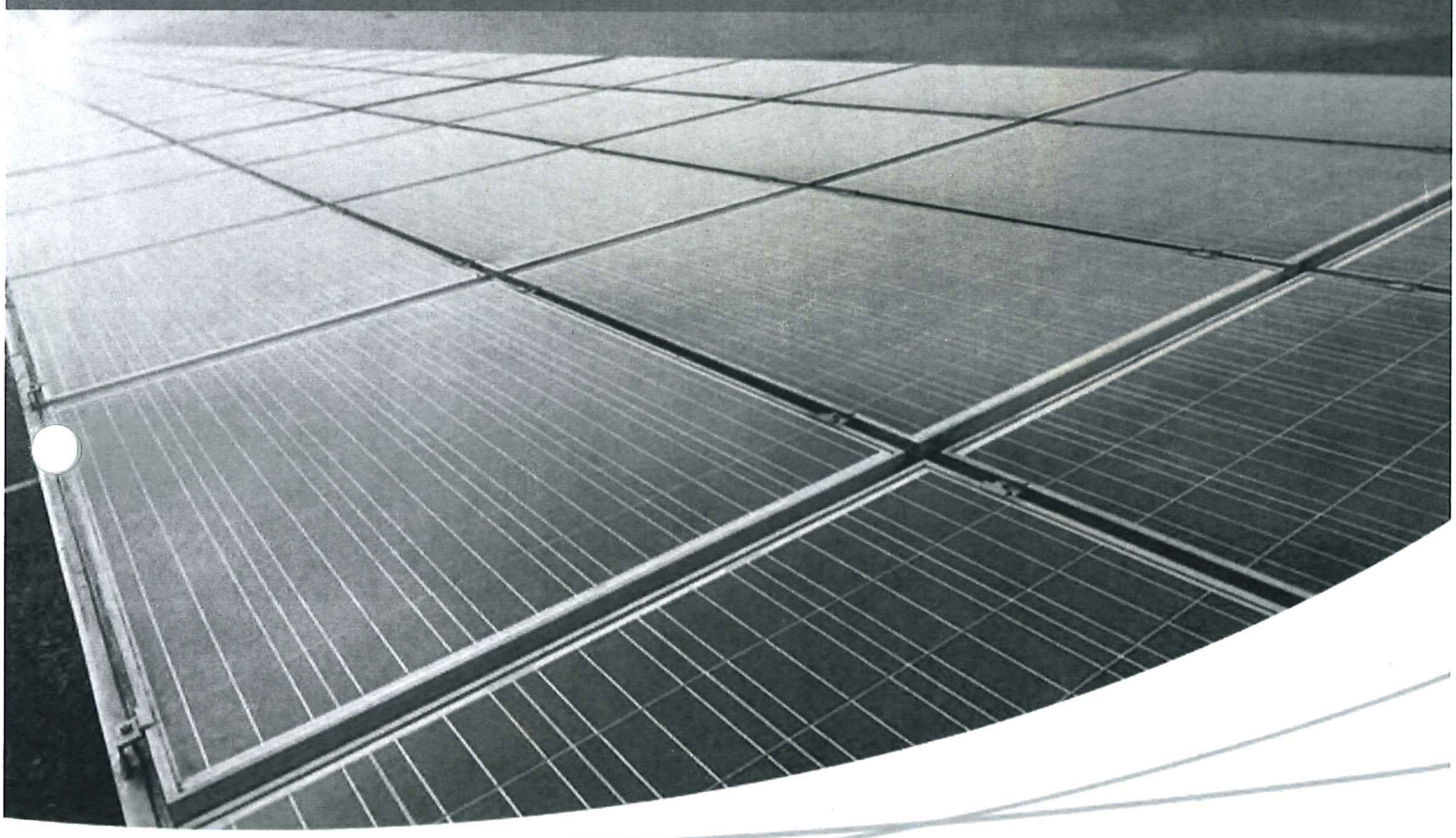
TRANSPORT IMPACT ASSESSMENT

Prepared for Robertstown Solar

Prepared by GTA Consultants



EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

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Robertstown Solar Project

Robertstown, SA
Transport Impact Assessment

Prepared by: GTA Consultants (SA) Pty Ltd for Energy Projects Solar (EPS) Pty Ltd on behalf of Robertstown Solar 1 Pty Ltd

on 27/11/18

Reference: S159810

Issue #: A

GTAconsultants

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	27/11/18	Final	Ian Bishop	Paul Froggatt	Paul Froggatt	

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CONTENTS

1. INTRODUCTION

01

1.1. Background

A Development Application is sought for a proposed solar project on land located approximately 5km north east of Robertstown, SA. The proposed development incorporates the construction of a Photovoltaic Energy Generation System (PVS) of approximately 500 MW (AC) generation capacity and Battery Energy Storage System (BESS).

GTA Consultants was commissioned by EPS Energy in 2018 to undertake a transport impact assessment of the proposed development.

1.2. Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

1. existing traffic conditions surrounding the site
2. traffic generation characteristics of the proposed development
3. heavy vehicle route to the proposed development
4. proposed access arrangements and sight distance for the site
5. transport impact of the development proposal on the surrounding road network.

1.3. References

In preparing this report, reference has been made to the following:

- Goyder Council Development Plan (consolidated – 24 November 2016)
- AustRoads Guide to Road Design – Part 4A – Signalised & Unsignalised Intersections (2017)
- Locality plan and project boundary for the proposed development as provided by EPS Energy.
- various technical data as referenced in this report
- other documents as nominated.

2. EXISTING CONDITIONS

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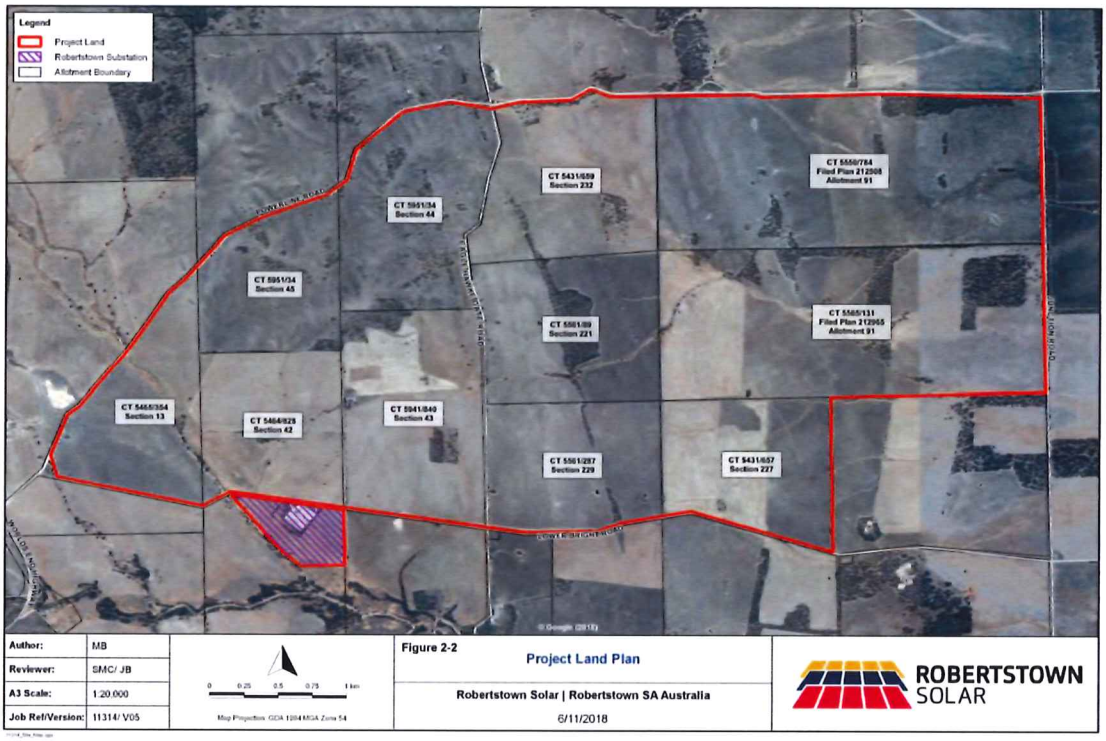
2.1. Project Area

The project area is located approximately 5km northeast of Robertstown, SA. The project area is comprised of a number of lots equating to a total area of approximately 1,800 hectares (ha) in size and is located to the east of Worlds End Highway. The project area is bounded by Lower Bright Road, Powerline Road and Junction Road. Eagle Hawke Gate Road bisects the site in a north/south direction.

The location of the project land, that includes the project area and the surrounding environs is shown in Figure 2.1.

Figure 2.1: Project Land and its Environs



2.2. Road Network

2.2.1. Adjoining Roads

Worlds End Highway

Worlds End Highway is under the care and control of the Department of Planning Transport and Infrastructure (DPTI) and is a two-way, two lane road, configured with one lane in each direction. The carriageway is approximately 8 metres wide and set within a road corridor approximately 60 metres wide. Data obtained from DPTI shows that within the vicinity of the project area, the annual average daily traffic volume (AADT) is approximately 170 vehicles per day[1]. The highway is subject to the rural default speed limit of 100km/h.

Local Roads

Powerline Road and Lower Bright Road are unsealed two-way local roads under the care of the Regional Council of Goyder. They are configured with an approximately 7m carriageway set within a 20m road reserve (approx.). As both roads

[1] LocationSA – Traffic Volume Estimates, base year 2014.

are unsealed, they are subject to the rural default speed limit of 100 km/h. GTA was unable to source traffic volume data for Powerline Road and Lower Bright Road however traffic volumes would be expected to be less than 170 vehicles per day.

The immediate Powerline Road approach to Worlds End Highway appears to be sealed.

Junction Road runs along the eastern boundary of the project area and is an unsealed road approximately 8.7 metres wide set within a road corridor approximately 18 metres wide. Being unsealed, the road is subject to the default rural limit of 100km/h.

Eagle Hawke Gate Road bisects the project area and is an unsealed road approximately 9 metres wide at its southern end towards Lower Bright Road however reduces to a track approximately 180 metres north of Lower Bright Road. The road is set within a corridor approximately 18 metres wide. Being unsealed, the road is subject to the default rural limit of 100km/h.

2.2.2. Surrounding Intersections

The following intersections currently exist in the vicinity of the project area:

- Lower Bright Road/ Powerline Road (unsignalised)
- Powerline Road/ Fettke Road / Worlds End Highway (unsignalised)
- Lower Bright Road / Junction Road (unsignalised)
- Lower Bright Road / Eagle Hawke Gate Road (unsignalised)

2.2.3. Sight Distance

A desktop assessment of sight distance at the intersection of Worlds End Highway and Powerline Road has been undertaken in accordance with the requirements of the Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections (Austroads, 2017). The assessment considers the Safe Intersection Sight Distance (SISD) and Minimum Gap Sight Distance (MGSD).

- Safe Intersection Sight Distance (SISD) – the sight distance for a vehicle travelling on a major road and approaching an intersection to observe a vehicle on the minor road approach moving into a collision situation and to decelerate to a stop before reaching the collision point; and
- Minimum Gap Sight Distance (MGSD) – sight distance for vehicles exiting the project area to observe approaching vehicles on the major road and decide whether there is a sufficient gap to turn from the minor road.

Given the rural location of the project area, at a design speed of 110km/h and a reaction time of 2.5 seconds, an SISD of 300 metres is required.

MGSD is based on the critical gap acceptance time that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. Depending on the types of turning movements, critical gap acceptance time has the following values:

- Right turn from major road – across one lane: 4 secs
- Right turn from minor road – two lane/two way: 5 secs
- Crossing – two lane/two way: 5 secs
- Left turn: 5 secs

A design speed of 110 km/h and critical gap acceptance time of 5 secs requires a MGSD of 153m.

The SISD and MGSD at the intersection of Powerline Road and Worlds End Highway are considered satisfactory to the north of the intersection however sight distance to the south is limited and is discussed further in Section 4 – Traffic Impact Assessment.

EXISTING CONDITIONS

A high-level aerial sight distance assessment has been undertaken at the intersection of Powerline Road and Lower Bright Road. The assessment indicates that there's likely to be at least 300 metres of horizontal sight distance in to the north and 170 metres horizontal sight distance to the south of the intersection.

3. DEVELOPMENT PROPOSAL

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3.1. Proposed Development

The development proposal includes the construction of a Photovoltaic Energy Generation System (PVS) of approximately 500 MW (AC) generation capacity and Battery Energy Storage System (BESS).

Construction of the development is proposed in stages.

A construction scenario of 28 months is adopted for the assessment. During construction a campsite may be established within the project area for construction workers.

3.2. Vehicle Access

Access locations to the project area are to be confirmed but will be primarily located on Powerline Road and Lower Bright Road. Options for access from Eagle Hawke Gate Road are being considered. Where possible, options to utilise existing crossovers will be adopted. Some access locations may be temporary to facilitate construction and may be closed once the solar facility is in operation.

4. TRAFFIC IMPACT ASSESSMENT

04

4.1. Proposed Heavy Vehicle Route to Project Area

Heavy vehicles will be required to access the project area and surrounding areas during the construction phase for solar PV module deliveries, BESS infrastructure deliveries, road upgrades associated with project area access, internal access tracks, sub-station, office and maintenance facility construction. During the operational phase, it is envisaged there will be very few heavy vehicle movements.

The indicative heavy vehicle route for the project area at Robertstown is as follows:

- From Port Adelaide via National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81), Worlds End Highway, Powerline Road and Lower Bright Road.

The existing DPTI approved restricted access vehicle routes are detailed on the DPTI RAVnet website and are reproduced in Figures 4.1 to 4.2, with the proposed route highlighted. Figure 4.3 shows the existing 26m B-Double (PBS Level 2) network in the locality of the project area. Worlds End Highway is gazetted for 26m B-Double vehicles, however Powerline Road, Lower Bright Road, Eagle Hawke Gate Road, and Junction Road are not currently gazetted for 26m B-Double (PBS Level 2) access. Where approval to operate B-doubles is sought, an application to the National Heavy Vehicle Regulator (NHVR) will be required.

