APPLICATION ON NOTIFICATION – CROWN DEVELOPMENT

Applicant:	FRV Services Australia Pty Ltd
Development Number:	433/V003/18
Nature of Development:	100MW Solar Farm & associated infrastructure
Type of development:	Public Infrastructure (State agency sponsored)
Zone / Policy Area:	Primary Production
Subject Land:	Allotment 3, DP12560 (CT Volume 6128 Folio 160); Allotment 4, DP12560 (CT Volume 6128 Folio 159); and Allotments 114-117 in FP170301 (CT Volume 6081 Folio 22)
Contact Officer:	Sharon Wyatt
Phone Number:	08 7109 7132
Start Date:	11 July 2018
Close Date:	10 August 2018
During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders Street, Adelaide during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).	

Written representations must be received by the close date (indicated above) and can either be posted, hand-delivered, faxed or emailed to the State Commission Assessment Panel (SCAP). A representation form is provided as part of this pdf document.

Any representations received after the close date will not be considered.

Postal Address:
The Secretary
State Commission Assessment Panel
GPO Box 1815
ADELAIDE SA 5001

Street Address:
Development Division
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders Street
ADELAIDE

Email Address: scapadmin@sa.gov.au
Fax Number: (08) 8303 0753

Government of South Australia

Department of Planning, Transport and Infrastructure

DEVELOPMENT ACT 1993

NOTICE OF APPLICATION FOR CONSENT TO DEVELOPMENT

SECTION 49 – PUBLIC INFRASTRUCTURE

Notice is hereby given that an application has been made by **FRV Services Australia Pty Ltd** for consent to construct a 100MW solar farm and associated infrastructure, including arrays of solar panels mounted on single-axis tracker framing, inverter stations, a 50MW battery energy storage system, substation (containing a minimum 100MVA transformer), overhead line from substation to existing 132kV transmission line, site office, onsite parking, refuse storage area, internal access roads and perimeter security fencing.
Development Number: 433/V003/18.

The development site is situated on vacant farming land (380 hectares) approximately 3.5km north-east of Mintaro. The site consists of two parcels of land located to the east and west of Chaff Mill Road. The western parcel is bounded by Merildin Road to the south, Wookie Creek Road to the west, Chaff Mill Road to the east and agricultural land to the north. The eastern parcel is bounded by Faulkner Road to the north, Chaff Mill Road to the west, agricultural land to the south and a rail line to the east.

The subject land is defined as: Allotment 3, DP12560 (CT Volume 6128 Folio 160); Allotment 4, DP12560 (CT Volume 6128 Folio 159); and Allotments 114-117 in FP170301 (CT Volume 6081 Folio 22).

The subject land is located within the Primary Production Zone of the Clare and Gilbert Valleys Development Plan (Consolidated 10 November 2016).

The application may be examined during normal office hours at the office of the State Commission Assessment Panel, Level 5, 50 Flinders Street and at the office of the Clare and Gilbert Valleys Council, 4 Gleeson Street, Clare. Application documentation may also be viewed on the State Commission Assessment Panel (SCAP) website: www.saplanningcommission.sa.gov.au/scap

Any person or body who desires to do so may make representations concerning the application by notice in writing delivered to the Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide 5001 **NOT LATER THAN Friday 10 August 2018**. Submissions may also be emailed to scapreps@sa.gov.au

Each person or body making a representation should state the reason for the representation and whether that person or body wishes to be given the opportunity to appear before the SCAP to further explain their representation.

Submissions may be made available for public inspection.

Should you wish to discuss the application and the public notification procedure please contact **Sharon Wyatt** on **7109 7132**.

Alison Gill
SECRETARY
STATE COMMISSION ASSESSMENT PANEL

PN2548

www.sa.gov.au

PN2775
25x2_250x63
Adelaide Advertiser 11.07.18
Plains Producer 11.07.18
Northern Argus 11.07.18

DEVELOPMENT ACT, 1993
S49/S49A – CROWN DEVELOPMENT
REPRESENTATION ON APPLICATION

Applicant:	FRV Services Australia Pty Ltd
Development Number:	433/V003/18
Nature of Development:	Construction of a 100MW solar farm, consisting of approximately 360,000 solar panels and associated infrastructure
Zone / Policy Area:	Primary Production
Subject Land:	Allotment 3, DP12560 (CT Volume 6128 Folio 160); Allotment 4, DP12560 (CT Volume 6128 Folio 159); and Allotments 114-117 in FP170301 (CT Volume 6081 Folio 22)
Contact Officer:	Sharon Wyatt
Phone Number:	08 7109 7132
Close Date:	10 August 2018

My name:_____

My phone number: _____

PRIMARY METHOD(s) OF CONTACT: Email address: _____

Postal address:_____

_____Postcode_____

You may be contacted via your nominated PRIMARY METHOD(s) OF CONTACT if you indicate below that you wish to be heard by the State Commission Assessment Panel in support of your submission.

My interests are:
[ ] owner of local property
[ ] occupier of local property
[ ] a representative of a company/other organisation affected by the proposal
[ ] a private citizen

The address of the property affected is .....Postcode.....

The specific aspects of the application to which I make comment on are: .....

.....

.....

.....

.....

.....

.....

.....

I
[ ] wish to be heard in support of my submission
[ ] do not wish to be heard in support of my submission
(Please tick one)

by
[ ] appearing personally
[ ] being represented by the following person : .....
(Cross out whichever does not apply)

Date: ..... Signature: .....

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or scapadmin@sa.gov.au

SECTION 49 & 49A – CROWN DEVELOPMENT
DEVELOPMENT APPLICATION FORM

PLEASE USE BLOCK LETTERS

COUNCIL: Clare and Gilbert Valleys Council

APPLICANT: FRV Services Australia Pty Limited (FRV)

ADDRESS: Level 22, 6 O'Connell St Sydney NSW 2000

CROWN AGENCY: Department of the Premier and Cabinet (sponsoring agency)

FOR OFFICE USE

DEVELOPMENT No: _____

PREVIOUS DEVELOPMENT No: _____

DATE RECEIVED: / /

CONTACT PERSON FOR FURTHER INFORMATION

Name: Bronte Nixon - WSP Australia Pty Limited

Telephone: 08 8405 4421 [work] 0416 159 355 [Ah]

Fax: - [work] - [Ah]

Email: Bronte.Nixon@wsp.com

☐ Complying
☐ Merit
☐ Public Notification
☐ Referrals

Decision: _____

Type: _____

Finalised: / /

NOTE TO APPLICANTS:

(1) All sections of this form must be completed. The site of the development must be accurately identified and the nature of the proposal adequately described. If the expected development cost of this Section 49 or Section 49A application exceeds $100,000 (excl. fit-out) or the development involves the division of land (with the creation of additional allotments) it will be subject to those fees as outlined in Item 1 of Schedule 6 of the *Development Regulations 2008*. Proposals over $4 million (excl. fit-out) will be subject to an advertising fee. (2) Three copies of the application should also be provided.

	Decision required	Fees	Receipt No	Date
Planning:				
Land Division:				
Additional:				
Minister's Approval				

EXISTING USE: Agriculture

DESCRIPTION OF PROPOSED DEVELOPMENT: Construction of a 100MW solar farm; consisting of approximately 360,000 solar panels (maximum height of 3m) and associated infrastructure.

LOCATION OF PROPOSED DEVELOPMENT:

House No: _____ Lot No: ____ Street: Chaff Mill Road Town/Suburb: Stanley

Section No [full/part] A114-117 F170301 Hundred: Stanley Volume: 6081 Folio: 22 (PART)

Section No [full/part] A4 D12560 Hundred: Stanley Volume: 6128 Folio: 159 (WHOLE)

Section No: A3 D12560 Hundred: Stanley Volume: 6128 Folio: 160 (WHOLE)

LAND DIVISION:

Site Area [m^2] _____ Reserve Area [m^2] _____ No of existing allotments _____

Number of additional allotments [excluding road and reserve]: _____ Lease: YES ☐ NO ☐

DEVELOPMENT COST [do not include any fit-out costs]: $ 240-260 million

POWERLINE SETBACKS: Pursuant to Schedule 5 (2a)(1) of the *Development Regulations 2008*, if this application is for a building it will be forwarded to the Office of the Technical Regulator for comment unless the applicant provides a declaration to confirm that the building meets the required setback distances from existing powerlines. The declaration form and further information on electricity infrastructure and clearance distances can be downloaded from sa.gov.au.

I acknowledge that copies of this application and supporting documentation may be provided to interested persons in accordance with the *Development Act 1993* and meet the requirements for lodgement under s.49 of the Development Act 1993.

SIGNATURE: D Hegarty Dated: 29 / 5 / 2018

Our ref: Chaff Mill Solar Farm – lodgment of Development Application

By email and post
scapadmin@sa.gov.au

7 June 2018

Simon Neldner
Acting Team Leader, Majors & Crown
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders Street
Adelaide SA 5001

Dear Mr Neldner

Chaff Mill Solar Farm - Section 49 Development Application

WSP Australia Pty Limited is pleased to submit this Development Application, on behalf of the proponent, FRV Services Australia Pty Ltd, for the Chaff Mill Solar Farm (previously referred to as the 'Mintaro Solar Farm') under Section 49 of the *Development Act 1993*. The application proposes the construction of 100 MW solar farm, located adjacent to the existing Mintaro substation, which once completed will have a generating capacity of approximately 250,000 MWh per year.

This application for public infrastructure received sponsorship from Erma Ranieri, Acting Chief Executive of the Department of the Premier and Cabinet (DPC) on 3 April 2018. Furthermore, the project has received a Certificate for Development from the Office of the Technical Regulator, under Section 37. Both letters have been attached for your reference.

This Development Application, containing a signed Section 49 Application Form and Electricity Act Declaration Form, sponsorship letter from the DPC, Certificate for Development, Development Application Report and supporting appendices, has been submitted to the State Commission Assessment Panel both electronically to SCAPadmin@sa.gov.au and delivered in hard copy to Level 5, 50 Flinders Street, Adelaide (3x copies).

It would be appreciated if any information regarding payment advice could please be forwarded to Mr Damien Hegarty at Damien.Hegarty@frv.com.

Should you have any questions regarding this application, please do not hesitate to contact me on 08 8405 4421, or via email at Bronte.Nixon@wsp.com.

Yours sincerely

Bronte Nixon
Principal Environmental Scientist/Planner

Level 1, 1 King William Street
Adelaide SA 5000
GPO Box 398
Adelaide SA 5001

Tel: +61 8 8405 4300
Fax: +61 8 8405 4301
www.wsp.com

FRV SERVICES AUSTRALIA PTY LTD

JUNE 2018

CONFIDENTIAL

CHAFF MILL SOLAR FARM

DEVELOPMENT APPLICATION REPORT

Question today
Imagine tomorrow
Create for the future

Chaff Mill Solar Farm
Development Application Report

FRV Services Australia Pty Ltd

WSP
Level 1, 1 King William Street
Adelaide SA 5000
GPO Box 398
Adelaide SA 5001

Tel: +61 8 8405 4300
Fax: +61 8 8405 4301
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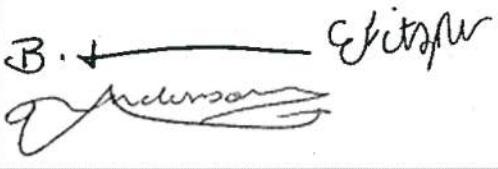
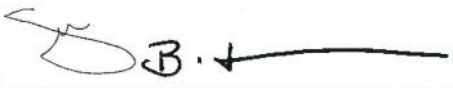
REV	DATE	DETAILS
00	19/03/2011	Draft
01	30/05/2018	Final
02	07/06/2018	Revised final

	NAME	DATE	SIGNATURE
Prepared by:	Bronte Nixon, Erin Fitzner, Tenille Anderson	07/06/2018	
Reviewed by:	Sean Myers, Bronte Nixon	07/06/2018	
Approved by:	Bronte Nixon	07/06/2018	

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GLOSSARY

ARI event	Average recurrence interval (ARI) is the average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration. It is implicit in this definition that the periods between exceedances are generally random (BOM 2018).
BDBSA	Biological Database of South Australia (BDBSA) is an integrated collection of corporate databases including data from the Department of Environment, Water and Natural Resources, Birds Australia, Birds SA, Australasian Wader Study Group, SA Museum and other State Government Agencies.
IBRA	Interim Biogeographical Regionalisation of Australia (IBRA) is a landscape based approach to classifying the land surface across a range of environmental attributes, which is used to assess and plan for the protection of biodiversity.
Commonwealth Land	Commonwealth Land includes land owned or leased by the Commonwealth or a Commonwealth agency.
Dispatchable Energy	A dispatchable source of electricity refers to an electrical power system, such as a power plant, that can be turned on or off. Dispatchable energy sources can adjust the power output supplied to the electrical grid on demand (Hanania, J. et al. ND)
Landscape characterisation	The assessment of the character and quality of the landscape. Elements comprising landscape character include landform, land use and cultural influences.
Landscape sensitivity	The degree to which a landscape can accommodate change (without detrimental impact on its character) resulting from a proposed development.
Megawatt hour	A megawatt hour (Mwh) is equal to 1,000 kilowatts of electricity used continuously for one hour.
National heritage place	Australia's national heritage comprises exceptional natural and cultural places that contribute to Australia's national identity. National heritage defines the critical moments in Australia's development as a nation and reflects the achievements, joys and sorrows in the lives of Australians. It also encompasses those places that reveal the richness of Australia's extraordinarily diverse natural heritage. National heritage places are located within Australia (DoEE ND).
OLS	The Obstacle Limitation Surfaces (OLS) are a series of surfaces that set the height limits of objects around an aerodrome. Objects that project through the OLS become obstacles.
Place attachment	The values that residents as well as various interest groups and stakeholders, place upon their environment and surrounds.
Project area	The land defined by the project boundary.
SCAP	The State Commission Assessment Panel (SCAP) is established under South Australia's Planning, Development and Infrastructure Act 2016. The SCAP has assumed the functions, powers and duties of the Development Assessment Commission.
Solar access	The ability of a property to receive sunlight without obstruction

ABBREVIATIONS

AARD-DSD	Aboriginal Affairs and Reconciliation Division – Department State Development
ACMA	Australian Communications and Media Authority
AHA	*Aboriginal Heritage Act 1988*
ASRIS	Australian Soil Resource Information System
ARENA	Australian Renewable Energy Agency
ARI event	Average recurrence interval event
ASS	Acid Sulphate Soils
BESS	Battery Energy Storage System
BDBSA	Biological Database of South Australia
CAR	*Civil Aviation Regulations 1988*
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CFS	Country Fire Service
CGVC	Clare and Gilbert Valleys Council
COAG	Council of Australian Governments
CTMP	Construction Traffic Management Plan
DPA	Development Plan Amendment
DPTI	Department of Planning, Transport and Infrastructure
ECOSA	Essential Services Commission of South Australia
EMF	Environmental Management Framework
EMI	Electromagnetic Interference
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FRV	FRV Services Australia Pty Limited
FRWL	Flinders Ranges Worm-lizard
HA	Hectare
IBRA	Interim Biogeographical Regionalisation of Australia
IFR	Instrument Flight Rules
LGA	Local Government Area
LSALT	Lowest Safe Altitude

MCA	Multi Criteria Analysis
MNES	Matters of National Environmental Significance
MWh	Megawatt hour
NEM	National Electricity Market
nm	Nautical Mile
NPW Act	*National Parks and Wildlife Act 1993*
NRM Act	*Natural Resources Management Act 2004*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
OLS	Obstacle Limitation Surface
OTR	Office of the Technical Regulator
PBTL	Pygmy Blue-tongue Lizard
PDI Act	*Planning, Development and Infrastructure Act 2016*
PPA	Power Purchase Agreement
PSI	Preliminary Site Investigation
PV Panel	Photovoltaic panel
RADCOM	Radio communication towers and radio services
RAAF AIS	Royal Australian Air Force Aeronautical Information Service
RAV	Restricted Access Vehicles
RET	Renewable Energy Target
SASP	South Australia's Strategic Plan
SAM	South Australian Museum
SCAP	State Commission Assessment Panel
SEB	Significant Environmental Benefit
SEDMP	Soil Erosion Drainage Management Plan
SIPSA	Strategic Infrastructure Plan for South Australia
TEC	Threatened Ecological Community
VFR	Visual Flight Rules
VRE	Variable Renewable Energy
WSP	WSP Australia Pty Limited

EXECUTIVE SUMMARY

PROJECT DESCRIPTION

FRV Services Australia Pty Limited (FRV) is seeking Development Approval for the construction and operation of a solar farm, at a location north-east of Mintaro in the Clare Valley, South Australia. The project is seeking approval under Section 49 (Crown Development) of the *Development Act 1993* as it is considered significant infrastructure for the State's development. The project sponsor for this application is the Department of the Premier and Cabinet (DPC) and the State Commission Assessment Panel (SCAP) is the relevant authority.

The project would generate approximately 250,000 Megawatt hours (MWh) of clean, zero emission electricity each year and would make a significant contribution to South Australia's energy production and stability of supply. The project would save approximately 132,500 tonnes of greenhouse gas emissions annually. The project would contribute to achieving renewable energy objectives within local, State and Commonwealth level planning and energy policy documents. The project will also create economic benefits to the local region, including employment, investment and tourism opportunities.

SITE DESCRIPTION

The site selection was influenced by a range of factors including availability of solar resources, proximity to grid infrastructure, community factors and environmental constraints.

The proposed 100MW solar farm would be developed on a 380 hectare (HA) site adjacent to the existing Mintaro substation and its 132 kilovolt (kV) transmission line to Waterloo.

The site is in an agricultural area and is largely cleared of native vegetation, containing grazing and cropping land. There is a large patch of remnant Eucalypts in the south-western corner of the western parcel where the land is too steep to cultivate. The roadside vegetation surrounding the site contains amenity plantings with some remnant native woodland and shrubland.

The western parcel includes low hills, with the highest and steepest area on the western side and the lowest area at Wookie Creek. The eastern parcel is of gentle undulation. The topography of the site ranges from 400-430 m above sea level. Wookie Creek, running north to south through the western parcel, is degraded with limited native flora species present.

STAKEHOLDER CONSULTATION

FRV is committed to a thorough engagement process with the community and key stakeholders and has engaged extensively with key stakeholders, neighbouring properties and the wider community to inform the planning process. Key issues raised during the consultation process have been identified and addressed in this report.

COUNCIL AREA AND ZONING

The proposed site is located within the Primary Production Zone of the Clare and Gilbert Valleys Council (CGVC). Solar farms are not specifically referred to in the CGVC Development Plan; however the development of wind farms and ancillary development are envisaged within the Primary Production Zone, in accordance with the State-wide Wind Farms Development Plan Amendment (DPA) 2012. Solar farms provide comparable benefits and may also be accepted within this zone. The adjacent and surrounding land use is largely agricultural, with some livestock and horticulture land use.

TECHNICAL ENVIRONMENTAL ASSESSMENTS AND SPECIALIST STUDIES

This Development Application was informed by a number of specialist technical reports including statutory planning, flora and fauna, Aboriginal cultural heritage, non-Indigenous heritage, visual amenity, glare, geotechnical, traffic and access, stormwater and flooding, socio-economic, site contamination and micro-climate. Potential Electromagnetic Interference (EMI) and aviation safety impacts were also reviewed. These studies assessed the potential impacts associated with construction and operation of the project and identified a range of mitigation measures to manage the identified impacts.

PLANNING AND LAND USE

A statutory planning and land use assessment was undertaken to support the Development Application. The project is considered appropriate for the project site and is not deemed at variance with the relevant Development Plan provisions. It will also provide reliable infrastructure and sustainable energy to facilitate economic growth for the region; consistent with South Australia's strategic policies. The nature of the development is recognised and provided for in the Clare and Gilbert Valleys Council Development Plan. Renewable energy facilities policy provisions are set out in both the Council Wide and Primary Production Zone. It is considered that the project will not significantly impact upon existing land uses in the local area and will not significantly impact upon the total area of productive agricultural land in the region.

FLORA AND FAUNA

A vegetation survey was undertaken across the project area and bordering roadsides in line with South Australian Native Vegetation Council requirements. Additionally, a roaming survey captured opportunistic flora and fauna observations. The project was assessed for compliance with the *Environment Protection and Biodiversity Conservation Act 1999, Native Vegetation Act 1991, National Parks and Wildlife Act 1972* and *Natural Resources Management Act 2004.*

The project area is largely devoid of native vegetation and presents few ecological constraints. No threatened flora species or threatened vegetation communities were recorded. There is a large group of Inland South Australian Blue Gum trees with high conservation significance present in the western section of the project area. The ephemeral creek line running through the western section of the project area is highly degraded but provides fauna habitat.

Only one state-threatened bird species was recorded during the survey; the White-winged Chough – a species found across most of south-eastern Australia. Habitat suitability for nationally threatened fauna species, such as the Flinders Ranges Worm-lizard and Pygmy Blue-tongue Lizard was assessed. These species are considered unlikely to occur due to lack of preferred habitat and known distribution patterns.

Impacts where there is remnant vegetation (i.e. the western section of the project area and roadsides) will be avoided. Any vegetation clearance for the project would require approval under the *Native Vegetation Act 1991*.

ABORIGINAL CULTURAL HERITAGE

An Aboriginal cultural heritage survey was undertaken for the project, comprising desktop research, an anthropological survey and an archaeological survey; in consultation with Ngadjuri traditional owner representatives.

There are no anthropological sites within the project area, although Wookie Creek was identified as culturally sensitive in relation to Aboriginal anthropology due to its connection with significant Creation Ancestor stories. Most of the project area is highly disturbed. The topography of the project area and the relatively high level of disturbance suggests a low probability for encountering Aboriginal heritage sites, objects and burials. There were no archaeological sites recorded within the project area, however ground visibility was low as the area is currently being used for cropping. Given the likelihood of buried, undisturbed soils within a region that has been demonstrably well-occupied by Ngadjuri people before and during European colonisation, the potential for encountering buried heritage sites, albeit low, does still exist.

The outcomes of the Aboriginal cultural heritage survey recommended an additional survey once the site is cleared and there is improved ground visibility, the preparation and implementation of a Cultural Heritage Management Plan for the project and inducting all construction workers undertaking ground disturbance work to typical Aboriginal site descriptions, potential indicators, the site discovery process and legislative obligations.

NON-INDIGENOUS HERITAGE

As outlined above, the Clare Valley region was inhabited by the Ngadjuri people prior to European contact. The country to the north of Gawler was occupied during the early 1840s by colonists who recognised the pastoral opportunities presented by the fertile grassy plains. Following the discovery of copper at Burra in 1845, the Burra Mine quickly became one of the richest copper mines in the world. The village of Mintaro was originally intended as a stopping place for the bullock teams (and later muleteers) which carted the copper ore from the mine to Port Wakefield and returned with coal and supplies shipped from Wales.

A significant proportion of Mintaro's buildings were built between 1850 and1870, including small cottages, shops, flour mill, blacksmiths, churches, hotels and several public buildings including a police station, a public school and the Council hall and Institute.

In 1877, the copper teams were rerouted through Riverton to the new railway terminus at Gawler, bypassing Mintaro and causing a decline although this was partially alleviated by the expansion of the slate quarries and the growing agricultural industry. The Mintaro Railway Station (renamed Merildin in 1918) was built in 1870, approximately seven km east of the township and Mintaro continued as an agricultural service centre despite the closure of the Burra Mines in 1877. The area began to decline in the 1930's although the slate quarry helped the Mintaro township survive. Mintaro has retained much of its historic character and was subsequently declared a State Heritage Area in 1982. The designation of a State Heritage Area is intended to ensure that changes to, and development within, the area are managed in a way that the area's cultural significance is maintained.

Numerous heritage database searches identified the following heritage listings:

- The Australian Heritage Places Inventory contained ten entries, two of which were state heritage places and eight listed under the Register of the National Estate (state heritage places were also recorded in the South Australian Heritage Database).
- The Australian Heritage Database contained 33 entries.
- The South Australian Heritage Places Database contained 27 entries.
- The Clare and Gilbert Valleys Development Plan did not contain any local heritage places for Mintaro (state heritage places were already covered by the South Australian Heritage Places Database).

Most of the heritage places are located within the Mintaro township and are between 1.8-2.3 km south-west of the project area. The closest heritage place to the project area is the Merildin Railway Station, approximately 1 km south of the site. The Chaff Mill Solar Farm will not impact any heritage places within the Mintaro township and surrounds. Vibration impacts of major construction projects are generally limited to 25 m. the construction of a solar farm will not comprise vibration impacts. The project area is not visible from the Mintaro township or from any key tourism areas or vistas. Construction and heavy vehicles will not be directed through the Mintaro township. All construction and site staff working on the project will be inducted as to their legal obligations regarding the protection of heritage places within and around Mintaro.

VISUAL AMENITY

A landscape character and visual impact assessment was undertaken for the project to determine existing landscape character values and the visual amenity of the project area, the sensitivity of the landscape to change and the degree of visual impact of the proposed Chaff Mill Solar Farm.

The study comprised a desktop evaluation of the topography of the area to determine the viewpoints from which the project may be visible. The assessment defined a 'Zone of Theoretical Visual Influence' from which the project may be seen. Consideration was also given to other locations outside of this zone that may be more sensitive to visual change

such as elevated scenic lookouts (including the Quarry Hill Road lookout) and notable tourism routes. Site visits were undertaken as part of the assessment to photograph the area from various viewpoints. The Zone of Visual Influence was ground-truthed and consideration was given to other influencing factors such as vegetation and topography.

The visual impact assessment found that the solar farm will not be visible within the Zone of Visual Influence due a combination of the hills, ridges and specific blocks of vegetation between the viewer and the project area. Generally, areas beyond the Zone of Visual Influence are likely to be too far away from the project area to offer discernible views of the Chaff Mill Solar Farm.

The landscape character assessment is concerned with the fabric, character and quality of the countryside. The landscape fabric consists of the elements that make up the landscape, such as landform, land-use and cultural influences and the way these elements interact. Further, the characterisation process defines the landscape 'sensitivity to change' based on the ability of the landscape to absorb a development of this nature without irreparable consequences and impacts on the inherent character and visual amenity. Consideration was also given to 'sense of place' values i.e. the intrinsic character of a place, or the meaning people give to it, but, more often, a mixture of both.

The assessment found that the sense of place and landscape character of the undulating vegetated hillsides of the project area and the Mintaro township is one of moderate to high scenic quality and has a moderate to high sensitivity to change. The introduction of the solar farm will not change the mainly pastoral nature of the locality and the wider contextual landscape, nor does it impact on any significant viewpoints within the contextual landscape. The solar farm will, however, be visible at several locations including three properties. The visual impact is only considered significant enough to warrant mitigation at one of these properties – located at the corner of Chaff Mill and Merildin Roads.

GLARE

The glare impact assessment undertaken for this project included an assessment of baseline conditions and desktop mapping of potential glare at the location of sensitive receptors. No glare potential was identified for most of the surrounding rural and residential dwellings where the likely impact on sensitive receivers was considered insignificant. No glare potential was identified for Copper Ore Road and other minor roads. Glare hazard potential was identified, however, for travellers on Merildin Road, where the road adjoins the south-eastern boundary of the project area. Glare hazard potential was also identified for the intersection of Chaff Mill and Merildin Roads. The impacts of potential glare at the affected locations will be mitigated with the establishment of vegetation screen planting.

GEOTECHNICAL

The underlying geology of the location north-east of the Mintaro area comprises recent Quaternary slope alluvium including outwash and soils, with some coarse gravels derived from older alluvium. More broadly, the Mintaro area soil comprises unbleached A_2 horizon and pedal subsoils, with soils that comprise sandy and clayey red-brown earths with dark brown cracking clay and terra rossa soils. Tertiary deposits are recorded as being present in areas of Site 1, comprising sandstone, sandy gravel, ferruginous (containing iron oxide or rust) gravel, and siliceous duricrust. Watervale Sandstone Member of the Burra Group is also present underlying areas of Site 1 and is characterised by fine to coarse grained feldspathic quartzite and orthoquartzite.

The groundwater table is generally located greater than 12 metres below ground level, although the presence of Wookie Creek indicates that groundwater may be intersected at shallower depths in some locations. Very hard rock (shale and slate) could be encountered at shallow depths in the area and soft soil materials (i.e. sand and gravel) may necessitate deeper footings. It is also known that local soils can become wet and boggy during periods of rainfall. Detailed geotechnical testing will be undertaken as part of the detailed design process.

TRAFFIC AND ACCESS

A Traffic Impact Assessment was undertaken for the proposed Chaff Mill Solar Farm to identify and assess any key traffic operational and safety issues that may arise during the construction and operation of the project. The assessment was based on a desktop assessment of traffic and road corridor information (predominantly sourced from DPTI) and a site inspection of roads and current traffic operations at and around the project area. The solar farm has been proposed for

two parcels of land which are accessible via a network of unsealed roads. The detailed layout of the solar farm is yet to be finalised but it will require vehicle access to both land parcels and an internal road network to allow for both its construction and maintenance.

Once operational, only a small number of staff will be in attendance daily and the vehicle trips generated will be less than 10 per day. During the construction phase though, traffic generation will be more significant. In the first stage of construction (duration 9 months) it is estimated that there will be 100 construction workers on site. This will increase to 200 in the following second stage (also 9 months). These construction workers will travel to and from the site daily using light vehicles and potentially mini buses to reduce trips. It is estimated that there will be up to 8 and 16 heavy vehicle movements daily in Stage 1 and Stage 2 respectively.

A number of alternative locations for access to the west and east sections of the project site were identified. These included access from Wookie Creek Road (north end and midway near the substation), Merildin Road and Chaff Mill Road. The advantages and disadvantages of these were assessed taking into consideration:

- The likely routes to be taken by construction workers (light vehicles) and heavy vehicles to the project site from their trip origins
- The extent of upgrading required to the unsealed roads and intersections
- The existing alignment of the unsealed roads and hence the safety risks
- The number of residential properties along the route that may be affected by the passing traffic.

On balance the preferred access location is on Wookie Creek Road adjacent to the existing substation. This would be supported by an internal road network that would allow access to Chaff Mill Road and then to the east section of the project site. Most light vehicle trips and all heavy vehicle trips would be expected to travel to the site via Horrocks Highway, Jolly Way, Catholic Church Road, Merildin Road and Wookie Creek Road.

The clear advantages of this option are:

- There are no residential properties along this section of Merildin Road or Wookie Creek Road
- There is a relatively short section of unsealed road to be upgraded as well as two intersections.

The use of the Mintaro-Leasingham Road by heavy vehicles (in particular) should be avoided as this takes traffic through the historic Mintaro township. The route via Manoora also takes traffic through Mintaro and the route via the unsealed Flagstaff and Riley Roads would require significant road upgrade and realignment works.

It can be noted that during the period of public consultation conducted by FRV in February 2018, it became apparent that there was Council and community support for an alternative route option (HV5 – via Barrier Highway and Mintaro-Manoora Rd) and concerns for the increased use of Jolly Way by heavy vehicles. The advantages and disadvantages of both HV2 and HV5 are discussed in this report.

The construction of the project will generate both light vehicle trips and heavy vehicle trips during the two construction phases of the project. These numbers of vehicle trips are not high in absolute terms but will represent a significant proportional increase in the traffic volumes currently using the sealed and particularly the unsealed road network. Daily traffic volumes on Jolly Way for example could increase by up to 44% during Stage 2 construction period. The increase in traffic volumes on the unsealed roads will be significantly higher than existing but only on relatively short sections of road and sections which do not pass by adjacent residences.

A range of mitigation measures are being considered to address the increased exposure to risk and the impacts on the road conditions in the local area.

STORMWATER AND FLOODING

Typical solar farm construction utilises the natural layout of the land to minimise earthwork construction costs, whilst also maintaining existing natural features, such as watercourses, across the site.

The installation of solar panels does not increase the overall runoff from the site, as runoff from each panel soaks into the ground under the adjacent downstream panel – resulting in little to no increase in the total catchment runoff.

Culverts will be provided at all locations along the access tracks that cross any water course or depression. The sizes of these culverts will also be subject to a more detailed analysis during the final design stage.

Flood mapping is not available for either site in the *Clare and Gilbert Valleys Council Development Plan*, and it is recommended that further analysis should be undertaken to assess the risk of flooding (despite the sites' occurring in the upper reaches of large catchment areas) during the later design stages.

Each site is in the upper reach of a separate stormwater catchment (Wakefield River and Broughton River catchments, respectively). As such it is highly unlikely that either site would experience any flooding issues during peak storm events. No flood plain zones are located within either site.

The northern site is relatively level, with any runoff gradually flowing northward, towards Faulkner Road. The southern site is of more undulating terrain with a central watercourse draining to the south; whereby runoff at the site enters Wookie Creek and flows south, past Merildin Road.

The proposed access road layout will incorporate culvert crossings where appropriate to ensure sub-catchment drainage is not affected. Once established, the solar farm will be re-seeded with the most suitable grass species for this particular location, which will further mitigate run-off and erosion potential. Detailed civil investigations will be undertaken as part of the detailed design process. In line with best-practice, a Soil Erosion and Drainage Management Plan (SEDMP) will be prepared prior to construction, which will be implemented in line with the Construction Environmental Management Plan.

SOCIO-ECONOMIC

Social and community impacts (both positive and negative) of the construction and operation of the proposed Chaff Mill Solar Farm to the local and regional community were investigated as part of the assessment process.

The solar farm would generate considerable environmental, economic and social benefits to Mintaro and the local region, including but not limited to:

- Providing employment for up to 200 workers during construction, drawn from the local area where possible
- Boost to the local economy through the procurement of local goods and services
- Attracting investment to the area
- Increased energy security
- Contributing to the Mid North region's reputation for renewable energy and potentially drawing increased tourism to the area
- Contributing to the achievement of local, state and national renewable energy targets
- Mitigation of climate change.

Whilst the project will provide wider benefits to the area and the region, there is also the potential for the project to cause adverse impacts to the community, including:

- An increased demand on public services and facilities - particularly accommodation and eateries
- Construction traffic and personnel
- Visual amenity – to the immediate local area – both during construction; and from several locations once operational.

Other concerns raised by the community (such as frost exacerbation and loss of productive agricultural land) have been reviewed and are not anticipated as being of significance – these issues are discussed in other sections of this information sheet.

Several mitigation measures have been recommended to minimise potential socio-economic impacts associated with the proposed project, including:

- Protocols to keep the community updated about the progress of the project
- Protocols to respond to complaints/concerns received
- Liaison with local representatives regarding business opportunities

- Liaison with local tourism industry to manage potential timing conflicts
- Liaison with local industry representatives and contractors to maximise the use of businesses and suppliers.
- The preparation of a Construction Environmental Management Plan.

SITE CONTAMINATION

A preliminary site investigation was undertaken for the project to determine any potential site contamination issues within the project area. The site has operated as farm land, with several private owners, from as early as 1870 through to the present day. It is possible that potentially contaminating activities associated with farming operations occurred on site. It is unlikely that the potentially contaminating activities would significantly impact the proposed future land use of the site as a solar farm. A baseline intrusive investigation would be undertaken in future project stages to identify if potentially contaminating activities are crystallised.

MICRO-CLIMATE IMPACTS (FROST)

To investigate community concerns that the solar farm may exacerbate frost conditions at adjacent properties (i.e. the impacts of radiative heat loss from panels on the surrounding climate); the following approach was undertaken:

1. Review of Solar Farm Assessment Guidelines.
2. Review of all other solar farm assessments, approvals and conditions of consent documents in Australia.
3. Web-based desktop assessment of solar farms and frost / radiative heat loss impacts.
4. Academic literature review of solar farms and frost / radiative heat loss impacts.
5. Discussions with agricultural, climatology and meteorological scientists in South Australia, Australia and overseas.

There is no reference to micro-climate or air temperature implications or requirements in any regulatory or policy guidelines in South Australia or interstate. In a review of other solar farm Development Applications and Environmental Impact Statements; none of them look at the issue in any detail.

A number of websites, reports and academic papers were reviewed to try and obtain an understanding of the potential radiative heat loss and frost exacerbation issues and impacts associated with solar farm development. Very little information on the topic exists but several sources stated that the potential development of thermal models for large-scale solar farms is highly problematic due to significant uncertainties associated with the multiple parameters involved including variations in albedo, climate data, cloud cover, landscape, seasonality, panel efficiency, panel design, wind speeds, vegetation cover, soil data and a number of other factors.

A review of potential academic reports and research papers was then subsequently undertaken using the University of South Australia's access to scientific journals, books and reports. There is a lack of specific studies and literature that relates to the general environmental impacts of solar farms. Literature regarding micro-climate impacts and impacts to the radiative heat exchange at solar farms is even rarer. Several studies were reviewed which had a range of findings and outcomes. Summarised relevant findings appear to be that:

- Temperatures in the centre of a solar farm may be slightly higher than ambient – particularly in warmer months
- Temperatures return to ambient several metres above a solar farm
- Temperatures may be slightly warmer directly adjacent a solar farm, gradually returning to ambient with distance away from the solar farm
- Soil temperatures at depth underneath panels may be slightly warmer during cooler months and slightly cooler in warmer months
- Air temperatures at ground level underneath panels may be slightly cooler during summer months
- Air temperatures at a two-metre height in the solar farm in the colder months would probably be similar to the surrounding areas
- Air temperatures at a two-metre height in the solar farm in the warmer months may be slightly warmer than the surrounding areas
- Air temperatures directly above solar arrays may be slightly warmer at night
- Temperatures at control sites adjacent solar farms generally had temperatures equal to ambient conditions

- Reduced temperatures adjacent a solar farm were never modelled or recorded except in the hypothetical modelling of massive solar farm scenarios of arrays with an area of 25,000,000 ha (the Chaff Mill project is 380-ha)
- Slight warming could be experienced upwind of a 250,000-km^2 solar farm scenario and slight cooling could be experienced downwind of a 250,000 km^2 solar farm scenario.

In discussion with research scientists, climatologists and meteorologists; the climate impacts of a 380-ha solar farm would not be significant and the addition of access roads within and around a solar farm would further mitigate any local climate impacts due to enhanced air flow.

ELECTROMAGNETIC FIELD LIMITS

All electronic equipment has associated electromagnetic fields. In some cases, electronic devices that are close to one another can encounter interference resulting from these fields.

Solar farms (including their ancillary infrastructure) have the potential to cause electromagnetic interference. Commercial equipment, such as solar panels, are subject to the relevant Australia regulations that determine the maximum allowable emissions limits to minimise interference impacts.

All infrastructures installed as part of the Project will comply with the relevant emissions standards. Consultation with telecommunications and other radiocommunications license holders in the area will be would be undertaken during the further design stages of the project.

AVIATION SAFETY

The main potential impact to aviation safety presented by the Chaff Mill Solar Farm is glare, although panels are designed to absorb rather than reflect energy (including light energy). Based on the proximity of the project to aviation operations and the findings of previous studies, any impacts are expected to be minimal. Communication with aviation operators in the region, via a Notice to Airmen would be undertaken to ensure they are aware of the project.

SUMMARY

The statutory planning assessment undertaken for the project found that the proposed development of a solar farm is consistent and not at variance with the relevant policy provisions set out in the Clare and Gilbert Valleys Council Development Plan (Consolidated 10 November 2016) and that the project warrants the granting of Development Plan Approval.

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1 INTRODUCTION

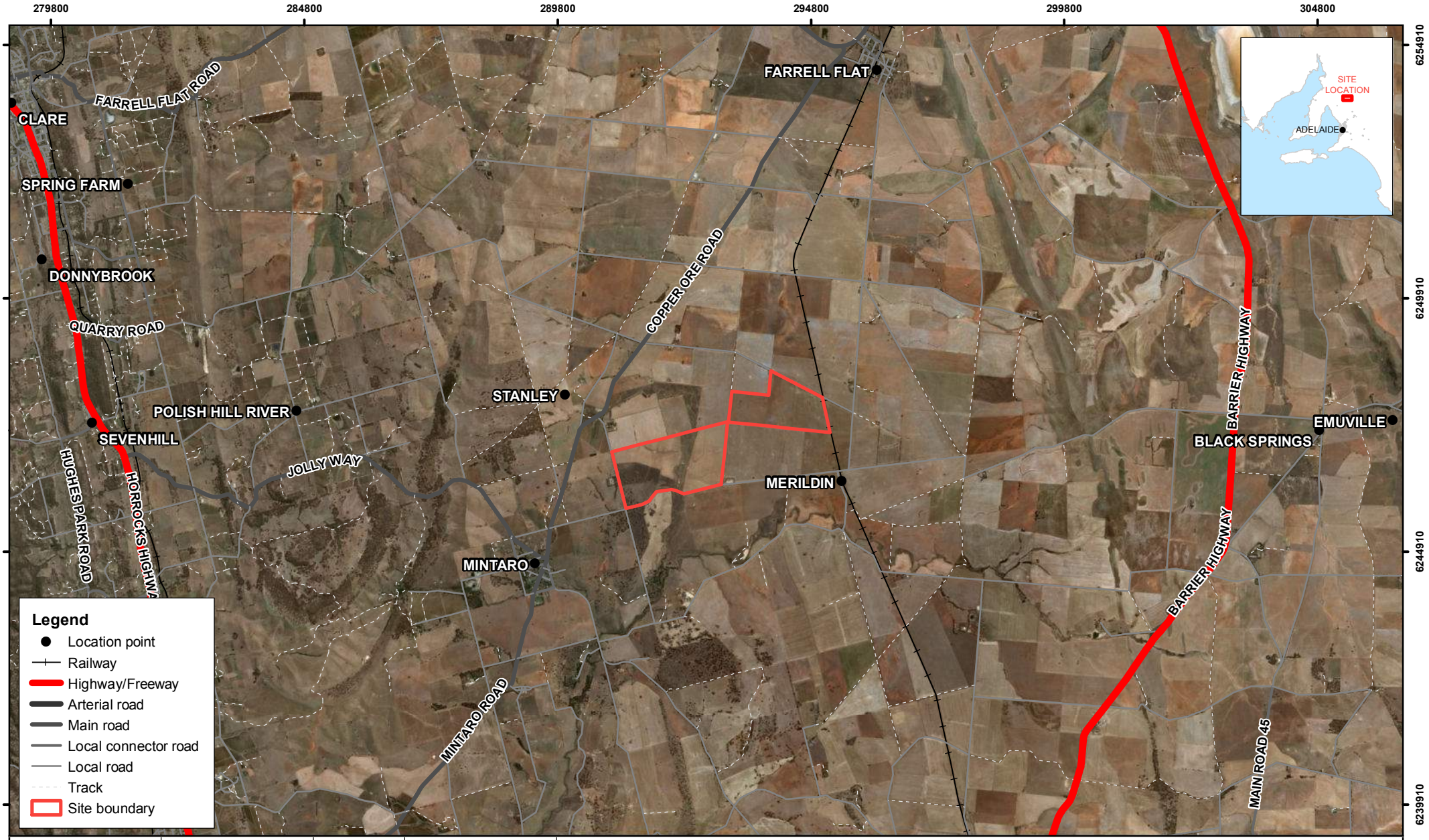
1.1 THE CHAFF MILL SOLAR FARM PROJECT

Australian solar development company FRV Services Australia Pty Limited (FRV) is proposing to develop the Chaff Mill Solar Farm at a location north-east of Mintaro in the Clare Valley, South Australia (Figure 1.1 and). The proposed 100 MW solar farm would be developed on a 380 hectare (HA) site adjacent to the existing Mintaro substation and its 132 kilovolt (kV) transmission line to Waterloo. The project will capture solar energy and generate approximately 250,000 MWh of clean, zero emission electricity each year through the latest in solar energy generation technology. The site is well-placed to capture and export renewable solar energy into the national electricity grid.

A Development Application is being submitted to the relevant authority, the State Commission Assessment Panel (SCAP). To support the planning approval process, a number of specialist technical studies have been undertaken.

Photo 1.1 Photo of the proposed site taken from the intersection of Wookie Creek Road and Merildin Road, Stanley

Photo 1.2 Photo of the proposed site taken from the intersection of Wookie Creek Road and Copper Ore Road, Stanley



Map: PS103225_GIS_003_D	Author: pottsr
Date: 28/05/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 1,000 2,000 m

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Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 1.1
Location plan

Map: PS103225_GIS_016_A	Author: pottsr
Date: 19/03/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 250 500 m

1:25,000

Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 1.2
Site Layout Plan

1.2 SCOPE OF THIS DOCUMENT

The scope of this document is to provide an assessment of the proposal against the provisions of the Clare and Gilbert Valleys Council Development Plan, the *Development Act 1993* and *Development Regulations 2008.* Relevant aspects of the *Planning, Development and Infrastructure Act 2016* (PDI Act) have also been considered.

1.3 STRUCTURE AND CONTENT OF THIS REPORT

This report contains the necessary information for the assessment of a Development Application, pursuant to the *Development Act 1993, Development Regulations 2008* and the relevant Development Plans and Council requirements.

1. **Section 1 – *Introduction*** provides an overview of the proposal, the approval process, including approvals under Commonwealth legislation and ancillary approvals and the proponent.
2. **Section 2 – *Strategic context*** provides an overview of the rationale for the proposal and outlines the project's consistency with Commonwealth and State targets, guidelines and strategic directions. It also outlines the key benefits associated with the construction and operation of the project.
3. **Section 3 – *Alternatives considered*** provides an overview of the alternatives considered in developing the proposal to minimise potential impacts and how the current proposal was reached.
4. **Section 4 – *Project site*** provides an overview of the existing site locality and existing infrastructure present.
5. **Section 5 – *Project description*** describes the details of the proposed development, including key components of the proposal, capital investment and the power purchasing agreement.
6. **Section 6 – *Key stakeholder consultation*** provides an overview of the key stakeholders for the proposal, the consultation activities undertaken to date and the issues raised by stakeholders.
7. **Section 7– *Environmental assessment*** details the results of the environmental assessments completed for the proposal, including; statutory planning, flora and fauna, Aboriginal cultural heritage, non-Indigenous heritage, visual amenity, glare, geotechnical, traffic and access, stormwater and flooding, socio-economic, site contamination, micro-climate, electro-magnetic interference (EMI) and aviation safety issues.
8. **Section 8 – *Construction, operation and decommissioning*** has been structured to provide details on how the project will generally be managed during the construction and operation phase. These details include fire / bushfire management, emergency management, site security and safety and biosecurity measures.
9. **Section 9 – *Conclusion and recommendations*** concludes the assessment, reviewing the development against the provisions of the Clare and Gilbert Valleys Council Development Plan, the *Development Act 1993* and *Development Regulations 2008.*
10. **Section 10 – *Limitations*** identifies the limitations of the assessment undertaken for this proposal.

1.4 APPROVAL PATHWAY

The *Development Act 1993* and *Development Regulations 2008* are the main pieces of legislation facilitating planning and development in South Australia. The *Development Act 1993* requires that Development Approval must be sought and obtained prior to undertaking any form of development, generally defined as a change in the use of land, building work or the division of an allotment (Attorney-General's Department 2014).

The project has secured Section 49 (Crown Development) status under the Development Act, with the Department of the Premier and Cabinet (DPC) providing sponsorship/endorsement.

The project is located within the jurisdiction of the Clare and Gilbert Valleys Council. Therefore, assessment of the project against the relevant provisions of the Clare and Gilbert Valleys Council Development Plan (consolidated 10 November 2016); and subsequent Development Approval, is required.

It is expected that referral to the following Prescribed Bodies / Referral Authorities will be required at a minimum:

- The Environment Protection Authority (EPA)
- Department Planning, Transport and Infrastructure (DPTI) (i.e. the Minister responsible for administering the *Highways Act 1926*)
- The Aboriginal Affairs and Reconciliation Division – Department State Development (AARD-DSD) (i.e. the Minister responsible for administering the *Aboriginal Heritage Act 1988*)
- The Native Vegetation Council (NVC) within the Department of Environment, Water and Natural Resources (DEWNR) (i.e. the Minister responsible for administering the *Native Vegetation Act 1991*)
- potentially; Heritage SA (i.e. the Minister responsible for administering the *Heritage Places Act 1993*).

The development of solar farms and their ancillary infrastructure is not listed as complying or non-complying development within the relevant Development Plan zone. Therefore, the project must be assessed on its merits against the relevant objectives and principles of development control.

It should be noted that there is a possibility that a land division may be lodged in the future, over a portion of one of the allotments on the project site. Land division within the Primary Production Zone is generally not envisaged, and considered non-complying except where it does not create additional allotments or where it is a boundary realignment resulting in allotments of at least 40 hectares. Whilst discussions of a potential land division are still in early stages, the proponent is considering scenarios in which a land division could further support the economically efficient use of the land for public infrastructure – in giving the operator autonomy and greater security over the portion of the land to be used for the solar farm substation – whilst not threatening the continued use or productivity of surrounding land for primary production activities envisaged under the zone.

1.5 OTHER APPROVALS

Other environmental approvals, authorisations and permits may be required in both the pre-construction and construction phases of the project under the following acts of legislation:

- *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act)
- *Development Act 1993*
- *Environment Protection Act 1993*
- *Natural Resources Management Act 2004* (NRM Act)
- *Native Vegetation Act 1991*
- *National Parks and Wildlife Act 1972* (NPW Act)
- *Aboriginal Heritage Act 1988*
- *Native Title Act 1993.*

1.5.1 EPBC RISK ASSESSMENT

Under the EPBC Act, proponents proposing an action that may have a significant impact on a Matter of National Environmental Significant (MNES), or occurring on Commonwealth Land, must prepare a referral that will help the Commonwealth decide whether the proposal is a controlled action and requires assessment and approval.

An EPBC risk assessment was completed for the Chaff Mill Solar Farm proposal to determine the likelihood of the proposal impacting on a MNES (Appendix A). This risk assessment found that of the nine MNES prescribed under the EPBC Act, there are three which could potentially trigger a Commonwealth assessment for the Chaff Mill Solar Farm project:

- Nationally threatened species and ecological communities
- Migratory species protected under international agreements
- National Heritage Places.

The EPBC risk assessment process was informed by a desktop assessment, including generation of an EPBC Act Protected Matters Report, Biological Database of South Australia (BDBSA) data and results from the flora and fauna survey undertaken for the project by EBS Ecology (Appendix G). A non-Indigenous Heritage report was also written for the project and identifies National Heritage Places within Mintaro and surrounds (Appendix I).

No EPBC Act listed flora species or ecological communities were observed during the flora and fauna survey however three nationally threatened species were identified as potentially occurring within the project area:

- *Dodonaea procumbens* (Trailing Hop-bush)
- Pygmy Blue-tongue Lizard (PBLT) (*Tiliqua adelaidensis*)
- Flinders Ranges Worm-lizard (FRWL) (*Aprasia pseudopulchella*).

The flora and fauna report and EPBC risk assessment found that, based on the EPBC Act Significant Impact Guidelines, the project is not considered to have a significant impact on any EPBC Act listed flora, fauna or ecological communities, for the following reasons:

- No Threatened Ecological Communities (TEC) were identified within the project area
- No EPBC listed flora species were detected or considered likely to occur within the project footprint, based on available habitat
- No EPBC listed fauna species were detected during the survey or considered likely to occur.

The EPBC risk assessment also involved a review of solar farm projects that have been referred to the Commonwealth Environment Minister under the EPBC Act from 2016-2017. In this period, 17 (seventeen) solar farms have been referred. Of these projects, 12 (twelve) were assessed as ‘not a controlled action’, meaning that approval is not required if the action is taken in accordance with the referral. Four were assessed as ‘not a controlled action if undertaken in a particular manner’, meaning that approval is not required if the action is taken in accordance with the manner specified. One project is currently open for Public Comment, with the referral decision pending. These previous referrals illustrate that projects of a similar nature and scale to the Chaff Mill Solar Farm have been considered not to have a significant impact on MNES.

The risk assessment considered submission of a referral under the EPBC Act for the Chaff Mill Solar Farm project to be unnecessary due to:

- The existing land use of the site – the project area has been cleared and farmed for more than 100 years
- A lack of threatened species recorded during the flora and fauna survey
- A lack of threatened species recorded in the BDBSA
- A lack of key habitat for threatened species within the project area
- The nature of the proposed development
- The distance to National Heritage Places
- The ability to manage and mitigate potential impacts through a detailed Construction Environmental Management Plan (CEMP).

1.5.2 ANCILLARY APPROVALS

The construction of the project will be subject to secondary and ancillary environmental and project approvals under predominantly State-based legislation, including:

- A range on Environmental Authorisations (e.g. licence for earthworks drainage) for prescribed activities under the *Environment Protection Act 1993*
- Potential approvals under the *Aboriginal Heritage Act 1988* (refer section 7.3 and Appendix H)
- Applications to remove native vegetation under Regulation 12(34) – Infrastructure or Regulation 12(27) – Major Projects exemptions of the *Native Vegetation Act 1991* (refer section 7.2 and Appendix G)
- Permits under Sections 79 and 80 and Regulations 33-46 of the *Fire and Emergency Services Act 2005*
- Wells, groundwater and water-related permits under the *Natural Resources Management Act 2004*
- Road transport permits under the *Road Traffic Act 1961*
- Dangerous Goods Licences under the *Dangerous Substances Act 1979.*

1.6 THE PROPONENT

The proponent for the Chaff Mill Solar Farm project is FRV Services Australia Pty Ltd. FRV have constructed two solar farms in Australia since 2010, including the Moree Solar Farm located in northern New South Wales and the Royalla Solar Farm in the Australian Capital Territory. Current projects being constructed include the 100 MW Clare Solar Farm and the 100 MW Lilyvale Solar Farm in Queensland. FRV's parent company, Fotowatio Renewable Ventures, has developed and operated solar farms spanning 24 (twenty-four) countries and five continents (FRV 2017a). Further information about FRV is provided in Appendix B.

The FRV Project Manager for the Chaff Mill Solar Farm project is:

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This Development Application Report has been prepared by WSP Australia Pty Limited (WSP) on behalf of FRV. Contact details are as follows:

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2 STRATEGIC CONTEXT

2.1 PROJECT RATIONALE AND BENEFITS

2.1.1 PROJECT OBJECTIVES

The Chaff Mill Solar Farm would further the development of the Australian clean energy industry and make a significant contribution to South Australia's energy production and stability of supply.

2.1.2 BROAD PROJECT BENEFITS

The Chaff Mill Solar Farm would generate approximately 250,000 MWh of clean energy each year, equivalent to the annual consumption of 60,000 South Australian households.

The project would save approximately 132,500 tonnes of greenhouse gas emissions annually.

The Chaff Mill Solar Farm would contribute to the reliability and stability of South Australia's energy supply. It would also increase investment and jobs in renewable energy and contribute to South Australia's (particularly the Mid North region) reputation as a national leader in renewable energy and low carbon initiatives. The project would also meet the Commonwealth Government's commitment to the provision of adequate, reliable and affordable energy to meet future energy consumption needs and to underpin strong economic growth.

The project would contribute to achieving renewable energy objectives within local, State and Commonwealth level planning and energy policy documents. These objectives have been identified by the Clare and Gilbert Valley Council, the South Australian Government and the Commonwealth Government to strengthen the economy, provide a more reliable and clean source of energy and limit greenhouse gas emissions. These objectives are discussed in section 2.2 below.

2.1.3 LOCAL PROJECT BENEFITS

The Chaff Mill Solar Farm offers direct and indirect economic benefits to the local community through employment, investment and tourism opportunities.

The project would employ up to five full-time workers during operation. This workforce would be drawn from the local area where possible, providing local jobs and increased security to the local economy, an opportunity to increase the working-age population of the region and diversify employment in the area.

The Yorke and Mid North Region is becoming well known for renewable energy. The world's largest lithium battery project recently built in Jamestown to store power generated by renewables achieved recognition on a global scale. During operation, the solar farm would potentially draw visitors to the area, including scientific and academic visitors, therefore providing opportunities to increase tourist accommodation and services in the food, retail and tourism sectors.

2.2 GOVERNMENT STRATEGIC CONTEXT

2.2.1 COMMONWEALTH GOVERNMENT

The construction of the Chaff Mill Solar Farm would support the Commonwealth's 2030 climate change target under the Paris Agreement (2015) to reduce emissions to 26-28% of 2005 levels by 2030.

2.2.1.1 RENEWABLE ENERGY TARGET SCHEME

The Renewable Energy Target (RET) is an Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the generation of electricity from sustainable and renewable sources.

Australia's RET aims to deliver more than 23% (approximately 33,000 Gigawatt hours) of Australia's electricity from renewable sources by 2020. The RET peaks in 2020 and runs until 2030.

The RET creates a financial incentive for the establishment or expansion of renewable energy power stations, such as solar farms, through legislating demand for Large-scale Generation Certificates. Renewable energy power stations create a certificate for every megawatt hour of power generated. These certificates are purchased by electricity retailers and submitted to the Clean Energy Regulator to meet the retailers' legal obligations under the RET (DoEE 2017).

The Chaff Mill Solar Farm would be eligible to apply for accreditation to create and sell large-scale generation certificates under the Large-scale Renewable Energy Target Scheme.

2.2.1.2 INDEPENDENT REVIEW INTO THE FUTURE SECURITY OF THE NATIONAL ELECTRICITY MARKET

The Independent Review into the Future Security of the National Electricity Market (Finkel Review) was released in June 2017. The Finkel Review proposed 50 (fifty) recommendations for energy development to deliver on four key outcomes; increased security, future reliability, reward consumers and lower emissions.

The Council of Australian Governments (COAG) Energy Council has agreed on a timeline to implement 49 (forty-nine) of the recommendations from the Finkel Review. The recommendation for a Clean Energy Target (recommendation 3.2) has not been adopted. The Clean Energy Target would be implemented from 2020 and continue in the long-term to incentivise new low emissions forms of energy generation to enter the market. In late 2017, the federal government proposed the National Energy Guarantee as an alternative policy to the Clean Energy Target (CET) recommended by the Finkel Review. The National Energy Guarantee provides both a reliability and emissions guarantee:

- The reliability guarantee requires electricity retailers to invest in enough dispatchable energy resources (coal, gas, hydro, battery storage) to cover a set percentage of their peak load in each region
- The emissions guarantee requires electricity retailers to meet a defined emissions level for the electricity they purchase from the wholesale market.

The National Energy Guarantee is currently under consultation.

The Chaff Mill Solar Farm will contribute to the supply of renewable energy to lower emissions in the long-term, beyond the RET.

2.2.2 STATE GOVERNMENT

The Chaff Mill Solar Farm would contribute towards achieving South Australia's decarbonisation targets, including:

- 50% of electricity produced from renewable sources by 2025
- $10 billion investment in low carbon generation by 2025
- Achieving net zero emissions by 2050
- Establishing Adelaide as the world's first carbon neutral city.

An overview of relevant South Australian State legislation and policies is provided below.

2.2.2.1 SOUTH AUSTRALIA'S STRATEGIC PLAN, 2011

South Australia's Strategic Plan (SASP) is an overarching, cross government plan setting out the State's strategic goals and targets. The renewable energy target within SASP has already been exceeded and has since been updated by the State Government. Strategic goals and targets within SASP relevant to the Chaff Mill Solar Farm are outlined in Table 2.1.

Table 2.1 Strategic goals and targets within SASP relevant to the Chaff Mill Solar Farm

TARGET	STATUS OF TARGET	PROJECT CONTRIBUTION
Target 46: Regional population levels Increase regional populations, outside of Greater Adelaide, by 20,000 to 320,000 or more by 2020.	The population the Yorke and Mid North region has increased by 5% from the 2010 baseline data.	The construction and operation of the Chaff Mill Solar Farm would generate short and long-term employment opportunities within the local area and help to stimulate and maintain population growth in the region.
Target 47: Jobs Increase employment by 2% each year from 2010 to 2016	In October 2017, the annual employment growth rate was 1.5% (increased by 0.1% from the 2010 baseline of 1.4%).	The Chaff Mill Solar Farm would create up to 200 jobs during construction and approximately five ongoing full-time equivalent roles during operation.
Target 59 – Greenhouse gas emissions reduction Achieve the Kyoto target by limiting the State's greenhouse gas emissions to 108% of 1990 levels during 2008-2012, as a first step towards reducing emissions by 60% (to 40% of 1990 levels) by 2050.	South Australia has achieved its Kyoto target of restricting emissions levels to less than 36.4 Mt CO2-e through to 2012 (Department of the Premier and Cabinet 2017).	The Chaff Mill Solar Farm would avoid the production of 132,500 t of CO^2 each year.
Target 64 – Renewable energy Support the development of renewable energy so that it comprises 33% of the State's electricity production by 2020.	The result for 2016-17 (48.9%) exceeds the target of 33% to be achieved by 2020.	The Chaff Mill Solar Farm would contribute 250,000 MWh into the South Australian grid each year.
Target 65 – GreenPower Purchase renewable energy for 50% of the Government's own electricity needs by 2014.	This commitment is currently being deferred. The reinstatement of GreenPower purchases is open to Government consideration in future budget processes (Department of the Premier and Cabinet 2017).	The Chaff Mill Solar Farm would increase the amount of renewable energy available for use in this program if this commitment is reinstated.
Target 66 – Emissions intensity Limit the carbon intensity of total South Australian electricity generation to 0.5 tonnes of CO^2/MWh by 2020.	In 2015, the carbon intensity of South Australian electricity generation was 0.43 tonnes of carbon dioxide equivalents emitted per megawatt hour (excluding interstate trade) (Department of the Premier and Cabinet 2017).	The Chaff Mill Solar Farm would avoid the production of 132,500 t of CO^2 each year.

2.2.2.2 SOUTH AUSTRALIAN PLANNING STRATEGY

The South Australian Planning Strategy specifies the planning and development activities that are needed to support the achievement of the SASP targets within each region of the State. The South Australian Planning Strategy is comprised of the 30-Year Plan for Greater Adelaide (covering metropolitan and peri-urban Adelaide) and Region Plans (covering the regional and remote parts of the State).

The Mid North Region Plan volume of the South Australian Planning Strategy seeks to enhance the development of renewable energy. Table 2.2 outlines the relevant principles and policies within the Mid North Region Plan.

Table 2.2 Principles and policies within the Mid North Region Plan relevant to the Chaff Mill Solar Farm

PRINCIPLE	POLICIES
Principle 4 Create the conditions for the region to adapt and become resilient to the impacts of climate change	**Policy 4.4** Provide for the development of alternative and innovative energy generation (for example, wind, solar, marine, biomass and geothermal technologies) and water supply facilities, as well as guidance on environmental assessment requirements.
Principle 5 Protect and build on the region's strategic infrastructure	**Policy 5.7** Identify land suitable to accommodate renewable energy development, such as wind farms.

2.2.2.3 STRATEGIC INFRASTRUCTURE PLAN FOR SOUTH AUSTRALIA, 2010 DISCUSSION PAPER

The Strategic Infrastructure Plan for South Australia (SIPSA) identifies strategic infrastructure priorities for 2005-2015. The 2010 Discussion Paper was prepared to initiate the preparation of an update to the SIPSA (currently underway). The Discussion Paper presents long-term strategic priorities to guide infrastructure development over the next 10-15 years and beyond. The Discussion Paper asserts that the government remains strongly committed to reducing greenhouse gas emissions by promoting the uptake of renewable energy and increasing efficiency of energy use. A strategic priority for the energy sector relevant to the Chaff Mill Solar Farm is to foster research and development and fast take-up of technological advances in renewable energy supply and use.

