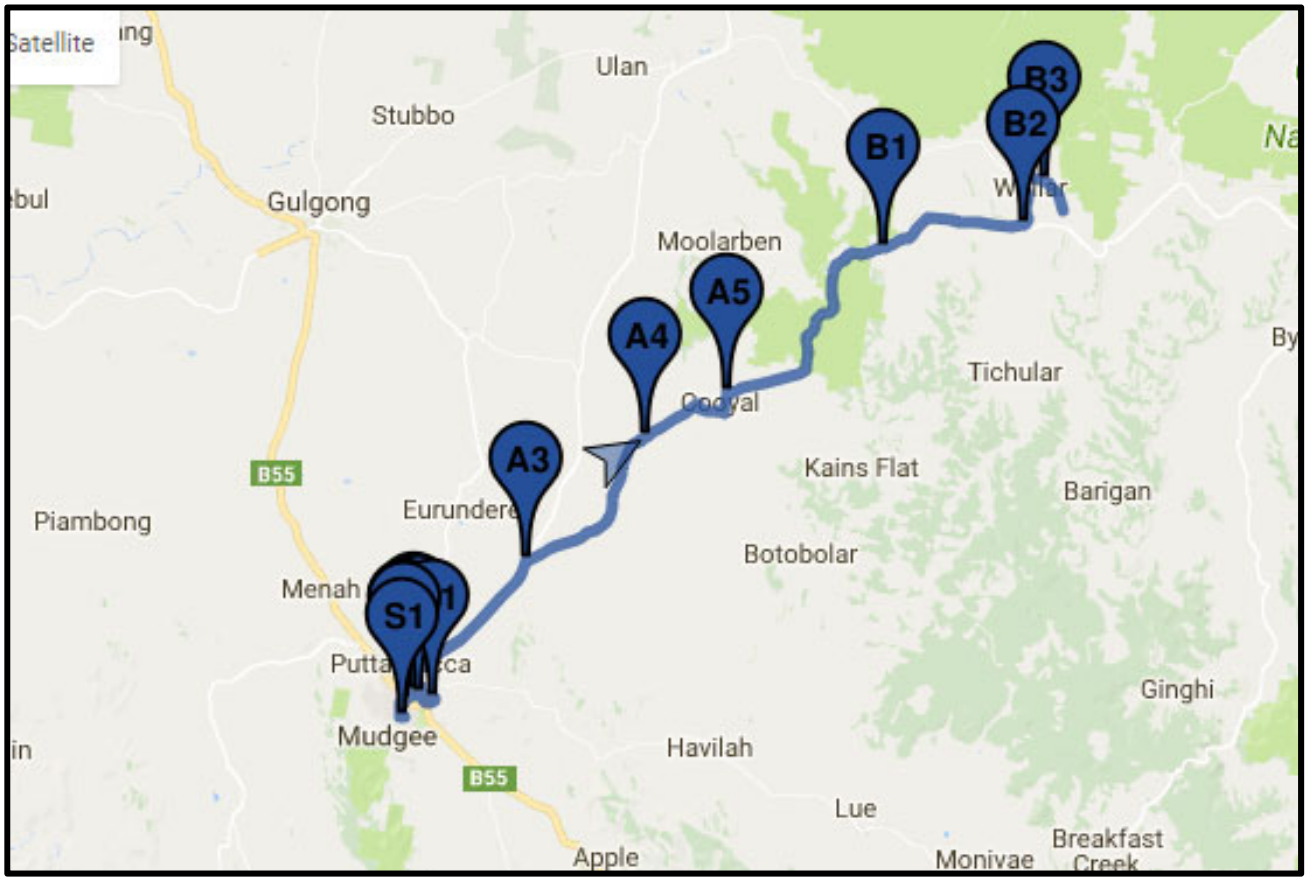


Figure 19 Existing school bus route between Wollar Village and Mudgee

2.9 School Transport

To assist in identifying any school transport demands within the vicinity or leading to the proposed Solar Farm site, Ontoit undertook consultation with the Department of Education and the regional Director based in Dubbo. Ontoit were advised that the local Wollar School was closed at the end of 2018 and therefore is no longer in operation. Further to this, Ontoit undertook further research with the Transport for NSW and was unable to identify any existing school services within the area or school routes that travelled along the key corridors leading to the Solar Farm site including Ulan Road and Wollar Road.

3. Proposed Development

Ontoit has been advised the proposed Solar Farm involves the construction, operation and decommissioning of a ground-mounted PV solar array. Up to approximately 290 MW (AC) of renewable energy would be generated and supplied directly to the national electricity grid. The proposal area is approximately 878 ha and would consist of associated infrastructure occupying around 523 ha. This section of the report outlines the detailed infrastructure items and works that will occur with the construction, operation and decommissioning of the new facility.

3.1 Solar Farm Infrastructure

Ontoit understands that the proposed Solar Farm could provide enough clean, renewable energy for about 104,926 average NSW homes while displacing approximately 515,564 metric tons of carbon dioxide annually.

The proposed Solar Farm comprises the following key items of infrastructure:

- Approximately 922,432 photovoltaic solar panels mounted on either fixed or tracking systems, both of which are considered feasible:
  - > Fixed-tilted structures in a north orientation at an angle of 32 degrees; or
  - > East-west horizontal tracking systems.
- Approximately 58 power conversion units (PCU) composed of two inverters, a transformer and associated control equipment to convert DC electricity generated in the solar panels to 33 kV AC electricity;
- Steel mounting frames with piled foundations;
- An onsite 330kV substation containing 2 transformers and associated switch gear to facilitate connection to the national electricity grid;
- Underground power cabling to connect solar panels, combiner box and PCU's;
- Underground auxiliary cabling for power supplies, data services and communications;
- Buildings to accommodate a site office, 33 kV switch gear, protection and control facilities, maintenance facilities and staff amenities;
- Up to 2km of access track off Barigan Road to the site via:
  - > The existing TransGrid substation access road, which would require construction of an access road between the Wollar substation and the proposed onsite substation – this will form the primary site access; and
  - > Maree Road – this will form an operational / maintenance access and will only be utilised occasionally post construction of the proposed Solar Farm.
- Internal access tracks and upgrades to existing access roads, for construction and maintenance activities;
- Space for future energy storage facility with a capacity of up to 30MWh and comprising lithium ion batteries with inverters;
- Perimeter security fencing up to 2.3 m height; and
- Native vegetation planting to provide visual screening for specific viewers, if any are required.

During the construction phase, temporary ancillary facilities would be established on the site and may include:

- Laydown areas;
- Construction site offices and amenities; and
- Car and bus parking areas for construction staff.

3.2 Indicative Site Layout

Ontoit was provided with an indicative site layout for the proposed Solar Farm. **Figure 20** illustrates the proposed layout of the Solar Farm which includes:

- Proposed layout of Solar PV Panels;
- Location of transmission lines and easements;
- Laydown areas;
- Substation area; and
- Key environmental constraints across the site.

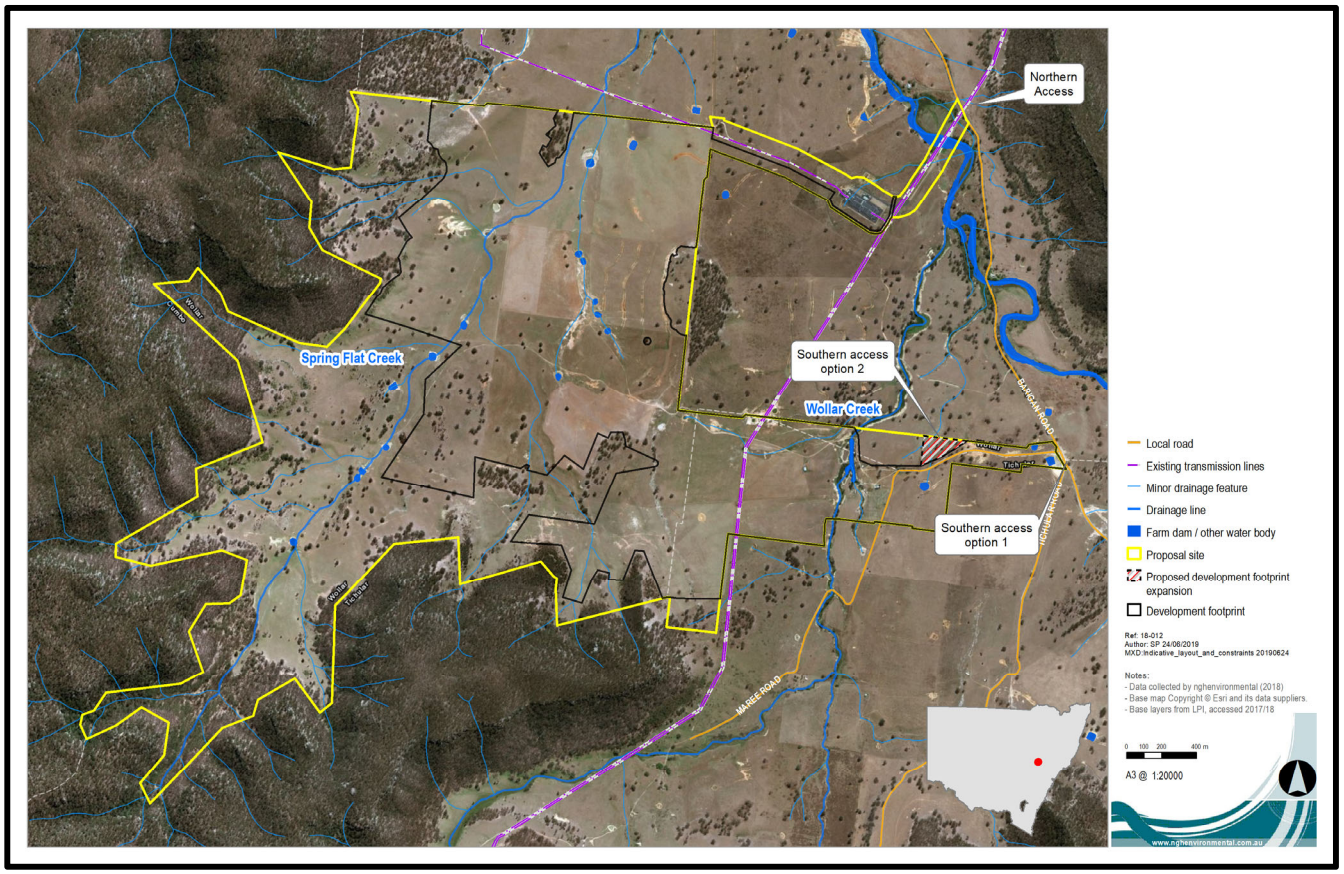


Figure 20 Indicative Solar Farm Layout

In addition, Ontoit was provided with a development footprint which is illustrated in **Figure 21**.

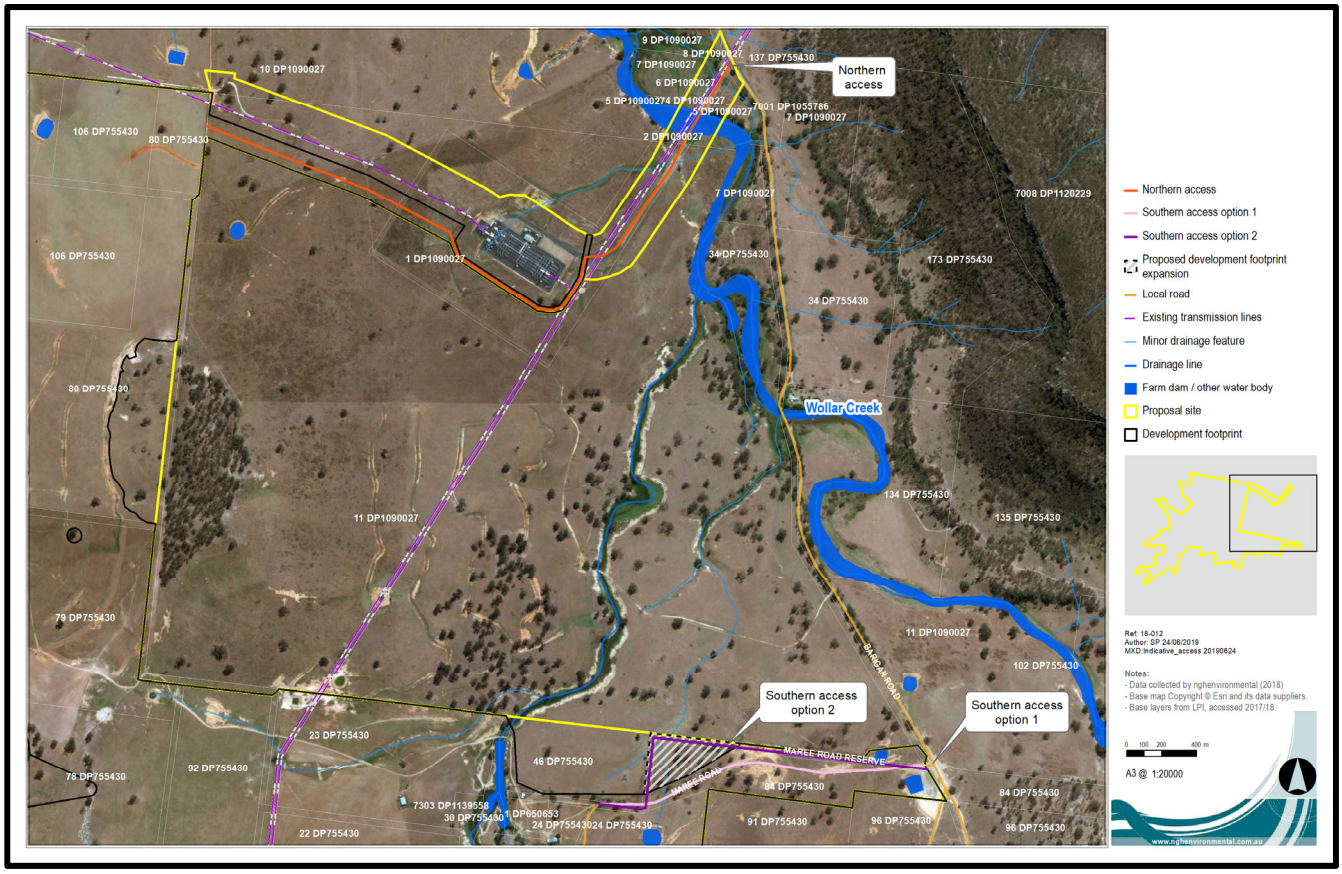


Figure 21 Development footprint for the proposed Wollar Solar Farm

3.3 Employees and Workforce

3.3.1 Construction Phase

Ontoit was advised by the proponent that the construction phase for the proposed Solar Farm will take approximately 12 - 18 months (peak construction 6 - 9 months). It is anticipated that the greatest travel demand will be during the construction phase due to:

- Peak workforce of 500 people;
- Up to 52 heavy goods vehicles deliveries a day (plus an additional eight movements at commencement and end of the construction phase);
- Up to two oversized vehicle movements (One off delivery and pickup) a day;
- Up to 40 buses a day to transport the workforce to and from the site; and
- A further 60 private vehicles are expected as a result of the workforce.

3.3.2 Operational Phase

Ontoit was advised that once construction is complete the Solar Farm trip demand will significantly decrease. It is anticipated that once established the Solar Farm will:

- have five full time employees; and
- A number of operational and maintenance light vehicles accessing each day.

3.3.3 Decommissioning Phase

Ontoit was advised that during the decommissioning phase the majority of plant at the Solar Farm will be scrapped, as it has reached end of life. Subsequently, this will result in a reduction of 30% traffic density from the numbers illustrated under **Section 3.3.1** . The reduction in traffic can be primarily achieved as a result of only transporting scrap (glass, steel, copper etc…) from the site which will results in a higher packing density and therefore less vehicles will be required.

4. Traffic and Parking Generation

4.1 Traffic Generation

The Roads and Maritime Services *'Guide to Traffic Generating Development'* does not outline specific trip generation rates for the construction and operation of a Solar Farm. As such, traffic generation demand has been determined through the analysis of the forecasted employee, workforce and goods and service vehicle deliveries provided by the proponent. This section of the report summarises the analysis undertaken to determine the traffic generation rates during both the construction and operational phases for the proposed Solar Farm.

4.1.1 Construction Traffic Demand

The construction phase of the Solar Farm is expected to generate the peak travel demand for the site which will result from the:

- Construction trade workforce;
- Large equipment deliveries; and
- Goods and Service vehicle deliveries and visitors.

Ontoit was advised that during the peak of the construction phase:

- The peak workforce demand will be 500 personnel;
- There will be two oversized vehicle movements a day (One off delivery and pickup);
- There will be 52 heavy goods vehicle movements every day;
- There will be a further eight heavy goods vehicle movements at the commencement and conclusion of the construction period (dropping off and picking up equipment);
- There will be a commitment by the proponent to transport 80% of the workforce to site via buses from local regional centres;
- Based on a commitment of 80% of the workforce travelling by bus there will be a need for 16 bus trips inbound (based on 25-seater) and a further 16 outbound; and
- As such, an allowance of up to 40 buses and 60 private vehicles a day transporting workforce to and from the site has been made.

Based on the information provided by the proponent, Ontoit estimated the peak vehicle demand for the AM peak period which is anticipated to have the largest single hour demand. **Table 3** outlines the estimated peak hour vehicle demand for the proposed Solar Farm construction phase.