Figure 4.1: Existing 26m B-Double Approved Routes – Port Adelaide to Gawler

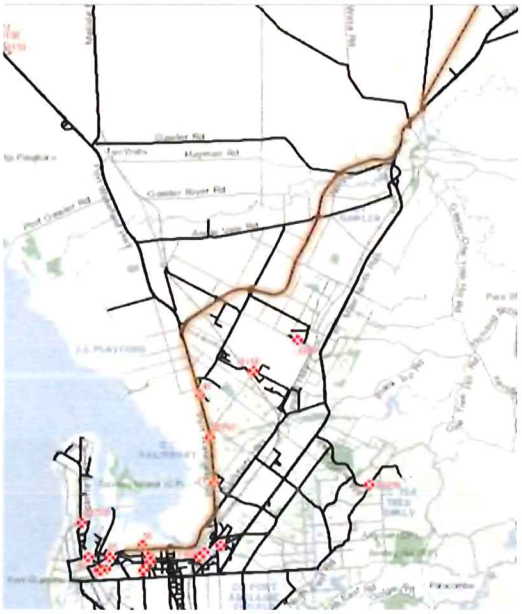


Figure 4.2: Existing 26m B-Double Approved Routes – Gawler to the proposed project area

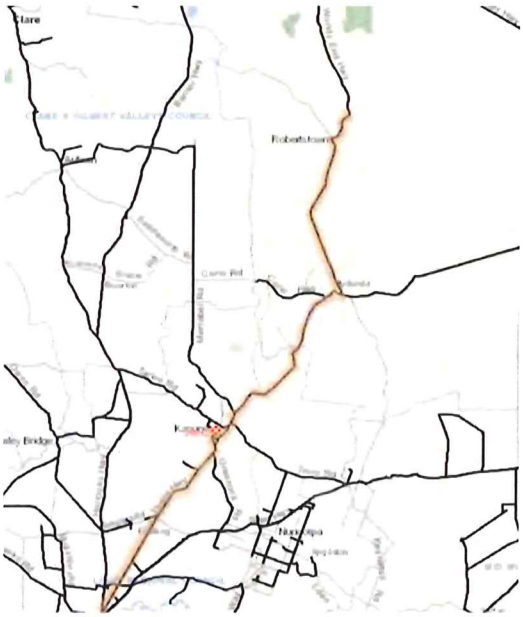
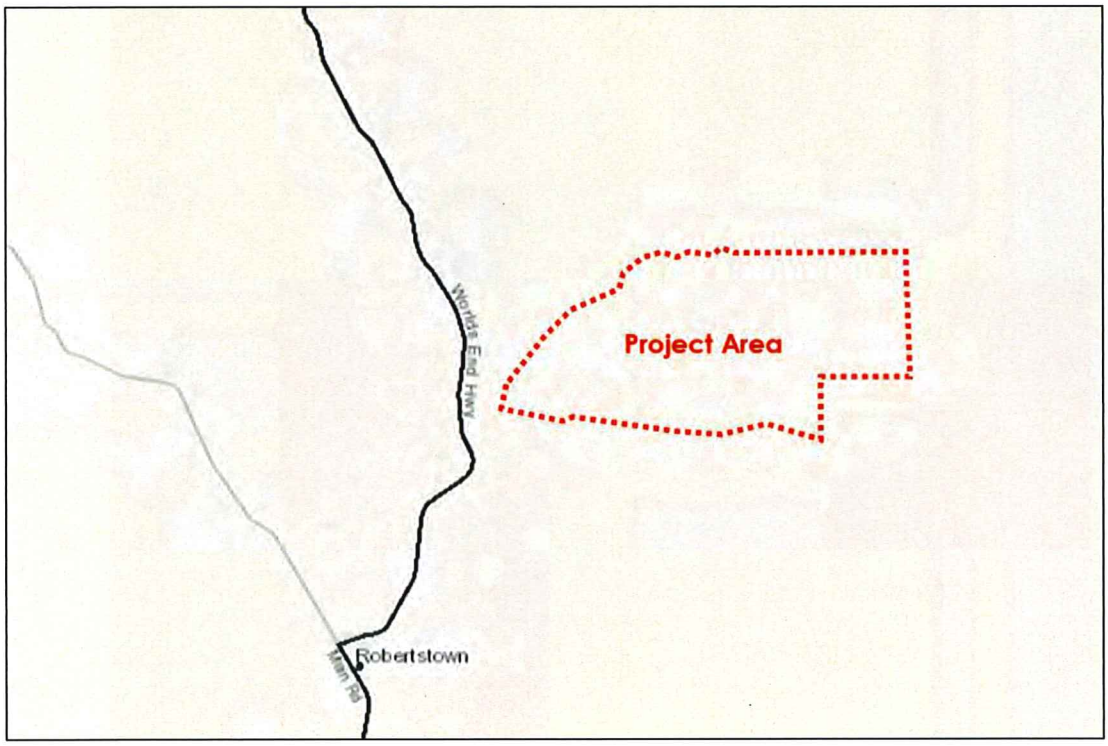


Figure 4.3: Existing 26m B-Double Approved Routes in vicinity of the project area



Except for a small number of oversize vehicles which are required for delivery of transformers and a substation, the maximum design vehicle for the proposed for project area access is a 26 metre B-Double which is currently approved for travel along most of the proposed route. There is one notable turning restriction (No. 24842) at Kapunda which only permits left turn movements by B-doubles from Perry Road into Adelaide Road, and right turn movements only from Adelaide Road onto Perry Road.

The above restriction corresponds with the approved B-double route and appears to have been implemented to prevent B-double movements through the town centre. Although the town centre is classed as a general access route and therefore accessible by 19 metre semi-trailers, it is recommended that semi-trailers adopt the approved B-double route for improved travel time and to preserve amenity within the town centre.

Over dimensional vehicles will require an application to be lodged with DPTI and require either private or police escort depending on the limits of the over dimensional load.

Turnpaths have been completed for a 26 metre B-double (PBS Level 2) combination turning between the Worlds End Highway and Powerline Road and are shown in Figures 4.4 and 4.5. The turnpaths show that a B-double will be able to undertake the turning manoeuvres within the existing footprint of the intersection and that upgrades to the intersection are not required to accommodate the turnpath. It is noted that when a B-double turns left from Powerline Road, simultaneous vehicle movements are not possible since the whole width of Powerline Road is required for the vehicle to complete the turn and avoid crossing the centreline on Worlds End Highway. The turnpath demonstrates however that a vehicle waiting to turn into Powerline Road can safely store on the highway while the B-double turns out. This arrangement is considered acceptable since the volume of traffic on Worlds End Highway is very low.

Figure 4.4: 26 Metre B-Double Turn Path - Right Turn into Powerline Road

Figure 4.5: 26 Metre B-Double Turn Path - Left Turn from Powerline Road

Turnpaths for a 26 metre B-double have also been completed for the intersection of Powerline and Lower Bright Road and are shown in Figures 4.6 and 4.7. The turn paths show that B-doubles will be able to turn within the existing footprint of the intersection and therefore modifications to the intersection are not required. While the turnpaths require the B-double to cross the centreline of the road, the manoeuvre is not considered high risk since there appears adequate sight distance at the intersection and traffic volumes along Powerline Road and Bright Road are very low.

Figure 4.6: 26 Metre B-Double Turnpath – Right Turn from Powerline Road to Lower Bright Road

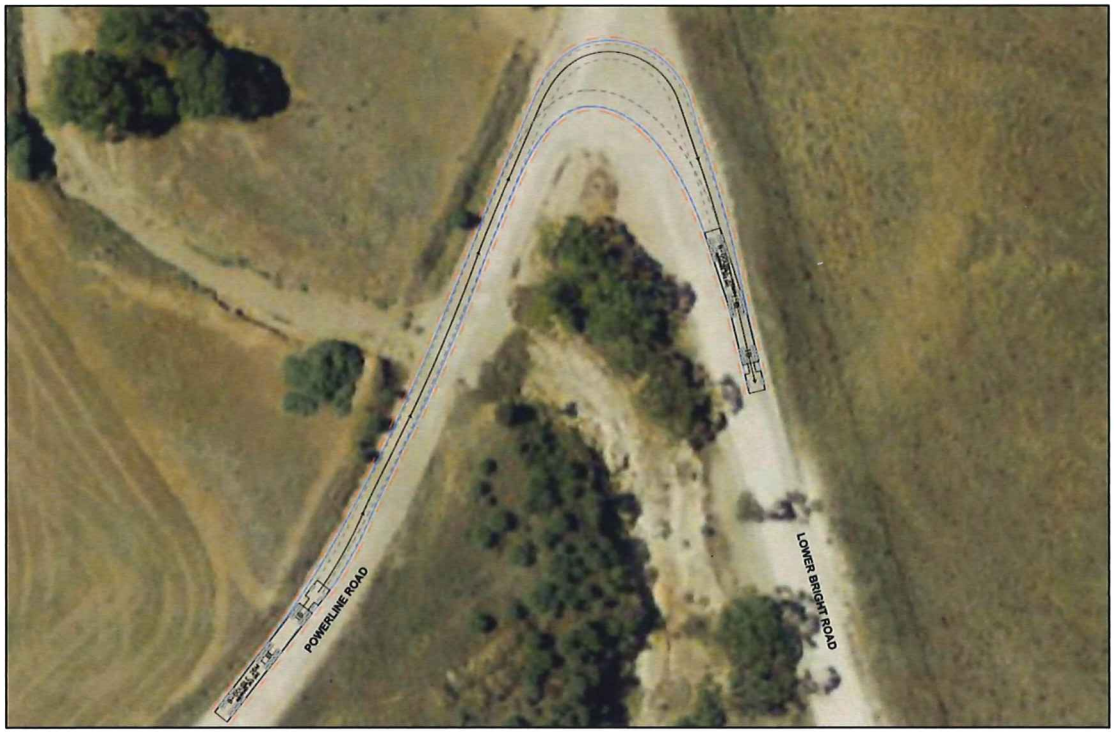
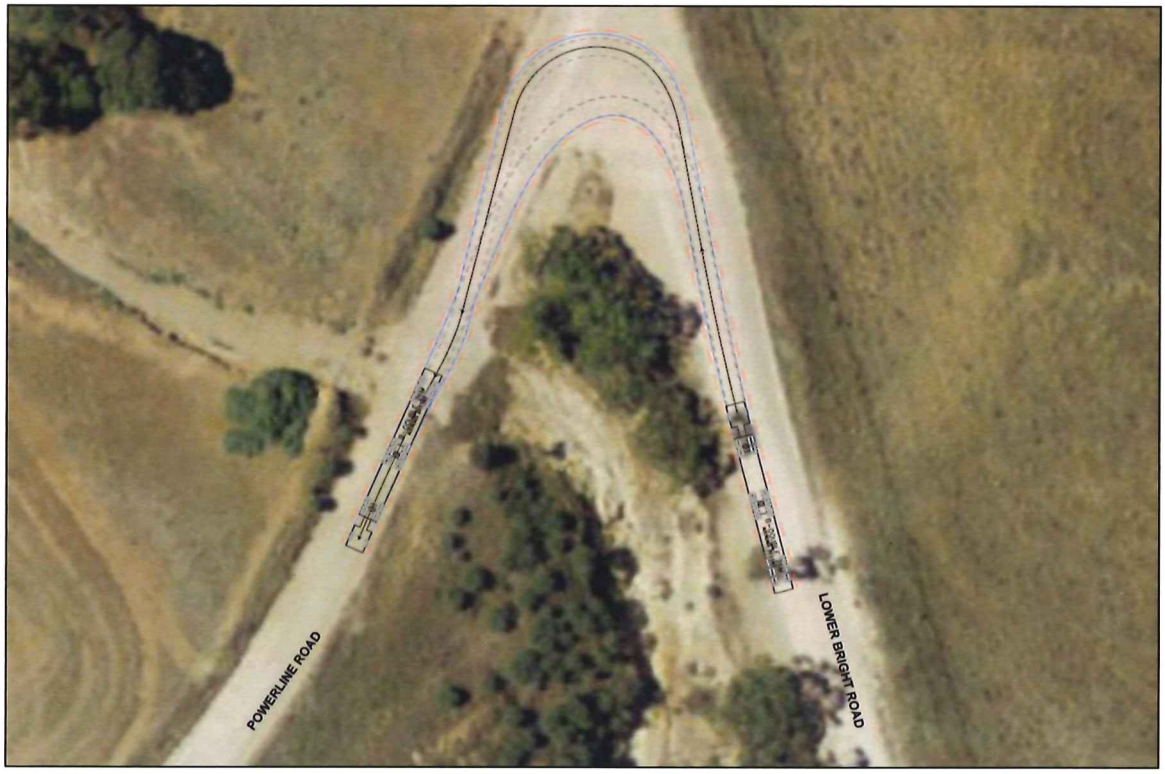


Figure 4.7: 26 Metre B-Double Turnpath – Left Turn from Lower Bright Road to Powerline Road



4.2. Traffic Generation

Traffic impacts of the proposed solar project on the surrounding road network during the construction phase have been assessed based on the following two scenarios:

- Scenario 1 – all light and heavy vehicle movements will arrive from the south during the construction phase
- Scenario 2 – a construction camp may be set up within the project area, which will reduce the volume of light vehicles traveling to and from the site on a daily basis.

Traffic in the operational phase will most likely comprise of light vehicles as staff monitor operations and maintain the facility. It is envisaged there will be very few heavy vehicle movements, and these would likely occur on an ad hoc basis for equipment replacement.

4.3. Construction Phase Traffic Generation – Scenario 1

4.3.1. Design Rates

Traffic generation estimates for the project area were sourced from EPS Energy. Based on a 28 month construction period, the proposed project is anticipated to generate a total of 11,342 heavy vehicle movements during the construction period of 28 months. A summary of the anticipated heavy vehicle types and movements during the construction period is provided in Table 4.1.