2.2.2.4 CLIMATE CHANGE AND GREENHOUSE EMISSIONS REDUCTION ACT 2007

The *Climate Change and Greenhouse Emissions Reduction Act 2007* sets out three targets:

- Reduce greenhouse gas emissions within the State by at least 60% to an amount that is equal to or less than 40% of 1990 levels by 31 December 2050 as part of a national and international response to climate change
- Increase the proportion of renewable electricity generated so it comprises at least 20% of electricity generated in the State by 31 December 2014
- Increase the proportion of renewable electricity consumed so that it comprises at least 20% of electricity consumed in the State by 31 December 2014 (DEWNR 2017).

The renewable energy generation and consumption targets under this legislation have been exceeded and have since been updated by the State Government.

2.2.2.5 SOUTH AUSTRALIA'S CLIMATE CHANGE STRATEGY 2015-2050

South Australia's Climate Change Strategy 2015-2050 sets a framework for achieving the emissions reduction targets and building resilience against the impacts of climate change. The uptake of renewable energy features in several of the priority actions and recommendations outlined in the strategy.

2.2.2.6 A LOW CARBON INVESTMENT PLAN FOR SA, 2015

The Low Carbon Investment Plan for SA outlines four key strategies to achieve $10 billion in low carbon investment and 50% of electricity production by renewable energy by 2025.

2.2.2.7 OUR ENERGY PLAN, 2017

Our Energy Plan contains strategies to provide the State Government with greater local control of energy security. Of relevance to the project is the Plan's new energy security target to increase South Australia's energy self-reliance by requiring more locally generated, cleaner, secure energy to be used in South Australia.

2.2.2.8 LIBERAL ENERGY SOLUTION

The Liberal Energy Solution outlines six key reforms to be delivered through strategies under the policy:

- A single comprehensive national energy strategy
- Strengthening the network
- Making storage work
- Modernising the National Electricity Market (NEM)
- Improving retail competition and protecting vulnerable consumers; and
- Rewarding consumers for managing their own electricity demand (Marshall Liberal Team 2017).

The Chaff Mill Solar Farm aligns with relevant reforms and strategies under the Liberal Energy Solution, as outlined in Table 2.3.

Table 2.3 Reforms and Strategies within the Liberal Energy Solution relevant to the Chaff Mill Solar Farm

REFORM	RELEVANT STRATEGIES	RELEVANCE TO CHAFF MILL SOLAR FARM
Strengthening the network	Establish a $200 million Interconnection Fund, with the delivery of an interconnector between South Australia and New South Wales.	The Chaff Mill Solar Farm would generate 250,000 MWh of clean energy each year for use in South Australia, or contributed to the NEM.
Making storage work	Establish a $50 million Grid Scale Storage Fund. New Variable Renewable Energy (VRE) generation will be required to bring forward dispatchable capacity.	The Chaff Mill Solar Farm incorporates a Battery Energy Storage System (BESS), to be installed on site. The 50 MW/100 MW BESS is designed to provide further stability to this part of the electricity grid and may be eligible for the Grid Scale Storage Fund. Through the BESS, the Chaff Mill Solar Farm will have significant dispatchable capacity.
Modernising the NEM	Contribute $10 million towards integrating distributed generation assets into the network.	The Chaff Mill Solar Farm will contribute to broadening the range of generation which can be called upon during times of peak demand.

2.2.3 LOCAL COUNCIL

The Clare and Gilbert Valleys Council Strategic Plan 2020 identifies various outcomes, strategies, success measures and targets for the region under a range of key priority areas. A strategy within the plan is the *encouragement of alternative renewable energy production whilst protecting important landscapes from inappropriate development.*

2.3 ASSESSMENT GUIDELINES

The following guidelines were consulted in the assessment for the Chaff Mill Solar Farm:

- South Australian Planning Requirements for New Electricity Generation, July 2014
- Guide to Commercial Scale Solar Development in South Australia, September 2014
- NSW Government Draft Large-Scale Solar Energy Guideline, November 2017.

The Chaff Mill Solar Farm would be developed in accordance with the requirements of these guidelines (as relevant to South Australia). Previous solar farm studies were also reviewed to ensure potential assessment requirements were addressed.

3 ALTERNATIVES CONSIDERED

3.1 TRADITIONAL ENERGY SOURCES

In South Australia, both renewable and non-renewable sources are used to generate electricity. Natural gas-fired generation is the main non-renewable source of energy generated in South Australia. A small amount of the State's electricity supply also comes from diesel-fired power stations (Government of South Australia 2018).

South Australia's gas supply is sourced from Victoria, Queensland and the Cooper Basin (Government of South Australia 2018). The eastern Australia gas market is increasingly reliant on coal seam gas and shale gas and over the past 10 years, the retail price of gas for households has increased by 8% a year (Engineers Australia 2017). While gas-fired generation has lower emissions than coal, sourcing significant quantities of energy from gas is unlikely to achieve the greenhouse gas emission reduction levels required (Engineers Australia 2017). The lowest cost, low emission generation scenarios in 2050 source less than 20% of energy from gas with the remaining energy sourced from renewables (Engineers Australia 2017).

3.2 ALTERNATIVE SITE LOCATIONS

FRV began assessing properties near the Mintaro substation in 2016, as an investigation into the area indicated that there was sufficient capacity to connect a 100MW generator into that part of the grid. FRV then contacted landowners in relation to properties in the area that fulfilled various initial conditions, including:

- Sufficient area to accommodate a large-scale project
- Proximity to existing electrical grid infrastructure
- Sufficient levels of average irradiation
- Land relatively clear of native vegetation.

Site selection considerations identified in the assessment guidelines outlined in section 2.3 were consulted in the final selection of the site for the proposed Chaff Mill Solar Farm. Previous solar farm studies were also reviewed to identify any additional issues that require consideration. A brief review of the proposed site against key selection considerations is presented in Table 3.1. Further information on the environmental considerations is provided in section 7.

Table 3.1 Review of the proposed Chaff Mill Solar Farm site against key selection considerations

KEY SITE SELECTION CONSIDERATIONS	SITE DESCRIPTION
Solar resources	Solar irradationis sufficient for a solar farm, based on insulation levels and site solar access (orientation, configuration and topography).
Proximity to grid infrastructure	The selected site is well-placed to capture and export solar energy into the national electricity grid from the nearby Mintaro substation and its existing 132 kV transmission line to Waterloo.
Native vegetation	The site is largely cleared of native vegetation. There is a large patch or remnant Eucalypts in the western parcel however impacts to remnant vegetation will be minimised through appropriate infrastructure placement.
Access and road connections	The site is located between two major arterial roads; 13 km west of the Barrier Highway (A32) and 8 km east of the Horrocks Highway (the B82 -Main North Road). These roads are sealed two-lane undivided roads. There are six heavy vehicle route options to the site.

KEY SITE SELECTION CONSIDERATIONS	SITE DESCRIPTION
Community	The Chaff Mill Solar Farm would create up to 200 job opportunities during construction and approximately five full-time equivalent roles during operation. These positions will be filled locally where possible. The Chaff Mill Solar Farm would deliver additional indirect economic opportunities to local businesses.
Local and State government support	The Chaff Mill Solar Farm received sponsorship from the Department of the Premier and Cabinet. The development of a solar farm within the area is supported by the strategic plan of the Clare and Gilberts Valleys Council.
Geology and hydrology	The site is moderately well-drained and is unlikely to remain wet for more than a week at a time. Studies have confirmed that surface water flows associated with the Wakefield River and Broughton River catchments and Wookie Creek do not present an unacceptable flood risk. Preliminary geotechnical studies have identified that the site is geotechnically stable, subject to intrusive investigations.
Site contamination	The historical land use is agricultural. Preliminary site investigations have not identified significant contamination issues for the proposed use of the site.
Visual impact	The visual impact assessment undertaken for this project has demonstrated that the likely visual impact on nearby sensitive receptors can be mostly managed though vegetative screening.
Cultural heritage	Initial surveys have not identified Aboriginal cultural heritage sites within or immediately adjacent the project site.
Land availability	The current land owner is supportive of the project and willing to sell the land to FRV.
Decommissioning and rehabilitation	The solar farm will have an operating life of approximately 30 years. On decommissioning, the site will be rehabilitated with a suitable grass cover. The minimal native vegetation clearance required for the project will be offset separately.

4 PROJECT SITE

4.1 SITE LOCATION

The proposed Chaff Mill Solar Farm is approximately 130 km north of Adelaide, located west of the Barrier Highway and east of Main North Road. The site is located approximately 3.5 km north-east of the Mintaro township in the Mid North Region of South Australia (Figure 1.1).

The site consists of two land parcels located to the east and west of Chaff Mill Road on approximately 380 HA of privately owned land. FRV has negotiated the purchase of this land with the existing landowner, subject to Development Approval. The western parcel is bounded by Merildin Road to the south, Wookie Creek Road to the west, Chaff Mill Road to the east and agricultural land to the north. The eastern parcel is bounded by Faulkner Road to the north, Chaff Mill Road to the west, agricultural land to the south and a rail line to the east. Further site information, including Certificate of Title information, is provided in Table 4.1 below.

Table 4.1 Site information for the proposed Chaff Mill Solar Farm

SITE ADDRESS	**159 HARE ROAD, MINTARO, SA, 5415**
TITLE REFERENCE	CT Volume 6081 Folio 22 CT Volume 6128 Folio 159 CT Volume 6128 Folio 160
PROPERTY DESCRIPTION	Allotments 114-117, Filed Plan F170301 Allotments 3 and 4, Deposited Plan D12560 In the Area named Stanley Hundred of Stanley
PROPERTY OWNER	Arapunya Investments Pty Ltd (6081/22) Martindale Farm Pty Ltd (6128/159 and 6128/160)
COUNCIL ZONING	Primary Production (PrPro)
CURRENT SITE USE	Agricultural
PROPOSED SITE USE	Commercial/Industrial
LAND AREA	Approximately 380HA

4.2 LAND MANAGEMENT/TENURE

The allotments outlined in Table 4.1 have been secured by an option agreement with the landowner that allows for the sale of the land once the project has obtained Development Approval and reached financial close.

4.3 SITE DESCRIPTION

The site is in an agricultural area and is largely cleared of native vegetation, containing grazing and cropping land. There is a large patch of remnant Eucalypts in the south-western corner of the western parcel where the land is too steep to cultivate. The roadside vegetation surrounding the site contains amenity plantings with some remnant native woodland and shrubland.

The western parcel includes low hills, with the highest and steepest area on the western side and the lowest area at Wookie Creek. The eastern parcel is of gentle undulation. The topography of the site ranges from 400-430 m above sea level. Wookie Creek, running north to south through the western parcel, is degraded with limited native flora species present.

Soil mapping for the site indicates sandy and clayey red-brown earths to be present, with dark brown cracking clay and terra rossa soils. The site is moderately well-drained.

Both rainfall and temperature follow a typical Mediterranean seasonal climate, with cool wet winter months and warm dry summer months. The long-term mean annual rainfall for the area is 633.7 mm, with June through to August typically the wettest months.

4.4 ZONING

The proposed site is located within the Primary Production Zone of the Clare and Gilbert Valleys Council.

4.4.1 PRIMARY PRODUCTION ZONE OF THE CLARE AND GILBERT VALLEYS COUNCIL

The desired character of the Primary Production Zone of the Clare and Gilbert Valleys Council promotes cropping and grazing activities on large rural land holdings and viticulture on small to medium sized allotments. The rural area is predominantly characterized by rolling pastures with stands of remnant vegetation with a variety of agricultural activities.

Solar farms are not mentioned in the Clare and Gilbert Valleys Council Development Plan however the development of wind farms and ancillary development are envisaged within the Primary Production Zone. The Development Plan recognises that wind farms may need to be built in visually prominent locations to maximise effectiveness and states that visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy. Solar farms provide comparable benefits and may also be accepted within this zone.

4.5 EXISTING INFRASTRUCTURE

Existing infrastructure and services at the site includes:

- The Mintaro Substation
- Unsealed roads bordering the project area.

4.6 ADJACENT AND SURROUNDING LAND USE

The adjacent and surrounding land use is largely agricultural, with some livestock and horticulture land use. The Mid North region contains some of the best agricultural and pastoral land in South Australia, with 78% of land used for either cropping or grazing (Figure 4.1).

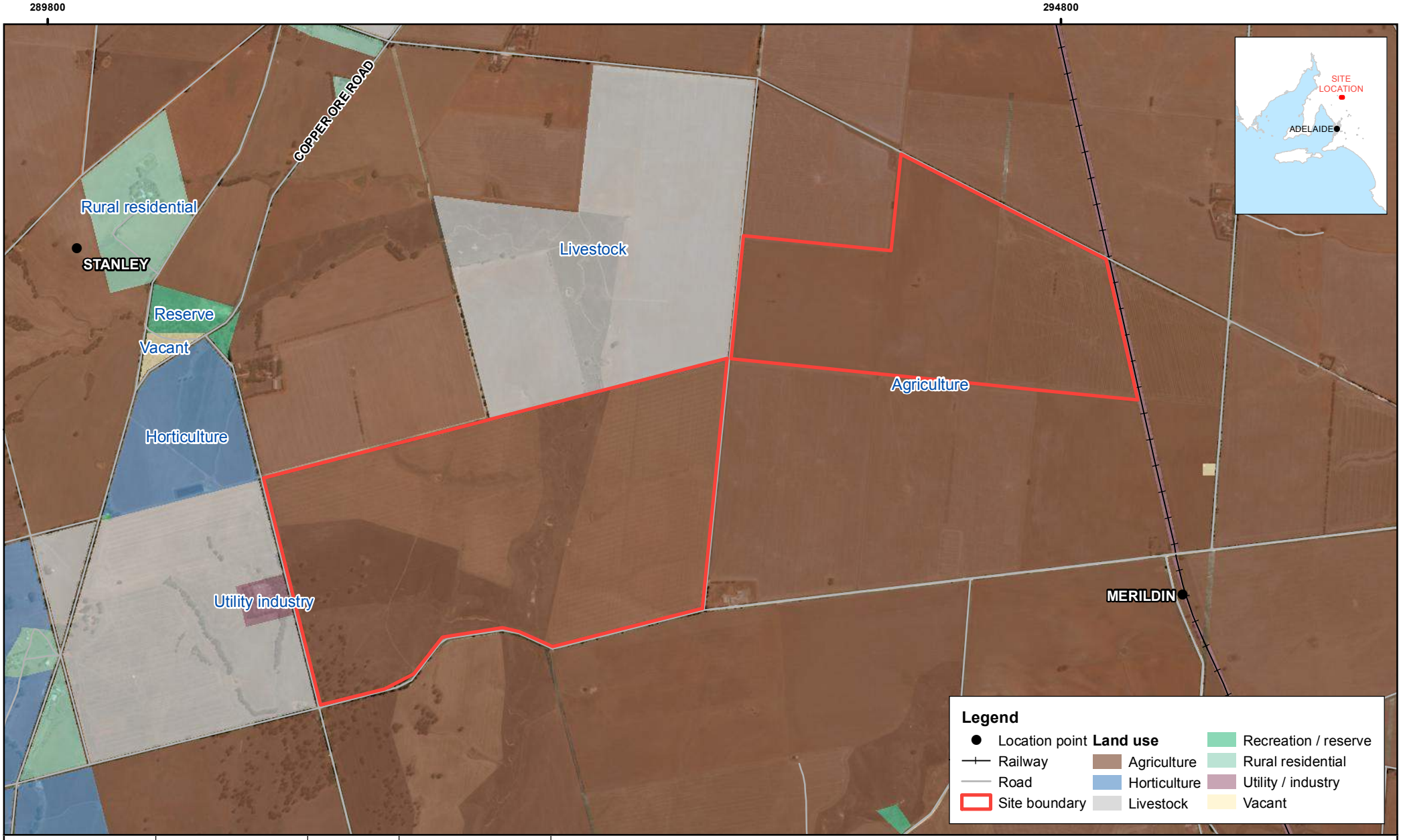
The site is adjacent the Mintaro substation (to the west) and the northern railway line (to the east).

4.7 BROADER SITE CONTEXT

The Chaff Mill Solar Farm is located within the Clare Valley in the Mid North region of SA. Within the region the land use is predominantly agricultural with some horticultural and livestock land use. The nearby township of Mintaro is a State Heritage Area and contains residential, rural residential, commercial, recreation, public institution and industry land uses. The Mintaro Quarry is located approximately 3 km south-west of the project area. Spring Gully Conservation Park and Martindale Hall Conservation Park are also located in the broader region.

The Mid North Region has a regional economy underpinned by primary production and processing, light industry and tourism activities, which reflect the region's variations in climate and landscapes (Department of Planning and Local Government 2011).

The region has significant geothermal, wind and wave energy potential and is well-placed in relation to power infrastructure and links to the eastern states (Department of Planning and Local Government 2011).



Map: PS103225_GIS_004_C	Author: pottsr
Date: 27/02/2018	Approved by: EFitzner

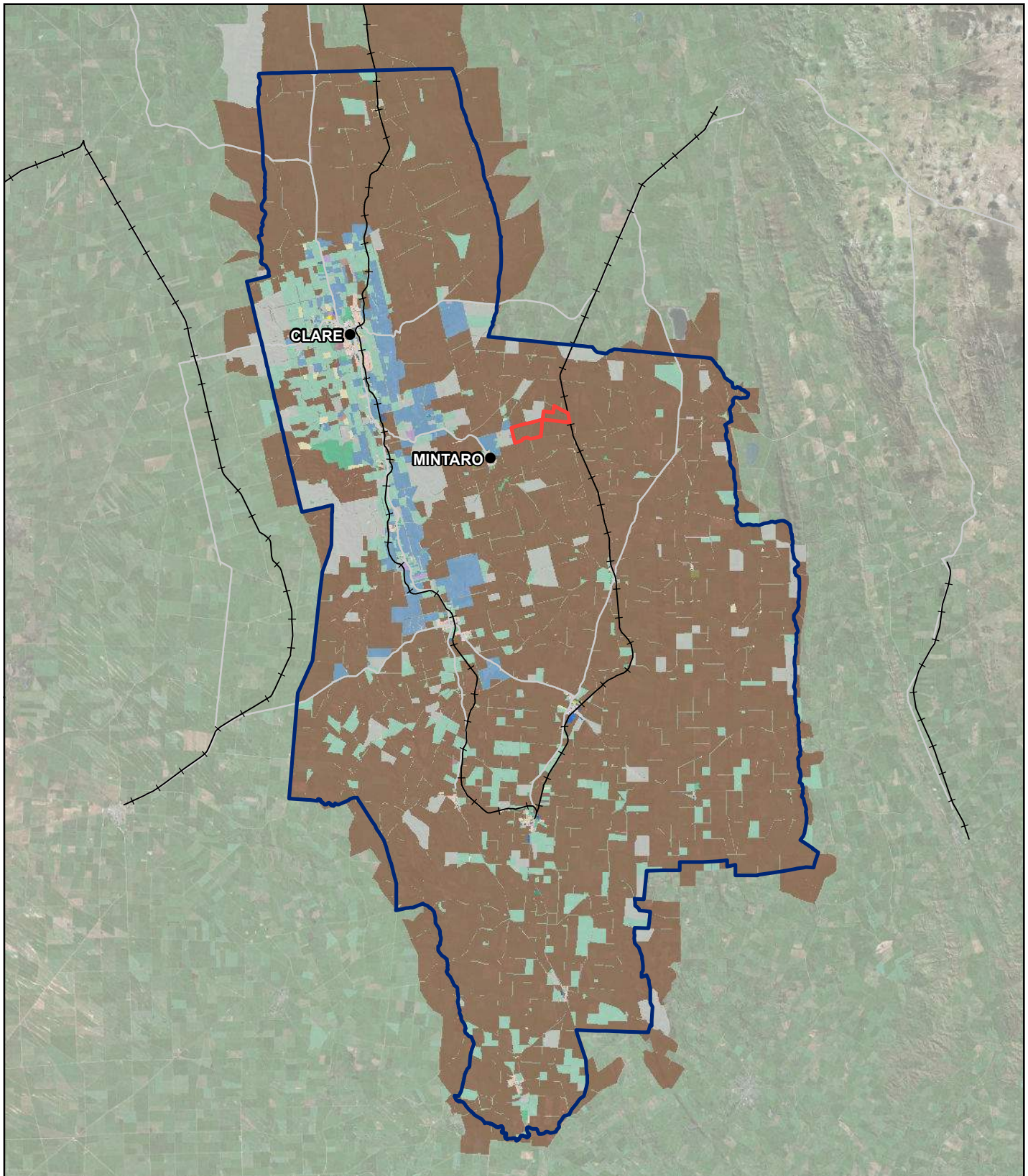
Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 250 500 m

1:25,000

Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 4.1
Land use within the project area



Legend

- Location point
- Clare and Gilbert Valleys Council
- Site boundary
- Road
- Railway

Land use

- Agriculture
- Commercial
- Education
- Food industry
- Forestry
- Horticulture
- Livestock
- Mining / quarrying
- Non private residential
- Public institution
- Recreation / reserve
- Residential
- Retail commercial
- Rural residential
- Utility / industry
- Vacant
- Vacant residential

Map: PS103225_GIS_005_D	Author: pottsr
Date: 16/03/2018	Approved by: EF

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 4,000 8,000 m

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Coordinate system: GDA 1994 MGA Zone 54

Scale ratio correct when printed at A4

Figure 4.2
Land use within the Clare and Gilbert Valleys Council

5 PROJECT DESCRIPTION

5.1 PROPOSED DEVELOPMENT

The proposed development is for the construction and operation of a 100 MW solar farm, on a 380-hectare site approximately 3.5 km north-east of Mintaro, South Australia. The solar farm could generate enough clean energy to power up to 60,000 South Australian homes.

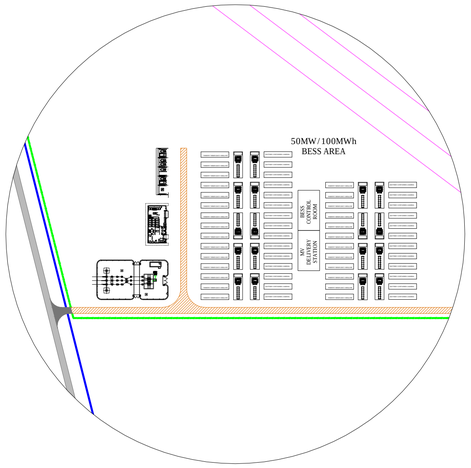
5.1.1 KEY COMPONENTS OF THE PROPOSAL

A general layout of the site is provided in Figure 5.1. Please note that this plan is indicative only and will be finalised following further detailed technical assessments and design; in line with the conditions of Development Approval (if granted). Key components of the proposal include:

- Approximately 360,000 solar panels (maximum height of 3 metres) mounted on single-axis tracker framing
- Inverter stations (MV) comprising 4 MW and 2.66 MW combined inverters
- 50 MW Battery Energy Storage Systems (BESS), comprising medium voltage delivery station and battery containers
- Substation (HV), containing a minimum 100 MVA transformer
- Overhead line (within site boundaries) from substation to existing 132 kV transmission line
- Modular site office/control building
- Structural foundations for on-site buildings (inverter stations, BESS, substation, control building)
- On-site parking
- Refuse storage area
- Internal access roads
- Perimeter security fencing
- Site access.

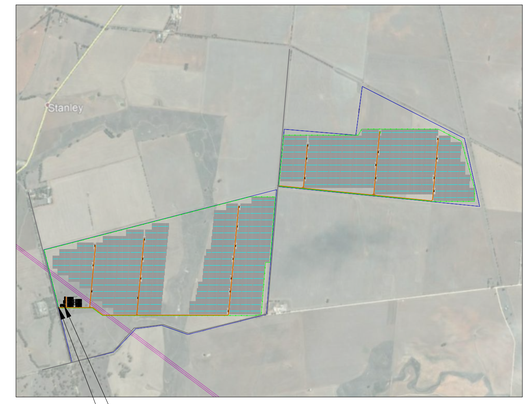
All components can withstand all climatic, aerodynamic and electrical induced loads during the operational design life, provided they are maintained in accordance with the manufacturers recommendations, as specified in the relevant International Electrotechnical Commission (IEC) standards.

INDICATIVE SITE ACCESS DETAIL & BESS POSITION
Scale 1:2500

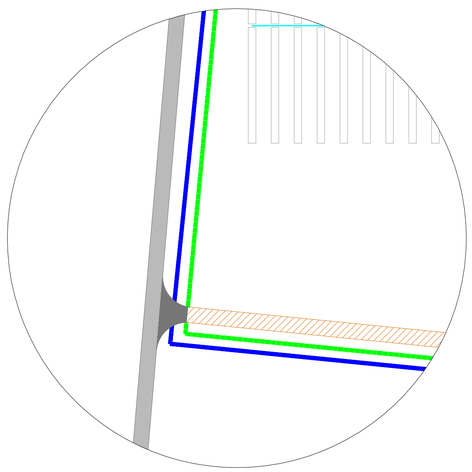


PV PLANT SUMMARY "MINTARO"		
AC Power : 100 MWn		
Peak Power: 125,007 kWp		
25	Power Stations	
24	3 x Ingeteam 1600 TL B615 (50°C) - 3.996 MWac	
1	2 x Ingeteam 1600 TL B615 (50°C) - 2.664 MWac	
BESS Capacity: 50MW/100MWh		
362,340 Modules 345 Wp		
Area:	Fenced area	Fence length
	310.3 Ha	10,995 m

GEOGRAPHICAL COORDINATES	
Country	Australia
Coordinates (UTM 54H)	291839.02 m E, 6246667.96 m S
Altitude	420 m



LEGEND	
	Tracker (1P) x 60M
	4 MWac Inverter/Transformer Station
	2.66 MWac Inverter/Transformer Station
	Fence
	Overhead Line
	Boundary
	4m wide path (internal road)
	Access to the PV Plant



INDICATIVE SITE ACCESS DETAIL
Scale 1:800

COMMENTS / APPROVED

A1

REV.	DATE	DRAWN	DESIGNED	CHECKED	APPROVED	DESCRIPTION	VERIF.
00	180315	A.M.C	A.M.C	A.T.A	I.C		

PROJECT
MINTARO PV PLANT
100 MWac

TITLE
GENERAL LAYOUT

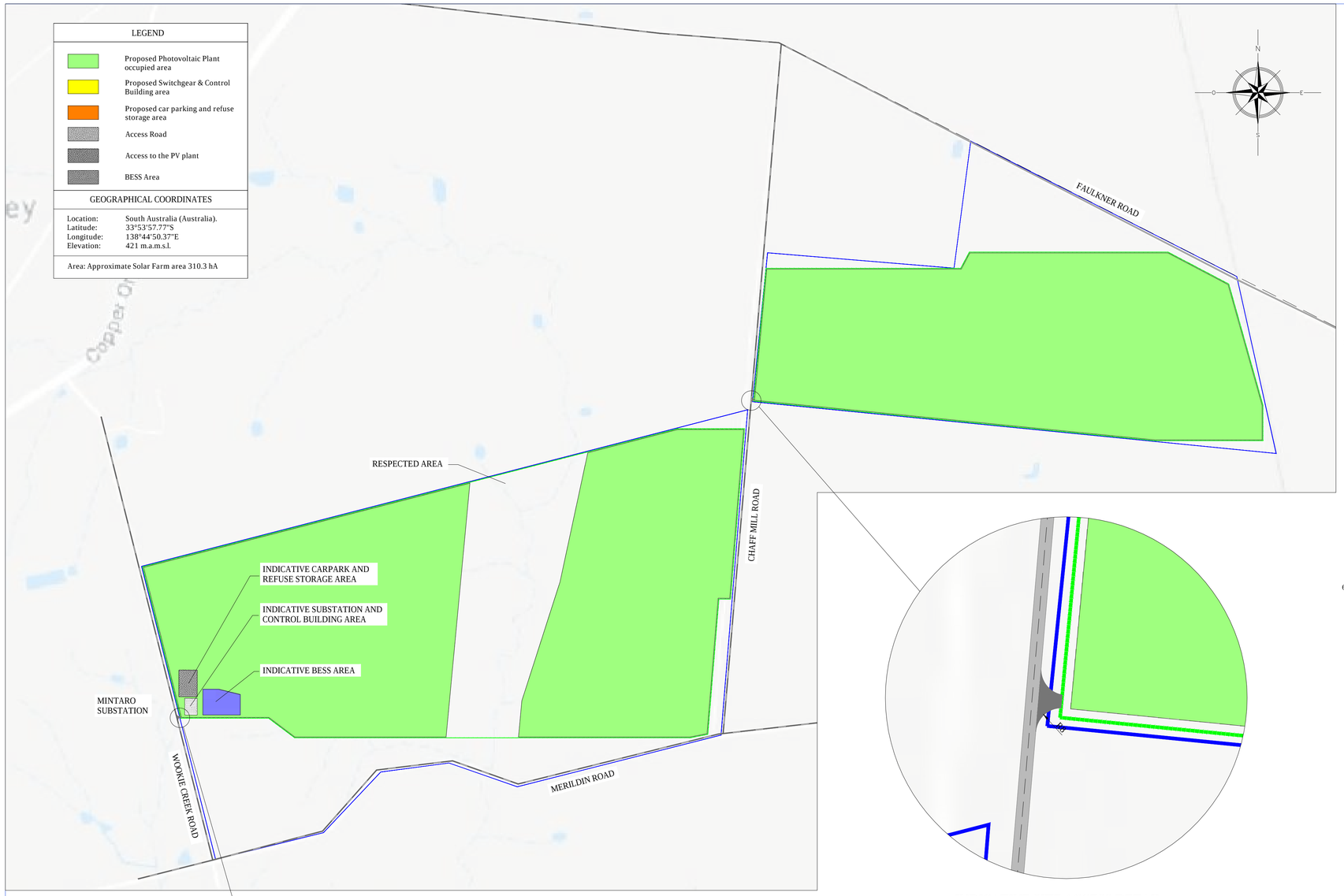
REF. N°:
SCALE 1:7500
N.° 0 Rev.
SHEET 01 FOLLOWS –

180315-EP-MINTARO-PLNS-OP01-REV00.DWG

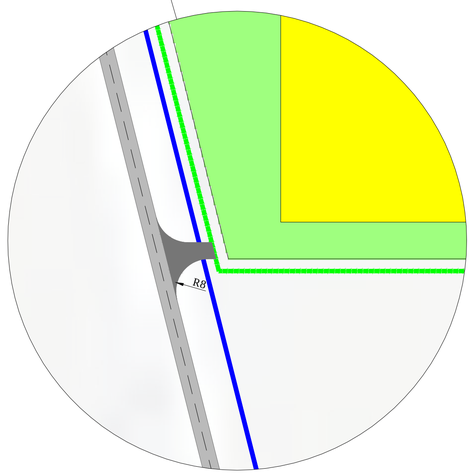
LEGEND	
	Proposed Photovoltaic Plant occupied area
	Proposed Switchgear & Control Building area
	Proposed car parking and refuse storage area
	Access Road
	Access to the PV plant
	BESS Area

GEOGRAPHICAL COORDINATES	
Location:	South Australia (Australia).
Latitude:	33°53'57.77"S
Longitude:	138°44'50.37"E
Elevation:	421 m.a.m.s.l.

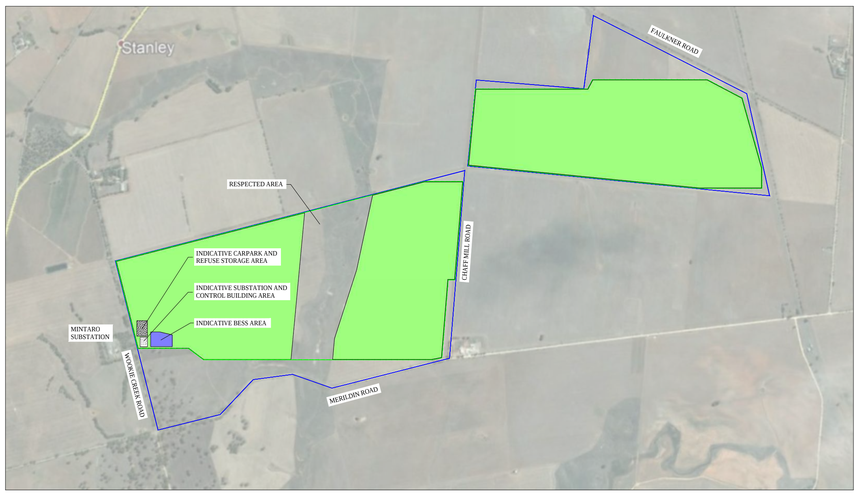
Area: Approximate Solar Farm area 310.3 hA



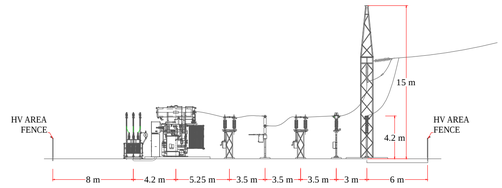
INDICATIVE SITE ACCESS DETAIL
Scale 1:750



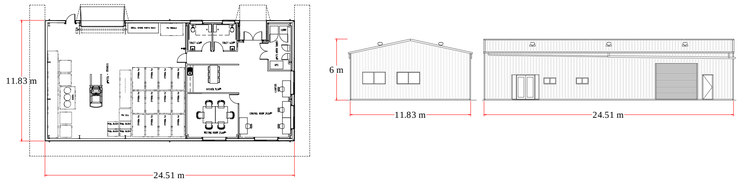
INDICATIVE SITE ACCESS DETAIL
Scale 1:750



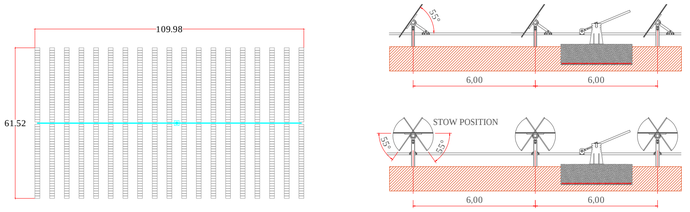
INDICATIVE SUBSTATION DIMENSIONS



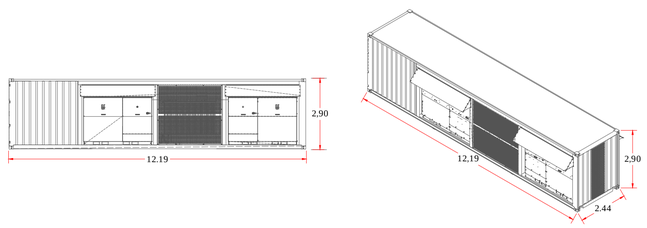
INDICATIVE CONTROL BUILDING DIMENSIONS



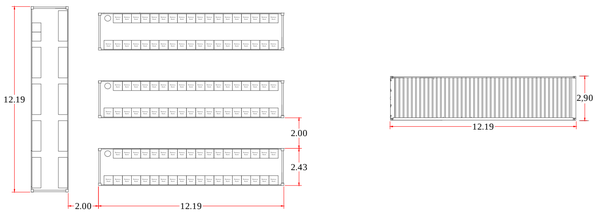
INDICATIVE PV PLANT ARRAY DIMENSIONS



INDICATIVE INVERTER BUILDING DIMENSIONS



INDICATIVE BESS DIMENSIONS



COMMENTS / APPROVED							A1
00	180315	A.M.C	A.M.C	A.T.A	I.C		
REV.	DATE	DRAWN	DESIGNED	CHECKED	APPROVED	DESCRIPTION	VERIF.

PROJECT
MINTARO PV PLANT
100 MWac

TITLE
GENERAL LAYOUT

REF. N°:
SCALE
N°
0 Rev.
SHEET 01 FOLLOWS –

180315-EP-MINTARO-INDICATIVE DIMENSION PLNS -OP01-REV00.DWG

5.1.1.1 CRYSTALLINE SOLAR PANELS AND TRACKING SYSTEM

Around 360,000 panels will be needed for the project. Crystalline solar panels will likely be used, which are comprised of multiple silicon cells. The panels themselves will be mounted on single axis trackers, which are made up of several metal racks arranged in a north-south direction. Single axis tracking is done though astronomical programming, where the embedded controller is responsible for operating the pusher, thus achieving optimum angle to the sun during the whole day. In this way, there is an increase of production between 15-20% compare to a conventional fixed mounting structure.

The panels, including mounting structures, would not exceed three metres in height at maximum tilt. The solar panel chosen for this project will not have metal frames in order to reduce potential glare.

The make and model of solar panel will not be decided until the period leading up to construction as prices can fluctuate significantly across suppliers over time.

Figure 5.3 Example of a typical frameless solar array, similar to that chosen for the Chaff Mill Solar Farm

5.1.1.2 INVERTER/TRANSFORMER STATIONS

The low voltage direct current (DC) output from the panels will be converted to a 3-phase alternating current (AC) using inverters on site. The current design of the solar farm indicates that it will utilise 24 (twenty-four) 4MW and one 2.6 MW inverter/transformer stations. These stations will be distributed at locations throughout the solar panel array.

5.1.1.3 BATTERY ENERGY STORAGE SYSTEM

A Battery Energy Storage System (BESS) will be installed on site to meet the Office of the Technical Regulator's (OTR) requirements and Essential Services Commission of South Australia (ECOSA) Licencing Conditions. The BESS is designed to provide further stability to this part of the electricity grid. The 50 MW/100 MW BESS area would be in the north-west corner of the site, covering an area of approximately 1.5 HA.

5.1.1.4 SUBSTATION

The 33 kV supply is increased to 132 kV via a transformer which is housed in the solar farm substation.

5.1.1.5 OVERHEAD LINE

The project will be connected from the solar farm substation to the overhead 132 kV Mintaro to Waterloo transmission line.

The new line would run adjacent the existing 132 kV transmission line within the site boundary. The network connection has been proposed by ElectraNet and involves establishing a Tee Connection, supported by a fibre optic communications system to provide a secure network connection.

5.1.1.6 MODULAR SITE OFFICE

There will be one office building on site that will be used by on-site staff during the operational period.

5.1.1.7 STRUCTURAL FOUNDATIONS

Galvanised steel beams will be installed to anchor the solar panel foundations to the ground. They would be installed by direct ramming into the ground, pre-drilled or by screw foundations.

5.1.1.8 ON-SITE PARKING

The on-site parking required for construction will be temporary and will accommodate vehicles that transport workers to and from the project site. Permanent on-site parking will be located on the western boundary of the site adjacent the site access point.

5.1.1.9 REFUSE STORAGE AREA

This area will be located on the western boundary of the project area.

5.1.1.10 INTERNAL ACCESS ROADS AND SITE ACCESS

Internal access roads would typically be 4 m wide, comprising layers of granular material, sub-base and base courses. The development of roads inside the plant involves stripping the topsoil to a depth with suitable ground characteristics, levelling and preparing the roadbed foundation. All roads would have adequate drainage and erosion control features and be engineered to withstand rain events.

Roads will be designed with the intention of decreasing site related traffic on external roads.

The most feasible option for site access is located off Wookie Creek Road, adjacent the existing substation.

5.1.1.11 PERIMETER SECURITY FENCING

A continuous fence will be constructed around the perimeter of the site for safety and environmental reasons. The height of the fence will approximately 3 m, as per Australian Standards. The fence will be wire mesh, topped with barbed wire.

5.1.2 CAPITAL INVESTMENT

The project has an estimated capital cost of $240-260 million.

5.1.3 POWER PURCHASING AGREEMENT

Should Development Approval be granted, FRV will seek agreement to supply a suitable off-taker with electricity via a Power Purchase Agreement (PPA). FRV has a successful record of executing PPAs for its previous projects (refer Appendix B).

6 KEY STAKEHOLDER CONSULTATION

FRV has been committed to a thorough engagement process with its neighbours and other key stakeholders. On the Chaff Mill Solar Farm project, FRV has engaged with key stakeholders, neighbouring properties and the wider community to inform the planning process. FRV commissioned RPS to undertake all community and stakeholder engagement for the proposed project (Appendix C).

FRV adopted a three-phased engagement process:

- Stage 1: Meet with stakeholders and the community (including all neighbouring properties) to introduce them to the project, outline its benefits, explain the Development Application process and to seek feedback.
- Stage 2: Continued engagement with stakeholders and the community, in particular with the Council, local MPs and key stakeholder groups providing an update on the Development Application process, initial findings from technical assessments and how community concerns are being addressed.
- Stage 3: Meet with all directly neighbouring properties (and some additional neighbours), the Clare and Gilbert Valleys Council, local MPs and community groups to share the findings from the specialist technical assessments and outline how concerns will be addressed in the Development Application. This phase also included a pop-up community information session at the Sevenhill Markets. A meeting with the new Minister of Trade Tourism and Investment and the advisor for the local MP following the change of South Australian government in March 2018 was also held.

This section of the Development Application summarises the engagement activities undertaken during the three phases, the feedback provided and how the project team has used and responded to this feedback.

6.1.1 COMMUNITY AND STAKEHOLDER CONSULTATION

6.1.1.1 SUMMARY OF CONSULTATION

PHASE ONE ENGAGEMENT

In September 2017, FRV undertook a process of introducing the project to key stakeholders and neighbouring property owners. The objective was to meet with both owners and lease holders of properties that neighbour the two parcels of land identified as the preferred site for the potential solar farm in Mintaro. All known property owners were contacted in the week commencing 18 September, offering them the opportunity to meet with representatives from FRV on Wednesday 27 September or Thursday 28 September. Property owners who were unable to meet on these days were emailed a copy of the FRV Chaff Mill Solar Farm fact sheet (included in Appendix D).

Six properties border the project site. A total of five meetings, and one phone meeting, were held with property owners and lease holders during this period. An additional property owner was identified during this series of meetings and a phone conversation was subsequently organised. Since this visit to Mintaro, a phone discussion has taken place with another property owner, and an offer of a face to face meeting was made as part of phase two consultation. All stakeholders will be kept updated during the specialist investigation process.

FRV also met with the Mintaro Progress Association, which is the peak body representing the Mintaro community. The association works in partnership with the Clare and Gilbert Valleys Council (CGVC) to ensure local concerns and issues are brought before the council. The meeting was held on Wednesday, 27 September and Council were represented at this meeting, with the Manager Governance and Community in attendance.

Local MPs including the Hon. Geoff Brock, Member for Frome and Minister for Regional Development and Minister for Local Government and Member for Stuart, Dan van Holst Pellekaan were also briefed about the project through their staff and/or advisors and a copy of the fact sheet sent to their offices.

The CGVC were engaged during this initial phase through a range of phone conversations and exchange of emails in September and October 2017. A meeting was also held with the Council's Manager – Development and Environment on

28 September 2017, providing an update to the project, engagement with stakeholders and timing of the Development Application.

Further conversations were also had with additional property owners who were interested in the project. Directly affected property owners provided contact details for these land owners, with FRV making contact via phone and email to ensure they were fully briefed about the project. These property owners were also added to a mailing list and provided with regular project updates. The concerns of these property owners have also been reflected in the following section outlining key issues.

PHASE TWO ENGAGEMENT

In late November 2017, FRV undertook an additional round of engagement between 23 and 24 November 2017, with FRV meeting with local MPs or their representatives. Discussions where had with Chris Hanna; the advisor to the Hon. Dan van Holst Pellekaan, Member for Stuart and Shadow Minister for Energy and Mining and Daniel Wilson; the advisor to Steven Marshall, the Leader of the South Australian Liberal Party. FRV also met with Hon. Geoff Brock, Member for Frome, Minister for Regional Development and Minister for Local Government and his ministerial advisors.

FRV has maintained regular contact with the Mintaro Progress Association since visiting in September 2017 and met again with representatives during this visit. Discussions focussed on how FRV can improve on its communication and engagement with the boarder Mintaro community and, more importantly, how FRV can potentially invest in the community in the future.

With a focus on identifying benefits to the boarder community, FRV also met with the Clare Business and Tourism Association. The Association is one for the peak bodies in the region that seeks to encourage and assist in tourism and promotion of the region, in addition to providing a platform for all businesses in the region to voice opinions on business development in the region. A range of local initiatives that FRV could present at (should the Development Application be successful) were discussed.

CGVC were engaged during this phase, through a range of emails and phone conversations in the lead up to the November 2017 visit and a formal presentation with the Mayor, acting CEO, various councillors and Council Managers in Development and Environment and Governance and Community in attendance. Through the presentation and visit to the project site, the Councillors were provided with an update on the project, engagement with stakeholders, timing of the Development Application and how specific landowner concerns were being managed.

All stakeholders were provided with a hard copy of FRV's Chaff Mill Solar Farm project update (included in Appendix D). Neighbouring landowners and interested stakeholders were emailed a copy of this update on 22 November 2017. FRV subsequently developed a contact list for all engagement opportunities prior to the submission of the Development Application.

PHASE THREE ENGAGEMENT

The final phase of community and stakeholder engagement mostly occurred in mid to late February 2018 with an additional meeting held in May 2018. This phase focussed on sharing the findings from the specialist technical assessments that were undertaken between September 2017 and February 2018, building on the earlier engagement process, ensuring that the consultation was meaningful and inclusive of all stakeholders (directly affected landowners, broader community and key stakeholder groups). The intention was to also address any outstanding concerns that community may have and ensure that these concerns are addressed in the final Development Application.

Engagement occurred between 21 and 24 February 2018 (except for an additional meeting in May 2018) and took on three forms:

- One-on-one meetings with directly neighbouring landowners (and their neighbours who had expressed an interest in meeting)
- Meetings with key stakeholder groups and MPs (Clare and Gilbert Valleys Council, Mintaro Progress Association – committee and members and Hon. Geoff Brock MP)
- Pop-up community information session as the Sevenhill's Producers market.

During this time, FRV met with 10 neighbouring landowners to provide them with an update on the Development Application process, the timing and opportunities to provide feedback (either directly as an individual or comments through the Council). FRV also used this opportunity to brief them on the findings from the 11-specialist technical and environmental assessments that have been undertaken to inform the Development Application. This enabled the landowners to have their concerns addressed first-hand by the project team and to ask any additional questions.

The Clare and Gilbert Valleys Council were also engaged again during this phase through a range of emails and phone conversations in the lead up to the February visit and a formal presentation with the Mayor, the new CEO, various councillors and Council Manager's in Development and Environment and Governance and Community in attendance. All in attendance were provided with an update on the project, focussing primarily on the findings from the technical and environmental assessments.

An on-site meeting was held with the Hon. Geoff Brock, Member for Frome, to provide him with a better understanding of the proposed solar farm; following on from the initial meeting in Adelaide in November 2017. FRV provided him an update on the technical and environmental assessments that had been undertaken between September 2017 and February 2018.

Also included in this phase of engagement was a presentation to the Mintaro Progress Association on 23 February, including both the committee and general association members – a total of 15 people were in attendance. A formal presentation was given highlighting the findings from the technical and environmental assessments and how various community concerns have been addressed. An update was also given on the Development Application process, including how the public can access the full studies and the Development Application submission. Fact sheets were also provided to all present.

To date, the engagement for this project has focussed on those directly associated or neighbouring the solar farm. One of the objectives of this phase of engagement was therefore to ensure the broader community about the proposed solar farm. FRV sought advice from both the Mintaro Progress Association and the CGVC on opportunities to attend events that locals usually attend. Following this advice, a decision was made to hold a pop-up community information session as the Sevenhills producers market on Saturday, 24 February between 8.30 am and 12 pm. Advertisements were placed in the Northern Argus and the Plains Producer two weeks prior to the event, inviting people to come and visit the team (copies of these advertisements are included in Appendix D). The CGVC also promoted the event for two weeks in their column in the respective newspapers. Just over 35 people visited the team at the market, with many noting they had seen the advertisements and had specifically come to meet the team. Most people visited to understand where the solar farm would be located and to identify potential business opportunities. FRV took the contact details of numerous B&B providers, a hotel, fencing contractors and individuals with previous construction experience, and will contact them in the future, should the project be approved. Overall comments from those who attended the information session were very supportive of the project.

All stakeholders and community members who spoke with FRV at any of these engagement initiatives were provided with a hard copy of FRV's Chaff Mill Solar Farm project update #2 and a range of fact sheets including frost and microclimate assessments, traffic assessments, overall technical and environmental assessments and an overview of the Chaff Mill Solar farm, including an indicative plan of where items will be located. Copies of these materials are included in Appendix D).

Following the result of the South Australian government elections and the change of government, FRV made a decision to submit the Development Application for the Chaff Mill Solar farm after March 2018 (the originally planned submission period). Emails were issued to all community members and stakeholders that FRV had previously engaged with, informing them that FRV still intended to submit the Development Application and that they would use the following weeks to speak with the new government before making a submission. They were also advised that FRV would contact them again to confirm when the application was submitted and how they could view this submission.

FRV met with the new Minister of Trade Tourism and Investment, Hon. David Ridgeway and Chris Hanna, the advisor to the Hon. Dan van Holst Pellekaan (Member for Stuart and Minister for Energy and Mining) on 23 May, briefing them on the project, the benefits to the State and the consultation to date with stakeholders and the community.

6.1.1.2 KEY MESSAGES

Throughout engagement, it was important that FRV provide key stakeholders and landowners with consistent information about the project. All stakeholders were generally advised of the following:

- Leading Australian solar developer and renewable energy company FRV Services Australia (FRV) is preparing a Development Application for a proposed 100 MW solar farm with battery storage 3.5 km north-east of Mintaro.
- FRV's parent company, Fotowatio Renewable Ventures, has developed and operated solar farms around the world over the past decade, developing 30 projects spanning 24 countries and five continents. This includes two operational solar farms in Australia; the 20 MW Royalla Solar Farm in the ACT and the 56 MW Moree Solar Farm in New South Wales. FRV is currently constructing the 100 MW Clare Solar Farm, near Ayr in QLD and the 100 MW Lilyvale Solar Farm, near Emerald in QLD.
- FRV has commissioned early environmental, traffic, civil and geotechnical studies to inform the design of the proposed Chaff Mill Solar Farm. These studies were performed from September 2017through to February 2018.
- FRV believes the proposed Chaff Mill Solar Farm could generate enough clean energy to power 60,000 homes for South Australian families.
- The proposed site, approximately 130 kilometres north of Adelaide, is well placed to capture and export solar energy into the national electricity grid from the nearby Mintaro substation and its existing 132 kV transmission line to Waterloo.
- The site of the proposed Chaff Mill Solar Farm is bounded by Wookie Creek Road, Merildin Road, Faulkner Road and Chaff Mill Road.
- This site was selected because of its proximity to grid infrastructure, good drainage and largely cleared land. The level of solar irradiation also makes it a suitable site for a solar farm.
- Development of the Chaff Mill Solar Farm is subject to Development Approvals through the South Australian Government's State Commission Assessment Planning (SCAP). FRV will submit its Development Application after March 2018 (the originally planned submission period).
- Discussions with the local council as well as community and stakeholder engagement will inform the proposed project's planning and design. FRV will meet with the community and stakeholders in late 2017 / early 2018 to share with them the proposed design of the solar farm, including layout and plant configuration, following the completion of specialist studies and reports.
- Subject to Development Approval, FRV seeks to commence construction in late 2019 and complete the project by mid-2021 (approximately 18 months)
- A final design for the proposed Chaff Mill Solar Farm will determine plant configuration, layout and specific equipment to be used should the project proceed.
- Should the project proceed, the solar farm would have an operating life of around 30 years. At the end of this period, the solar farm will be decommissioned and the land restored to its original condition. Any extensions of the solar farm would require a new Development Approval.
- Operation of Chaff Mill Solar Farm would deliver clean, zero emission electricity to meet the region's energy needs and would have significantly lower environmental impacts relative to other electricity generation methods.
- There will be little noise associated with the operation of the Chaff Mill Solar Farm. Noise from the cooling fans in the inverter cabins may be heard for short periods of time, in extreme heat conditions; however, you would need to be standing directly next to the unit to hear it.
- FRV will use PV-crystalline modules with a horizontal, single axis tracking system. The panels, including the mounting structure would be no more than three metres from ground level. With this technology, the panels no longer feature metal rims, lessening the risk of glare to neighbouring properties.

- The solar panels will be positioned in a north to south orientation and will track from east to west.
- Should the project proceed, FRV would employ up to 200 workers during construction. During the operational stage, up to five ongoing jobs will be created.
- The proposed Chaff Mill Solar Farm would attract investment to the area and deliver additional indirect economic opportunities to local businesses including local grocery stores, restaurants, cafés, accommodation providers and petrol stations.
- Should the project proceed, there would be some initial traffic impacts, with the delivery of materials of the site. This would usually occur in the first month, so short in duration. FRV will implement a construction management plan to manage traffic and other potential impacts.
- Traffic to and from the Chaff Mill Solar Farm during operation will be minimal. Vehicles will only need to access the site for maintenance purposes, and in the instance of an emergency. A Traffic Impact Statement has been prepared to support the Development Application.
- FRV is committed to minimising impacts on the environment. The trees located in the far corner on one of the identified parcels of land, near the creek, will be retained and preserved.
- FRV will work with properties who are classified sensitive receptors to consider ways to reduce the visual impact through vegetation screening.
- Committed to partnering with the local community, FRV has had discussions with local community groups to determine the best way to contribute to the community through a range of partnership opportunities both with community and sporting groups.

6.1.1.3 FEEDBACK RECEIVED

KEY ISSUES ARISING FROM PHASE THREE ENGAGEMENT

During landholder, Council and stakeholder meetings held in February 2018, key common issues raised included:

- Whether the level of frost will increase in the area
- Whether there was any opportunity for compensation from FRV due to visual changes to the area
- What measures would be undertaken to manage biosecurity
- How impacts on local roads, stormwater run-off and ground conditions would be managed during both construction and operation phases of the project
- What the benefits of the project are to the local community via local employment and use of local businesses
- What the benefits of the project are to local sporting and community groups.

SPECIFIC ISSUES RAISED DURING THE ENGAGEMENT PROCESS

Landholders and stakeholders have raised a number of specific concerns throughout the engagement process. These have been summarised in the table below.

Table 6.1 Summary of stakeholder and community concerns

CATEGORY	SPECIFIC ISSUE
Environmental	Potential for the installation of solar panels to create a barrier, reducing airflow and increasing the level of frost in the region.
	Maintenance of the creek and the associated tributary on the land which the solar farm will be located.
	Increased water run-off from the solar farm property into neighbouring properties.
	Alternations to the land which will further increase the risk flooding to the region.

CATEGORY	SPECIFIC ISSUE
Farming operations	Compromised biosecurity for neighbouring properties, with contaminants being transported on vehicles using private and public roads.
	Continued supply of water from the windmill in the parcel of land proposed for the solar farm.
	Construction activities or operation of the solar farm having impacts that will compromise neighbouring properties from being able to maintain European Union Cattle Accreditation Scheme credentials.
	Impact on neighbouring property values with the development of a solar farm both in terms of inflated value due to the price paid for the solar farm land and the impact on remaining farms on having a solar farm as a neighbour.
	Aerial restrictions over the solar farm and neighbouring properties due to the existence of the solar farm.
	Could the installation of a 3-metre chain wire fence around the solar farm potentially trap frost which will affect neighbouring properties.
	Additional restrictions that may be placed on farmers when undertaking spraying operations.
Traffic	High volume of vehicles travelling on and damaging unsealed roads.
	Heavy vehicles using Chaff Mill Road in winter, potentially damaging the road and causing vehicles to get stuck.
	Entrance to the solar farm, whether it will be off Merildin or Chaff Mill Roads and what impact it will have on neighbouring properties.
	Traffic route during construction and ensuring that the optimal route is chosen, to ensure farming operations, such as harvesting which requires a high volume of vehicles, can occur concurrently.
Noise	Increase in noise in the area due to the operation of the solar farm battery and the existing substation needing to operate longer at night.
Community	Whether FRV will directly invest in the Mintaro / Clare community through a community grants program.
	Overall benefits to the community both during construction and operations.
	Visual impacts to properties that have been, or about to be constructed to maximise local views.
	Opportunities for local businesses and trades to be involved in both the construction and operation the solar farm.
	Potential health risks to people and animals from the operation of a solar farm.
Solar farm operations	Hours of operation and potential increase in night time noise.
	Installation of overhead powerlines rather underground lines.
	Measures taken to reduce and manage fire risks.
	Number of vehicles that will access the operational solar farm.
	Ground conditions not being suitable for the operation of a solar farm. Soil can change considerably – it can expand and contract over time, as well as pooling with water.

CATEGORY	SPECIFIC ISSUE
	Visual impact from the moving panels to the neighbouring properties, and the potential risk of solar glare.
	Can the solar farm land be used for grazing during the operational phase and what happens to the land after the 30-year operational period?
	What happens if FRV sells the solar farm? What assurances will be given that the solar farm will be operated in accordance to the commitments made by FRV?
Fire risks	What measures will be taken to manage fire, both on the solar farm and from neighbouring properties?
Financial impacts	Whether financial compensation will be provided to all properties neighbouring the solar farm.
	What additional insurance will adjacent properties need to take to cover any damage they may accidentally cause to the solar farm?

Comprehensive records were made for all individual landholder and stakeholder meeting but have not been provided here for privacy reasons.

6.1.1.4 MEDIA ENGAGEMENT

FRV received four media enquiries from the ABC and the Northern Argus during the engagement process. These enquiries have focused on the economic benefits of the solar farm to the region, the Development Application process and the overall timing of the project. The articles where FRV has been contracted for comment have been primarily positive. Copies of these news stories are included in Appendix D.

There have been two negative media stories relating to the proposed solar farm. Both articles appeared in the Plains Producer and highlight concerns from landowners who are not directly affected by the solar farm, nor been involved in discussions about the project; hence raised several misconceptions about the project - including the proposed location of the solar farm. It was interesting to note that locals who were approached to make comment supported the project. FRV was not approached to provide comment in either of these articles. Copies of these articles can also be found in Appendix D.

6.1.1.5 COMMUNITY AND STAKEHOLDER SUPPORT

FRV has received letters of in principle support for the Chaff Mill Solar Farm, acknowledging the benefit to the Mintaro community and South Australia (refer Appendix E).

6.1.1.6 MOVING FORWARD

FRV has pledged to continue with the community and stakeholder engagement process for the project and will return to the region at some stage after the Development Application has been submitted. An information line remains open for the project and FRV responds to all queries lodged on this line. FRV is continuing to consider ways that they can work with the Mintaro Progress Association and local community if the project is approved. Currently, discussions are taking place regarding gold sponsorship of the MinMan Eagles (the local football and netball association) and a potential community grants program, which would be administered through the Mintaro Progress Association; if the project is approved.

7 ENVIRONMENTAL ASSESSMENT

The following chapter discusses the outcomes of all the specialist technical studies that were commissioned for the project, including:

- Planning
- Flora and fauna
- Aboriginal cultural heritage
- Non-Indigenous heritage
- Visual amenity
- Glare
- Geotechnical
- Traffic and access
- Stormwater and flooding
- Socio-economic
- Site contamination
- Micro-climate
- Electromagnetic Field Limits
- Aviation safety.

For each study, the following information is discussed:

- Legislative and policy requirements
- Assessment methodology
- Existing conditions
- Potential impacts
- Management and mitigation measures
- Key recommendations.

7.1 PLANNING AND LAND USE

7.1.1 LEGISLATIVE AND POLICY REQUIREMENTS

The following legislation and policy will be relevant to the planning assessment of the proposed solar farm:

- *Development Act 1993* – the functions of which are currently being transitioned to the *Planning, Development and Infrastructure Act 2016.* The *Planning, Development and Infrastructure Act 2016* (the PDI Act) is the State's new legislation governing development. The PDI Act is being introduced through a staged process. At the time of writing this report, the Crown development assessment pathways section of the PDI Act, being Part 9, had not come into operation. Therefore, the proposed development will be assessed under Section 49 of the *Development Act 1993*, as a State sponsored development.
- *Development Regulations 2008.*
- Clare and Gilbert Valleys Council Development Plan.

7.1.2 ASSESSMENT METHODOLOGY

A planning and land use assessment for the proposed Chaff Mill Solar Farm was undertaken to assess the proposed development against the relevant provisions of the Clare and Gilbert Valleys Council Development Plan (consolidated 10 November 2016) (Appendix F).

The planning and land use assessment was informed by a site visit, consultation with the proponent and a review of community and stakeholder engagement as well as the strategic context of the project. The specialist technical assessments undertaken for the project were also reviewed, including:

- Flora and fauna
- Aboriginal cultural heritage
- Non-Indigenous heritage
- Visual amenity
- Glare
- Geotechnical
- Traffic and access
- Stormwater and flooding
- Socio-economic
- Site contamination
- Micro-climate.

7.1.3 EXISTING CONDITIONS

The project area is within the Primary Production Zone under the Clare and Gilbert Valleys Council Development Plan and is not covered by a Policy Area or Precinct. The land is currently used for agricultural purposes which is an envisaged land use under the zone.

7.1.3.1 BROAD LANDSCAPE DESCRIPTION

The site consists of two distinct allotments; the western parcel, bound by Merildin Road to the south, Wookie Creek Road to the west and Faulkner Road to the east and the eastern parcel, bound by Faulkner Road to the north, Chaff Mill Road to the west, agricultural land to the south and a rail line to the east. The Wakefield River is approximately 2.3 km south of the site.

Several renewable energy developments have been completed in the region over recent years, including the Waterloo Wind Farm and the world's largest lithium battery recently built in Jamestown.

7.1.3.2 ISSUE-SPECIFIC SITE DESCRIPTION/BASELINE

The application is seeking approval for the construction and operation of a 100 MW solar farm. Approval will be sought from SCAP. As the proposed development is located within the CGVC area, the application will be assessed against the relevant provisions of the Clare and Gilbert Valleys Council Development Plan.

7.1.4 POTENTIAL IMPACTS

The *Development Act 1993* requires that the project be assessed against the relevant provisions of the Development Plan.

7.1.4.1 CONSISTENCY WITH THE PLANNING PROVISIONS

The Primary Production Zone envisages a range of primary production land uses, including cropping and grazing activities on large rural land holdings and viticulture operations on small to medium sized allotments. The zone recognises the significance of the area within the district in providing some of the region's most productive rural land.

The zone's desired character allows for the development of wind farms where they can take advantage of natural resources, recognising that they may need to be in visually prominent locations, visible in valuable scenic or environmental areas and may need to be closer to roads than what is outlined in the Council-wide setback policies. Based on this, whilst solar farms are not specifically identified under the zone, potential visual impacts of the project are considered acceptable in pursuit of the benefits derived from increased generation of renewable energy.

Under the Procedural Matters of the zone, solar farms and ancillary development are neither listed as complying or non-complying, therefore the project must be assessed on its merits against the relevant objectives and principles of development control. Assessment of the proposed solar farm against the relevant provisions of the Primary Production Zone is outlined in Table 7.1.