Table 3 Estimate 'worst case' peak hour vehicle demand for the construction phase

Mode	Daily Trip Generation	Estimated Peak Hour Trips
Shuttle Bus (25 seats)	40	20
Private Vehicles	60	60
Heavy Vehicles (at commencement and conclusion only)	8	2
Heavy Goods Vehicles	52	10
Oversized Vehicles	2	0
TOTAL	**162**	**92**

In estimating the peak hour trips presented above a number of assumptions were made:

- There will be 10 inbound and 10 outbound bus movements in the peak period with all other buses arriving before and after the peak hour;
- All the workforce travelling by private vehicles will arrive during the peak period; and
- 10% of the daily estimated heavy goods vehicle trips are made in the peak hour (inbound and outbound movement).

Based on the above analysis, it is anticipated that the peak travel demand, 'worst case' during the construction phase, is estimated to be 92 additional vehicles. It is not anticipated that these peak figures would be a consistent daily demand throughout the 12 - 18-month construction phase. However, to analyse a 'worst case scenario' the peak vehicle demand has been estimated; to ensure sufficient capacity in the surrounding transport infrastructure is in place to support the additional vehicle demand resulting during the construction phase.

4.1.2 Operation Phase

The travel demand during the operational phase of the proposed Solar Farm is anticipated to be significantly less than the construction phase. In estimating the operational phase vehicle demands for the Solar Farm, Ontoit has considered the total workforce and the light goods and vehicle deliveries as advised by the proponent. **Table 4** outlines the estimated peak hour vehicle demand for the proposed Solar Farm operational phase.

Table 4 Estimated peak hour vehicle demands for the operational phase

Mode	Total Workforce / Deliveries	Percentage of Peak Hour Trips	Estimated Peak Hour Trips
Private Vehicles	5	100%	5
Light Goods and Service Vehicles	15	20%	3
TOTAL	**N/A**	**N/A**	**8**

Based on the above analysis it is anticipated that the daily peak travel demand for the operational phase of the Solar Farm is estimated to be eight vehicles. Given the estimated, very low, volume of traffic demand during the operational phase, no further analysis has been undertaken. The transport capacity and distribution analysis presented in **Section 5** therefore focusses on the estimated peak construction phase vehicle volumes.

4.2 Parking Generation

Whilst the Mid-Western Regional Council DCP does not specify parking rates specifically for Solar Farm Developments, the proposed Solar Farm will need to provide sufficient capacity for a temporary parking facility during construction and a permanent facility for operational and maintenance vehicle parking once complete. Parking generation rates were therefore determined and based on the peak vehicular demand during the construction and operational phases. Subsequently the parking demands are as flows:

- Construction phase:
  - > Temporary parking facility for up to 100 vehicles;
  - > A designated bus pick-up and drop-off location and storage / waiting facility; and
  - > Loading and unloading spaces for light goods and service deliveries.
- Operational Phase:
  - > Five permanent employee parking spaces;
  - > Two permanent visitor parking spaces; and

> Two loading and unloading spaces.

It is proposed that all parking, during both construction and operational phases, is contained on-site and no off-site vehicle parking is allowed.

5. Transport and Traffic Impact Assessment

This section summarises the analysis of the potential impacts associated with the development related traffic. The analysis has focussed on the traffic generated during the construction phase of the project which will produce the largest volume of additional traffic on the network.

5.1 Development Related Traffic Network Distribution

As noted in **Section 4.1**, the estimated peak traffic volume during the construction phase is an additional 92 vehicles. Ontoit has distributed this demand across the transport network to understand and identify any impacts and mitigation measures that may be required to support the proposal. The distribution of the additional traffic onto the existing transport network was based on consultation with the proponent and the historic origin and destination data outlined in **Section 2.1.3**.

Table 5 Predicted origin and destination of the additional traffic during the construction phase of the proposed Solar Farm

Origin / Destination	Inbound / Outbound	Trip Distribution Share (%)	Estimated Additional Traffic Volume
Mudgee	Inbound	90%	83
Mudgee	Outbound	90%	20
Newcastle	Inbound	8%	7
Newcastle	Outbound	8%	2
Other	Inbound	2%	2
Other	Outbound	2%	0
TOTAL	**N/A**	**100%**	**114***

*92 inbound trips and 22 outbound trips. It assumes only the bus and heavy goods vehicles movements will be both inbound and outbound movements during the peak period.

Table 5 illustrates that the largest increase in traffic volumes are anticipated to start and end at Mudgee, which is the largest regional town within the Mid-Western Reginal LGA. In comparison, all other origins and destinations are expected to experience a minor increase in traffic relative to this corridor. Given the anticipated low volume increases from Newcastle and other areas, the traffic impact analysis focussed on the Mudgee to Wollar road corridor which consists of:

- Ulan Road;
- Wollar Road; and
- Barigan Road.

5.2 Future Road Capacity

As identified in **Section 5.1** the primary access corridor for vehicular traffic to the proposed Solar Farm site is expected to be Ulan Road - Wollar Road – Barigan Road. As noted in **Section 2.1**, given the rural nature of Ulan Road and Wollar Road, their existing estimated capacity would be between 600-1000 vehicles per hour (300-500 per lane) based on Austroads *'Guide to Traffic Management Part 3: Traffic Studies and Analysis'*. Barigan Road would be slightly lower due to being narrower width, unsealed and a lower posted speed limit, but would still be capable of carrying 300-500 vehicles per hour.

Table 6 compares the existing capacity v's existing and future estimated traffic volumes.

Table 6 Existing capacity vs Existing AM Peak Hour Traffic Volume vs Estimated AM Peak Hour Traffic Volume

Road	Capacity	Existing AM Peak Volume	Estimated Future AM Peak Volume (during construction of Solar Farm)
Ulan Road (south of Wollar Road) Northbound	300-600	370	453
Ulan Road (south of Wollar Road) Southbound	300-600	154	174
Wollar Road Eastbound	250-450	27	110
Wollar Road Westbound	250-450	20	40
Barigan Road Southbound	300-500*	n/a	92
Barigan Road Northbound		n/a	22

* Due to the width of Barigan Road being less than the desired 3.6m lane width in each direction, we have considered the capacity of Barigan Road as a single traffic lane.

The RMS *'Guide to Traffic Generating Developments'* and Austroads *'Guide to Traffic Management Part 3: Traffic Studies and Analysis'* provide guidance on the acceptable Level of Service (LoS) for road corridors and major intersections. The Highway Capacity Manual (HCM) defines LoS as *"the quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to manoeuvre, traffic interruptions, and comfort and convenience"*.

As defined within Austroads, typical single lane traffic capacities are dependent on a number of factors and characteristics; however generally accepted as approximately 1800 passenger car units per hour. The capacities defined in **Table 6** have taken the rural road conditions/characteristics into consideration which aligns with the capacities displayed in Table 4.5 of the RMS *'Guide to Traffic Management Part 3: Traffic Studies and Analysis'*.

Based on the information presented in **Table 6** and comparison to Table 4.5 in the RMS guide, we can summarise the future traffic conditions along the primary corridors as follows:

- Ulan Road (south of Wollar Road) Northbound – during the construction phase (12 - 18 months (6 - 9 months peak construction) and based on the estimate traffic generated the road corridor between Mudgee and Wollar Road will operate above a satisfactory level;
- Ulan Road (South of Wollar Road) Southbound – during the construction phase (12 - 18 months (6 - 9 months peak construction) the road will continue to operate above a satisfactory level;
- Wollar Road Eastbound– during the construction phase (12 - 18 months (6 - 9 months peak construction) the road will continue to operate above a satisfactory level;
- Wollar Road Westbound– during the construction phase (12 - 18 months (6 - 9 months peak construction) the road will continue to operate above a satisfactory level;

- Barigan Road – based on the analysis above, it is likely that Barigan Road will continue to operate within capacity for the construction phase (12 - 18 months (6 - 9 months peak construction). It should, however, be noted that given the nature of the vehicles that will be travelling along the corridor there may be minor delays if no mitigation measures are implemented to accommodate bi-directional traffic or passing lanes.

5.3 Intersection Capacity / Operation

There are two intersections along the primary access corridor that will experience a growth in traffic use during the twelve-month construction period:

- Ulan Road – Wollar Road – a priority-controlled intersection which has a right turn storage for vehicles travelling northbound on Ulan Road (see **Figure 22 and 23**); and
- Wollar Road – Barigan Road – a priority-controlled intersection.

Figure 22 Ulan Road / Wollar Road Intersection looking north

Figure 23 Ulan Road / Wollar Road intersection looking south

The recent site visit observed minimal traffic travelling through the Wollar Road / Barigan Road intersection with the predominant movement from between Wollar Road east and west of the intersection. A single vehicle was observed using Barigan Road and therefore existing traffic levels are extremely low. These observations are consistent with the traffic assessment undertaken for the Wilpinjong mine expansion. It is however noted that there is an existing single lane bridge on the approach to the intersection that could impact on capacity particularly with an increase in two-way traffic. As such, RMS have requested a Road Safety Audit (RSA) be undertaken on the intersection to consider the implications of the increased traffic flow in the area. This RSA will be undertaken prior to any construction activity being undertaken. A proposal has been received to undertake the RSA and is included in **Appendix 5**. It is anticipated however, that despite the forecasted increase in traffic through this intersection there will be minimal impact on the operation of the intersection and bridge during peak travel periods and if any delays are experienced; they will be minimal and only during the 12 - 18 month construction period.

Additionally, the recent site visit also observed that the Ulan Road / Wollar Road intersection has recently been modified / upgraded to include a right turn pocket, with significant storage capacity 8-10 car lengths (approx. 100m). This modification will assist in maintaining an acceptable LoS during construction phase. The estimated future traffic flows through the intersection during the twelve-month construction phase are illustrated in **Figure 24**.

Figure 24 Estimated future traffic distribution at the Ulan Road / Wollar Road priority intersection

Whilst no Sidra analysis was undertaken, based on the traffic flows estimated in **Figure 24** the intersection is expected to continue to operate within capacity.

5.4 Access Arrangements

Ontoit understands that access to the proposed Solar Farm will be as follows:

- The unnamed access to the existing substation, this is currently an unsealed road approximately 4-5m in width, this will form the primary access to the Solar Farm; and
- Maree Road (Southern Access) which is an existing unsealed road with varied width ranging from 3-5m which is located further south along Barigan Road:
  - The Southern Access would be used during construction and operation and would likely be limited to the use of light vehicles.

> This road will be used during the operational phase only for access for maintenance and operational purposes to transport a limited number of light vehicles
  / As such, road upgrades to this access route would not be required as the estimated number of light vehicles that would utilise the track is low and would not exceed the capacity of the road.
  / If required, and to facilitate access to the south a new road could be constructed along the existing road reserve for Maree Road (see Figure 25)

Should the southern access be necessary for use by heavy vehicles, upgrades would be required to Maree Road and Barigan Road.

– Additional assessment and approval would be needed in this case.

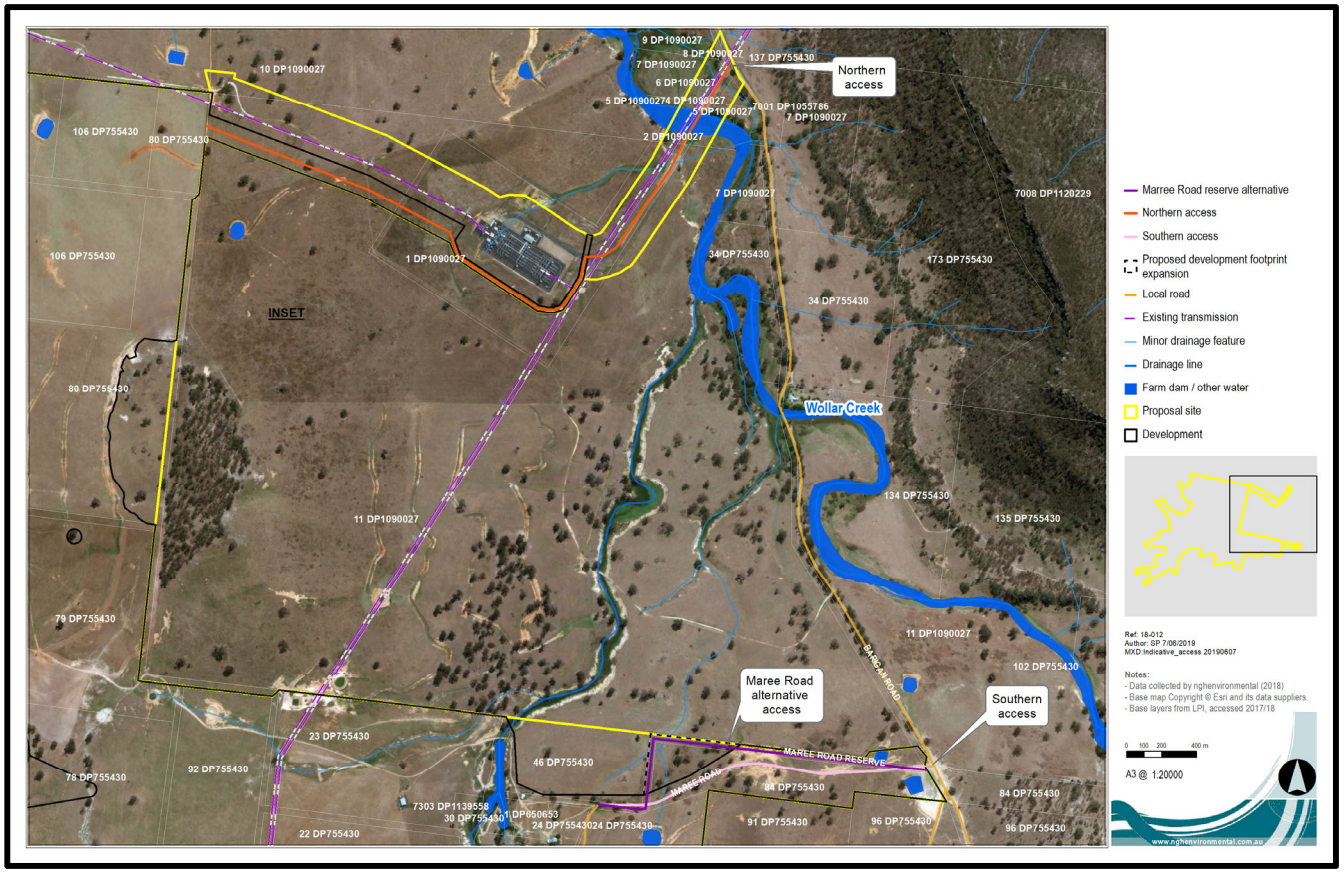


Figure 25 Maree Road reserve for alternative southern access

Both options were considered as the primary access corridor to the site. However, in considering the forecast volume of traffic during the construction phase and the existing condition of the carriageway, Ontoit has recommended to the proponent that the primary access to the site be via the existing TransGrid substation access road; with Maree Road used only for Maintenance and Operational activities to gain access to the Solar Farm at the southern end.

The proposed access arrangements for the site are illustrated in **Figure 26.**

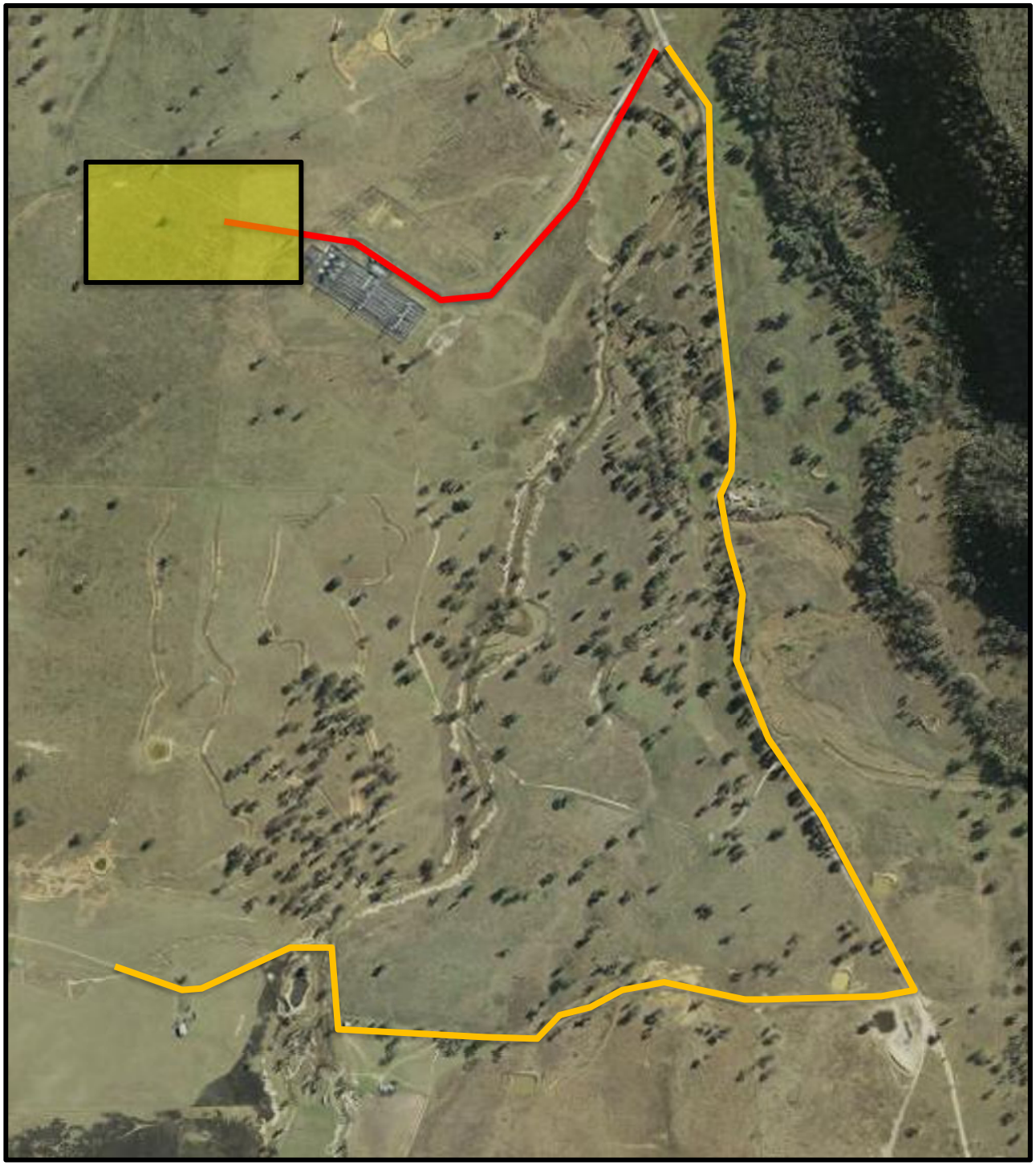


Figure 26 Proposed site access arrangements for construction and operation (red – proposed primary access, orange – operational and maintenance only access

5.5 Parking Impacts

5.5.1 Construction

Temporary parking facilities will be required during the construction of the proposed Solar Farm. The temporary parking vehicles will need to accommodate a minimum of 180 vehicles and designated pick-up / drop-off and loading / unloading areas. In addition, adequate provision should be made within the site for the turning of large goods vehicles. Ideally this would be located in close proximity to the loading and unloading zone.