Table 4.1: Anticipated Heavy Vehicle Type and Movement Details [1]

Equipment		Delivery Vehicle	Movements
Major Equipment Delivery	Post Pounding Units and Piles.	Semi-Trailer	1,532
	Tracking System, Framework	Semi-Trailer	3,238
	PV Modules	B-Double Semi	3,090
	PCS, Inverters	L - Low Loader	206
	Combiner Boxes	Semi-Trailer	62
	Other including cabling	Semi-Trailer	1,122
Site Mobilisation / Set-up	Misc. Establishment Deliveries	L - Low Loader	12
	Earthmoving Equipment Deliveries	H - Low Loader	12
	Imported Materials for Office / Laydown	Truck and Dog	280
	Imported Materials for Roads	Truck and Dog	900
HV Trenching	Excavator Delivery	H - Low Loader	4
	Cable Laying Equipment	L - Low Loader	4
	Cable Bedding Sand	Truck and Dog	200
	Misc. Building Materials etc	Semi-Trailer	10
Substation Works	Primary Transformer	O/D H-Low Loader	2
	Modular Substation	O/D L-Low Loader	2
	Switchboard	L - Low Loader	4
	Cabling	L - Low Loader	4
	Switchgear Components	Semi-Trailer	10
General Construction	Waste Collection	Waste Truck	160
	Dust suppression	Water Trucks	488
		TOTAL	**11,342**

[1] Source: Estimated traffic movement data by EPS Energy, dated [22 August 2018].

The average heavy vehicle and light vehicle movements per day during construction are shown in Table 4.2.

Table 4.2: Traffic Generation Estimates

Construction Phase	Light Vehicles per day	Heavy Vehicles per day	OD Heavy Vehicles	Total movements per day
Months 1-2	10	9		19
Months 3-4	15	11		26
Months 5-6	23	17		40
Months 7-8	34	26		60
Months 9-10	32	20		52
Months 11-12	27	21	2	50
Months 13-14	30	21		51
Months 15-16	32	19		51

Construction Phase	Light Vehicles per day	Heavy Vehicles per day	OD Heavy Vehicles	Total movements per day
Months 17-18	26	20		46
Months 19-20	27	21		48
Months 21-22	30	19		49
Months 23-24	29	18		47
Months 25-26	22	11		33
Months 27-28	17	1		18

The estimated average vehicle movements per day across the construction scenario varies across different phases, with a consistent level of daily movements averaging approximately 50 movements per day (20 light vehicles and 30 heavy vehicles) during construction months 7 to 24.

4.3.2. Intersection Treatment Warrant Assessment

Based on the above traffic generation estimates, an assessment in accordance to the Guide to Road Design Part 4: Intersections and Crossings - General (Austroads, 2017) has considered the warrants for turning treatments at the intersection of Worlds End Highway and Powerline Road. Figure 4.8 shows the various traffic volume parameters calculated by the warrant.

Figure 4.8: Calculation of the Major Road Traffic Volume Parameter Qm

Turn type	Splitter island	Q_m (veh/h)
Right	No	$= Q_{T1} + Q_{T2} + Q_L$
Right	Yes	$= Q_{T1} + Q_{T2}$
Left	No/yes	$= Q_{T2}$

For a right turn movement, the major road traffic volume parameter (Q_M) consists of the traffic held up behind the right turning vehicles on the major road (Q_{T1}), and traffic impacting the right turn movement in the opposite direction of travel (Q_{T2} and Q_L). For a left turn movement, the major road traffic volume parameter (Q_M) considers only the traffic held up by the turning vehicle in the same lane (Q_{T2}).

Worlds End Highway has an Average Annual Daily Traffic (AADT) of 170 in vicinity of the project area. For this assessment a peak hour volume of 10% of the daily traffic was assumed. As such, the peak hour traffic volume is approximately 17 vehicles, comprising 9 northbound movements and 8 southbound movements based on a 50:50 directional split being assumed.

Turning movements into the Project Area

It is assumed that 30% of the light vehicles will likely arrive at the project area within a given peak hour correlating with shift work. Therefore, it is anticipated that the volume of light vehicles arriving at the project area in a peak hour will be approximately 6 vehicles. Given the location of the project area to major towns in the vicinity, it is assumed that most of the traffic will arrive and depart Powerline Road to the south. Since most of the traffic is expected from the south, potential limitations of the sight distance from Powerline Road to the south will have little impact or risk to development traffic since right turn movements from Powerline Road are not expected to be frequent.

Heavy vehicles will be travelling via the proposed route via Worlds End Highway from the west of the project area. It is assumed that the arrival distribution of heavy vehicles is even over hours of construction. As such a peak hour heavy vehicle volume equal to 10% of the daily heavy vehicle volume has been adopted, which equates to approximately 3 vehicles in the peak hour.

The turning movements of vehicles at the intersection of Worlds End Highway and Powerline Road is shown in Figure 4.9.

Figure 4.9: Turning movements in a peak hour

Warrants for turn treatments

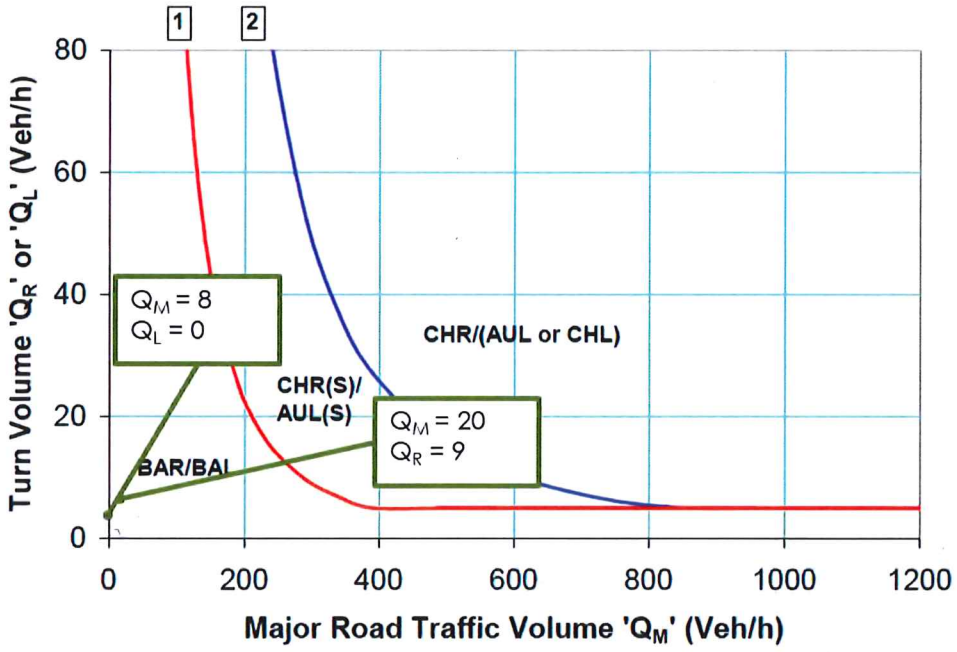
Based on the traffic volume and distribution assumptions, Table 4.3 presents the left and right turn volume calculations with respect to the major road traffic volumes.

Table 4.3: Traffic Volume Parameters

Turn Type	Peak Hour Movements	Major Traffic Volume (QM)
Right (Q_R)	Q_R =9	$Q_M = Q_{T1} + Q_{T2} + Q_L = 20$
Left (Q_L)	$Q_L = 0$	$Q_M = Q_{T2} = 8$

Figure 4.10 outlines the warrant for turn treatments on the major road at unsignalised intersections for a design speed equal to or greater than 100km/h. The Peak Hour Movements (Q_R/Q_L) and corresponding Major Traffic Volumes (Q_M) are plotted on the graph to determine the type of turn treatment required.

Figure 4.10: Warrant for intersection treatment



(a) Design speed ≥ 100 km/h

(Reproduced based on Figure A 10b, Austroads, Guide to Road Design Part 4)

From the above assessment, it can be concluded that during the peak hour, the marginal increase in turning movements at the intersection associated with the development traffic would not significantly impact on the current warrant requirements. Therefore, formal turn treatments at the intersection are not considered to be warranted.

4.4. Construction Phase Traffic Generation – Scenario 2

In this scenario, a construction camp is proposed within the project area so that light vehicle traffic generated during the construction phase will be reduced. The construction camp is anticipated to reduce light vehicle movements during the peak period by up to 90% compared to Scenario 1, hence reducing the project-generated light vehicles from 20 vehicles per day to 2 vehicles per day.

The peak hour light vehicle traffic is therefore anticipated to be less than 1 vehicle per hour (assuming 30% of daily vehicle movements are in the peak hour).

The anticipated heavy vehicle volume will be consistent with that of Scenario 1, which is 3 heavy vehicles in the peak hour.

The increase in traffic volumes in the construction phase is marginal and will not generate any additional intersection treatment requirement. The risk associated with the additional turning manoeuvres in this scenario is negligible given the traffic volumes considered.

4.5. Operational Phase Traffic Generation

Given the low trip rate generated by the operational staff, the development will not compromise the safety or function of the surrounding road network during the operational phase. No turning treatments at the intersection of Worlds End Highway and Powerline Road would therefore be warranted.

4.6. Summary

In summary, the project is not anticipated to generate high volumes of traffic during either the construction or operational phases. The intersection of Worlds End Highway and Powerline Road will not require any additional intersection treatment beyond the current layout.

5. CONCLUSION

05

5.1. Conclusion

GTA has undertaken a transport feasibility assessment for the proposed Robertstown Solar development and the following conclusions are made:

1. A Photovoltaic Energy Generation System (PVS) of approximately 500 MW (AC) generation capacity and Battery Energy Storage System (BESS) is proposed on the project area located 5km northeast of Robertstown SA.
2. Access to the project area will be provided primarily along Powerline Road and Lower Bright Road with potential access also considered from Eagle Hawke Gate Road.
3. Traffic volumes on the surrounding road network are considered to be very low with approximately 170 vehicles per day on Worlds End Highway and less than 170 vehicles per day along Powerline Road and Lower Bright Road.
4. The proposed heavy vehicle route to the Project Area will be from Port Adelaide via National Highway A9, National Highway A1, National Highway M20, Thiele Highway B81, Worlds End Highway, Powerline Road and Lower Bright Road
5. The proposed heavy vehicle route is currently gazetted for 26m B-Double (PBS Level 2) combinations up to Worlds End Highway. Powerline and Lower Bright Roads are not currently gazetted for 26m B-Double combinations and will require applications to be lodged with for the National Heavy Vehicle Regulator (NHVR) for approval. This may require a formal Restricted Access Vehicle Route assessment to be completed for the subject sections of road.
6. Where over dimensional loads are proposed, an application to DPTI will be required and over dimensional loads will likely require a vehicle escort.
7. The traffic generated by the proposed project area during the construction and operational phases is very low in comparison to existing traffic volumes and therefore is not expected to compromise the safety or function of the surrounding road network.
8. Review of the warrants for various intersection treatments indicates that additional traffic generated by the development will not impact on the warrant for formal turn treatments from Worlds End Highway to Powerline Road over existing traffic volumes, therefore formal turning facilities into Powerline Road are not required.
9. A desk top sight distance assessment at the intersection of Powerline Road and Worlds End Highway suggests that the SISD and MGSD meets the requirements of the AustRoads Guide to Road Design Part 4a in the northbound direction. Sight distance in the southbound direction appears to have some limitations but is not expected to be required for anything more than an occasional site vehicle.
10. A desktop aerial sight distance assessment at the intersection of Lower Bright Road and Powerline Road suggests that there is at least 300 metres of available horizontal sight distance in either direction which is considered acceptable. Vertical sight distance requires on-site confirmation.

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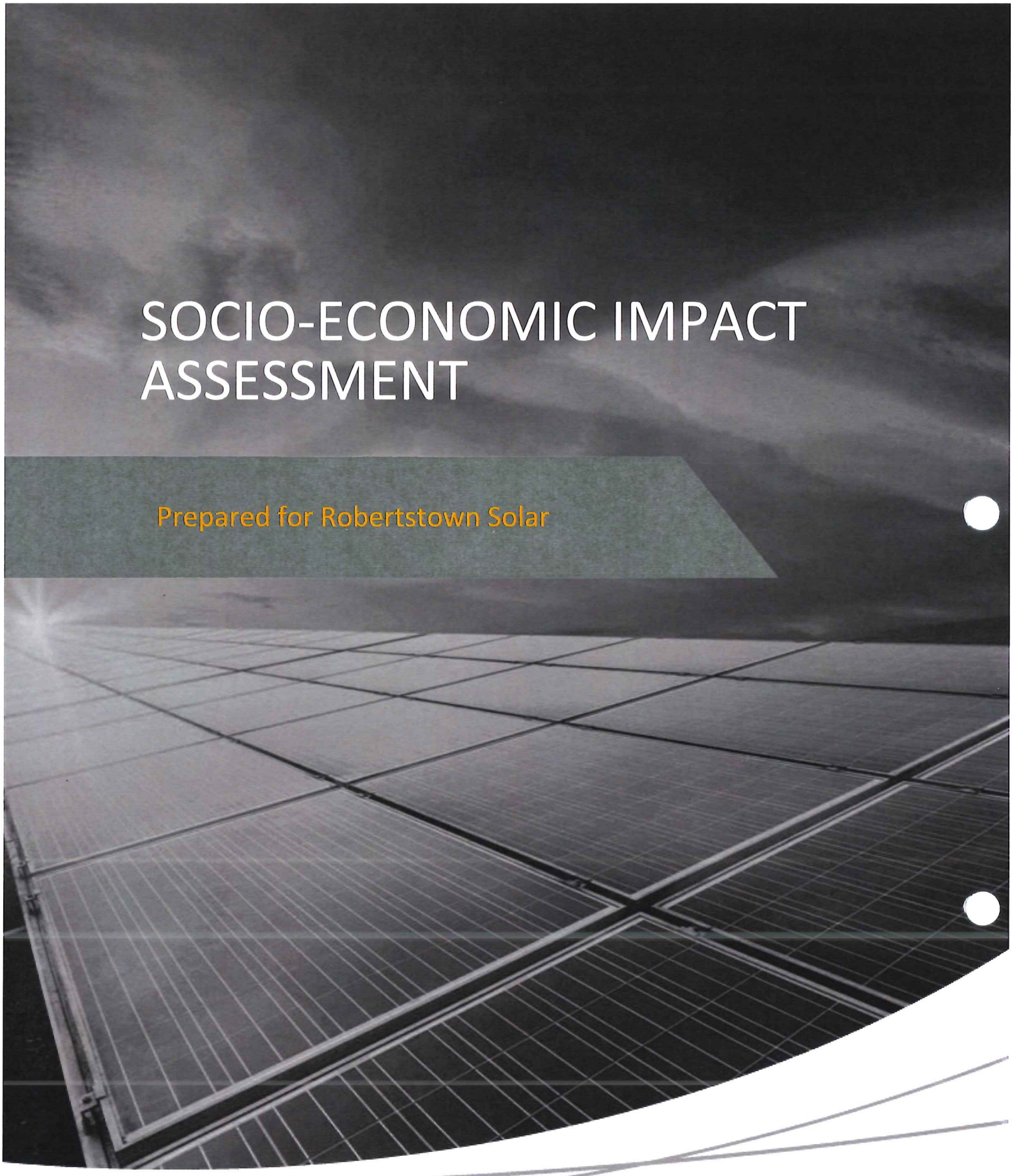
APPENDIX 11