Under the Council-wide provisions of the Development Plan, the planning and land use assessment found that the proposed development generally complies with the relevant provisions under Hazards, Infrastructure, Interface Between Land Uses, Natural Resources, Renewable Energy Facilities, and Siting and Visibility. The proposed site layout and design will ensure that the facility takes advantage of the required solar resources for electricity generation. Specialist technical assessments have been undertaken and support the notion that the project will not unduly impact the environment, heritage, or people in the area, with appropriate mitigation measures having been proposed where required. Assessment of the proposed solar farm against the relevant Council-wide provisions is outlined in Table 7.2.

Table 7.1 Relevant Primary Production Zone policy provisions

PRIMARY PRODUCTION ZONE	COMMENT
Land Use Objectives 1, 2 & 3 PDCs 1 & 3	Renewable energy facilities are envisaged within and form part of the desired character of the zone. Specifically, the policy provisions recognise that such forms of development (particularly wind farms) require siting of infrastructure in visually prominent locations to effectively harness renewable energy sources. The zone envisages sustainable primary production with the solar farm not affecting agricultural efficiency within the surrounding area or not significantly impacting upon other development activities anticipated within the zone. The siting and configuration of the proposed solar panels will also not alter the size and configuration of the existing allotments. A number of specialist technical assessments have been undertaken which demonstrate that the project infrastructure can be designed and sited to minimise potential environmental impacts with specific mitigation measure proposed to address visual amenity and glare to the nearest sensitive receptor to the east through vegetative planting and screening. By virtue of established native vegetation, topography and distance the solar farm will not adversely impact the general public, surrounding landholders or the Mintaro State Heritage Area. The project is considered a compatible land use and is appropriate within the zone. A Construction Environmental Management Plan (CEMP) will be prepared for the project following the granting of development consent to outline the environmental management systems and procedures to be implemented during construction to ensure activities comply with relevant statutory requirements and provide adequate protection for the environment. The purpose of the CEMP is to provide guidance to the contractor(s) and will outline the need for a number of management plans to be developed for specific areas of potential impacts during construction, such as dust and air quality, water quality, traffic management, erosion control and stormwater management and weed and pest management.
Form and character Objectives 5, 6 & 7 PDCs 9 & 11	The desired character of the Primary Production Zone recognises renewable energy facilities as forming an integral component of the area within which the project site is located. The zone comprises agricultural areas that underpin the region's economy, primarily consisting of general farming, grazing and viticulture with associated rural based industry, services and facilities. It is intended that the dominant rural character of the zone won't be adversely affected, while as stated by Hemisphere Design "*the solar farm will introduce a new infrastructure element of an acceptable design standard that will evoke curiosity, become an 'incidental' infrastructure feature of merit and a best practice example of progressive renewable energy delivery*".

PRIMARY PRODUCTION ZONE	COMMENT
Heritage PDC 12	The proposed siting and layout of the project will not impact the Mintaro State Heritage Area or heritage significance of the settlement. Hemisphere Design concluded that the visual amenity impacts of the development would be negligible given: — the sense of place and place attachment values of Mintaro township will not be detrimentally affected — the nature and visual qualities of the Expansive Eastern Plains Character Unit will not be significantly altered — the introduction of the project does not change the mainly pastoral nature of the locality and wider contextual landscape — the project does not impact on any significant viewpoints within the contextual landscape — the project is proposed to be sited and designed to blend with the natural features of the landscape and to cause minimal damage to the natural landform; and — the likely visual impact on the identified sensitive receptor can be managed through visual mitigation introduced through vegetative screening. The project will therefore not detract from the form and character of the locality.

Table 7.2 Relevant Council Wide policy provisions

COUNCIL WIDE	COMMENT
Hazard Objectives 1, 3 & 4 PDCs 2, 3, 4, 6, 7, 8	The project is situated within a 'general bushfire risk area' with all infrastructure siting and access to be designed in accordance with the provisions of the '*Minister's Code: Undertaking development in Bushfire Protection Area*'. With the exception of bushfire risk, the project site is not located within an area identified as being susceptible to other natural hazards, such as flooding, contamination, acid sulphate soils or landslips. Construction and operation of the solar farm shall be designed to ensure appropriate environmental management controls are implemented, such as a soil and erosion management, to ensure earthworks cut and fill minimise potential impacts to Wookie Creek and do not impede the ephemeral flows and water quality of this watercourse. All cut and fill associated with site earthworks will also ensure a geotechnically stable development site is established.
Infrastructure Objectives 1, 2 & 3 PDCs 1, 10, 11 & 13	As previously stated, the outcome of specialist studies – and the MCA process – supports the proposed siting and location of all project infrastructure to ensure that it is able to minimise potential visual and environmental impacts. The project is located some 3.5 km from Mintaro township (being a State Heritage Area) with the majority of the infrastructure components obscured from view by virtue of existing and proposed vegetation, topography and distance which effectively screen the solar farm from the view of the general public and adjacent landholders, except of the immediately adjacent property to the south-east. In addition, all access roads servicing the project site are existing with only minor upgrades (eg temporary earthworks and fill material to accommodate heavy vehicle turning paths) to accommodate project design traffic with all road works to minimise disturbance to existing native vegetation and biodiversity as far as practicable.

COUNCIL WIDE	COMMENT
Interface Between Land Uses Objectives 1, 2 & 3 PDCs 1, 2, 7, 8 & 14	Renewable energy facilities are envisaged and encouraged within the Clare region, subject to compliance with prescribed siting, design and construction management requirements that can all be complied with. The project is sited more than 3.5 km away from Mintaro township and will not impact on the heritage significance of the township, while existing native vegetation, topography, distance will effectively screen the solar farm from the view of the general public and adjacent landholders. The project will not detract from primary production in the area and forms a compatible land use given: — the project site's location is confined to a low density farming community — the installation of solar panels will not impact climatic conditions in the region — the surrounding area hosts existing renewable energy facilities to the south-east (Waterloo Wind Farm); and — impacts to sensitive receptors is able to be mitigated. It is considered that the project has been adequately informed by the completion of specialist technical assessments, comprising visual amenity, glare, ecology (flora and fauna), Aboriginal cultural heritage, traffic and surface water to assess potential impacts and propose suitable mitigation measures (where required). It is considered that the project will not detrimentally affect the amenity of the locality, whilst impacts on other land uses is minimal given the location of the project infrastructure away from sensitive receptors and the Mintaro State Heritage Area.
Natural Resources Objectives 1, 4, 6, 8, 10, 11 & 13 PDCs 1, 2, 3, 7, 8, 9, 10, 12, 13, 17, 26, 27, 31, 32, 36, 37, 38 & 39	The project is located in an area where natural solar energy will be able to be effectively and efficiently harnessed, while its location within a low density rural area ensures the development is able to be appropriately separated from residences and the Mintaro State Heritage Area. The project has been purposely sited and designed to afford as much protection as possible to the region's natural resources. There will be some disturbance to the natural landform across the project site through construction of the solar farm and ancillary infrastructure, however these will be purposefully designed and sited to avoid areas of native vegetation (as far as practicable), whilst balancing the volume of earthworks (ie cut and fill) on-site. The site will be returned to its original form following decommissioning of the project. EBS Ecology assessed the potential ecological impacts the project may have on terrestrial flora and fauna. This assessment involved both desktop and field surveys with the level of significance of the vegetation communities determined to be low. Notwithstanding this, the opportunity to avoid and or minimise impacts to remnant native vegetation has formed a key parameter adopted in the infrastructure siting and design to protect and maintain the biodiversity value of the area. All earthworks and associated vegetation clearance within the project site will be undertaken so as not to cause or exacerbate erosion or sediment, decrease soil stability or cause any deterioration in the quality of surface water runoff that may potentially impact Wookie Creek.

COUNCIL WIDE	COMMENT
Renewable Energy Facilities Objectives 1, 2 & 3 PDCs 1, 2, 3 & 4	The policy provisions actively promote renewable energy facilities (and associated infrastructure) where natural resources can be harnessed for the efficient generation of electricity that will benefit the community and State by connecting into South Australia's power grid. Whilst not specifically referencing solar farms, the policy provisions provide key siting and design considerations which are able to be satisfied as follows: — infrastructure to be sited and designed to blend with the natural features of the landscape — protect areas of scenic or conservation significance from undue damage — cause minimal damage to the natural landform; and — screen and orientate infrastructure away from public view, tourist and scenic routes. The project is considered to present a desired land use within the zone and its locality. Careful consideration has demonstrated that impacts associated with visual amenity, glare, noise, ecology (flora and fauna), Aboriginal cultural heritage, traffic and engineering design (ie geotechnical, surface water) are able to be minimised. In particular, the project's photovoltaic panels and tracking system will use quality products and best practice design to ensure impacts associated with glare will be eliminated, while vegetative planting will ensure potential impacts to the nearest sensitive receptor to the east can be appropriately minimised. The project promotes the generation and use of renewable energy for the benefit of the environment, local and regional communities and the State more generally, whilst its location has been sited to minimise impacts on the natural environment, other land uses in the locality, transport systems and natural resources.
Siting and Visibility Objective 1 & 2 PDC 1, 4, 5 & 8	The project site has been chosen due to it providing ideal conditions and transmission line connection to maximise the efficiency and power generation of the solar farm. Hemisphere Design concluded that from a visual amenity perspective the introduction of the solar farm: — does not change the mainly pastoral nature of the locality and wider contextual landscape — does not it impact on any significant viewpoints within the contextual landscape; and — will not significantly alter the nature and visual qualities of the Expansive Eastern Plains Character Unit. Hemisphere Design also stated that in their opinion "the solar farm will introduce a new infrastructure element of an acceptable design standard that will evoke curiosity, become an 'incidental' infrastructure feature of merit and a best practice example of progressive renewable energy delivery". As previously stated, the siting of the project infrastructure has been designed to minimise visual impacts and effectively screen the development from the view of the general public and adjacent landholders by virtue of established native vegetation, topography, distance and proposed vegetative planting. The project is not considered to adversely impact on the natural or rural character of the locality.

7.1.5 MANAGEMENT AND MITIGATION MEASURES

7.1.5.1 CONSTRUCTION

To comply with the relevant statutory requirements, a CEMP will be prepared for the project following the granting of Development Approval. Refer to section 8.1.4 for further details on the CEMP.

7.1.5.2 OPERATION

The project will operate in accordance with all plans and supporting documents submitted and approved under this Development Application (should Development Approval be granted).

7.1.6 KEY RECOMMENDATIONS

The proposed development of a solar farm is consistent and not at variance with the relevant policy provisions set out in the Clare and Gilbert Valleys Council Development Plan (Consolidated 10 November 2016), and that the project warrants the granting of Development Approval.

7.2 FLORA AND FAUNA

7.2.1 LEGISLATIVE AND POLICY REQUIREMENTS

The following legislation is relevant to flora and fauna matters for the proposed Chaff Mill Solar Farm:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Native Vegetation Act 1991*
- *National Parks and Wildlife Act 1972*
- *Natural Resources Management Act 2004.*

7.2.1.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It applies to all Australian territory and waters. Under the Act, actions that are likely to have a significant impact upon defined Matters of National Environmental Significance (MNES) are subject to an assessment and approval process.

Under the EPBC Act, a company proposing an action that may have a significant impact on a matter of national environmental significance must prepare and submit a Referral that will help the Commonwealth decide whether the proposal requires further assessment.

The requirement for a referral under the EPBC Act is discussed in section 1.5.1.

7.2.1.2 NATIVE VEGETATION ACT 1991

In South Australia, under the *Native Vegetation Act 1991* (NV Act), all clearance of native vegetation requires the approval of the Native Vegetation Council (NVC) unless it is covered by a specific exemption contained within the *Native Vegetation Regulations 2017*.

Under the NV Act, the NVC considers applications to clear native vegetation under ten principles. Native vegetation should not be cleared if it is significantly at odds with these principles:

- It contains a high level of diversity of plant species
- It is an important wildlife habitat
- It includes rare, vulnerable or endangered plant species
- The vegetation comprises a plant community that is rare, vulnerable or endangered

- It is a remnant of vegetation in an area which has been extensively cleared
- It is growing in, or association with, a wetland environment
- It contributes to the amenity of the area
- The clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding
- The clearance of vegetation is likely to cause deterioration in the quality of surface or underground water
- After clearance, the land is to be used for a purpose which is unsustainable.

The principles apply in all cases, except where the vegetation has been considered exempt under the *Native Vegetation Regulations 2017* or can be classified as an 'intact stratum'. 'Intact stratum' means that applications will usually be denied when the vegetation has not been seriously degraded by human activity within the last 20 years.

All approved vegetation clearance must also be conditional on achieving a Significant Environmental Benefit (SEB) to offset the clearance. The requirement for a SEB also applies to several of the exemptions.

The project area is situated within the Clare and Gilbert Valley Council region which is subject to the *Native Vegetation Act 1991* and *Regulations 2017*. The project is likely to fall under Regulation 12(34) – Infrastructure or 12(27) – Major Projects.

7.2.1.3 NATIONAL PARKS AND WILDLIFE ACT 1972

Vascular plants and vertebrate animals (e.g. mammals, birds, reptiles and amphibians) are protected in South Australia under the threatened species schedules of the *National Parks and Wildlife Act 1972* (NPW Act): Schedule 7 (endangered species), Schedule 8 (vulnerable species) and Schedule 9 (rare species). The criteria used to define threatened species in South Australia are generally based on categories and definitions from the IUCN Red List Categories and Criteria.

The current schedules do not include non-vascular plants, fish, insects, butterflies, spiders, scorpions and other invertebrates, fungi and other life forms which do not have a current legal conservation status in South Australia.

Under the NPW Act, persons must not:

- Take a native plant on a reserve, wilderness protection area, wilderness protection zone, land reserved for public purposes, a forest reserve or any other Crown land
- Take a native plant of a prescribed species on private land
- Take a native plant on private land without the consent of the owner (such plants may also be covered by the *Native Vegetation Act 1991*)
- Take a protected animal or the eggs of a protected animal without approval
- Keep protected animals unless authorised to do so
- Kill a protected animal without approval.

7.2.1.4 NATURAL RESOURCES MANAGEMENT ACT 2004.

Under the *Natural Resources Management Act 2004* (NRM Act), landholders have a legal responsibility to manage declared pest plants and animals and prevent land and water degradation.

Key components under the Act include the establishment of regional Natural Resource Management (NRM) Boards and development of regional NRM Plans; the ability to control water use through prescription, allocations and restrictions; requirement to control pest plants and animals, and activities that might result in land degradation.

A ‘duty of care’ is a fundamental component of this Act, i.e. ensuring one’s environmental and civil obligation by taking reasonable steps to prevent land and water degradation. Persons can be prosecuted if they are considered negligent in meeting their obligations.

The project area is situated within the Northern and Yorke Natural Resources Management Board Region.

7.2.2 ASSESSMENT METHODOLOGY

A flora and fauna assessment was undertaken for the proposed Chaff Mill Solar Farm (Appendix G). The assessment involved:

- Extensive background research – literature review on all available relevant reports and database searches
- Vegetation mapping to establish the vegetation communities present, their condition and the overall biological significance of the vegetation. The vegetation survey was performed in accordance with the Native Vegetation Council (NVC) methodology
- Opportunistic fauna survey and visual assessment of habitat value for native fauna
- Targeted Pygmy Blue-tongue Lizard (PBTL) survey in appropriate habitat. Spider holes were investigated using an optic fibre 'burrowscope' to determine species presence
- Targeted Flinders Ranges Worm-lizard (FRWL) survey in areas of appropriate habitat.

7.2.3 EXISTING CONDITIONS

7.2.3.1 CURRENT LANDSCAPE

Using the Interim Biogeographical Regionalisation of Australia (IBRA) zones and remnancy landscape classification, the proposed Chaff Mill Wind Farm is located within the Flinders Lofty Block bioregion, the Broughton subregion and the Hansen environmental association. Approximately 3% (3738 HA) of the association is mapped as remnant native vegetation, of which 1% is formally conserved.

The project area is mostly cleared of native vegetation and is under crop. There is a large patch of remnant *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland Blue Gum) in the western corner of the western parcel, where the land is too steep to cultivate. The understory is grazed and comprised of exotic grassland species. The creek line running through the western parcel is highly degraded with very limited native understory species present. The western parcel is bordered on the western side by a relatively steep rocky escarpment.

Amenity plantings, mostly comprised of native species, occur as small patches within the project area and as narrow strips along the roadsides. Small strips of remnant native woodland and shrubland also occur along some roadside.

7.2.3.2 VEGETATION ASSOCIATIONS

Six broad vegetation associations were recorded within the project area (refer Figure 7.1):

- *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland
- *Allocasuarina verticillata* (Drooping Sheoak) Woodland
- *Acacia paradoxa* (Kangaroo Thorn) Shrubland
- Mixed Amenity Planting +/- scattered natives
- Exotic Grassland
- Crop.

Bushland condition was assessed in two locations. The condition of the areas described as *Eucalyptus leucoxylon* ssp. *pruinosa* Woodland was poor to moderate. The condition of the areas described as *Allocasuarina verticillata* (Drooping Sheoak) was poor. Most of the land on the undulating flats and low hills has been cultivated and is highly modified. Native vegetation is generally restricted to steep hills, along the creek line and within roadside vegetation.

Photo 7.1 *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland

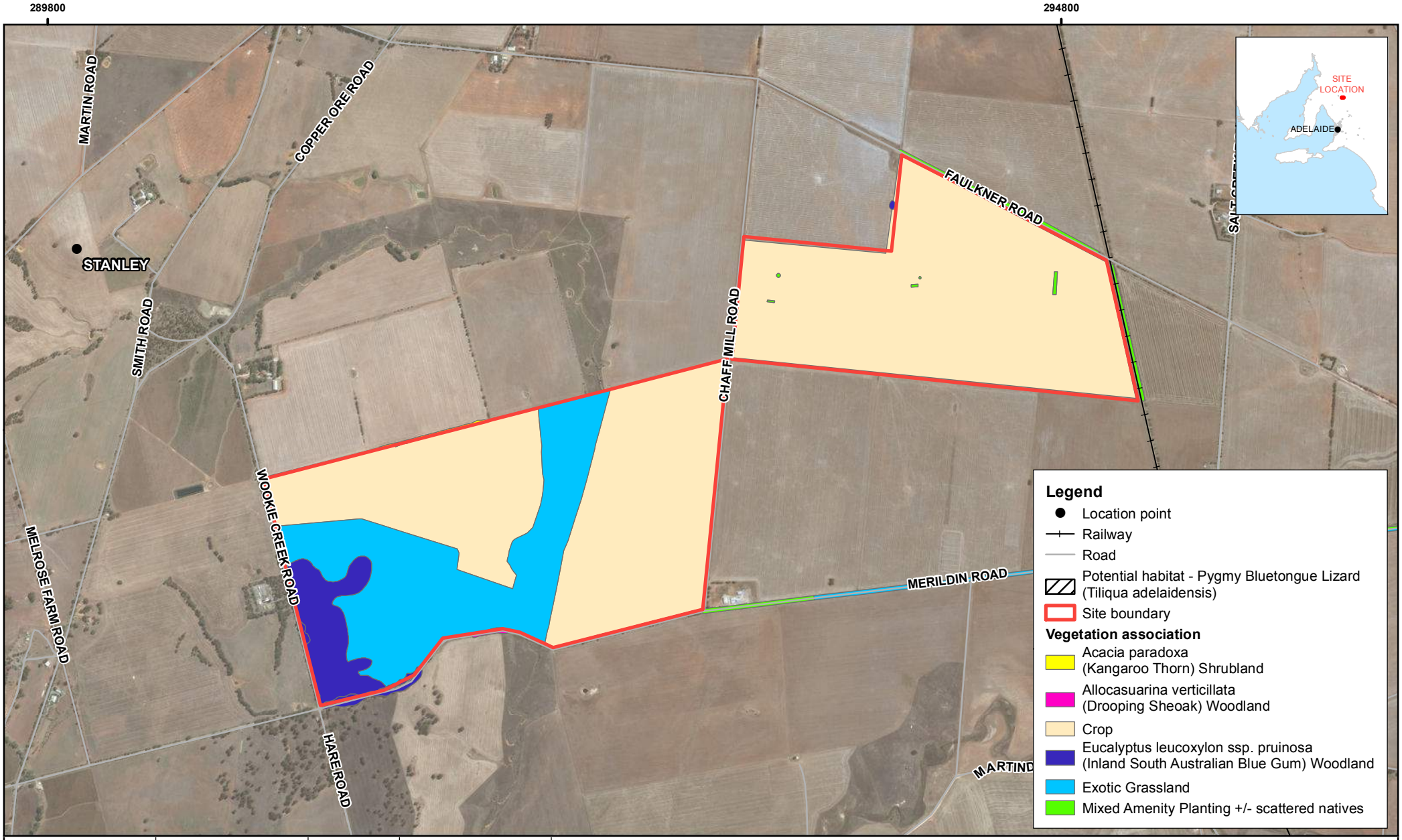
Photo 7.2 *Allocasuarina verticillata* (Drooping Sheoak) Woodland

Photo 7.3 *Acacia paradoxa* (Kangaroo Thorn) Shrubland

Photo 7.4 Mixed amenity planting +/- scattered natives

Photo 7.5 Exotic Grassland following the creek line on the western block

Photo 7.6 Crop



Map: PS103225_GIS_009_C	Author: brownma2
Date: 19/03/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, EBS Ecology

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Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.1
Vegetation associations

7.2.3.3 NATIONAL THREATENED SPECIES

No nationally threatened species were recorded during the field survey.

One flora species of national conservation (EPBC Act) significance, *Dodonaea procumbens* (Trailing Hop-bush) was identified as possibly occurring within the project area. This species was conservatively assessed as potentially present for areas that were rapidly assessed, such as the road and rail reserves. It is unlikely to be present within the cropped and mixed grassland areas, where it is presumed infrastructure will be focused.

One fauna species of national conservation significance, Flinders Ranges Worm-lizard (FRWL) (*Aprasia pseudopulchella*) was identified as possibly occurring within the project area. While the habitat is largely unsuitable for FRWL, this species could possibly occur along the creek line and within areas of exotic grassland where undisturbed surface, surface rock, litter/fallen trees are present. Whilst the habitat suitability is assessed as low, the presence of FRWL cannot be discounted where the soil structure remains intact and surface cover is present.

One migratory bird species, Fork-tailed Swift (*Apus pacificus*), was identified as a possible occasional visitor to the project area. This species is mostly aerial and would not be impacted by the Chaff Mill Solar Farm.

7.2.3.4 STATE THREATENED SPECIES

No threatened flora species were recorded during the field survey. Based on the background research and the species' relative inconspicuousness (and hence potential for non-detection during the broad level survey), two State listed flora species are considered as possibly occurring within the project area:

- *Dodonaea procumbens* (Trailing Hop-bush)
- *Rytidosperma tenuius* (Short-awn Wallaby-grass).

The State conservation (NPW Act) listed White-winged Chough (*Corcorax melanorhamphos*) was recorded during the field survey. Four other State threatened bird species could possibly occur based on species distribution and available habitat. The Brown Toadlet (*Pseudophryne bibronii*) could possibly be present along the ephemeral creek line within the western block. The Common Brushtail Possum (*Trichosurus vulpecula*) may occupy the established trees (remnant and planted). State threatened species and the likelihood of their occurrence within the project area is outlined in Table 7.3.

Threatened flora and fauna species records from the Biological Database of South Australia near the project area are shown in Figure 7.2 and Figure 7.3.

Table 7.3 State threatened species potentially occurring within the project area

SCIENTIFIC NAME	COMMON NAME	NPW ACT RATING*	LIKELIHOOD OF OCCURRENCE WITHIN THE PROJECT AREA
FLORA			
Dodonaea procumbens	Trailing Hop-bush	V	Possible. Discussed in Section 7.2.3.3
Rytidosperma tenuius	Short-awn Wallaby-grass	R	Possible – this species is known more generally from disturbed road verges.
AMPHIBIANS			
Pseudophryne bibronii	Brown Toadlet	R	Possible
BIRDS			
Corcorax melanorhamphos	White-winged Chough	R	Known (recorded during the field survey)
Falco peregrinus	Peregrine Falcon	R	Possible

SCIENTIFIC NAME	COMMON NAME	NPW ACT RATING*	LIKELIHOOD OF OCCURRENCE WITHIN THE PROJECT AREA
Neophema elegans	Elegant Parrot	R	Possible
Petroica phoenicea	Flame Robin	V	Possible
Turnix varius	Painted Buttonquail	R	Possible
MAMMALS			
Trichosurus vulpecula	Common Brushtail Possum	R	Possible

*As listed in the Schedules of the NPW Act version 15.3.2017

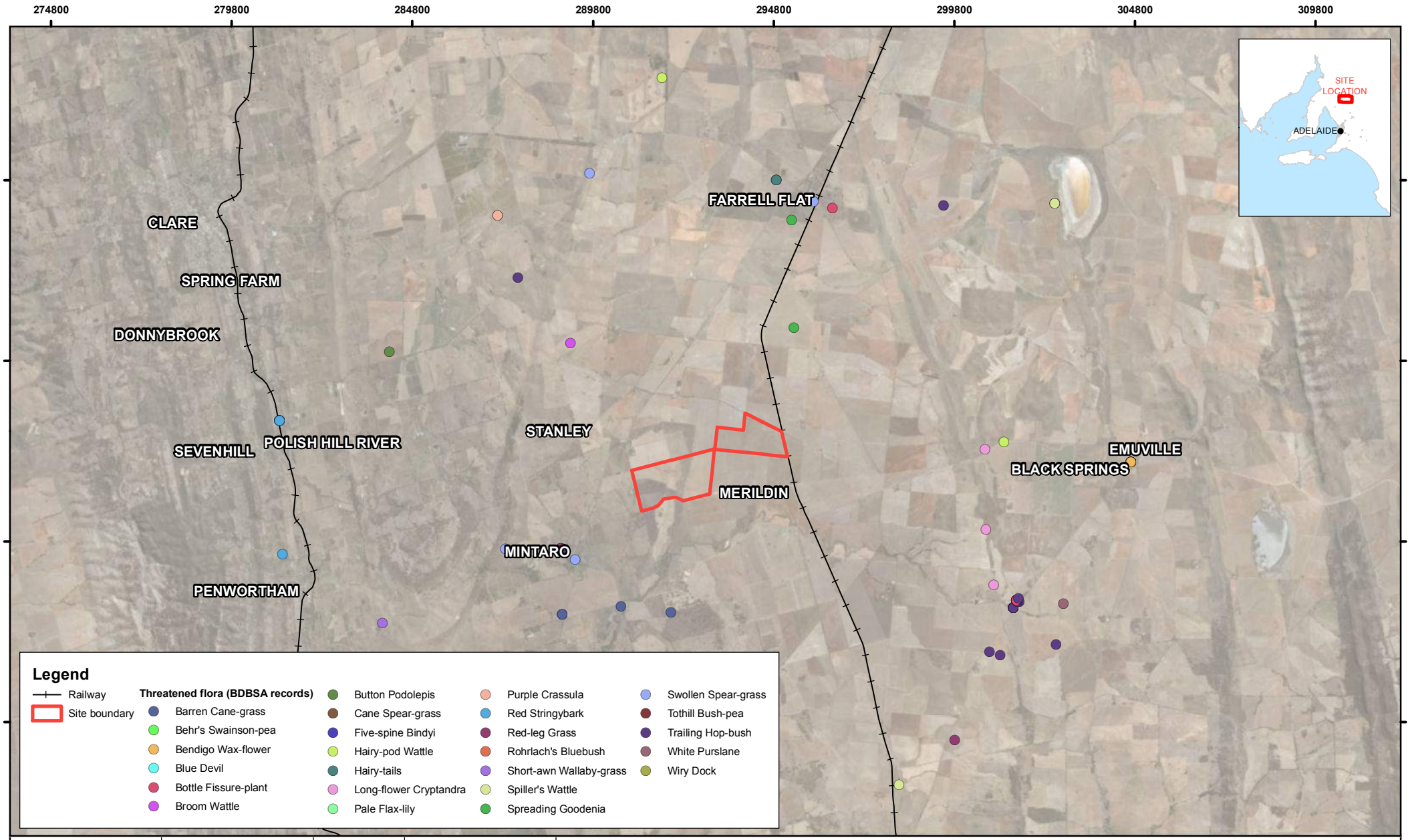
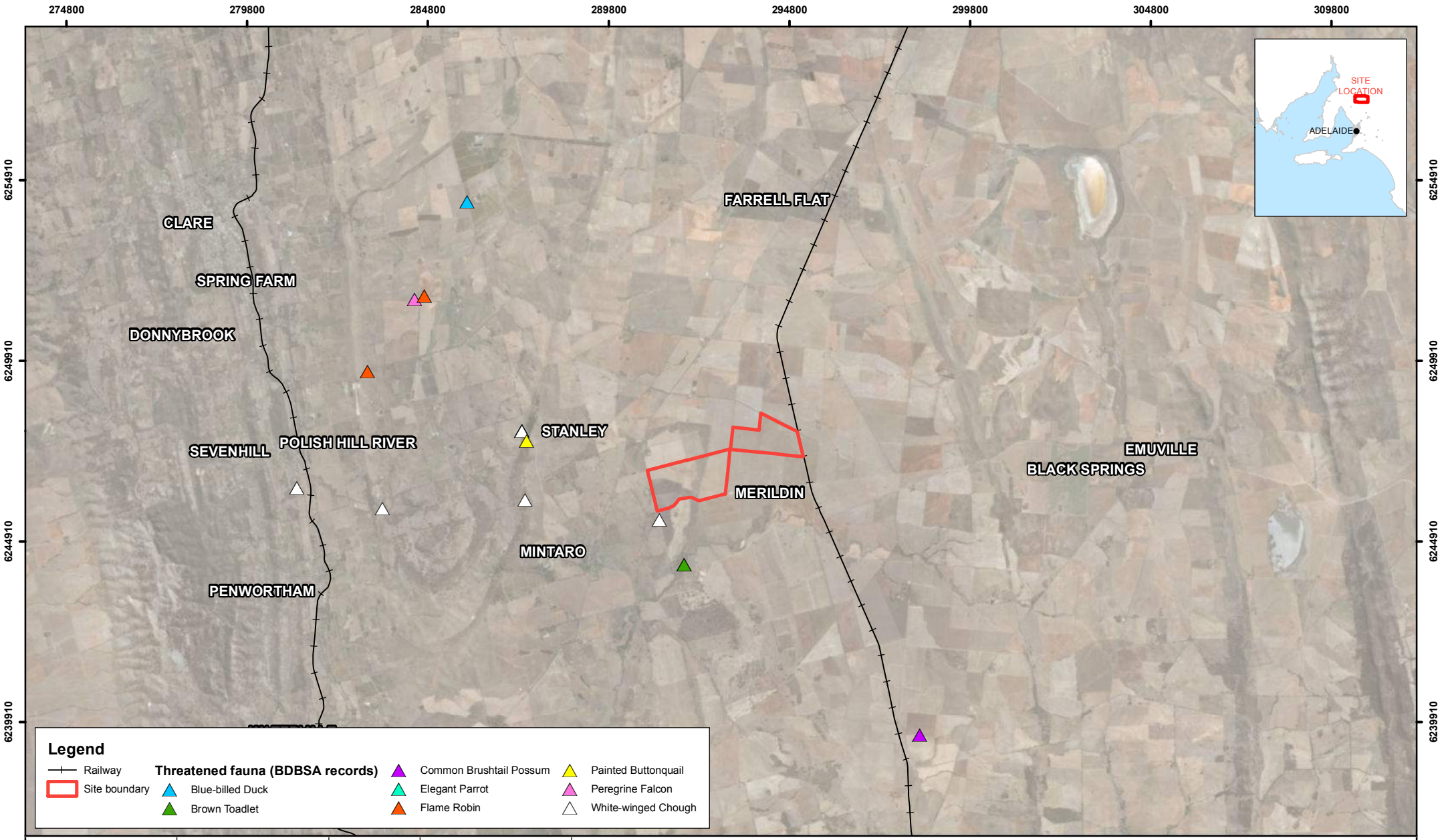


Figure 7.2
BDBSA Threatened Flora Species Records Within the Vicinity of the Project Area



Map: PS103225_GIS_015_C	Author: pottsr
Date: 19/03/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, EBS Ecology

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Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.3
BDBSA Threatened Fauna Species Records Within the Vicinity of the Project Area

7.2.3.5 WEED SPECIES

A total of 22 (twenty-two) weed species were recorded during the field survey (the full species list can be found in Appendix G), four of which are declared under the *Natural Resources Management Act 2004* (Table 7.4).

Table 7.4 Declared weed species recorded within the project area

SCIENTIFIC NAME	COMMON NAME
Echium plantagineum	Salvation Jane
Marrubium vulgare	Horehound
Olea europaea ssp.	Olive
Rosa canina	Dog Rose

7.2.4 POTENTIAL IMPACTS

7.2.4.1 FLORA

Infrastructure placement would avoid native vegetation clearance where possible, however the exact vegetation clearance requirements are yet to be confirmed. The ecological survey has collected data to calculate the area of vegetation clearance and required significant environmental benefit (SEB) offset under the *Native Vegetation Act 1991* should this be required for a Native Vegetation Clearance Application once the construction footprint has been determined.

Native vegetation was mostly restricted to the steep area on the western side of the western block and along the road and railway corridors bordering the project area. Infrastructure placement will be avoided in these areas and any clearance of roadside vegetation would only be needed at access points. Should the roads require widening for large vehicle access, native vegetation clearance should be minimised by utilising already cleared areas where possible. The ecological assessment identified appropriate locations of road widening.

The proposed Chaff Mill Solar Farm is not likely to have a significant impact on any matters of national or State conservation significance. The EPBC listed *Dodonaea procumbens* was conservatively assessed as potentially present for areas that were rapidly assessed, such as the road and rail reserves. If infrastructure placement is within the cleared areas and avoids native vegetation, it is unlikely that the species (if present) would be impacted.

7.2.4.2 FAUNA

Due to its isolation from other large areas of habitat, the remnant vegetation within the project area is expected to be most valuable for highly mobile threatened species, such as the Elegant Parrot (*Neophema elegans*) and Flame Robin (*Petroica phoenicea*), which make broad-scale movements in response to season and the abundance of food resources. The presence of highly mobile species within the project would be expected to be temporal with respect to the availability of food resources.

Many trees on the site contained hollows that are valuable for resident or nesting threatened species such as the Common Brushtail Possum (*Trichosurus vulpecula*) and the Elegant Parrot (*Neophema elegans*). The protection of trees with hollows is important for the reproductive success of nesting birds which can affect population recruitment.

Clearance of vegetation, either on the project site or along the access route, may have a direct impact on fauna through loss of habitat. The construction and operation of a solar farm may result in indirect loss of fauna through displacement due to disturbance, visual intrusion, physical barriers and altered conditions.

A small number of individual FRWL (if present) may be directly impacted (direct loss, or loss of habitat) by the construction of the solar farm. The scale of loss of potential habitat and individual FRWL is considered minor and inconsequential to the local population. Based on the criteria in the EPBC Act Significant Impact Guidelines the project is not considered to have a significant impact on FRWL.

The Fork-tailed Swift (*Apus pacificus*), listed as migratory, could occur as an occasional visitor but would not be significantly impacted by the development.

7.2.5 MANAGEMENT AND MITIGATION MEASURES

Management of project impacts to flora and fauna have followed a general principle (in order of preference) of:

- Avoiding impacts
- Minimising impacts
- Mitigating impacts
- Compensating for residual impacts.

7.2.5.1 PLANNING

The following management and mitigation measures would be implemented in the planning stage:

- Infrastructure and access routes would be aligned, where practical, with cropping/cleared land.
- Areas containing the woodland and shrubland associations and scattered trees would be avoided where possible as they offer valuable habitat for fauna species in an area largely devoid of shrubs and trees.
- Infrastructure would be located as far away from areas of native vegetation/fauna habitat as possible to reduce impacts associated with disturbance, weed invasion etc.
- If any Wedge-tailed Eagle nests are observed (none were recorded during the survey), a buffer between the nest and infrastructure/maintenance access would be implemented to avoid disturbance.

7.2.5.2 CONSTRUCTION

In general, construction activities would be managed to avoid construction or disturbance to any areas of high ecological value.

- A Construction Environmental Management Plan (CEMP) would be developed, prior to construction. This will provide specific, detailed methods to avoid environmental damage during the construction phase.
- Vegetation clearance will be restricted to a designated clearance envelope (once confirmed). A site induction session with clearance contractors will be arranged whereby the project area is defined and areas designated for clearance are delineated. The purpose of the site induction would be to prevent inappropriate clearance of vegetation not within the clearance envelope.
- Native fauna disturbed during any vegetation clearance/construction would if possible be relocated to suitable habitat nearby.
- Construction machinery would be kept clean and free from soil pathogens and any weed seed materials before entering/exiting the area.
- Any soil/material brought to site must be certified clean and free of weed propagules and soil pathogens. Suitable management measures in relation to Phytophthora would be included in the CEMP.
- Vegetative material removed from the site would be appropriately managed
- Stockpile sites, vehicle / machinery parking areas and general laydown areas would be located away from any native vegetation.
- Weed management strategies (including weed hygiene procedures) would be implemented to ensure that weed species are not introduced or spread throughout the construction area.

7.2.5.3 OPERATION

Any native vegetation clearance required will be offset by achieving an SEB for the project (Under the *Native Vegetation Act 1991)* and completing appropriate revegetation and landscaping.

7.2.6 KEY RECOMMENDATIONS

Key recommendations from the flora and fauna assessment relate primarily to legislative compliance under the *Native Vegetation Act 1991* and the *Environment Protection Biodiversity Conservation Act 1999.*

- Once the infrastructure footprint has been finalised, the extent of vegetation removal required will be determined to calculate the required SEB offset.
- The project is not considered to have a significant impact on any EPBC Act listed flora, fauna or ecological communities, and hence a referral is not required based on the current assessment area.

7.3 ABORIGINAL CULTURAL HERITAGE

7.3.1 LEGISLATIVE AND POLICY REQUIREMENTS

The central legislation to management of Aboriginal heritage in the project area is the *Aboriginal Heritage Act 1988* (AHA). Under the AHA, all Aboriginal sites, objects and remains that are of significance to Aboriginal tradition, archaeology, anthropology and/or history are protected.

The AHA provides the following definition of an Aboriginal site in section 3;

“Aboriginal site” means an area of land

a That is of significance according to Aboriginal tradition; or
b That is of significance according to Aboriginal archaeology, anthropology or history.

Any Aboriginal site or object, whether a newly discovered object or previously recorded, is covered under the blanket protection of the AHA.

It is an offence under section 23 of the AHA to damage, disturb or interfere with Aboriginal sites, objects or remains unless written authorisation is sought from the Minister for Aboriginal Affairs and Reconciliation. Penalties for an offence under this section are up to $10,000 or six months’ imprisonment in the case of an individual, or $50,000 in the case of a corporate body.

It is an offence under section 35 of the AHA to divulge information, in contravention of Aboriginal tradition, relating to an Aboriginal site, object, remains or Aboriginal tradition. Penalties for an offence against this section are up to $10,000 or six months imprisonment. Aboriginal sites are also protected by Commonwealth Legislation, namely the Aboriginal and Torres Strait Islander *Heritage Protection Act 1984*. The Commonwealth Act becomes active where there is reason to believe that the State Heritage Act is not sufficiently protecting an item, object and/or remains.

On 17 October 2017 the Minister for Aboriginal Affairs and Reconciliation introduced changes to the AHA in the form of the *Aboriginal Heritage Regulations 2017*. The main changes that may be relevant to this project going forward are discussed in Appendix H.

The following legislation is also relevant to Aboriginal cultural heritage matters for the Chaff Mill Solar Farm:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- *Native Title Act 1993*
- *Native Title (South Australia) Act 1994*
- *Environment Protection Biodiversity Conservation Act 1999.*

7.3.2 ASSESSMENT METHODOLOGY

The Aboriginal cultural heritage survey undertaken for the proposed Chaff Mill Solar Farm (Appendix H) involved:

- Desktop research, including searches of relevant databases, the Central Archive Register of Aboriginal Sites and Objects maintained by Aboriginal Affairs and Reconciliation Division (DSD-AAR), previous reports, relevant literature and aerial imagery and other documents relating to the development history of the area.
- Archaeological and anthropological surveys. The archaeological component and consisted of a pedestrian foot survey and the anthropological component involved broad, on site consultation with the nominated Ngadjuri traditional owners' representatives as well as a foot survey. The surveys were undertaken separately, with the anthropological survey undertaken on 1 November 2017, and the archaeological survey undertaken on 2 November 2017.

7.3.3 EXISTING CONDITIONS

7.3.3.1 BROAD LANDSCAPE DESCRIPTION

Lichen-encrusted outcrops are present within the project area, primarily along Wookie Creek and to the west. A small borrow pit was identified featuring siltstone with quartzitic inclusions including prominent quartz veins. Loose quartz ranging considerably in size was found throughout the project area.

The project area has been subject to previous disturbance by intensive farming and is subject to considerable natural erosion. Persistent clearing of the area for agricultural related activities, and then crop cultivation and livestock grazing is evident in the general area. In general, archaeological features such as burials, fire-places and ovens, middens, preserved workshop areas etc. will be destroyed by ploughing if they occur on the surface or within the plough zone. As a plough turns the soil it displaces any archaeological deposits within that depth of soil. Material buried lower within the soil profile will remain undisturbed, unless exposed by repeated ploughing and soil erosion.

7.3.3.2 PREVIOUS AND CURRENT RESEARCH

There have been no specific heritage surveys carried out relating directly to the project area.

The Central Archive, which includes the Register of Aboriginal Sites and Objects, maintained by the Department of State Development Aboriginal Affair and Reconciliation (DSD-AAR), did not contain any previously recorded Aboriginal heritage sites within the project area.

The South Australian Museum (SAM) Anthropology database identified four records of culturally sensitive material discovered in Clare (three records) and north-west of Clare (one record).

The Aboriginal cultural heritage survey of the Mintaro Solar Farm Project Area recorded no archaeological or anthropological sites as defined by the AHA.

There are landscape features within the project area that are connected to significant Creation Ancestor stories. These include rocks and outcrops that are coloured a deep purplish red and which may also have a covering of lichen, and milky quartz (Photo 7.7). Within the project area, there are outcrops of the lichen covered rocks along the western slopes which decline towards Wookie Creek (Figure 3). Milky quartz was not visible; however, it may be present. Both features have cultural significance and should not be disturbed. The Wookie Creek area, featuring rocky outcrops, was delineated as a culturally sensitive area (Figure 7.4).

Photo 7.7 Siltstone rocks feature in traditional stories and are a potential ochre source

The project area is within the country of the Ngadjuri peoples and is covered by Native Title Claims from the Kaurna Peoples and Ngadjuri Nation #2 (Location SA 2017) (Figure 7.5).

7.3.4 POTENTIAL IMPACTS

The design of the project will need to avoid culturally sensitive areas delineated in Figure 7.4.

The low ground surface visibility across much of the project area limited the potential for site identification during the field survey. Given the project area is highly disturbed farmland including a moderately disturbed minor creek system with little remnant vegetation noted, the potential for intact Aboriginal heritage sites remains low although there remains potential for subsurface archaeological sites, objects or remains as defined by the AHA, based on general research, combined with the consultation and survey results (refer Appendix H for further details).

7.3.5 MANAGEMENT AND MITIGATION MEASURES

A Cultural Heritage Management Plan would be developed by FRV, in consultation with traditional owners. The Cultural Heritage Management Plan would include a site discovery procedure to be implemented if Aboriginal heritage sites, objects or remains are discovered during civil works.

Heritage inductions will be undertaken for all work personnel, covering typical Aboriginal sites descriptions, potential indicators, site discovery process, working with monitors and legislative obligations.

7.3.6 KEY RECOMMENDATIONS

The design of the project would avoid culturally sensitive areas delineated in Figure 7.4.

Due to low visibility at the time of the survey, the site will be re-surveyed when it is cleared for construction and ground surface visibility is rendered to a state where the identification of potential Aboriginal heritage sites and objects can be undertaken confidently.

Map: PS103225_GIS_010_C	Author: brownma2
Date: 19/03/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Integrated Heritage Services Pty Ltd.

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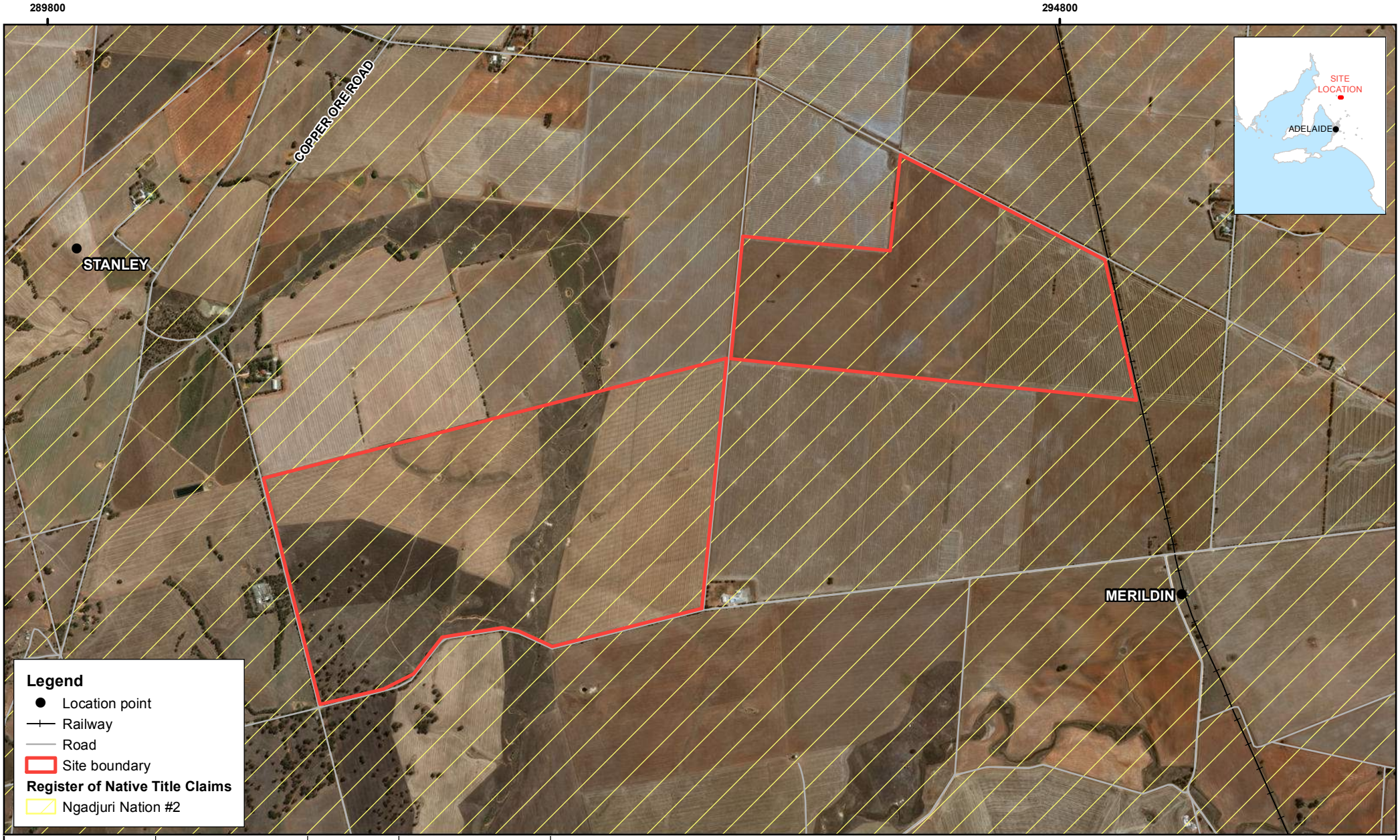
Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.4
Aboriginal Heritage Survey Results Map



Map: PS103225_GIS_011_C	Author: brownma2
Date: 19/03/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, data.gov.au

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Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.5
Native Title Claims

7.4 NON-INDIGENOUS HERITAGE

7.4.1 LEGISLATIVE AND POLICY REQUIREMENTS

Three pieces of legislation apply to the non-Indigenous heritage context of the site and locality, in relation to the project:

- *Environment Protection and Biodiversity Conservation Act 1999*, discussed in section 1.5.1.
- *Heritage Places Act 1993*
- *Development Act 1993*, and the *Planning, Development and Infrastructure Act 2016.*

The *Heritage Places Act 1993* makes provision for the identification, recording and conservation of places and objects of non-Indigenous heritage significance in South Australia. The Act establishes the South Australian Heritage Council, and allows for the identification and protection of places of heritage significance under the South Australian Heritage Register, which lists all places of heritage significance in South Australia. Once registered, State heritage places are protected under both the *Heritage Places Act 1993* and the *Development Act 1993* (soon to be superseded by the PDI Act).

7.4.2 ASSESSMENT METHODOLOGY

An assessment was undertaken to determine the potential impacts of the project on any non-Indigenous heritage values within the project site and surrounding locality (Appendix I).

The assessment of non-Indigenous heritage values within the site and wider project area involved a review of the following registers, databases and documents:

- The Australian Heritage Places Inventory
- The Australian Heritage Database
- The South Australian Heritage Places Database
- The Clare and Gilbert Valleys Development Plan
- The Register of the National Estate (non-statutory)
- The Mintaro State Heritage Area: Guidelines for Development (DEWNR, Government of South Australia 2015)
- The Mintaro Conservation Study (McDougall and Vines 1988).

7.4.3 EXISTING CONDITIONS

The assessment established a baseline description of the non-Indigenous heritage values associated with the wider project area.

7.4.3.1 BROAD LANDSCAPE DESCRIPTION

As outlined in the previous section, the Clare Valley region was inhabited by the Ngadjuri people prior to European occupation (South Australian Museum 2017).

During the early 1840s, land in the region was occupied by colonists perusing pastoral opportunities. The Barossa Valley and Clare Valley were settled and the discovery of copper at Kapunda in 1844 and Burra in 1845 continued to attract settlers and investment in the lower and mid-north regions of South Australia (McDougall and Vines 1988).

The Mintaro township was shaped by early land transportation, extractive primary industry, distinctive social and community groups, and productive primary industry (McDougall and Vines 1988).

A significant proportion of Mintaro's buildings were built between 1850-1860, including small cottages, shops, flour mill, blacksmiths, churches and hotels. During the 1860s and 1870s several public buildings were built in the town including a police station, a public school and the Council hall and Institute (Department of Environment, Water and Natural Resources 2015).

The Mintaro Slate Quarry opened in 1854 and was a major source of employment. Approximately 40 men were employed at the quarry in 1860 (McDougal and Vines 1988). The Mintaro Slate Quarry continues to be one of the oldest continuously producing quarries in Australia (DEWNR 1990).

The Mintaro Railway Station (renamed Merildin in 1918) was built in 1870, approximately 7 km east of the township. Mintaro was well-placed to continue as an agricultural service centre despite the closure of the Burra Mines in 1877. The surrounding farming districts of the fertile Gilbert Valley prospered during South Australia's rural boom of the early 1870s and early 1880s (DEWNR1990).

Two large pastoral properties were built during this prosperous period; Martindale Hall (built 1879-80) and Kadlunga Homestead (purchased 1881). These properties were serviced by local labour from Mintaro. Martindale Hall continuous to be an attraction in Mintaro.

After 1930, there was a general decline in rural populations. The continuing function of the slate quarry helped Mintaro survive, however there has been limited development. Consequently, Mintaro has retained much of its historic character (DEWNR ND).

Mintaro was declared a State Heritage Area (SHA) in 1982. The designation of a State Heritage Area is intended to ensure that changes to, and development within, the area are managed in a way that the area's cultural significance is maintained (DEWNR 2015). Objectives within the Mintaro State Heritage Area include:

- Retention of the original land division pattern and orientation
- Reinforcement of the rural village character with minimal infrastructure
- Retention of significant views between buildings along Burra Street to agricultural land
- Retention and conservation of the historic buildings, structures and ruins
- Adaption of some historic buildings and structures to ensure their long-term conservation and viability
- Unity of built-form with new buildings of a sympathetic design and form to historic building
- Retention and enhancement of the town's landscape character (DEWNR 2015).

7.4.3.2 ISSUE-SPECIFIC SITE DESCRIPTION/BASELINE

The desktop search revealed a number of places of heritage interest in the subject area. In total, the search revealed 34 places on the Register of National Estate (now non-statutory), 26 State heritage places, one State Heritage Area, and no local heritage places. Most of the registered places are located within the township, approximately 1.8-2.3 km south-west of the project site; the nearest being the Merildin Railway Station, approximately 1 km south of the project site. The results of the database searches are presented in Table 7.5 and Table 7.6 below.

Table 7.5 Heritage places in Mintaro and surrounds recorded on the Australian Heritage Places Database

ADDRESS	DETAILS	CLASS	PROXIMITY TO SITE
Lot 44 Burra St	Blacksmiths Shop	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 53 Burra St	Briggs Cottage Ruins	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 38 Burra Rd	Carpenters Shop Complex	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Catholic Church Road, Mintaro	Catholic Church of Mary Immaculate	Register of the National Estate	Outskirts of Mintaro township, approximately 2km west of the project area
Lot 21 Church St	Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area

ADDRESS	DETAILS	CLASS	PROXIMITY TO SITE
Lot 65 Church St	Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 66 Young St	Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 13 Burra St	Devonshire Hotel (former)	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 5 Wakefield St	Flour Mill Ruins	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 41 Burra Rd	H Jolly House	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 80 Wakefield St	House and Outbuildings	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 35/36 Burra St	House, Outbuildings and Stone Wall	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 42 Burra St	Hunt Workshop/Barn and Stone Fence	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
	Kadlunga	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 4 Burra St	Magpie and Stump Hotel	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
	Martindale Hall	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Mintaro Rd	Merildin Railway Station Group	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 8/9 Stein St	Methodist Church Group	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Mintaro Rd	Mintaro Cemetery	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
	Mintaro Conservation Area	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 3 Burra St	Mintaro Institute and Civic Hall	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 61 Church St	Mintaro Primary School	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Mintaro Rd	Mintaro Slate Quarries	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 569 Burra Rd	Police Station (former)	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area

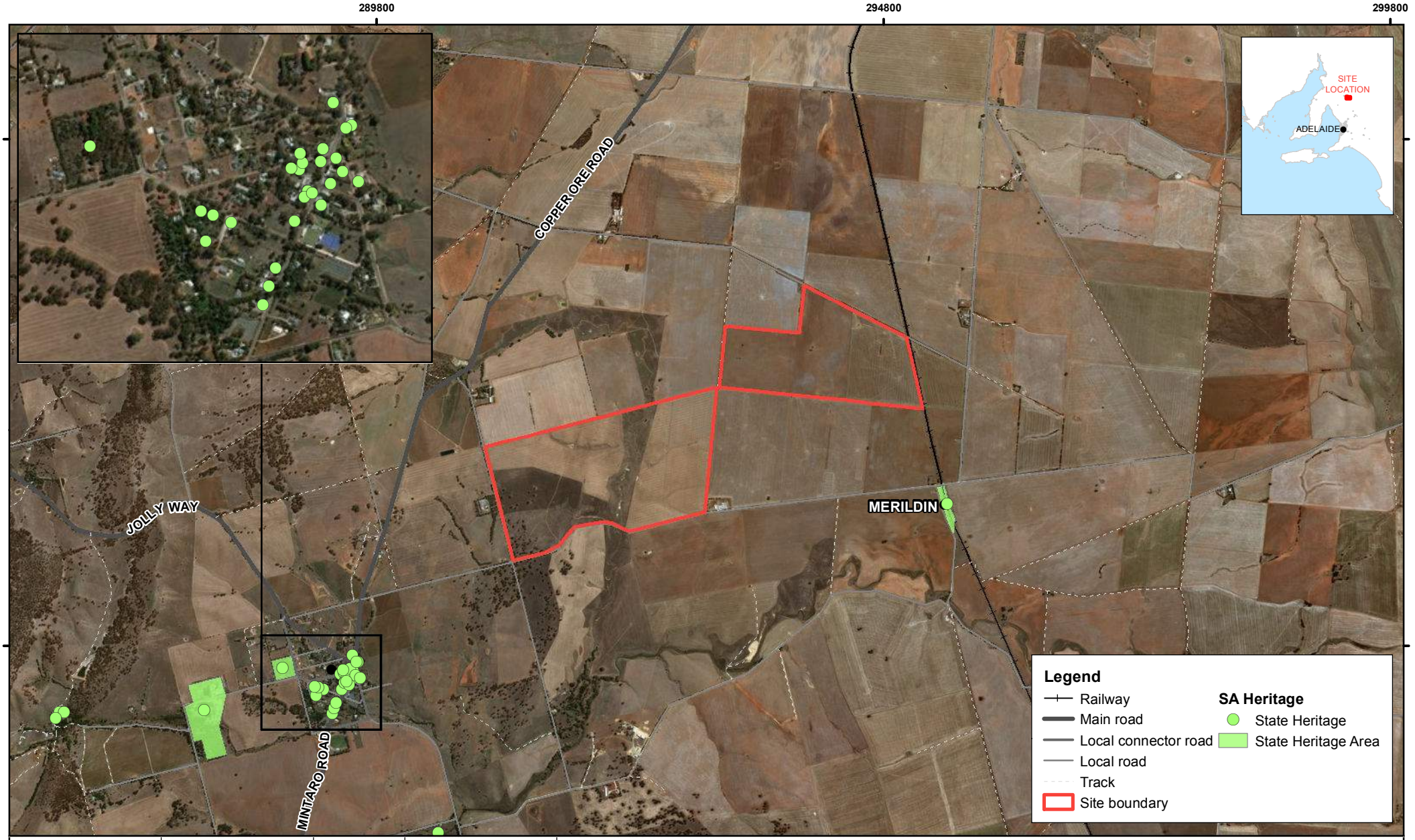
ADDRESS	DETAILS	CLASS	PROXIMITY TO SITE
Lot 34 Burra St	Reillys Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 36 and 37 Burra St	Row of shops and dwellings	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 35 Burra St	Shop and Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 37 Burra St	Shops and Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Ruin King St	Slate Farmhouse (R Alcock)	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 23 Hill St	St Peters Anglican Church	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Government Rd	St Stanislaus Catholic Church (former)	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 33 Hill St	Thompson Priest House and Mines Office	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 77 Wakefield St	Wakefield Cottage	Register of the National Estate	Within township. approximately 1.8-2.3 km south-west of the project area
Mintaro road, Merildin	Merildin Railway Station	Register of the National Estate	Approximately 1km south of the project area

Table 7.6 Heritage places in Mintaro and surrounds recorded on the South Australian Heritage Places Database

ADDRESS	DETAILS	CLASS	STATE HERITAGE PLACE NO	PROXIMITY TO PROJECT AREA
Burra Road MINTARO	Mintaro Institute and Civic Hall	State	11650	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Road MINTARO	Dwelling (former Shop and Dwelling)	State	11647	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Road MINTARO	Dwelling - Jolly House	State	11721	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Road MINTARO	Former Carpenter's Workshop and Dwelling	State	11643	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Road MINTARO	Mintaro Mews (former Shop and Dwelling)	State	11646	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Road MINTARO	Former Blacksmith Shop	State	11718	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Road MINTARO	Former Carpenter's Workshop/Stables	State	11720	Within township. approximately 1.8-2.3 km south-west of the project area

ADDRESS	DETAILS	CLASS	STATE HERITAGE PLACE NO	PROXIMITY TO PROJECT AREA
Burra Street MINTARO	Mounting Steps, Mintaro	State	10069	Within township. approximately 1.8-2.3 km south-west of the project area
Burra Street MINTARO	Dwelling (former Mintaro Police Station)	State	10205	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 22 Burra Street MINTARO	Shop and Cottage	State	11649	Within township. approximately 1.8-2.3 km south-west of the project area
Church Street MINTARO	Dwelling	State	11645	Within township. approximately 1.8-2.3 km south-west of the project area
Church Street MINTARO	Mintaro Primary School	State	11710	Within township. approximately 1.8-2.3 km south-west of the project area
Hill Street MINTARO	Former Mintaro Slate Mine Office and Dwelling	State	11707	Within township. approximately 1.8-2.3 km south-west of the project area
Hill Street MINTARO	Dwelling, Outbuilding and Fence	State	11709	Within township. approximately 1.8-2.3 km south-west of the project area
Kadlunga Road MINTARO	'Kadlunga' House and Stone Garden Wall	State	10200	Within township. approximately 1.8-2.3 km south-west of the project area
Leasingham Road MINTARO	Devonshire House (former Devonshire Hotel and Footway)	State	10066	Within township. approximately 1.8-2.3 km south-west of the project area
Leasingham Road MINTARO	Reillys Cellar Door and Restaurant, Heritage B&B Cottages (former Shop and Dwelling)	State	11648	Within township. approximately 1.8-2.3 km south-west of the project area
Lot 9 Leasingham Road MINTARO	Magpie and Stump Hotel	State	10201	Within township. approximately 1.8-2.3 km south-west of the project area
Manoora Road MINTARO	"Martindale Hall", Martindale Hall Conservation Park	State	10067	Approximately 2.6 km south-west of the project area
Mintaro Road MINTARO	Mintaro Cemetery	State	11715	Approximately 2.3 km south-west of the project area
Slate Quarry Road MINTARO	Mintaro Slate Quarries	State	11711	Approximately 3.1 km south-west of the project area
Wakefield Street MINTARO	Dwelling and Kitchen	State	11716	Within township. approximately 1.8-2.3 km south-west of the project area
Wakefield Street MINTARO	Dwelling ('Wakefield Cottage')	State	11714	Within township. approximately 1.8-2.3 km south-west of the project area
Wakefield Street MINTARO	Former Flour Mill	State	11644	Within township. approximately 1.8-2.3 km south-west of the project area

ADDRESS	DETAILS	CLASS	STATE HERITAGE PLACE NO	PROXIMITY TO PROJECT AREA
Young Street MINTARO	Dwelling (former Mintaro Anglican Church)	State	11695	Within township. approximately 1.8-2.3 km south-west of the project area
Young Street MINTARO	Dwelling	State	11699	Within township. approximately 1.8-2.3 km south-west of the project area
MINTARO	Mintaro State Heritage Area	State Her Area	13935	Covers whole of Mintaro township. The closest boundary is approximately 1.2km from the project area.



Map: PS103225_GIS_006_D	Author: pottsr
Date: 19/03/2018	Approved by: EFitzner

Source: Department of Planning, Transport and Infrastructure, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.6
Heritage Places in Mintaro and Surrounds

7.4.4 POTENTIAL IMPACTS

7.4.4.1 CONSTRUCTION

Any potential impacts on non-Indigenous heritage interests in the area during construction are unlikely. Potential sources of impact are:

- Vibration levels generated by compactors, vibration rollers and pile driving
- Trucks accessing the site through the Mintaro township.