The yellow box illustrated on Figure 23 is the recommended area for the temporary parking facility. Further consideration will need to be given to this facility during the detailed design process.

5.5.2 Operation

Ontoit was advised that there will be five full time employees post construction. Provision for five parking spaces should be made next to the proposed site office. In addition, a further 5-10 spaces are recommended to allow for parking of maintenance and delivery vehicles.

5.6 Public Transport Impacts

Given there is no existing public transport linkages servicing the proposed Solar Farm site, no impact on public transport routes or provisions is anticipated.

5.7 Pedestrian and Cycle Impacts

No impacts are anticipated on pedestrian and cycle access to the proposed Solar Farm.

5.8 Cumulative Traffic Impacts

There are a number of industrial activities in the vicinity of the Village of Wollar, particularly relating to agriculture and mining activities. Ontoit has reviewed the Peabody Energy Road Transport Assessment (RTA) Wilpinjong Extension Project and undertaken consultation and reviewed the traffic assessment in relation to the Bylong Mine Proposal to understand the cumulative impact of traffic on the road network leading to the various existing and proposed facilities.

The recent traffic surveys indicated a rise in traffic volumes on Ulan Road in particular since the 2015 data presented in the Wilpinjong Expansion RTA. There is a direct correlation between the observed traffic flows on Ulan Road and the forecasted traffic flows contained within the RTA. As such, the growth in traffic observed on Ulan Road is directly attributable to the mine expansion as forecasted within the traffic report. No increase in traffic was forecasted on Wollar Road due to the Wilpinjong Mine and this was confirmed with the site observations in 2018.

The peak workforce for the Wilpinjong Expansion was predicted to be in 2024, however, this figure was only 24 additional staff on the 2018 figure. It is therefore a reasonable assumption that the 2018 existing road conditions are a reflection of the peak traffic demand from the mining activity. As such, no further increase in traffic is predicted and the numbers presented within **Section 5.1** and **5.2** of this report would be reflective of the cumulative traffic growth in the region.

The Bylong Mine has yet to commence, however their traffic report forecasted that there would be an increased in traffic volumes at peak periods on Wollar Road of approximately 100 vehicles. It is unknown at this stage whether the Bylong Mine activities will commence concurrently with the proponents Solar Farm construction. However, should the activities be concurrent, we have undertaken a brief analysis of the increased traffic flows along key corridors in **Table 7**.

Table 7 Potential cumulative traffic impacts on key roads leading to the solar farm site

Road	Capacity	Existing AM Peak Volume	Estimated Future AM Peak Volume (during construction of Solar Farm)	Estimated Future AM Peak Volume (during construction of Solar Farm and Bylong Mine)
Ulan Road (south of Wollar Road) Northbound	300-600	370	453	553
Ulan Road (south of Wollar Road) Southbound	300-600	154	174	224
Wollar Road Eastbound	250-450	27	110	210
Wollar Road Westbound	250-450	20	40	90
Barigan Road Southbound	300-500*	n/a	92	92
Barigan Road Northbound		n/a	22	22

Table 7 illustrates that the biggest impact would be on Wollar Road however as demonstrated within the table the road would still be within operational capacity. Management strategies should the activities commence concurrently are discussed in Section 6 of this report.

Should construction of the Bylong Coal Project be carried out at the same time as the project, an Accommodation and Employment Strategy would be developed in consultation with Council. It would include but not be limited to:

- Identification of a strategy to facilitate accommodation of the workforce associated with the concurrent construction of the development and the Bylong Coal Project.
- Development of a program to monitor and review the effectiveness of the strategy over the construction period.

6. Options and Mitigation Measures

6.1 Road and Intersection Treatments

6.1.1 Road Treatments

6.1.1.1 Ulan Road

At this stage based on the analysis presented in this report no further upgrades are required along Ulan Road and the road should continue to operate within capacity.

6.1.1.2 Wollar Road

In consultation with RMS, we acknowledge that a number of animal strikes have been recorded along this corridor and the Mid-Western Council has also identified a number of potential deficiencies along the corridor in relation to the road design. To manage driver behaviour along this corridor we recommend that regular toolbox talks, safety presentation and driver awareness training is undertaken to ensure that drivers and the workforce are constantly reminding to drive to the road conditions. This is further discussed in **Section 6.2.3**.

6.1.1.3 Barigan Road

Due forecasted traffic growth along Barigan Road during the construction period a number of options / management strategies have been considered and discussed with the proponent, these include:

- Construction traffic management strategy – to manage the movement of goods and haulage vehicles / deliveries to and from the site, one option would be to introduce a operational management strategy that managed the arrivals and departures of goods and haulage vehicles. Most freight and logistics companies have the ability through their scheduling software to co-ordinate deliveries and with most trucks now with in vehicle GPS and CB radios co-ordination of arrival and departure times has now become a lot easier. This strategy would be supported with the appropriate temporary traffic management measures and signage.
- Potential passing facilities – the implementation of passing facilities such as pull in bays at strategic locations between the Village of Wollar and the site primary entrance (TransGrid access road) would enable vehicles to pass in a controlled and safe manner and improve the flow of vehicles along the corridor – this will be particularly important for larger heavy goods vehicles. Based on our review of Barigan Road, it is likely that any widening required can be undertaken within the existing road base cross section. Preliminary consideration of where road widening maybe required is illustrated in **Appendix 4**;
- Re-grading and widening – there is potential to re-grade and widen the whole road corridor between the intersection with Wollar Road and the primary entrance to the site. This option would enable free flowing traffic in both directions during the construction period, minimising delays and allowing larger vehicles to pass safely; and
- Upgrade and seal the road – widening and sealing Barigan Road could also be considered; however, this option is likely to be costly and could take significant time due to the length of corridor. It would however provide the best form of access to the facility and would be able to accommodate higher volumes of traffic and be suitable for the larger heavy goods vehicles.

Ontoit has undertaken a cost comparison of the estimated costs to implement each of the options presented above. The purpose of this exercise is to assist in informing the decision around the preferred option to be implemented along Barigan Road prior to the commencement of construction activities. The estimated cost for each option is presented in **Table 8**.

Table 8 Cost comparison of options for Barigan Road

Option	Total estimated cost (including GST)
Construction traffic management strategy	No additional cost anticipated
Passing facilities	$150,000
Re-grading and widening	$2,100,000
Upgrade and seal the road	$3,100,000

All options presented would be implemented in line with relevant standards and guidelines but would be subject to further design work prior to implementation. All options would assist with managing traffic and vehicular access and safety aspects along Barigan Road.

6.1.2 Intersection Treatments

6.1.2.1 Ulan Road / Wollar Road

At this stage and based on the existing operation and forecasted traffic growth no changes / upgrades are envisaged to the Ulan Road / Wollar Road intersection.

6.1.2.2 Barigan Road / Wollar Road

RMS has specifically requested that a RSA be undertaken on the Barigan Road / Wollar Road which will be completed prior to construction commencement. In addition to adopting the recommendations of the RSA, Ontoit will develop a Construction Traffic Management Plan as outlined in Section 6.2 where temporary traffic management plans will be captured and implemented prior to commencement of construction to manage traffic through the narrow bridge. A proposal has been received to undertake the required RSA and is attached in **Appendix 5**.

6.2 Construction Traffic Management Plan (CTMP)

6.2.1 Draft CTMP

In preparing to commence construction activities on site, the project team will prepare a CTMP. A draft table of contents for the CTMP has been included within **Appendix 2**.

6.2.2 Draft Temporary Traffic Management Plans (TTMP)

Within the CTMP all proposed and agreed TTMPs will need to be captured. The TTMPs will be implemented along the key access corridor to facilitate and manage safe vehicular access to and from the site. Ontoit has undertaken some preliminary thinking around the potential TTM measures (refer to **Appendix 3**) that maybe required along the corridor. This will need to be developed further in consultation with the Mid-Western Regional Council prior to agreement and implementation.

6.2.3 Safety and Driver Behaviour

In light of the majority of the workforce, delivery vehicles, and access requirements requiring extended periods of driving on the road network it is proposed that a range of measures are implemented to support driver education and mange driver fatigue on the network, these measures will include:

- 80% of the workforce to be transported by shuttle bus to / from the site;
- Reviewing and implementing adequate and responsible shift patterns;
- Promotion of Car Pooling for those driving to / from the site;

- Workforce toolbox sessions and training on responsible driving – these will be scheduled in consultation with RMS Western Region who provide toolbox talks and training on responsible driving;
- Promotion of regular and scheduled breaks during long-distance driving;
- Education and promotion on the use and abstinence from alcohol, medications which cause drowsiness, and other drugs that may influence fitness for work;
- Promotion of good exercise and diet routines;
- provide employee assistance programs.

The above suggestions are to be captured and further outlined within the CTMP.

6.2.4 Workforce Travel Plan

The proponent has committed to transfer 80% of the proposed 500 people workforce to and from the solar farm site by shuttle bus during the construction phase. The construction phase is estimated to take 12-18 months and as such it is imperative that there is a clear travel plan in place to support the 80% of work travelling by bus. The travel plan should document a number of elements including (but not limited to):

- Bus routes;
- Bus pick up and drop off locations;
- Frequencies; and
- All day parking options.

Once completed the travel plan should be attached to the Construction Traffic Management Plan and should be monitored and revised if targets are not being met. Ontoit has undertaken some preliminary thinking particularly in relation to bus routes, pick up / drop off locations and parking options from the regional centres of Mudgee and Gulgong. Further consultation with Mid-Western Regional Council and any Local Councils will be required prior to implementing any travel and parking strategy.

Gulgong

Should any workforce originate in Gulgong consideration should be given to an all-day parking facility in the north-east of the town within the area highlighted in **Figure 27**.

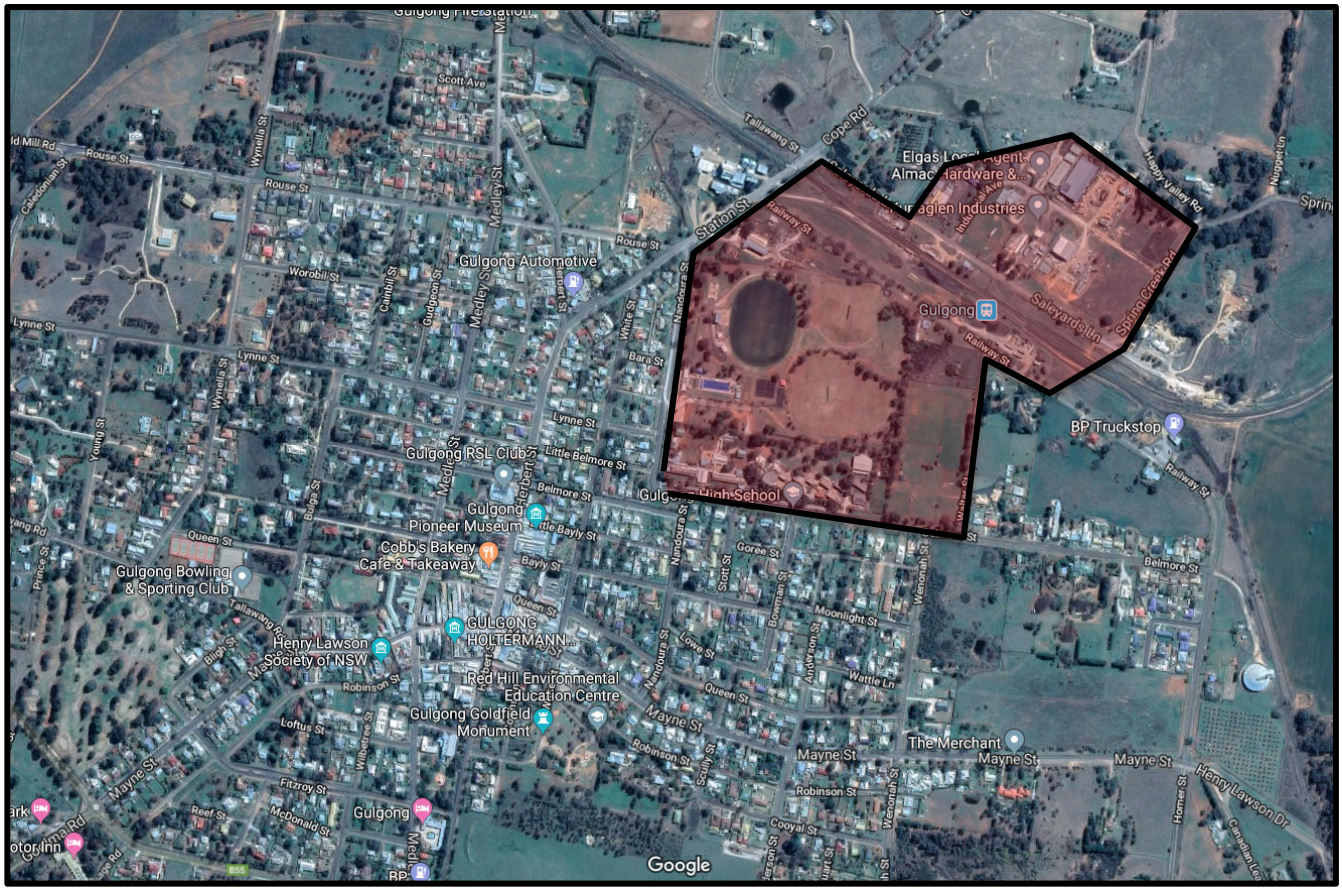


Figure 27 recommended investigation area for any proposed pick up / drop off and all-day parking facility (highlighted red area)

Within this area are a number of recreation facilities and industrial areas that are in close proximity to the major roads through Gulgong. These areas (pending further investigations) would potentially accommodate a all-day parking and shuttle bus pick up and drop off locations.

Mudgee

Should any workforce originate in Mudgee consideration should be given to an all-day parking facility in the north-east of the town within the area highlighted in **Figure 28**.