Socio Economic Impact Assessment

ROBERTSTOWN SOLAR

SOCIO-ECONOMIC IMPACT ASSESSMENT

Prepared for Robertstown Solar



ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

Reference No. 11314

November 18

QUALITY ASSURANCE AND DECLARATION

Quality Assurance and Version Control Table		
Project:	Robertstown Solar	
Client:	Robertstown Solar 1 Pty Ltd and Robertstown Solar 2 Pty Ltd	
Rev:	Date:	Reference:
V01	29.11.2018	11314_ Robertstown Solar – Socio- Economic Impact Assessment
Checked by:	D. Carruthers	
Approved by:	S. McCall/ J. Burns	
Declaration:	*The opinions and declarations in this document are ascribed to EPS Energy and are made in good faith and trust that such statements are neither false nor misleading.* *In preparing this document, EPS Energy has considered and relied upon information obtained from the public domain, supplemented by discussions between key EPS Energy staff, representatives from governing agencies and independents, including the client and specialist consultants.*	
Applicant:	EPS Energy PO Box 195 Charlestown NSW 2290 (02) 9258 1362	
Prepared By:	L. Bryson	
Reviewed By:	S. Duffy/ A. Tipper	

EXECUTIVE SUMMARY

The following Socio-Economic Impact Assessment (SEIA) examines the baseline social and economic characteristics of the Goyder Local Government Area and considers the likely outcomes of the proposed Robertstown Solar project.

Robertstown Solar is an integrated but separately operated grid connected Photovoltaic Energy Generation System (PVS) of approximately 500MW (AC) generation capacity and a 250MW capacity Battery Energy Storage System (BESS) with 1,000MWh of storage that will feed into the National Electricity Market via ElectraNet's Robertstown Substation. The PVS element, the BESS element and associated infrastructure together are "the Project".

The Project area is approximately 1,800ha located in the suburbs of Bright and Geranium Plains in South Australia. The Project area is situated approximately 5km north-east of Robertstown, and 115km north-east of the State's capital, Adelaide. The Project is within the Local Government Area (LGA) of Regional Council of Goyder.

The key findings of this assessment indicate that the proposal will:

- Deliver clean and renewable energy for Australia in the face of climate change;
- Assist in meeting renewable energy targets for the State and the Nation;
- For each year of its 30-year operational life, displace the equivalent of 815,000 tonnes of greenhouse gas emissions per annum, the equivalent of offsetting the impact of 326,500 cars or providing the equivalent benefit of 116,500 trees per annum;
- Provide clean energy to power an equivalent of 144,000 homes for the project's life;
- Create industry diversity for the Goyder region;
- Create substantial employment opportunities during project construction phases;
- Be located in a suitable area with access to existing infrastructure;
- Provide a flexible, low-impact alternative to the existing agricultural land use;
- Generate an estimated economic benefit in the order of $526.5 million for the broader economy and approximately $295.4 million as direct domestic project expenditure;
- Generate up to an estimated 275 equivalent full-time jobs during construction, and a further 410 indirect full-time equivalent jobs;
- Generate up to an estimated 15 equivalent full-time jobs during operations; and
- Provide a direct benefit to the community in the form of a community fund.

A full analysis and discussion supporting the key findings is provided within.

CONTENTS

TABLE OF FIGURES

LIST OF TABLES

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1. INTRODUCTION

EPS Energy has been engaged by Robertstown Solar to examine the forecast social and economic outcomes of Robertstown Solar, an integrated but separately operated grid connected Photovoltaic Energy Generation System (PVS) of approximately 500MW (AC) generation capacity and a 250MW capacity Battery Energy Storage System (BESS) with 1,000MWh of storage that will feed into the National Electricity Market via ElectraNet's Robertstown Substation. The PVS element, the BESS element and associated infrastructure together are "the Project".

The focus of this socio-economic impact assessment (SEIA) is to identify and facilitate enhanced development outcomes as well as examine and ameliorate any perceived or unintended negative social outcomes. The purpose of this assessment is to assist the Project, project community and related stakeholders in understanding the relative social and economic benefits of the proposal.

1.1. LIMITATIONS AND ASSUMPTIONS

This report is subject to the limitations, assumptions and data sources presented within. The following limitations need to be considered when interpreting this SEIA.

This SEIA is intended to accompany the Planning Report documentation as part of the Project's development application and assessment. The context for this report is the Project's proposal stage, and while every effort has been undertaken to ensure the data represents project forecasts, any significant changes to data inputs should be referred to the author for review, and this report refreshed.

EPS Energy has based this impact assessment on the assumption that the Project will operate for its entire design life of 30 years. However, this operational duration may be shortened or lengthened depending on market influence. Additionally, there may be opportunities for project expansion in the future. This SEIA is limited to the Project's anticipated operation period of 30 years and current project scale and design, including cost and employment estimates.

2. ROBERTSTOWN SOLAR PROJECT

2.1. PROJECT DESCRIPTION

Robertstown Solar is an integrated but separately operated grid connected Photovoltaic Energy Generation System (PVS) of approximately 500MW (AC) generation capacity and a 250MW capacity Battery Energy Storage System (BESS) with 1,000MWh of storage that will feed into the National Electricity Market via ElectraNet's Robertstown Substation. The PVS element, the BESS element and associated infrastructure together are "the Project".

The Project area is approximately 1,800ha located in the suburbs of Bright and Geranium Plains in South Australia. The Project area is situated approximately 5km north-east of Robertstown, and 115km north-east of the State's capital, Adelaide. The Project is within the Local Government Area (LGA) of Regional Council of Goyder.

The Project is currently in the development application stage, with technical studies being undertaken to establish the relevant technical information required to seek crown sponsorship development approval. This study is intended to form part of the suite of development application documents for the Project.

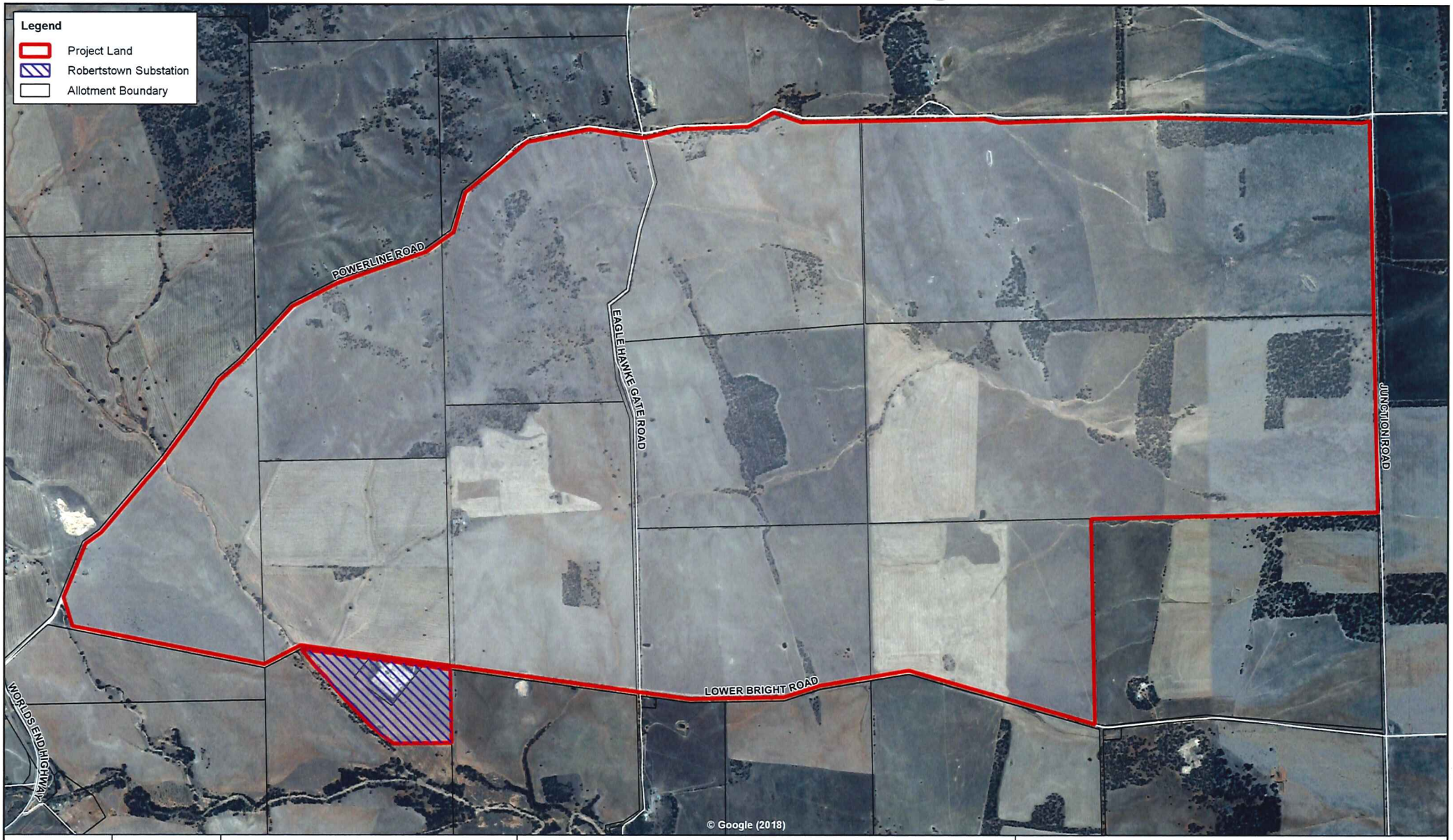
2.2. PROJECT AREA CONTEXT

The Project land comprises the Project area on which the PVS, BESS, Project's substation, Operations and Maintenance buildings and associated infrastructure will be built and operated, and land required to connect the Project's elements to ElectraNet's Robertstown Substation. The Project area consists of approximately 1,800ha of cleared and or disturbed land, located in the districts of Bright and Geranium Plains, South Australia (refer to Figure 2-1) The Project area falls within the municipality of Goyder Regional Council.

2.3. STUDY AREA

The study area for this assessment is The Regional Council of Goyder, in which the Project is proposed to be located. Figure 2-2 as follows, demonstrates the Project land within the context of the Regional Council of Goyder's Local Government Area (LGA).

The properties that comprise the Project area have historically been used for agricultural purposes including cereal cropping and grazing. Surrounding development is predominately agricultural land with cereal crops and pasture most prominent.



Author:	MB
Reviewer:	SMC/ JB
A3 Scale:	1:20,000
Job Ref/Version:	11314/ V06

0 0.25 0.5 0.75 1 km

Map Projection: GDA 1994 MGA Zone 54

Figure 2-1

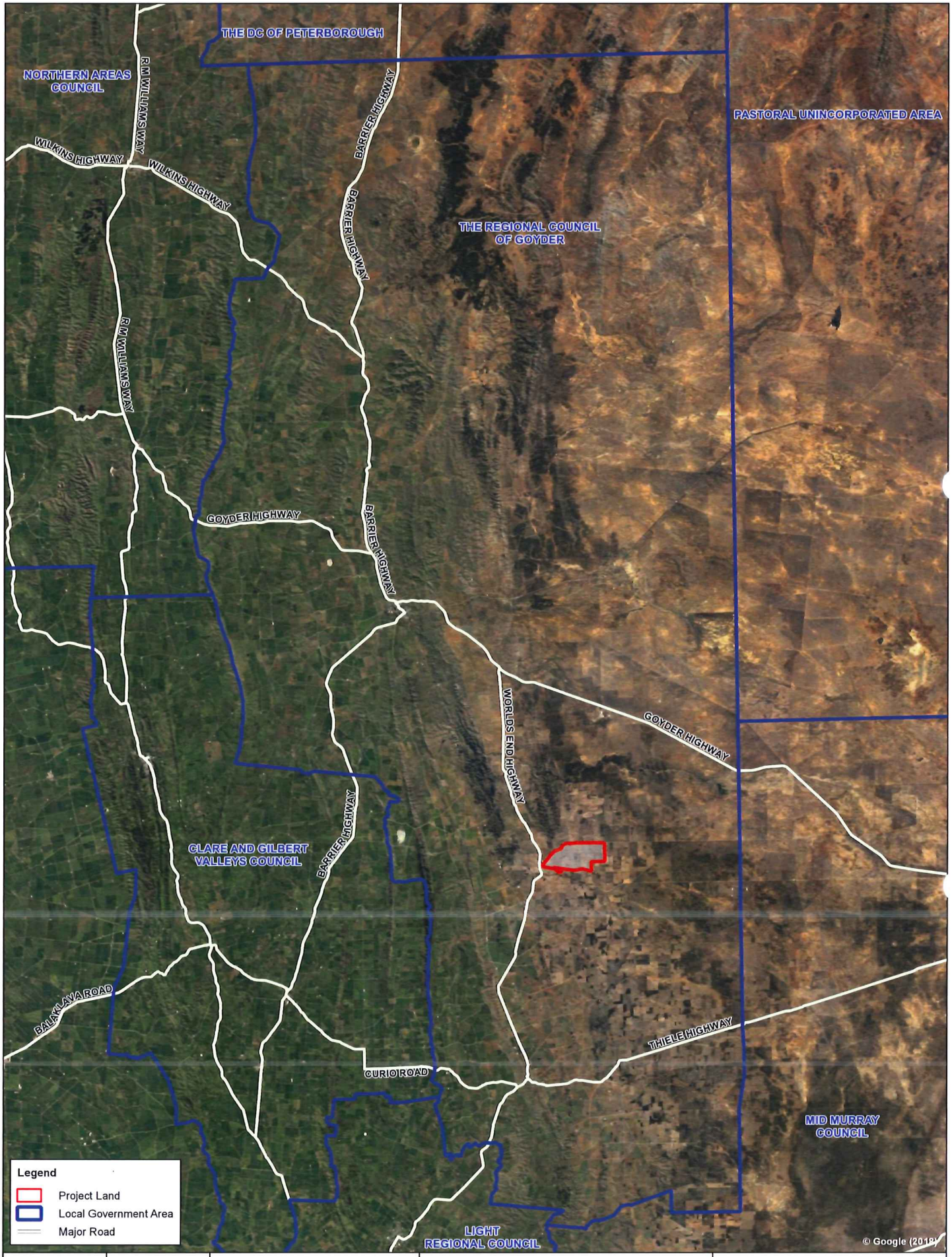
Project Land

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_SEIA_Project Land.qgs



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Reviewer:	SMC/ JB
A3 Scale:	1:400,000
Job Ref/Version:	11314/ V07