Whilst vibration levels can generate structural damage, this is generally limited to a proximity of 25 m. All places of heritage interest are located at least 1 km away. Measures will be put in place to ensure construction traffic does not access the site via the Mintaro township.

7.4.4.2 OPERATION

The potential for impacts on non-Indigenous heritage interests in the area during the operation stage is low. Potential impacts may be to:

- The State Heritage Area status and amenity value of the township and surrounds
- The Mintaro State Heritage Area objective for 'reinforcement of the rural village character with minimal infrastructure'.

Any impacts would be negligible due the 3.5 km distance between the development site and the township. There is no potential for vibrations resulting from the operation of the facility to structurally impact heritage places.

7.4.5 MANAGEMENT AND MITIGATION MEASURES

7.4.5.1 CONSTRUCTION

The assessment has determined that no direct impacts from construction are expected on the heritage values of the Mintaro township and surrounds. Furthermore, a Traffic Management Plan and CEMP will be prepared for the project to ensure that workers are aware of the heritage values in the area and that there are no impacts to these places.

7.4.5.2 OPERATION

Potential impacts on the State Heritage Value objectives for Mintaro will largely be mitigated through the design layout of the solar farm.

The solar plant will be low in profile, comprising of panels which do not exceed three metres in height. The model of solar panel chosen for this project will not have metal frames in order to reduce glare impacts. Visual and glare studies have been undertaken as part of the Development Application and mitigation and management measures, such as screening, have been investigated as part of these reports. Refer to section 7.5 and Appendix J for visual amenity mitigation measures.

7.4.6 KEY RECOMMENDATIONS

The Chaff Mill Solar Farm will not impact any heritage places within the Mintaro township and surrounds.

The project may impact on the objectives of the Mintaro State Heritage Area, which include limiting the development of infrastructure and retaining views to agricultural land. Any impact would be mitigated through the design of the solar farm. Visual and glare studies have been undertaken as part of the Development Application and mitigation and management measures, such as screening, have been investigated as part of these reports.

A Traffic Management Plan and CEMP will be prepared to ensure that the heritage values of Mintaro are not impacted in any way. The access route for construction vehicles will not pass through the Mintaro township. All personnel working on the project site would be informed of their legal obligations regarding the protection of non-Indigenous heritage places.

Photo 7.8 Merildin Railway Station (renamed from 'Mintaro' in 1918) – located one kilometre away from the project site boundary

Photo 7.9 Merildin Railway Station (renamed from 'Mintaro' in 1918) - located one kilometre away from the project site boundary

7.5 VISUAL AMENITY

7.5.1 LEGISLATIVE AND POLICY REQUIREMENTS

Guidance is drawn from a broad range of relevant policy items within the Clare and Gilbert Valleys Council Development Plan. Infrastructure development should:

- Be sited and designed to blend with the natural features of the landscape.
- Protect areas of scenic or conservation significance from undue damage.
- Cause minimal damage to the natural landform.
- Screen and orientate infrastructure away from public view, tourist and scenic routes.

Further, the State Heritage Area (Mintaro) Objectives, require:

- Objective 1. Development that does not compromise the Statement of Heritage Value and contributes to the Desired Character for the Mintaro State Heritage Area.

The qualitative landscape character assessment was undertaken consistent with best practice, as prescribed by the *Guidelines for Landscape and Visual Impact Assessment (Third Edition).*

7.5.2 ASSESSMENT METHODOLOGY

A visual amenity assessment was undertaken for the Chaff Mill Solar Farm (Appendix J). The visual amenity assessment methodology involved:

- A desktop study of the topography and determination of the likely viewpoints from which the solar farm may be apparent
- A site visit to verify desktop assessment and assess existing conditions. Photographs were taken at selected viewpoints to underpin the landscape character and visual assessment
- Identification of visual receptors potentially affected by the proposed solar farm. These are locations from where it is considered the proposed solar farm is likely to be wholly or partially visible
- Landscape character assessment. In total 19 (nineteen) waypoints were visited to determine landscape character. These location of these waypoints are displayed on Figure 7.7 below
- Definition of place attachment value. 'Place attachment'; for the purpose of this report, is defined as a complex synergy of any number of relevant sensory and emotive qualities, which shape how individuals and communities perceive and connect to the landscape
- Identification of appropriate mitigation measures to reduce potential impacts.

7.5.3 EXISTING CONDITIONS

7.5.3.1 BROAD LANDSCAPE DESCRIPTION

The Clare Valley agricultural landscape contains fields bounded by occasional groups of scattered Eucalypts and scattered hedgerows. Sprawling traditional land holdings of pastural and cropping fields are visually punctuated by the occasional visually prominent vineyard. The presence of visually imposing, steel constructed barns and warehouses reinforce the utilitarian nature of the landscape and the growing regional focus being placed on wine production.

The landscape of the Clare Valley comprises of some of the region's most productive rural land. Its visual qualities make the landscape a significant tourism asset to the region. The landscape of the Clare Valley is in stark contrast to the landscape of the Mt Rufus and Mount Horrocks ranges to the east, comprised of a visual expanse of open, sparsely vegetated grazing land, within which the proposed solar farm development site will be located.

7.5.3.2 ISSUE-SPECIFIC SITE DESCRIPTION/BASELINE

The landscape character of the immediate development area was assessed in two distinct localities:

- The vegetated hillsides west of the Mintaro township
- The expansive eastern plains up to the A32 Barrier Highway

The vegetated hillsides to the west of the Mintaro township, bound by Leasingham Road to the southwest, Martindale Road to the south, and Farrell Flat Road to the north, broadly characterise the landscape to the west of Mount Horrocks and Mount Rufus. The agricultural land use defines the area with pastural land, crop grazing, and vineyards. The rolling topography, combined with the presence of mature native road side vegetation, adds an element of human scale to the landscape, with a tightly defined visual enclosure. The Mintaro township itself adds a rural, historic sense of place through its built form. Through the assessment, this locality was determined to be one of moderate to high scenic quality and of moderate to high sensitivity to change.

The expansive eastern plains up to the A32 Barrier Highway, bound by Copper Ore Road to the west and north, Martindale Road to the south, and the A32 Barrier Highway to the east, is a visually simple landscape. Vegetated hillsides to the west give way to a mostly flat landform of open pastoral and cropping fields. The area is generally void of significant boundary plantings, however occasional scattered groups of mature native trees cluster around the few residential dwellings; with occasional windmills, agricultural barns and stobie poles dotting the landscape. The Waterloo Windfarm to the distant east sits prominently on the horizon. Through the assessment, this locality was determined to be of a low scenic quality and of low sensitivity to change.

7.5.4 POTENTIAL IMPACTS

7.5.4.1 CONSTRUCTION

During construction, visual amenity impacts within the locality will occur because of earthworks, construction of additional minor infrastructure and the overall increase in the number of people and vehicles. As the changing visual environment and activity during construction will be temporary, the visual impacts of this phase were not considered in detail in the visual impact assessment.

7.5.4.2 OPERATION

Of the 19 (nineteen) locations visited during the assessment, eight were sensitive receptors (refer Figure 7.7 to Figure 7.14). A summary of the likely visual impacts of the solar farm is provided in Table 7.7. At most sensitive receptors, the predicted impact was determined to be only slightly adverse or non-existent and no mitigation measures were recommended.

At Sensitive Receptor seven, predicted impacts were determined to be substantially to moderately adverse. It was recommended the mitigation measures be considered for this receptor. For reference, Sensitive Receptor seven is located at the Chaff Mill Road intersection with Merildin Road. It comprises of agricultural storage buildings, with a residential property soon to be constructed.

Table 7.7 Summary of likely visual impacts of the Chaff Mill Solar Farm

SENSITIVE RECEPTOR	WESTERN PARCEL (PARCEL ONE)			EASTERN PARCEL (PARCEL TWO)		
	DISTANCE	EXPOSURE	IMPACT	DISTANCE	EXPOSURE	IMPACT
SR #01	0.6 km	Slight to moderate	Slight adverse to no change	2.4 km	None to slight	No change
SR #02	1.0 km	Slight	Slight adverse to no change	2.4 km	Slight to moderate	Slight adverse to no change
SR #03	Approx. 1.8 km	Slight	Slight adverse to no change	Approx. 1.8 km	Slight	Slight adverse to no change
SR #04	Approx. 1.5 km	Slight	No change to slight adverse	Approx. 1.5 km	Slight	No change to slight adverse
SR #05	Greater than 3.7 km	Negligible	No change	3.7 km	Negligible	No change
SR #06	Greater than 0.6 km	Slight to negligible	No change	Approx. 0.6 km	Slight to negligible	No change
SR #07	Approx. 200+ m	High	Substantially to moderately adverse	Greater than 200 m	Slight	Slightly adverse to no change
SR #08	3.3 km to 2.7 km	Moderate	Slightly adverse	3.3 km to 2.7 km	Slight	No change

Figure 7.7 Sensitive receptor one

Figure 7.8 Sensitive receptor two

Figure 7.9 Sensitive receptor three

Figure 7.10 Sensitive receptor four

Figure 7.11 Sensitive receptor five

Extensive screen planting on the western and southern boundaries and around the dwelling will exclude all views of both the nearby Parcel Two and Parcel One which lies beyond.

Figure 7.12 Sensitive receptor six

Figure 7.13 Sensitive receptor seven

Figure 7.14 Sensitive receptor eight

7.5.5 MANAGEMENT AND MITIGATION MEASURES

Mitigation measures were recommended for SR#7. On-site opportunities should be found along the eastern boundary of the eastern parcel for the introduction of quick growing native screen planting – to be delivered when construction commences. It is recommended that this vegetation / screening plan be implemented in consultation with the residents; who have expressed a desire to be involved in the design of any vegetation mitigation program that affects their property.

It is considered unnecessary to screen views from adjacent roads within the locality as these roads are for local traffic only and the volume and frequency of traffic movement is low. It is recommended that where desirable, visual mitigation is undertaken on an individual site basis and should comprise of screen planting using indigenous and native vegetation.

7.5.6 KEY RECOMMENDATIONS

The introduction of the solar farm does not change the mainly pastoral nature of the locality and wider contextual landscape, nor does it impact on any significant viewpoints within the contextual landscape. The nature and visual qualities of the Expansive Eastern Plains Character Unit will not be significantly altered.

The solar farm will meet the Provisions of the Development Plan which requires it to be 'sited and designed to blend with the natural features of the landscape' and to 'cause minimal damage to the natural landform'.

It has been demonstrated that, where necessary, the likely visual impact on the identified sensitive receptors can be managed through visual mitigation introduced through vegetative screening.

The sense of place and place attachment values of Mintaro township will not be detrimentally impacted. As required by the Provisions of the Development Plan the development will:

- 'Protect areas of scenic or conservation significance from undue damage'
- 'Not compromise the Statement of Heritage Value'.

The solar farm would introduce a new infrastructure element of an acceptable design standard that will evoke curiosity, become an 'incidental' infrastructure feature of merit and a best practice example of progressive renewable energy delivery.

With the application of the recommended mitigation measures, the proposed Chaff Mill Solar Farm will have a negligible to slightly adverse only visual impact within a locality and character unit of low scenic quality. In saying this; FRV plan to work with the owners of the property on the corner of Merildin and Chaff Mill Roads who will be the most impacted (out of all residences in the area) by the visual appearance of the solar farm. The owners of this land / property have written to FRV expressing their desire to be involved in any decision-making regarding visual mitigation measures. Their letter is attached as Appendix K.

7.6 GLARE

7.6.1 LEGISLATIVE AND POLICY REQUIREMENTS

The assessment guidelines listed in section 2.3 cite glare as an issue to be investigated when undertaking environmental studies for proposed solar farm developments, however no legislative or policy documentation is prescribed.

The Civil Aviation Safety Authority (CASA) and the Department for Planning, Transport and Infrastructure (DPTI) have not published specific regulations regarding solar farm glare relating to aviation or road safety (refer section 7.14 for further information on glare the impacts of glare on aviation safety).

7.6.2 ASSESSMENT METHODOLOGY

A glare assessment was undertaken to assess the potential glare impact of the proposed Chaff Mill Solar Farm (Appendix L). The assessment methodology involved a viewshed analysis and the use of the Solar Glare Hazard Analysis Tool (SGHAT).

The viewshed analysis considered the location of sensitive receptors, relative to the solar farm and view lines between the two (accounting for topography).

The SGHAT (2.0 and 3.0), developed by Sandi National Laboratory, was utilised to assess potential glare caused by the Chaff Mill Solar Farm. SGHAT considers the following factors:

- Latitude and longitudinal coordinates
- Elevation
- Sun position
- Vector calculations
- PV module orientation
- Reflectance environment
- Ocular factors.

Once the potential for glare was identified through the viewshed analysis and SGHAT, a risk assessment approach was used to identify the potential significance of the risk based on the magnitude of the glare hazard generated and the sensitivity of the receptors.

7.6.3 EXISTING CONDITIONS

The baseline condition within the vicinity of the project area is characterised by flat to undulating agricultural land. The landscape is predominately cleared with some native vegetation remaining along road verges, creeks and drainage lines. Existing dwellings in the area include homesteads which are scattered across the landscape and are generally located in association with agricultural buildings. There are a small number of dams within the vicinity of the project area. The closest buildings to the project area are agricultural storage buildings located at the intersection of Chaff Mill and Merildin Roads. A proposed residential dwelling is currently under construction on this property.

There are no significant existing features in the landscape with the potential to contribute to glare.

7.6.4 POTENTIAL IMPACTS

The main elements of the solar farm with the potential to induce glare are the tilt, orientation and optical properties of the PV modules in the solar array and the rotational capabilities of the tracking system.

The results of the SGHAT modelling found that:

- No glare hazard potential is likely to affect existing rural and residential dwellings within the vicinity of the project area
- There is potential for glare hazard to occur when travelling along Merildin Road adjoining the south-east corner of the project area, notably at the intersection with Chaff Mill Road. The glare hazard potential occurs in the morning from around 5 am-11 am
- Potential glare hazard may affect the residential dwelling currently under construction adjoining the intersection of Chaff Mill and Merildin Roads
- No glare potential was identified for Copper Ore Road and other minor roads.

7.6.5 MANAGEMENT AND MITIGATION MEASURES

The sections of Merildin and Chaff Mill Roads adjoining the south-eastern corner of the project area, where potential glare hazard was identified, are currently not fully screened by existing vegetation. Proposed mitigation of this glare potential is a minimum 3.5 m high screen planting along the south-eastern boundary of the project area where it adjoins Merildin Road. The planting should extend along Chaff Mill Road, approximately 130 m from the intersection with Merildin Road, to provide sufficient screening to Chaff Mill Road and the rural dwelling under construction. The planting should be of sufficient density to screen potential glare, a minimum width of 5 m containing dense shrubs and tree planting is likely to provide the screening required. The screen planting would be undertaken prior to operation. This planting program would be designed and implemented in consultation with the property owners.

7.6.6 KEY RECOMMENDATIONS

Mitigation of potential glare on travellers along the affected Merildin Road section and intersection with Chaff Mill Road and the residential dwelling currently under construction at this intersection would be undertaken with the establishment of a vegetation screen planting. This planting would be established prior to operation of the solar farm and be maintained as a dense vegetation screen to a minimum height of 3.5 m.

7.7 GEOTECHNICAL

7.7.1 LEGISLATIVE AND POLICY REQUIREMENTS

7.7.1.1 ASSESSMENT METHODOLOGY

The geotechnical study was undertaken to better understand the likely subsurface conditions which will be encountered across the site and assist in identifying issues which may be encountered during construction.

The study involved a review of available information, including databases, industry adopted technical documents and geology maps.

7.7.2 EXISTING CONDITIONS

7.7.2.1 REGIONAL GEOLOGY

A review of the South Australian Resources Information Gateway (SARIG) database shows historic boreholes drilled within 3 km of the proposed sites encountered low to medium plasticity sandy clays and silts overlaying highly weathered shale and hard to very hard slate. The shale and slate was encountered at depths as shallow as 3.5 m below ground level in some areas.

SOILS

The Soil Map of Northern Agricultural Areas of South Australia 1: 506,880 indicates sandy and clayey red-brown earths to be present at the two sites with dark brown cracking clay and terra rossa soils (shallow residual formations, red or red-brown in colour and developed from limestones or other highly calcareous rocks).

The 1:2,000,000 Soil Map of Australia (1958-1968) indicates the Mintaro area soil comprises unbleached A2 horizon and pedal subsoils. Pedal soils are characterised as having individual particles of soil that are held together, either by chemical or organic means, creating peds, or lumps. The structure of pedal soil allows the soil to retain moisture within the ped and still allow draining and air movement between the peds.

GEOLOGY

Published information (Forbes, 1964) indicates the underlying geology of the location north-east of the Mintaro area comprises recent Quaternary slope alluvium including outwash and soils, with some coarse gravels derived from older alluvium.

Tertiary deposits are recorded as being present in areas of Site 1, comprising sandstone, sandy gravel, ferruginous (containing iron oxide or rust) gravel, and siliceous duricrust. Watervale Sandstone Member of the Burra Group is also present underlying areas of Site 1 and is characterised by fine to coarse grained feldspathic quartzite and orthoquartzite.

7.7.2.2 GROUNDWATER

A review of the South Australian Government's WaterConnect database was performed for previously investigated boreholes within a 3 km radius of the sites and indicates the groundwater table in the area is generally located greater than 12 m below ground level.

Due to the Wookie Creek watercourse and its seasonal fluctuations in water heights, there is a possibility that groundwater may be intersected at a shallower depth in this vicinity.

7.7.2.3 ACID SULPHATE SOILS (ASS)

Based on the Australian Soil Resource Information System (ASRIS), it is very unlikely that the site is underlain by ASS. ASRIS lists it as having an 'extremely low probability of occurrence' (a confidence level of 4) for ASS in the near-surface materials of the natural soil profile.

7.7.2.4 SEISMIC ACTIVITY

Potential earthquake damage at a site is related to the distance from an earthquake epicentre, its magnitude, and its intensity. Magnitude is a quantitative value computed from seismograph data, whilst intensity is a qualitative value based on how people and objects respond to an event. There have been no significant earthquakes (defined as having a magnitude of 3.5 or greater) recorded by Geosciences Australia in Mintaro area within the last 60 years.

Seismic activity recorded in the Mintaro area as measured by the Geoscience Australia Earthquake Database indicates the area generally has low seismic activity. The largest recorded earthquake within 100 km of the Mintaro area, with a magnitude of 2.5, occurred on 24 July 2017 and was found to have an epicentre located 30 km north-east of the proposed sites.

7.7.3 POTENTIAL IMPACTS

Historical data indicates hard to very hard rock (shale and slate) could be encountered at shallow depths and may require a rock breaker attachment used during construction excavation.

Soft soil materials including alluvium (sands and gravels) may impact shallow footings. Geotechnical laboratory testing would be required to assess the subsurface material for bearing capacity and settlement.

Local knowledge of the soils and topsoils indicates that the ground can become quite wet and boggy during periods of rainfall. This would present a risk for accessing the site with plant equipment for geotechnical drilling investigations and during the construction phase. Published information states the soil is moderately well drained and unlikely to remain wet for more than a week.

7.7.4 KEY RECOMMENDATIONS

WSP recommends that detailed site geotechnical investigation be undertaken once the design of the solar farm is more defined. The investigations would include analysis of the subsurface soil profile (including laboratory analysis) to obtain engineering properties and parameters of the underlying soil and geology of the sites to inform the detailed design of the solar farm infrastructure.

A Safe Work Method Statement (SWMS) and Health, Environmental, and Safety plan should be created prior to attending site and should specifically address the potential for vehicles and plant equipment getting bogged during wet weather. These documents should include the use of engineering aids for accessing the site and vehicle recovery. Site workers should have training/experience in safe operation of 4WD vehicles and vehicle recovery.

7.8 TRAFFIC AND ACCESS

7.8.1 LEGISLATIVE AND POLICY REQUIREMENTS

The following legislation and policy documents are relevant to traffic and access requirements for the Chaff Mill Solar Farm:

- *Road Traffic Act 1961*
- *Environment Protection Act 1993*
- *Heavy Vehicle National Law Act 2013*
- Clare and Gilbert Valleys Development Plan.

7.8.2 ASSESSMENT METHODOLOGY

A Traffic Impact Assessment (TIA) was prepared for the Chaff Mill Solar Farm (Appendix M). The objective of the TIA is to identify any key traffic operational and safety issues that may arise out of the construction and operational phases of the project and to suggest measures that may mitigate these. This assessment is based on a desktop assessment and site inspections (undertaken on 11 January and 15 March 2018) of roads and traffic operations at and surrounding the proposed site. The site inspections assessed current road condition to identify any existing safety hazards and determine their capacity to carry additional traffic if required. These inspections together with traffic usage provides a basis for the assessment of any impacts associated with the proposed solar farm.

The assessment approach involved:

- Determining the existing (baseline) road and traffic conditions near the project that may be impacted by the proposed project
- Developing an understanding of the construction staging and traffic generating activities
- Identifying and assessing options for access to the project site
- Estimating the volume, type, frequency and patterns of traffic movements associated with the construction and ongoing operations activities of the project
- Assessing the impacts of the traffic generated by the project on the existing (baseline) road and traffic operations
- Identifying and suggesting mitigation measures that may be implemented to minimise or eliminate these impacts.

7.8.3 EXISTING CONDITIONS

7.8.3.1 ROAD NETWORK LAYOUT AND SITE ACCESS

Mintaro is located between two major arterial roads; 13 km west of the Barrier Highway (A32 linking Gawler with Sydney via Broken Hill) and 8km east of the Horrocks Highway (the B82 – Main North Road – which joins the A32 at Giles Corner about 35 km to the south and provides access to the mid-north via Clare). These roads are sealed two-lane undivided roads.

Road access to the project area is provided by:

- Merildin Road which connects Copper Ore Road approximately 600 m north of Mintaro. The south west corner of the west section land parcel at Wookie Creek Road is approximately 1.5 km east of the Copper Ore Road intersection. The south west corner of the east section land parcel is located a further 2.1 km east along Merildin Road then 1.2 km north along Chaff Mill Road.
- Wookie Creek Road (west land parcel only) which connects with Copper Ore Road at its norther end about 3 km north of Mintaro and 800 m to the north-west corner of the west section land parcel.

- Flagstaff Road which connects the Barrier Highway to the east of the project site and about 13 km north of Manoora and then via Riley Road/Merildin Road. It is about 8.5 km from the Barrier Highway to the junction with Chaff Mill Road and a further 2.1 km to the junction with Wookie Creek Road.
- Chaff Mill Road runs between the two land parcels linking Merildin Road and Faulkner Road.

These roads are all unsealed. Chaff Mill Road and Faulkner Road are narrow unsealed roads suitable for dry weather access only.

7.8.3.2 DESCRIPTION OF ROADS

BARRIER AND HORROCKS HIGHWAYS

These two rural arterial roads are sealed with formed shoulders and (centre and edge) line marking. Both roads are gazetted B-double routes which means they have been assessed and are of an appropriate standard to allow for use by restricted access vehicles (RAV) without the need for special permits.

The subject 27 km section of the Barrier Highway passes through the townships of Saddleworth, Riverton and Manoora. The vertical and horizontal alignments through this section are of a high standard with few small radii curves.

The subject 40 km section of the Horrocks Highway passes through six towns including Auburn. The vertical and horizontal alignments through this section are also of a reasonable standard and the section includes overtaking lanes in both directions. The apparent poor physical condition of the Horrocks Highway has been the subject of adverse public comment in recent years which has been supported by the RAA. This issue relates to the more highly trafficked sections north of Gawler and less so in the section north of Giles Corner.

MINTARO-LEASINGHAM ROAD

This road is a narrow sealed road with gravel shoulders. It is generally flat (i.e. no significant vertical grades) and exhibits long straight sections with intermittent horizontal curves. Some of these curves are quite tight and reduced speeds are required to negotiate these. There are numerous trees located close to the road posing safety hazards but not unlike many other rural roads of its type. Through the Mintaro township there are no shoulders. The road is not generally considered to be conducive to significant use by large heavy vehicles (such as semi-trailers) without some improvements along parts of its length to improve curves and sight distances, widen shoulders and provide protection from roadside hazards.

MINTARO-MANOORA (MIN-MAN) ROAD

This road is a sealed road about 7.5 m wide and with minimal shoulders. The alignment consists of straight sections with intermittent curves. Many of these curves have small radii and are treated with advisory speed signs (50, 60 and 70 kph). There are numerous small crests having slight grades. The road has painted centrelines, edgelines and barrier lines (around curves and over crests). There is evidence in numerous locations of significant stormwater erosion which may appear to undermine the pavement structure. It is assumed that this would be exacerbated with further wet weather. Vehicles riding off the pavement edge at these locations may lose control.

MINTARO-FARRELL FLAT (COPPER ORE) ROAD

The inspection was limited to the section between Mintaro and the junction with Faulkner Road. The road exhibits similar characteristics to the Mintaro-Leasingham Road with some crests that restrict sight distance and warrant limits on overtaking.

JOLLY WAY (MAIN NORTH ROAD TO COPPER ORE ROAD)

The alignment of this sealed road consists of a combination of straight sections and curves having varying radii through level to undulating topography. There are sections of road where visibility of oncoming traffic is restricted and hence overtaking without care may be problematic. The road is delineated with painted centrelines, edgelines and barrier lines over some crests and around some curves (preventing overtaking), Some of the curves are signposted with advisory speed signs and other warning signs and a guardrail is located on the outside of those curves where there is a drop off. There are two curves where the advisory speed signs are 50 kph and 45 kph (S-vend). Although the design standard of the vertical

and horizontal alignment of this road is lower than the posted speed limit, appropriate safety measures appear to have been implemented to both reduce the risk of crashes occurring and the severity of crashes should these occur. Overall the road did not present any foreseen significant safety issues. At the western end of the road, it is crossed by the Riesling Trail – a shared use path along a disused rail corridor. Tourist cyclists reportedly use this path and then Jolly Way to access the wineries abutting Jolly Way further to the east.

CATHOLIC CHURCH ROAD (JOLLY WAY TO COPPER ORE ROAD)

This is a narrow, unsealed road about 750 m in length with no shoulders. It is generally straight and exhibits a slight uphill grade from east to west at its western end. It connects to Jolly Way via a T-junction and to Copper Ore Road with a four-way intersection opposite Merildin Road.

MINTARO-MERILDIN ROAD

This road is a narrow unsealed road with no effective shoulders. At the time of inspection there were significant sections of road with loose gravel on the road surface. It appears likely that the road would be slippery to traverse when wet. The riding surface was corrugated in parts indicating that re-grading and possible re-sheeting is required in selective areas. Long grass and trees of varying sizes occupy the road verges, some of which pose safety hazards due to insufficient clearance from the road edge. There are unprotected drop-offs of varying heights along the road which pose a safety hazard for errant vehicles. There are several horizontal curves around which sight distance is restricted and in one location there is a dangerous combination of vertical and horizontal curves. A short 300 m section of road has been sealed around a combination S-curve.

The road does not appear to be well used by traffic. The road provides access to a small number of farming residences (east of the project site) and adjacent land and there is likely very low exposure to the safety risks identified. In its current form, the road would not be conducive to use by any significant increase in light vehicle traffic or use by heavy or long vehicles.

Photo 7.10 Mintaro – Merildin Road (looking west from intersection with Wookie Creek Road)

FLAGSTAFF ROAD/RILEY ROAD

These roads exhibit similar characteristics to Merildin Road. Flagstaff Road is misaligned at and connected by a 450 m long section of Riley Road. The horizontal curves at either end of these connections exhibit very small radii which are difficult to negotiate without encroaching onto the opposite side of the road. Sight distance is restricted in all directions.

WOOKIE CREEK ROAD

This road is a narrow, unsealed road with minimal pavement and no shoulders. It appears likely that the road would be slippery to traverse when wet. The road alignment is quite straight and is flanked by natural vegetation including some large trees close to the road which pose a safety hazard for errant vehicles. The road passes through several cuts in the natural topography and it appears there is little if no provisions to carry stormwater away from the road.

The road does not appear to be well-used by traffic. During the inspection, no other cars were observed. The road provides access to adjacent land (including the existing substation) and is a convenient link between Merildin Road and Copper Ore Road. In its current condition the road would not be conducive to use by any significant increase in traffic volumes.

CHAFF MILL ROAD

This is a narrow, earth-formed road having no shoulders. It is sign-posted as a dry weather road as it has not been raised above the natural ground level and is subject to impacts of wet weather. During the inspection, the road was quite firm but it operates as a single-lane track with worn wheel tracks evident either side of an earth mound. The road is clearly not conducive to general use in its present form.

Photo 7.11 Chaff Mill Road

MARTINDALE ROAD

Martindale Road runs west-east from Min-Man Road to Bowmans Road. It is a narrow unsealed road in a wide road reserve and is generally flat and straight apart from a low-speed S-bend between Hare Road and Mintaro-Manoora Road. The pavement condition is poor in places and there is no stormwater drainage along its length. There appears to be potential for flooding in wet weather. Martindale Hall, a key tourist attraction for the area, has driveway access off this road.

Photo 7.12 Martindale Road looking east from Min-Man Road

HARE ROAD

Hare Road runs north-south connecting Martindale Road (approximately 1 km from Min-Man Road) with Merildin Road, and is about 2.2 km in length. There is one residence (no. 159) located immediately adjacent the road. The road is straight, narrow and unsealed and there are numerous large trees close to the road edge. It is low-lying with no stormwater drainage and is clearly subject to flooding. There is a moderate uphill grade (south to north) part way along its length and pavement condition overall is quite variable.

Photo 7.13 Hare Road looking north towards the uphill grade

FAULKNER ROAD

This is another earth-formed road with no shoulders. It runs generally west-east and connects Copper Ore Road with Chaff Mill Road. The eastern end of the road abuts the boundary of the east section of land.

7.8.3.3 INTERSECTIONS

COPPER ORE ROAD-MERILDIN ROAD-CATHOLIC CHURCH ROAD

This four-way intersection of a sealed main road and two unsealed roads is in an 80 kph posted speed limit zone. Copper Ore Road exhibits a slight right-hand bend from south to north. Merildin Road is located on the inside of this curve. The visibility of oncoming traffic from both directions along Copper Ore Road is restricted by vegetation. The intersection is inconspicuous and would be difficult to identify at night time.

Photo 7.14 Intersection of Copper Ore Road and Mintaro – Merildin Road

COPPER ORE ROAD-WOOKIE CREEK ROAD

This junction of a sealed main road and an unsealed road is located in a 110 kph posted speed limit zone. Cooper Ore Road exhibits a slight crest on the southern approach to the junction and a left-hand curve on the northern approach. The visibility of oncoming traffic from both directions along Copper Ore Road is restricted by the road geometry. The intersection is inconspicuous and would be difficult to identify at night time.

BARRIER HIGHWAY-FLAGSTAFF ROAD-WINDERS ROAD

This four-way intersection of a sealed main road and two unsealed roads is located in a 110 kph posted speed limit zone. The alignment of the Barrier Highway on the approach to and through the intersection is straight and flat. There is no roadside vegetation to restrict visibility. Culverts located either side of Flagstaff Road and passing under the highway prevent vehicles from taking generous radii turns and must therefore slow down significantly to negotiate the tight right angle manoeuvre. This might lead to rear-end crashes on the main road (in particular). The intersection is inconspicuous and would be difficult to identify at night time.

BARRIER HIGHWAY – MIN-MAN ROAD

This acute angled T-junction is located on the northern side of the Manoora township in a 60kph speed zone. Approaching the junction from the north, the Barrier Highway exhibits a right-hand bend, is on moderate downhill grade and passes over a disused railway crossing. The curve restricts visibility of the junction and traffic entering the Barrier Highway from it. Min-Man Road approaches the junction at an acute angle and this combined with the curve on the northern approach of the Barrier Highway makes it very difficult for drivers entering the Barrier Highway to see oncoming traffic (refer Photo 7.15). Large trucks making a right hand turn from Min-Man Road from a standing start would take some time to accelerate and may impede southbound traffic on the main highway.

Photo 7.15 Barrier Highway – Min-Man Road junction looking north

MERILDIN ROAD-WOOKIE CREEK ROAD-HARE ROAD

This four-way intersection comprises four unsealed road approaches at right angles. There is also a gated entrance to a property located on the north-eastern corner. The alignment of all four roads is straight and visibility from Wookie Creek Road of approaching traffic on Merildin Road is reasonable. However, as the roads are unsealed there is no delineation at the intersection and the intersection is inconspicuous. It is likely that in the event of wet weather, vehicles may experience difficulties in stopping at the intersection should the need arise.

MERILDIN ROAD-CHAFF MILL ROAD

This T-junction of unsealed roads is located on a slight grade on Merildin Road. Visibility of west-bound traffic on Merildin Road from Chaff Mill Road is restricted by the slight crest on the road. The junction is inconspicuous.

HORROCKS HIGHWAY-JOLLY WAY

This T-junction is located in a 100 kph zone. The northern approach of the Horrocks Highway exhibits a left hand bend which restricts sight distance to about 200 metres. There is a short (left turn) deceleration lane on the northern approach but there is no right turn lane for traffic entering the junction from the south. Right turning vehicles may impede following traffic. There is an approximate level difference of about 1 metre between road junction and the adjoining land on the south-east corner and accordingly the left turn movement from Jolly Way is via a right angle turn. Large vehicles are likely to encroach into the adjacent traffic lanes when turning left and at the time of the inspection there was evidence of tyre marks supporting this assumption. Also in the same corner, there are small diameter trees abutting the road and a length of guard rail fence.

MIN-MAN ROAD – MARTINDALE ROAD

The T-junction is located about 100 metres north of the driveway entrance to Martindale Hall. It is quite inconspicuous from the southern approach as there is no junction warning sign. The stem of the junction is quite narrow and there is a stand of trees on both corners. The apron of the junction is unsealed and there is loose material on the surface which could hinder stopping or turning vehicles. Trucks would have to cross onto the opposite side of the roads to negotiate left and right turns out of and into the junction.

MARTINDALE ROAD – HARE ROAD

This T-junction comprises unsealed roads and is quite inconspicuous from all approaches. There is a stand of trees on the south-west corner that restricts sight distance from the west approach of Martindale Road (refer Photo 7.16). Sight distance is otherwise good. The junction pavement surface was of variable condition and there is loose materials in the junction area and on the approaches which might be a hazard for stopping and turning vehicles. Large vehicles turning at the junction would encroach into the opposite side of the road.

Photo 7.16 Martindale Road – Hare Road junction

7.8.3.4 COMMENTS

Inspection of the existing unsealed roads and junctions identified concerns regarding:

- The geometric standard of the roads
- The condition of the road pavements
- Safety hazards including trees close to the road and unprotected drop offs around curves
- Restricted visibility and inconspicuous intersections.

None of the roads described above (either sealed or unsealed) are lit and the above safety risks would be exacerbated at night time. None of the unsealed roads in their existing condition are considered suitable to accommodate any significant increase in use, particularly by large trucks.

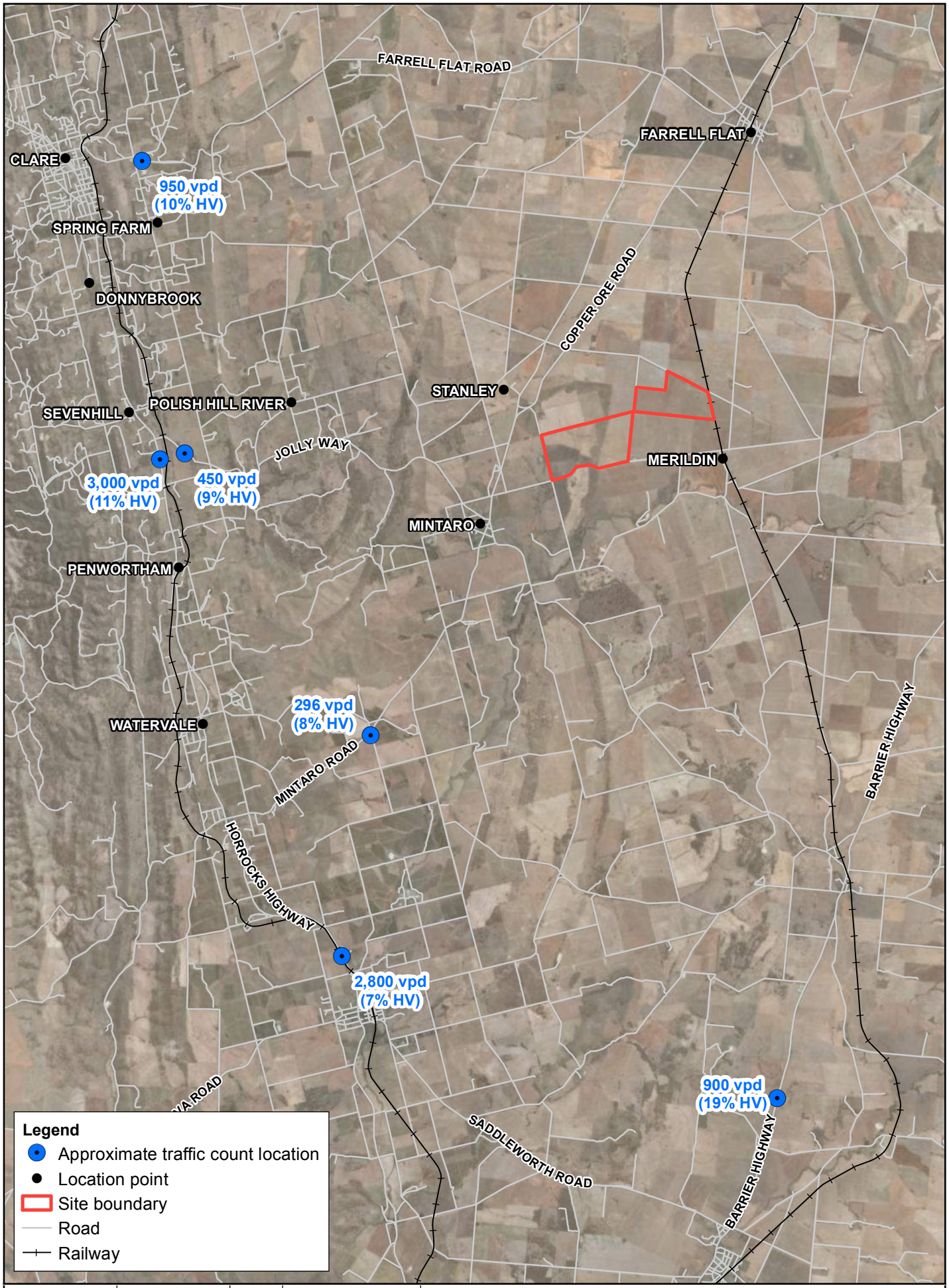
7.8.3.5 TRAFFIC

Based on observations and assessment of the surrounding land uses and the road network configuration, the overall level of traffic using the roads of interest is likely to be low. Traffic counts are shown in Figure 7.15. There is no information on traffic volumes available for the unsealed roads near the subject site. The unsealed roads in the immediate vicinity of the project site would be expected to carry no more than 50 vehicles per day (at the very most).

It is anticipated that during grain-carting season, some sections of some of these roads may experience relatively high volumes of truck traffic for a short period.

7.8.3.6 CRASHES

There are no records of road crashes on the unsealed roads. Along Jolly Way, two crashes occurred in the five years between 2012 and 2016. One crash was reported along Copper Ore Road, in the five years between 2012 and 2016.



Map: PS103225_GIS_012_C | Author: brownma2

Date: 19/03/2018 | Approved by: EF

0 1,000 2,000 m

1:125,000

Coordinate system: GDA 1994 MGA Zone 54

Scale ratio correct when printed at A4

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 7.15
Traffic Counts on Arterial Roads

7.8.4 TRAFFIC ACCESS AND IMPACTS

7.8.4.1 CONSTRUCTION

Construction of the solar farm will be undertaken in two stages; both generating light and heavy vehicle trips. The expected traffic generation from stages one and two is 50-100 and 100-200 light vehicle trips per day respectively (based on an assumption that the construction workforce will reside off site and travel to the project site daily, with some sharing rides).

The construction traffic represents a significant proportional increase in the traffic volumes currently using the sealed and unsealed road network. The increased traffic volumes on unsealed roads will be significantly higher than existing but only on relatively short sections of road and sections which do not pass by adjacent residences.

The increased level of traffic will increase exposure to safety risks and these will need to be mitigated. The increased traffic will also accelerate the deprecation of the road surfaces. The areas of greatest concern are:

- Conflicts at intersections. Vehicles turning to and from side roads onto major roads will need to select appropriate gaps in traffic to cross or enter the road
- Vehicles leaving the road on the approaches to and departures from tight radii curves
- Vehicles overtaking over crests having poor sight distance
- Vehicles travelling at inappropriate speeds along particularly unsealed road sections and losing control
- Vehicles losing control on loose gravel particularly on narrow roads and around curve.

Alternative access locations for light and heavy vehicles are discussed below and compared in Table 7.8.

LIGHT VEHICLE ACCESS

From the intersection of Copper Ore Road with Catholic Church/Merildin Road) four route/access options are considered for the project site. These are shown in Figure 7.16 and described below:

- Option A: Site access on Wookie Creek Road at the north-west corner of the west section as indicated in the layout plan. Route comprises 2.5 km along Copper Ore Road, then 750 m south along the unsealed Wookie Creek Road to the site entry.
- Option B: Site access on Wookie Creek Road near the existing substation. Route comprises 1.5 km along Merildin Road then 600 m north along the unsealed Wookie Creek Road the site entry.
- Option C: Site access on Merildin Road nominally east of the junction with Wookie Creek Road. Route comprises about 1.8 km east along the unsealed Merildin Road from the Copper Ore Road.
- Option D: Site access on Chaff Mill Road nominally 500 metres from Merildin Road. Route comprises 3.5 km east along the unsealed Merildin Road and about 500 metres along the unsealed Chaff Mill Road.

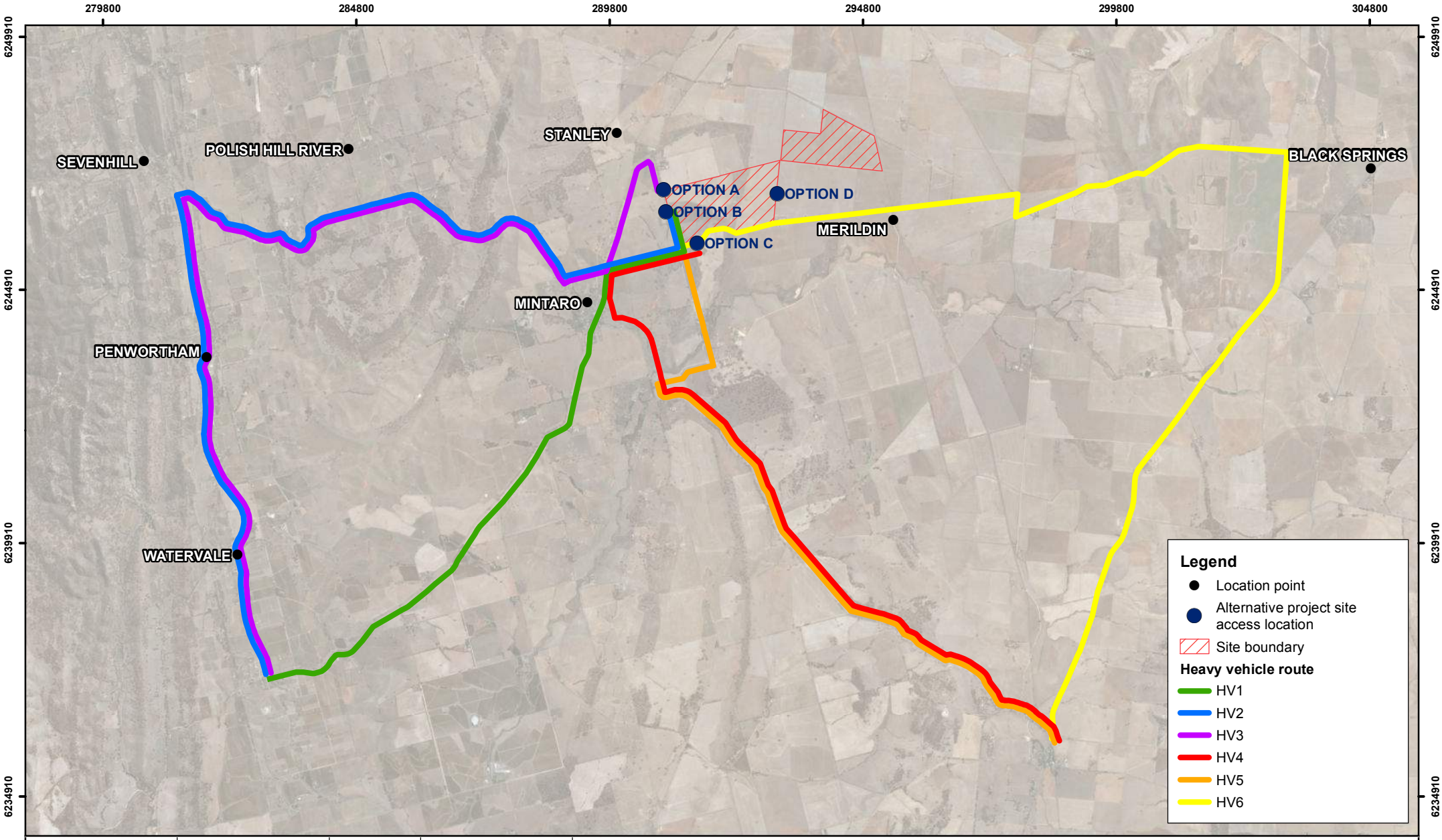
HEAVY VEHICLE ACCESS

The preferred route for heavy vehicle access would be a compromise of relevant factors including safety, vehicle operating costs (travel distance and driver time) over the duration of the construction period, the costs of upgrading and maintaining sections of any unsealed roads and the impacts of truck movements on amenity for residents and the wider community along the routes.

Six alternative routes to the project site (taken from Giles Corner where the Horrocks Highway and Barrier Highway diverge) are shown in Figure 7.16 and are:

- Option HV1: Horrocks Highway to Mintaro via the Mintaro-Leasingham Road (about 42 km) then a further 2 km along Merildin Road to Wookie Creek Road (access Option B). This route travels through Mintaro township.
- Option HV2: Horrocks Highway to Mintaro via Jolly Way (about 51 km) and then a further 2 km along Merildin Road and Wookie Creek Road (access Option B). This route avoids travel through Mintaro township.

- Option HV3: Horrocks Highway to Mintaro via Jolly Way (about 51 km) and then a further 3.2 km along Copper Ore Road and 700 m south along Wookie Creek Road (access Option A). This route avoids travel through Mintaro township and avoids travel on Merildin Road.
- Option HV4: Barrier Highway to Mintaro via Mintaro-Manoora Road (about 43 km) and then a further 2 km along Merildin Road and Wookie Creek Road (access option B). This route travels through Mintaro township.
- Option HV5: Barrier Highway to Mintaro via Mintaro-Manoora Road and then Martindale Road and Hare Road to Merildin Road (about 42 km, access Option C). This route avoids the Mintaro township incurring travel along 3.8 km of unsealed narrow roads.
- Option HV6: Barrier Highway and then via Flagstaff Road-Riley Road-Merildin Road (54 km, access Option C). This route avoids both Mintaro and Manoora townships.



Map: PS103225_GIS_007_D	Author: pottsr
Date: 19/03/2018	Approved by: EFitzner

Source: Department of Planning, Transport and Infrastructure, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 1,000 2,000 m

1:100,000

Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.16
Heavy vehicle access routes

Table 7.8 Alternative access locations

ACCESS LOCATION	ADVANTAGES	DISADVANTAGES	COMMENTS
Option A Wookie Creek Road (North) As per Indicative Layout Plan	**Light vehicles:** Trips to and from Clare via Catholic Church Road involve left and right turns to/from Copper Ore Road at intersections with Catholic Church Road and Wookie Creek Road. **Heavy vehicles:** Predominantly sealed route for majority of trip via Horrocks Highway/Jolly Way. Comparative route length to Barrier Highway via Flagstaff/Merildin Road. Internal road network shown in the indicative layout could be extended to allow vehicles to access the east section via a short section of Chaff Mill Road if required. Requires upgrade of a relatively short section of unsealed road and two junctions along Copper Ore Road (Wookie Creek Road and Catholic Church Road). Provides direct access to the BESS and office area.	Perceived anti-directional route (for light vehicles) to access site compared with access options along Merildin Road (option C) and Wookie Creek Road (option B). All light and heavy vehicle movements will pass by a residence located on the eastern side of Wookie Creek Road for the duration of the construction period. Requires upgrade of unsealed road sections (Catholic Church Road) and two junctions along Copper Ore Road (Wookie Creek Road and Catholic Church Road)	Requires upgrading of the Copper Ore Road junction and approximately 1.4 km of unsealed road (including 700 metres along Catholic Church Road and 700 metres along Wookie Creek Road). Project staff and transport contractors would need to be discouraged from accessing Wookie Creek Road via Merildin Road

ACCESS LOCATION	ADVANTAGES	DISADVANTAGES	COMMENTS
Option B Wookie Creek Road adjacent to substation	**Light vehicles:** Trips to and from Clare via Catholic Church Road, then cross Copper Ore Road and most direct route via Merildin Road followed by left turn into Wookie Creek Road. **Heavy vehicles:** Predominantly sealed route for majority of trip via Horrocks Highway/Jolly Way. Comparative route length to Barrier Highway via Flagstaff/Merildin Road Internal road network could be adapted to allow vehicles to access the east section via a short section of Chaff Mill Road if required. Shorter route than Option A by 1.2 km as it uses the more direct route along Merildin Road rather than the indirect route along Copper Ore Road. Does not impact on adjacent residents along either Wookie Creek of Merildin Roads.	Cars and trucks would need to cross at right angles the Copper Ore Road junction between Catholic Church Road and Merildin Road. Requires longer section of road upgrade than access at Option A at the northern end of the road (2.8 km vs 1.4 km). Requires upgrade of unsealed road sections (Catholic Church Road) and two junctions along Copper Ore Road (Wookie Creek Road and Catholic Church Road)	Project staff and transport contractors would be encouraged to access Wookie Creek Road via Merildin Road. Requires upgrading of the junctions of Copper Ore Road with Merildin/Catholic Church Road and Merildin Road with Wookie Creek Road and upgrading selected sections of approximately 2.8km of unsealed road (including Catholic Church Road)
Option C Merildin Road	**Heavy vehicles:** Predominantly sealed route for majority of trip via Horrocks Highway/Jolly Way. Comparative route length to Barrier Highway via Flagstaff/Merildin Road Internal road network could be adapted to allow vehicles to access the east section via a short section of Chaff Mill Road if required. Shortest route of the four access options depending on the exact location of the access. Preferred access location is about 200-300 metres east of the Wookie Creek Road junction. Does not impact on adjacent residents along either Wookie Creek of Merildin Roads.	Cars and trucks would need to cross Copper Ore Road junction between Catholic Church Road and Merildin Road. Requires upgrade of unsealed Catholic Church Road and two junctions along Copper Ore Road (Wookie Creek Road and Catholic Church Road)	Requires upgrading of the junction of Copper Ore Road with Merildin/Catholic Church Road, development of a suitable access layout on Merildin Road and 2.4 km of unsealed road. An alternative access could be located about 300 metres west of the Chaff Mill Road junction.

ACCESS LOCATION	ADVANTAGES	DISADVANTAGES	COMMENTS
Option D Chaff Mill Road	Provides a single road access to both the west and east sections.	Proposed new residence on the corner of Chaff Mill Road and Merildin Road would be subjected to significant impacts of turning car and truck traffic. Cars and trucks would need to cross Copper Ore Road junction between Catholic Church Road and Merildin Road. Requires longest section of road upgrade than the other access options.	Requires upgrading of the junctions of Copper Ore Road with Merildin/Catholic Church Road and Merildin Road with Chaff Mill Road and approximately 4 km of unsealed road.

7.8.4.2 OPERATION

The solar farm will employ up to five staff once operational. It is estimated that the vehicular traffic generated by the daily operating activities will be very low, and be predominantly light vehicles. Traffic movements will represent volumes in the order of what is already being experienced on these roads and are likely to have a negligible impact on traffic operations for the surrounding road network.

7.8.5 MANAGEMENT AND MITIGATION MEASURES

7.8.5.1 SITE ACCESS LOCATION AND LIGHT VEHICLE ACCESS

On balance the preferred access location is on Wookie Creek Road adjacent to the existing substation (Option B). This would be supported by an internal road network that would allow access to Chaff Mill Road and then to the east section of the project site. Most light vehicle trips and all heavy vehicle trips would be expected to travel to the site via Horrocks Highway, Jolly Way, Catholic Church Road, Merildin Road and Wookie Creek Road.

7.8.5.2 HEAVY VEHICLE ACCESS

The preferred heavy vehicle route is HV2, via Horrocks Highway.

During the period of public consultation conducted by FRV in February 2018, it became apparent that there was Council and community support for the HV5 route option (via Barrier Highway and Mintaro-Manoora Road) and concerns for the increased use of Jolly Way by heavy vehicles.

Jolly Way does exhibit a vertical and horizontal alignment that requires care and attention to safely negotiate. It does attract tourist traffic and some cyclists, which might demand other regular road users to be more vigilant. On the other hand, the traffic management and controls implemented along the road would appear to adequately address any safety risks for the level of exposure. The curves have been treated with advisory speed signs, barrier lines to discourage overtaking and guard rail in places to prevent errant vehicles from leaving the road. There may be a perception that the road is not fit for use by trucks but there is already an average of 45 heavy vehicle movements per day using the road. There may also be additional trucks using the road during grain-carting season. The introduction of 8-16 extra truck movements per day is not expected to significantly increase the safety risks along the road.

The alternative route (HV5) will direct trucks onto Min-Man Road and the unsealed Martindale and Hare Roads. Min-Man Road is a lower standard road to Jolly Way and the significant stormwater drainage issues affecting the integrity of the pavement structure might be exacerbated by an increase in heavy vehicle traffic running close to the pavement edge. Tourist traffic also uses this road to access Martindale Hall. Martindale Road is narrow and subject to flooding and Hare Road would require significant upgrading in some sections. Directing trucks along these unsealed roads would pose a greater safety risk to other road users than directing them along Jolly Way where truck traffic is already evident.

On balance from a safety and amenity viewpoint, the preferred route option for access by heavy vehicles to the vicinity of the project site is via Horrocks Highway (HV2). The significant majority of the route is sealed, deploys appropriate traffic control measures to reduce the risk and severity of crashes and will be subjected to only a small number of additional heavy vehicles movements per day during the construction period. The route is also the preferred and most likely route for access by light vehicles travelling predominantly to and from the west of Mintaro.

7.8.5.3 ADDITIONAL MITIGATION MEASURES

A range of mitigation measures have been proposed to address the increased exposure to risk and the impacts on the road conditions during construction. These include:

- Improvements to the horizontal and vertical alignment at select locations
- Improvements at selected intersections to improve sight distance, make the approaches more conspicuous and reduce wear and tear by turning vehicles
- Re-sheeting of the road surface at necessary locations and regular repair and grading

- Widening of the roads particularly around curves
- Measures to protect errant vehicles from roadside hazards.

Measures to reduce the amount and intensity of travel demand (e.g. staggering shift times and promoting ride sharing), encourage appropriate driver behaviour and inform the community of construction activities that may change traffic patterns would also be implemented.

A safety audit of roads near the project site is recommended. This would be undertaken when more details of the project are known (at detailed design stage).

No construction related travel would be undertaken outside of daylight hours.

As per best-practice, a Construction Traffic Management Plan (CTMP) would be prepared to the satisfaction of DPTI (and/or the Clare and Gilbert Valleys Council) prior to construction commencement.

7.8.6 KEY RECOMMENDATIONS

The TIA also made the following key recommendations:

- The preferred location for site access is Wookie Creek Road, adjacent to the existing substation. This should be supported by an internal road network.
- The preferred light vehicle and heavy vehicle route to the site is via Horrocks Highway, Jolly Way, Catholic Church Road, Merildin Road and Wookie Creek Road.
- The preferred route option for access by heavy vehicles to the vicinity of the project site is via Horrocks Highway (HV2)
- Mitigation measures should be implemented to address the increased exposure to risk and the impacts on the road conditions during construction.
- Complimentary mitigation measures should be adopted to assist in reducing the amount and intensity of travel, and educate/inform to educated drivers and the community.
- A road safety audit should be undertaken of roads near the project site.
- No construction related travel be undertaken outside of daylight hours.
- A Construction Traffic Management Plan (CTMP) should be prepared prior to construction commencement.

7.9 STORMWATER AND FLOODING

7.9.1 LEGISLATIVE AND POLICY REQUIREMENTS

Legislation and policy documents relevant to stormwater and flooding requirements for the project are:

- *Environment Protection Act 1993.*
- The Environment Protection (Water Quality) Policy 2015 (under the *Environment Protection Act 1993*).
- Environmental Protection Agency Government of South Australia (EPA) 1999, *Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry 1999.*
- Environmental Protection Authority Government of South Australia 1999, *EPA Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry 1999.*
- Clare and Gilbert Valleys Council Development Plan.

7.9.2 ASSESSMENT METHODOLOGY

A Civil Assessment (stormwater and flooding) was undertaken to assess the topography and drainage characteristics of the site and to then identify any flooding and drainage issues which may result from the proposed development (Appendix N).

The assessment comprised of the following components:

- Desktop hydrological analysis
- Assessment of modifications to the site
- Assessment of potential risks
- Identification of mitigation measures
- Identification of potential construction impacts.

7.9.3 EXISTING CONDITIONS

7.9.3.1 BROAD LANDSCAPE DESCRIPTION

Each parcel of the project site is in the upper reach of a separate stormwater catchment (Wakefield River and Broughton River catchments for the western and eastern parcels, respectively). As such, it is highly unlikely that either site would experience any flooding issues during peak storm events. Additionally, no flood plain zones are located within the site.

A water course (Wookie Creek) traverses north to south across the western parcel. There are no formalised water courses present in the eastern parcel.

It should be noted that flood mapping is not available for the site under the relevant Development Plan.

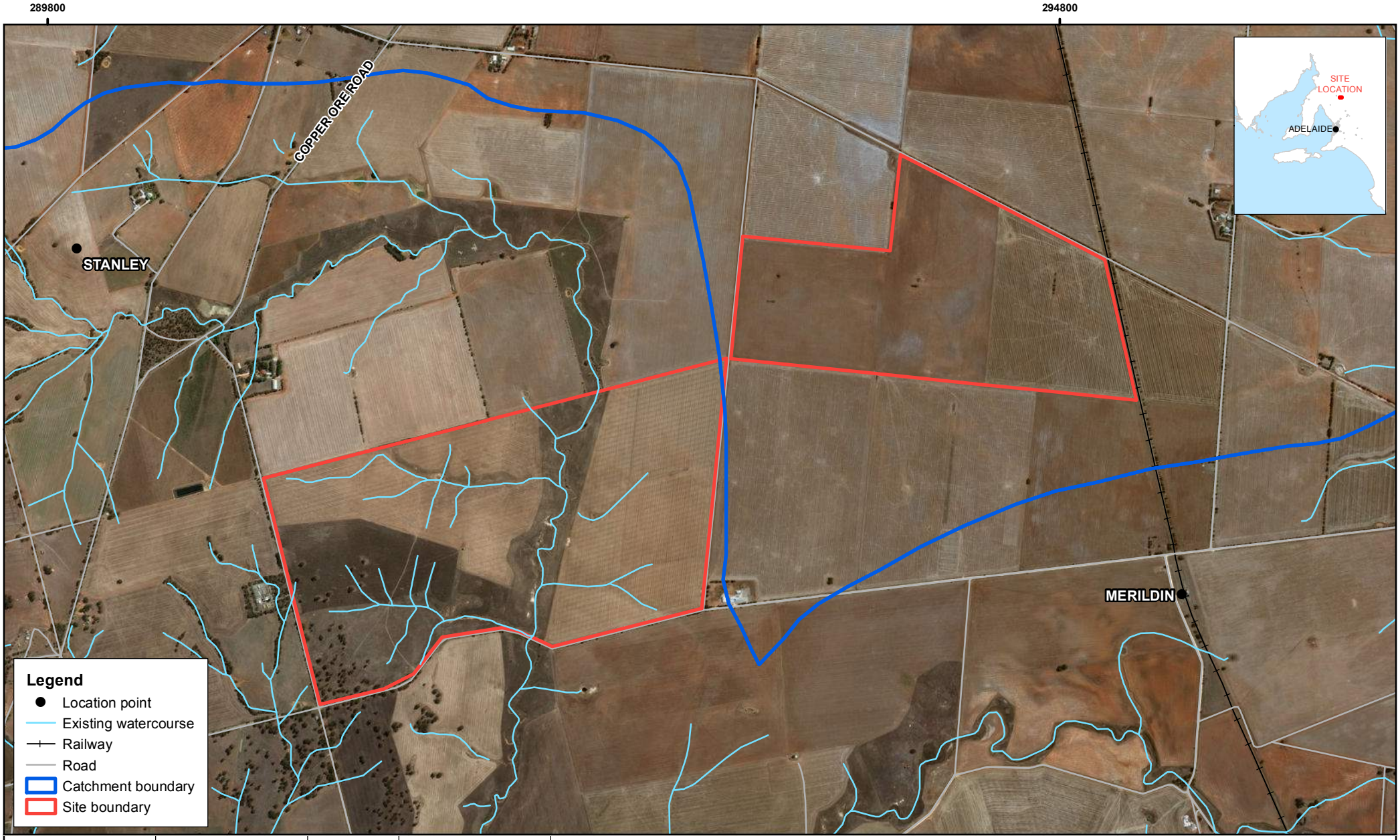
7.9.3.2 ISSUE-SPECIFIC SITE DESCRIPTION/BASELINE

The eastern parcel is relatively level, with any runoff gradually flowing northward towards Faulkner Road. The western site is of more undulating terrain, with a central watercourse draining to the south. Runoff enters Wookie Creek and flows south past Merildin Road. Three smaller sub-catchments drain into Wookie Creek, as outlined in Figure 7.17.

A summary of site characteristics relevant to stormwater and flooding is provided in Table 7.9.

Table 7.9 Site characteristics

	WESTERN PARCEL	EASTERN PARCEL
Site Area (km^2)	2.46	1.44
Catchment Area (km^2)	12.3	4.2
Existing Pervious Surface Area (%)	100%	100%
Local watercourses	Wookie Creek	nil
Highest elevation across site	430 m	415 m
Lowest elevation across site	390 m	410 m



Map: PS103225_GIS_013_C	Author: pottsr
Date: 19/03/2018	Approved by: EFitzner

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 250 500 m

1:25,000

Scale ratio correct when printed at A4
Coordinate system: GDA 1994 MGA Zone 54

Figure 7.17
Site Drainage Overview

7.9.4 POTENTIAL IMPACTS

7.9.4.1 CONSTRUCTION

Construction of the solar farm will involve earthmoving activities to form the internal access tracks and minor groundworks prior to solar panel installation (including trenching for underground cables and other services). This will include the stripping of topsoil and localised re-grading to ensure maintenance access tracks are trafficable. Earthmoving and re-grading activities would consider potential impacts to local watercourses and catchments.