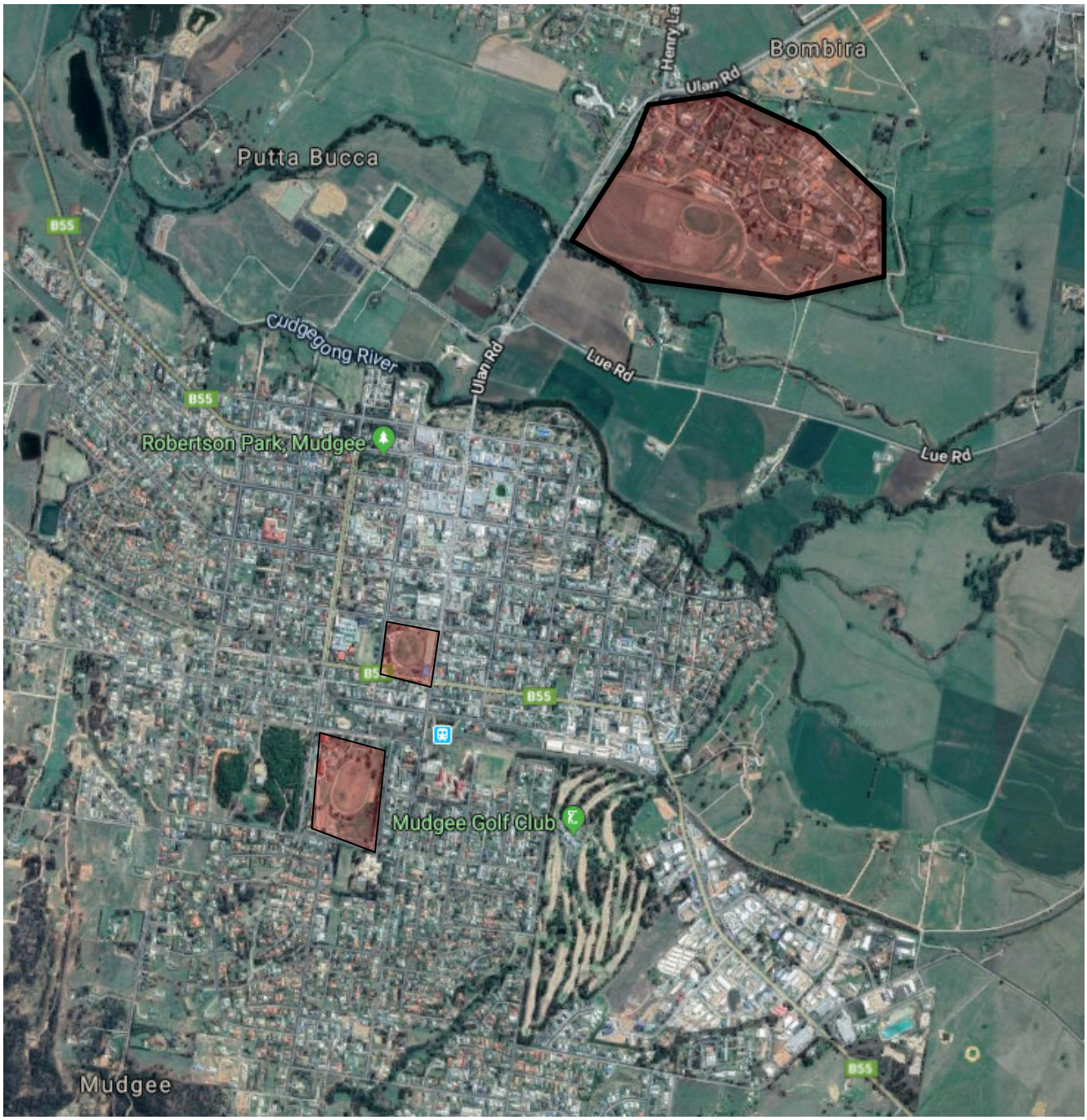


Figure 28 recommended investigation area for any proposed pick up / drop off and all-day parking facility (highlighted red area)

There are a number of potential areas highlighted within Figure 25 that are made up of recreation facilities and industrial areas that are in close proximity to the major roads through Mudgee. These areas (pending further investigations) would potentially accommodate an all-day parking and shuttle bus pick up and drop off locations.

7. Summary and Recommendations

7.1 Summary

The primary impacts of the proposed Solar Farm will be the result of the 12 -18-month construction period. It is likely that the additional construction traffic will result in short journey time delays and possible localised minor congestion particularly on Wollar Road and Barigan Road and at the intersection between these two corridors. Once fully operational, the facility will have a negligible impact on the road traffic conditions due to the small amount (5) of full-time employees.

A number of temporary measures could be considered to assist in minimising the temporary impact brought about by the construction activities and these are included below.

7.2 Recommendations

To minimise localised congestion and traffic impact on the local road network, the following measures should be considered:

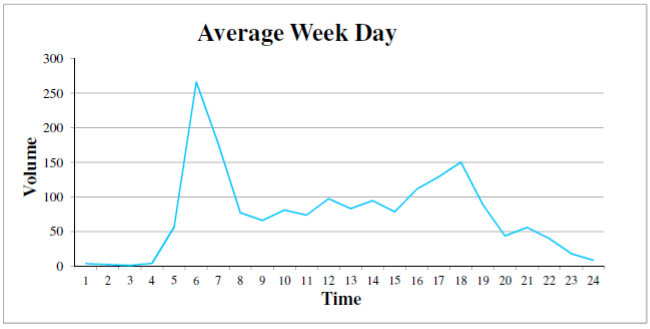
- A priority consideration should be the enhancement of Barigan Road; there are a number of possible measures to improve access to the site that should be considered:
  - Construction traffic management strategy – to manage the movement of goods and haulage vehicles / deliveries to and from the site, one option would be to introduce an operational management strategy that managed the arrivals and departures of goods and haulage vehicles. Most freight and logistics companies have the ability through their scheduling software to co-ordinate deliveries and with most trucks now with in vehicle GPS and CB radios co-ordination of arrival and departure times has now become a lot easier. This strategy would be supported with the appropriate temporary traffic management measures and signage.
  - Passing facilities – the implementation of passing facilities such as pull in bays at strategic locations between the Village of Wollar and the site primary entrance (TransGrid access road) would enable vehicles to pass in a controlled and safe manner and improve the flow of vehicles along the corridor – this will be particularly important for larger heavy goods vehicles;
  - Re-grading and widening – there is potential to re-grade and widen the whole road corridor between the intersection with Wollar Road and the primary entrance to the site. This option would enable free flowing traffic in both directions during the construction period, minimising delays and allowing larger vehicles to pass safely; and
  - Upgrade and seal the road – widening and sealing Barigan Road could also be considered; however, this option is likely to be costly and could take significant time due to the length of corridor. It would however provide the best form of access to the facility and would be able to accommodate higher volumes of traffic and be suitable for the larger heavy goods vehicles.
- Based on a high level cost estimate the most economical solutions for the options presented above is Option 1 and 2 and as such it is recommended that both options are considered for implementation prior to the commencement of construction activities;
- It is recommended that the proponent undertakes a road dilapidation survey and report prior and post construction activity;
- A Construction Traffic Management Plan and Temporary Traffic Management Plans should be produced in consultation with the Mid-Western Regional Council and approved prior to the commencement of any activity at the site;
- The CTMP should also capture the safety education programs to be implemented to manage driver fatigue and safe driver behaviours;
- A Workforce Travel Plan should be developed prior to commencement of construction and documents the travel arrangement for the workforce;

- Any impacts or deterioration to the existing road network in the vicinity of the proposed Solar Farm will need to be returned to the same standard as pre-construction;
- Consideration of a temporary car park facility should be given to allow construction staff and vehicles to be accommodated and managed effectively on site;
- As per the RMS request the RSA is commissioned and recommendations adopted prior to the commencement of construction activities;
- A commitment to meeting the 80% of workforce travel needs through bus travel is adopted and implemented during the construction period and that further consultation is undertaken with Mid-Western Council in the development of a strategy to assist with the implementation of this measure to identify supporting measures such as all day parking locations and bus pick up and drop off locations; and
- Where concurrent projects occurred a commitment to work with the Mid Western Regional Council in developing an Accommodation and Employment Strategy.

A.1 Traffic Surveys – extracted from the Wilpinjong Extension Project, Wilpinjong, NSW, Road Transport Assessment (GTA, 2015)

Site 2 Ulan Road 800m South of Wollar Road **Northbound**

Day	*Fri*	*Sat*	*Sun*	*Mon*	*Tue*	*Wed*	*Thu*	*W/Day*	*W/End*	*7 Day*
Time	27-Feb-15	28-Feb-15	1-Mar-15	2-Mar-15	3-Mar-15	4-Mar-15	5-Mar-15	*Ave.*	*Ave.*	*Ave*
0:00	7	6	5	0	6	2	3	4	6	4
1:00	3	3	3	2	1	3	3	2	3	3
2:00	2	3	2	1	1	2	1	1	3	2
3:00	2	0	2	5	5	5	3	4	1	3
4:00	61	12	13	53	56	51	62	57	13	44
5:00	260	75	72	223	260	291	298	266	74	211
6:00	162	34	32	160	181	190	193	177	33	136
7:00	79	52	24	79	59	72	97	77	38	66
8:00	78	59	34	43	75	64	70	66	47	60
9:00	71	63	74	90	67	89	88	81	69	77
10:00	83	87	89	75	73	57	81	74	88	78
11:00	82	80	101	107	83	109	106	97	91	95
12:00	81	108	84	101	80	74	80	83	96	87
13:00	107	88	79	104	95	93	75	95	84	92
14:00	97	71	63	57	87	76	76	79	67	75
15:00	132	65	78	113	91	102	120	112	72	100
16:00	138	53	70	117	144	119	129	129	62	110
17:00	154	80	80	140	151	150	156	150	80	130
18:00	102	55	44	83	71	82	104	88	50	77
19:00	41	29	21	33	41	55	50	44	25	39
20:00	43	36	50	51	64	63	59	56	43	52
21:00	20	32	30	38	51	51	40	40	31	37
22:00	30	21	8	9	11	16	24	18	15	17
23:00	16	19	7	9	7	2	9	9	13	10
Total	**1851**	**1131**	**1065**	**1693**	**1760**	**1818**	**1927**	**1810**	**1098**	**1606**

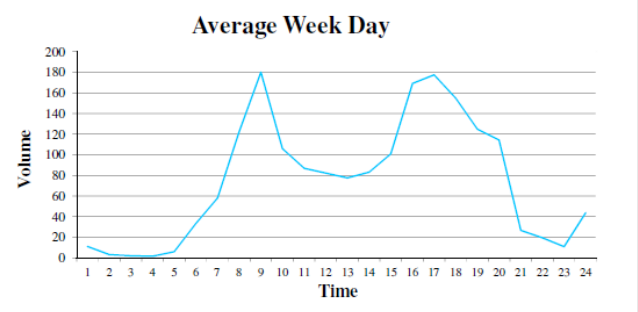


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	**298**
PM Peak	5:00 PM	6:00 PM	**156**
		Week Day Average	**1810**
		Weekend Day Average	**1098**
		7 Day Average	**1606**

Site 2 Ulan Road 800m South of Wollar Road **Southbound**

Day	*Fri*	*Sat*	*Sun*	*Mon*	*Tue*	*Wed*	*Thu*	*W/Day*	*W/End*	*7 Day*
Time	27-Feb-15	28-Feb-15	1-Mar-15	2-Mar-15	3-Mar-15	4-Mar-15	5-Mar-15	*Ave.*	*Ave.*	*Ave*
0:00	11	10	6	7	11	14	12	11	8	10
1:00	3	4	5	4	0	5	4	3	5	4
2:00	7	3	1	0	1	0	2	2	2	2
3:00	2	1	2	1	1	0	4	2	2	2
4:00	3	15	11	11	9	4	3	6	13	8
5:00	37	25	26	29	26	29	45	33	26	31
6:00	56	26	14	51	65	58	60	58	20	47
7:00	125	69	35	122	125	114	125	122	52	102
8:00	174	76	55	176	180	190	180	180	66	147
9:00	113	85	89	93	114	100	110	106	87	101
10:00	94	117	78	91	72	95	82	87	98	90
11:00	83	95	75	84	78	75	91	82	85	83
12:00	90	60	86	80	55	66	97	78	73	76
13:00	114	63	48	78	62	76	86	83	56	75
14:00	110	64	88	83	90	102	119	101	76	94
15:00	229	45	75	156	168	129	164	169	60	138
16:00	149	61	84	198	159	190	192	178	73	148
17:00	110	72	60	174	165	162	164	155	66	130
18:00	112	80	61	121	135	130	126	125	71	109
19:00	92	73	81	105	112	166	96	114	77	104
20:00	26	16	18	23	21	33	30	27	17	24
21:00	29	17	16	16	19	17	16	19	17	19
22:00	14	6	3	13	8	13	6	11	5	9
23:00	42	20	22	50	41	46	39	44	21	37
Total	**1825**	**1103**	**1039**	**1766**	**1717**	**1814**	**1853**	**1795**	**1071**	**1588**



Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**190**
PM Peak	3:00 PM	4:00 PM	**229**
		Week Day Average	**1795**
		Weekend Day Average	**1071**
		7 Day Average	**1588**