0 5 10 15 20 km

Map Projection: GDA 1994 MGA Zone 54

Figure 2-2

Study Area

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_SEIA_Goyder LGA.qgs

3. REGIONAL PROFILE

The Regional Council of Goyder is located in the mid - north region of South Australia. The area is predominantly agricultural land, primarily associated with cereal crops, such as wheat and barley, as well as sheep grazing for merino wool. Agriculture is the mainstay of its economy, with manufacturing and tourism also becoming prominent. The Council main office is at Burra, with a branch office situated at Eudunda. The LGA is geographically constrained by the Flinders Ranges to the east.

3.1. POPULATION AND GROWTH PROJECTIONS

Australian Bureau of Statistics (ABS) data re-published by South Australian Planning Portal (2018), provides population forecasting based on an analysis of growth trends considering assumptions of mortality, fertility and migration. Growth projections are not intended to predict the future, rather they provide an informed estimate of population movements.

The data indicates that the population of Goyder LGA is forecast to increase by 4% or 177 people (from a population of 4,225 to 4,402) between 2011 and 2031. The projection is equivalent to a + 0.2% annual projected population change, half the recorded average growth rate of Regional South Australia between the 2011 and 2016 census at 0.4%.

South Australia Planning Portal (2018) notes that growth in regional South Australia is typically dwarfed by those levels experienced in metropolitan Adelaide, generally as a result of increased housing densification in urban areas. It is noted that between the 2011 and 2016 census 15 out of 44 regional LGA's (or 34% of regional councils) experienced population decline over that period. Low growth or population decline in regional areas can result from numerous factors including a downturn in a major industry, youth migration or an ageing population.

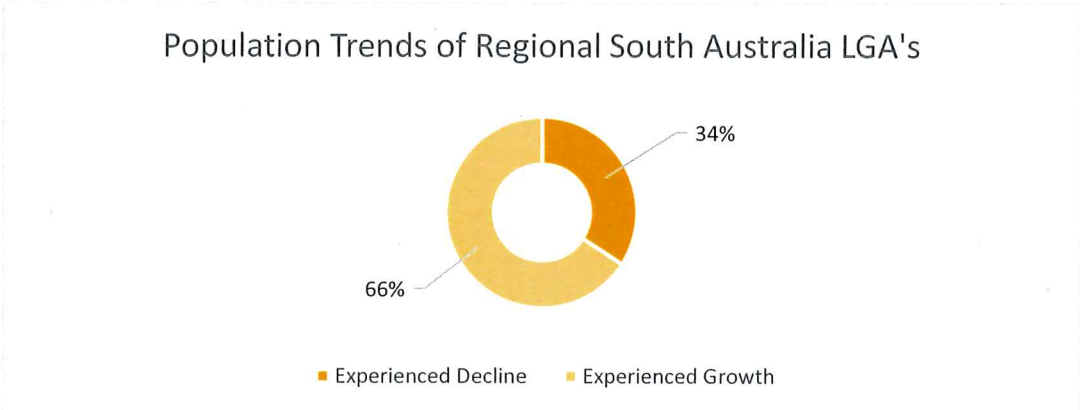

Figure 3-1: Population Trends of Regional South Australia LGA's (2011-16)

3.2. REGIONAL EMPLOYMENT CONDITIONS

The latest published data from the Small Area Labour Markets Publication, released by the Australian Department of Jobs and Small Business (2018), indicates that Goyder LGA has an unemployment rate of 6.4%.

This is substantially higher than the National and South Australian State averages of 5.4% and 5.6% respectively. This could be attributed to the LGA's high proportion of agricultural lands and population engaged in home rural enterprise as opposed to a typical formal employment structure.

As demonstrated in the previous aerial imagery, the locality constitutes predominantly open rural and agricultural lands, locality photos are provided at Figure 3-2 below.

The LGA is serviced by several small townships, with the largest urban and employment bases located outside of the LGA in the Barossa Valley, and greater Adelaide to the south.

Figure 3-2: Development Context Photos

4. SOLAR DEVELOPMENT CONTEXT

The recent momentum for large scale solar development in Australia has been predominantly driven by the improved feasibility of projects, through both advances in technology and competitive construction costs. According to the Australian PV Institute (2018), there are over 1,000MW of solar projects currently commissioned and operational in Australia.

Australian Energy Market Operator (AEMO) (2018) estimates that, as at the date of this report, almost 7,000MW of projects are currently proposed or in various stages of approval and development across the nation.

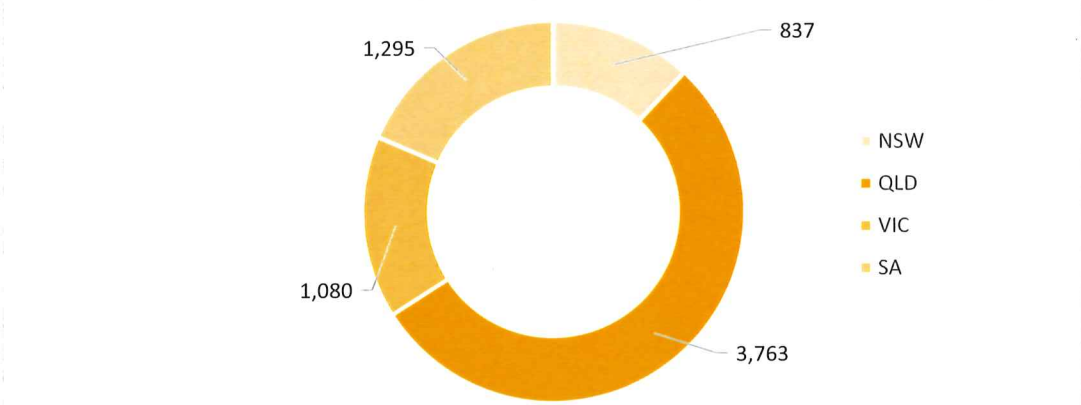

Figure 4-1: AEMO Estimate: Proposed Solar Development Pipeline Nationally (MW)

Recent growth in the industry has been encouraged by the increased focus on meeting clean energy targets, both nationally and internationally.

Solar farms, including the proposed Robertstown Solar project, are considered to align with national and international policy as they:

- Fulfil the nation's commitment to reducing greenhouse gas emissions as a signatory to the Paris Agreement;
- Contribute to the Australian Commonwealth renewable energy target;
- Contribute to meeting South Australia's 50% Renewable Energy Production Target;
- Align with the Government of South Australia's, Renewable Energy Plan for South Australia; and
- Contribute to meeting the Government of South Australia's investment target of $10 billion in low carbon generation by 2025.

South Australia is considered to be a leader within the Australian market, in targeting and delivering renewable energy generation and storage, having recently met its 50% renewables target, years before schedule.

4.1. SOCIAL LICENSE

A social license to operate is a concept that reflects a community's support of a development. A proposal may be able to satisfy legal requirements in order to gain approval, however attaining social support from the community can be vitally important to a project's longevity and sustainability.

Large scale solar is a relatively recent emerging industry for Australia. As such, relatively little data is available regarding community attitudes towards solar farms, in comparison to other more longstanding and prevalent types of energy projects. For this reason, long-term community attitudes towards individual solar projects, as well as the cumulative impact of projects across the Australian solar industry, are particularly difficult to gauge.

Research undertaken by the Australian Renewable Energy Agency (ARENA) suggests that the Australian public has a generally positive attitude towards the emerging large-scale solar industry. The study included a mix of the general Australian public as well as selected communities with a current or proposed large scale solar project.

Overall the ARENA research concluded that 78% of participants were either somewhat or strongly in favour of large-scale solar projects, with a small proportion (5%) being opposed to such projects. In other words, for everyone person opposed to the solar industry in Australia, more than 15 people are in favour (ARENA 2015).

The survey suggests that the Australian community have generally demonstrated positive attitudes toward large-scale solar projects.

The community and government agency consultation undertaken to date for the Robertstown Solar project, demonstrated a similar level of support, with most people consulted supporting the proposal.

5. STUDY METHODOLOGY

This report assesses both the social and economic impacts of Robertstown Solar. The following section outlines the data sources and methodologies adopted.

5.1. SOCIAL IMPACT ASSESSMENT DATA

The social impact assessment data analysis identifies the social effects of the proposed development. The approach encourages the realisation of positive externalities and the mitigation of negative impacts. The purpose of the assessment is to ensure that decision makers have the necessary information available to promote socially responsible development. Accordingly, the social impact assessment methodology has included data sourced from a review of:

- Socio-demographic data from the ABS;
- Additional published and publicly available social and demographic data; and
- Other strategic documentation, where relevant.

5.2. ECONOMIC IMPACT ASSESSMENT DATA

The economic impact assessment has adopted a methodology that identifies the economic effects of the proposal, allowing for the maximisation of positive externalities and mitigation of negative impacts. This assessment has considered the direct economic effects of the proposal, including employment, as well as the indirect broader effects such as investment and spending within the local economy. Accordingly, the economic impact assessment methodology has included:

- Economic and employment data from the ABS;
- Review of published and publicly available economic data; and
- Estimates provided by the project's Early Works Engineering Procurement and Construction Contractor (Early Works Contractor).

5.3. ASSESSMENT METHODOLOGY

The social and economic data provided below demonstrates the relative conditions of the study area. This SEIA assesses the opportunities and constraints of the study area and examines the likely outcomes of the Project utilising published industry economic and employment multipliers.

6. SOCIAL CONTEXT

6.1. SOCIO-DEMOGRAPHIC PROFILE OF THE PROJECT AREA

6.1.1. Persons

At the time of the 2016 census, Goyder LGA has a population of 4,136 people, having experienced a slight decrease of 26 people from the time of the 2011 census. As at the 2016 census, the population was closely divided between males and females, 50.2% to 49.8% respectively.

The average household size in Goyder LGA is 2.3 persons with 1.6% of the population identifying as Aboriginal or Torres Strait Islander.

6.1.2. Age

The largest proportion of the Goyder LGA population falls around the 50 to 69 years age brackets. There is an additional peak in population proportion around the early teen years (10 to 14 years). There is a distinct under-representation of young working-age population groups (18-35 year). The following figure demonstrates these trends.

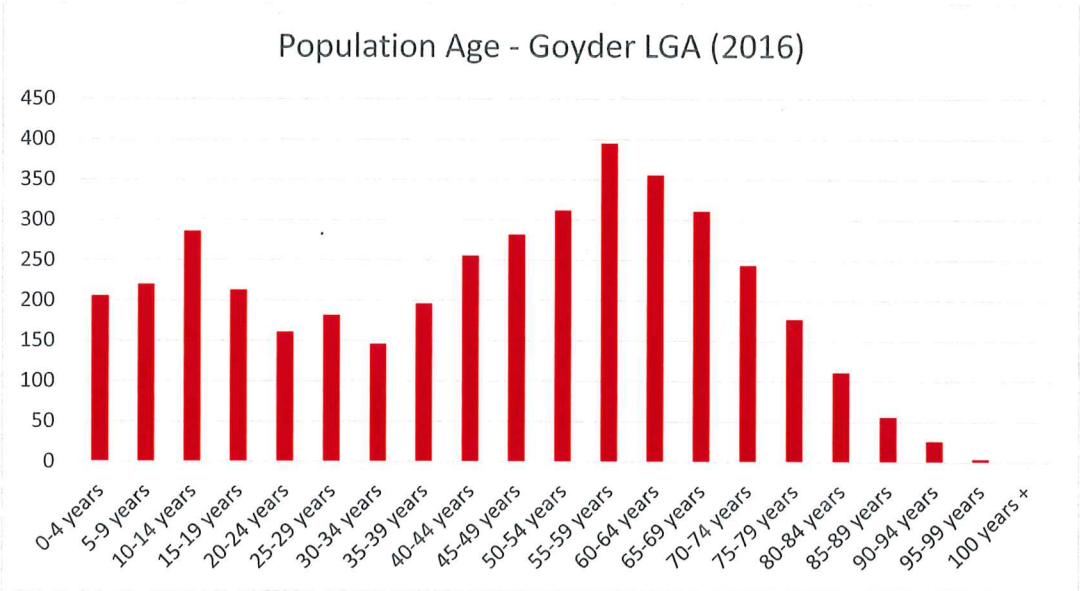

Figure 6-1: Population by Age (ABS 2016)

6.1.3. Household Types

The household type of an area is an indicator of the locality's function and role within the broader region. Household type gives significant insight into settlement patterns, demand for facilities and services and identifies opportunities for housing and employment.