Storm events during construction could result in sediment entering the watercourse if appropriate mitigation measures are not in place.

Pollutants used during construction have the potential to enter waterways and seriously damage the wider stormwater network. Pollutants are listed under the *Environment Protection (Water Quality) Policy 2015* which states that a person must not discharge these pollutants into waterways or onto land from which it is likely they will enter a waterway.

7.9.4.2 OPERATION

The construction of hardstand zones, buildings and access tracks required for the solar farm will increase the quantity of impervious surfaces across the site, therefore increasing total runoff. The solar panels themselves are not expected to increase runoff as water collected on each panel will be able to discharge onto the permeable surface below the adjacent panel.

Due to the relatively gradual slope of the land in the eastern parcel, it is anticipated that the impacts on total site runoff would be negligible following construction of the solar farm for this portion of the site. However, the quantifiable impact from access track/hardstand provisions on the total runoff is subject to detailed drainage analysis of the site during the detailed design stage.

Flood mapping available for Mintaro indicates that the township will not be in any way impacted by the proposed development.

7.9.5 MANAGEMENT AND MITIGATION MEASURES

7.9.5.1 CONSTRUCTION

A Soil Erosion and Drainage Management Plan (SEDMP) must be prepared during the detailed design stage as per the '*Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry 1999'* to the satisfaction of the Clare and Gilbert Valleys Council. The SEDMP must be lodged with the CGVC, along with engineering drawings prior to construction. All contractors onsite will need to abide by the Soil Erosion and Drainage Management Plan (SEDMP) prepared by the Construction Contractor.

The SEDMP will include the following measures to manage and mitigate impacts during the construction phase:

- Sediment and erosion controls should be implemented, including (but not limited to):
  - Preserve as much grassed area as possible
  - Construction vehicles should enter and leave the site by an access driveway to limit the tracking of mud and/or soil onto roads
  - A large gravel or aggregate should be used to establish the entry/exit point, and should only require periodic maintenance by topping up the rock
  - A guide to the design and operation of a wash area should be outlined in the documents
  - Where practical, upslope water should be diverted around the site onto stable areas and should not be diverted into neighbouring properties unless written permission is obtained from the landowner(s)
  - A guide to waste management should be outlined in the documents

  - All areas disturbed by construction should be promptly stabilised (e.g. revegetated) so they can no longer act as a sediment source
  - All construction vehicles on-site are to be fitted with a suitable oil/fuel spill kit.
- If a significant rainfall event has been forecast, all work may need to be temporarily halted until the storm has passed. It is also advisable to secure loose materials including construction waste and equipment, or to alternatively remove them from the site. Any washing of site vehicles and equipment should also be prohibited on-site to prevent stormwater contamination, unless an appropriate facility is provided.
- The Environment Protection (Water Quality) Policy 2015 must be complied with, in protecting waters and land from listed pollutants.
- If there is a risk that contaminants have entered the waterway, it is recommended that water quality tests should be undertaken immediately. If there is any trace of contamination, works should be suspended until an appropriate treatment is implemented.
- The solar farm should be re-seeded with the most suitable grass species for this particular location following completion of construction works, providing benefits to stormwater runoff quality.

7.9.5.2 OPERATION

As per the CGVC Development Plan, the location, siting, design and operation of renewable energy facilities must be completed such that the "adverse impacts on the natural environment and other land uses" are minimised. Any development must also be "located and designed to minimise the risks to safety and property from flooding" during "a minimum of a 1-in-100 year" ARI event. The project must not result in any of the following items outlined in the development plan:

- Impede the flow of floodwaters through the land or other surrounding land
- Increase the potential hazard risk to public safety of persons during a flood event
- Aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood
- Cause any adverse effect on the floodway function
- Increase the risk of flooding of other land
- Obstruct a watercourse.

The proposed solar panels are located outside the principal watercourse. The proposed access road layout will incorporate culvert crossings where appropriate to ensure sub-catchment drainage is not affected.

The installation of solar panels and construction of localised earthworks would be reviewed during the future detailed design phase, to adequately consider the effects of access tracks and hardstand areas on the sub-catchments across the southern site. The design will utilise the existing topography where feasible, and allow the existing drainage network to continue to drain freely. This aligns with best management practices regarding site stormwater management for solar farm operation.

Due to the lack of flood mapping under the relevant Development Plan, it is recommended that further analysis be undertaken to assess the risk of flooding. Flood modelling of the greater site should be undertaken prior to detailed design.

A "buffer zone" may be created around waterways to prevent works being undertaken in areas which may be subject to localised flooding.

It may also be necessary to establish stormwater detention ponds to ensure post-development flows match pre-development flows from the site (subject to further detailed investigation). This is in line with South Australian Councils' typical requirements for site developments, including solar farms.

7.9.6 KEY RECOMMENDATIONS

The development of access roads, hardstand zones and buildings are likely to increase runoff amounts, particularly for the western parcel.

Prior to the commencement of the construction phase, Council must approve a SEDMP (to be submitted with the engineering design drawings). The SEDMP will include controls to manage and mitigate impacts on the surrounding watercourses during the design phase, including:

- Temporarily halt all work if a significant storm is forecast (securing any loose materials, including construction waste and equipment, or alternatively removing them from the site)
- Provide an appropriate facility for the washing of vehicles and equipment onsite, to prevent stormwater contamination
- Implement erosion and sediment controls as outlined in Section 7.9.5.1 and in both the *'EPA Handbook for Pollution Avoidance on Commercial and Residential Building Sites, 2004'* and in the *'Stormwater Pollution Prevention Code for the Building and Construction Industry, 1999'*.

It may also be necessary to establish stormwater detention ponds to ensure post-development flows match pre-development flows from the site (subject to further detailed investigation). This is in line with South Australian Councils' typical requirements for site developments, including solar farms.

It is necessary to ensure that the design satisfies the requirements outlined in section 7.9.5.2.

Further analysis should be undertaken to assess the risk of flooding (despite the sites' occurring in the upper reaches of large catchment areas) during the later design stages.

7.10 SOCIO-ECONOMIC

7.10.1 LEGISLATIVE AND POLICY REQUIREMENTS

The following pieces of legislation are relevant to the socio-economic context of the proposed Chaff Mill Solar Farm:

- *Development Act 1993*

  Through the assessment pathway, under Section 49 of the *Development Act 1993*, the application will be publicly notified for a period of at least 15 days, seeking submissions from the public. Additionally, pursuant to Section 49 (17), there are no rights of appeal against Minister's the decision on the application.

- *Aboriginal Heritage Act 1988*
- *Environment Protection Act 1993* (including policies under this Act)
- *Environment Protection Biodiversity Conservation Act 1999*
- *Heritage Places Act 1993.*

7.10.2 ASSESSMENT METHODOLOGY

A socio-economic assessment was undertaken to determine the potential impacts, both positive and negative, associated with the construction and operation of the proposed solar farm development within the local community (Appendix O).

The following qualitative and quantitative sources were utilised for the assessment:

- Statistical information from the Australian Bureau of Statistics (ABS) 2016 Census data
- Social service providers' websites including the Clare and Gilbert Valleys Council and Tourism SA
- Review of relevant reports and recent literature concerning the social and economic impacts of solar farms
- Review of FRV's current proposal for the proposed Chaff Mill Solar Farm.

Please note that the assessment relied on understanding and addressing the existing perceptions and values of stakeholders and the community. All consultation and engagement activities were comprehensively undertaken by RPS and WSP's review relied on documentation/records of these activities.

7.10.3 EXISTING CONDITIONS

7.10.3.1 BROAD LANDSCAPE DESCRIPTION

The Clare and Gilbert Valleys Council area has a permanent residential population of approximately 9,059 (ABS 2016). The median age of the council area, at 44.4 years, is moderately greater than that of both Greater Adelaide, at 38.6 years, and the whole of South Australia, at 40 years. The area has had slow but stable population growth overall since 2006, with the exception being a small population decline of two people between 2015-2016. This slow rate of population growth may be attributed to the restructuring of farming enterprises, interstate and intrastate migration, and changing industry demands.

Key economic assets of the Yorke and Mid North region were identified as:

- Highly productive agriculture and horticultural land
- An agriculture sector which contributes 43.7% of South Australia's GSP for Grains
- Diverse landscape and scenery
- Tourism in selected districts
- Renewable energy opportunities – in 2016 the region had nearly half of all South Australia's installed wind farm capacity (Regional Development South Australia 2016).

Within the council area, primary production industries occupy a significant portion of the land. Land occupations include:

- Agriculture – 146,246.45 ha
- Food Industry – 170.5 ha
- Livestock – 11,767.7 ha.

7.10.3.2 ISSUE-SPECIFIC SITE DESCRIPTION/BASELINE

Mintaro is characterised as a small, rural community of approximately 188 residents. The heritage status of the township is strongly valued by the community. The township relies on nearby services in Clare for critical community facilities such as education and health care. Community facilities and attractions within Mintaro include:

- Martindale Hall
- Mintaro Maze
- Mintaro Garden Rooms
- sporting clubs including the Mintaro Bowling Club, MinMan Sporting Club (Mintaro and Manoora Football and Netball teams), Mintaro Tennis Club and Auburn Mintaro Cricket Club
- Anglican Church of Australia St Peters
- St Mary's Catholic Church
- Local wineries and eateries, including the recently reopened Magpie & Stump Hotel and Reilly's Eatery on the main street
- Accommodation including Mintaro Mews, Mintaro Hideaway, Millers House, Devonshire House, The Olde Lolly Shop B&B, Reilly's Historic B&B Cottages, William hunt's Retreat, Ellenor Ivy Cottage and Irongate Studio B&B.

Mintaro has experienced significant population decline in recent years, with Census data having recorded population decline from 370 to 188 people between 2011 and 2016 (ABS 2017). This decline in population may be partly attributed to the age profile of the community which recorded a median age of 50 in the 2011 Census (compared to 39 years for South Australia in the same year). People aged 65 years and over made up 15.6% of the population in 2011 (ABS 2017). The current median age of the population, being 54 years, is significantly greater than that of the greater Mid-North

region (44.4 years) (ABS 2017). Another contributing factor to the decline in population could be the restructuring or sale of agricultural properties in the area.

Mintaro sits within the Federal Electorate of Wakefield, currently held by Nick Champion MP (Australian Labor Party), and the State Electorate of Frome, currently held by the Hon Geoff Brock (Independent).

Key economic drivers for Mintaro include the production of slate, agriculture and food production, intensive livestock, viticulture and oenology, and tourism. The main land uses surrounding the area are comprised of livestock, horticulture and agriculture.

7.10.4 POTENTIAL IMPACTS

7.10.4.1 CONSTRUCTION

Potential negative socio-economic impacts on the local community during construction were identified as:

- Divided opinions, conflict and disrupted social cohesion in the community, in relation to the development, exacerbated by the small size of the community which may be reliant on connectedness
- Opposition in the community towards renewable energy developments, stemming from past renewable energy developments in the area and related media and political attention (such as the Waterloo Wind Farm)
- Public facilities and local services such as accommodation, eateries and possibly health services, being overstretched or unable to service the potential increased demand resulting from a temporary population increase during construction
- Short-term decline in tourists to Mintaro, if local services cannot accommodate increased demand (after construction, there is potential, however, for the solar farm to generate tourists)
- Increased risk of collisions, road damage/deterioration (particularly on unsealed roads) and congestion resulting from increased traffic on arterial and local roads from construction vehicles and workforce private vehicles
- Increased traffic generation and associated impacts could deter tourism during construction
- Construction noise affecting properties bordering the proposed project site. Note: The project site is located approximately three kilometres away from the Mintaro township and therefore construction noise is not expected to impact the town
- Compromised biosecurity for neighbouring properties from contaminants being transported on construction vehicles using private and public roads.

Potential socio-economic benefits to the local community during construction were identified as:

- Increased employment and investment in the area, with the project directly employing up to 200 workers during construction, from the local area where possible
- A boost in the local economy through the procurement of hospitality and retail services, driven by a temporary increase in Mintaro's population
- Potential for the project to encourage local and regional investment in the area
- The investment in renewable technologies may help to increase the security of energy supply, price transparency and encourage a lower cost of energy (Guerin 2017).

7.10.4.2 OPERATION

Potential negative socio-economic impacts on the local community during operation were identified as:

- Potential for noise generated by the battery as well as the inverter fans for the battery and inverter substations. The battery will have a low noise profile, and fans will only be in operation during warmer temperatures, and only audible within the immediate vicinity. Noise impacts are considered negligible
- Potential visual impacts and glare resulting from the visibility of the proposed development from certain viewpoints surrounding the Mintaro township
- Impediment of aerial farming operations on surrounding properties resulting from above ground infrastructure

- Impact on the value of surrounding properties. The extent (positive or negative) of the impact is largely dependent the management of other impacts
- The perceived potential for the solar farm to exacerbate the frost risk at adjacent properties. Note: research in the area is limited, however it suggests that while temperatures directly above and below solar panels are slightly affected, temperatures adjacent solar farms quickly return to ambient status
- Potential traffic impacts during operation will be minimal. Maintenance requirements will be relatively low during operation and decommissioning
- The loss of arable land in the region. On balance, the loss of a 380 ha site within the context of the Clare and Gilbert Valleys Council area comprises only a 0.24% loss of arable farming land.

Potential socio-economic benefits to the local community during operation were identified as:

- The project would employ up to five full-time workers during operation, drawing from the local area where possible, providing local jobs and increasing security of the local economy. This also brings with it the opportunity to increase the working age population of the region
- Potential to draw visitors to the area, including scientific and academic visitors. Therefore, providing opportunities to increase tourist accommodation, and services in food, retail and tourism sectors
- On a regional scale, the development of the solar farm will work to achieve several renewable energy objectives within local and State level planning documents. Additionally, the project will work with efforts to reduce global warming impacts, assist in meeting emissions reductions targets, and further reduce costs in relation to adaption to the consequences of climate change.

7.10.5 MANAGEMENT AND MITIGATION MEASURES

Where the assessment identified a potential impact as negative, appropriate management and mitigation measures have been proposed.

7.10.5.1 CONSTRUCTION

The following management and mitigation measures have been proposed for potential negative socio-economic impacts during construction:

- A Stakeholder and Community Consultation Plan could manage impacts to community stakeholders, including but not limited to; protocols to keep the community updated on the progress of the project, protocols to respond to complaints and concerns, and preparation of a Local Benefits Plan detailing the ongoing benefits to the community.
- Demand on public facilities and services could be managed through liaising with local representatives regarding business opportunities; liaising with local tourism industry to manage potential timing conflicts with local events and maximising opportunities; and, liaising with local industry representatives and contractors to maximise the use of local resources.
- Construction traffic can be managed through establishing protocols to inform relevant stakeholders of potential impacts; establishing protocols to appropriately respond to complaints and concerns received; developing a Traffic Management Plan to form part of the overall Construction Environmental Management Plan for the project; potentially operating a coach service for workers in temporary accommodation; and, maintaining the amenity of the area by way of cleanliness and maintenance, as well as the upgrading and reinstatement of roadways.
- Potential noise impacts can be managed and mitigated by complying with *Environment Protection (Noise) Policy* requirements, and timing construction activities to minimise disturbance.
- Biosecurity risks can be minimised by ensuring appropriate hygiene practices are detailed in a CEMP and followed on site.

7.10.5.2 OPERATION

The solar panels chosen for the project will be no more than three metres from ground level and will have no metal rims, lessening the risk of potential visual impacts and glare. Solar panels are designed to absorb, rather than reflect, light. Visual and glare studies have been undertaken as part of the Development Application. Appropriate mitigation and management measures, such as screening, will be implemented where required.

The use of underground cabling, as opposed to overhead powerlines, can be used to minimise any impacts to aerial farming operations. There will be a power line from one parcel of land to the other, but it won't go over neighbouring properties. It is yet to be determined if this will be an overhead or underground powerline. There will also be a powerline from the solar farm connecting to the overhead transmission line that runs across the site.

The degree to which the solar farm could impact property values is largely dependent on the effective management of physical impacts to neighbouring properties. Potential adverse impacts such as visual and glare will be mitigated where possible to reduce the likelihood of this affecting property values.

A micro-climate review and assessment was undertaken for the proposed solar farm (refer section 7.12). The assessment found that while there can be minor differences in the soil and air temperatures directly under and above solar panels on solar farms, there is no significant impact on air temperatures in the surrounding areas. Therefore, no mitigation measures are required.

Traffic impacts are expected to be low, with low maintenance requirements during operation and decommissioning. This impact does not require mitigation however upgrading and reinstatement of roadways should occur (to an equal or better higher condition) than the existing condition, in collaboration with either the Clare and Gilbert Valleys Council or the Department for Planning, Transport and Infrastructure (depending on the road caretaker) as needed for the duration of the project.

7.10.6 KEY RECOMMENDATIONS

The following key recommendations have been drawn from the assessment of the socio-economic impacts (negative and positive) to the local and regional community, associated with the construction and operation of the proposed Chaff Mill Solar Farm.

The solar farm would generate considerable environmental, economic and social benefits to Mintaro and the local region, including but not limited to:

- Providing employment for up to 200 workers during construction, drawn from the local area where possible
- Boost to the local economy through the procurement of local goods and services
- Attracting investment to the area
- Opportunities for landowners to be agents of change in contributing to new, non-fossil fuel infrastructure
- Increased energy security
- Contributing to the Mid North region's reputation for renewable energy and potentially drawing increased tourism to the area
- Contributing to the achievement of local, State and national renewable energy targets
- Mitigation of climate change.

Whilst the project will provide positive impacts to the existing social and economic environment of Mintaro, and provide broader regional and State-wide benefits, there is also the potential for the project to impact negatively on the community. Several mitigation measures are recommended to minimise potential socio-economic impacts associated with the project, including:

- Protocols to keep the community updated about the progress of the project and any potential benefits, impacts and mitigation measures
- Protocols to respond to complaints and concerns received

- Liaising with local representatives regarding business opportunities such as accommodation options for staff to minimise any adverse impacts on local services and maximise opportunities for businesses (i.e. re accommodation)
- Liaising with the local tourism industry to manage potential timing conflicts with local events and maximise opportunities for future tourism
- Liaising with local industry representatives and contractors to maximise the use of local contractors, manufacturing facilities, materials
- Preparing and implementing a CEMP to develop specific mitigation measures to manage potential impacts of the project.

7.11 SITE CONTAMINATION

7.11.1 LEGISLATIVE AND POLICY REQUIREMENTS

The primary piece of legislation for site contamination is the *Environment Protection Act 1993*. The *Environment Protection Act* requires a duty of care for the environment. This is specified under section 25 of the act: General environmental duty, and states that *a person must not undertake an activity that pollutes, or might pollute the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm* (Attorney-General's Department 2018).

This Preliminary Site Investigation (PSI) was undertaken in accordance with the following documents:

- National Environment Protection Council (NEPC) 2013, *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended in 2013 (ASC NEPM).
- Planning SA 2001, *Site Contamination.* Planning Advisory Notice 20.
- Standards Australia 2005, *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds*. AS4482.1-2005 Homebush NSW.

7.11.2 ASSESSMENT METHODOLOGY

The PSI was undertaken to determine any potential site contamination issues within the project area (refer Appendix P). The PSI methodology involved the following research components:

- Site characterisation, including site identification, site inspection, adjacent land uses and sensitive reports, regional geology, regional hydrogeology and zoning
- Review of previous site investigation reports
- Review of historical information, including history of Certificate of Titles, aerial photographs, EPA section 7 search, and the EPA public register.

7.11.3 EXISTING CONDITIONS

7.11.3.1 REGIONAL GEOLOGY

The Burra 1:250,000 geological map sheet (South Australian Department of Mines and Energy, 1964) indicates that the region is underlain by the quaternary recent low angle slope deposits. The western portion of the site is also located with the Torrensian Burra Group formation, which is characterized by quartzite and dolomite and interbedded shale.

The 1:100,00 Geology Map provided in the Lotsearch report characterises the local geology in the eastern portion of the site as Holocene claypan and lagoonal sediments. Soil types identified were predominantly loam over clay or rock in the western portion and red cracking clay in the eastern portion.

The Australian Soil Resource Information System (ASRIS) identifies the area of Mintaro as having an extremely low probability of acid sulphate soils occurring.

7.11.3.2 REGIONAL HYDROGEOLOGY

There are twelve registered groundwater bores within an approximate 2 km radius of the project area. The details of the five closest registered bores to the site are presented in Table 7.10. All registered bores were located offsite.

Wookie Creek intersects the western portion of the site in a north-south direction and runs into the Wakefield River, located approximately 2.3 km south of the site. Therefore, groundwater within the uppermost aquifer would generally be expected to flow in a southerly direction.

Table 7.10 Information regarding closest registered bores to site

BORE NO.	APPROXIMATE DISTANCE FROM SITE	DRILL DATE	DRILL/MAX DEPTH (m)	STATUS	PURPOSE	SWL (mBGL)	SALINITY (mg/L TDS)
6630-3148	20 m west	22/12/2000	80.0	-	Domestic	18.7	1,546
6630-3258	1,200 m west	22/12/2000	34.96	-	Monitoring	16.21	1,653
6630-525	350 m south-east	15/03/1972	30.48	-	-	12.19	5,273
6630-521	400 m north-east	06/06/1958	38.1	Unknown	Domestic	-	3,639
6630-522	500 m north-east	15/03/1972	19.0	-	Stock	12	6,236

7.11.4 POTENTIAL IMPACTS

Based on the history of certificates of title and the historical aerial photographs, the site has operated as farm land, with several private owners, from as early as 1870 through to the present day. It is considered possible that the following potentially contaminating activities may have occurred at the site:

- Use of imported, and potentially impacted fill materials, which were not identified as part of the site walkover. Imported fill may have been used by farmers to level the land
- Historical use of agricultural chemicals, weedicides and termiticides – including possible use of arsenic based weedicides/herbicides near the rail infrastructure at the eastern boundary of the eastern portion of the site
- Hydrocarbons associated with railway activities to the east of the site
- Use of asbestos train brakes.

A more detailed summary of the potentially contaminating activities, including potential contaminants, likely locations and possible significance, is provided in Table 7.11.

No Section 83A notifications have been recorded in the area. The nearest notifications were reported for service stations and work depots in Clare, which are located approximately 20 km to the north-west of the site. Potential contamination from these sites is considered unlikely to impact upon the site due to the distance of separation.

An EPA licence was issued to Synergen Power Pty Ltd for fuel burning – not coal or wood at the power station, located immediately adjacent the western portion of the site.

Table 7.11 Summary of potentially contaminating activities

POTENTIALLY CONTAMINATING ACTIVITY	POTENTIAL CONTAMINANTS	LIKELY LOCATIONS	POSSIBLE SIGNIFICANCE/RISK
Unconfirmed activities:			
Use of imported, and potentially impacted, fill materials	Metals, polycyclic aromatic hydrocarbons, petroleum hydrocarbons, solvents, asbestos, OCPs/OPPs and/or PCBs.	Entire site	**Unknown but probably minor:** Uncontrolled filling or dumping may have occurred at the site. These materials are often brought in from other sites without checks. Such materials have the potential to contain concentrations of chemicals which may preclude the site for certain future land uses (i.e. depending on possible human exposure scenarios) or aesthetically and/or geotechnically unsuitable, without further assessment and/or remediation. As the land is cropped or grassed, only intrusive investigation will reveal material brought in from off-site sources to fill in undulations or build up the site.
Historical use of agricultural chemicals, herbicides and termiticides	Unknown but may have included metal or arsenic-based herbicides, triazines, phenoxyacid herbicides and, more recently, glyphosate-based chemicals, fertilizers (nitrogen, phosphorous), OCPs, OPPs	Entire site	**Unknown but probably minor:** As the allotment appears to have been used for historical agricultural/grazing purposes it is likely that various chemicals may have been used. Should any persistent chemicals have been used on the site, they are likely to have resulted in surface (if any) soil contamination and the degree of remnant contamination would be largely dependent on when they were used, the volumes used and the persistence of the individual chemical compounds. Given their low mobility, leaching of these chemicals into the groundwater is considered unlikely.
Potential use of arsenic based weedicides/herbicides in the vicinity of rail infrastructure	Arsenic, lead, organochlorines, organophosphates	Eastern boundary of eastern portion of the site	**Unknown but probably minor:** As the eastern portion of the site situated adjacent the railway line it is likely that some weed spraying may have occurred. Such contamination is likely to be confined to shallow soils in the area.
Hydrocarbons associated with railway activities	Hydrocarbons, arsenic, phenolics, heavy metals, nitrates and ammonia	Eastern boundary of eastern portion of the site)	**Unknown but probably minor:** As the eastern portion of the site situated adjacent the railway line it is likely that some soil contamination may have resulted due to dripping and spilling of hydrocarbon products. Such contamination is likely to be confined to shallow soils in the area.
Use of asbestos train brakes	Asbestos	Eastern boundary of eastern portion of the site	**Unknown:** As Parcel 2 is situated near the railway line it is possible that if asbestos brakes were used historically, some fragments may exist in the nearby soils.

7.11.5 MANAGEMENT AND MITIGATION MEASURES

The CEMP will outline controls to avoid the uncontrolled mobilisation of contaminants associated with construction activities, including:

- Any suspect material discovered during excavations will be stockpiled separately and tested for contamination prior to disposal
- Should any contaminated material be stored in construction areas it will be in accordance with recommendations made by suitably qualified persons
- Any contaminated material will be transported via an EPA licensed waste contractor and disposed of at an EPA licensed waste facility following treatment
- Waste Transport Certificates will be retained for contaminated material and made available on request.

7.11.6 KEY RECOMMENDATIONS

It is unlikely that the potentially contaminating activities would significantly impact the proposed future land use of the site as a solar farm. However, once the final site is selected a baseline intrusive investigation would be undertaken to identify if potentially contaminating activities are crystallised. This work would be undertaken in conjunction with a geotechnical intrusive investigation.

7.12 MICRO-CLIMATE IMPACTS (FROST)

An issue raised by the community regarding the proposed Chaff Mill Solar Farm was the perceived potential of the solar farm to exacerbate the frost risk at adjacent properties. This issue was later clarified as being more related to the potential impacts (either positive or negative) of radiative heat loss from the surfaces of the solar panels on the temperatures of the surrounding environments or climate.

This section first provides some context on frost and the existing climate in proximity to the proposed project site, then moves on to discuss the investigations undertaken to form a view on the potential significance of radiative heat loss from solar farm sites, and closes by summarising key findings.

7.12.1 LEGISLATIVE AND POLICY REQUIREMENTS

In South Australia, the *Guide to Commercial Scale Solar Development in South Australia* was produced for Renewables SA in September 2014. The New South Wales Government's *Draft Large-Scale Solar Energy Guidelines for State Significant Development* was produced in November 2017. However, neither of these documents provide any guidance on the potential impacts of radiative heat loss to the surrounding climates of potential solar farms or potential micro-climate impacts.

Other interstate renewable energy approval guidance documents are mainly in relation to wind farms. No other reference to solar farms and climate impacts could be located from other State documents, although new planning and community engagement guidelines are currently being developed in Queensland.

7.12.2 ASSESSMENT METHODOLOGY

To investigate community concerns that the solar farm may exacerbate frost conditions at adjacent properties (i.e. the impacts of radiative heat loss from panels on the surrounding climate); the following approach was undertaken:

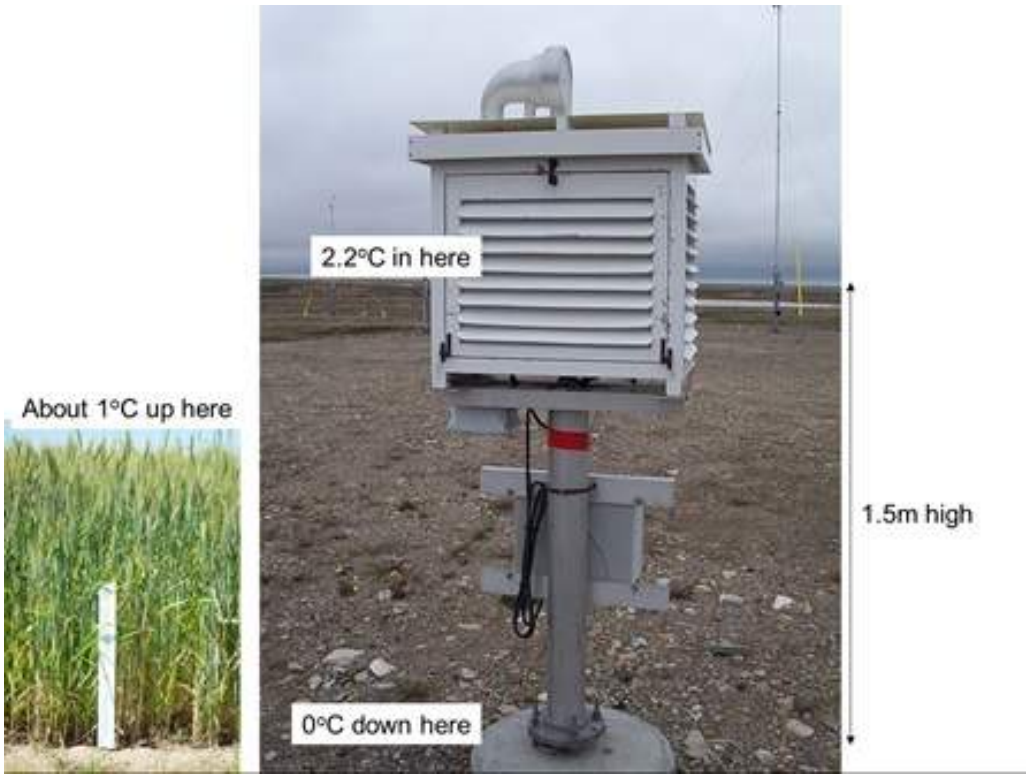
1. Review of Solar Farm Assessment Guidelines in Australia.
2. Review of all other solar farm assessments, approvals and conditions of consent documents in South Australia.
3. Web-based desktop assessment of solar farms and frost / radiative heat loss impacts.
4. Academic literature review of solar farms and frost / radiative heat loss impacts.
5. Discussions with agricultural, climatology and meteorological scientists in South Australia, Australia and overseas.

7.12.3 EXISTING CONDITIONS

7.12.3.1 FROST

The Australian Bureau of Meteorology defines frost as a deposit of white ice crystals or frozen dew which forms on objects near the ground when the surface temperature drops below freezing point (BOM 2014).

Most Bureau of Meteorology temperatures are measured 1.2 to 1.5 metres above the ground in a Stevenson Screen (refer to Figure 7.18). Frost generally occurs at ground level when it is 2.2 degrees Celsius or lower in the box, with threshold temperature for frost varying with the crop-type and season. Generally, though, when it is 0 degrees Celsius at ground level there will be a negative effect on most crops (Grey 2014). It should be noted here however that growers often experience temperatures lower than the nearest weather station so if the weather station indicates that conditions may not, or have not, reached frost conditions, there still may be the chance that frost has been experienced in cooler or lower lying areas than those around the weather station (Barr 2012).



Source: Grey 2014

Figure 7.18 BOM Frost recording system

Frost forms in two main ways:

— Radiation frost; whereby frost occurs when the ground and ambient air cools down by the loss of heat to the atmosphere. This commonly occurs under clear skies with little or no wind.
— Advection frost; also known as 'freeze', whereby frost forms when a mass of extremely cold air moves over an area; replacing warmer air. It is not affected by cloud cover and is generally never seen in Australia.

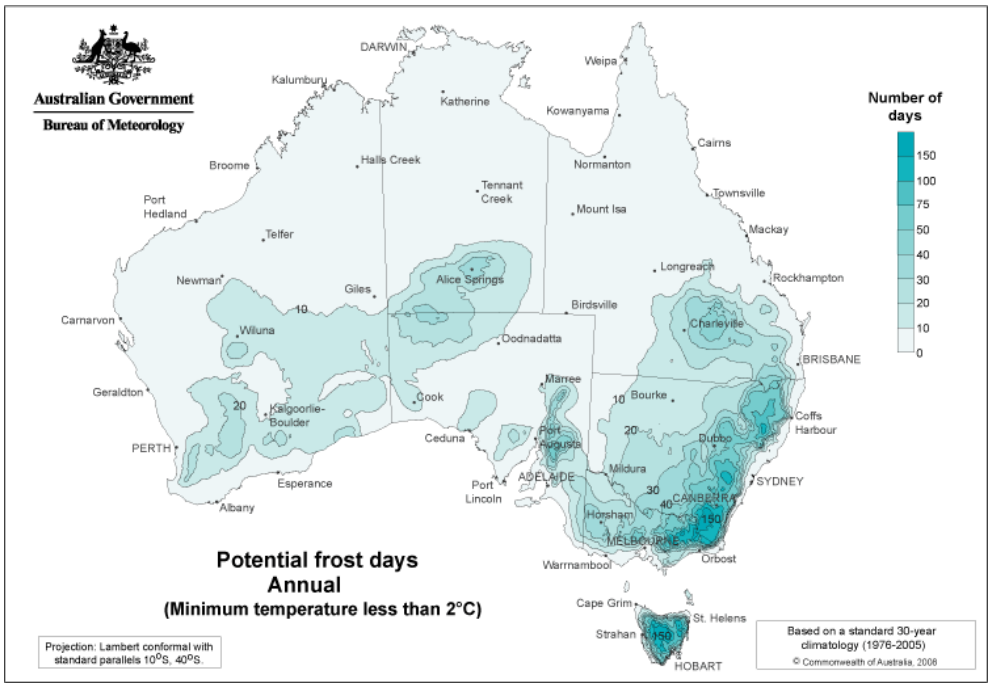
The formation of frost in Australian regions is affected by a series of factors:

— **Cloud cover:** Clear skies favour the escape of radiation (or heat) from the earth's surface.
— **Humidity:** When the air is humid, the cooling process is slowed, which decreases the likelihood of frost.
— **Surface winds:** Wind occurring at night acts to mix the cooler air near the ground with warmer air just above it. This slows radiative cooling making frost less likely to occur.

Frost in the Mintaro area is therefore defined as 'radiation frost' and is most likely to occur under a clear sky, with low humidity and light surface winds (BOM 2014).

It should also be noted that cold air is heavier than warm air and as such, it sinks and flows to low lying areas until it ponds at the bottom (Barr 2012).

Based upon these factors, the Bureau of Meteorology map annual and monthly potential frost days; as outlined in Figure 7.19.



Source: BOM 2017

Figure 7.19 Potential Annual Frost Days

Frost damages plants when the temperature drops below zero and the surrounding air is very dry, which may be outside of the winter season. Water between the cells of plants freezes and forms large crystals, these pop holes in the cells which cause permanent damage. Once thaw occurs, the plant is left looking floppy and discoloured and the result is detrimental to the yield (Grey 2014). Actual plant susceptibility to frost depends on its growth stage (Barr 2014).

In the Clare Valley, aspect influences the exposure of crops to the sun, with the warmest aspects being those facing north, north-east and east. Westerly aspects are the next warmest and are cool in the morning but receive harsh afternoon sun. Southerly aspects are the coolest (Davidson Viticultural Consulting Services 2012).

7.12.3.2 AVAILABLE CLIMATE DATA

The proposed Chaff Mill Solar Farm is located near the township of Mintaro in the Clare Valley, South Australia. The Clare Region is described as moderately continental with cool to cold nights and warm to hot summer days. Overall; it is a moderately warm, low rainfall region.

In 2012, a Clare Valley Climate Profile was prepared for the Grape and Wine Research and Development Corporation (Davidson Viticultural Consulting Services 2012). This profile was based upon climate data recorded from four weather stations; Clare High School, Clare Post Office, Sevenhill and Kirribilly. The closest weather station to Mintaro is Sevenhill (approximately 10 kilometres from the proposed project site); with the Kirribilly weather station being located at an elevation that is the most like Mintaro (Kirribilly – 400 m, Mintaro – 404 m). Mintaro and Kirribilly also have similar rainfall patterns.

For a number of years there was also a weather station operating at Polish Hill River, four to five kilometres to the west of the project area. It is currently unknown if this weather station still exists or is still being used for data collection,

however the station was known to be located in a comparatively low-lying frosty area and there were therefore difficulties in using it for prediction of wider Clare Valley weather conditions (Davidson Viticultural Consulting Services 2012). The Polish Hill River site was known to be collecting data at least until approximately ten years ago; and would have been located in a region comparatively representative of the proposed Chaff Mill Solar Farm project (Davidson Viticultural Services 2005).

Table 7.12 outlines monthly climate statistics for the nearest available weather station – Clare Post Office.

Table 7.12 Mean monthly climate statistics

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Mean Max Temp	29.7	29.3	26.9	21.8	17.3	14.1	13.2	14.5	17.5	21.0	24.6	27.5
Mean Min Temp	13.4	13.5	11.5	8.2	5.7	3.9	3.1	3.6	5.0	7.2	9.6	11.7
Mean Rainfall	25.3	24.2	25.4	46.6	72.9	80.2	81.7	79.5	72.7	57.4	36.9	29.4
Mean No. Clear Days	12.6	12.5	12.6	8.8	7.0	5.8	5.3	5.6	6.8	8.1	8.3	9.3
Mean No. Cloudy Days	5.8	4.5	6.2	8.5	12.2	11.8	13.0	12.6	11.5	9.8	8.2	7.7

Source: BOM 2017

Table 7.13 outlines some of the key climate data discussed in climate profiles from published reports.

Table 7.13 Key climate data

	CLARE	SEVENHILL	KIRRIBILLY	POLISH HILL RIVER
Elevation	385	480	400	440
Annual rainfall	632	569	566	667
Mean Frost Incidence	7.5	0.3	13.3	9.9

Source: Davidson Viticultural Services 2005 and 2012

*Data considered unreliable

Mean Frost Incidence is the average number of times that the temperature will reach 2.2 degrees Celsius or below at the recording station in the months of September to November. This temperature reflects a ground temperature of 0 degrees Celsius.

This data shows that Kirribilly has the highest incidence of frost in the region with an average of 13 frosts in the September to November period. Polish Hill River has a mean frost incidence of 10 days. Sevenhill has only 0.3 days of Frost during the same period because it experiences easterly winds which generally disturb the pooling of any cold air (Davidson Viticultural Services 2005 and 2012).

7.12.4 POTENTIAL IMPACTS

7.12.4.1 DESKTOP ASSESSMENT AND LITERATURE REVIEW

A number of websites, reports and academic papers were reviewed to try and obtain an understanding of the potential radiative heat loss and frost exacerbation issues and impacts associated with solar farm development. Very little information on the topic exists but several sources stated that the potential development of thermal models for large-scale solar farms is highly problematic due to significant uncertainties associated with the multiple parameters involved including variations in albedo, climate data, cloud cover, landscape, seasonality, panel efficiency, panel design, wind

speeds, vegetation cover, soil data and a number of other factors. One study author indicated that the potential climatic effects of one solar farm may be completely irrelevant at another solar farm due to changes in conditions and location.

A review of potential academic reports and research papers was subsequently undertaken using the University of South Australia's online access to scientific journals, books and reports. Solar farm studies; particularly the environmental impacts associated with solar farms are few and far between. Even rarer are solar farm studies relating to radiative heat loss impacts, climate impacts or air temperature impacts. In all; seven scientific papers were found which discuss relevant issues. These studies are discussed below.

1. In a 2013 study focussing on air temperature; meteorological modelling was undertaken for the Los Angeles region to evaluate the potential atmospheric effects of PV solar arrays (Taha 2012). Simulations undertaken as part pf the study showed that from a radiative balance perspective; there were no adverse impacts on air temperatures from large-scale PV solar arrays.

2. In another 2013 study into the potential for a heat island effect in large solar farms, Fthenakis and Yu (2013) developed a computational fluid dynamics capability to model the potential effects of solar farms on local micro-climates. Field data and model simulations showed that for a solar farm in North America the annual average air temperatures in the centre of the PV farm were 1.9 degrees warmer than the ambient temperatures but that the thermal energy completely dissipated to the environment several metres above the solar farm. Likewise, the data also showed that the warmer temperatures also promptly dissipated at progressive distances away from the solar farm. These authors' study found that temperatures within 300 metres of the solar farm panels were 0.3 degrees warmer than the ambient temperature. 18 months' worth of data from this study showed that solar arrays completely returned to ambient temperatures at night. The study also showed that access roads within and around the solar farm helped to keep local temperatures close to ambient. Their results did not find any cooling effects in surrounding areas.

3. In a study evaluating soil temperature in 2014, it was found that the existence of large solar arrays can increase soil temperatures directly underneath the solar farm during autumn and winter, but slightly decrease the soil temperatures during spring and summer; when compared to similar locations without solar arrays. This was attributed to the air absorbing heat from the soil when the air temperature is lower than the soil temperature; and vice versa; the air also releases this heat to the soil (Wu *et al* 2014). Once again; this study was based on large-scale solar array situations.

4. In another study looking at heat surface balance through modifications to ground surface albedo through solar array development in Golmud it was found that soil temperatures underneath the solar farm at a depth of 5 to 10 centimetres were slightly lower than areas without solar arrays on them, with the arrays obviously demonstrating thermal insulation properties (Yang *et al* 2017). It was further found that in areas with solar arrays, at a height of 2 metres above the ground; temperatures stayed the same during the winter and cooler months and increased slightly during the summer and warmer months. The effect of heating the air was found to be greater during the summer months.

5. In the same study, it was found that during the day time, temperatures at a two-metre height in the solar during winter were the same as at adjacent control areas. During the other seasons the two-metre-high air temperatures were found to be slightly warmer than the adjacent control areas. Night-time air temperatures at the two-metre height during all seasons were slightly higher than surrounding areas. The monthly average air temperatures in the solar farm were slightly higher than the surrounding areas.

6. In a recent solar park study from the United Kingdom which studied the impacts on vegetation directly underneath large-scale solar arrays, localised temperature reductions were noted when compared to control sites; but only in areas directly underneath solar panels (ground-level micro-climates) and mainly in the summer months (Armstrong et al 2016). It was found that there were no changes in temperatures in the 'control' areas directly next to the solar farm. In other words; the only changes or impacts were found to be directly underneath the panels and between the panel arrays – not adjacent or outside of the solar farm; in this instance – no impacts or changes were detected.

7. The authors of this paper studied an operating solar farm in the south of England for over 12 months by comparing temperatures under the panels with control areas. During the summer, temperatures under the panels were found to be 5.2 degrees Celsius cooler during the summer. In winter, soil temperatures were found to be 1.7 degrees Celsius

warmer. This was when compared to the area immediately surrounding the solar farm and the internal access tracks. This was due to the shading effects of panels. It was also found that during winter the solar panels acted like a blanket over the land, which reduced the incidence of frosts.

8 In a 2016 study investigating the photovoltaic heat island effect of large solar power plants, it was found that PV plants alter the way that incoming energy is absorbed due to changes in albedo, vegetation cover and terrain structure (Barron-Gafford *et al* 2016). The authors found through experimentation that temperatures over a PV plant were 3 to 4 degrees warmer than ambient temperatures at adjacent surrounding areas at night. This effect was due to the alteration in the balance of the incoming and outgoing energy fluxes due to the modified landscape. The basis of these assumptions is that within natural ecosystems, vegetation reduces heat gain and storage in soils by essentially creating a shading effect. Energy absorbed by soils and vegetation is later released as latent heat through evapotranspiration. This heat-dissipating latent exchange is hence reduced in a PV installation, which may theoretically increase soil temperatures underneath panels (Barron-Gafford *et al* 2016). The solar farm array study area in this particular study was compared to an adjacent control site (a natural desert environment which demonstrated no temperature increases) and a nearby concrete carpark which also demonstrated the heat island effect. The outcomes demonstrate the effect of altering albedo of a site in general as this alters the way that incoming energy is either reflected back to the atmosphere or absorbed by the earth. This study was undertaken in desert conditions in Arizona, USA.

9 Finally, in a recent Australian study published in 2017, a control simulation and eighty sensitivity experiments were completed for twenty massive hypothetical solar arrays that each had an area of 250,000 km^2. These experiments were set up with different array orientations and at different locations across Australia. The study showed that the climatic impact on the surrounding areas depended upon the magnitude of the albedo perturbation as well as the size and orientation of the arrays (Nguyen, Katzfey, Riedl and Troccoli 2017). Some key findings from this study included:

- Any potential changes to local climate from the introduction of solar arrays is dependent on background climatic conditions and orographic features
- Any climatic cooling would generally occur down-wind of the solar panels, due to air temperatures being colder down-wind of the solar arrays
- Up-wind, there may be some climatic warming experienced, which could lead to a slight increase in the night-time minimum temperature, which may reduce frosts and be beneficial for some types of agriculture
- Regions down-wind of the arrays may experience stronger wind flows
- Average ambient temperatures generally decrease when surface albedo is increased. So around the solar arrays; the more that sun is reflected back into space; the lower the temperature
- Generally, for the massive hypothetical solar arrays, modelling indicated slight warming up-wind and slight cooling down-wind. However the authors point out this is based on the modelled massive 250,000 km^2 arrays and the situation would not be anywhere near as significant for anything smaller (Nguyen, Katzfey, Riedl and Troccoli 2017).

10 Other studies were also reviewed, but these were found to have no relevance to the Chaff Mill project. One paper (Hu *et* al 2015) modelled the hypothetical idealistic effects of placing massive solar farms across every desert region of the world (a slight warming effect was found for Australia). A second paper (Masson *et al* 2014) investigated the impact of placing solar panels across large areas of rooves in Paris on the requirements for domestic heating (the need for domestic heating was found to decrease slightly in the buildings directly under the panels).

Please note: albedo is the fraction of solar energy being reflected from the Earth back into space. It is a measure of the reflectivity of the earth's surface. Generally, dark surfaces have a low albedo and light surfaces have a high albedo. Snow has a high albedo; with most sunlight hitting it bouncing back into space. PV panels absorb more solar insolation due to decreased albedo.

As well as investigating the potential negative effects of solar farms, a number of the authors also looked into positive benefits. Aside from the obvious benefits of solar energy as a renewable energy resource, it was also found that:

- Solar farms can be easily rehabilitated at the end of the project life
- Solar farms have large footprints, however not all of the land is actively taken up by solar panels. They are typically installed on piles or mounting structures with disturbance to the ground usually comprising less than 5% of the land area and only 40% to 50% of the land surface is over-sailed by the array panels
- As the solar modules are tilted and raised on posts to minimise shading; the land is also open to grassing and soil rehabilitation.

In order to gain perspective on these studies as they relate to the proposed Chaff Mill Solar Farm, relevant authors were contacted in an attempt to gain their opinion as to the scale of potential climate, radiative heat loss and air temperature impacts that may result from the development of the solar farm. The outcomes of these discussions are outlined in the following section.

7.12.4.2 DISCUSSIONS WITH AGRICULTURAL, CLIMATOLOGY AND METEOROLOGICAL SCIENTISTS

In order to gain perspective on these studies as they relate to the proposed Chaff Mill Solar Farm, relevant authors were contacted in an attempt to gain their opinion as to the scale of potential climate, radiative heat loss and air temperature impacts that may result from the development of the solar farm.

Two authors of relevant research papers responded to requests for opinion regarding the potential impacts of the Chaff Mill Solar Farm. One of the authors believed that it would be very unlikely that there would be significant impacts on temperatures resulting from the solar farm; in particular in adjacent neighbouring properties. The author outlined that even in the studies of much larger hypothetical solar farms, impacts were not significant. For a much smaller solar farm; the risk would be even less. The author further opined that the risk of frost exacerbation may even be slightly reduced in adjoining areas due to the potential increased mixing of the air resulting from the solar arrays. The author said that to be certain a modelling study could be undertaken based on monitoring at other constructed solar farms in areas with similar conditions, however this has never been undertaken for EIA studies previously and would be based upon too many assumptions and unknown factors. The value of the outcomes of such a study and the validity of any findings would be open to conjecture.

A second author also broadly agreed with this view, saying that theoretically, enhanced frost would only arise if it was noted that there were comparatively lower night time temperatures above the panels when compared to the air surrounding them; which could theoretically lead to a marginal local temperature-driven high pressure (in clear conditions only) potentially resulting in advected cooler air to the surroundings of the solar farm. The author specified that this could only happen if it was a clear and still night and further clarified that for a smaller solar farm (such as Chaff Mill) the effects would be minute anyway. This author also agreed that further assumptions could only be made based upon monitoring of a number of local weather, climate, landscape, albedo and soil conditions, coupled with monitoring results based on other constructed solar farms from similar projects in terms of landscape and climate. A model would then have to be designed and testing undertaken. It is believed that this is beyond the scope of what is practicable or necessary for the current project as any impacts are likely to be negligible. Generally, the papers reviewed above all found negligible temperature decreases adjacent to solar farms, and more often than not found very slight temperature increases immediately adjacent solar farms.

As part of this exercise, a number of other organisations were contacted, including the CSIRO, the Bureau of Meteorology, two State government agricultural agencies and consulting bodies, specialist consulting companies (air modelling), an international climate and energy organisation, agricultural consultants and two universities. All scientists who were spoken to were of the opinion that the issue would not be significant and that the risk would be very minor – particularly in adjacent areas; as opposed to directly under the solar panels themselves.

The majority of people spoken to also questioned the validity or justification of an expensive monitoring and modelling study; particularly with so many unknown parameters and external influences.

7.12.5 MANAGEMENT AND MITIGATION MEASURES

7.12.5.1 CONSTRUCTION AND OPERATION

The incidence of frost is a result of local climatic conditions and is most likely to occur under a clear sky, with low humidity and light surface winds. The intensity or damaging effects of frost however, are exacerbated by introducing elements into the landscape that can block cold air and inhibit it from moving towards a natural cold air drainage system.

The solar farm has been designed in a way that allows air circulation underneath and around the individual panels and arrays. The panels are supported on piles which are set directly into the ground without concrete footings or benching. The panels then tilt and track; following the sun and allowing free air flow. In additions to this, the security fencing comprises mesh fencing with no vegetation planted around the boundaries unless it is for visual impact or glint mitigation purposes.

The site will also be maintained to a high standard with grasses being kept low and weeds constantly being cleared.

7.12.6 KEY RECOMMENDATIONS

There is a lack of specific studies and literature that relates to the general environmental impacts of solar farms. Literature regarding micro-climate impacts and impacts to the radiative heat exchange at solar farms is even rarer. Several studies were reviewed which had a range of findings and outcomes. Summarised relevant findings appear to be that:

- Temperatures in the centre of a solar farm may be slightly higher than ambient – particularly in warmer months
- Temperatures return to ambient several metres above a solar farm
- Temperatures may be slightly warmer directly adjacent a solar farm, gradually returning to ambient with distance away from the solar farm
- Soil temperatures at depth underneath panels may be slightly warmer during cooler months and slightly cooler in warmer months
- Air temperatures at ground level underneath panels may be slightly cooler during summer months
- Air temperatures at a two-metre height in the solar farm in the colder months would probably be similar to the surrounding areas
- Air temperatures at a two-metre height in the solar farm in the warmer months may be slightly warmer than the surrounding areas
- Air temperatures directly above solar arrays may be slightly warmer at night
- Temperatures at control sites adjacent solar farms generally had temperatures equal to ambient conditions
- Reduced temperatures adjacent a solar farm were never modelled or recorded except in the hypothetical modelling of massive solar farm scenarios of arrays with an area of 25,000,000 ha (the Chaff Mill project is 380-ha)
- Slight warming could be experienced upwind of a 250,000- km^2 solar farm scenario and slight cooling could be experienced downwind of a 250,000 km^2 solar farm scenario.

In discussion with research scientists, climatologists and meteorologists; the climate impacts of a 380-ha solar farm would not be significant and the addition of access roads within and around a solar farm would further mitigate any local climate impacts due to enhanced air flow.

7.13 ELECTROMAGNETIC FIELD LIMITS

7.13.1 LEGISLATIVE AND POLICY REQUIREMENTS

The Clare and Gilbert Valleys Council Development Plan contains a provision for industrial development outlining that it should minimise significant adverse impact on adjoining land uses due to electronic interference.

7.13.2 ASSESSMENT METHODOLOGY

Methods used to identify potential electromagnetic interference (EMI) impacts presented by the Chaff Mill Solar Farm involved a desktop review of:

- regulatory framework related to EMI
- publicly available reports, guidelines and case studies relevant to the potential EMI impacts of solar farms
- previously completed EMI studies for other solar farm projects

7.13.3 EXISTING CONDITIONS

A search of the Australian Communications and Media Authority (ACMA) register of radio licences, radio communication towers and radio services (RADCOM) database identified eight sites within an approximate 5 km radius of the project area (refer Table 7.14 and Figure 7.20).

Table 7.14 Radio communications sites identified within an approximate 5 km search area

SITE ID	LATITUDE	LONGITUDE	RADIO SITE NAME	APPROXIMATE DISTANCE TO PROJECT AREA
24292	-33.903166	138.738749	ElectraNet site MINTARO	Adjacent the project area on Wookie Creek Road.
132783	-33.884658	138.705672	Telstra Mintaro CMTS 1 km N of MT RUFUS	5 km north-west of the project area
404290	-33.898531	138.729357	Pump Station MINTARO	1 km west of the project area
501686	-33.88711	138.675389	Pikes Wines Polish Hill River Road SEVENHILL	5 km north-west of the project area
9001664	-33.862917	138.825811	Lot 581 Section 582 Farrell Flat Road FARRELL FLAT	6 km north-east of the project area.
9010098	-33.903087	138.737865	ElectraNet Mintaro Substation Wookie Creek Road MINTARO	Adjacent the project area on Wookie Creek Road.
10002603	-33.91848	138.72409	Mill Street Mintaro	2 km south-west of the project area.
10007452	-33.92569	138.69443	NBN Co Site 209B Kadlunga Road MINTARO	3.5 km south-west of the project area

Figure 7.20 Radio communications sites identified within the approximate 5 km search area

7.13.4 POTENTIAL IMPACTS

All electronic equipment has associated electromagnetic fields. In some cases, electronic devices that are close to one another can encounter interference resulting from these fields.

Solar farms (including their ancillary infrastructure) have the potential to cause electromagnetic interference. Commercial equipment, such as solar panels, are subject to the relevant Australia regulations (such as the ARPANSA Standard) that determine the maximum allowable emissions limits to minimise interference impacts.

7.13.5 MANAGEMENT AND MITIGATION MEASURES

All infrastructures installed as part of the Project will comply with the relevant emissions standards detailed in AS/NZS 4251.1:1999 Electromagnetic compatibility (EMC) - Generic emission standard Residential, commercial and light industry.

While specific to wind farms, the Environment Protection and Heritage Council Draft National Wind Farm Development Guidelines outline the following hierarchy of mitigation measures that may be applicable to managing EMI for solar farm projects. The mitigation options (in order of most preferable to least preferable):

1. Relocation / removal of turbines (or solar panels for the purposes of the Chaff Mill Solar Farm assessment)
2. Replacement of existing radio communications service equipment with another, less affected type (e.g. replace UHF link with microwave link; replace analogue TV with digital TV).
3. Relocation of radio communications services to another existing radio communications tower.
4. Relocation of radio communications services to a new telecommunications tower.
5. Substitute radio communication for underground or overhead optical fibre.
6. Enhance radar filters (Environment Protection and Heritage Council 2010).

Construction equipment, such as cranes, may cause interference. Potential EMI impacts will be considered in the CEMP for the project.

7.13.6 KEY RECOMMENDATIONS

Consultation with telecommunications and other radiocommunications license holders in the area will be would be undertaken during the further design stages of the project.

7.14 AVIATION SAFETY

A review of potential aviation safety risks was undertaken for the Chaff Mill Solar Farm.

7.14.1 LEGISLATIVE AND POLICY REQUIREMENTS

Relevant regulatory bodies to aviation safety in Australia are the Civil Aviation Safety Authority (CASA) and Airservices Australia. CASA is primarily responsible for the safety regulation of civil air operations in Australia and the operation of Australian aircraft overseas (CASA 2018). Airservices Australia is Australia's air navigation service provider. Neither bodies have released any specific regulations for solar farms.

The main piece of legislation relevant to aviation safety for the Chaff Mill Solar Farm is the *Civil Aviation Act 1988*. The main object of the Civil Aviation Act is to establish a regulatory framework for maintaining, enhancing and promoting the safety of civil aviation, with emphasis on preventing aviation accidents and incidents (Australian Government 1988). The *Air Services Act 1995* is an Act to establish Airservices Australia.

The *Civil Aviation Regulations 1988* (CAR), under the Civil Aviation Act, do not have a specific regulation regarding solar farms near or en route to airfield operations. A regulation within the CAR that may be relevant to the Chaff Mill Solar Farm relates to potential glare caused by the solar farm:

Regulation 94 (1): Dangerous lights.

Whenever any light is exhibited at or in the neighbourhood of an aerodrome, or in the neighbourhood of an air route or airway facility on an air route or airway, and the light is likely to endanger the safety of aircraft, whether by reason of glare, or by causing confusion with, or preventing clear reception of, the lights or signals prescribed in Part 13 or of air route or airway facilities provided under the Air Services Act 1995*; CASA may authorise a notice to be served upon the owner of the place where the light is exhibited or upon the person having charge of the light directing that owner or person, within a reasonable time to be specified in the notice, to extinguish or to screen effectually the light and to refrain from exhibiting any similar light in the future.*

Regulations regarding height and physical obstructions to aircraft are also detailed below, however these are unlikely to be applicable to the Chaff Mill Solar Farm.

The CAR define the Lowest Safe Altitude (LSALT) for aircraft. Aircraft undertaking Visual Flight Rules (VFR) operations are required to maintain a minimum height of 500 feet above ground level outside of built up areas and 1,000 feet over built up areas. Instrument Flight Rules (IFR) or a Night VFR aircraft operation must not be flown at a height less than 1,000 feet above the highest obstacle within a 10 nm radius of the aircraft in flight.

The CAR, Part 9, Subpart 95, provide for the marking or removal of hazardous objects within the Obstacle Limitation Surface (OLS) of any aerodrome. The Obstacle Limitation Surfaces (OLS) are a series of surfaces that set the height limits of objects around an aerodrome. Objects that project through the OLS become obstacles. For major aerodromes, the OLS could extend up to 15 km from the aerodrome.

7.14.2 ASSESSMENT METHODOLOGY

Methods used to identify potential aviation safety risks presented by the Chaff Mill Solar Farm involved a desktop review of:

- Regulatory framework related to aviation
- Publicly available reports and guidelines relevant to the potential aviation safety implications of solar farms
- Previous aviation studies for projects in the region to gain an understanding of the existing aviation environment
- Previously completed aviation studies for other solar farm projects.

7.14.3 EXISTING CONDITIONS

Aviation operations identified from publicly available information within 50 km of the project area are detailed in Table 7.15. Figure 7.21 shows airports within 50 km of the project area. In addition to these aviation operations, agricultural aerial spraying and possibly fertilising may occur in the region surrounding the proposed Chaff Mill Solar Farm.

Table 7.15 Aviation operations within 50 km of the project area

AVIATION OPERATION	DISTANCE TO PROJECT AREA
Farrell Flat Airport	Approximately 6 km north of the project area
Clare Valley Aerodrome	Approximately 25 km north-west of the project area
Snowtown Airport	Approximately 36 km north-west of the project area
Balaklava Airfield	Approximately 42 km south-west of the project area
Kapunda Airport	Approximately 60 km south-east of the project area

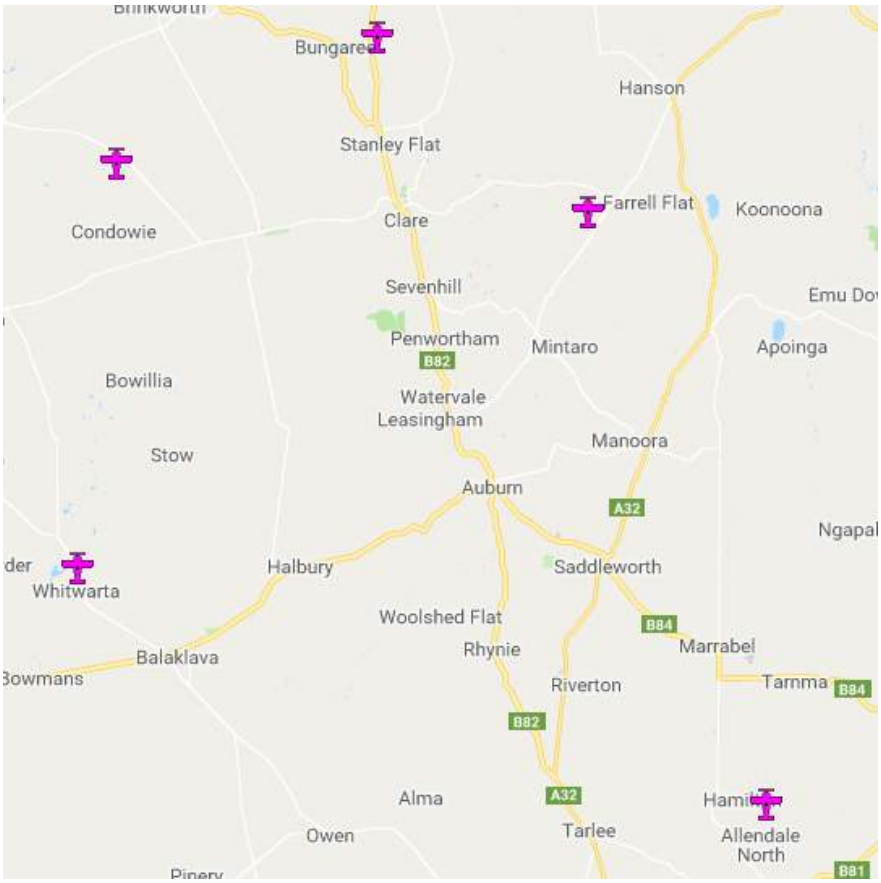


Figure 7.21 Airports within 50 km of the proposed Chaff Mill Solar Farm (Our Airports 2018)

7.14.4 POTENTIAL IMPACTS

The photovoltaic (PV) solar panels that would be used for the Chaff Mill Solar Farm are on three metre stands. The project would also comprise a substation and tee-connection to an existing transmission line. This infrastructure would be a comparable height to other transmission infrastructure in the area.

The Chaff Mill Solar Farm is not likely to require any infrastructure that would be within the Obstacle Limitation Surface (OLS) of any aerodrome. The closest airport is Farrell Flat Airport, located approximately 6 km north of the project area. The infrastructure would be below the LSALT.

Solar panels are designed to absorb, rather than reflect energy (including light energy). Typical panels are designed to reflect approximately 2% of incoming sunlight (Spaven Consulting 2011). The PV panels to be used for the project are frameless, further reducing the risk of glare.

A glare assessment was undertaken for the Chaff Mill Solar Farm using the Solar Glare Hazard Analysis Tool (SGHAT 2.0 and 3.0) (refer section 7.5.5). SGHAT has been used extensively in the United States to assess the potential impact of solar arrays located near airports. The US Federal Aviation Administration requires the use of SGHAT to demonstrate compliance with safety requirements for all proposed solar energy systems located at federally obligated airports. The glare assessment modelled glare at various sensitive receptors however glare was not modelled for aircraft.