A.2 Example Construction Traffic Management Plan – Contents Page

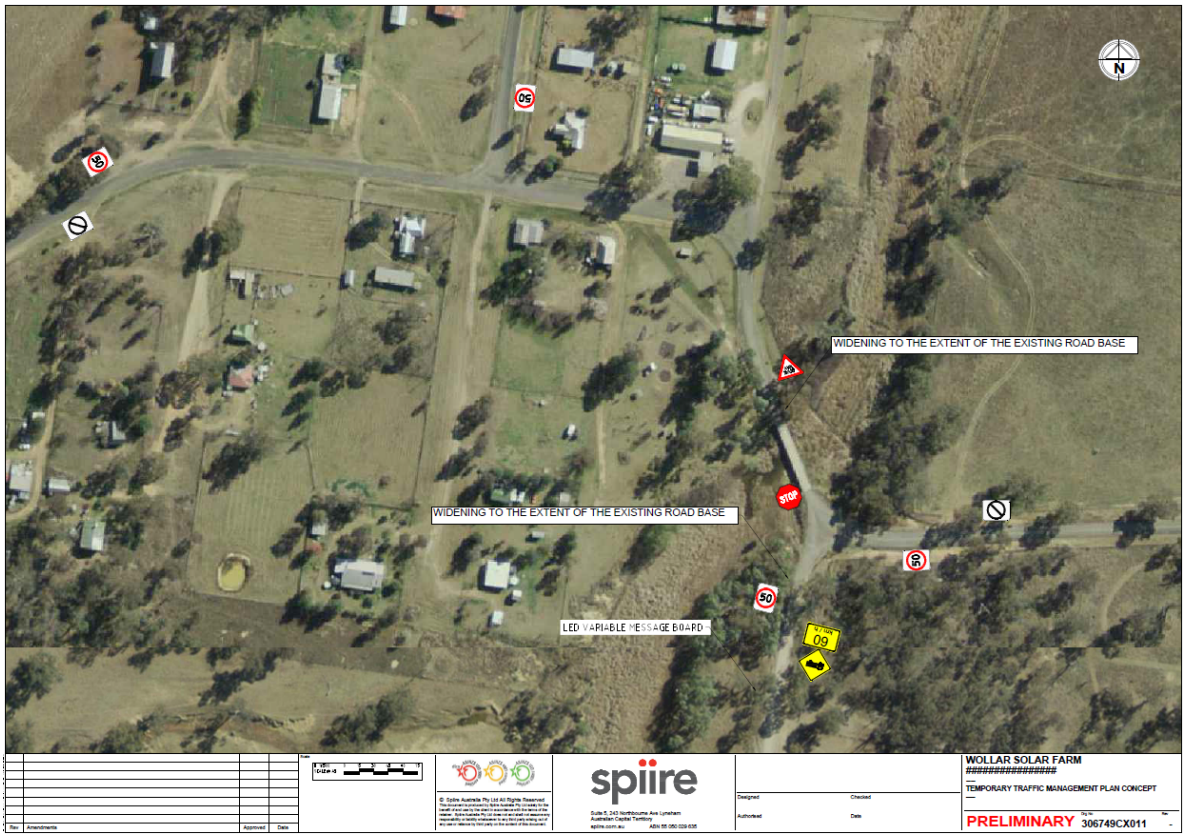
CONTENTS

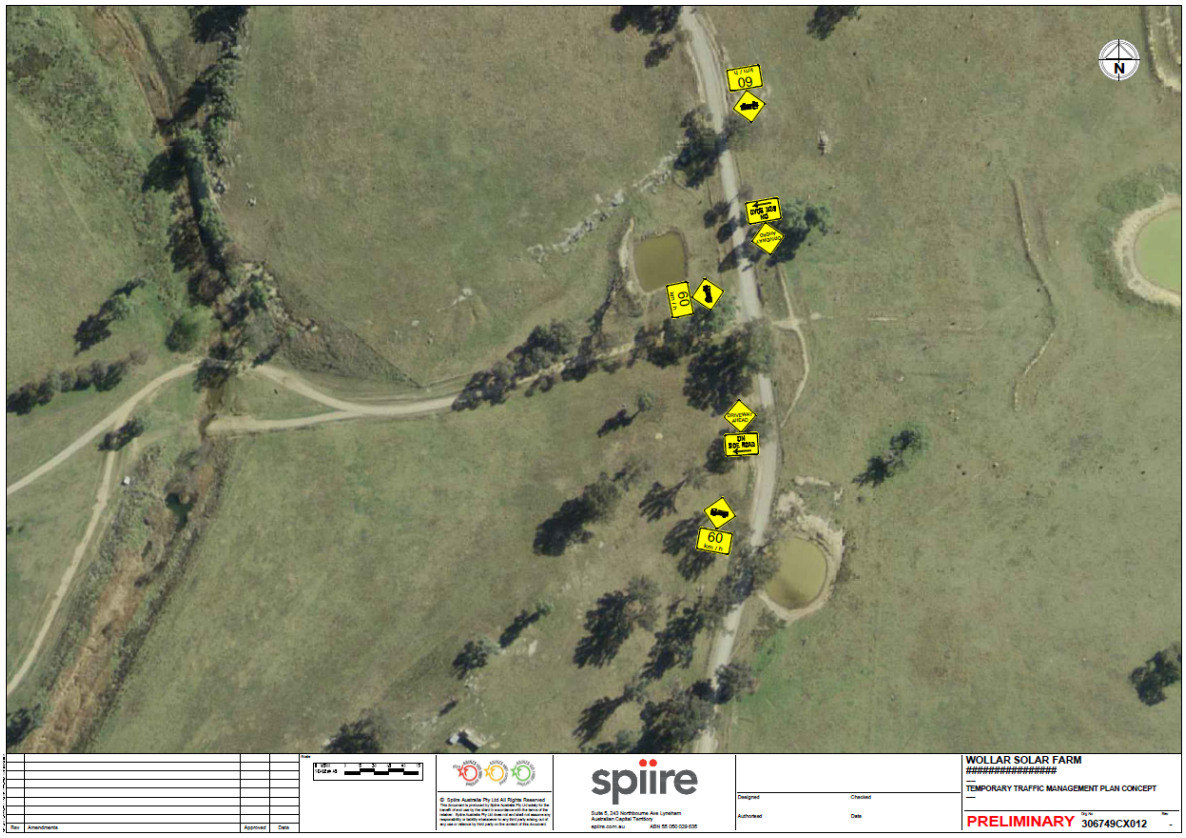
- AUDITING
- REPORTING

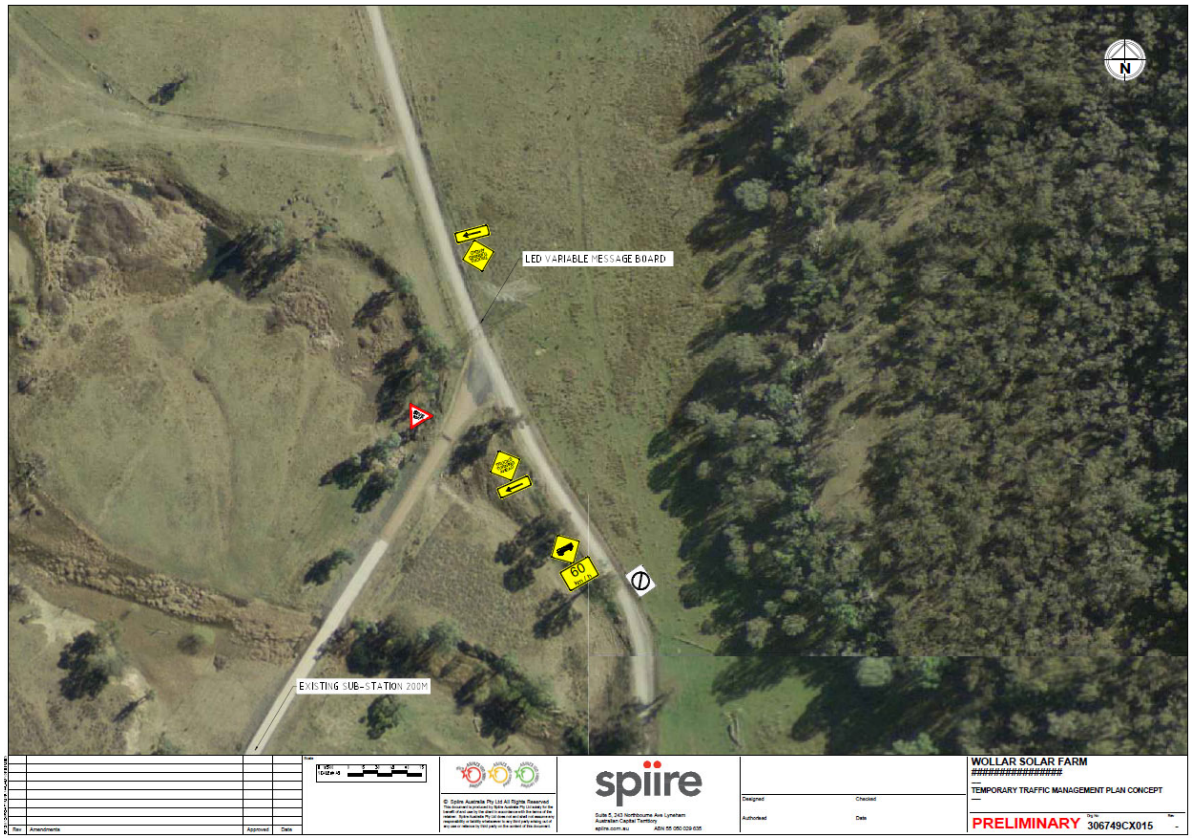
– REVIEW AND IMPROVEMENT

- CONTINUOUS IMPROVEMENTI
- TMP UPDATE AND AMENDMENT

A.3 Preliminary Temporary Traffic Management Plans



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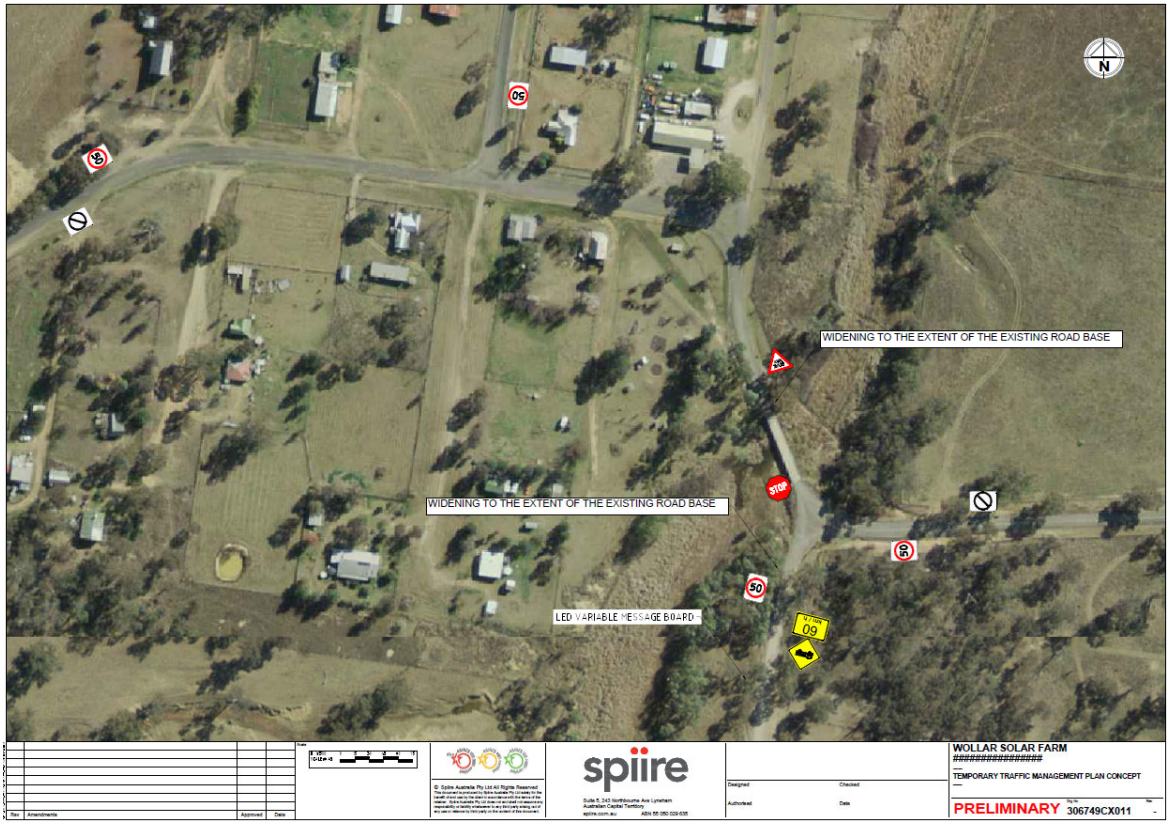
WOLLAR SOLAR FARM
TEMPORARY TRAFFIC MANAGEMENT PLAN CONCEPT
PRELIMINARY
306749CX015

A.4 Potential Widening Locations – Barigan Road

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WOLLAR SOLAR FARM
TEMPORARY TRAFFIC MANAGEMENT PLAN CONCEPT
PRELIMINARY
306749CX014

A.5 Proposed RSA Scope

ontoit.

CREATING CERTAINTY.

Level 3, 164 Flinders Lane
Melbourne, VIC, 3000
+61 (0) 3 9639 1504
info@ontoit.com

/

ontoit global pty ltd
ABN 68 001 220 816
ACN 117 083 048

/

ontoit.com

APPENDIX C ADDENDUM TRAFFIC IMPACT ASSESSMENT

Amber (2019).

Amber Organisation
www.amber.org.au
+61 432 022 363

Louiza Romane
Environmental Consultant
NGH Consulting
PO Box 470
Bega NSW 2550

Ref: 043
8 October 2019

Issued via email: louiza.r@nghconsulting.com.au

Dear Louiza

Wollar Solar Farm – Traffic Impact Assessment

Amber has been asked to assess the traffic matters of the proposed 290MW solar farm located approximately 7km south of Wollar. Vehicles accessing the site will be required to travel through the township of Wollar via Wollar Road or Ulan-Wollar Road. Vehicles will then use Barigan Road to reach one of the three access locations proposed for the site:

- Northern Access: connects directly with Barigan Road and is currently constructed to connect with the existing substation. This access is the primary access for heavy and light vehicles.
- Southern Access Option 1: utilises Maree Road, which connects with Barigan Road, to access the site. It will be utilised by light and heavy vehicles to access the site.
- Southern Access Option 2: provides a new connection with Barigan Road, just north of Maree Road, and will provide access for heavy vehicles.

It is understood the Northern Access and Southern Access Option 1 require legal access across private land. In the event that easements are unable to be established, Southern Access Option 2 would be the only access utilised during construction and operation for both heavy and light vehicles. If easements are able to be established, the Northern Access would be used for both heavy and light vehicles. Southern Access Option 1 would be used for light and heavy vehicles during construction and light vehicles during operation.

Staff will be located within the nearby regional towns, and primarily within Mudgee and Gulgong. The majority of plant is expected to be delivered from Newcastle and will access the site via Golden Highway, Ulan Road and Ulan-Wollar Road.

A Traffic Impact Assessment has previously been prepared for the solar farm by Ontoit, dated 12 June 2019. The following Traffic Assessment will form an Addendum to the existing report and will undertake a detailed review of the expected traffic generation of the solar farm during key construction phases in order to determine the required road upgrades along key sections of the access route. An assessment of the traffic impacts of the solar farm is provided below.

1. Traffic Assessment

1.1 Traffic Generation

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

The Applicant has advised that the following number of staff will be on-site during the 18-month construction period.

Table 1: Staff On-site Per Construction Month

Month	1	2	3	4	5	6	7	8	9
Staff	26	43	84	80	102	150	180	250	260
Month	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Staff	260	320	320	200	150	80	50	20	5

A maximum of 320 staff will be on-site during peak construction periods. It is understood that 20 shuttle buses will be provided that can accommodate approximately 260 staff (~80% of staff). The remaining staff will access the site using private vehicles. Assuming a vehicle occupancy rate of 2.0 for workers, the site is expected to generate 30 light vehicle movements during each of the peak periods.

Approximately 30 trucks will access the site per day during typical construction periods. The delivery trucks will predominantly be Medium and Heavy Rigid Trucks (MRV and HRV as defined within AS 2890.2:2009). Articulated Vehicles (AV as defined within AS 2890.2:2009) and B-Doubles will occasionally be used to transport larger plant such as the PV panels.

It is anticipated that during peak construction the site could generate up to 72 heavy vehicle and 100 light vehicle movements per day. Table 2 summarises the traffic movements generated during the peak construction period of the solar farm.

Table 2: Traffic Generation During Peak Construction Periods

Vehicle Type	Vehicle Movements per Day
Light Vehicle (car / 4WD)	60
Shuttle Bus	40
MRV/HRV	46
AV/B-Double	26
Total	**172**

Accordingly, the site is expected to generate approximately 172 vehicle movements per day during peak periods.

1.2 Traffic Distribution

Traffic accessing the site will do so via Wollar Road and via Ulan-Wollar Road to/from the west and north, respectively. Vehicles will then be able to utilise Ulan Road to access the wider road network. The following provides a breakdown of the access routes for each of the vehicle classifications outlined within Table 2:

- Light Vehicles: These vehicles will consist of project managers who are provided with their own vehicle and miscellaneous trips made by other contractors. It has been assumed that these trips have been distributed evenly between Wollar Road and Ulan-Wollar Road. This represents staff vehicles located in Mudgee and Gulgong, and trips made to other destinations such as Newcastle or Sydney.

- Shuttle Bus: Staff will be located predominantly within the nearby towns of Mudgee and Gulgong. Shuttles travelling to/from Mudgee will utilise Wollar Road, and shuttles travelling to/from Gulgong will utilise Ulan-Wollar Road to limit the number of vehicle movements along Wollar Road. For the purposes of this assessment it has been assumed that 70% of staff will be based in Mudgee and 30% will be based in Gulgong.

- MRV/HRV: These vehicles will predominantly be water trucks and vehicles transporting materials such as concrete and fencing supplies. These materials will be sourced within the surrounding area and as such, it has been assumed that these vehicles will be evenly distributed between Wollar Road and Ulan-Wollar Road.

- AV/B-Double: All plant will be transported from Newcastle and will utilise Ulan-Wollar Road, unless an alternative route is agreed with Council.

The peak hour for the solar farm will occur at the start and end of the day when staff are transported to/from the site. During the morning peak all vehicle movements will be towards the site and in the evening peak all vehicle movements will be away from the site. It has been assumed that 50% of general light vehicles and all shuttle buses will access/egress the site during the peak hours. The remaining light vehicle and heavy vehicle movements will be distributed throughout the day and will be split evenly between inbound and outbound movements.

1.3 Summary

The site is expected to generate 35 vehicle movements during each of the morning and evening peak hours. These vehicles will be shuttle buses and light vehicles transporting staff to/from the site. Based on the distribution of staff accommodation, the site is expected to generate an increase of 22 and 13 vehicle movements during each of the peak hours on Wollar Road and Ulan-Wollar Road, respectively. This will result in approximately one additional vehicle every 3 minutes on Wollar Road and approximately one additional vehicle every 4 minutes on Ulan-Wollar Road during each peak hour during peak construction times.

A summary of the daily and peak hour traffic volumes for each of the access routes is provided below in Table 3.

Table 3: Traffic Distribution During Peak Construction Periods

Vehicle Type	Vehicle Movements per Day		Vehicle Movements per Peak Hour	
	Wollar Road	Ulan-Wollar Road	Wollar Road	Ulan-Wollar Road
Light Vehicle (car / 4WD)	30	30	8	7
Shuttle Bus	28	12	14	6
MRV/HRV	23	23	0	0
AV/B-Double	0	26	0	0
Total	**81**	**91**	**22**	**13**

Vehicles will also be distributed throughout the day and will generate approximately 9 vehicle movements per hour. Of these vehicle movements, 3 will be light vehicles and 6 will be heavy vehicles. All AV and B-Doubles will utilise Ulan-Wollar Road, whilst the light vehicles and MRV/HRVs will be separated evenly between Wollar Road and Ulan-Wollar Road.

2. Access Route Assessment

2.1 Western Access Route

Vehicles travelling to/from the west will do so via Wollar Road and Ulan Road to reach Mudgee and the wider State Highway network. The Traffic Assessment prepared by Ontoit (Traffic Report) provides a detailed description of Wollar Road, Ulan Road and the crash history along the access route between Wollar and Mudgee. In addition to the comments made within the Traffic Report, the following provides a summary of the key traffic conditions along the western access route:

- Wollar Road is a sealed road which is typically in good condition and provides one lane of traffic in each direction.
- The section of Wollar Road that traverses the Munghorn Gap Nature Reserve has a mountainous nature creating a number of tight bends and in some locations the road condition is poor. This section extends for approximately 4-5km.
- The intersection of Wollar Road with Ulan Road is provided with dedicated right and left turn lanes from Ulan Road.
- Based on the traffic surveys undertaken by Ontoit of the intersection of Wollar Road with Ulan Road, Wollar Road accommodates approximately 40-50 vehicle movements during each of the peak hours. Assuming the peak hour represents approximately 10% of the daily traffic volume, Wollar Road is estimated to currently accommodate 400-500 vehicles per day.
- Ulan Road is an approved AV and B-Double route as outlined within the RMS Heavy Vehicles Map.

The western access route is expected to accommodate 22 light vehicle movements during each of the peak hours and approximately 3 vehicle movements per hour during construction times. The majority of the vehicles will be shuttle bus drivers who know the route well and will not be fatigued such as regular workers. Based on on-site observations, the western route is typically in good condition to accommodate the light vehicles generated during the peak hour and the small number of vehicles generated throughout the day.

Whilst it is noted that there is a section of the route that is in poor condition through the Munghorn Gap Nature Reserve, the western route is still considered appropriate for use by the solar farm for the following reasons:

- All peak hour vehicles will be light vehicles, with some MRV/HRV vehicles utilising the road during the day.
- Skilled shuttle bus drivers will form the majority of vehicle trips. These drivers will know the route well and will not be fatigued such as regular workers. As such, they are expected to be able to traverse the Munghorn Gap Nature Reserve in a safe manner.
- The low level of solar farm traffic that will utilise the western route and the current low level of traffic along the route provides a low congestion environment.

It is understood that a proposal associated with Bylong Coal may result in an increase in traffic along Wollar Road. Further to the above, and even with the increase in traffic volumes generated by the solar farm, there will remain ample road capacity along the western access route. Therefore, it is concluded that the solar farm will still provide ample road capacity along Wollar Road for an increase in traffic movements.