The predominant household types in the Goyder LGA are both 'one family households with no children' (32%) and 'lone person households' (32%). This data suggests an underrepresentation of 'traditional' settlement patterns, typified by family households which is likely a reflection of an ageing population as demonstrated above.

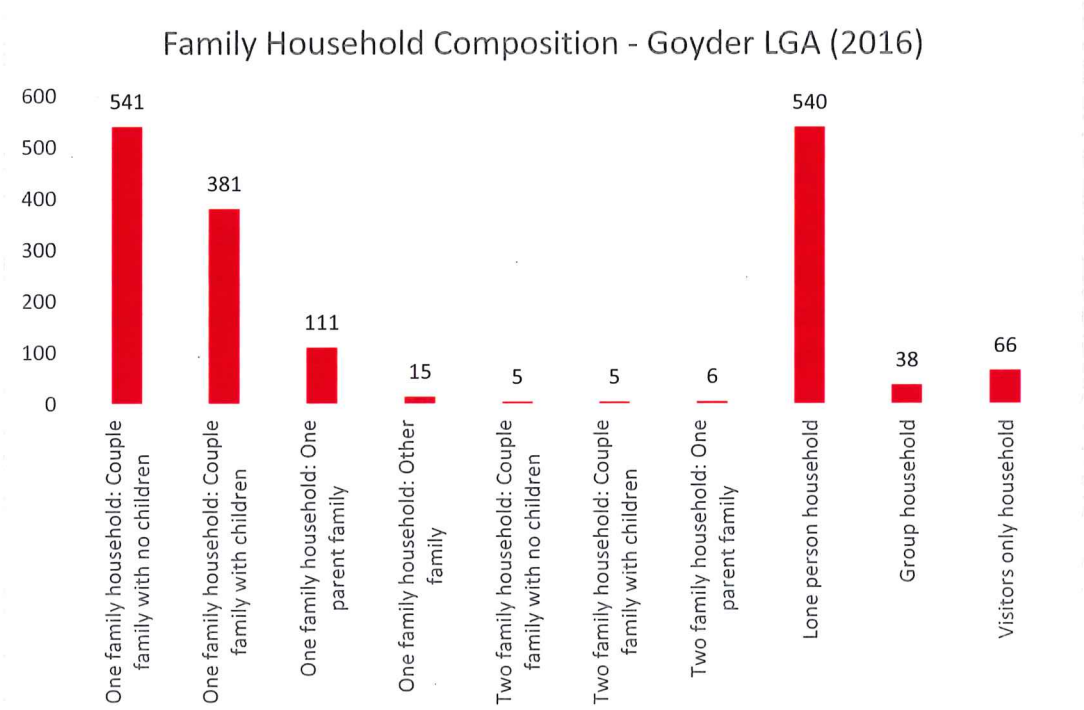

Figure 6-2: Household Composition (ABS 2016)

6.1.4. Tenure

Tenure data gives an indication of the socio-economic status of an area. Within the Goyder LGA, the largest proportion of residents own their residence outright, accounting for 35% of the population, this is higher than the South Australian State average of 32%.

The remaining population comprise those owning their house with a mortgage (22%) and those who rent (14%). The proportion of the population who rent in the Goyder LGA is considerably lower than the State average of 29%, refer to Figure 6-3 below.

This data suggests that Goyder LGA is a relatively established area, with perhaps a prevalence of multi-generational households, given the high ownership and low rental rates.

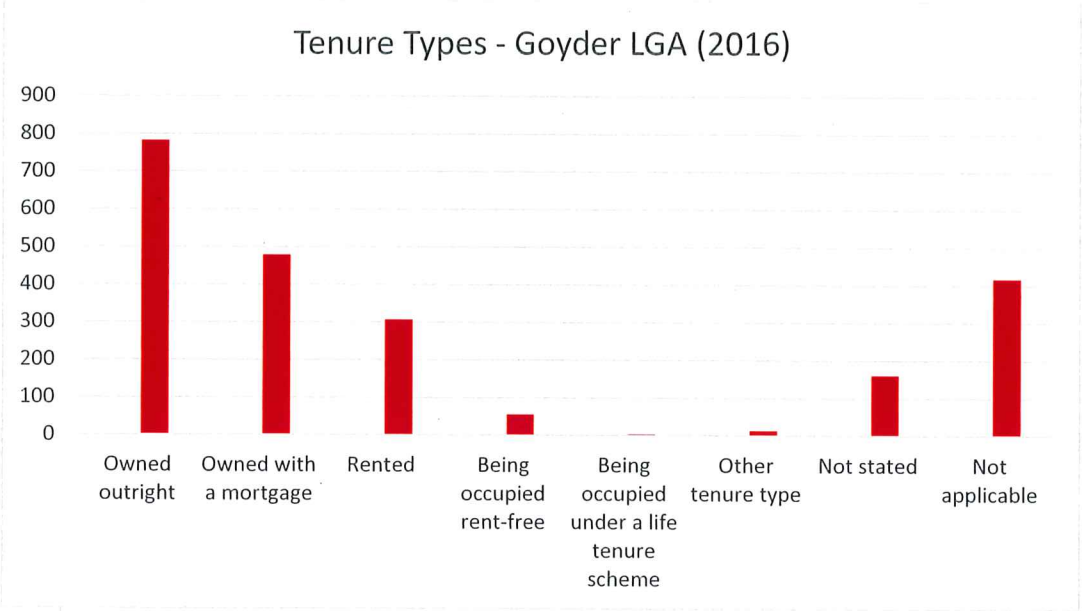

Figure 6-3: Tenure Type (ABS 2016)

6.1.5. Education

Educational levels are another important indicator of socio-economic status. Educational factors can help illustrate a regional population's skill set, work force capacity and working ambitions. Additionally, education levels can help to understand deficiencies in skill sets and help to guide strategies to nurture and retain a skilled workforce.

Within the Goyder LGA, approximately 7% of the population hold a bachelor's degree or higher, this is significantly lower than the South Australian state average of 18.5% (refer to Figure 6-4 below).

Of those participants who disclosed their highest educational level, the highest proportion had obtained a Year 10 (or above) high school certificate or a Certificate III or IV level training (32% and 14% respectively).

The large portion of local population with up to a Certificate III, could reflect the educational requirements of the predominant occupations in the area.

Furthermore, the low proportion of people with a higher level of education could indicate a lack of tertiary education opportunities for the locality as well as young adult migration trends.

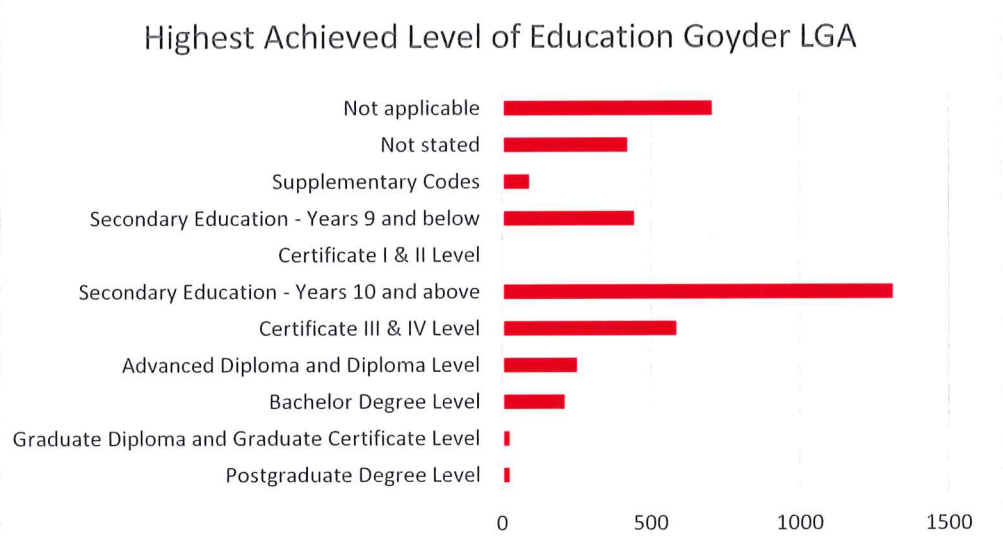

Figure 6-4: Highest Achieved Level of Education (ABS 2016)

6.1.6. Social Analysis Summary

To summarise, the data outlined above suggests that:

- Goyder LGA is experiencing relatively low population growth;
- Goyder LGA has a distinctive lack of a young working aged demographic;
- There is as a high proportion of single and family households with no children;
- The majority of residents own their primary place of residence outright; and
- The predominant level of education achievement is up to a Certificate III.

7. ECONOMIC CONTEXT

The economic statistics for an area provide valuable background information that, when combined with social considerations, allows for a robust understanding of the locality. This understanding can be used to quantify anticipated benefits to a community, as well as identify the socio-economic strengths and weaknesses of that locality, such as employment rates.

7.1. ECONOMIC PROFILE OF GOYDER LOCAL GOVERNMENT AREA

The following information provides an overview of the economic and employment data for the Goyder Regional Council LGA. This data provides baseline information as to how the proposed development is likely to affect the community economically.

7.1.1. Gross Regional Profit

Gross Regional Product (GRP) is an objective measure of the economic output of a region. It is defined as the total market value of goods and services produced in the region within a given period, after deducting the cost of goods and services used up in the process of production, but before deducting allowance for the consumption of fixed capital.

For example, if a region manufactured a car, the GRP would equal the value of the car, less the cost of acquiring the parts or materials for the car, but no allowance is made for the depreciation in the car manufacturing plant and equipment.

Goyder LGA's Gross Regional Product is estimated at $209 million as at last financial year (June 2017) (National Institute of Economic and Industry Research 2017 data sited by Economy id).

7.1.2. Household Income

Household income can indicate the socio-economic status of an area, in particular the economic opportunities that are available to the labour force. Weekly household income depends on the number of workers in the household and their industry of employment. Income data is applicable only to persons aged 15 years and over.

Within the Goyder LGA, approximately 49% of households earn up to $1,000 per week, with the highest proportion of households earning between $650 to $799 total per week.

The following figure illustrates the weekly income of households in the Goyder LGA.

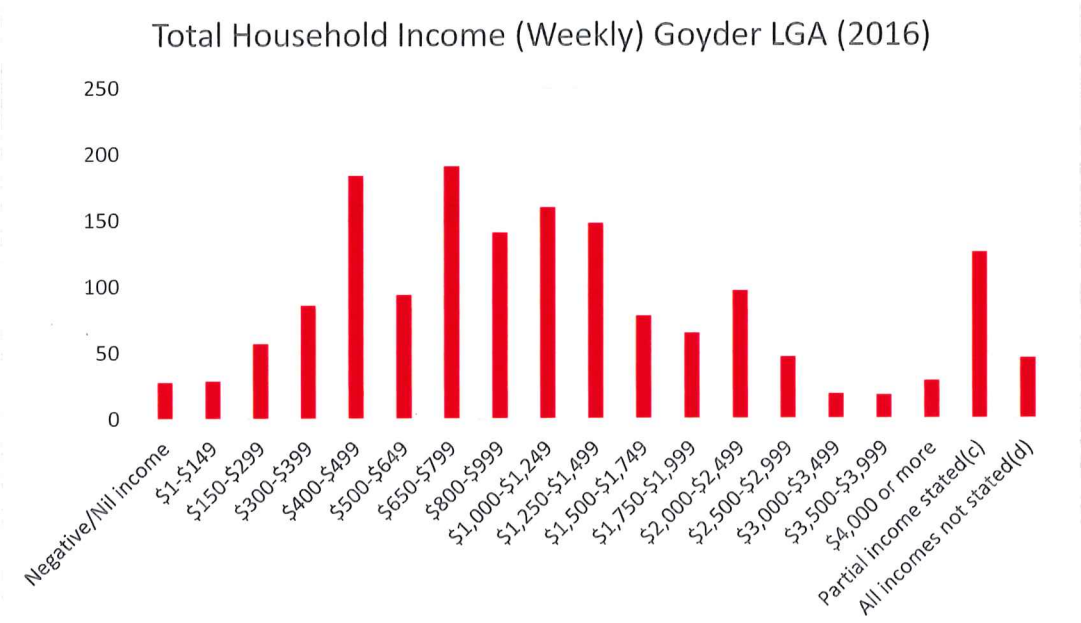

Figure 7-1: Total Household Weekly Income (ABS 2016)

The median weekly household income across South Australia at the time of the 2016 census was $1,206 with a slightly larger household size of 2.4 people.

Individual income measures can be indicative of educational qualifications and the type of employment undertaken. This data can be used to assist in the evaluation of an area's socio-economic status.

Within the Goyder LGA, the largest proportion of individuals earn between $300 and $399 per week. The median individual income falls just above this bracket, at approximately $481 per week. The following figure illustrates the weekly income of people in Goyder LGA aged 15 years and over.

As demonstrated, there is a high proportion of respondents who indicated that weekly income was 'Not Applicable' to their circumstance. This is likely a reflection of the predominance of farming industry in the locality, whereby individual incomes are variable and depend on production yields and seasonality as opposed to a fixed income wage.