A study undertaken by Spaven Consulting in 2011 into the potential for solar photovoltaic energy facilities to impact on aviation found that solar energy facilities located away from the vicinity of airfields are unlikely to present problems of glare to pilots. The report also found no evidence from existing solar energy projects around the world of any reported problems of glare affecting pilots (Spaven Consulting 2011).

7.14.5 MANAGEMENT AND MITIGATION MEASURES

The main potential impact to aviation safety presented by the Chaff Mill Solar Farm is glare although panels are designed to absorb rather than reflect energy (including light energy). However, based on the proximity of the project to aviation operations and the findings of previous studies, any impacts are expected to be minimal. Communication with aviation operators in the region, via a Notice to Airmen will be required to ensure they are aware of the project.

Project construction equipment and project infrastructure will be kept below the OLS of aerodromes in the surrounding region as well as the LSALT.

7.14.6 KEY RECOMMENDATIONS

Key recommendations arising from the aviation safety review are as follows:

— Aerial spraying, seeding or fertilising operations by aircraft within the vicinity of the solar farm is not recommended.

— Identification of the solar farm on relevant aeronautical charts (i.e. both the civil World Aeronautical Charts and the RAAF produced chart series) is required. Pending such identification on maps, all aviation operators would be made aware of the existence of the solar farm. This is normally communicated through a Notice to Airmen through Airservices.

— The solar farm proposal would be forwarded to the Land Planning and Spatial Information (LPSA) department within the Department of Defence. The LPSI department coordinates the Defence assessment of land use/development proposals within the vicinity of bases and facilities (Department of Defence 2017).

8 CONSTRUCTION, OPERATION AND DECOMMISSIONING

8.1 CONSTRUCTION

8.1.1 INDICATIVE TIMELINE

The proposed timing for the construction period is late-2019 to mid-2021 (approximately 18 months), pending Development Approval.

8.1.2 CONSTRUCTION ACTIVITIES

The main construction activities would include:

- Site preparation works, including fencing, preliminary civil works and drainage, access road and internal track construction, construction of site office
- Installation of concrete footings and steel posts for the solar arrays to be mounted on
- Installation of underground cabling (trenching) and connection of communications equipment
- Construction of the Battery Energy Storage System
- Removal of temporary construction facilities and rehabilitation of disturbed areas.

8.1.3 RESOURCING REQUIREMENTS

It is estimated that up to 200 workers will be required during the approximately 18-month long construction period. Local people are strongly encouraged to apply for construction related roles. Most of the workers for FRV's Lilyvale project in Queensland (currently under construction) have been sourced from the local area.

Equipment required for construction would include earth moving equipment, trucks and cranes. Materials required will include gravel, concrete (for the solar array footings) and the infrastructure components.

8.1.4 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Framework (EMF) has been prepared for the Chaff Mill Solar Farm (Appendix Q) to identify the environmental management and monitoring measures that would need to be implemented during the construction phase of the project.

- Provide a framework for the management of potential environmental impacts
- Provide guidance to the contractor(s) and help them meet their obligations; particularly under the *Environment Protection Act 1993*
- Address statutory requirements
- Provide assurance to government agencies on how potential environmental impacts will be avoided or mitigated during construction
- Detail individual environmental commitments to the project
- Provide an overview of all environmental values of the project area in association with the implications of the construction methodology
- Outline and discuss the implications of all relevant legislation and state and commonwealth guidelines that will need to be incorporated into management measures
- Guide the preparation of the Construction Environmental Management Plan (CEMP) by the contractor(s).

A CEMP will need to be prepared in line with the EMF prior to construction to manage environmental issues including:

- Aboriginal heritage – a specific Cultural Heritage Management Plan would be prepared for the project, in consultation with traditional owners, to ensure there are no impacts to Aboriginal cultural heritage
- Water quality protection, erosion and sediment control
- Noise and vibration
- Storage of hazardous substances
- Weeds, pests and diseases control
- Flora and fauna
- Air quality and dust suppression
- Materials, fuels and waste management
- Traffic and access – a specific Traffic Management Plan to manage construction traffic would be prepared for the project
- Emergency and fire management.

8.1.5 HEALTH AND SAFETY

The Chaff Mill Solar Farm would be designed in accordance with the South Australian *Work Health and Safety Act 2012*. Health and safety risks would be managed through a site Health and Safety Plan.

Road safety would be managed through the selection of an appropriate site access route for construction vehicles and personnel. This route has been proposed in consultation with the community and key stakeholders and is discussed in section 0. An information line is open for community members to report incidents, near-misses, concerns and feedback. A Construction Traffic Management Plan (CTMP) would be prepared to the satisfaction of DPTI (and/or the Clare and Gilbert Valleys Council) prior to construction commencement.

Site security would be in place prior to construction to ensure there is no risk to public safety through accessing the site.

All site personnel would be inducted on to the project, including safety requirements and responsibilities. Site personnel would be equipped with appropriate Personal Protective Equipment (PPE). Machinery and equipment used would be maintained and regularly checked for functionality and safety.

8.1.6 LAND TENURE

The site is freehold land currently owned by Mr. Graham Johnson. FRV has taken out an option to purchase the land upon financial close.

8.2 OPERATION

Once the project has been constructed and commissioned, the operation and ongoing maintenance of the solar farm would be managed through a framework which looks at the maintenance and operational requirements of the PV panels, access, roads, hazards, risks and security.

An operational environmental management plan would be developed prior to the commencement of operation, which would outline the environmental management requirements for operation of the project. This would include an emergency response plan to manage any potential emergency incidents that could occur at the solar farm.

8.2.1 HOURS OF OPERATION

The Chaff Mill Solar Farm would operate during the day time, seven days a week, with the Battery Energy Storage Systems (BESS) mostly exporting electricity at dusk and dawn and at other times as required for grid network stabilisation.

The Chaff Mill Solar Farm would have an operating life of approximately 30 years.

8.2.2 MAINTENANCE

Five permanent staff (sourced locally if possible) will be required during the operational phase for maintenance purposes. Maintenance activities are likely to involve:

- Preventative maintenance, including scheduled upgrades, cleaning and serving of infrastructure
- Corrective maintenance, including repairs or replacements of infrastructure
- Performance tests
- Maintenance/grading of access tracks
- Vegetation maintenance, including buffers between fencing, transmission lines and infrastructure as well as screening vegetation
- General inspection of the site, including fencing and security systems.

Maintenance operations are expected to be within normal business hours.

8.2.3 FIRE / BUSHFIRE MANAGEMENT

Bushfire risk would be managed through a Bushfire Management Plan developed specifically for the project, in consultation with the Country Fire Service (CFS) and surrounding landowners. Measures contained within the Bushfire Management Plan would include:

- The operation and maintenance of the site in a manner that no bushfire originates from the site and/or any approaching bushfire does not intensify because of excessive fuel loads within the site
- Maintain an Asset Protection Zone from the site boundary. No infrastructure is allowed in this space
- Requirements for water supply on site
- Fuel load reduction measures (e.g. mechanical slashing)
- Regular maintenance of on-site fire-fighting equipment and staff training
- No smoking would be permitted on site, other than in designated smoking areas
- All site personnel would be trained and have access to the appropriate emergency and safety equipment in the event of an emergency at the facility
- On-site burning will be prohibited.

If required personnel will evacuate the site in accordance with the Emergency Management Plan (refer section 8.2.4).

8.2.4 EMERGENCY MANAGEMENT

An Emergency Plan will be developed for the project detailing:

- Key responsibilities and authorities
- Emergency contacts
- Evacuation plan
- Incident and injury management
- Emergency preparedness information
- Emergency response actions
- Post emergency investigations, rehabilitation and records.

The plan is based on various relevant Australian Standards (including AS 3745:2010 “Planning for Emergencies in Facilities”). Visitors would undertake a site induction prior to entering the facility

8.2.5 SITE SECURITY AND SAFETY

A three-metre-high wire mesh fence, topped with barbed wire, will be constructed around the perimeter of the site and security gates installed at access points. Security fencing will be used in conjunction with infra-red sensors or thermal cameras to detect any night-time intrusions to the site. A specialist security contractor would be contracted to provide security monitoring and manned response services.

Alarms and cameras will be used to monitor the facility 24 hours a day, seven days a week. A buffer will be maintained between the perimeter fence and infrastructure. Security lighting will be used in certain locations, such as access points and the site carpark.

The Emergency Plan would include response actions for site security breaches.

Based on previous studies and assessments completed for developed solar farms, the hazard presented to public and site personnel from exposure to electric and magnetic fields are likely to be negligible.

8.2.6 BIOSECURITY

The Clare Valley contains highly productive agriculture and horticultural land as well as strong viticulture and oenology industries. South Australia is the only Australian mainland state that is free of fruit fly, and one of the few places in the world free of the vine-destroying pest phylloxera (PIRSA 2017).

Biosecurity would be managed at the Chaff Mill Solar Farm site through the implementation of site hygiene controls, which would be incorporated into the CEMP. These controls would also be included in the induction for all site personnel. The biosecurity measures within the CEMP would be developed in line with guidelines prepared by the Commonwealth Department of the Environment (2015) and incorporate the following steps:

1. Undertake a risk assessment for the project area to assess pathogen and weed risks through liaison with neighbouring landowners and government agencies.
2. Develop appropriate controls including which hygiene procedures are necessary to prevent the spread of pathogens and weeds, and how and where to apply them.
3. Ensure all materials taken onto the site—such as seedlings, mulch, soil, gravel, rock and sand—are certified free of weeds and pathogens. Ensure that rigorous inspections and quality checks are built into the management of the entire supply chain for materials and plant material.
4. Create a checklist of hygiene procedures for site managers.
5. Induct site personnel on the risks of spreading pathogens and weeds and risk mitigation strategies. This would include the provision of maps with the location of infested and clean areas and wash-down points.
6. The project area is within a moderate Phytopthora risk zone. Schedule earthmoving activities for the dry season as Phytopthora spreads more easily in wet and muddy conditions. If necessary, postpone activities and reschedule for a day when the soil is dry and doesn't stick to footwear, equipment and tools.
7. Where possible construction activities will be scheduled for when weed species are not in seed.
8. Vehicles will be kept clean and dry on entry and exit of the site. Movement will be restricted to formed roads and designated parking areas. Personnel will avoid driving through puddles and mud.
9. Equipment will be cleaned thoroughly and regularly.

8.3 DECOMMISSIONING

The decommissioning and rehabilitation of the Chaff Mill Solar Farm site and would involve:

1. Removal of all solar farm infrastructure (above and below ground) from the site. Materials would be sorted and packaged for removal from the site and recycling or re-use.
2. Remediation of the land to its original condition. Access roads would also be reinstated to the reasonable satisfaction of the Clare and Gilbert Valleys Council.
3. Undertake various specialist assessments of the land to confirm that FRV's obligations with respect to the property have been fulfilled.

Following rehabilitation, the land would either be leased or sold.

9 CONCLUSION AND RECOMMENDATIONS

This Development Application Report outlines FRV's proposal to develop the 100MW Chaff Mill Solar Farm at a location north-east of Mintaro in the Clare Valley, South Australia. The proposed 100MW solar farm would capture solar energy and generate approximately 250,000MWh of clean, zero emissions electricity each year.

The project has secured Section 49 (Crown Development) status under the Development Act, with the Department of the Premier and Cabinet (DPC) providing sponsorship/endorsement.

This document provides a detailed description of the project and the site, a justification for the development and assessment of potential impacts. The Development Application Report also involved a review of the proposed Chaff Mill Solar Farm against the relevant provisions of the Clare and Gilbert Valleys Council Development Plan, as well as State and Commonwealth level policies and legislation.

The assessment found that the proposed development of a solar farm, is consistent and not at variance with the relevant policy provisions set out in the Clare and Gilbert Valleys Council Development Plan (Consolidated 10 November 2016), and that the project warrants the granting of Development Approval.

The report considers that the Chaff Mill Solar Farm is compliant with the strategic and statutory planning context of the area and there are no major environmental impacts that would result from the construction of the solar farm that could not be appropriately managed, mitigated or avoided. Key management and mitigation measures relate to infrastructure layout in the planning stage of the project as well as the development of a range of management plans.

FRV has engaged with key stakeholders, neighbouring properties and the wider community to inform the planning process for the Chaff Mill Solar Farm. FRV are committed to continuing a thorough engagement process and are considering ways that they can work with the Mintaro Progress Association and local community if the project is approved.

The Chaff Mill Solar Farm would generate considerable environmental, economic and social benefits for Mintaro, the local region and South Australia, including employment opportunities, local investment and increased energy security and reliability. The Chaff Mill Solar Farm would contribute to the South Australian and Commonwealth renewable energy targets and help to mitigate climate change. The assessment has recommended that the proposed Chaff Mill Solar Farm warrants granting of Development Approval.

10 LIMITATIONS

10.1 SCOPE OF SERVICES

This environmental site assessment report (the report) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and WSP (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

10.2 RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

10.3 SPECIALIST STUDIES

Any limitations relating to the findings of the specialist studies are set out in the relevant report, provided in the appendices of this document.

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APPENDIX A

EPBC RISK ASSESSMENT

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FRV AUSTRALIA

JANUARY 2018

CONFIDENTIAL

CHAFF MILL SOLAR FARM *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999* RISK ASSESSMENT

Question today
Imagine tomorrow
Create for the future

Chaff Mill Solar Farm Environment Protection and Biodiversity Conservation Act 1999 Risk Assessment

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ABBREVIATIONS

EPBC Act	*Environment Protection Biodiversity Act 1999*
BDBSA	Biological Database of South Australia
DEWNR	Department of the Environment, Water and Natural Resources
DoEE	Department of the Environment and Energy
FRV	Fotowatio Renewable Ventures
FRWL	Flinders Ranges Worm-Lizard
MNES	Matters of National Environmental Significance
PBTL	Pygmy Blue-tongue Lizard
SCAP	State Commission Assessment Panel

1 INTRODUCTION

Australian solar development company Fotowatio Renewable Ventures (FRV) Australia is proposing to develop the Chaff Mill Solar Farm at a location north-east of Mintaro in the Clare Valley, South Australia (Figure 1.1). The proposed 100 MW solar farm would be developed on a 380 ha site adjacent to the existing Mintaro substation and the associated 132 kV transmission line to Waterloo. The project would deliver clean, zero-emissions electricity via the latest in solar energy generation technology; PV-Polycrystalline modules with a horizontal, single-axis tracking system. The panels, including the mounting structures, would not exceed three metres in height. The site is well-placed to capture and export renewable solar energy into the national electricity grid.

Environmental studies, including an ecological survey and assessment have been completed for the project and a Development Application is currently being prepared for submission to the State Commission Assessment Panel (SCAP).

The following report assesses the likelihood of the project having a significant impact on a Matter of National Environmental Significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and therefore the requirement for a referral to the Commonwealth Environment Minister.

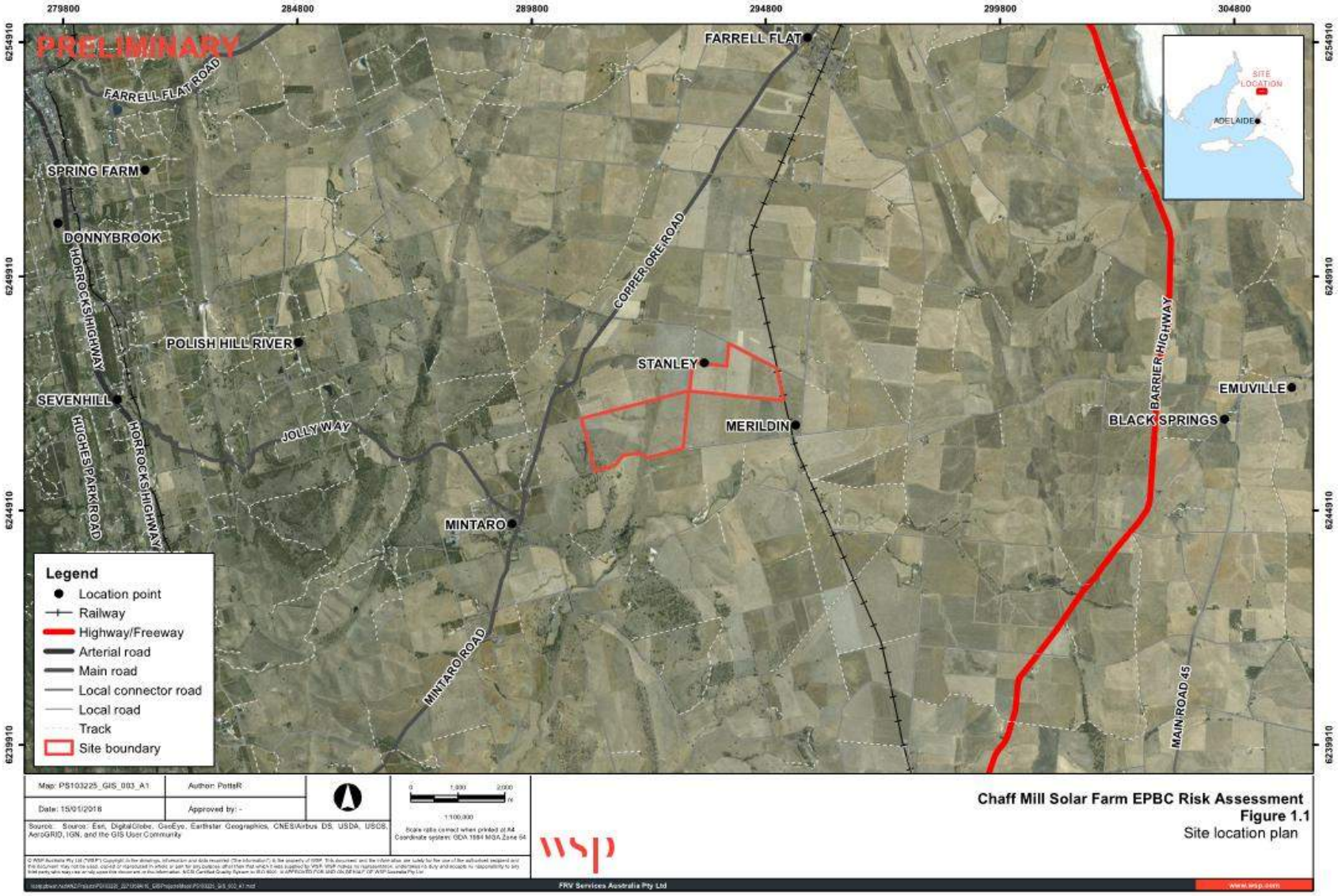

Figure 1.1 Chaff Mill Solar Farm site location

2 THE *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999* (EPBC ACT)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It applies to all Australian territory and waters. Under the Act, actions that are likely to have a significant impact upon defined Matters of National Environmental Significance (MNES) are subject to an assessment and approval process. A company proposing to take an action that may have a significant impact on a MNES must refer that action to the Commonwealth Minister for the Environment.

The EPBC Act can be triggered when an action:

- is taken anywhere in Australia and has, or is likely to have a significant impact on a matter of national environmental significance; or
- is taken on Commonwealth land or in a Commonwealth marine area and has, or is likely to have a significant impact on the environment; or
- is taken outside Commonwealth land or marine areas and has, or is likely to have a significant impact on the environment on Commonwealth land or waters; or
- is taken by the Commonwealth and has, or is likely to have a significant impact on the environment.

In order to decide whether an action is likely to have a significant impact, it is necessary to take into account the nature and magnitude of potential impacts. In determining this, it is important to consider:

- all on-site and off-site impacts
- all direct and indirect impacts
- the frequency and duration of the action
- the total impact, which can be attributed to that action over the entire geographic area affected, and over time
- the sensitivity of the receiving environment
- the degree of confidence with which the impacts of the action are known and understood.

The EPBC Act prescribes nine matters of national environmental significance as triggers for Commonwealth assessment. These are:

- World Heritage sites
- National Heritage places
- Ramsar Wetlands of international importance
- nationally threatened species and ecological communities
- migratory species protected under international agreements
- the Commonwealth marine environment
- the Great Barrier Reef Marine Park
- nuclear actions, including uranium mining
- a water resource, in relation to coal seam gas development and large coal mining development.

Of these nine matters, there are three which could potentially trigger a Commonwealth assessment for the Chaff Mill Solar Farm project:

- nationally threatened species and ecological communities
- migratory species protected under international agreements
- National Heritage places.

Under the EPBC Act, a company proposing an action that may have a significant impact on a matter of national environmental significance must prepare and submit a Referral that will help the Commonwealth decide whether the proposal requires further assessment. The Commonwealth Environment Minister will consider the Referral and is required to decide within 20 business days whether the action requires approval via a higher level of assessment. This is either through:

- assessment on preliminary documentation
- assessment by public environment report
- assessment by environmental impact assessment
- assessment by Public Inquiry.

3 PROTECTED MATTERS SEARCH

An EPBC Protected Matters Report was generated for the proposed location of the Chaff Mill Solar Farm with a ten-kilometre buffer (EBS 2017). The Protected Matters Report provides guidance on MNES that may occur, or have habitat occurring, within the search area.

A search of the Biological Database of South Australia records (BDBSA), maintained by the Department for Environment, Water and Natural Resources (DEWNR), was then undertaken to determine if any of the MNES identified in the Protected Matters Report have been previously recorded within a ten-kilometre buffer of the project area (EBS 2017).

A summary of the results of the Protected Matters Search is provided in Table 3.1. Listed Marine species have not been listed as the rating is only relevant to Commonwealth Marine areas, which are not relevant to the project. A rating of the likelihood of each MNES occurring within the project area is provided based on preferred habitat, historical records and the results of the ecological survey, undertaken by EBS in September 2017 for this project.

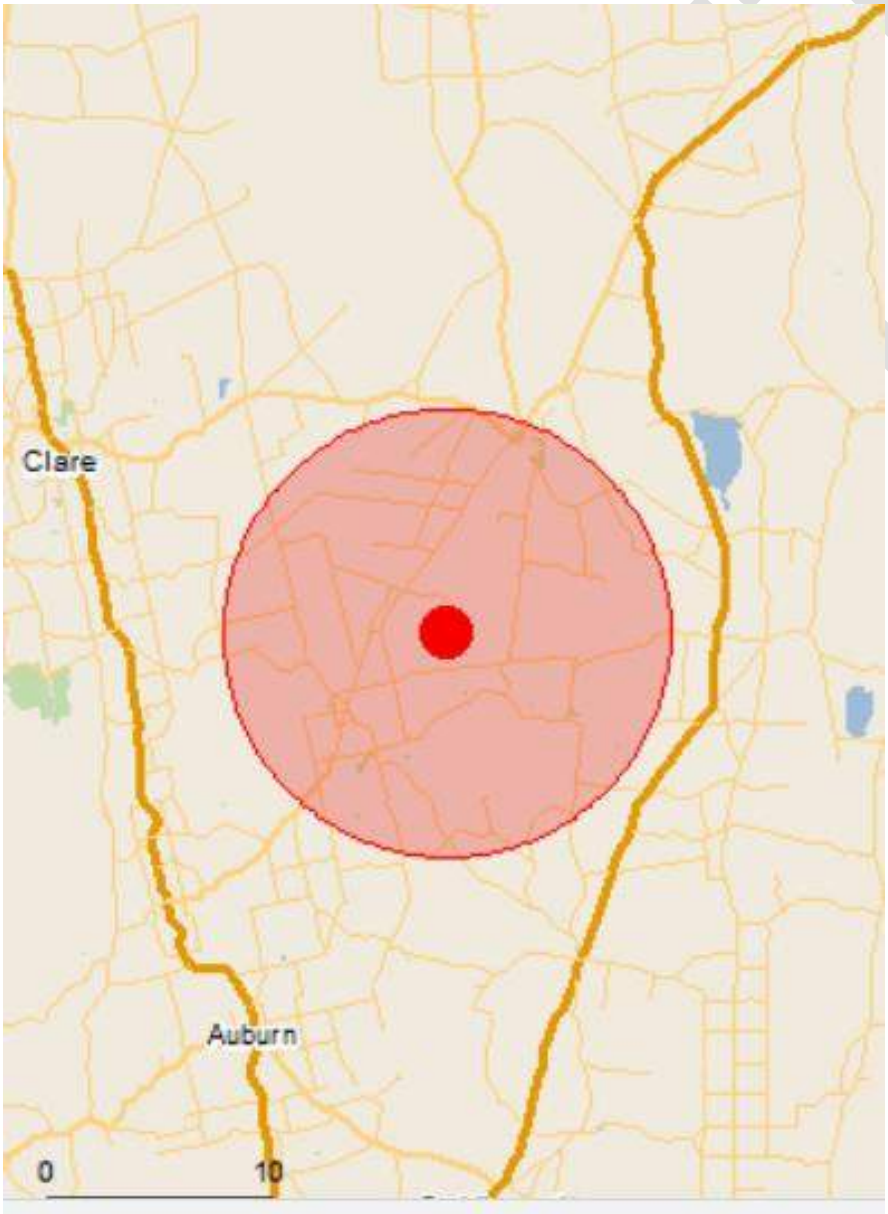

Figure 3.1 Protected Matters Search area

Table 3.1 Protected matters search results for Chaff Mill Solar Farm with a 10 km buffer

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Threatened Ecological Communities							
Iron-grass Natural Temperate Grassland of South Australia			Distribution: Main distribution is on slopes and hills of the Mount Lofty Ranges, west of the River Murray and throughout the Mid North.	N/A	No	Unlikely	No
Peppermint Box (Eucalyptus odorata) Grassy Woodland of South Australia			Distribution: Extends from the southern Flinders Ranges to Lake Alexandrina. It is mostly found in the Flinders–Lofty Block Bioregion but patches also extend into the Murray–Darling Depression, Kanmantoo, Eyre–Yorke Block and Gawler Bioregions.	N/A	No	Unlikely	No
Plants							
Acacia glandulicarpa	Hairy-pod Wattle	Vulnerable	Occurs in semi-arid environments with a mean annual rainfall of 400–500 mm. Many sites coincide with gentle slopes at the transition zone between heavy clay/gravel soils on the flats and sandy soils on the rises (DoEE 2017a).	Yes	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Acacia spilleriana	Spiller's Wattle	Endangered	Grows on rocky hills, commonly along watercourses and roadsides (DoEE 2017a).	Yes	No	Unlikely	No
Caladenia argocalla	White-beauty Spider-orchid	Endangered	Preferred habitat is open grassy herbland under light, in a mixed *Eucalypt* and *Callitris* forest. The species is also noted to occur on hills and slopes in open forest dominated by Drooping She Oak and in Eucalypt woodlands with a grassy understory (DoEE 2017a).	No	No	Unlikely	No
Caladenia gladiolata	Bayonet Spider-orchid	Endangered	*Eucalyptus leucoxylon* Woodland and *Eucalyptus fasciculosa* Woodland. All extant subpopulations grow on slopes (moderate to steep) in sandy loam soils with scattered shale and quartzite.	No	No	Unlikely	No
Caladenia macroclavia	Large-club Spider-orchid	Endangered	Grows in fertile shallow loams in mallee-broombrush woodland in sandy loam.	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Caladenia tensa	Greencomb Spider-orchid	Endangered	Grows on red-brown sandy loams on rises in open woodland dominated by *Eucalyptus leucoxylon* sens. lat. and *Callitris preissii*. Also recorded in Black Box /Yellow Gum Woodland and Mallee/Heathland.	No	No	Unlikely	No
Caladenia woolcockiorum	Woolcock's Spider-orchid	Vulnerable	Typically grows in *Eucalyptus cladocalyx*, *E. goniocalyx*, *E. leucoxylon* subsp. *pruinosa* open forest or woodland. Grows on the mid to lower slopes of steep gullies, in relatively open, herbaceous understorey vegetation with loam soils. Also grows in *Eucalyptus leucoxylon* subsp. *pruinosa*, *Allocasuarina verticillata* woodland. In this habitat type, grows on gentle south facing slopes and flats with clay loam soils.	No	No	Unlikely	No
Caladenia xantholeuca	White Rabbits	Endangered	Occurs in *Callitris glaucophylla* woodland, often on south-facing slopes in heavily shaded areas, where it grows on mossy rock ledges and red-brown loam soils.	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Dodonaea procumbens	Trailing Hop-bush	Vulnerable	This species grows in low-lying, often winter-wet areas in woodland, low open forests, heathland and grasslands, on sands and clays.	Yes	No	Possible	Threats to this species include: — disturbance/destruction of habitat and individual plants — weed invasion — heavy grazing/browsing — altered fire regimes (DoEE 2017a) *Dodonaea procumbens* has been previously recorded in roadside vegetation within 10 km of the project area. Roadside vegetation will not be impacted by the project. It is unlikely to be present within the cropped and mixed grassland areas, where it is presumed infrastructure will be focused. If infrastructure placement is within the cleared areas and avoids native vegetation, it is unlikely that the species (if present) would be impacted.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Euphrasia collina subsp. osbornii	Osborn's Eyebright	Endangered	This species is generally recorded growing in mallee scrubland but has also been found growing in sclerophyll forest and sclerophyll woodland. It is also found in heathy openings in wet sclerophyll forest (DoEE 2017a).	No	No	Unlikely	No
Glycine latrobeana	Clover Glycine	Vulnerable	Found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer (DoEE 2017a).	No	No	Unlikely	No
Olearia pannosa subsp. pannosa	Silver Daisy-bush	Vulnerable	Scattered throughout agricultural areas. Occurs in sandy, flat areas and in hilly, rocky areas in woodland or mallee.	No	No	Unlikely	No
Prasophyllum pallidum	Pale Leek-orchid	Vulnerable	Occurs in in well-grassed open forests from the Flinders Ranges to the Northern and Southern Lofty regions of South Australia (DoEE 2017a).	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Birds							
Calidris ferruginea	Curlew Sandpiper	Critically Endangered, Migratory (Wetland)	Intertidal mudflats in sheltered coastal areas. Also occurs inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.	No	No	Unlikely	No
Grantiella picta	Painted Honeyeater	Vulnerable	Woodland	No	No	Unlikely	No
Numenius madagascariensis	Eastern Curlew	Critically Endangered, Migratory (Wetland)	Sheltered coasts, mangrove swamps, bays, harbours and lagoons that contain mudflats and sandflats, often with beds of seagrass.	No	No	Unlikely	No
Pedionomus torquatus	Plains-wanderer	Critically Endangered	Sparse grasslands	No	No	Unlikely	No
Pezoporus occidentalis	Night Parrot	Endangered	Samphire plains, often around intermittent salt lake systems and with chenopod communities. Also occurs among spinifex on rocky ridges.	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Rostratula australis	Australian Painted Snipe	Endangered	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans.	No	No	Unlikely	No
Fish							
Galaxias rostratus	Flathead Galaxias	Critically Endangered	Inhabits a variety of habitats including billabongs, lakes, swamps and rivers, with a preference for still or slow flowing waters (DoEE 2017a).	No	No	Unlikely	No
Maccullochella peelii	Murray Cod	Vulnerable	Utilises a diverse range of habitats from clear rocky streams, to slow-flowing, turbid lowland rivers and billabongs (2017a).	Yes	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Reptiles							
Aprasia pseudopulchella	Flinders Ranges Worm-lizard	Vulnerable	Burrows freely in loose sand and soil, under rocks and litter. The species occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates.	No	No	Possible	This species was not detected during targeted survey and searches however there is a small chance that it could be present. Therefore, a small number of individual FRWL (if present) may be directly impacted (direct loss, or loss of habitat) by the construction of the solar farm. The scale of loss of potential habitat and individual FRWL is considered minor and inconsequential to the local population (EBS 2017).
Tiliqua adelaidensis	Pygmy Blue-tongue Lizard	Endangered	Variety of habitats, ranging from highly degraded grasslands (dominated by exotic grasses) to grasslands with high native biodiversity. In addition, vegetation cover ranges from moderate to sparse or light.	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Migratory species							
Actitis hypoleucos	Common Sandpiper	Migratory (Wetland)	Occurs in coastal and inland wetlands (2017a).	No	No	Unlikely	No
Apus pacificus	Fork-tailed Swift	Migratory (Marine)	This species is almost exclusively aerial. It mostly occurs over inland plains and occasionally above foothills or in coastal areas (2017a).	No	No	Possible	No
Calidris acuminata	Sharp-tailed Sandpiper	Migratory	Intertidal mudflats in sheltered coastal areas. Also occurs inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (2017a).	No	No	Unlikely	No
Calidris ferruginea	Curlew Sandpiper	Critically Endangered, Migratory (Wetland)	Refer 'Birds' section above.	No	No	Unlikely	No
Calidris melanotos	Pectoral Sandpiper	Migratory	Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DoEE 2017a).	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Migratory (Wetland)	Occurs in permanent and ephemeral wetlands. Usually inhabits open, freshwater wetlands with low, dense vegetation (DoEE 2017a).	No	No	Unlikely	No
Hirundapus caudacutus	White-throated Needletail	Migratory (Terrestrial)	This species is almost exclusively aerial. It has been recorded flying above farmland, over partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (DoEE 2017a).	No	No	Unlikely	No
Motacilla cinereal	Grey Wagtail	Migratory (Terrestrial)	Agricultural areas, forested areas as settled areas.	No	No	Unlikely	No
Motacilla flava	Yellow Wagtail	Migratory (Terrestrial)	Damp or wet habitats with low vegetation, from rushy pastures, meadows, hay fields and marshes to damp steppe and grassy tundra.	No	No	Unlikely	No
Myiagra cyanoleuca	Satin Flycatcher	Migratory (Terrestrial)	Vegetated gullies in Eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	No	No	Unlikely	No

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS	PREFERRED HABITAT	IDENTIFIED IN BDBSA	IDENTIFIED IN ECOLOGICAL SURVEY	POTENTIAL PRESENCE ON SITE	POTENTIAL SIGNIFICANT IMPACT
Numenius madagascariensis	Eastern Curlew	Critically Endangered, Migratory (Wetland)	Refer 'Birds' section above.	No	No	Unlikely	No

4 DATABASES AND RELEVANT REPORTS

4.1 SOLAR FARM EPBC REFERRALS

The Commonwealth Department of the Environment and Energy (DoEE) publishes the majority of EPBC referral decisions and notices issued, as well as invitations to comment, on the EPBC Act Notices database (DoEE 2017). A review has been undertaken of solar farm projects that have been referred to the Commonwealth Environment Minister under the EPBC Act in the last two years. From 2016–2017, seventeen (17) solar farm projects have been referred Table 4.1. Of these projects:

- three referrals are currently pending and are open for invitation for Public Comment
- four have been assessed as 'not a controlled action if undertaken in a particular manner'. Approval is not required if the action is taken in accordance with the manner specified
- ten have been assessed as 'not a controlled action'. Approval is not required if the action is taken in accordance with the referral.

An overview of the size of these developments and their likelihood to impact on MNES is provided in the table below for comparison with the Chaff Mill Solar Farm.

Table 4.1 Solar farms referred to the Commonwealth Environment Minister from 2016-2017

REFERENCE #	TITLE OF REFERRAL	SIZE (ha)	LIKELY TO IMPACT ON MNES	DATE OF REFERRAL	STATUS
2017/8101	Merredin Solar Farm, WA Merredin Solar Farm Nominee Pty Ltd	4.32 ha	Yes	6/12/2017	Pending – open for invitation for Public Comment on Referral
2017/8098	Gregory Solar Farm, QLD Gregory Solar Farm Pty Ltd	872 ha	Yes	6/11/2017	Pending – open for invitation for Public Comment on Referral
2017/8055	Bulli Creek Solar Farm, QLD Bulli Creek Solar Farm Pty Ltd	5,398 ha	Yes	22/09/2017	Not controlled action
2017/8000	Haughton Solar Farm, QLD Pacific Hydro Haughton Solar Farm Pty Ltd	1,181 ha	No	6/09/2017	Not controlled action
2017/7998	Burdekin Solar Farm, QLD Cleangen Projects Pty Ltd	223.6 ha	Yes	31/07/2017	Pending – open for invitation for Public Comment on Referral
2017/7963	Majors Creek Solar Farm, QLD Edify Energy Pty Ltd	539.5 ha	Yes	14/06/2017	Not controlled action

REFERENCE #	TITLE OF REFERRAL	SIZE (ha)	LIKELY TO IMPACT ON MNES	DATE OF REFERRAL	STATUS
2017/7962	Columboola Solar Farm, QLD Luminous Energy Pty Ltd	594 ha	Yes	27/06/2017	Not controlled action if undertaken in a particular manner
2017/7942	Chinchilla Solar Farm, QLD First Solar (Australia) Pty Ltd	250.5 ha	Yes	12/05/2017	Not controlled action if undertaken in a particular manner
2017/7910	Whyalla Solar Farm Project, SA Adani Infrastructure Pty Ltd	396.5 ha	Yes	28/03/2017	Not controlled action
2017/7904	Stage 2 Solar Farm Development, QLD Edify Energy Pty Ltd	2,375 ha	Yes	16/03/2017	Not controlled action
2017/7898	White Rock Solar Farm, NSW Goldwind Capital (Australia) Pty Ltd	149.7 ha	Yes	16/03/2017	Not controlled action
2017/7885	Longreach Solar Farm, QLD Canadian Solar (Australia) Pty Limited	30.74 ha	Yes	28/02/2017	Not controlled action
2017/7879	Oakey Solar Farm, QLD Canadian Solar (Australia) Pty Limited	205 ha	Yes	15/02/2017	Not controlled action if undertaken in a particular manner
2016/7824	Solar Farm Development, QLD Edify Energy Pty Ltd/Energy Generation and Supply	455 ha	Yes	24/11/2016	Not controlled action if undertaken in a particular manner
2016/7807	Gannawarra Solar Farm Development, VIC Edify Energy Pty Ltd	535 ha	Yes	2/11/2016	Not controlled action
2016/7764	Construction and Operation of a Solar Farm, QLD Yarranlea Solar Pty Ltd	250 ha	Yes	19/08/2016	Not controlled action

REFERENCE #	TITLE OF REFERRAL	SIZE (ha)	LIKELY TO IMPACT ON MNES	DATE OF REFERRAL	STATUS
2016/7694	Darling Downs Solar Farm, QLD Origin Energy Darling Downs Solar Farm Pty Ltd	441 ha	Yes	3/05/2016	Not controlled action

4.2 CHAFF MILL SOLAR FARM ECOLOGICAL REPORT

An ecological survey was undertaken for the project by EBS Ecology. The field survey was undertaken from 24-26 September 2017 and included a vegetation survey and an opportune fauna survey.

The ecological report found that the project is not considered to have a significant impact on any EPBC Act listed flora, fauna or ecological communities, and hence a referral is not required based on the current assessment area (EBS 2017).

The below is an excerpt from the ecological report.

4.2.1 THREATENED ECOLOGICAL COMMUNITIES

The Threatened Ecological Communities identified in the EPBC Protected Matters Search Report were not detected within the project area.

4.2.2 FLORA

None of the EPBC listed flora species identified in the EPBC Protected Matters Search were detected or considered likely to occur within the project area based on the available habitat.

Dodonaea procumbens (Trailing Hop-bush), listed as nationally vulnerable, is considered as possibly occurring given nearby records and the species' relative inconspicuousness (and hence potential for non-detection). *Dodonaea procumbens* is unlikely to be present within the cropped and mixed grassland areas, where it is presumed infrastructure will be focused. If infrastructure placement is within the cleared areas and avoids native vegetation, it is unlikely that the species (if present) would be impacted.

Dodonaea procumbens has been previously recorded within the following vegetation associations:

- open *Eucalyptus camaldulensis*, *E. fasciculosa* and *E. leucoxylon* Woodlands in low-lying areas
- *Lepidosperma viscidum, Themeda triandra, Rhytidosperma* spp., *Austrostipa* spp. Native Grasslands
- with shrubs, including *Acacia acinacea*, *D. viscosa* and *Bursaria spinosa*.

There are 32 records of *Dodonaea procumbens* within 10 km of the project area, including from Mintaro Cemetery, within roadside vegetation, along the Barrier Highway, within plantation reserve east of Holm Hill and south-west of Black Springs (DEWNR 2017).

Two of the other EPBC listed flora species have BDBSA records within 10 km of the project area:

- *Acacia glandulicarpa* (Hairy-pod Wattle) – EPBC vulnerable. Two records; Flagstaff Road 3.7 km WNW of Black Springs, along roadside in Mixed Native sp. / Exotic sp. Grassland; and 5.5 km WNW of Farrell Flat.
- *Acacia spilleriana* (Spiller's Wattle) – EPBC endangered. Two records; 2.6 km NNW of Manoora, and another 1.5 km SSW of Porter Lagoon in the bed of quarry.

It is considered that these species would have been observed within the project area if present.

4.2.3 FAUNA

None of the fauna species identified in the EPBC Protected Matters Search have previous BDBSA records within 10 km of the project area. No fauna species protected under the EPBC Act were detected during the field survey.

4.2.3.1 PYGMY BLUE-TONGUE LIZARD

The Pygmy Blue-tongue Lizard (PBTL) was not detected during the field survey. The absence of PBTL is attributed to the large area of land that has been cropped. The area of exotic grassland/and *E. leucoxylon* Open Woodland within the western block is broadly considered potential habitat however no spider holes were detected therefore it is considered unlikely that PBTL occur.

Based on the results, there is no need for further targeted surveys or an EPBC referral for this species.

4.2.3.2 FLINDERS RANGES WORM-LIZARD

The Flinders Ranges Worm-Lizard (FRWL) was not detected during the field survey. The habitat suitability for Flinders Ranges Worm-lizard is considered low, however given the species' broad distribution across the region, it is considered as possibly present in non-cropped areas where surface rock, leaf litter and fallen timber occurs. Overall the habitat is considered as low suitability.

A small number of individual FRWL (if present) may be directly impacted (direct loss, or loss of habitat) by the construction of the solar farm. The scale of loss of potential habitat and individual FRWL is considered minor and inconsequential to the local population.

Based on the criteria in the EPBC Act Significant Impact Guidelines (Department of the Environment 2013) the project is not considered to have a significant impact on FRWL. An EPBC referral is not considered necessary for this species.

4.2.3.3 FORK-TAILED SWIFT

The Fork-tailed Swift (*Apus pacificus*), listed as migratory, could occur as an occasional visitor but would not be significantly impacted by the development.

5 EPBC RISK

5.1 RISK OVERVIEW

The Chaff Mill Solar Farm project area is mostly cleared of native vegetation and is under crop. There is a large patch of remnant *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland Blue Gum) in the western corner of the project area where it is too steep to cultivate. The understory is grazed and comprised of exotic grassland species. The creek line running through the western block is highly degraded with very limited native understory species present. The western block is bordered on the western side by a relatively steep rocky escarpment. Amenity plantings, mostly comprised of native species, occur as small patches within the project area and as narrow strips along the roadsides. Small strips of remnant native woodland and shrubland also occur along some roadside (EBS 2017).

The site falls within the Flinders Lofty Block IBRA Bioregion, the Broughton Sub-region and the Hansen Environmental Association. This Environmental Association has native vegetation comprising only 3% of its total area with a landform of gentle foot slopes forming extensive intramontane plains, with occasional narrow strike ridges on metasediments.

The ecological survey undertaken to support the Development Application for the project did not identify any nationally threatened species, or Threatened Ecological Communities (TEC) that meet required TEC criteria, although there is still potential for some of the species (predominantly *Aprasia pseudopulchella),* to occur on site if the right habitat conditions are present.

Even if nationally threatened species of reptiles, birds and plants are present, the project is assessed as having a low risk under the EPBC Act due to the following factors:

- Surveys have located potential habitat for a limited number of threatened species but are yet to identify any recordings.
- The South Australian BDBSA does not show any relevant records for nationally threatened species.
- Even if impacted – potential impacts would not be deemed significant due to the area not comprising key habitat for any of the species (see Section 5.2).

5.2 EPBC ACT POLICY STATEMENT 1.1 SIGNIFICANT IMPACT GUIDELINES

An assessment against the EPBC Act Significant Impact Guidelines has been undertaken for EPBC Act Threatened species and Migratory species that have a possibility of being present within the project area. The purpose of these guidelines is to assist in determining whether Referrals should be prepared for projects and whether potential impacts may be significant under the Act.

Table 5.1 through to Table 5.3 outline the significant impact criteria (from the EPBC Act Significant Impact Guidelines) for Threatened and Migratory/Marine species; against each of the species that may occur in the area (based upon the information in Table 3.1).

Table 5.1 Significant impact guidelines assessment for vulnerable species

CRITERIA	SIGNIFICANT IMPACT ON *APRASIA PSEUDOPULCHELLA*	SIGNIFICANT IMPACT ON *DODONAEA PROCUMBENS*
Lead to a long-term decrease in the size of an important population of the species	No	No
Reduce the area of occupancy of an important population	No	No
Fragment an existing important population into two or more populations	No	No
Adversely affect critical habitat to the survival of a species	No	No
Disrupt the breeding cycle of an important population	No	No
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	No
Result in invasive species becoming established in the vulnerable species' habitat	No	No
Introduce disease that may cause the species to decline	No	No
Interfere substantially with the recovery of the species	No	No

Table 5.2 Significant impact guidelines assessment for endangered species

CRITERIA	SIGNIFICANT IMPACT ON *TILIQUA ADELAIDENSIS*
Reduce the extent of an ecological community	No
Fragment or increase fragmentation of an ecological community	No
Adversely affect habitat critical to the survival of an ecological community	No
Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	No
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	No
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: assisting invasive species that are harmful to the listed ecological community to become established, or; causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	No
Interfere with the recovery of an ecological community	No

Table 5.3 Significant impact guidelines assessment for migratory species

CRITERIA	SIGNIFICANT IMPACT ON *APUS PACIFICUS*
Substantially modify (including fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	No
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	No
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	No

6 RECOMMENDATIONS

At this stage, it is considered unnecessary to prepare and submit a Referral under the EPBC Act for the Chaff Mill Solar Farm project. This is due to:

- a lack of threatened species recorded during the 2017 project survey
- a lack of threatened species recorded in the BDBSA
- a lack of key habitat for threatened species within the project area
- the nature of the proposed development
- the ability to manage and mitigate potential impacts through detailed Environmental Management Plans for construction and operation.

7 LIMITATIONS

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

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APPENDIX B

ABOUT FRV

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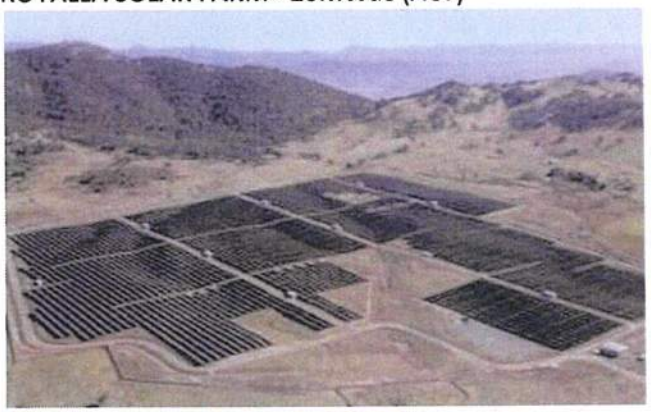
Appendix A - FRV Services Australia Pty Ltd - the Project Developer

FRV SA has extensive experience in the Australian renewable energy industry - it is a responsible and reliable developer and manager of large scale solar PV projects in three states. FRV SA's management team in Sydney, Australia is currently involved in the following projects under construction or operation:

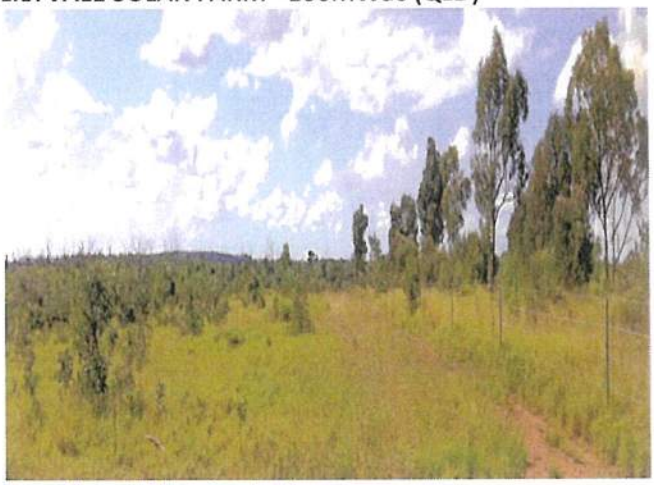
ROYALLA SOLAR FARM - 20MWac (ACT)  http://www.royallasolarfarm.com.au/	Originally developed by the FRV Group, on 5 September 2012, the Minister for the Environment and Sustainable Development announced that FRV Royalla Solar Farm Pty Limited was successful in the 'fast-track stream' of the Solar Auction and was awarded a grant of feed-in-tariff entitlement for its 20 MW proposal to be located at Royalla in the ACT. FRV SA provided the Construction Management Services and the Royalla Solar Farm which was commissioned in late August 2014 and officially opened by the Minister on 3 September 2014. Since commissioning, FRV SA has been providing and continues to provide the Asset Management Services to the owners of the Royalla Solar Farm.
MOREE SOLAR FARM - 56MWac (NSW)   http://www.moreesolarfarm.com.au/	Moree Solar Pty Ltd is the owner and operator of the 56MWac (70.1MWdc) Moree Solar Farm located in the northern NSW. The Moree Solar Farm project was developed and is funded by the FRV Group with the support of the Australian government through a grant of AUD$101.7 million from the Australian Renewable Energy Agency (ARENA) and debt on commercial terms from the Clean Energy Finance Corporation (CEFC). FRV SA provided the Construction Management Services throughout the construction of the solar farm which started generating in February 2016. The Moree Solar Farm is now fully operational and FRV SA is providing the Asset Management Services which includes but not limited to the participation in the electricity market, wholesale trading, operations management, settlements and risk management.
CLARE SOLAR FARM - 136MWac (limited)(QLD)	Clare Solar Farm is the first utility-scale solar generation facility in Australia to secure financing purely on the basis of a commercial Power Purchasing Agreement without any additional grant funding. The Project is currently being built under an EPC Contract and FRV SA is currently providing the

http://www.claresolarfarm.com.au/

Construction Management Services to the Owner.

Once fully commissioned, FRV SA will provide all Asset Management Services to the Operator of the Project. The Solar Farm is expected to start generating in Q1 with the extension (Clare II) to follow closely behind.

LILYVALE SOLAR FARM - 100MWac (QLD)



http://www.lilyvalesolarfarm.com.au

Continuing its success of signing Power Purchase Agreements (PPA) for previous projects, FRV signed a PPA with Ergon Energy for 100% of the output from its Lilyvale Solar Farm in Queensland.

Lilyvale is a project near Emerald and is currently under construction, making it FRV's 4th solar farm in construction or operation in Australia. FRV will also be installing its millionth solar panel in Australia at Lilyvale Solar Farm.

APPENDIX C

CHAFF MILL SOLAR FARM ENGAGEMENT REPORT

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REPORT

Chaff Mill Solar Farm Engagement Report (September 2017 to May 2018)

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No.:	17162		
Version:	0.3		
Date:	May 2018		

Document Status

Version	Purpose of Document	Approved by	Reviewed by	Review Date
0.2	Issued to client	Alistair Kingston	Mandi Davidson	21/03/2018
0.3	Revision to client	Alistair Kingston	Mandi Davidson	28/05/2018

Approval for issue

Name	Signature	Date
Alistair Kingston	Alistair Kingston	29/05/18

Contents

Appendices

1 Background

FRV Services Australia ("FRV") is committed to being a good corporate citizen and working with its neighbours. On the Chaff Mill solar farm project, FRV has engaged with key stakeholders, neighbouring properties and the wider community to inform the planning process.

FRV is has adopted a three-phase engagement process:

- **Stage 1:** Meet with stakeholders and the community (including with neighbouring properties) to introduce them to the project, outline its benefits, explain the Development Application process and to seek feedback.
- **Stage 2:** Continued engagement with stakeholders and the community, in particular with the council, local members of parliament and key stakeholder groups by providing an update on the Development Application process, initial findings from technical assessments and how community concerns are being addressed.
- **Stage 3:** Demonstrate that FRV has listened and responded to community and stakeholder interests and concerns by meeting with all directly neighbouring properties (and various other neighbours), the Clare and Gilbert Valleys Council, local MPs and community groups and sharing the findings from the specialist technical assessments and how their concerns will be addressed in the Development Application. This phase also includes a pop-up community information session at the Sevenhill Producers market and a meeting with the new Minister of Trade Tourism and Investment, and the advisor for the local MP following the change of South Australian government in March 2018.

This document summarises the engagement activities undertaken during the three phases, the feedback provided and how FRV has used and responded to this feedback.

RPS

2 Summary of consultation

2.1 Phase one engagement

In September 2017, FRV undertook a process of introducing the project to key stakeholders and neighbouring property owners. The objective was to meet with both owners and leaseholders of properties that neighbour the two parcels of land identified as the site for the potential solar farm in Mintaro.

All known property owners were contacted in the week commencing 18 September offering them the opportunity to meet with representatives from FRV on Wednesday 27 September or Thursday 28 September 2017. Property owners who were unable to meet on these days were emailed a copy of the FRV Chaff Mill Solar Farm fact sheet (included in Appendix A).

Seven properties border the two parcels of land identified as a site for the solar farm. A total of five meetings where held with property owners over this period. FRV was not able to make contact with two of the property owners prior to the meetings. A phone discussion was had with one property owner for one of the properties, and they chose to have a fact sheet sent to them in lieu of a meeting. An email conversation was had with another of the landowners to address specific questions. An additional property owner was identified during this series of meetings, and a phone conversation has since been had with this property owner.

Since this visit to Mintaro, a phone discussion has been had with all outstanding property owners, and an offer was made to meet with them face to face as part of phase two of consultation. Stakeholders were kept updated during the specialist investigation process.

FRV also met with the Mintaro Progress Association (MPA), which is the peak body representing the Mintaro community. The association works in partnership with the Clare and Gilbert Valleys Council (CGVC) to ensure local concerns and issues are brought before the council. The meeting was held on Wednesday 27 September 2017 and the council was represented at this meeting, with the Manager Governance and Community in attendance.

Local MPs including the Hon. Geoff Brock, Member for Frome and Minister for Regional Development and Local Government, and Member for Stuart and Shadow Minister for Energy and Mining, Dan van Holst Pellekaan, were also briefed about the project through their staff and a copy of the fact sheet was sent to their offices.

The Clare and Gilbert Valleys Council was engaged during this phase, through a range of phone conversations and exchange of emails in September and October 2017. A meeting was also held with the council's Manager – Development and Environment on 28 September 2017, providing an update on the project, engagement with stakeholders and timing of the Development Application.

Further conversations were also had with additional property owner who were interested in the project. Directly affected property owners provided contact details for these land owners, with FRV making contact with them via phone and email to ensure they too were fully briefed about the project. These property owners were also added to a mailing list and provided with regular project updates. The concerns of these property owners have also been reflected in the following section outlining key issues.

2.2 Phase two engagement

In late November 2017, FRV undertook an additional round of engagement. This phase of engagement was much broader than the first round, focussing less on those directly neighbouring the proposed site, but those with a community interest.

Engagement occurred on 23 and 24 November 2017, with FRV meeting with the local MPs, or their representatives. Discussions where had with Chris Hanna, the advisor to the Hon. Dan van Holst Pellekaan, and Daniel Wilson, the advisor to Steven Marshall, the Leader of the South Australian Liberal Party. FRV also met with Hon. Geoff Brock and his ministerial advisors.

FRV has maintained regular contact with the Mintaro Progress Association since visiting in September 2017, and met again with representatives during this visit. Discussions focussed on how FRV can improve on its communication and engagement with the boarder Mintaro community and how FRV can invest in the community in the future. FRV was provided with a copy of the Mintaro Progress Association Strategic Plan 2017-2022 to provide insights into their vision for managing and developing key assets in Mintaro, and for FRV to consider how they might be able to provide support in the future.

With a focus on identifying benefits to the boarder community, FRV also met with the Clare Business and Tourism Association (CBTA). The association is one of the peak bodies seeking to encourage and assist in tourism and promotion of the region, in addition to providing a platform for all businesses in the region to voice opinions on business development. This provided an opportunity to discuss the range of local events that FRV could be participate in to discuss local business opportunities should its Development Application be successful, including CBTA's Annual General Meeting. Copies of the solar farm fact sheets were distributed at the meeting, which were then emailed to the CBTA members.

The Clare and Gilbert Valleys Council were engaged during this phase, through a range of emails and phone conversations in the lead up to the November 2017 visit and a formal presentation with the Mayor, acting CEO, various councillors and the council's Development and Environment and Governance and Community managers. Through the presentation and a visit to site, the councillors were provided with an update on the project, engagement with stakeholders, timing of the Development Application and how specific landowner concerns were being managed.

All stakeholders were provided with a hard copy of FRV's Chaff Mill Solar Farm project update (included in Appendix A). Neighbouring landowners and interested stakeholders were emailed a copy of this update on 22 November 2017. FRV developed a contact list for all engagement prior to the submission of the Development Application with all on the mailing list receiving copies of any project updates.

2.3 Phase three engagement

The final phase of engagement occurred in mid to late May 2018 and focussed on sharing the findings from the technical assessments that were performed between September 2017 and February 2018, and to build on the earlier engagement, ensuring that the consultation was seen as meaningful and inclusive of all (directly affected landowners, broader community and key stakeholder groups). The intention was to also address any outstanding concerns that the community may have, and ensure that these concerns are addressed in the final Development Application.

Engagement occurred between 21 and 24 February 2018 during this phase and took on three forms:

- One on one meetings with directly neighbouring landowners (and their neighbours who had expressed an interest in meeting)
- Meetings with key stakeholder groups and MPs (Clare and Gilbert Valleys Council, Mintaro Progress Association – committee and members and the Hon. Geoff Brock MP)
- Pop-up community information session as the Sevenhills Producers Market.

During this time, FRV met with 10 neighbouring landowners to provide them with an update on the Development Application process, the timing and opportunities to provide feedback (either directly as an individual or comments through the council). FRV also used this opportunity to brief them on findings from the 11 technical and environmental assessments that have been undertaken to shape the Development Application. This enabled the landowners to have their concerns addressed first-hand by the WSP environmental scientist who was commissioned to manage the assessments, and to ask any additional questions. Key areas of concern continue to be whether the level of frost will increase in the area, whether there was any opportunity for compensation from FRV due to visual changes to the local amenity and what measures will be taken to manage biosecurity, impacts on local roads, stormwater run-off and ground conditions. It was noted with all of the landowners that measures to manage specific environmental and construction impacts will be addressed as part of the Construction Environmental Management Plan during the construction phase. Commitments were made to meet with these neighbouring landowners, should the project be approved.

The Clare and Gilbert Valleys Council were engaged during this phase, through a range of emails and phone conversations in the lead up to the February 2018 visit and a formal presentation with the Mayor, the new CEO, various councillors and the council's Development and Environment and Governance and Community managers. All in attendance were provided with an update on the project, focussing primarily on the findings from the technical and environmental assessments. The council acknowledged the thorough review of the issues raised both by themselves and the community during past discussions, but provided comment on a number areas such as impacts on local roads, visual amenity, and frost, and expect these issues to be further addressed in the Development Application.

An onsite meeting was held with the Hon. Geoff Brock to provide him with a better understanding of the proposed solar farm, following on from the meeting in Adelaide in November 2017. During the discussion he mentioned some a few of the concerns that his constituents had discussed with him, with the primary one being frost. FRV provided him with an update on the technical and environmental assessments that had been performed between September 2017 and February 2018.

Included in this phase of engagement was a presentation to the Mintaro Progress Association on 23 February, including both committee and general association members – a total of 15 people were in attendance. A formal presentation was given highlighting the findings from the technical and environmental assessments and how various community concerns have been addressed. An update was also given on the Development Application process, including how the public can assess the full studies and the Development

Application submission at the end of March 2018. Fact sheets were also provided to all present, reiterating this information and offering a direct link to the State Commission Assessment Panel.

During this meeting there was a discussion about the direct benefits to the community of Mintaro, including jobs available to contractors (civil contractors, fencers, and electricians for example) during construction and the indirect opportunities through catering and accommodation. In addition to this, FRV was pleased to offer the Mintaro Progress Association a community grant program over a five year period once the construction of the solar farm commences to support the strategic initiatives outlined in their Strategic Plan for Mintaro. It was noted that FRV will look at other ways to support the community, such as the MinMan Eagles, should the project be approved.

To date, the engagement for this project has focussed on those directly associated with or neighbouring the solar farm. One of the objectives of this phase of engagement was to ensure the broader community was informed about the proposed solar farm, and given the opportunity ask the FRV team questions. FRV sought advice from both the Mintaro Progress Association and the Clare and Gilbert Valleys Council on opportunities to attend events that locals usually attend. Following this advice, a decision was made to hold a pop-up community information session as the Sevenhills Producers Market on Saturday 24 February 2018 between 8.30am and 12pm. Advertisements were placed in the Northern Argus and the Plains Producer two weeks prior to the event, inviting people to come and visit the team (copies of these advertisements are located in Appendix C). The Clare and Gilbert Valleys Council also promoted the event for two weeks in their column in the respective newspapers. Just over 35 people visited the team at the market, with many noting they had seen the advertisements and had specifically come to meet the team. Most people visited to understand where the solar farm would be located and to identify potential business opportunities. FRV took the contact details of numerous B&B providers, a hotel, fencing contractors and individuals with previous construction experience, and will contact them in the future, should the project be approved. Overall comments from those who attended the information session were very supportive of the project, and commended the project and its use of renewable energy.

All stakeholders and community members who spoke with FRV at any of these engagement initiatives were provided with a hard copy of FRV's Chaff Mill Solar Farm project update #2 and a range of facts sheets on topics including frost and microclimate assessments, traffic assessments, overall technical and environmental assessments and an overview of the Chaff Mill Solar farm, including an indicative plan of where items will be located on the solar farm land. Copies of these materials are included in Appendix A.

Following the result of the South Australian government elections, and the change of government, FRV made a decision to submit the Development Application for the Chaff Mill Solar farm after March 2018 (the originally planned submission period). Emails were issued to all community members and stakeholders that FRV had previously engaged with, informing them that FRV still intended to submit the Development Application and that they would use the following weeks to speak with the new government before making a submission. They were also advised that FRV would contact them again to confirm when the application was submitted and how they could view this submission.

FRV met with the new Minister of Trade Tourism and Investment, Hon. David Ridgeway and Chris Hanna, the advisor to the Hon. Dan van Holst Pellekaan (Member for Stuart and Minister for Energy and Mining) on 23 May, briefing them on the project, the benefits to the State and the consultation to date with stakeholders and the community.