Overall, it is concluded that the use of Wollar Road to access Ulan Road, as outlined above, is acceptable and will not generate any safety or capacity issues. It is recommended that all staff,

including shuttle bus drivers, be made aware of the road conditions within the Munghorn Gap Nature Reserve and this form part of any future Construction Traffic Management Plan which will be prepared prior to construction of the site.

2.2 Northern Access Route

Vehicles travelling to/from the north will do so via Ulan-Wollar Road and Ulan Road to reach Newcastle, Gulgong, and the wider State Highway network. The Ontoit Traffic Report provides a detailed description of Ulan-Wollar Road along the access route. In addition to the comments made within the Traffic Report, the following provides a summary of the key traffic conditions along the northern access route:

- Ulan-Wollar Road is a sealed road which is in good condition and provides one lane of traffic in each direction. A large proportion of the road has recently or is in the process of being upgraded as part of the Wilpinjong Mine Expansion and is suitable for use by heavy vehicles.
- A school is located along Ulan-Wollar Road, within the Wollar township, which is understood to not currently be in use.
- The intersection of Ulan-Wollar Road with Ulan Road is provided with dedicated right and left turn lanes from Ulan Road.
- Based on traffic surveys outlined within the Wilpinjong Mine Expansion Traffic Report prepared by GTA, Ulan-Wollar Road is expected to accommodate approximately 130 vehicle movements during each of the peak hours north of the mine site access.
- Ulan Road is an approved AV and B-Double route as outlined within the RMS Heavy Vehicles Map.

The northern access route is expected to accommodate 13 light vehicle movements during each of the peak hours and approximately 7 vehicle movements per hour during construction times. The majority of the vehicles during regular construction hours will be larger trucks such as AV and B-Double vehicles. Even with the increase in traffic volumes generated by the solar farm there will remain ample road capacity along the northern access route.

As outlined above, the majority of the northern route has been upgraded as part of the Wilpinjong Mine Expansion and is suitable for use by larger vehicles. South of the upgraded section the road is considered to be in good condition for use by light and heavy vehicles based on on-site observations. Overall, it is concluded that the use of Ulan-Wollar Road to access Ulan Road, as outlined above, is acceptable and will not generate any safety or capacity issues.

2.3 Barigan Road / Maree Road

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

Barigan Road is estimated to currently accommodate 60 vehicle movements per day assuming that each of the six dwellings that have access to the road generate 10 vehicle movements per day. The traffic volumes along Barigan Road would increase to 232 vehicle movements per day during peak construction periods (an increase of 172 vehicle movements generated by construction traffic). Therefore, the traffic volumes would marginally exceed the recommended loading for gravel roads.

In order to accommodate the traffic volumes generated by the development it is recommended that Barigan Road and Maree Road along the access route be upgraded to have a width of 7.0 metres to

allow two vehicles to pass. In some locations the road is proposed to be widened further to accommodate simultaneous two-way truck movement. These locations are shown within Appendix A.

It is noted that the widening required in the location highlighted within Figure 5 would be excessive and it is recommended that this section is operated as a one lane road and is controlled by either a temporary traffic signal or traffic controllers. Given the short section of one lane road, and the temporary nature of the construction of the solar farm this is considered to be a suitable arrangement.

It is recommended that water trucks or a light spray seal be used to accommodate the level of traffic generated by the construction traffic and to also act to reduce the dust impact to the nearby dwellings. The increased carriageway width will also allow two trucks to pass.

Given the expected traffic along Barigan Road during construction, it is concluded that the surface of the road with the inclusion of the proposed upgrades, is suitable to accommodate the future traffic volumes. In addition, the adoption of the above recommendations will assist to mitigate any impact to the road surface and adjacent properties.

2.4 Summary

A Construction Traffic Management Plan (CTMP) will be prepared prior to construction of the site. It is recommended that the following form part of the CTMP to minimise the impact of construction traffic along the unsealed roads:

- All staff, including shuttle bus drivers, be made aware of the road conditions within the Munghorn Gap Nature Reserve.
- Prior to construction, a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council. During construction the sections of the road network utilised by the proposal are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the solar farm would be rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road network is left in the consistent condition as at the start of construction.
- Water trucks or a light spray seal be used along Barigan Road and Maree Road to accommodate the level of traffic generated by the construction traffic and to also act to reduce the dust impact to the nearby dwellings.
- Neighbours of the solar farm be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
- Barigan Road and Maree Road be upgraded based on the designs shown within Appendix A and B, and that suitable traffic management measures be implemented in key locations.

It is noted that the proposed access routes have been determined in consultation with Council. The distribution of traffic on the road network and the use of the northern route for all vehicles travelling to/from the port has been chosen to remove heavy vehicles from the Munghorn Gap Nature Reserve. Further, the extensive use of shuttle buses will reduce the chance of driver fatigue and the number of vehicles on the road network.

It is also noted that the Ontoit Traffic Report notes that a Road Safety Audit will be undertaken in the vicinity of the Wollar Road / Barigan Road intersection in conjunction with RMS, and a structural assessment will be undertaken for the Wollar Creek culvert.

3. Access Design

3.1 Access Options

Vehicles will use Barigan Road to reach one of the three potential access locations proposed for the site:

- Northern Access: connects directly with Barigan Road and is currently constructed to connect with the existing substation. This access is the primary access for heavy and light vehicles and is currently constructed up to the existing TransGrid substation. It would require construction of an access track between the existing substation and the proposed substation.

- Southern Access Option 1: utilises Maree Road, which connects with Barigan Road, to access the site. It will be utilised by light and heavy vehicles to access the site.

- Southern Access Option 2: provides a new connection with Barigan Road, just north of Maree Road, and will provide access for heavy vehicles.

It is understood the Northern Access and Southern Access Option 1 require legal access across private land. In the event that easements are unable to be established, Southern Access Option 2 would be the only access utilised during construction and operation for both heavy and light vehicles. If easements are able to be established, the Northern Access would be used for both heavy and light vehicles. Southern Access Option 1 would be used for light and heavy vehicles during construction and light vehicles during operation.

3.2 Northern Access

The Northern Access is proposed to be used for heavy and light vehicles during construction. The access will only be used if an easement agreement is achieved. A swept path assessment (refer Appendix B) has been prepared that shows two AVs are able to pass at the Northern Access assuming Barigan Road has been widened to 7.0 metres. Vehicles exiting the access will be required to wait for vehicles to turn right into the access before proceeding onto Barigan Road. This is considered to be a suitable arrangement given the low traffic volumes expected at the access. Accordingly, the access is currently suitably designed to accommodate two-way heavy and light vehicle movements.

Clear sight distances are provided along Barigan Road in both directions for vehicles exiting the site.

3.3 Southern Access Option 1

Southern Access Option 1 will be used for light and heavy vehicles during construction and light vehicles during operation, and will only be used if an easement agreement is achieved. The access will utilise the current formation of Maree Road, which extends from Barigan Road. The access is located on private land and it is understood that the existing formation of Maree Road will be widened to 7.0 metres to accommodate two-way vehicle movement.

3.4 Southern Access Option 2

In the event that easements are unable to be established, Southern Access Option 2 would be the only access utilised during construction and operation for both heavy and light vehicles. The access will utilise Council's road reserve located at the termination of Barigan Road to access the development site. The access will be constructed to have a road width of 7.0 metres to allow for simultaneous two-way traffic movement.

The access design and a swept path assessment showing access to the site by an AV is shown within Appendix B. The swept path assessment shows that at the bends within the road reserve only one truck is able to accommodate the carriageway. Accordingly, temporary traffic management measures

such as temporary traffic signals or traffic controllers will be required. It is recommended that these be detailed within the future CTMP.

Incorporating the above recommendations, the access is able to accommodate the worst-case design vehicle expected to access the site.

4. Conclusions

Amber has assessed the traffic impacts of the solar farm located approximately 7 kilometres south of Wollar, New South Wales. Access to the site is to be provided to/from Barigan Road and Maree Road. The above assessment determined the following:

- The peak construction period of the solar farm is 9 months. The site will generate up to 172 vehicle movements per day during peak construction times, including 72 truck movements;
- The road network is able to accommodate the traffic generated by the development during the construction and operational period;
- In order to mitigate the impacts of the development during construction a CTMP will be prepared which should include the following recommendations:
  - All staff, including shuttle bus drivers, be made aware of the road conditions within the Munghorn Gap Nature Reserve.
  - Prior to construction, a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council. During construction the sections of the road network utilised by the proposal are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the solar farm would be rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road network is left in the consistent condition as at the start of construction.
  - Water trucks or a light spray seal be used along Barigan Road and Maree Road to accommodate the level of traffic generated by the construction traffic and to also act to reduce the dust impact to the nearby dwellings.
  - Neighbours of the solar farm be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
  - Barigan Road and/or Maree Road be upgraded based on the designs shown within Appendix A and B, and that suitable traffic management measures be implemented in key locations.

Accordingly, based on the assessment and recommendations above, it is considered that the proposed access arrangements for the solar farm are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction and operation phase of the project.

If you have any questions please feel free to contact the undersigned.

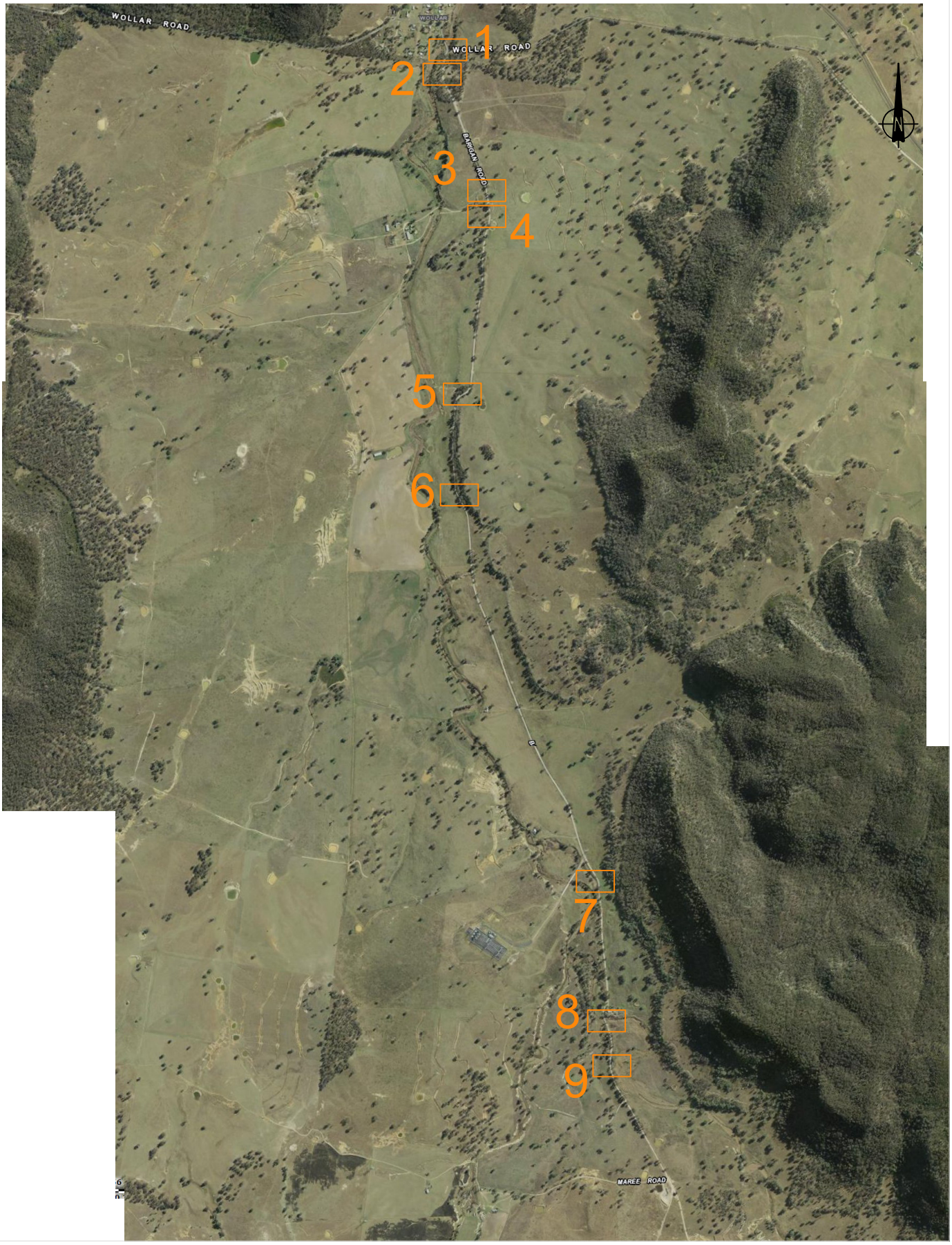
Yours sincerely
Amber Organisation

Michael Willson
Director

Attach: Appendix A – Swept Path Assessment
Appendix B – Access Design

Appendix A

Swept Path Assessment



Barigan Road
Swept Path Location Map

Amber A1

Vehicle Envelope

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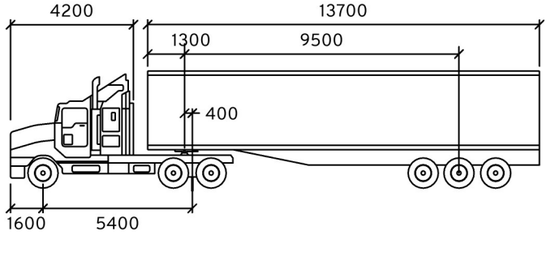

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Articulating Angle	: 70.0

Wollar Solar Farm

Road Widening

Swept Paths

DRAWN: MW
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DWG NO: 043-S01A

Amber 1

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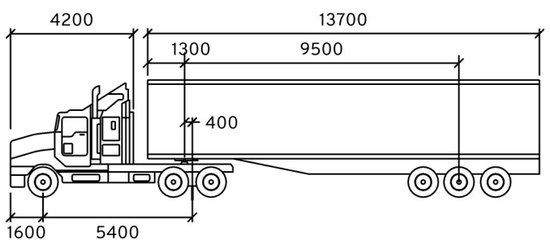

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Wollar Solar Farm

Road Widening

Swept Paths

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Amber 2

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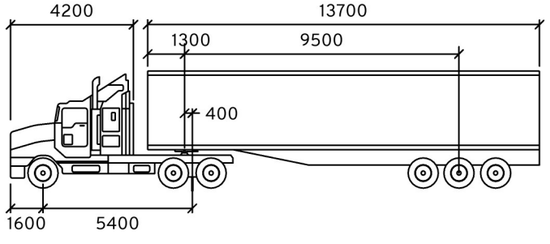

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Wollar Solar Farm

Road Widening

Swept Paths

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DWG NO: 043-S01A

Amber 3

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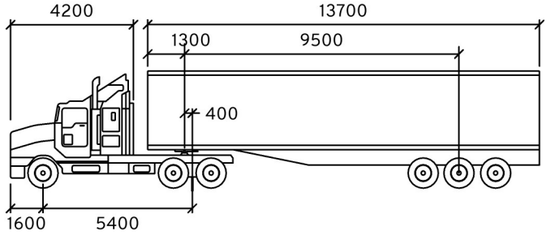

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Wollar Solar Farm

Road Widening

Swept Paths

DRAWN: MW
DATE: 03/09/2019
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Amber

Provide Traffic Control for One Lane System

Vehicle Envelope

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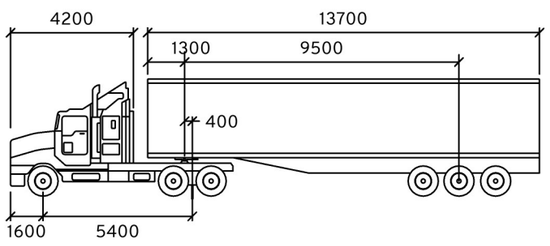

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Articulating Angle	: 70.0

Wollar Solar Farm

Road Widening

Swept Paths

DRAWN: MW
DATE: 03/09/2019
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DWG NO: 043-S01A

Amber

Vehicle Envelope

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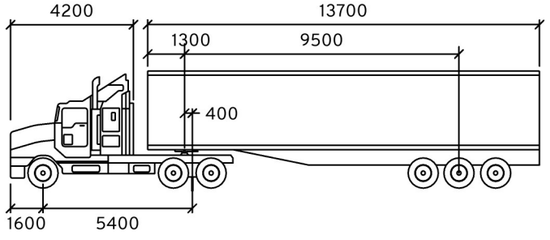
AV



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Articulating Angle	: 70.0

Wollar Solar Farm

Road Widening

Swept Paths

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Amber 6

Vehicle Envelope

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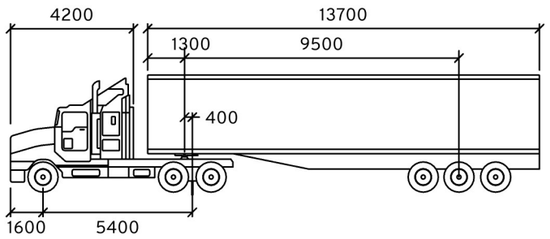