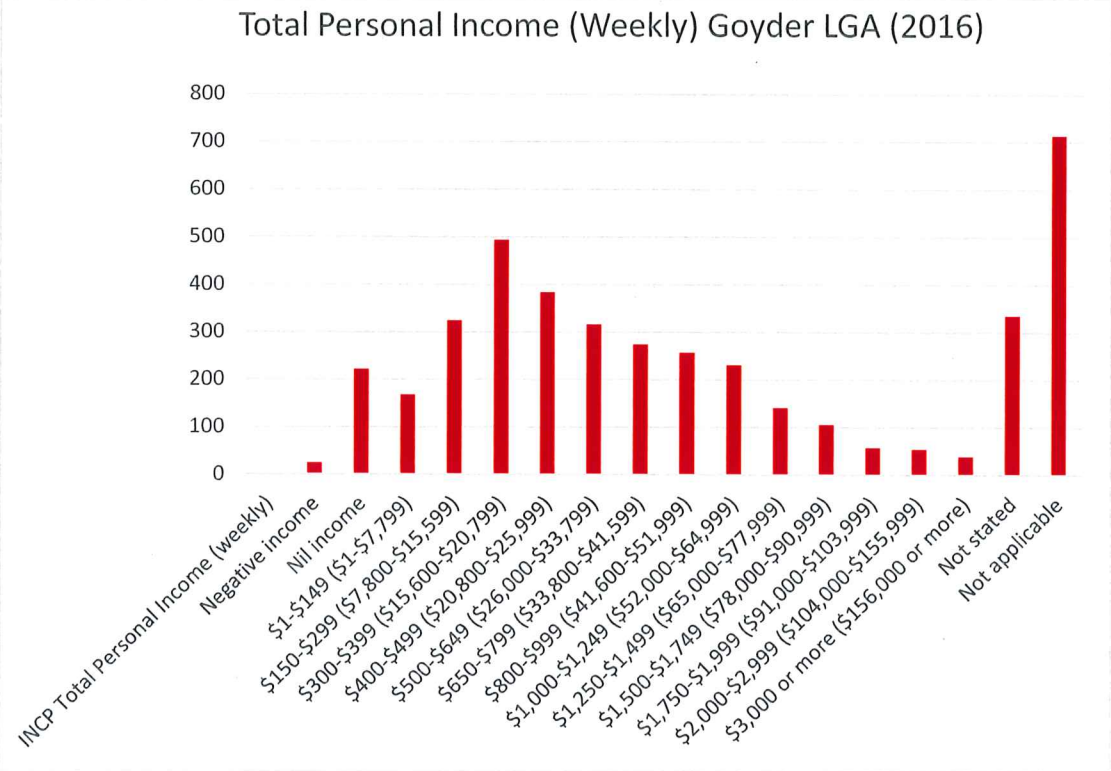

Figure 7-2: Individual Weekly Income (ABS 2016)

7.1.3. Labour Force

At the time of the 2016 census an estimated 1,818 people were reported as being currently employed in the labour force. It is noted that people who are aged 15 years and under who are either employed or unemployed, retirees, pensioners and people engaged solely in-home duties, are not classified as being in the labour force.

Information about employment type is important to determine the social and economic status of a region, and to determine the type of services that are in demand. Recognising Goyder LGA's population as being 4,136 people, approximately 38% of the total area is employed either fulltime or part-time. This statistic is likely to reflect the high proportion of self-employment in the agricultural sector.

The following figure illustrates the distribution of labour force characteristics, i.e. the spread of employment type of the working aged population only.

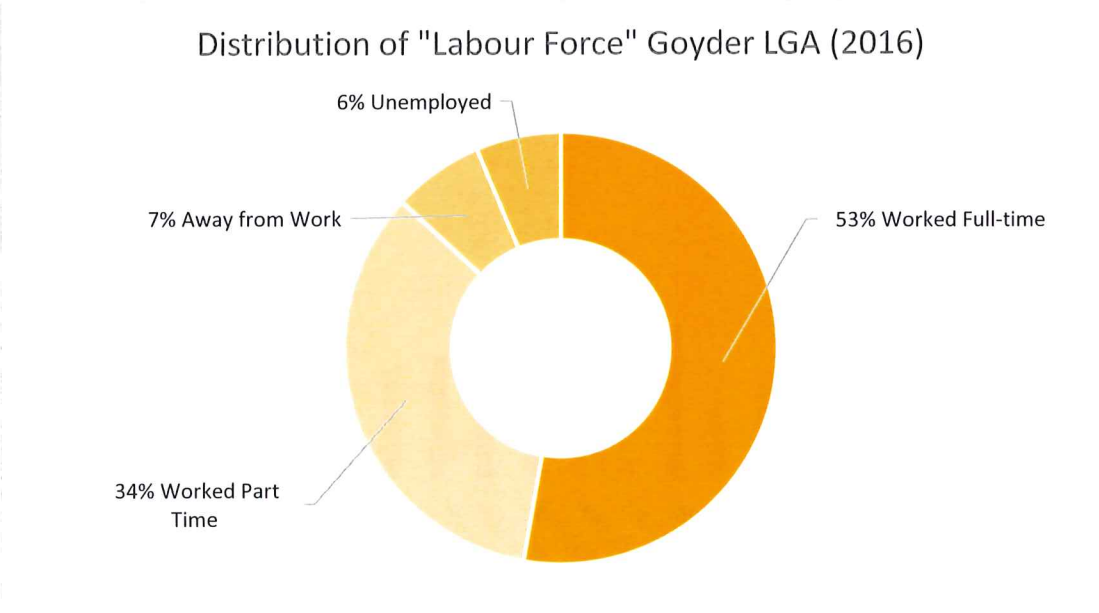

Figure 7-3: Distribution of Labour Force (ABS 2016)

7.1.4. Industry of Employment

The occupational structure of the workforce is an important indicator of the characteristics of the labour force. With other indicators, such as educational qualifications and income, occupation is a key component of evaluating the socio-economic status and skill base of an area. In general, the occupations held by a workforce are linked to a range of factors including:

- The economic base and employment opportunities available within the area;
- The educational qualifications of the population; and
- The working and social aspirations of the population.

The most common stated industry sectors within the Goyder LGA, as illustrated in the following figure, are:

- Agriculture, Forestry and Fishing (34%);
- Health Care and Social Assistance (9%);
- Manufacturing (9%); and
- Retail Trade (8%).

As indicated below agriculture is the strongest industry of the LGA based on employment.

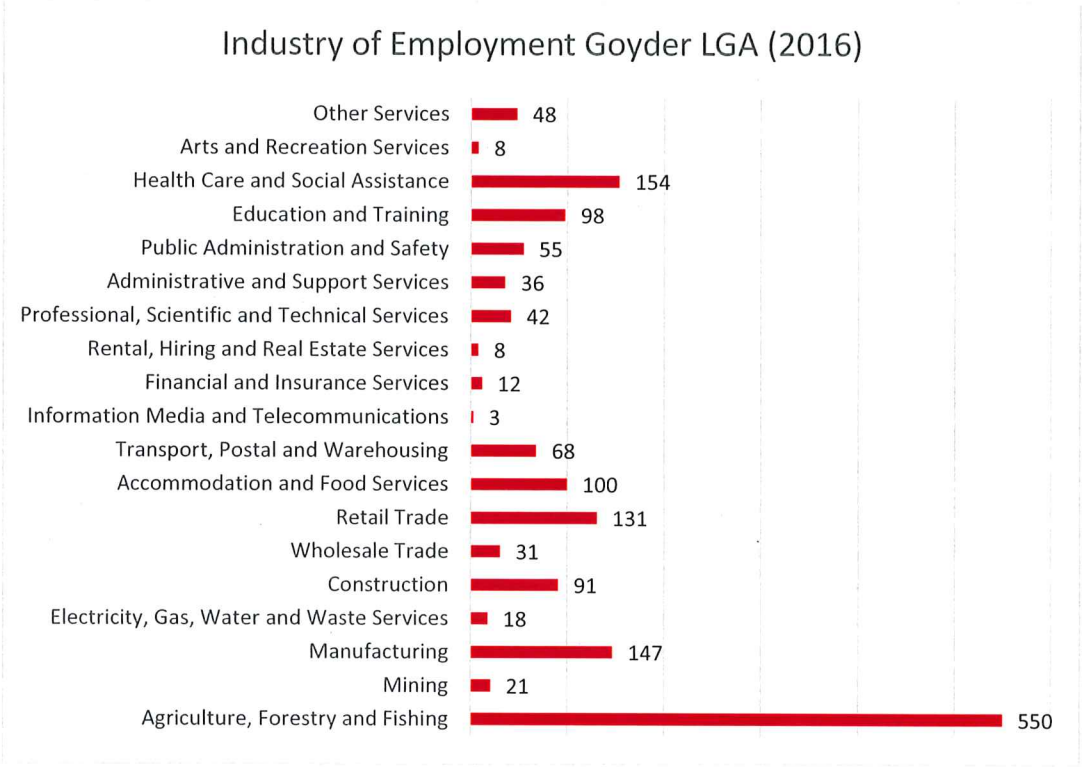

Figure 7-4: Industry of Employment (ABS 2016)

7.1.5. Occupation

The occupation of residents within an area is indicative of the opportunity for employment within the labour force, as well as the educational qualifications of a population. The three most prominent occupations reported in the 2016 census are:

- Managers (28%);
- Labourers (18%); and
- Technicians and Trades Workers (13%).

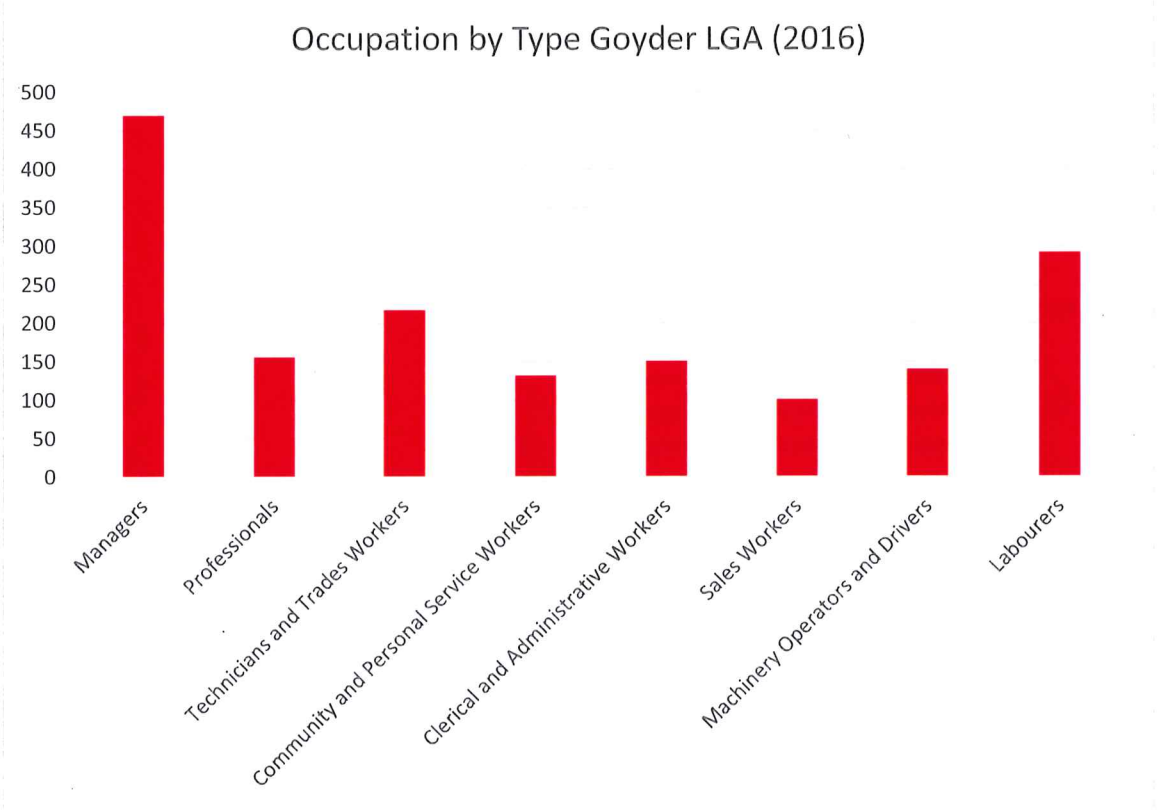

Figure 7-5: Occupation Type (ABS 2016)

7.1.6. Economic Analysis Summary

To summarise, the data provided above indicates that:

- Goyder LGA's GRP was approximately $209 million as at last financial year (June 2017);
- Household and individual incomes are less than the reported state average;
- Approximately 38% of the total population are in the labour force in either full-time or casual work;
- Goyder LGA's largest employment provider is the agricultural sector; and
- The predominant occupation type in the LGA are managers and labourers.

8. SOCIO-ECONOMIC IMPACT ASSESSMENT

8.1. LARGE SCALE SOLAR OPPORTUNITIES

The construction phase of a large-scale solar project offers the greatest opportunity for local/domestic employment. The Project's construction requires site preparation, assembly, and installation of hundreds of thousands of Photo-Voltaic (PV) panels and over several hundred hectares of Project area in addition to instillation of battery storage technology.

A typical project will also require landscaping, fencing, transportation services, electrical works, security, etc. Large scale solar projects have an innate high demand for a semi-skilled/unskilled workforce particularly for site preparation and assembly tasks, which constitute the largest aspects of construction.

Anecdotally, during the community consultation phase of the Project, many community members and project neighbours indicated an eagerness to assist with the project, offering services, labour and equipment.

EPS Energy maintain a register of all interested individuals and businesses who have been in contact seeking employment opportunities. The Engineering Procurement and Construction Contractor will identify the opportunities for local engagement and employment for a variety of services and equipment required to construct the project. Where suitable, local and or domestic employment will be preferred.

8.2. DIRECT DOMESTIC BENEFIT

The majority of construction works is associated with the PVS element. If the PVS element is constructed in 4 phases with the phases flowing sequentially and work overlapping at the end/start of phase 2 and phase 3 and at the end/start of phase 3 and phase 4 construction would take approximately 28 months.

The total cost of the project is estimated at $1.17 billion AUD. Approximately 75% ($877,500,000) of expenditure will be used to acquire the plant and equipment internationally as the required technology is not commercially available in Australia. Approximately 25% ($292,500,000) of expenditure is expected to be expended domestically, to construct the project.