3 Key messages

Throughout engagement, it was important that FRV provide key stakeholders and the land owners with consistent information about the project. All stakeholders were advised of the following:

- Leading Australian solar developer and renewable energy company FRV Services Australia (FRV) is preparing a development application for a proposed 100MW solar farm with battery storage 3.5km north-east of Mintaro.
- FRV's parent company, Fotowatio Renewable Ventures, has developed and operated solar farms around the world over the past decade, developing 30 projects spanning 24 countries and five continents. This includes two operational solar farms in Australia, the 20MW Royalla Solar Farm in the ACT and the 56MW Moree Solar Farm in New South Wales. FRV is currently constructing the 100MW Clare Solar Farm, near Ayr in QLD and the 100MW Lilyvale Solar Farm, near Emerald in QLD.
- FRV commissioned WPS to undertake environmental, traffic, hydrological and geotechnical assessments, including surveys, to inform the design of the proposed Chaff Mill Solar Farm. These studies were performed from September 2017 through to February 2018.
- FRV believes the proposed Chaff Mill Solar Farm could generate enough clean energy to power 60,000 homes for South Australian families.
- The proposed site, approximately 130 kilometres north of Adelaide, is well placed to capture and export solar energy into the national electricity grid from the nearby Mintaro substation and its existing 132kV transmission line to Waterloo.
- The site of the proposed Chaff Mill Solar Farm is bounded by Wockie Creek Road, Merildin Road, Faulkner Road and Chaff Mill Road.
- This site was selected because of its proximity to grid infrastructure, good drainage and largely cleared land. The level of solar irradiation also makes it a suitable site for a solar farm.
- Development of the Chaff Mill Solar Farm is subject to development approvals through the South Australian Government's State Commission Assessment Panel. FRV will submit its Development Application in March or April 2018.
- Discussions with the local council as well as community and stakeholder engagement will inform the proposed project's planning and design. FRV met with the community and stakeholders on various occasions in 2017 / early 2018 to share with them the proposed design of the solar farm, including layout and plant configuration, and insights from specialist studies and reports.
- Subject to development approval, FRV seeks to commence construction in mid-2019 and complete the project by late 2020.
- A final design for the proposed Chaff Mill Solar Farm will determine plant configuration, layout and specific equipment to be used should the project proceed.
- Should the project proceed, the solar farm would have an operating life of around 30 years. At the end of this period, the solar farm will be decommissioned and the land restored to its original condition. Any extensions of the solar farm would require a new planning application.
- Operation of Chaff Mill Solar Farm would deliver clean, zero emissions electricity to meet the region's energy needs and would have significantly lower environmental impacts relative to other electricity generation methods.

- There will be little noise associated with the operation of the Chaff Mill Solar Farm. Noise from the cooling fans in the inverter cabins may be heard for short periods of time, in extreme heat conditions however you would need to be standing directly next to it to hear it.
- FRV will use PV-Polycrystalline modules with a horizontal, single axis tracking system. The panels, including the mounting structure would be no more than three metres from ground level. With this technology, the panels no longer feature metal rims, lessening the risk of glare to neighbouring properties.
- The solar panels will be positioned in a north to south orientation and will track from east to west.
- Should the project proceed, FRV would employ up to 200 workers during construction. During the operational stage, up to five ongoing jobs will be created.
- The proposed Chaff Mill Solar Farm would attract investment to the area and deliver additional indirect economic opportunities to local businesses including local grocery stores, restaurants, cafés, accommodation providers and petrol stations.
- Should the project proceed, there would be some initial traffic impacts, with the delivery of materials of the site. FRV will implement a construction management plan to manage traffic and other potential impacts.
- Traffic to and from the Chaff Mill Solar Farm during operation will be minimal. These traffic movements will generally be by private vehicles and will represent volumes in the order of what is already being experiences on the surrounding roads.
- FRV is committed to minimising impacts on the environment. The trees located in the far south-west corner on one of the identified parcels of land, near the creek, will be retained and preserved.
- FRV will work with properties who are classified sensitive receptors to consider ways to reduce the visual impact through vegetation screening.
- Committed to partnering with the local community, FRV has had discussions with local community groups to determine the best way to contribute to the community through a range of partnership opportunities both with community and sporting groups.

4 Key issues

Stakeholders and property owners were receptive to the concept of a solar farm in Mintaro, but raised a number of concerns that they expect to see FRV respond to or address in the Development Application.

Table 1 provides a summary of these concerns and the approach that FRV will take to ensure that any issues are addressed or managed accordingly.

Table 1 Summary of stakeholder and community concerns

Category	Specific issue	FRV mitigation measures
Environmental	Placement of the solar panels and the risk of restricting air flow by placing panels too close to the ground and to neighbouring fences and properties.	On most solar farms there is a gap between the end of panel arrays and the solar farm fence that is normally wide enough to allow for a vehicle to drive through. This is FRV's preferred design approach, and will be considered when finalising the detailed design. An Asset Protection Zone between the fence and solar farm infrastructure may also be required as part of the Bushfire Management Plan. The likely distance between the ground and the bottom edge of the panels (at their lowest height) will be between 0.5-1metres, although this will be confirmed during the detailed design stage following an extensive geotechnical assessment.
	Maintenance of the creek and the associated tributary on the land which the solar farm will be located.	The creek and associated riparian zone will be avoided and vegetation removal from this area will not be required. Protection measures will be outlined in the required Construction Environmental Management Plan.
	Increased water run-off from the solar farm property into neighbouring properties.	A preliminary civil assessment has shown that there will be no increase in total run-off from the site. Detailed civil and flooding assessments will be undertaken prior to construction to inform final design. A Sediment Erosion and Drainage Management Plan will be prepared for the project.
	Alternations to the land which will further increase the risk flooding to the region.	A civil assessment (stormwater and flooding) was undertaken to assess the topography and drainage characteristics of the site and to identify any flooding and drainage issues. The design of the solar farm will utilise the existing topography to allow the existing drainage network to continue to drain freely. This aligns with best management practices regarding site stormwater management for solar farm operation. Due to the lack of flood mapping in the relevant Development Plan, it is recommended that further analysis be undertaken to assess the risk of flooding. Flood modelling of the wider area would be undertaken prior to detailed design. A "buffer zone" may be created around waterways to prevent works being undertaken in areas which may be subject to localised flooding. It may also be necessary to establish stormwater detention ponds to ensure post-development flows

Category	Specific issue	FRV mitigation measures
		match pre-development flows from the site due to potentially increased run-off (subject to further detailed investigation).
Farming operations	Compromised biosecurity for neighbouring properties, with contaminants being transported on vehicles using private and public roads and potential impact on neighbouring properties being able to maintain European Union Cattle Accreditation Scheme credentials.	Biosecurity (including weed control) would be managed at the Chaff Mill Solar Farm site through the implementation of site hygiene controls, which would be incorporated into the Construction Environmental Management Plan (CEMP). The biosecurity measures within the CEMP would be developed in line with best practice and incorporate the following steps: ▪ Undertake a risk assessment for the project area to assess pathogen and weed risks through liaison with neighbouring landowners and government agencies. ▪ Develop appropriate controls including which hygiene procedures are necessary to prevent the spread of pathogens and weeds, and how and where to apply them. ▪ Create a checklist of hygiene procedures for site managers. ▪ Induct site personnel on the risks of spreading pathogens and weeds and risk mitigation strategies. This would include the provision of maps with the location of infested and clean areas and wash-down points. ▪ Vehicles will be kept clean and dry on entry and exit of the site. Movement will be restricted to formed roads and designated parking areas. Personnel will avoid driving through puddles and mud. ▪ Equipment will be cleaned thoroughly and regularly.
	Location of the solar farm fencing and impacts on existing boundary fences	The 3 metre high chain wire security fence is normally positioned on the boundary and FRV will seek to replace the existing fencing on the boundary with the security fence if so. In some cases, if required, the existing fence and new security fence can be co-located side by side.
	Continued supply of water from windmill in the parcel of land proposed for the solar farm.	FRV will use its best endeavours to maintain the water supply to neighbouring properties from the existing windmill. FRV will have discussions with neighbouring properties on how this can be achieved once the site design is finalised. The current site layout for the project leaves that part of the site vacant, so there may not necessarily be a need to move the windmill to another location.
	Health impacts on either humans or animals as a result of electromagnetic fields (EMFs)	FRV and its consultants have undertaken research into EMFs. Through this research it has found that photovoltaic (PV) systems generate electromagnetic fields (EMF), sometimes referred to as radiation. EMF produced by electricity is nonionizing radiation, meaning

Category	Specific issue	FRV mitigation measures
		the radiation has enough energy to move atoms in a molecule around, but not enough energy to remove electrons from an atom or molecule (ionize) or to damage DNA. Modern humans are exposed to EMF throughout their daily lives without negative health impacts. Someone outside of the fenced perimeter of a solar facility is not exposed to significant EMF from the solar facility. As such, there is no negative health impact from the EMF produced in a solar farm. Commercial equipment such as solar panels are subject to the relevant Australia regulations (such as the ARPANSA Standard) that determine the maximum allowable emissions limits.
	Impact on neighbouring property values with the development of a solar farm both in terms of inflated value due to the price paid for the solar farm land and the impact on remaining farms on having a solar farm as a neighbour.	Property values are influenced by a range of factors and it is therefore difficult to determine if solar farms (or other similar infrastructure) can cause land values on neighbouring agriculture properties to increase or decrease. There is little available research on the impact of solar farms on property value however a study undertaken in 2016 into the impacts of wind farms on the value of neighbouring agricultural properties found that: *For rural properties used for primary production, there is no direct loss of productivity resulting from wind farms; therefore, they are unlikely to negatively impact the value of such properties.* Property values for neighbouring properties within the local area may be influenced by the solar farm (potentially positively or negatively). This is difficult to quantify; however it is not expected that the Chaff Mill Solar Farm would affect productivity of neighbouring agricultural properties.
	Potential impact on the temperature inversion and an increase in cooler air in the area with the installation of the solar panels.	FRV's research found a lack of specific studies and literature that relate to the general environmental impacts of solar farms. Literature regarding micro-climate impacts and impacts to the radiative heat exchange at solar farms is even rarer. WPS reviewed several studies that had a range of findings and outcomes. Summarised relevant findings appear to be that: ▪ Temperatures in the centre of a solar farm may be slightly higher than ambient – particularly in warmer months ▪ Temperatures return to ambient several metres above a solar farm ▪ Temperatures may be slightly warmer directly adjacent a solar farm, gradually returning to ambient with distance away from the solar farm ▪ Soil temperatures at depth underneath panels may be slightly warmer during cooler months and slightly

Category	Specific issue	FRV mitigation measures
		cooler in warmer months ▪ Air temperatures at ground level underneath panels may be slightly cooler during summer months ▪ Air temperatures at a two-metre height in the solar farm in the colder months would probably be similar to the surrounding areas ▪ Air temperatures at a two-metre height in the solar farm in the warmer months may be slightly warmer than the surrounding areas ▪ Air temperatures directly above solar arrays may be slightly warmer at night ▪ Temperatures at control sites adjacent solar farms generally had temperatures equal to ambient conditions. In discussion with research scientists, climatologists and meteorologists; the climate impacts of a 380-ha solar farm would not be significant and the addition of access roads within and around a solar farm would further mitigate any local climate impacts due to enhanced air flow.
	Increase in frost to the region following the installation of the solar panels	Research and discussions with scientists has demonstrated that there will be no significant changes to the micro-climate in areas surrounding the solar farm. The risk to the exacerbation of frost conditions in the area is also not significant. Research shows no cooling in surrounding areas; only a potential very slight warming affect immediately above and immediately next to solar panels with temperatures returning to ambient outside of the solar farm. The design of the solar farm and panels and the design of the security fencing will all ensure adequate air flow within and around the site.
	Installation of a 3 metre chain wire fence around the solar farm that could potentially trap frost which will affect neighbouring properties.	The proposed fencing is made of metal chain wire mesh, and is not expected to restrict air flow any more than the existing metal wire fences on the boundary.
	The impact of the solar farm on the inversion layer and additional restrictions that will be placed on farmers when undertaken spraying operations	FRV is unable to provide comment or advice on individual circumstances in relation to crop spraying restrictions, however would encourage crop sprayers continue to take all reasonable and practicable measures to prevent or minimise actual or potential contamination of land, animals or plants outside the target area.
	Traffic route during construction and ensuring that the optimal route is chosen, in particular to ensure	FRV through its technical assessment has considered key routes for construction to minimise the impact on existing operations. The preferred route at this stage is

Category	Specific issue	FRV mitigation measures
Traffic	farming operations, such as harvesting which requires a high volume of vehicles, can occur concurrently.	the Horrocks Highway to Mintaro via Jolly Way (about 51km) and then a further 2km along Merildin Road and Wockie Creek Road (access Option B). This route avoids travel through Mintaro township. The majority of the route is sealed, deploys appropriate traffic control measures to reduce the risk of incidents and is subjected to only a small number of additional heavy vehicles movements per day during the construction period. The route is also the preferred and most likely route for access by light vehicles travelling predominantly to and from the west of Mintaro. FRV will work with the council to confirm the route and any upgrades to the roads that need to be undertaken prior to the use of this route.
	Entrance to the solar farm, whether it will be off Merildin or Chaff Mill Roads and what impact it will have on neighbouring properties.	The initial design has indicated that the key entry point to the solar farm will be from Wockie Creek Road, noting that the road will require some upgrades for this to occur.
	High volume of vehicles travelling on and damaging unsealed roads	FRV will undertake a dilapidation survey of council road infrastructure on the designed traffic route prior to commencing works to assess and agree the existing condition of the relevant sections of road. Follow up surveys will be undertaken upon the completion of the works and use of the designated traffic route to demonstrate the level and scope of remedial works to be undertaken to restore the roads to their original condition. FRV will also put in place a range of measures to address potential impacts on road condition during construction including: ▪ improvements to the horizontal and vertical alignment at selected locations ▪ improvements at intersections to improve sight distance, make the approaches more conspicuous and reduce wear and tear by turning vehicles ▪ re-sheeting of the road surface, repair and grading – in identified locations widening of selected roads particularly around curves ▪ measures to protect errant vehicles from roadside hazards. A road safety audit of roads near the project area would be undertaken during detailed design. Any required mitigation measures would be developed in consultation with the council. Measures would also be taken to reduce the amount and intensity of travel demand on the local roads by staggering shift times and promoting ride sharing with the workforce. FRV will also encourage appropriate driver behaviour and inform the community of construction activities that may change traffic patterns.

Category	Specific issue	FRV mitigation measures
		It should also be noted that no construction related travel would occur outside of daylight hours. A Construction Traffic Management Plan (CTMP) would also be prepared to the satisfaction of DPTI and / or the Clare and Gilbert Valleys Councils prior to construction commencing.
Noise	Increase in noise in the area due to the operation of the solar farm battery and the existing substation needing to operate longer at night.	There will be little noise associated with the operation of the Chaff Mill Solar Farm. Noise from the cooling fans in the inverter cabins may be heard for short periods of time in extreme heat conditions, however you would need to be standing directly next to it to hear it.
	Increased noise and other environmental impacts such as dust during construction	Construction of the solar farm would be undertaken during normal working hours (Monday-Friday). As the Mintaro township is located approximately 3.5km away, there are unlikely to be any impacts to the township of Mintaro. Impacts to adjoining properties will be managed through a CEMP and any noise impacts will comply with EPA guidelines.
Community	Visual impacts to properties that have been, or about to be constructed to maximise local views.	FRV has worked closely throughout the environmental and specialist technical assessment phase and the production of the Development Application, with the

Category	Specific issue	FRV mitigation measures
		property owners classified as sensitive receptors and visually impacted by the solar farm. Discussions will continue with these property owners to agree a vegetation screening solution to meet their needs.
	Overall benefits to the community both during construction and operations.	Should the project proceed, FRV would employ up to 200 workers during construction. The proposed Chaff Mill Solar Farm would attract investment to the area and deliver additional indirect economic opportunities to local businesses including local grocery stores, restaurants, cafés, accommodation providers and petrol stations. In the operational phase, the project would employ up to five full-time workers during operation. This workforce would be drawn from the local area where possible. There would also be opportunities for those with expertise in weed control, grass cutting, electrical services and operations and maintenance. FRV also continuing to consider ways that they help share the benefits to the broader community and are speaking with local community groups about potential partnerships.
	Timing of the Development Application and how many days the community has to respond to the application.	The project will be assessed under the Crown development approval pathway (lodged under s49 / s.49A of the *Development Act 1993*). For these applications, a longer period of time is provided for representations to be received (which must not be less than fifteen (15) business days from the date of notification). FRV has advised the community and stakeholders of the State Commission Assessment Panel site under Public Notices at https://www.saplanningcommission.sa.gov.au/scap/public_notices
	Opportunities for local businesses and trades to be involved in both the construction and operation the solar farm.	FRV has created a register of businesses, individuals and contractors that have expressed an interested in being involved in the solar farm construction, and / or can provide services to workers during the construction phase. FRV will contact those who have expressed interest should the project obtain approval and progress to the delivery phase. FRV has also committed to hosting a Business Breakfast in the lead up to construction, briefing locals on the opportunities and how they can become involved. The intention is that FRV will involve the Mintaro Progress Association, Clare and Gilbert Valleys Council and the Clare Valley Business and Tourism Association in the planning for the Business Breakfast, based on previous discussions on maximising opportunities for local businesses and employment for individuals.

Category	Specific issue	FRV mitigation measures
	Whether local businesses can tender for the solar panel cleaning business	FRV encourages local business involvement. Businesses with equipment suitable to clean the panels and that comply with the manufacturers' requirements are welcome to tender for these works. Other jobs that will be sourced locally include grass cutting, weed spraying, vegetation maintenance, civil works and electrical services as an example.
	Potential increase in crime in the area	A 3 metre high chain wire security fence will be constructed around the solar farm to deter trespassers onto the site. FRV will not be providing security systems for neighbouring properties, although the operations and maintenance workers on the solar farm site will be able to report any suspicious activity in the local area.
	Whether there will be any infra-red cameras on the security fencing	The security system on the solar farm is likely to include infra-red sensors or thermal cameras that will operate at night to alert the security contractor of breaches of the security fence.
Solar farm operations	Installation of overhead powerlines rather underground lines.	There are not expected to be overhead lines installed outside of the site boundaries. It is proposed that an underground cable running beneath Chaff Mill Rd will connect the west and east land parcels comprising the project site.
	Number of vehicles that will access the operational solar farm.	Traffic to and from the Chaff Mill Solar Farm during operation will be minimal. These traffic movements will generally be by private vehicles and will represent volumes in the order of what is already being experienced on the surrounding roads.
	Solar panels being able to withstand high wind (potentially cyclonic) conditions.	In cyclone prone areas where the loads are very high, the solar panel tracker can be engineered to resist speeds of up to 120 km/h, although the tracker can be designed for even higher wind speeds. As per the Australian standards, FRV will design the structure to resist the worst case wind speed scenario in Mintaro. If those wind speeds are actually reached, the tracker will go to "stow-position", which consists of 0 degrees of tilt where the tracker is in defence position and the impact on the tracker is minimised.
	Ground conditions not being suitable for the operation of a solar farm. Soil can change considerably – it can expand and contract over time, as well as pooling with water.	A geotechnical overview was undertaken to support the Development Application process. Detailed geotechnical investigations, including soil and groundwater testing, will be undertaken as part of the detailed design phase. Feedback on the changeable conditions of the soils was received from many community members and this will be taken into account during future investigations.
	Visual impact from the moving panels to the neighbouring properties, and	Where a direct and prominent visual impact is experienced by a nearby residence, FRV will consider

Category	Specific issue	FRV mitigation measures
	the potential risk of solar glare.	ways to reduce the visual impact (such as vegetation screening). FRV has agreed to provide vegetation screening along part of the southern section of Chaff Mill Road to mitigate the visual impact to the property near the corner of Merilden and Chaff Mill Roads. FRV has had initial conversations with owners of this property regarding both the location and the species of vegetation. These conversations will continue with the property owners to ensure they are involved in the final screening solution, should the project proceed
	How the solar farm land will be used for grazing during the operational phase and what happens to the land after the 30 year operational period.	FRV will consider the option of grazing livestock on the solar farm, however no commitment has been given as to who will manage the livestock should they proceed with grazing. Following the conclusion of the 30-year operational period, the land will be reinstated and returned to the original condition and either sold or leased.
	What happens if FRV sells the solar farm? What assurances will be given that the solar farm will be operated in accordance to the commitments made by FRV?	Should FRV sell the solar farm, the new owner and operator will be subject to the conditions that were put on FRV as part of the original Development Application.
Fire risks	What measures will be taken to manage fire, both on the solar farm and from neighbouring properties	Bushfire risk would be managed through a Bush Fire Management Plan developed specifically for the project, in consultation with the Country Fire Service (CFS) and surrounding landowners. Measures contained within the Bushfire Management Plan would include: ▪ The operation and maintenance of the site in a manner that no bushfire originates from the site and/or any approaching bushfire does not intensify because of excessive fuel loads within the site. ▪ Maintain an Asset Protection Zone from the site boundary, if required. No infrastructure is allowed in this space. ▪ Requirements for water supply on site. ▪ Fuel load reduction measures (e.g. mechanical slashing). ▪ Regular maintenance of on-site fire-fighting equipment and staff training. ▪ No smoking would be permitted on site, other than in designated smoking areas. ▪ All site personnel would be trained and have access to the appropriate emergency and safety equipment in the event of an emergency at the facility.

Category	Specific issue	FRV mitigation measures
		▪ On-site burning will be prohibited. ▪ If required personnel will evacuate the site in accordance with the Emergency Management Plan developed for the project. Consultation will be undertaken with the CFS and Emergency Services to determine how best to respond to a fire emergency.
Financial and insurance aspects	Whether financial compensation will be provided to properties neighbouring the solar farm.	It is not a FRV policy to provide financial compensation to neighbouring properties. FRV will manage direct and prominent visual impacts on nearby dwellings through screening, and in accordance with the conditions of the Development Application.
	What additional insurance will neighbouring properties need to take cover any damage they may cause to the solar farm. Note these farmers currently have $20 million in public liability insurance.	FRV will have its own insurance policy in place to provide coverage in the unlikely event that solar farm equipment is damaged by fire. A Bush Fire Management Plan will include procedures to deal with a fire on site, and normally requires water to be kept on site for that specific purpose. The Environmental Management Plan will include obligations that prevent the spread of fire across the site (such as grass cutting and an asset protection zone if required.). FRV recommends that farmers on nearby properties also take all maximum precautions to prevent the ignition and spreading of fires, and seek advice from their insurance providers on individual insurance policy matters.
	Purchase of additional properties	FRV has secured a sufficient amount of land to progress the development of a 100MW solar project. No additional land is required for this project.

5 Media engagement

FRV received four media enquiries the engagement process, from the ABC and the *Northern Argus*. These enquiries have focused on the economic benefits the solar farm to the region, the Development Application process and the overall timing of the project. The articles where FRV have been contracted for comment have been primarily been positive. Copies of these news stories are included in Appendix B – Media Coverage.

There have only been two negative media stories relating to the proposed solar farm. Both of these articles appeared in the *Plains Producer* and highlighted concerns from landowners who are not directly affected by the solar farm. These landowners were not involved directly in discussions with FRV about the project. Locals who were approached to make comment supported the project. FRV was not approached to provide comment in either of these articles. Copies of these articles can also be found in Appendix B.

Appendix A

Communication collateral

RPS

Fact Sheet – September 2017

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

Chaff Mill Solar Farm: A plan to harness the power of the sun and create jobs in your community

Leading Australian solar developer Fotowatio Renewable Ventures (FRV) is preparing a development application for a proposed 100MW solar farm 3.5km north-east of Mintaro.

FRV is working on a preliminary design for the proposed solar farm, which could generate enough clean energy to power up to 60,000 homes for South Australian families. This would be achieved by connecting the farm to the electricity network via a Tee Connection to an existing 132kV transmission line running from the adjacent Mintaro substation to the Waterloo substation, which is owned and managed by AEMO-ElectraNet.

FACT SHEET

Planning and environmental considerations

The proposed Chaff Mill Solar Farm is subject to development approvals through the South Australian Government's Development Assessment Commission.

Environmental studies have commenced. These will be completed during the design phase to ensure that any potential impacts on native vegetation, birds or animals are minimised.

Subject to development approval, FRV seeks to commence construction late 2019 and start generating energy 12 to 18 months later. The solar farm would have an operating life of 30 years.

An ideal location to generate energy for South Australians

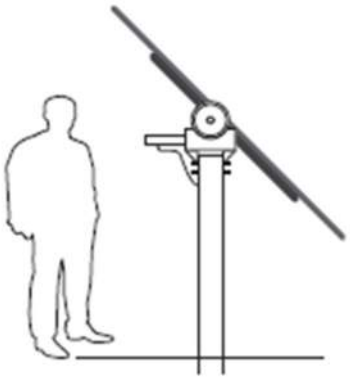
South Australia is nationally recognised as a leader in clean energy production.

The proposed Chaff Mill Solar Farm can further the development of the Australian clean energy industry and make a significant contribution to South Australia's energy production.

The 380 hectare site is approximately 130 kilometres north of Adelaide, is well placed to capture and export solar energy into the national electricity grid from the nearby Mintaro substation and its existing 132kV transmission line to Waterloo. This site was selected because of its proximity to grid infrastructure, good drainage and largely cleared land. The level of solar irradiation also makes it a suitable site for a solar farm.

Operation of Chaff Mill Solar Farm would deliver clean, zero emissions electricity to meet the region's energy needs and would have significantly lower environmental impacts relative to other electricity generation methods.

FRV plans to use the latest in solar energy generation technology: PV-Polycrystalline modules with a horizontal, single-axis tracking system. The panels, including the mounting structures, would be no more than three metres from ground level.



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PROPOSED PROJECT TIMELINE

September - October 2017
Complete specialist studies.

September - November 2017
Stakeholder and community engagement.

December 2017 - March 2018
Finalise and submit development application report to Development Assessment Commission.

Late 2018
Development application considered by SA Government.

2019
Planned commencement of project construction (if approved).

Figure 1: *Development of the Chaff Mill Solar Farm is subject to development approvals through the South Australian Government's Development Assessment Commission. This indicative timeline sets out the development application process and proposed construction, including current community and stakeholder consultation.*

Economic benefits

Should the project proceed, FRV would employ up to 200 workers during construction. Operation of Chaff Mill Solar Farm would create up to five ongoing jobs.

In addition, the project would attract investment to the area and deliver additional indirect economic opportunities to local businesses including local grocery stores, restaurants, cafés, accommodation providers and petrol stations.

About FRV

FRV has developed and operated solar farms spanning 24 countries and five continents.

FRV has had a presence in Australia since 2010.

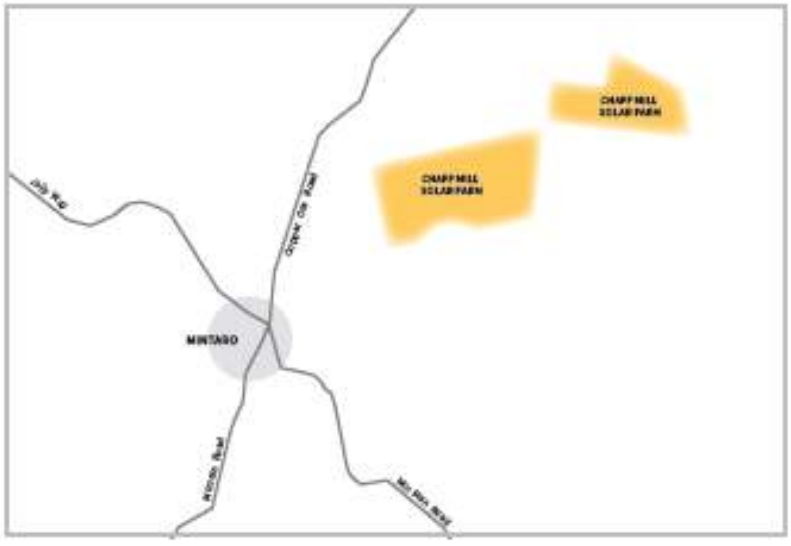
A leader in its field, FRV uses the latest technology and design solutions to generate and deliver sustainable and clean energy.

FRV's track record of achievements includes two operational solar farms in Australia, the 20MW Royalla Solar Farm in the ACT and the 56MW Moree Solar Farm in New South Wales. FRV is currently constructing the 100MW Clare Solar Farm, near Ayr in QLD and the 100MW Lilyvale Solar Farm, near Emerald in QLD.

Find out more

Community and stakeholder engagement on the proposed Chaff Mill Solar Farm is underway. Engagement will inform the planning process and encourage the community to offer feedback, including an alternative name for the proposed solar farm.

FRV will have discussions with State Parliamentary members, as well as the local council, community interest groups and local people as planning progresses.



If you would like more information, email infoaustralia@frv.com or call the project team on (03) 9417 9711.

FRV

RPS

Project Update – November / December 2017

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM
Project update – November 2017

Leading Australian solar developer, FRV, has identified an area of land, 3.5km north-east of Mintaro in South Australia, for a 100MW solar farm.

FRV began discussions with neighbouring properties and community interest groups in September this year, making them aware of the proposed Chaff Mill Solar Farm. Feedback from these discussions, along with initial site investigations and specialist studies will inform the preliminary design and the development application for the proposed 380 hectare solar farm. This update provides an overview of what FRV have heard from the community, the investigations performed to date, and the next steps.

Environmental assessment and specialist studies

Through specialist consultants, FRV will undertake a range of environmental and technical studies to inform its development application. To date the following studies have been kicked off:

- Flora and fauna
- Aboriginal cultural heritage
- Visual impact and landscape assessment
- Solar glare impact assessment
- Planning, zoning and land use (still being assessed)
- Traffic and access (still being assessed)
- Social and community (still being assessed)
- Site contamination
- Geotechnical assessment
- Stormwater and flooding (still being assessed)
- Non-indigenous heritage assessment (still being assessed).

FRV has obtained initial findings in a number of these areas including flora and fauna, Aboriginal cultural heritage, visual impact and landscape assessment, site contamination and geotechnical assessment. Further investigations will occur in December 2017, with findings to be discussed with the local community and other interested stakeholders in early 2018.

Proposed project timeline

RPS

What we've heard

Community and stakeholder feedback will shape FRV's development application and inform the plant configuration, layout of the proposed solar farm and construction mitigation measures. Since September 2017, FRV has met with members of the community, local council, community interest groups and parliamentary members face-to-face and have continued these discussions on the phone and via email in October and Nov[illegible]er.

Key areas of interest include:

- risk that radiative heat loss will accelerate change in ambient air conditions and accelerate frost conditions
- damage to the local road network
- rehabilitation and usage of the solar farm land at the end of the 30 year operation period
- why this location
- the visual impact from the solar panels on the local amenity
- condition of the existing soil and the ability to support the solar panel structures.

FRV through its consultants, have undertaken a range of specialist studies to not only manage the environmental and technical requirements but to address community concerns. Studies carried out to date, indicate that there is minimal impact from the proposed development. However, FRV wants to confirm the accuracy of the information before presenting feedback to the community in late January / early February 2018.

Next steps

Over the coming months FRV will prepare its development application. Prior to submitting the application to the South Australian Government's Development Assessment Commission in 2018, FRV will engage with the community with more detail on the plant configuration and layout and findings of the environmental and technical studies.

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711.

FRV FOTOWATIO RENEWABLE VENTURES

RPS

Project Update – February 2018

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM
Project update–February 2018

Over the last two months, FRV, leading Australian solar developer, has consolidated the findings from recent environmental and technical studies and feedback from discussions with the community and key stakeholders to further refine its development application for the proposed 100MW Chaff Mill Solar Farm, located 3.5km north-east of Mintaro in South Australia.

This update provides an overview of the status of FRV's development application and additional opportunities to obtain community feed.

Completion of environmental assessment and specialist studies

Specialist consultants, WSP have now completed the environmental and technical assessments that are needed to inform the development application for the proposed Chaff Mill Solar Farm. Fact sheets have been developed to provide specific information on these studies. Copies of these fact sheets can be requested by contacting the team at infoaustralia@frv.com.

FRV will ensure that the preliminary design and development application for the solar farm address the recommendations made in these assessments, in particular taking into consideration the preferred routes and screening to properties identified as being visually impacted by the solar farm or that will experience glare.

Engaging with the community

FRV values feedback from the local community and key stakeholders. Through meetings with the local community, council and community interest groups, FRV have identified key areas of concern and have used these to inform the preliminary design and development application for the Chaff Mill Solar Farm.

In February, FRV will meet again with landowners directly neighbouring the site of the proposed solar farm, interested stakeholder groups, Clare and Gilbert Valleys Council and local MPs in late-February 2018 to provide them with an update on the development application and findings from the environmental and technical assessments. FRV will also be present at the Sevenhill Producers Market on Saturday, 24 February from 8.30am to 12.00pm, providing an opportunity to meet with the team and view the proposed layout of the solar farm.

Feedback will be taken into consideration and incorporated into the final development application, where possible.

For those who are unable to attend this information session, they are welcome to contact the project team by email at infoaustralia@frv.com or calling (03) 9417 9711.

Next steps

FRV is on schedule to submit the application for the Chaff Mill Solar Farm in late- March 2018 to the South Australian Government's State Commission Assessment Panel (SCAP). The Clare and Gilbert Valley Council are provided with a copy of this application, along with detailed reports as part of this process. The State Commission Assessment Panel will publicly advertise the application and make the documentation available online: https://www.saplanningcommission.sa.gov.au/scap/public_notices

FRV expect the State Commission Assessment Panel to make a decision on this application in mid to late 2018, and will advise the boarder the community of the outcomes soon after.

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

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Fact Sheet – Frost and Micro-Climate Impact Assessment

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM
FROST AND MICRO-CLIMATE IMPACT ASSESSMENT

FACT SHEET

FRV recognises the importance of working with the community in the development of the proposed Chaff Mill Solar Farm. During engagement last year, there was community concern that the solar farm might accelerate frost conditions in the local area. To address this, FRV and its consultants conducted a frost and micro-climate review and assessment.

Key findings

Frost is defined by the Bureau of Meteorology as a deposit of white ice crystals or frozen dew which forms on objects near the ground when the surface temperature drops below freezing point. In Mintaro, frost is most likely to occur when the sky is clear with light winds and low humidity.

The assessment concluded that while there can be minor differences in the soil and air temperatures directly under and above solar panels on solar farms, there is no significant impact on air temperatures in the surrounding areas.

Methodology

Literature review

A review of scientific literature and studies relating to the environmental impacts of solar farms was carried out. A number of studies and academic papers from Australia and around the world were reviewed and the findings were analysed and compared.

In response to community feedback and interest, this also included a review of two specific research papers published in 2016 - *Solar Park Microclimate and Vegetation Management Effects on Grassland Carbon Cycling by Alona Armstrong et al* published in Volume 11 of the Environmental Research Letters journal and *The Photovoltaic Heat Island Effect: Larger Solar Power Plants Increase Local Temperatures by G Barron-Gafford et al* published in Volume 6 of Scientific Reports (Nature).

Both studies included scientific monitoring and assessment at constructed solar farms and found that there were slightly increased temperatures directly above solar panels and slightly decreased temperatures directly beneath solar panels (as would be expected). Importantly, the studies did not note any significant changes to temperatures at progressive locations next to the solar farms. Other solar farm impact studies based on hypothetical modelling also generally reflected these findings.

RPS

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

Discussions with scientists

Acknowledging the limited scientific research available, FRV's consultants contacted scientists from relevant government agencies, meteorology and climate organisations, specialists in air modelling, agricultural scientists and universities.

Although not able to provide informed or definitive advice regarding the Chaff Mill Solar Farm, scientists spoken to were of the opinion that there would be no significant micro-climate impacts from a solar farm of this size. Further, some of those contacted were of the view that air flow from the road network in and around the solar farm would also help mitigate any potential local climate impacts.

More information and next steps

FRV is planning to submit its application to the South Australian Government's State Commission Assessment Panel in March 2018. This application will include the frost and micro-climate study findings and other specialist study reports, which can be accessed following submission on the State Commission Assessment Panel site under Public Notices at:

www.saplanningcommission.sa.gov.au/scap/public_notices

FACT SHEET

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

FRV FOTOWATIO RENEWABLE VENTURES

RPS

Fact Sheet – Traffic Impact Assessment

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM
TRAFFIC IMPACT ASSESSMENT

FACT SHEET

Traffic impact studies were undertaken between September and December 2017, to inform FRV's development application for the proposed Chaff Mill Solar Farm, which is intersected by Chaff Mill Road and bounded by Wockie Creek Road, Merildin Road, Chaff Mill Road and Faulkner Road. Current vehicle access to the east and west sections of the proposed site is by a network of unsealed roads.

Below is a summary of the traffic study report.

Traffic study

The purpose of the traffic study was to:

- Understand the likely extent of light and heavy vehicle traffic impacts during the construction and operation of the solar farm
- Identify alternative routes for light and heavy vehicles to access the site
- Recommend a preferred route to be used by vehicles as the primary access to the site.

FRV and its consultants conducted a site inspection of local road conditions and a desktop assessment of traffic and road corridor information from the Department of Planning, Transport and Infrastructure.

Traffic generation

Vehicular access would be required to both sections of the proposed site during the construction and operation of the solar farm. Construction of the proposed solar farm is expected to take approximately 18 months and will be completed in two stages.

FRV estimates there would be up to 100 workers on the site during the first stage of construction. For the second stage the number of workers would increase to up to 200 on site. These workers would be expected to travel to and from the site in light vehicles. Most likely, workers would share rides with each other to the remote site.

FRV has estimated that between eight and 16 heavy vehicle movements a day will transport construction plant and equipment to the site during both stages of construction.

Once operational, it is estimated up to five ongoing staff would need to access the site. The vehicle movements would be significantly reduced during the operational period, with around ten trips per day.

Route and access options

The preferred access to the west section of the site is from Wockie Creek Road. Preferred access to the east section of the site via a road within the solar farm.

A short section of Chaff Mill Road would be upgraded to allow traffic to pass between the west and east sections.

RPS

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

FACT SHEET

Alternative traffic routes were identified for vehicles to access the west (Wockie Creek Road) section of the proposed site including:

- Route A – via Horrocks Highway, Jolly Way, Catholic Church Road, Merildin Road and Wockie Creek Road
- Route B – via Barrier Highway, Mintaro-Manoora Road, Copper Ore Road, Merildin Road and Wockie Creek Road
- Route C – via Barrier Highway, Mintaro-Manoora Road, along Martindale and Hare Roads to Merildin Road and Wockie Creek Road
- Route D – via Barrier Highway, Flagstaff and Riley Roads and Merildin Road.

Route A was considered the most suitable for both light and heavy vehicles to access the site for the following reasons:

- It avoids travel through the Mintaro and Manoora townships
- There are no residential properties along Merildin Road and Wockie Creek Roads between Copper Ore Road and the preferred access
- Access to the eastern section of the site is available via a short section of Chaff Mill Road
- It includes the shortest length of unsealed roads to be upgraded including two intersections.

Vehicles would travel to the site via Horrocks Highway, then Jolly Way Road and along Catholic Church and Merildin Roads to access the western section of the site on Wockie Creek Road.

Traffic impacts

FRV acknowledges there would be an increase in light and heavy traffic volumes on sealed and unsealed roads in vicinity of the project site during the construction stage.

To manage the traffic impacts during construction, FRV will develop a Construction Management Plan that details vehicle routes and measures to maintain road conditions. This plan would be developed by FRV's appointed construction contractor.

More information and next steps

FRV is planning to submit its application to the South Australian Government's State Commission Assessment Panel in March 2018. This application will include the traffic impact report and other specialist study reports, which can be accessed on the State Planning Commission Assessment Panel site under Public Notices at:

www.saplanningcommission.sa.gov.au/scap/public_notices

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

FRV FOTOWATIO RENEWABLE VENTURES

RPS

Fact Sheet – About the Chaff Mill Solar Farm

FRV TOTOWATO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

ABOUT THE CHAFF MILL SOLAR FARM

FACT SHEET

The proposed 380-hectare, 100 MW Chaff Mill Solar Farm is located near Mintaro in South Australia and is approximately 130 kilometres north of Adelaide. The solar farm could generate enough clean energy to power up to 60,000 homes for South Australian families.

Leading Australian solar developer FRV Services Australia (FRV) selected the site because of its proximity to grid infrastructure, good drainage and largely cleared land. The level of solar irradiation at the site during the year also makes it suitable for a solar farm.

Location and layout

The proposed 380-hectare site is 3.5km north – east of Mintaro. The site is bounded by Copper Ore Road, Wockle Creek Road, Merildin Road, Faulkner Road and Chaff Mill Road.

The proposed layout of the solar farm would comprise of approximately 360,000 solar panels and a battery storage unit with containers. FRV plans to build a three-metre-high wire mesh fence around the site, topped by barbed wire.

FRV is considering the use of solar PV – Polycrystalline modules that would be no higher than three metres high at maximum tilt to capture solar energy.

Construction and traffic management

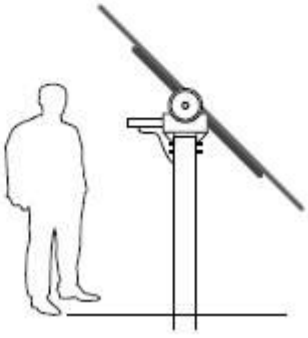
Subject to development approvals through the South Australian Government's State Commission Assessment Panel, FRV seeks to commence construction in late 2019 and start generating energy 12 to 18 months later.

Before construction commences FRV will develop a Construction Management Plan, including a traffic plan for vehicle access to the site during construction. This plan would be approved by the Clare and Gilbert Valleys Council.

Traffic assessment has found that access to the site will be via Horrocks Highway, then Jolly Way Road and along Catholic Church and Merildin Roads to access the western section of the site on Wockle Creek Road.

Operation after 30 years

Should the project proceed, FRV will own and operate the solar farm. The plant will have an operating life of around 30 years. Following this period, the land would be restored to its original state and either leased or sold. The restoration would take approximately 12 months.



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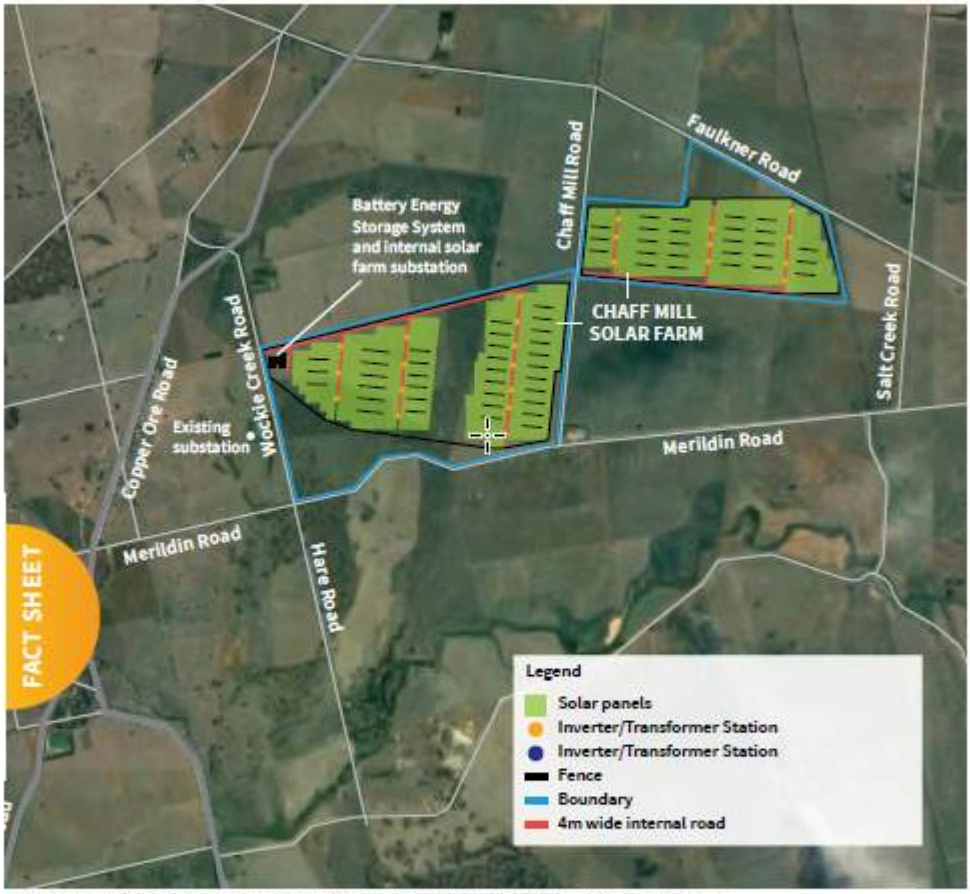
FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM



** This design is indicative and is subject to change until a final design is submitted to Clare and Gilbert Valleys Council.*

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

FRV FOTOWATIO RENEWABLE VENTURES

RPS

Fact Sheet – Environmental and Site Assessment

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM
ENVIRONMENTAL AND SITE ASSESSMENTS

FRV through its consultants, have undertaken a range of environmental and specialist studies to inform the development application for the proposed Chaff Mill Solar Farm. These studies took place between September 2017 and January 2018.

Below is a summary of the findings from each report.

Social and community

The solar farm will generate considerable environmental, economic and social benefits for Mintaro and the local region, including employment opportunities, local investment, increased energy security and increased tourism opportunities. It will also contribute to local, regional and state energy targets and help to mitigate climate change.

As with the development of any project of this size, there is the potential for increased demand for services like accommodation and cafes and restaurants during construction of the solar farm. There will also likely be an increase in the use of local roads during construction.

FRV is committed to ongoing engagement with the local community to maximise the benefits of the project. A Construction Environmental Management Plan will assist in minimising impacts during construction.

Planning and land use

A statutory planning and land use assessment found that the project is appropriate for the site. The nature of the development is recognised and provided for in the Clare and Gilbert Valleys Council Development Plan. The assessment found that the project will not significantly impact upon existing land uses in the local area or upon the total area of productive agricultural land in the region.

In addition, the project will provide reliable infrastructure and sustainable energy to facilitate economic growth for the region which is consistent with South Australia's strategic policies.

Flora and fauna

The proposed site area and bordering roadsides were surveyed in accordance with state legislation and Native Vegetation Council requirements. No threatened flora or vegetation were found. FRV will seek to avoid impacts on existing trees, especially the large Blue Gums that were identified as significant on the western part of the site. The studies found that the site is unlikely to be home to nationally threatened fauna species, however the White-winged Cough was observed during the assessment. This bird species is considered threatened in South Australia but that is found across most of the country's south-east.

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

RPS

FRV POTOMAC RENEWABLE VENTURES

Landscape and visual impacts

The studies recognised the 'sense of place' and character of the Mintaro township. FRV understands visual impact is important to the community. It was confirmed that the proposed solar farm will not be visible from Mintaro due to the surrounding hills, ridges and vegetation. FRV will work with direct neighbours of the site to minimise any visual impacts.

Stormwater and flooding

The installation of solar panels is not expected to increase the overall runoff of stormwater and the potential for flooding is considered very low but will be assessed in more detail during later design stages. Once established, the solar farm will be re-seeded with native grass species, which will mitigate what little run-off there is and reduce the potential for erosion.

Geotechnical

A regional geology soils and ground water overview was prepared for the project.

It is known that local soils can become wet and boggy in a rainfall event. Detailed site geotechnical investigations will be undertaken during the detailed design phase.

Glare

The highly absorbent dark glass of solar panels is designed to take in sunlight instead of reflecting it. The study found potential for glare at only two sites – on Merildin Road, which joins the south-eastern boundary of the site and at the intersection of Chaff Mill and Merildin Roads. FRV will plant vegetation in these locations to minimise any impact.

Aboriginal cultural heritage

Studies were carried out in consultation with Ngadjuri traditional owner representatives but did not identify any Aboriginal heritage sites, objects or burials. The site will be re-surveyed when it is cleared for construction and FRV will work with traditional owners to implement a Cultural Heritage Management Plan.

Heritage

The heritage assessment found there would be no impact to the protection of heritage places in and around Mintaro during construction and operation of the solar farm, with the closest heritage asset more than a kilometre away. Construction and heavy vehicles will not be directed through the Mintaro township and all construction and site staff working on the project will be inducted as to their legal obligations regarding the protection of heritage places within and around Mintaro.

Preliminary site assessment

A preliminary site assessment was undertaken to investigate potential site contamination issues in the project area. The assessment identified only extensive agricultural use of the land and assigned a subsequent low site contamination risk.

More information

FRV is planning to submit its application to the South Australian Government's State Commission Assessment Panel in March 2018. This application will include detailed copies of these technical reports, which can be accessed on the State Commission Assessment Panel site under Public Notices at:

https://www.saplanningcommission.sa.gov.au/scap/public_notices

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

FRV POTOMAC RENEWABLE VENTURES

Appendix B
Media Coverage

Plains Producer – October 2017 (no comment sought)

News AFTER MEETING LAST

www.plainsproducer.com.au

Residents will have their say on solar farm

Chaff Mill Road

Salt Creek Road

Meridian Road

Proposed solar farm

RESIDENTS and council will have an opportunity to provide a response to the proposed Chaff Mill Solar Farm at Mintaro when the development application is lodged with the state planning department.

Renewable Energy firm, FRV, is yet to lodge a development application on a 400 hectares of farming land near the Clare Valley town but has been consulting with the community and Clare and Gilbert Valleys Council.

The company met with CGVC elected members and senior staff last week to discuss the proposal.

Les Pearson reports:

"It was mainly to update us as to where they were at, plus fill us in on ongoing discussions with the Mintaro Progress Association and landowners in the area," CGVC acting CEO, John Coombe said.

A development application should be lodged early next year, possibly January or February.

"Once it is lodged, the plans are put on public exhibition and there is a six to eight week opportunity to comment on the application," Mr Coombe confirmed.

The Department of Planning confirmed council's development plan would be a factor in its deliberations.

"Any proposal lodged would need to be assessed having regard to the relevant provisions of council's development plan," a department spokesperson explained.

"Public notification would be undertaken in accordance with the requirements of the Development Act.

"In general terms, and noting an application has not been lodged, local residents would be consulted and provided time to lodge a representation.

"Once lodged, and should they wish to be heard, they would also have opportunity to attend an assessment hearing to talk to their submission."

Several property owner neighbouring the proposed sola farm location have raised co cerns about potential impac to the climate and their o property values.

"The company is working finishing a lot of investigati and studies surrounding t queries, including visual im increased traffic levels, a priate land use, all the t that form part of the pro Mr Coombe confirmed.

RPS

Northern Argus – 1 November 2017 (no comment sought)

Wednesday November 01, 2017 NORTHERN ARGUS

NEWS

Solar farm proposed for Mintaro

BY CHELSEA ASHMEADE

IF A development application is approved, a 380-hectare solar farm could be established in Mintaro.

Renewable energy company Fotowatio Renewable Ventures is currently preparing a development application for the proposed solar farm 3.5km north-east of the town.

They are also completing both visual and environmental impact studies.

A spokesperson for FRV said subject to development approval, FRV seeked to commence construction late 2019 and complete the project by late 2020.

The spokesperson said FRV was committed to working with the local community, landholders and Mintaro Progress Association, and would keep them informed through all phases of the project – this had already begun.

Further consultation is planned in late November 2017 and again in early 2018, prior to submitting the DAP.

"FRV believes it is important to understand the community's views on its proposal and will continue to engage with local residents, businesses and community groups and key stakeholders to inform planning and design as part of the development application process."

Clare and Gilbert Valleys Council manager development and environment Andrew Christiansen said council had met with the group on a couple of occasions.

"They will come out again next month to meet with councillors and show them the site," Mr Christiansen said. The development application will go direct to the State Planning Assessment Commission.

Mr Christiansen said council could make comment on the project but they were not the approving body.

"From my perspective they are doing a really good job of community consultation and engagement. It's good that they are engaging from the git-go and that's important to us."

The proposed site has been chosen due to its close proximity to existing grid infrastructure and the largely clear land.

Other land was investigated for potential use, but it was deemed unsuitable. The project could create 200 jobs during construction and five ongoing jobs.

Northern Argus – 13 November 2017 (comment sought)

Fotowatio Renewable Ventures propose Chaff Mill Solar Farm

Chelsea Ashmeade

Royalla Solar Farm (ACT), Photovoltaic Plant, this solar farm is in operation and covers 50ha.

A proposed solar farm in Mintaro – Chaff Mill Solar Farm – could potentially create up to 200 jobs during its construction.

Although in consultation and research stages, the company Fotowatio Renewable Ventures is positive about its potential impact on the region.

A spokesperson told Northern Argus 200 jobs could be created during the construction with (up to) five ongoing positions once in operation.

This is subject to the proposal going ahead.

The spokesperson said benefits to the local community would be maximised and this would be key for the company.

"...with considerable opportunities being available during the construction of the solar farm. If approved, FRV will hold industry briefings to understand and identify local contractors," the spokesperson said.

FRV is working closely with Clare and Gilbert Valleys Council and another community consultation will be held in late November.

The Advertiser – 22 November 2017 (no comment sought)

Snowtown and Mintaro to be site of three major solar farms which would generate hundreds of jobs during construction

THREE solar farms capable of generating enough electricity to power more than 100,000 homes are planned for the state's Mid North promising hundreds of jobs during construction.

Tilt Renewables is proposing to build a 45MW solar farm and a 70MW solar farm next to South Australia's largest wind farm project at Snowtown.

The company this month lodged plans with the State Development Commission for the $60 million 45MW Snowtown North Solar Energy farm, which will feature 180,000 panels, battery storage of up to 25MW and is expected to generate up to 200 jobs during construction.

The second larger is still in planning stages and the company said would likely be lodged for approval in the first half of next year.

The company said both projects are capable of powering up to 46,000 homes.


An artist's impression of Tilt Renewable's proposed $60 million Snowtown North Solar Energy Farm. Picture: Tilt Renewables

Tilt renewable development general manager Clayton Delmarter said the Snowtown North Solar Energy Farm could be operating within 12 months of approval.

"The solar farm will hook into the existing network connection saving us some costs there," he said.

"We have been looking for solar at Snowtown for some time, I guess it's been delayed a little bit while we work through some of network changes."

The farm will be located 10km west of Snowtown on 100ha of cleared farming land next to the existing Snowtown Stage 1 Wind Farm substation.

Mr Delmater did not expect too much opposition to the project.

"I think in our view it's a relatively benign development for that part of the world," he said.

"We love developing in South Australia because it's a great place to develop, there's good support from stakeholders generally and it makes it a smooth and enjoyable process."

It comes as Spanish renewable energy developer FRV is proposing a 100MW farm — paired with 50MW battery — capable of powering up to 60,000 homes which would be located 3.5km north east of Mintaro.

The company said up to 200 jobs would be created during construction which could start in 2019 pending approvals.

Magic 105.9 – 16 November 2017 (no comment sought)

Mintaro solar farm could soon be a reality

A new solar farm in Mintaro, could open as many as 200 possible jobs for the region.
It's called the Chaff Mill Solar Farm. It's only in research and consultation stage at the moment, but the company behind it, FRV, thinks it'll have a big impact on the region.
They'll need 200 jobs for construction and up to five for operation once it's all built-but the proposal needs to go ahead before any of that becomes a reality.
Apart from the obvious benefit of job openings, it'll also mean more investment is pulled to the area.
Local businesses like grocery stores, restaurants, cafes, accommodation providers and petrol stations are just some that can be looking forward to it getting the green light.

Below is the project overview from the FRV factsheet.

This project would comprise the construction and operation of a grid connected solar farm using solar PV modules similar to those used on houses. The final design of the project prior to construction will determine the plant configuration, layout and specifi c equipment to be used, as well as the solar farm's electricity generating capacity. While a final investment decision has not yet been made, it is envisaged that construction could commence sometime in 2016 to 2017 and would take between 12 to 18 months. It is currently intended to utilise a tracking system where the PV panels rotate from east to west, following the sun across the sky, maximising the electricity production. The height of the structures including the PV modules would be no more than approximately 3m from ground level. Inverters that are typically housed in shipping container sized structures would be used to convert the direct current electricity generated by the PV modules into alternating current. A transformer would be installed to step up the voltage to a level suitable for injection into the national electricity grid. The solar farm is proposed to connect into the electricity grid via the existing Clare South substation located immediately adjacent to the solar farm site.

RPS

Plains Producer – 22 November 2017 (no comment sought)

SOLAR FLARE

Mintaro farmers raise solar farm worries

Les Pearson reports:

NEIGHBOURING farmers to the proposed site of a solar farm near Mintaro have a long list of concerns surrounding the development but the owner of the land in question feels similar ventures will be commonplace in coming years.

Renewable energy firm, FRV Australia, is the proponent behind the Chaff Mill Solar Farm, a proposed 100MW solar farm and 50 MW battery located 3.5km north-east of Mintaro on land farmed by local man, Graham Johnson.

Several adjoining landowners have raised concerns since behind contacted by FRV Australia, citing potential increases to frost risk, increased local traffic, fire hazard and general aesthetic issues amongst a raft of questions.

Debbie Baum, one of those with adjacent land to the proposed site, has already quizzed the company.

"I'm not against renewable energy, it definitely has a place now and in the future," Mrs Baum said.

"I'm just not convinced this has been planned in the right place.

"From what I've read on solar farms, the three main parameters are it needs to be mostly cleared, flat land close to the electrical grid for connection, so I think they've only ticked one of these three boxes."

Continued Page 6

Fraud Investigation Depart-

Farmers claim solar proposal has its grey areas

• From Page 1

With an annual rainfall of about 450mm and about half of the land in question "fairly undulating", which includes partial catchment of the Wakefield River, it is quality agricultural land.

The proposal does contravene some points within the Clare and Gilbert Valleys Council's Strategic Plan surrounding protection of local farmland from such developments but the sheer value of the development takes the application out of council hands and lands it with the state planning department.

Council will have the opportunity to review the development application once it is submitted.

Mrs Baum included the expected visual impact in her questions to FRV Australia, which may well impact on the price of her own land.

"The valley is a fabric of colour and vibrancy and to see it broken up by a bunch of mirrored panels would be disappointing," she said.

Fellow neighbour, John Faulkner, said their land is prone to frost at times and the installation of the solar panels may disrupt the microclimate, triggering an increase in frosts.

"Also the biosecurity and control of weeds in the area is a worry, we don't know what's going to happen," Mr Faulkner explained.

"It has a projected lifespan of 20 years assuming they buy the land and don't leave it, so how are they going to rehabilitate it after that?

"I don't want to be a stick in the mud but I've got more questions than answers at this stage."

Mr Johnson felt the development was just a sign of the times as the state sought more energy security.

"These things happen, they're happening elsewhere too, not just here," he said.

"It isn't the first, it won't be the last.

"The idea behind it would be it increases the state's ability to meet its power demands."

> *"I don't want to be a stick in the mud but I've got more questions than answers at this stage."* - John Faulkner

FRV contacted Mr Johnson some six months ago seeking land near the Waterloo substation, an electricity network heading directly to Adelaide.

Mr Johnson, who owns and operates about 3500 hectares in the region, agreed to an option land deal with FRV Australia on about 400ha, where the company can opt to buy the land after a certain period or decline to take it over.

When asked if Mrs Baum would be tempted by a similar offer, she was diplomatic.

"You can never say never, there will always be a price," she said.

"I don't begrudge anyone getting a good price for their property."

That said, Mr Johnson claimed he encouraged FRV Australia to contact neighbouring landowners to gauge their interest.

"I told them to speak to the neighbours and see if there was a deal there for them," he said.

"Some saw the opportunity and were tempted to sell but they wanted to sell more than the company wanted, and they didn't want the excess land."

FRV Australia will be meeting with Clare and Gilbert Valleys Council staff and affected landowners on Friday in a bid to allay concerns and address the questions raised.

Northern Argus – 16 February 2018 (comment sought)

Chaff Mill Solar Farm proposal

Solar: Royalla Solar Farm (ACT). Photo: royallasolarfarm.com.au

FRV have recently spent time in the community of Mintaro to discuss with key stakeholders their plans for the proposed Chaff Mill Solar Farm.

A spokesperson for FRV said the company valued community and stakeholder feedback and had met with neighbouring property owners, stakeholders, Clare and Gilbert Valley Council, local MPs and community interest groups since September 2017 to discuss the proposed solar farm.

“From 21 February, FRV has planned to meet again with landowners directly neighbouring the site of the proposed solar farm, interested stakeholder groups, Clare and Gilbert Valleys Council and local MPs to provide them with an update on the development application and findings from the environmental and technical assessments.”

The spokesperson said FRV was on schedule to submit the application for the Chaff Mill Solar Farm in late March 2018.

This submission will go to the South Australian Government’s State Commission Assessment Panel – this will then be publicly advertised and documentation will be made available online for people to see.

Clare and Gilbert Valleys Council are provided with a copy of this application.

FRV expect the State Commission Assessment Panel to make a decision on this application in mid to late 2018, and will advise the broader community of the outcomes soon after.

FRV will be at the Sevenhill Producers Market on Saturday, February 24 from 8.30am to 12pm, providing an opportunity to meet with the team and view the proposed layout of the solar farm.

Where possible, feedback will be taken into consideration and incorporated into the final development.

Appendix C
Advertisements

Northern Argus advertisement (appeared on 8 February 2018)

Plains Producer advertisement (appeared on 8 February 2018)

APPENDIX D

PUBLIC RELATIONS AND MEDIA MATERIAL

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COMMUNICATION MATERIAL

FACT SHEET – SEPTEMBER 2017

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

Chaff Mill Solar Farm: A plan to harness the power of the sun and create jobs in your community

Leading Australian solar developer Fotowatio Renewable Ventures (FRV) is preparing a development application for a proposed 100MW solar farm 3.5km north-east of Mintaro.

FRV is working on a preliminary design for the proposed solar farm, which could generate enough clean energy to power up to 60,000 homes for South Australian families. This would be achieved by connecting the farm to the electricity network via a Tee Connection to an existing 132kV transmission line running from the adjacent Mintaro substation to the Waterloo substation, which is owned and managed by AEMO-ElectraNet.

FACT SHEET

Planning and environmental considerations

The proposed Chaff Mill Solar Farm is subject to development approvals through the South Australian Government's Development Assessment Commission.

Environmental studies have commenced. These will be completed during the design phase to ensure that any potential impacts on native vegetation, birds or animals are minimised.

Subject to development approval, FRV seeks to commence construction late 2019 and start generating energy 12 to 18 months later. The solar farm would have an operating life of 30 years.

An ideal location to generate energy for South Australians

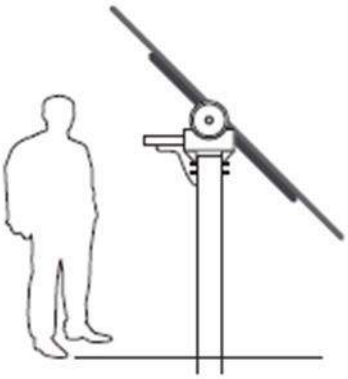
South Australia is nationally recognised as a leader in clean energy production.

The proposed Chaff Mill Solar Farm can further the development of the Australian clean energy industry and make a significant contribution to South Australia's energy production.