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Wollar Solar Farm

Road Widening

Swept Paths

DRAWN: MW

DATE: 03/09/2019

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DWG NO: 043-S01A

Amber 7

Provide Traffic Control for One Lane System

Vehicle Envelope

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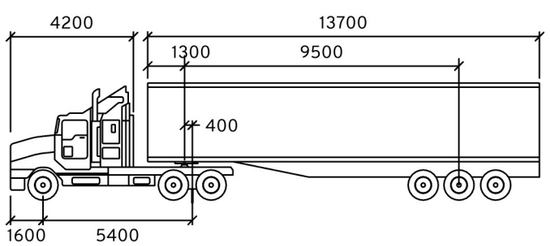

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Wollar Solar Farm

Road Widening

Swept Paths

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Amber

Vehicle Envelope

300mm Clearance

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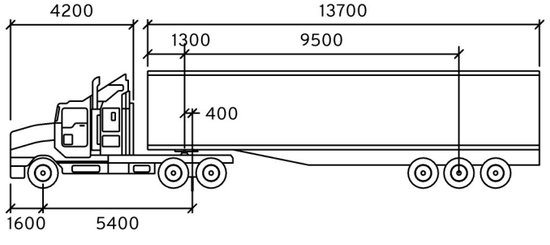

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Articulating Angle	: 70.0

Wollar Solar Farm

Road Widening

Swept Paths

DRAWN: MW
DATE: 03/09/2019
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Amber 9

Appendix B

Access Design

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7000

7000

Vehicle Envelope

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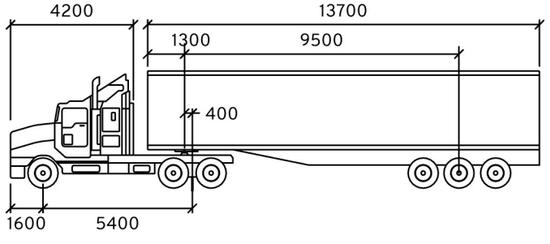

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Articulating Angle	: 70.0

Wollar Solar Farm

Northern Access

Swept Paths

DRAWN: MW

DATE: 04/09/2019

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DWG NO: 043-S01A

Amber

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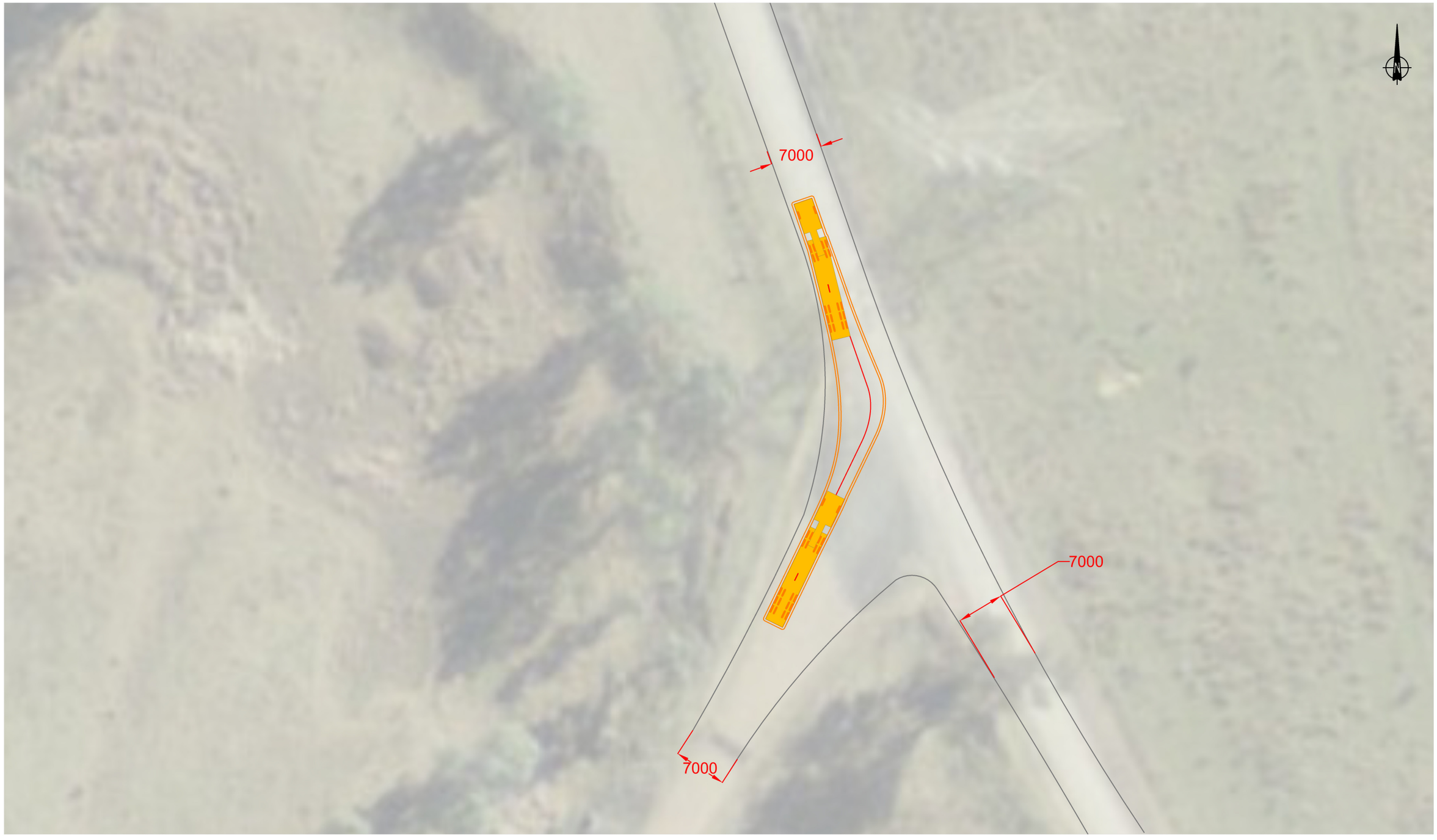

Vehicle Envelope

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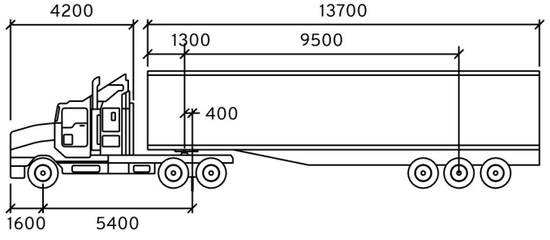
AV



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Articulating Angle	: 70.0

Wollar Solar Farm

Northern Access

Swept Paths

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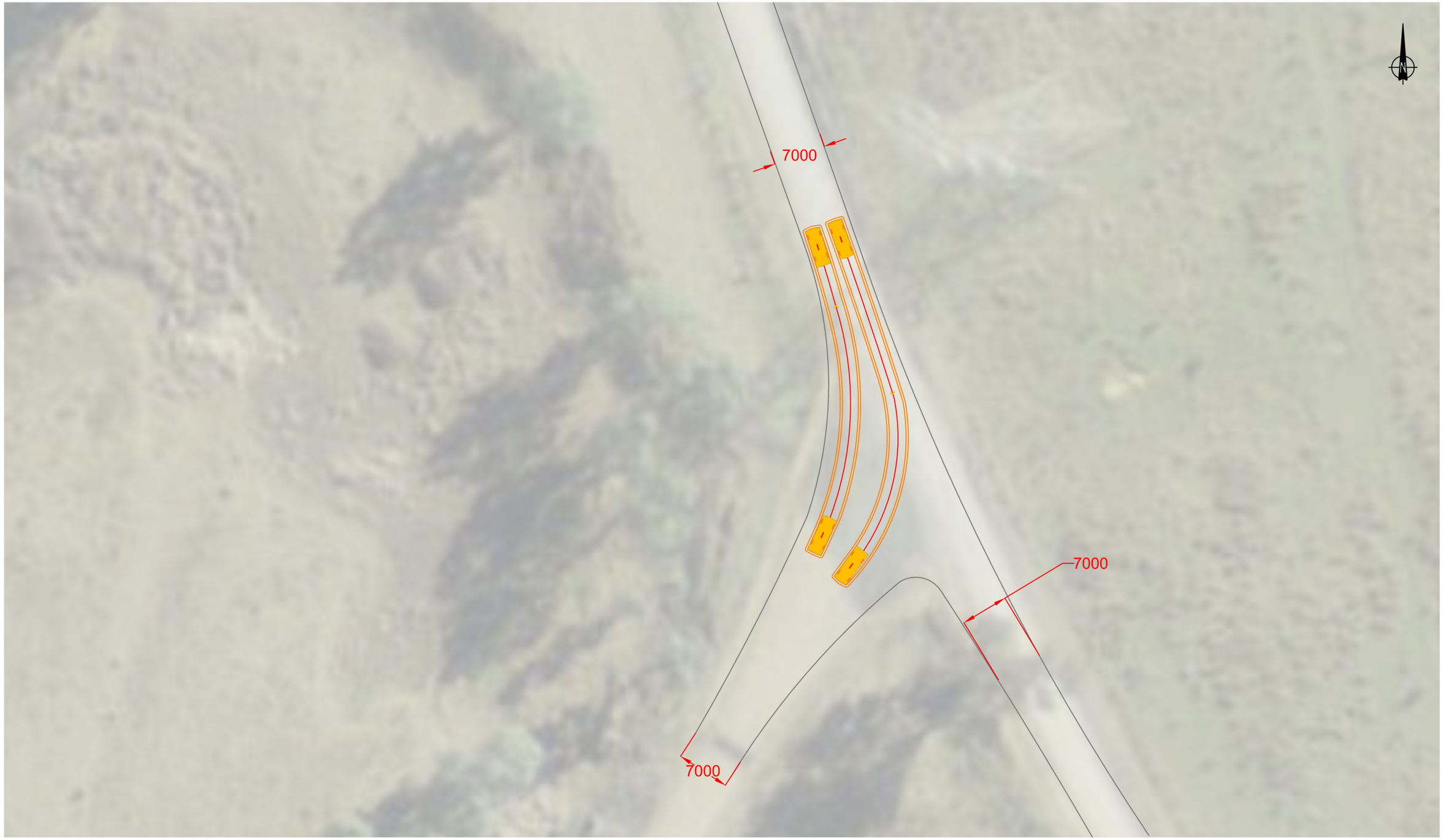
Amber B2



Vehicle Envelope

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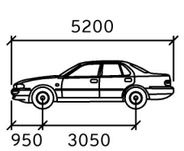

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Wollar Solar Farm

Northern Access

Swept Paths

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Amber B3

7000

R10000

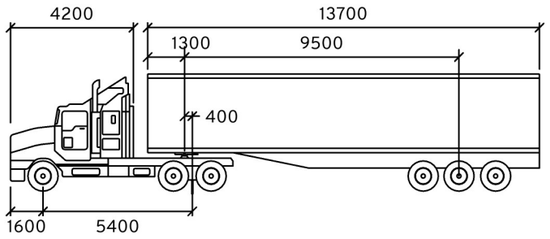
7000

Site Boundry

Vehicle Envelope

300mm Clearance

AV



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Wollar Solar Farm

Southern Access Option 1

Swept Paths

DRAWN: MW
DATE: 05/09/2019
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DWG NO: 043-S01B