The anticipated project construction cost of $292,500,000 is equivalent to approximately 140% of Goyder LGA's annual GRP to be spent domestically, as a direct result of the project.

In addition to this construction cost, ancillary development expenditure will occur in the form of the following:

- Legal Advice;
- Specialist Study and Design Consultants (such as engineering and ecological advice);
- Project Management Services; and

- Finance.

Typically, these costs run at up to approximately 1% of construction value, or an additional $2.9 million which equates to a total estimated domestic spend equivalent to say $295,400,000.

Table 8-1: Estimated Total Domestic Spend

Estimated Total Domestic Spend	
Domestic Spend (Construction)	**$292,500,000**
Domestic Spend (Consultancy, Legal, etc.)	$ 2,900,000
Domestic Spend (Total) Say	**$295,400,000**

8.3. EMPLOYMENT OPPORTUNITIES

8.3.1. Development Phase Employment Benefits (Direct and Indirect)

As with economic output, the direct employment generated is only a part of the overall stimulation to employment which is created by a development project.

In economic terms, the production induced effect means that additional employment is created in the industries which supply goods and services to the construction project, while the consumption induced effect, means that further employment is created in all industries which benefit from the additional wages, taxes and profits generated by the project being spent throughout the economy.

Acknowledging the last published ABS input/output economic multipliers for the construction industry and making an allowance for inflation to the current day, and considering the scale of the project, a fair estimation for general construction industry employment may equate to approximately: 1 full time equivalent job, and 1.5 indirect full-time equivalent jobs for each approximate $1.06 million in project value derived from domestic sources.

Adoption of these multipliers suggests that the $292.5 million domestic spend from the project's construction would yield employment generation, on an equivalent full-time basis, of up to approximately 275 direct construction jobs and 410 indirect jobs, over the intensive construction period.

It should be noted that Robertstown Solar is not a traditional construction project and involves a lightweight construction typology, therefore requiring a lessened construction labour force. The employment estimates within have considered this fact.

Table 8-2: Construction Phase Employment

Construction Phase Employment - Full time equivalent (FTE)	
Domestic Project Value (Construction)	$292,500,000
Direct Employment (FTE positions)	~275
Indirect Employment (FTE positions)	~410
Total Employment	~685

8.3.2. Operational Phase Employment Benefits

Robertstown Solar is expected to directly generate up to approximately 15 full time equivalent, long term jobs during the operational phase. These roles include management, maintenance and operations.

Based on the South Australian average weekly FTE earnings of $1,200/week (ABS 2016), this equates to some $940,000 in additional wages being generated in the local economy each year, or $28,200,000 over the life of the project.

Table 8-3: Operational Phase Employment

Operational Phase Employment	
Direct Employment (FTE positions)	15
South Australia Average Weekly FTE Earnings	$1,200
Wages Generated (pa)	**$940,000**
Wages Generated (project life)	**$28,200,000**

8.4. LOCAL EXPENDITURE

In addition to the direct contribution to the economy from the Project's construction and operations, as described above, the Project will have 'flow-on' benefits to the activities of other industries.

An estimate of the extent of these impacts can be illustrated using published industry multipliers such as those created by the ABS. While not exact, this methodology is nonetheless useful in broadly demonstrating the magnitude of additional 'indirect' economic benefit.

Utilising the ABS input-output table for the construction industry, the total multiplier is 2.8; meaning that for every one dollar ($1.00) spent in the construction industry an additional one dollar and eighty cents ($1.80c) of value is added to other parts of the economy.

On this basis, the Project is estimated to contribute additional 'indirect' economic benefits in the order of $526.5 million to the wider economy.

This estimate encapsulates the entire stimulus to those sectors of the domestic economy that will contribute goods or services to the project or have an increase in employment/production as an indirect result of the project. This includes accommodation, transportation, food services, entertainment for construction workers, telecommunications etc.

8.5. DIRECT COMMUNITY FUND

In addition to the direct and indirect economic benefits afforded by the planning, construction and operation of the Project, Robertstown Solar is committed to providing additional direct benefit to the community in the form of a 'Community Fund'.

A local Community Fund is proposed to be established, with the project making an annual financial contribution throughout the life of the Project. The Community Fund is intended for the local community who are hosting the Project; to assist with funding environmental, social, and economic development opportunities for the community.

Essentially the fund is envisioned to be managed by a committee, consisting of elected community members, a representative of Robertstown Solar and the Local Council. The committee will be responsible for administering the fund.

The fund will be furnished with an annual monetary donation from Robertstown Solar for the duration of the operation of the project. Local community members and organisations can apply to receive funding for projects or activities that benefit the local community.

The committee will assess the merit of applications and govern the appropriate distribution of the fund.

9. RENEWABLE ENERGY AND CARBON EMISSIONS

In recent times South Australia has diversified its energy supply sources, as evidenced by its growing proportion of renewable energy sources. This transition has been significantly influenced by several coal-fired operations ceasing in the state. See relative energy generation mix by State below.

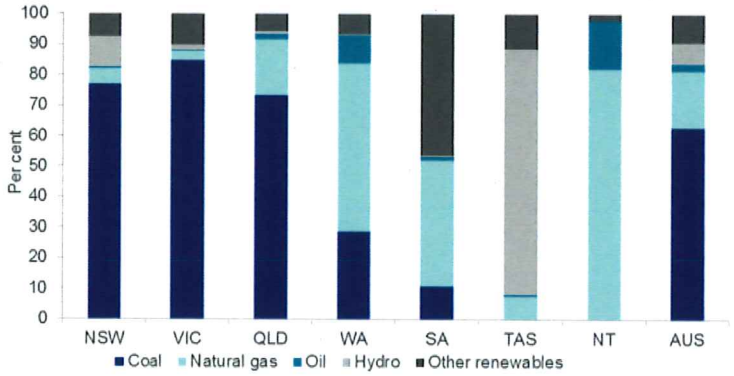

Figure 9-1: Australian Electricity Fuel Generation Mix for 2016
Source: Department of the Environment and Energy (2017)

Broadly, South Australia recognises that high levels of solar and wind generation, together with other generation sources and effective grid stability services have the potential to safely deliver affordable power. The Project will contribute to the delivery of affordable power from renewable energy.

Development of large-scale generation assets within South Australia will increase competition for dispatching power to the state's electrical network and hence assist in reducing electricity prices over the long term.

9.1. ROBERTSTOWN SOLAR RENEWABLE ENERGY GENERATION

Based on the Project's current indicative design (including approximately 500MW(AC) of single axis tracking system), the Project is anticipated to generate over 1,181,000MWh of renewable energy per year; enough to power 144,000 homes per annum.

This renewable energy generation equates to an annual equivalent of 815,000 tonnes of Greenhouse Gas (GHG) emissions displaced, which may otherwise be sourced by non-renewable energy sources. Robertstown Solar's approximate 500MW(AC) generating capacity, and GHG displacement is equivalent to offsetting the impact of 326,500 cars or the equivalent benefit of 116,500 trees per annum.

10. STRATEGIC CONSIDERATIONS

10.1. SOCIAL AND ENVIRONMENTAL ISSUES

Based on a review of the existing characteristics and profile of the Goyder LGA, the following impacts have been considered.

10.1.1. Positive Impacts

The Project will deliver clean and renewable energy in the face of climate change and will assist to meet renewable energy targets for the nation.

Climate change is arguably one of the most topical social and environmental issues of today, with the globalised unsustainable dependence on fossil fuels becoming ever more apparent. As described in sections above, large scale solar projects have the capability to contribute substantially to meeting renewable energy targets and improving sustainable energy generating practices. Robertstown Solar will make a substantial contribution in providing renewable energy for the nation to meet renewable energy targets.

The Project will create employment opportunities for the study area.

The Project will generate considerable employment for the Goyder LGA, particularly during the construction phase and as a flow on effect from the heightened investment and spending in the locality. The economic impact assessment section of this report illustrates the anticipated employment generation.

Members of the community who attended the Robertstown Solar information sessions identified that the Goyder LGA experiences high levels of unemployment. Many local individuals and businesses expressed interest in being involved in the Project.

The Project provides a suitable alternative land use for the Project area that meets the needs of the wider community and promotes industry diversity.

The Project is considered a suitable alternative land use for the Project area as it is temporary in nature, has minimal long-lasting effects, and upon project completion the land can be returned to its original condition. Further, the Project area is proximate to existing substation infrastructure, allowing the Project to be localised and minimise adverse environmental impacts.

Robertstown Solar provides an opportunity for the Goyder LGA to diversify its industry by adopting an innovative, high-tech industry such as solar. Further, the use of the Project area for the Project does not preclude other concurrent agricultural uses, such as grazing of lambs on low-lying pasture underneath the solar panels.

Solar farms typically have a minor physical disturbance footprint. As such, investigations into co-agriculture opportunities are underway to ascertain opportunities within Robertstown Solar for other forms of traditional agriculture such as sheep grazing and apiculture to co-exist with the Project.

The Project provides income diversification to Project land-holders, assisting land-holders to mitigate seasonal agricultural enterprise risk. Robertstown Solar will provide Project land-holders with an income stream that is stable and defined for a significant period of time.

10.1.2. Perceived Negative Impacts

Notwithstanding the positive impacts noted above, a number of potentially negative impacts have also been identified, through the site assessment and community engagement process. These issues are identified and discussed below.

Perceived visual impacts including general amenity and glint/glare.

It is recognised that the Project area is exposed to sections of Worlds End Highway, Powerline, Lower Bright and Junction Roads and neighbouring properties. A Visual Impact Assessment (VIA) attached as Appendix 7 considers the Project's potential visual impacts and appropriate mitigation measures. Based on the Visual Impact Assessment the Project's potential to adversely impact the existing and planned visual landscape is low.

A Glint and Glare Assessment attached as Appendix 12 considers the Project's potential glint and glare impacts and appropriate mitigation measures. Based on the Glint and Glare Assessment the Project's potential to adversely impact area beyond the Project area is minimal.

The Project area is zoned Primary Production. The Goyder Council Development Plan (Consolidated – 24 November 2016) (Development Plan) notes Renewable Energy Facilities are envisaged within the Primary Production zone and constitute a component of the zone's desired character.

It is noted that as renewable energy development intensifies in Australia, largescale solar projects are becoming an increasingly common and acceptable rural landscape.

Perceived impact on agricultural land.

It is acknowledged that the Project on the Project area has the potential to impact on the agricultural viability of the Project area. However, given that a Project of this type is temporary in nature and has minimal long-lasting negative impacts, it is considered that Robertstown Solar will not affect the long-term viability of agricultural land at the Project area.

Solar farms in general are considered a relatively 'non-invasive' development as the mounting system which connects the support frames to the ground are small in diameter.

Notwithstanding any perceived impacts, the change of use will act to provide diversity and security of income for farmers in this seasonally difficult agricultural area. Upon decommissioning the land use will revert back to dry land agriculture.

Impacts arising from construction phase including dust and noise.

It is recognised that development requiring construction works has the potential to generate noise and dust. While the potential to create dust and noise is real, there are minimal receptors located within 1km of the Project area.

Noise and dust will be managed through a construction environmental management plan and an operation management plan. Potential dust and noise impacts are explored in in the Planning Report.

The Project's potential to adversely impact the existing noise environment during the construction phase is moderate.

The Project's potential to adversely impact the existing air quality environment from dust is low.

Health Impacts from electromagnetic *fields and radio frequency interference.*

Electromagnetic field (EMF) radiation is generated by all electrical appliances and other sources that carry an electrical current. Radio Frequency Interference (RFI) can be generated by a range of electrical apparatus.

While substantial EMF's and RFI have the potential to interrupt electrical equipment and impact human health there are minimal receptors located within 1km of the Project area.

EMF and RFI potential impacts are explored in in the Planning Report. The Project's potential to adversely impact the existing EMF and RFI environment is low.

11. CONCLUSION

This SEIA has been prepared to ascertain the social and economic outcomes of the construction and operation of Robertstown Solar. The analysis concludes that the Project will provide significant positive social, environmental and economic outcomes for both the LGA and the state of South Australia. The assessment has been framed by considering the existing social and economic conditions of Goyder LGA.

As examined, the most prevalent industry within the Goyder LGA is low-rainfall large scale agri-business such as grazing. Income levels in the study area are lesser than that of the recorded state average, and the demographic profile indicates a predominantly semi-skilled workforce. These statistics potentially reflect the migration of skilled working age young adults away from region and/or the prevalence of agricultural-based employment.

This study revealed that Regional South Australia has recently experienced a general population decline and that the Goyder LGA is experiencing low population growth, possibly as a result of limited employment or study opportunities in addition to an ageing population.

The Project will provide significant economic stimulus and diversification of the region's economic base. Anecdotal evidence collected during community consultation for the project, indicates that the local community are generally supportive of the project and have expressed interest to participate in the Project's construction and operation. Based on the analysis, assumptions, discussion and data provided within, the following key findings are identified. The Project will:

- Deliver clean and renewable energy for Australia in the face of climate change;
- Assist in meeting renewable energy targets for the State and the Nation;
- For each year of its 30-year operational life, displace the equivalent of 815,000 tonnes of greenhouse gas emissions per annum, the equivalent of offsetting 326,500 cars or providing the equivalent benefit of 116,500 trees per annum;
- Provide clean energy to power an equivalent of 144,000 homes for the project's life;
- Create industry diversity for the Goyder region;
- Create substantial employment opportunities during project construction phases;
- Be located in a suitable area with access to existing infrastructure;
- Provide a flexible, low-impact alternative to the existing agricultural land use;
- Generate an estimated economic benefit in the order of $526.5 million for the broader economy and approximately $295.4 million as direct domestic project expenditure;
- Generate up to an estimated 275 equivalent full-time jobs during construction, and a further 410 indirect full-time equivalent jobs;
- Generate up to an estimated 15 equivalent full-time jobs during operations; and
- Provide a direct benefit to the community in the form of a community fund.

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APPENDIX 12

Glint & Glare Assessment