Amber B4

7000

R10000

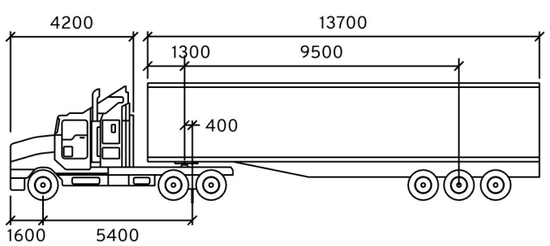
7000

Site Boundry

Vehicle Envelope

300mm Clearance

AV



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Articulating Angle	: 70.0

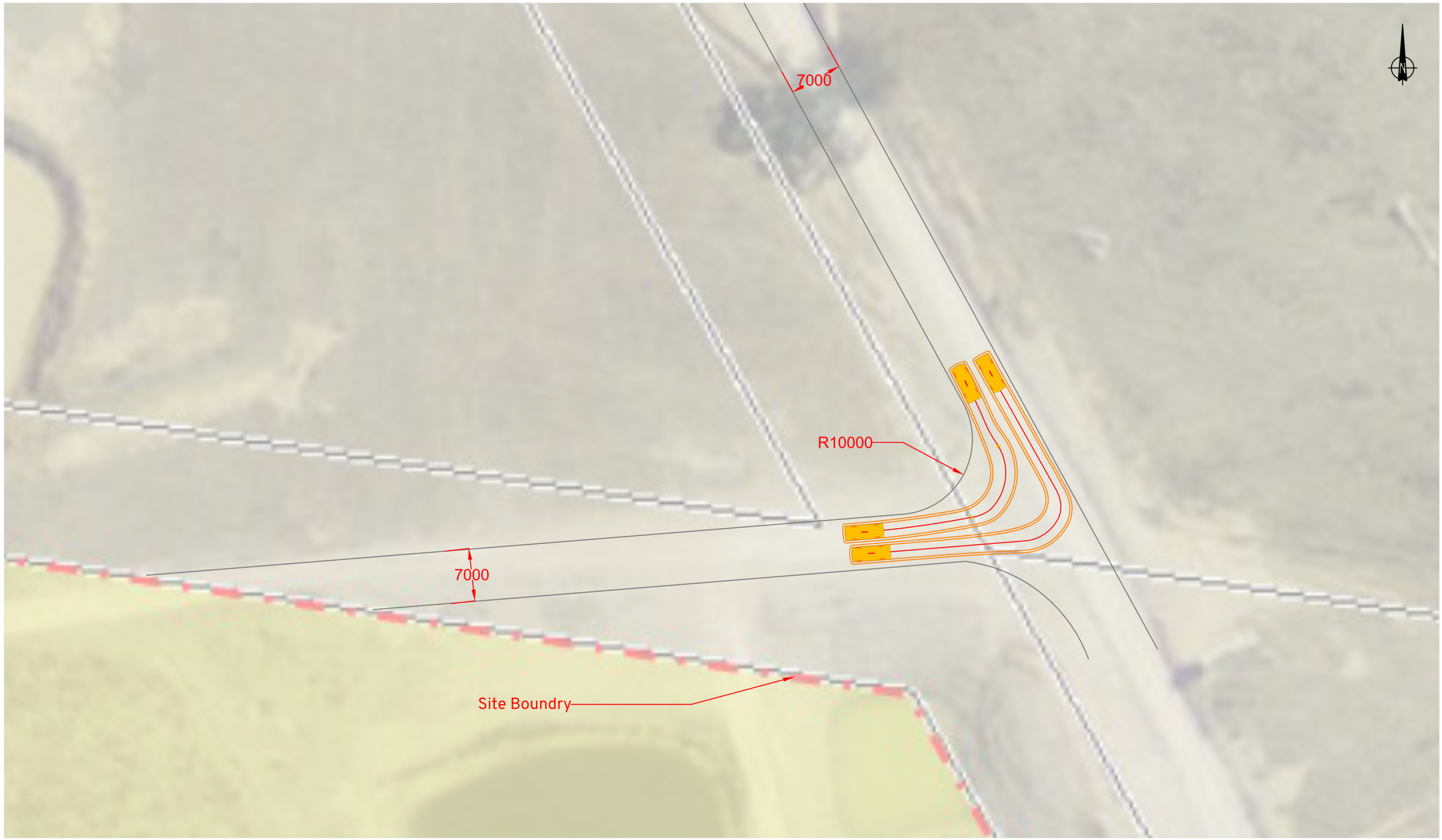
Wollar Solar Farm

Southern Access Option 1

Swept Paths

DRAWN: MW
DATE: 05/09/2019
SCALE: 1:500 @ A3
DWG NO: 043-S01B

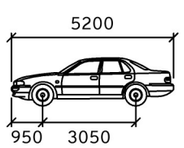
Amber B5



Vehicle Envelope

300mm Clearance

B99



	mm
Width	: 1940
Track	: 1840
Lock to Lock	: 6.0s
Steering Angle	: 33.9

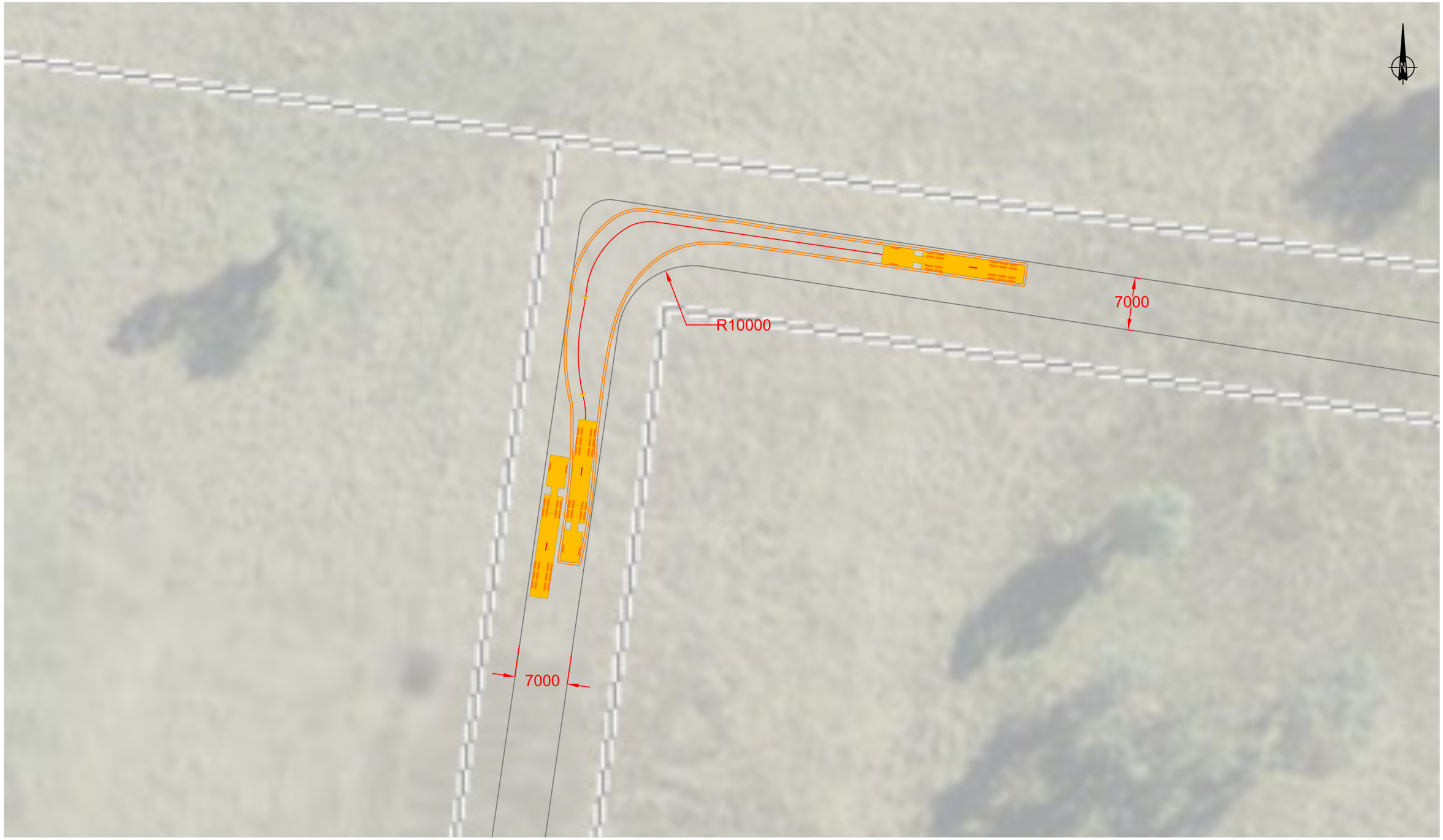
Wollar Solar Farm

Southern Access Option 1

Swept Paths

DRAWN: MW
DATE: 09/09/2019
SCALE: 1:500 @ A3
DWG NO: 043-S01B

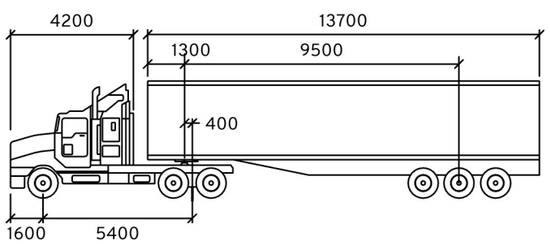
Amber B6



Vehicle Envelope

300mm Clearance

AV



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 28.3
Articulating Angle	: 70.0

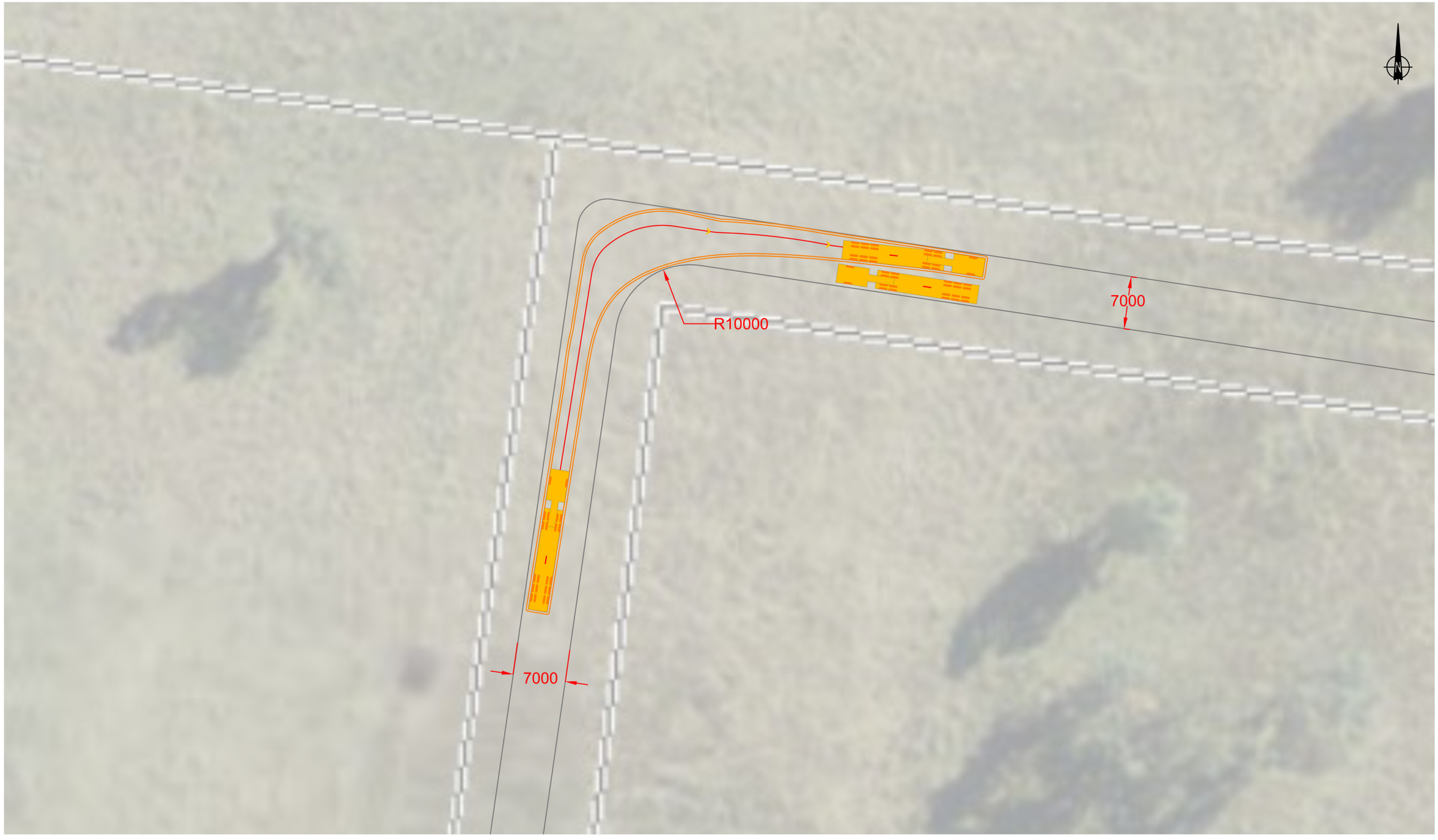
Wollar Solar Farm

Southern Access Option 2

Swept Paths

DRAWN: MW
DATE: 04/09/2019
SCALE: 1:500 @ A3
DWG NO: 043-S01A

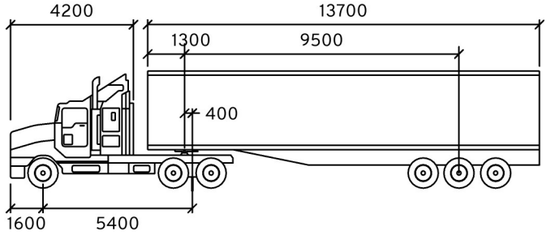
Amber B7



Vehicle Envelope

300mm Clearance

AV



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 28.3
Articulating Angle	: 70.0

Wollar Solar Farm

Southern Access Option 2

Swept Paths

DRAWN: MW
DATE: 04/09/2019
SCALE: 1:500 @ A3
DWG NO: 043-S01A

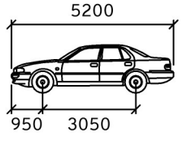
Amber

B8

Vehicle Envelope

300mm Clearance

B99



	mm
Width	: 1940
Track	: 1840
Lock to Lock	: 6.0s
Steering Angle	: 33.9

Wollar Solar Farm

Southern Access Option 3

Swept Paths

DRAWN: MW
DATE: 04/09/2019
SCALE: 1:500 @ A3
DWG NO: 043-S01A

Amber B9

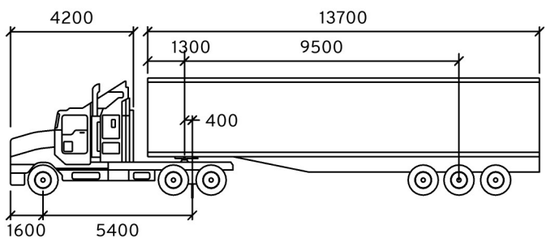
7000

Site Boundry

Vehicle Envelope

300mm Clearance

AV



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 28.3
Articulating Angle	: 70.0

Wollar Solar Farm

Southern Access Option 2

Swept Paths

DRAWN: MW

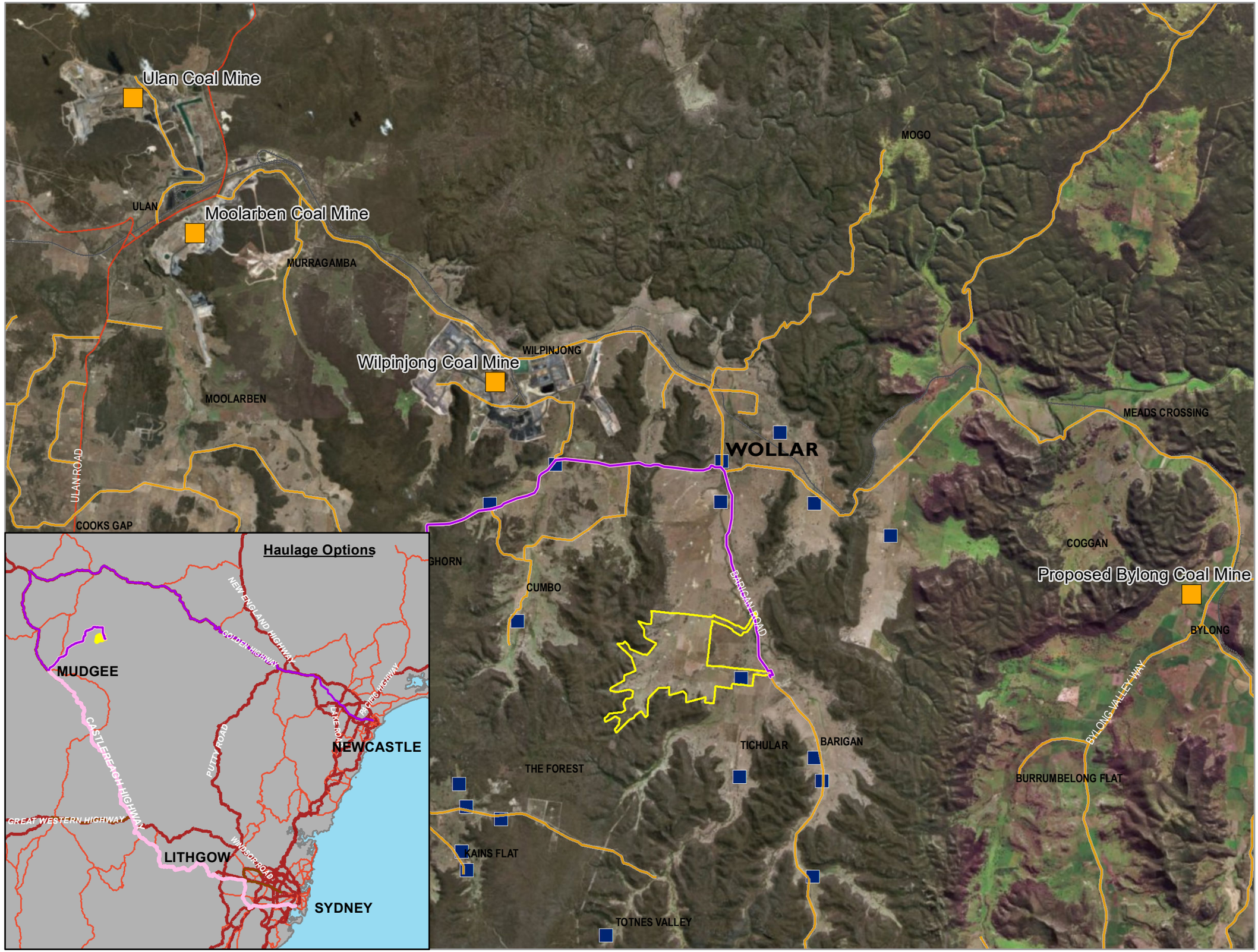
DATE: 04/09/2019

SCALE: 1:500 @ A3

DWG NO: 043-S01A

Amber B10

APPENDIX D MAP OF HAULAGE ROUTE



Notes:
- Data collected by nghenvironmental (2018)
- Base map Copyright © Esri and its data suppliers.
- Base layers from LPI, accessed 2017/18

0 0.5 1 2 km

A3 @ 1:135000
Ref: 18-012
Author: SP

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APPENDIX E ACCOMMODATION AND WORKFORCE STRATEGY OUTLINE

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APPENDIX F TRAFFIC PLAN

Jacobs Pty Ltd (2018).

Traffic Access Plan for Wollar Solar Farm

Output (MW)		295								
Construction Duration		18 month	5.5 working days/week							
Transportation Type	Item	Manufacture/Description	Models	Quantity	Type of Vehicle	Qty/Vehicle	Total Estimated No. of Vehicles/Trips	Estimated Daily Movement (Note 3)	Worst Case Daily Movement Estimation (per item)	Notes/Assumptions
Equipment	Solar Panels	Hanwha Q Cells	Q. PEAK L-G4.2 360	938,336	B Double	1276	736	4	4	Continuous delivery and pick up during the construction period
	PCU	SMA	Sunnt Central 2500-EV	59	Semi-Trailer	0.5	118	2	2	2 trucks/PCU Continuous delivery and pick up during the construction period
	Switchboards	Self-contained Building	N/A	2	Semi-Trailer	1	2	N/A	2	One-off delivery and pick up, no other heavy vehicles to enter site on the same day
	Transformer + 200 Tonnes Cranes	Grid Connection Transformer	N/A	2	Oversize Vehicles	1	2	N/A	2	One-off delivery and pick up, no other heavy vehicles to enter site on the same day
	Total Cables	N/A	N/A	HV Cables Approx. 30km LV Cables Approx. 4km DC Feeder Approx. 57km DC Strings Approx. 3800km Total = 3891km	Semi Trailer	30km	130	2	2	Continuous delivery and pick up during the construction period
	30 MWH Battery Storage	N/A	N/A	30 MWH	Semi-Trailer	1 MWH	30	2	2	1MWH/truck Continuous delivery and pick up during the construction period
	Auxiliary electrical equipment and machineries	Assuming 10 vehicles/day	N/A	-	Semi-Trailer	-	-	N/A	10	One-off delivery and pick up
	Steel - Posts, Tables, and Brackets	N/A	N/A	295	Semi-Trailer	0.5	590	4	4	2 trucks/1 MW Continuous delivery during the construction period
Buildings	Control Room	N/A	N/A	1	Semi-Trailer	1	1	N/A	2	One-off delivery and pick up
	Warehouse	N/A	N/A	1	Semi-Trailer	1	1	N/A	2	One-off delivery and pick up
	Offices	N/A	N/A	6	Semi-Trailer	1	6	N/A	2	One-off delivery and pick up
	Water Tanks	N/A	N/A	4	Semi-Trailer	1	4	N/A	8	One-off delivery and pick up
Fences	Post & Wire/Mesh	N/A	N/A	-	Semi-Trailer	-	5	N/A	2	One-off delivery and pick up
Heavy Machineries	Earthworks and Grading Machine	N/A	N/A	3	Semi-Trailer	1	3	N/A	2	Delivery and pick up once during the entire construction period
	Telehandler	N/A	N/A	30	Semi-Trailer	1	30	N/A	4	Delivery and pick up once during the entire construction period
	Tractors/Bulldozers	N/A	N/A	3	Semi-Trailer	1	3	N/A	2	Delivery and pick up once during the entire construction period
	Miscellaneous Trucks	N/A	N/A	300	Standard Truck	1	2000	10	10	Assume 5 trucks continuous delivery and pick-up during the construction period.
	Water Tankers	20000L Tanker	N/A	162ML	Standard Truck	20000	7920	30	30	The assumed water usage per day is 600kL for the first 12 months of the project. Using 3 water tankers aligns with the amount of graders.
Construction Personnel	Construction Workers	Assuming peak construction workforce of 500 (peak) daily	N/A	500	Shuttle Buses	25	7296	40	40	Assume 10 Shuttle buses available
					Cars	20	8880	40	60	
Total Vehicles							27757		192	

*Notes:
1. The traffic plan does not include 330kV OHL augmentation.
2. No. of days assumed for construction is 396, for 18 months (72 weeks) of 5.5 working days/week.
3. Two movements per day per vehicle