The 380 hectare site is approximately 130 kilometres north of Adelaide, is well placed to capture and export solar energy into the national electricity grid from the nearby Mintaro substation and its existing 132kV transmission line to Waterloo. This site was selected because of its proximity to grid infrastructure, good drainage and largely cleared land. The level of solar irradiation also makes it a suitable site for a solar farm.

Operation of Chaff Mill Solar Farm would deliver clean, zero emissions electricity to meet the region's energy needs and would have significantly lower environmental impacts relative to other electricity generation methods.

FRV plans to use the latest in solar energy generation technology: PV-Polycrystalline modules with a horizontal, single-axis tracking system. The panels, including the mounting structures, would be no more than three metres from ground level.



PROPOSED PROJECT TIMELINE

Figure 1: *Development of the Chaff Mill Solar Farm is subject to development approvals through the South Australian Government's Development Assessment Commission. This indicative timeline sets out the development application process and proposed construction, including current community and stakeholder consultation.*

Economic benefits

Should the project proceed, FRV would employ up to 200 workers during construction. Operation of Chaff Mill Solar Farm would create up to five ongoing jobs.

In addition, the project would attract investment to the area and deliver additional indirect economic opportunities to local businesses including local grocery stores, restaurants, cafés, accommodation providers and petrol stations.

About FRV

FRV has developed and operated solar farms spanning 24 countries and five continents.

FRV has had a presence in Australia since 2010.

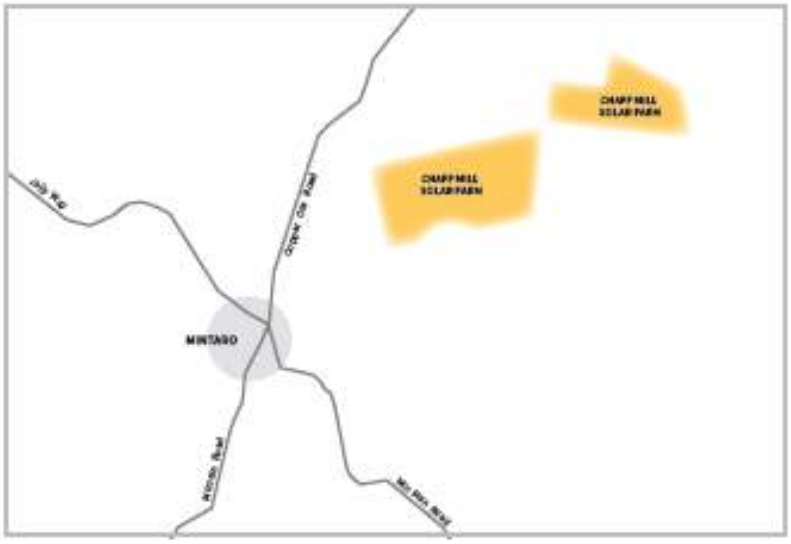
A leader in its field, FRV uses the latest technology and design solutions to generate and deliver sustainable and clean energy.

FRV's track record of achievements includes two operational solar farms in Australia, the 20MW Royalla Solar Farm in the ACT and the 56MW Moree Solar Farm in New South Wales. FRV is currently constructing the 100MW Clare Solar Farm, near Ayr in QLD and the 100MW Lilyvale Solar Farm, near Emerald in QLD.

Find out more

Community and stakeholder engagement on the proposed Chaff Mill Solar Farm is underway. Engagement will inform the planning process and encourage the community to offer feedback, including an alternative name for the proposed solar farm.

FRV will have discussions with State Parliamentary members, as well as the local council, community interest groups and local people as planning progresses.



If you would like more information, email infoaustralia@frv.com or call the project team on (03) 9417 9711.

PROJECT UPDATE – NOVEMBER / DECEMBER 2017

CHAFF MILL SOLAR FARM

Project update – November 2017

Leading Australian solar developer, FRV, has identified an area of land, 3.5km north-east of Mintaro in South Australia, for a 100MW solar farm.

FRV began discussions with neighbouring properties and community interest groups in September this year, making them aware of the proposed Chaff Mill Solar Farm. Feedback from these discussions, along with initial site investigations and specialist studies will inform the preliminary design and the development application for the proposed 380 hectare solar farm. This update provides an overview of what FRV have heard from the community, the investigations performed to date, and the next steps.

Environmental assessment and specialist studies

Through specialist consultants, FRV will undertake a range of environmental and technical studies to inform its development application. To date the following studies have been kicked off:

- Flora and fauna
- Aboriginal cultural heritage
- Visual impact and landscape assessment
- Solar glare impact assessment
- Planning, zoning and land use (still being assessed)
- Traffic and access (still being assessed)
- Social and community (still being assessed)
- Site contamination
- Geotechnical assessment
- Stormwater and flooding (still being assessed)
- Non-indigenous heritage assessment (still being assessed).

FRV has obtained initial findings in a number of these areas including flora and fauna, Aboriginal cultural heritage, visual impact and landscape assessment, site contamination and geotechnical assessment. Further investigations will occur in December 2017, with findings to be discussed with the local community and other interested stakeholders in early 2018.

Proposed project timeline

- **September – December 2017**: Complete specialist studies
- **September – November 2017**: Initial stakeholder and community engagement
- **January – February 2018**: Finalise and submit development application report to Development Assessment Commission
- **January – March 2018**: Stakeholder and community engagement
- **Late 2018**: Development Application considered by SA Government
- **Early 2019**: Planned commencement of project (pending outcome of Development Application)

What we've heard

Community and stakeholder feedback will shape FRV's development application and inform the plant configuration, layout of the proposed solar farm and construction mitigation measures. Since September 2017, FRV has met with members of the community, local council, community interest groups and parliamentary members face-to-face and have continued these discussions on the phone and via email in October and November.

Key areas of interest include:

- risk that radiative heat loss will accelerate change in ambient air conditions and accelerate frost conditions
- damage to the local road network
- rehabilitation and usage of the solar farm land at the end of the 30 year operation period
- why this location
- the visual impact from the solar panels on the local amenity
- condition of the existing soil and the ability to support the solar panel structures.

FRV through its consultants, have undertaken a range of specialist studies to not only manage the environmental and technical requirements but to address community concerns. Studies carried out to date, indicate that there is minimal impact from the proposed development. However, FRV wants to confirm the accuracy of the information before presenting feedback to the community in late January / early February 2018.

Next steps

Over the coming months FRV will prepare its development application. Prior to submitting the application to the South Australian Government's Development Assessment Commission in 2018, FRV will engage with the community with more detail on the plant configuration and layout and findings of the environmental and technical studies.

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711.

FRV FORWARD RENEWABLE VENTURES

PROJECT FACT SHEETS – FEBRUARY 2017

FRV
FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

FROST AND MICRO-CLIMATE IMPACT ASSESSMENT

FACT SHEET

FRV recognises the importance of working with the community in the development of the proposed Chaff Mill Solar Farm. During engagement last year, there was community concern that the solar farm might accelerate frost conditions in the local area. To address this, FRV and its consultants conducted a frost and micro-climate review and assessment.

Key findings

Frost is defined by the Bureau of Meteorology as a deposit of white ice crystals or frozen dew which forms on objects near the ground when the surface temperature drops below freezing point. In Mintaro, frost is most likely to occur when the sky is clear with light winds and low humidity.

The assessment concluded that while there can be minor differences in the soil and air temperatures directly under and above solar panels on solar farms, there is no significant impact on air temperatures in the surrounding areas.

Methodology

Literature review

A review of scientific literature and studies relating to the environmental impacts of solar farms was carried out. A number of studies and academic papers from Australia and around the world were reviewed and the findings were analysed and compared.

In response to community feedback and interest, this also included a review of two specific research papers published in 2016 – *Solar Park Microclimate and Vegetation Management Effects on Grassland Carbon Cycling by Alona Armstrong et al* published in Volume 11 of the Environmental Research Letters journal and *The Photovoltaic Heat Island Effect: Larger Solar Power Plants increase Local Temperatures by G Barron-Gafford et al* published in Volume 6 of Scientific Reports (Nature).

Both studies included scientific monitoring and assessment at constructed solar farms and found that there were slightly increased temperatures directly above solar panels and slightly decreased temperatures directly beneath solar panels (as would be expected). Importantly, the studies did not note any significant changes to temperatures at progressive locations next to the solar farms. Other solar farm impact studies based on hypothetical modelling also generally reflected these findings.

CHAFF MILL SOLAR FARM

FACT SHEET

Discussions with scientists

Acknowledging the limited scientific research available, FRV's consultants contacted scientists from relevant government agencies, meteorology and climate organisations, specialists in air modelling, agricultural scientists and universities.

Although not able to provide informed or definitive advice regarding the Chaff Mill Solar Farm, scientists spoken to were of the opinion that there would be no significant micro-climate impacts from a solar farm of this size. Further, some of those contacted were of the view that air flow from the road network in and around the solar farm would also help mitigate any potential local climate impacts.

More information and next steps

FRV is planning to submit its application to the South Australian Government's State Commission Assessment Panel in March 2018. This application will include the frost and micro-climate study findings and other specialist study reports, which can be accessed following submission on the State Commission Assessment Panel site under Public Notices at:

www.saplanningcommission.sa.gov.au/scap/public_notices

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

CHAFF MILL SOLAR FARM

TRAFFIC IMPACT ASSESSMENT

FACT SHEET

Traffic impact studies were undertaken between September and December 2017, to inform FRV's development application for the proposed Chaff Mill Solar Farm, which is intersected by Chaff Mill Road and bounded by Wockle Creek Road, Merildin Road, Chaff Mill Road and Faulkner Road. Current vehicle access to the east and west sections of the proposed site is by a network of unsealed roads.

Below is a summary of the traffic study report.

Traffic study

The purpose of the traffic study was to:

- Understand the likely extent of light and heavy vehicle traffic impacts during the construction and operation of the solar farm
- Identify alternative routes for light and heavy vehicles to access the site
- Recommend a preferred route to be used by vehicles as the primary access to the site.

FRV and its consultants conducted a site inspection of local road conditions and a desktop assessment of traffic and road corridor information from the Department of Planning, Transport and Infrastructure.

Traffic generation

Vehicular access would be required to both sections of the proposed site during the construction and operation of the solar farm. Construction of the proposed solar farm is expected to take approximately 18 months and will be completed in two stages.

FRV estimates there would be up to 100 workers on the site during the first stage of construction. For the second stage the number of workers would increase to up to 200 on site. These workers would be expected to travel to and from the site in light vehicles. Most likely, workers would share rides with each other to the remote site.

FRV has estimated that between eight and 16 heavy vehicle movements a day will transport construction plant and equipment to the site during both stages of construction.

Once operational, it is estimated up to five ongoing staff would need to access the site. The vehicle movements would be significantly reduced during the operational period, with around ten trips per day.

Route and access options

The preferred access to the west section of the site is from Wockle Creek Road. Preferred access to the east section of the site via a road within the solar farm.

A short section of Chaff Mill Road would be upgraded to allow traffic to pass between the west and east sections.

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

FACT SHEET

Alternative traffic routes were identified for vehicles to access the west (Wockie Creek Road) section of the proposed site including:

- Route A – via Horrocks Highway, Jolly Way, Catholic Church Road, Merildin Road and Wockie Creek Road
- Route B – via Barrier Highway, Mintaro-Manoora Road, Copper Ore Road, Merildin Road and Wockie Creek Road
- Route C – via Barrier Highway, Mintaro-Manoora Road, along Martindale and Hare Roads to Merildin Road and Wockie Creek Road
- Route D – via Barrier Highway, Flagstaff and Riley Roads and Merildin Road.

Route A was considered the most suitable for both light and heavy vehicles to access the site for the following reasons:

- It avoids travel through the Mintaro and Manoora townships
- There are no residential properties along Merildin Road and Wockie Creek Roads between Copper Ore Road and the preferred access
- Access to the eastern section of the site is available via a short section of Chaff Mill Road
- It includes the shortest length of unsealed roads to be upgraded including two intersections.

Vehicles would travel to the site via Horrocks Highway, then Jolly Way Road and along Catholic Church and Merildin Roads to access the western section of the site on Wockie Creek Road.

Traffic impacts

FRV acknowledges there would be an increase in light and heavy traffic volumes on sealed and unsealed roads in vicinity of the project site during the construction stage.

To manage the traffic impacts during construction, FRV will develop a Construction Management Plan that details vehicle routes and measures to maintain road conditions. This plan would be developed by FRV's appointed construction contractor.

More information and next steps

FRV is planning to submit its application to the South Australian Government's State Commission Assessment Panel in March 2018. This application will include the traffic impact report and other specialist study reports, which can be accessed on the State Planning Commission Assessment Panel site under Public Notices at:

www.saplanningcommission.sa.gov.au/scap/public_notices

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

FRV FOTOWATIO RENEWABLE VENTURES

CHAFF MILL SOLAR FARM

ABOUT THE CHAFF MILL SOLAR FARM

FACT SHEET

The proposed 380-hectare, 100 MW Chaff Mill Solar Farm is located near Mintaro in South Australia and is approximately 130 kilometres north of Adelaide. The solar farm could generate enough clean energy to power up to 60,000 homes for South Australian families.

Leading Australian solar developer FRV Services Australia (FRV) selected the site because of its proximity to grid infrastructure, good drainage and largely cleared land. The level of solar irradiation at the site during the year also makes it suitable for a solar farm.

Location and layout

The proposed 380-hectare site is 3.5km north – east of Mintaro. The site is bounded by Copper Ore Road, Wockle Creek Road, Merildin Road, Faulkner Road and Chaff Mill Road.

The proposed layout of the solar farm would comprise of approximately 360,000 solar panels and a battery storage unit with containers. FRV plans to build a three-metre-high wire mesh fence around the site, topped by barbed wire.

FRV is considering the use of solar PV – Polycrystalline modules that would be no higher than three metres high at maximum tilt to capture solar energy.

Construction and traffic management

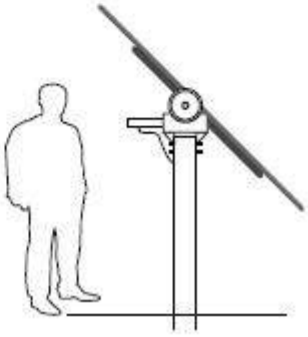
Subject to development approvals through the South Australian Government's State Commission Assessment Panel, FRV seeks to commence construction in late 2019 and start generating energy 12 to 18 months later.

Before construction commences FRV will develop a Construction Management Plan, including a traffic plan for vehicle access to the site during construction. This plan would be approved by the Clare and Gilbert Valleys Council.

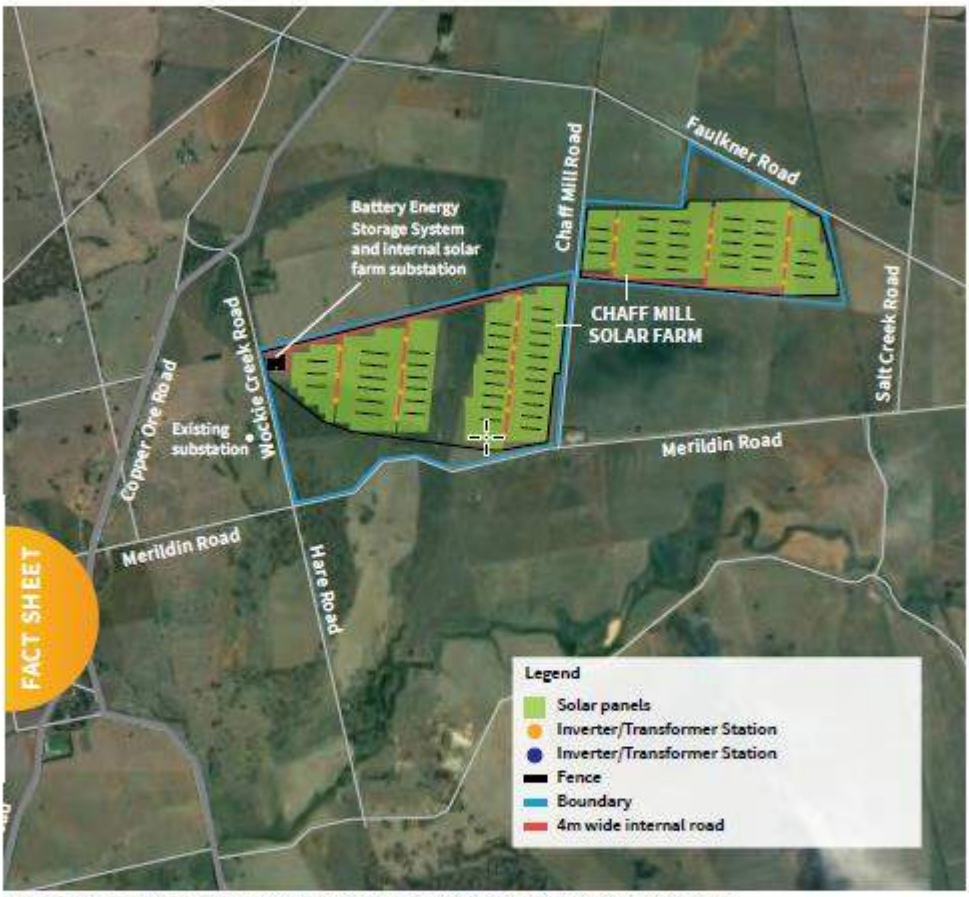
Traffic assessment has found that access to the site will be via Horrocks Highway, then Jolly Way Road and along Catholic Church and Merildin Roads to access the western section of the site on Wockle Creek Road.

Operation after 30 years

Should the project proceed, FRV will own and operate the solar farm. The plant will have an operating life of around 30 years. Following this period, the land would be restored to its original state and either leased or sold. The restoration would take approximately 12 months.



CHAFF MILL SOLAR FARM



FACT SHEET

** This design is indicative and is subject to change until a final design is submitted to Clare and Gilbert Valleys Council.*

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

Landscape and visual impacts

The studies recognised the 'sense of place' and character of the Mintaro township. FRV understands visual impact is important to the community. It was confirmed that the proposed solar farm will not be visible from Mintaro due to the surrounding hills, ridges and vegetation. FRV will work with direct neighbours of the site to minimise any visual impacts.

Stormwater and flooding

The installation of solar panels is not expected to increase the overall runoff of stormwater and the potential for flooding is considered very low but will be assessed in more detail during later design stages. Once established, the solar farm will be re-seeded with native grass species, which will mitigate what little run-off there is and reduce the potential for erosion.

Geotechnical

A regional geology soils and ground water overview was prepared for the project.

It is known that local soils can become wet and boggy in a rainfall event. Detailed site geotechnical investigations will be undertaken during the detailed design phase.

Glare

The highly absorbent dark glass of solar panels is designed to take in sunlight instead of reflecting it. The study found potential for glare at only two sites – on Merildin Road, which joins the south-eastern boundary of the site and at the intersection of Chaff Mill and Merildin Roads. FRV will plant vegetation in these locations to minimise any impact.

Aboriginal cultural heritage

Studies were carried out in consultation with Ngadjuri traditional owner representatives but did not identify any Aboriginal heritage sites, objects or burials. The site will be re-surveyed when it is cleared for construction and FRV will work with traditional owners to implement a Cultural Heritage Management Plan.

Heritage

The heritage assessment found there would be no impact to the protection of heritage places in and around Mintaro during construction and operation of the solar farm, with the closest heritage asset more than a kilometre away. Construction and heavy vehicles will not be directed through the Mintaro township and all construction and site staff working on the project will be inducted as to their legal obligations regarding the protection of heritage places within and around Mintaro.

Preliminary site assessment

A preliminary site assessment was undertaken to investigate potential site contamination issues in the project area. The assessment identified only extensive agricultural use of the land and assigned a subsequent low site contamination risk.

More information

FRV is planning to submit its application to the South Australian Government's State Commission Assessment Panel in March 2018. This application will include detailed copies of these technical reports, which can be accessed on the State Commission Assessment Panel site under Public Notices at:

https://www.saplanningcommission.sa.gov.au/scap/public_notices

If you would like to receive further information, email infoaustralia@frv.com or call the project team on (03) 9417 9711

MEDIA COVERAGE

PLAINS PRODUCER – OCTOBER 2017 (NO COMMENT SOUGHT)

News AFTER MEETING LAST www.plainsproducer.com.au

Residents will have their say on solar farm

RESIDENTS and council will have an opportunity to provide a response to the proposed Chaff Mill Solar Farm at Mintaro when the development application is lodged with the state planning department.

Renewable Energy firm, FRV, is yet to lodge a development application on a 400 hectares of farming land near the Clare Valley town but has been consulting with the community and Clare and Gilbert Valleys Council.

The company met with GVC elected members and senior staff last week to discuss proposal.

Les Pearson reports:

"It was mainly to update us as to where they were at, plus fill us in on ongoing discussions with the Mintaro Progress Association and landowners in the area," CGVC acting CEO, John Coombe said.

A development application should be lodged early next year, possibly January or February.

"Once it is lodged, the plans are put on public exhibition and there is a six to eight week opportunity to comment on the application," Mr Coombe confirmed.

The Department of Planning confirmed council's development plan would be a factor in its deliberations.

"Any proposal lodged would need to be assessed having regard to the relevant provisions of council's development plan," a department spokesperson explained.

"Public notification would be undertaken in accordance with the requirements of the Development Act.

"In general terms, and noting an application has not been lodged, local residents would be consulted and provided time to lodge a representation.

"Once lodged, and should they wish to be heard, they would also have opportunity to attend an assessment hearing to talk to their submission."

Several property owners neighbouring the proposed solar farm location have raised concerns about potential impacts to the climate and their own property values.

"The company is working on finishing a lot of investigations and studies surrounding the queries, including visual impact, increased traffic levels, appropriate land use, all the things that form part of the process," Mr Coombe confirmed.

NORTHERN ARGUS – 1 NOVEMBER 2017 (NO COMMENT SOUGHT)

Solar farm proposed for Mintaro

BY CHELSEA ASHMEADE

IF A development application is approved, a 380-hectare solar farm could be established in Mintaro.

Renewable energy company Fotowatio Renewable Ventures is currently preparing a development application for the proposed solar farm 3.5km north-east of the town.

They are also completing both visual and environmental impact studies.

A spokesperson for FRV said subject to development approval, FRV seeked to commence construction late 2019 and complete the project by late 2020.

The spokesperson said FRV was committed to working with the local community, landholders and Mintaro Progress Association, and would keep them informed through all phases of the project – this had already begun.

Further consultation is planned in late November 2017 and again in early 2018, prior to submitting the DAP.

"FRV believes it is important to understand the community's views on its proposal and will continue to engage with local residents, businesses and community groups and key stakeholders to inform planning and design as part of the development application process."

Clare and Gilbert Valleys Council manager development and environment Andrew Christiansen said council had met with the group on a couple of occasions.

"They will come out again next month to meet with councillors and show them the site," Mr Christiansen said. The development application will go direct to the State Planning Assessment Commission.

Mr Christiansen said council could make comment on the project but they were not the approving body.

"From my perspective they are doing a really good job of community consultation and engagement. It's good that they are engaging from the git-go and that's important to us."

The proposed site has been chosen due to its close proximity to existing grid infrastructure and the largely clear land.

Other land was investigated for potential use, but it was deemed unsuitable. The project could create 200 jobs during construction and five ongoing jobs.

NORTHERN ARGUS – 13 NOVEMBER 2017 (COMMENT SOUGHT)

Fotowatio Renewable Ventures propose Chaff Mill Solar Farm

Chelsea Ashmeade

Royalla Solar Farm (ACT), Photovoltaic Plant, this solar farm is in operation and covers 50ha.

A proposed solar farm in Mintaro – Chaff Mill Solar Farm – could potentially create up to 200 jobs during its construction.

Although in consultation and research stages, the company Fotowatio Renewable Ventures is positive about its potential impact on the region.

A spokesperson told Northern Argus 200 jobs could be created during the construction with (up to) five ongoing positions once in operation.

This is subject to the proposal going ahead.

The spokesperson said benefits to the local community would be maximised and this would be key for the company.

"...with considerable opportunities being available during the construction of the solar farm. If approved, FRV will hold industry briefings to understand and identify local contractors," the spokesperson said.

FRV is working closely with Clare and Gilbert Valleys Council and another community consultation will be held in late November.

THE ADVERTISER – 22 NOVEMBER 2017 (NO COMMENT SOUGHT)

Snowtown and Mintaro to be site of three major solar farms which would generate hundreds of jobs during construction

THREE solar farms capable of generating enough electricity to power more than 100,000 homes are planned for the state's Mid North promising hundreds of jobs during construction.

Tilt Renewables is proposing to build a 45MW solar farm and a 70MW solar farm next to South Australia's largest wind farm project at Snowtown.

The company this month lodged plans with the State Development Commission for the $60 million 45MW Snowtown North Solar Energy farm, which will feature 180,000 panels, battery storage of up to 25MW and is expected to generate up to 200 jobs during construction.

The second larger is still in planning stages and the company said would likely be lodged for approval in the first half of next year.

The company said both projects are capable of powering up to 46,000 homes.


An artist's impression of Tilt Renewable's proposed $60 million Snowtown North Solar Energy Farm. Picture: Tilt Renewables

Tilt renewable development general manager Clayton Delmarter said the Snowtown North Solar Energy Farm could be operating within 12 months of approval.

"The solar farm will hook into the existing network connection saving us some costs there," he said.

"We have been looking for solar at Snowtown for some time, I guess it's been delayed a little bit while we work through some of network changes."

The farm will be located 10km west of Snowtown on 100ha of cleared farming land next to the existing Snowtown Stage 1 Wind Farm substation.

Mr Delmater did not expect too much opposition to the project.

"I think in our view it's a relatively benign development for that part of the world," he said.

"We love developing in South Australia because it's a great place to develop, there's good support from stakeholders generally and it makes it a smooth and enjoyable process."

It comes as Spanish renewable energy developer FRV is proposing a 100MW farm — paired with 50MW battery — capable of powering up to 60,000 homes which would be located 3.5km north east of Mintaro.

The company said up to 200 jobs would be created during construction which could start in 2019 pending approvals.

MAGIC 105.9 – 16 NOVEMBER 2017 (NO COMMENT SOUGHT)

Mintaro solar farm could soon be a reality

A new solar farm in Mintaro, could open as many as 200 possible jobs for the region.
It's called the Chaff Mill Solar Farm. It's only in research and consultation stage at the moment, but the company behind it, FRV, thinks it'll have a big impact on the region.
They'll need 200 jobs for construction and up to five for operation once it's all built-but the proposal needs to go ahead before any of that becomes a reality.
Apart from the obvious benefit of job openings, it'll also mean more investment is pulled to the area.
Local businesses like grocery stores, restaurants, cafes, accommodation providers and petrol stations are just some that can be looking forward to it getting the green light.

Below is the project overview from the FRV factsheet.

This project would comprise the construction and operation of a grid connected solar farm using solar PV modules similar to those used on houses. The final design of the project prior to construction will determine the plant configuration, layout and specifi c equipment to be used, as well as the solar farm's electricity generating capacity. While a final investment decision has not yet been made, it is envisaged that construction could commence sometime in 2016 to 2017 and would take between 12 to 18 months. It is currently intended to utilise a tracking system where the PV panels rotate from east to west, following the sun across the sky, maximising the electricity production. The height of the structures including the PV modules would be no more than approximately 3m from ground level. Inverters that are typically housed in shipping container sized structures would be used to convert the direct current electricity generated by the PV modules into alternating current. A transformer would be installed to step up the voltage to a level suitable for injection into the national electricity grid. The solar farm is proposed to connect into the electricity grid via the existing Clare South substation located immediately adjacent to the solar farm site.

PLAINS PRODUCER – 22 NOVEMBER 2017 (NO COMMENT SOUGHT)

SOLAR FLARE

Mintaro farmers raise solar farm worries

Les Pearson reports:

NEIGHBOURING farmers to the proposed site of a solar farm near Mintaro have a long list of concerns surrounding the development but the owner of the land in question feels similar ventures will be commonplace in coming years.

Renewable energy firm, FRV Australia, is the proponent behind the Chaff Mill Solar Farm, a proposed 100MW solar farm and 50 MW battery located 3.5km north-east of Mintaro on land farmed by local man, Graham Johnson.

Several adjoining landowners have raised concerns since behind contacted by FRV Australia, citing potential increases in frost risk, increased local traffic, fire hazard and general aesthetic issues amongst a raft of questions.

Debbie Baum, one of those with adjacent land to the proposed site, has already quizzed the company.

"I'm not against renewable energy, it definitely has a place now and in the future," Mrs Baum said.

"I'm just not convinced this has been planned in the right place.

"From what I've read on solar farms, the three main parameters are it needs to be mostly cleared, flat land close to the electrical grid for connection, so I think they've only ticked one of those three boxes."

■ Continued Page 6

Fraud Investigation Depart-

Farmers claim solar proposal has its grey areas

• From Page 1

With an annual rainfall of about 450mm and about half of the land in question "fairly undulating", which includes partial catchment of the Wakefield River, it is quality agricultural land.

The proposal does contravene some points within the Clare and Gilbert Valleys Council's Strategic Plan surrounding protection of local farmland from such developments but the sheer value of the development takes the application out of council hands and lands it with the state planning department.

Council will have the opportunity to review the development application once it is submitted.

Mrs Baum included the expected visual impact in her questions to FRV Australia, which may well impact on the price of her own land.

"The valley is a fabric of colour and vibrancy and to see it broken up by a bunch of mirrored panels would be disappointing," she said.

Fellow neighbour, John Faulkner, said their land is prone to frost at times and the installation of the solar panels may disrupt the microclimate, triggering an increase in frosts.

"Also the biosecurity and control of weeds in the area is a worry, we don't know what's going to happen," Mr Faulkner explained.

> *"I don't want to be a stick in the mud but I've got more questions than answers at this stage."* - John Faulkner

"It has a projected lifespan of 20 years assuming they buy the land and don't leave it, so how are they going to rehabilitate it after that?

"I don't want to be a stick in the mud but I've got more questions than answers at this stage."

Mr Johnson felt the development was just a sign of the times as the state sought more energy security.

"These things happen, they're happening elsewhere too, not just here," he said.

"It isn't the first, it won't be the last.

"The idea behind it would be it increases the state's ability to meet its power demands."

FRV contacted Mr Johnson some six months ago seeking land near the Waterloo substation, an electricity network heading directly to Adelaide.

Mr Johnson, who owns and operates about 3500 hectares in the region, agreed to an option land deal with FRV Australia on about 400ha, where the company can opt to buy the land after a certain period or decline to take it over.

When asked if Mrs Baum would be tempted by a similar offer, she was diplomatic.

"You can never say never, there will always be a price," she said.

"I don't begrudge anyone getting a good price for their property."

That said, Mr Johnson claimed he encouraged FRV Australia to contact neighbouring landowners to gauge their interest.

"I told them to speak to the neighbours and see if there was a deal there for them," he said.

"Some saw the opportunity and were tempted to sell but they wanted to sell more than the company wanted, and they didn't want the excess land."

FRV Australia will be meeting with Clare and Gilbert Valleys Council staff and affected landowners on Friday in a bid to allay concerns and address the questions raised.

NORTHERN ARGUS – 16 FEBRUARY 2018 (COMMENT SOUGHT)

Chaff Mill Solar Farm proposal

Solar: Royalla Solar Farm (ACT). Photo: royallasolarfarm.com.au

FRV have recently spent time in the community of Mintaro to discuss with key stakeholders their plans for the proposed Chaff Mill Solar Farm.

A spokesperson for FRV said the company valued community and stakeholder feedback and had met with neighbouring property owners, stakeholders, Clare and Gilbert Valley Council, local MPs and community interest groups since September 2017 to discuss the proposed solar farm.

“From 21 February, FRV has planned to meet again with landowners directly neighbouring the site of the proposed solar farm, interested stakeholder groups, Clare and Gilbert Valleys Council and local MPs to provide them with an update on the development application and findings from the environmental and technical assessments.”

The spokesperson said FRV was on schedule to submit the application for the Chaff Mill Solar Farm in late March 2018.

This submission will go to the South Australian Government’s State Commission Assessment Panel – this will then be publicly advertised and documentation will be made available online for people to see.

Clare and Gilbert Valleys Council are provided with a copy of this application.

FRV expect the State Commission Assessment Panel to make a decision on this application in mid to late 2018, and will advise the broader community of the outcomes soon after.

FRV will be at the Sevenhill Producers Market on Saturday, February 24 from 8.30am to 12pm, providing an opportunity to meet with the team and view the proposed layout of the solar farm.

Where possible, feedback will be taken into consideration and incorporated into the final development.

ADVERTISEMENTS

NORTHERN ARGUS ADVERTISEMENT (APPEARED ON 8 FEBRUARY 2018)

PLAINS PRODUCER ADVERTISEMENT (APPEARED ON 8 FEBRUARY 2018)

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APPENDIX E

LETTERS OF IN-PRINCIPLE SUPPORT

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Mintaro Progress Association Inc.
c/o Post Office, MINTARO SA 5415
ABN 59 838 572 252

M 0418 638 048 | *E* mintaroprogress@gmail.com

www.mintaro.sa.au

26 May 2018

Carlo Frigerio
Managing Director
FRV Services Australia Pty Ltd
Level 22, 6 O'Connell Street
SYDNEY NSW 2000

Attention: Damien Hegarty

Dear Damien,

Thank you for your recent information session regarding questions about the proposed Chaff Mill Solar Farm near Mintaro and also the letter proposing FRV's partnership with the Mintaro Progress Association (MPA) to provide targeted benefits to the local community.

At the MPA general meeting on 11 April 2018 the following motion was put to the meeting and carried. 'That the Mintaro Progress Association gives "in principle" support to the Chaff Mill Solar Farm project acknowledging that it will be of considerable benefit to the Mintaro community'.

The MPA Committee have considered the proposed FRV/MPA partnership agreement and are very supportive of it as an opportunity for community members to engage with FRV in ways to 'deliver positive social change within the community.' We feel there is general community goodwill to working closely with FRV for the benefit of the community but just as importantly for the benefits it will bring to the State as a whole.

On behalf of the Mintaro Progress Association I would like to extend the Association's support for the proposed Chaff Mill Solar Farm project and accept your offer.

Sent: Wednesday, 21 March 2018 11:02 AM
Subject: [EXT] Chaff Mill Solar Farm proposal Mintaro South Australia

To whom it may concern

Following on from a number of meetings, various discussions and with feedback being given to the community about the proposed Solar Farm to be built North East of Mintaro. I am happy to support this new venture.

Not only will it contribute to the state of South Australia, with its challenged power supply. The village of Mintaro and surrounding district will also benefit from this project.

Mintaro although a small community, is a tightly knit group and prides itself on the future of the village and I believe the Solar Farm will contribute to that.

TO WHOM IT MAY CONCERN

Re: FRV Chaff Mill Solar Farm proposal Mintaro

I have been very well informed about the proposal to develop this large scale solar farm near Mintaro.

My understanding is that, in the event of the project proceeding, this development will contribute positively to the State's power supply. Let's hope that the very recent change to a conservative State Government will not hamper this progress.

I have no doubt that an innovative project such as this will bring some tangible benefits to Mintaro.

As the state's first declared "State Heritage Area" (in 1984), Mintaro welcomes many tourists and travellers who in turn support a small but active business community. It is indeed very positive yet ironic that a project at the vanguard of technology be based in this Heritage town.

Mintaro is the home to many retired professionals who have chosen this town as a place to enjoy, in an active sense, their post work years. The residents include retired Doctors, Lawyers, Engineers, Journalists, Business people, farmers, vignerons and many others. And of course there are many folk still working that call Mintaro home. Do not ignore the intellect and expertise on the project's doorstep.

As a resident of nearly 30 years, and one that believes in encouraging sustainability, I welcome the project and give it my full support.

19th March 2018

TO WHOM IT MAY CONCERN

Re: FRV Chaff Mill Solar Farm proposal Mintaro

We have been very well informed about the proposal to develop this large scale solar farm near Mintaro.

Our understanding is that, in the event of the project proceeding, this development will contribute positively to the State's power supply.

It should, as we understand it, also bring some tangible benefits to Mintaro and it's population.

As a heritage listed village, Mintaro welcomes many tourists and travellers who in turn support a small but active business community.

It is envisaged that businesses including bed & breakfast accommodation, gift shops, entertainment, food & beverage, art galleries et al should all benefit, directly and/or indirectly.

The newly refurbished Magpie & Stump hotel which re-opens on the 24th March should also benefit considerably.

As residents of 6.5 years, we are very pleased to add our support for this project.

APPENDIX F

PLANNING ASSESSMENT

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Chaff Mill Solar Farm - Planning and Land Use Assessment

Prepared for WSP Australia Pty Ltd | 5 February 2018

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Chaff Mill Solar Farm - Planning and Land Use Assessment

Final

Report S17158RP1 | Prepared for WSP Australia Pty Ltd | 5 February 2018

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Signature		Signature	
Date	5 February 2018	Date	5 February 2018

Document Control

Version	Date	Prepared by	Reviewed by
V1	22/11/17	P. Gibbons	B. McLennan
V2	5/02/18	P. Gibbons	B. McLennan

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1 Introduction

FRV Services Australia Pty Ltd (FRV) proposes to develop the Chaff Mill Solar Farm (the project) at a location north-east of Mintaro in the Clare Valley, South Australia (the project site).

The project will capture solar energy and generate approximately 250,000 Megawatt hours (MWh) of clean electricity each year, enough to power up to 60,000 homes.

This planning and land use assessment has been prepared to support a Section 49 (Crown Development) Development Application to the State Commission Assessment Panel (SCAP) and provides an assessment of the project against the relevant policy provisions of the Clare and Gilbert Valleys Council Development Plan (consolidated 10 November 2016).

EMM Consulting Pty Ltd (EMM) has been engaged by WSP Australia Pty Ltd (WSP) to prepare this planning and land use assessment.

1.1 The project

The project would be developed on a 380 hectares (ha) site adjacent to the existing Mintaro substation and its 132 kilovolt (kV) transmission line to Waterloo. The project would deliver clean, zero-emissions electricity via the latest in solar energy generation technology; photo-voltaic (PV) Polycrystalline modules with a horizontal, single-axis tracking system.

The modules, including the mounting structures, would not exceed 3 metres (m) in height. The project site is well-placed to capture and export renewable solar energy into the South Australian power grid.

1.2 Project site

The project site is located 3.5 kilometres (km) north-east of Mintaro in the Clare Valley, 130 km north of Adelaide, within the Clare and Gilbert Valleys local government area (LGA). The project site in its regional and local context can be seen in Figures 1.1 and 1.2.

The project site is intersected by Chaff Mill Road and Wookie Creek and is bordered by Wookie Creek Road, Merildin Road, Salt Creek Road and Faulkner Road. A site layout is illustrated in Figure 1.3.

The existing land use is agricultural.

Figure 1.1 Project site - regional location

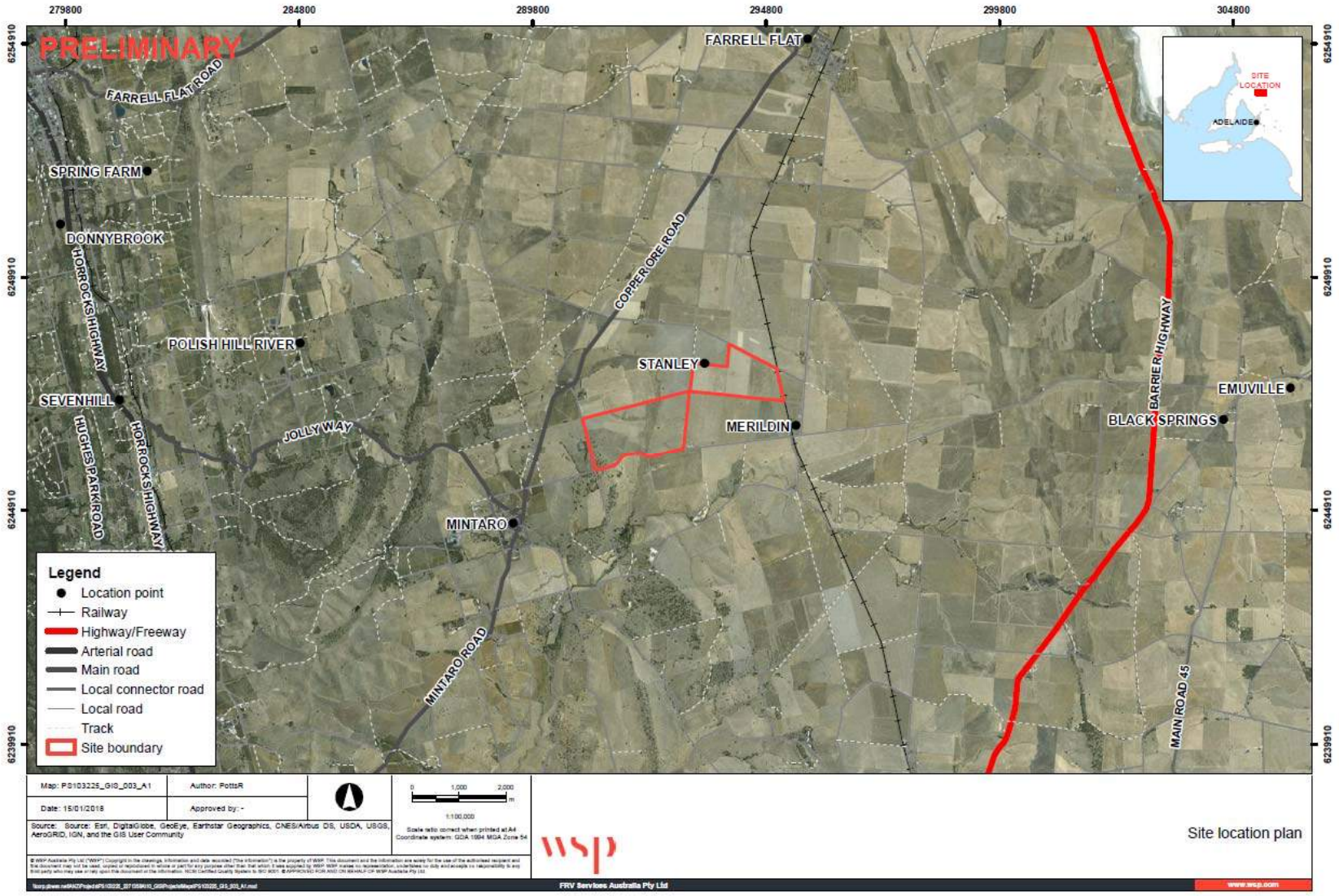


Figure 1.2 Project site - local location

Photograph 1.1 Project site looking east from Wookie Creek Road

Photograph 1.2 Project site access road (Wookie Creek Road) looking south

Figure 1.3 Indicative project layout

1.3 Legislative and policy requirements

The South Australia *Development Act 1993* (the Act) and South Australia *Development Regulations 2008* (the Regulations) are the main pieces of legislation facilitating planning and development in South Australia.

The project is currently in the process of securing Section 49 (Crown Development) status under the Act with State Government agency sponsorship/endorsement to be provided by Office of the Technical Regulator (OTR).

FRV is seeking approval from the State Commission Assessment Panel (as the relevant planning authority) for the following components of the project:

- construction and operation of a 100 MW solar farm, comprising:
  - photovoltaic solar panels, tracking system, inverter/transformer stations;
  - 50 MW/100 megawatt hours (MWh) Battery Energy Storage System (BESS) Area;
  - Medium Voltage (MV) Delivery Station;
  - battery containers (up to 54);
  - substation and tee-connection to existing 132 kV transmission line within the project site;
  - internal underground and/or above ground (overhead) electrical connections and cabling;
  - external electrical connections and cabling;
  - modular site office for FRV personnel;
  - internal access roads and on-site parking for operational staff vehicles (including one disabled parking space);
  - new formalised vehicular access onto Wookie Road; and
  - security fencing (up to 2.1 m) around the perimeter of the project site.

1.3.1 Assessment methodology

This planning and land use assessment has been informed by:

- attending the project site and locality on 10 August 2017;
- consultation with proponent and WSP on the project;
- review of issues and concerns raised during community and stakeholder engagement;
- project assessment against State Government strategies and policy initiatives;

- review of specialist technical assessments to be submitted with the Section 49 (Crown Development) Development Application assessing potential project impacts and mitigation measures from a planning and land use perspective, including:
    - landscape character and visual impact assessment;
    - glare impact assessment;
    - noise assessment;
    - ecology (flora and fauna) assessment;
    - Aboriginal cultural heritage assessment;
    - traffic and transport assessment;
    - surface water investigation;
    - soil and geotechnical desktop assessment;
    - engineering design and preliminary site layout design; and
- assessing the project against the relevant objectives and policies of the Clare and Gilbert Valleys Council (consolidated 10 November 2016).

2 Government strategic context

A number of State and Local Government strategic plans and policy documents are of relevance in providing context and justification for the project. These are summarised below.

2.1 State Government strategies

2.1.1 Our Energy Plan, 2017

The South Australian State Government released the *Our Energy Plan* in 2017 to provide the State with greater local control of energy security by generating capacity, greater competition, increased public ownership of assets, more renewable energy with battery storage, more gas supplies and more job opportunities.

Of relevance to the project is the Plan's new energy security target to increase South Australia's energy self reliance by requiring more locally generated, cleaner, secure energy to be used in South Australia. The goal of the target is to stimulate new investment in cleaner energy to increase competition, put downward pressure on prices and provide more energy system reliability.

The project will use the latest solar energy generation technology to maximise the generation of clean energy that will be connected into the South Australian power grid and enhance local energy-system security for the Clare and Gilbert Valleys region. Specifically, the solar panels will utilise a horizontal, single-axis tracking system to maximise renewable energy generation of 100 MW of electricity that could power up to 60,000 South Australian homes.

2.1.2 South Australia's Strategic Plan, 2011

South Australia's Strategic Plan (2011) is the key planning document of the South Australian Government. It sets the strategic direction for the State across a wide range of social, economic and environmental areas.

For the purpose of the project, the Plan provides strategic context through the identification of the goal and targets with those of the greatest relevance to the project identified in Table 1.1 below.

Table 2.1 Relevant South Australian Strategic Plan targets and project contribution

Goal	Target	Project contribution
Ensure South Australia has a sustainable population	Target 46: Regional population levels Increase regional populations, outside of Greater Adelaide, by 20,000 to 320,000 or more by 2020	The project would generate short and long term employment opportunities thus helping maintain and stimulate population growth in the region
Provide all South Australians with job opportunities	Target 47: Jobs Increase employment by 2% each year from 2010 to 2016	The project is estimated to provide up to 5 full-time equivalents (FTE) employment positions during operations and 200 jobs during construction to the regional economy

Table 2.1 Relevant South Australian Strategic Plan targets and project contribution

Goal	Target	Project contribution
We reduce our greenhouse gas emissions	Target 59: Greenhouse gas emissions reduction Achieve the Kyoto target by limiting the State's greenhouse gas emissions to 108% of 1990 levels during 2008-2012, as a first step towards reducing emissions by 60% (to 40% of 1990 levels) by 2050	The project will maximise renewable energy generation of 100 MW of electricity that could power up to 60,000 South Australian homes. Generation of renewable energy will reduce
Ensure South Australia has reliable and sustainable energy sources, where renewable powers our homes, transport and workplaces	Target: 64 Renewable energy Support the development of renewable energy so that it comprises 33% of the State's electricity production by 2020	The project would maximise the use of renewable by connecting clean solar energy into South Australia's grid and enhance local energy-system security

2.1.3 Mid North Region Plan, 2011

The Mid North Region Plan (2011) is a regional volume of the South Australian Planning Strategy and provides strategic context and specifically directs land use and development, provision of services and infrastructure while setting out policies to manage changes in population and climate.

The Clare Valley region is dominated by a diverse and rich landscape that is internationally recognised for its quality wines and primary produce which has attracted steady population growth.

The following key issues are identified as critical to the region's future:

- Environment – scenic landscapes
  - retaining the significant landscapes of the Clare wine region when planning and designing development;
  - avoid development within significant landscapes that can be viewed from tourist routes, walking trails, unless the development requires such as location in which case the scale, height, design and siting must:
    - protect views;
    - minimise the alteration of natural landforms;
    - be visually compatible with the character of the surrounding area; and
    - restore and enhance visual quality in degraded areas where possible.
  - avoid adverse impacts of development on landscapes through site selection and design that reduces the height or bulk of structures.

The project is located 3.5 km from Minarto township with the majority of the infrastructure components obscured from view by existing and proposed vegetation, topography and distance which effectively screen the solar farm from the view of the general public and the majority of adjacent landholders.

- Agriculture and horticulture

  - prevent loss of productive agricultural land and potential conflict with incompatible land uses.

  The project will lead to a minor reduction in agricultural production, but the benefits of the production of clean energy outweigh the loss of this small amount of land, while the desired character of the Primary Production Zone within the Clare and Gilbert Valleys Council Development Plan in which the project site is located recognises renewable energy facilities as forming an integral component of the area.

  Given careful consideration of infrastructure siting and design the project, it is considered to form a compatible land use. The installation of the solar panels will occupy approximately 3 ha and would not remove a significant area of agricultural land from the regional area, while the site layout presents the opportunity for livestock grazing between solar panel rows site conditions.

- Renewable energy

  - increasing renewable and low emission energy generation; and

  - support the renewable energy in appropriate locations.

The project will use the latest clean energy technology to generate renewable solar electricity that supports the State Government's objective to meet the climate change challenge and reduces the State's reliance on carbon-based energy supply.

It should be noted that the Mid North Region Plan is currently under review but its strategic directions, as applicable to the project and project site, is unlikely to change.

3 Nature of development

3.1 Development application

The approval process under Section 49 (Crown Development) of the South Australia *Development Act 1993* for the project with the Clare and Gilbert Valleys Council is outlined in Table 3.1.

Table 3.1 Approval process

Relevant authority	State Commission Assessment Panel
Relevant development plan	Clare and Gilbert Valleys Council Development Plan (consolidated 10 November 2016)
Zone	Primary Production Zone
Nature of development	Proposed 100 MW Chaff Mill Solar Farm with infrastructure components and ancillary development as outlined in Section 1.3

3.2 Site selection

The project site was selected based upon the following key considerations:

- solar profile and terrain of land;
- proximity and connection to existing electricity transmission network;
- infrastructure footprint;
- land availability and accessibility;
- proximity to sensitive receptors;
- minimising visual impact;
- minimising environmental impacts; and
- protecting cultural heritage.

A Multi Criteria Analysis (MCA) was undertaken during the project feasibility phase to identify the preferred site. The MCA process included an analysis across engineering, economics, environmental and cultural heritage indicators of the options. Constructability and the capacity of the solar farm to meet the operational efficiencies required for the project also shaped the choice of the project site.

The outcome of the MCA process supports the proposed siting and location of all project infrastructure.

3.3 Specialist technical assessments

This planning and land use assessment has been informed taking into consideration the findings and recommendations of a number of specialist technical assessments, including:

- landscape character and visual impact – Hemisphere Design concluded that the project would not significantly alter or impact amenity values or the landscape character of the area;
- glare – Environment Ethos found no glare potential was identified for the surrounding rural and residential dwellings, major or minor roads. The exception was Merildin Road adjoining the project site's south-eastern boundary that could be mitigated by vegetation screen planting;
- ecology (flora and fauna) – EBS Ecology determined the significance of vegetation communities, species and habitat value within the project site to be low. Notwithstanding this, recommendations to minimise impacts forms a key design parameter for the future placement of solar panels and ancillary infrastructure;
- Aboriginal cultural heritage – IHS confirmed that no Aboriginal cultural heritage sites are located within or immediately adjacent the project site;
- traffic and transport – WSP determined that potential construction and operational impacts of traffic could be managed by minor upgrades to the existing local road network to accommodate vehicle types and volumes;
- geotechnical – WSP confirmed the project site to be geotechnically stable with further geotechnical investigations recommended to determine the subsurface soil profile during detailed engineering design (eg bearing capacity, settlement); and
- surface water management – WSP confirmed that surface water flows associated with the Wakefield River and Broughton River catchments (within which the project site resides) and Wookie Creek (that traverses the southern portion of the project site) do not present an unacceptable flood risk with potential impacts to be managed through best practice design and construction (ie Sediment Erosion Drainage Management Plan, Construction Environment Management Plan).

4 Planning and land use assessment

This chapter provides an assessment of the project against the relevant provisions of Clare and Gilbert Valleys Council Development Plan (consolidated 10 November 2016).

4.1 Desired Character

The project resides within the Primary Production Zone of the Clare and Gilbert Valleys Council Development Plan.

The desired character of the zone promotes a wide range of farming practices, including cropping and grazing activities on large rural land holdings and viticulture on small to medium sized allotment. The zone is of significant asset to the district and comprises some of the region's most productive rural land which is capable of supporting a wide range of agriculture.

The landscape to the east of the Clare Valley contrasts with the surrounding district with predominantly open, sparsely vegetated, grazing land, while the old homesteads, small settlements and churches reflect the historical development of the district. In particular the small settlement of Mintaro, was established to service the Burra to Port Wakefield bullock trail and the slate quarry, and has retained much of its nineteenth century character.

The climate, soil and landform characteristics of the zone favour the continuance of agricultural production and livestock grazing. Significant tracts of native vegetation and areas of bushland are scattered throughout the district and along the road reserves which form important natural features that are expected to be protected as they contribute to the character and attractiveness of the rural landscape.

Whilst solar farms are not specifically identified, renewable energy facilities and wind farms in particular are envisaged within and constitute a component of the zone's desired character. The zone provisions recognise the need for such forms of development to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence it is recognised that wind farm infrastructure may need to be:

- located in visually prominent locations;
- visible from scenic routes and valuable scenic and environmental areas; and
- located closer to roads than envisaged by generic setback policy.

Subject to implementation of management techniques set out by the council wide policy regarding renewable energy facilities, visual impacts of such forms of development are interpreted to be acceptable in pursuit of benefits derived from increased generation of renewable energy.

The development of solar farms and their ancillary infrastructure is neither listed as complying nor non-complying within the relevant Development Plan zone, and therefore the project must be assessed on its merits against the relevant objectives and principles of development control.

The following planning analysis provided in Tables 4.1 and 4.2 assesses the project against the relevant planning provisions.

Table 4.1 Council wide – relevant policy provisions

Council Wide	Comment
Hazard Objectives 1, 3 & 4 PDCs 2, 3, 4, 6, 7, 8	The project is situated within a 'general bushfire risk area' with all infrastructure siting and access to be designed in accordance with the provisions of the *'Minister's Code: Undertaking development in Bushfire Protection Area'.* With the exception of bushfire risk, the project site is not located within an area identified as being susceptible to other natural hazards, such as flooding, contamination, acid sulphate soils or landslips. Construction and operation of the solar farm shall be designed to ensure appropriate environmental management controls are implemented, such as a soil and erosion management, to ensure earthworks cut and fill minimise potential impacts to Wookie Creek and do not impede the ephemeral flows and water quality of this watercourse. All cut and fill associated with site earthworks will also ensure a geotechnically stable development site is established.
Infrastructure Objectives 1, 2 & 3 PDCs 1, 10, 11& 13	As previously stated, the outcome of specialist studies – and the MCA process – supports the proposed siting and location of all project infrastructure to ensure that it is able to minimise potential visual and environmental impacts. The project is located some 3.5 km from Minarto township (being a State Heritage Area) with the majority of the infrastructure components obscured from view by virtue of existing and proposed vegetation, topography and distance which effectively screen the solar farm from the view of the general public and adjacent landholders, except of the immediately adjacent property to the south-east. In addition, all access roads servicing the project site are existing with only minor upgrades (eg temporary earthworks and fill material to accommodate heavy vehicle turning paths) to accommodate project design traffic with all road works to minimise disturbance to existing native vegetation and biodiversity as far as practicable.
Interface Between Land Uses Objectives 1, 2 & 3 PDCs 1, 2, 7, 8 & 14	Renewable energy facilities are envisaged and encouraged within the Clare region, subject to compliance with prescribed siting, design and construction management requirements that can all be complied with. The project is sited more than 3.5 km away from Minarto township and will not impact on the heritage significance of the township, while existing native vegetation, topography, distance will effectively screen the solar farm from the view of the general public and adjacent landholders. The project will not detract from primary production in the area and forms a compatible land use given: • the project site's location is confined to a low density farming community; • the installation of solar panels will not impact climatic conditions in the region; • the surrounding area hosts existing renewable energy facilities to the south-east (Waterloo Wind Farm); and • impacts to sensitive receptors is able to be mitigated. It is considered that the project has been adequately informed by the completion of specialist technical assessments, comprising visual amenity, glare, ecology (flora and fauna), Aboriginal cultural heritage, traffic and surface water to assess potential impacts and propose suitable mitigation measures (where required). It is considered that the project will not detrimentally affect the amenity of the locality, whilst impacts on other land uses is minimal given the location of the project infrastructure away from sensitive receptors and the Mintaro State Heritage Area.

Table 4.1 Council wide – relevant policy provisions

Council Wide	Comment
Natural Resources Objectives 1, 4, 6, 8, 10, 11 & 13 PDCs 1, 2, 3, 7, 8, 9, 10, 12, 13, 17, 26, 27, 31, 32, 36, 37, 38 & 39	The project is located in an area where natural solar energy will be able to be effectively and efficiently harnessed, while its location within a low density rural area ensures the development is able to be appropriately separated from residences and the Mintaro State Heritage Area. The project has been purposely sited and designed to afford as much protection as possible to the region's natural resources. There will be some disturbance to the natural landform across the project site through construction of the solar farm and ancillary infrastructure, however these will be purposefully designed and sited to avoid areas of native vegetation (as far as practicable), whilst balancing the volume of earthworks (ie cut and fill) on-site. The site will be returned to its original form following decommissioning of the project. EBS Ecology assessed the potential ecological impacts the project may have on terrestrial flora and fauna. This assessment involved both desktop and field surveys with the level of significance of the vegetation communities determined to be low. Notwithstanding this the opportunity to avoid and or minimise impacts to remnant native vegetation has formed a key parameter adopted in the infrastructure siting and design to protect and maintain the biodiversity value of the area. All earthworks and associated vegetation clearance within the project site will be undertaken so as not to cause or exacerbate erosion or sediment, decrease soil stability or cause any deterioration in the quality of surface water runoff that may potentially impact Wookie Creek.
Renewable Energy Facilities Objectives 1, 2 & 3 PDCs 1, 2, 3 & 4	The policy provisions actively promote renewable energy facilities (and associated infrastructure) where natural resources can be harnessed for the efficient generation of electricity that will benefit the community and State by connecting into South Australia's power grid. Whilst not specifically referencing solar farms, the policy provisions provide key siting and design considerations which are able to be satisfied as follows: • infrastructure to be sited and designed to blend with the natural features of the landscape; • protect areas of scenic or conservation significance from undue damage; • cause minimal damage to the natural landform; and • screen and orientate infrastructure away from public view, tourist and scenic routes. The project is considered to present a desired land use within the zone and its locality. Careful consideration has demonstrated that impacts associated with visual amenity, glare, noise, ecology (flora and fauna), Aboriginal cultural heritage, traffic and engineering design (ie geotechnical, surface water) are able to be minimised. In particular, the project's photovoltaic panels and tracking system will use quality products and best practice design to ensure impacts associated with glare will be eliminated, while vegetative planting will ensure potential impacts to the nearest sensitive receptor to the east can be appropriately minimised. The project promotes the generation and use of renewable energy for the benefit of the environment, local and regional communities and the State more generally, whilst its location has been sited to minimise impacts on the natural environment, other land uses in the locality, transport systems and natural resources.

Table 4.1 Council wide – relevant policy provisions

Council Wide	Comment
Siting and Visibility Objective 1 & 2 PDC 1, 4, 5 & 8	The project site has been chosen due to it providing ideal conditions and transmission line connection to maximise the efficiency and power generation of the solar farm. Hemisphere Design concluded that from a visual amenity perspective the introduction of the solar farm: • does not change the mainly pastoral nature of the locality and wider contextual landscape; • does not it impact on any significant viewpoints within the contextual landscape; and • will not significantly alter the nature and visual qualities of the Expansive Eastern Plains Character Unit. Hemisphere Design also stated that in their opinion *"the solar farm will introduce a new infrastructure element of an acceptable design standard that will evoke curiosity, become an 'incidental' infrastructure feature of merit and a best practice example of progressive renewable energy delivery"*. As previously stated, the siting of the project infrastructure has been designed to minimise visual impacts and effectively screen the development from the view of the general public and adjacent landholders by virtue of established native vegetation, topography, distance and proposed vegetative planting. The project is not considered to adversely impact on the natural or rural character of the locality.

Table 4.2 Primary Production Zone – policy provisions

Primary Production Zone	Comment
Land Use Objectives 1, 2 & 3 PDCs 1 & 3	Renewable energy facilities are envisaged within and form part of the desired character of the zone. Specifically, the policy provisions recognise that such forms of development (particularly wind farms) require siting of infrastructure in visually prominent locations to effectively harness renewable energy sources. The zone envisages sustainable primary production with the solar farm not affecting agricultural efficiency within the surrounding area or not significantly impacting upon other development activities anticipated within the zone. The siting and configuration of the proposed solar panels will also not alter the size and configuration of the existing allotments. A number of specialist technical assessments have been undertaken which demonstrate that the project infrastructure can be designed and sited to minimise potential environmental impacts with specific mitigation measure proposed to address visual amenity and glare to the nearest sensitive receptor to the east through vegetative planting and screening. By virtue of established native vegetation, topography and distance the solar farm will not adversely impact the general public, surrounding landholders or the Mintaro State Heritage Area. The project is considered a compatible land use and is appropriate within the zone. A Construction Environmental Management Plan (CEMP) will be prepared for the project following the granting of development consent to outline the environmental management systems and procedures to be implemented during construction to ensure activities comply with relevant statutory requirements and provide adequate protection for the environment. The purpose of the CEMP is to provide guidance to the contractor(s) and will outline the need for a number of management plans to be developed for specific areas of potential impacts during construction, such as dust and air quality, water quality, traffic management, erosion control and stormwater management and weed and pest management.
Form and character Objectives 5, 6 & 7 PDCs 9 & 11	The desired character of the Primary Production Zone recognises renewable energy facilities as forming an integral component of the area within which the project site is located. The zone comprises agricultural areas that underpin the region's economy, primarily consisting of general farming, grazing and viticulture with associated rural based industry, services and facilities. It is intended that the dominant rural character of the zone won't be adversely affected, while as stated by Hemisphere Design *"the solar farm will introduce a new infrastructure element of an acceptable design standard that will evoke curiosity, become an 'incidental' infrastructure feature of merit and a best practice example of progressive renewable energy delivery".*
Heritage PDC 12	The proposed siting and layout of the project will not impact the Mintaro State Heritage Area or heritage significance of the settlement. Hemisphere Design concluded that the visual amenity impacts of the development would be negligible given: • the sense of place and place attachment values of Mintaro township will not be detrimentally affected; • the nature and visual qualities of the Expansive Eastern Plains Character Unit will not be significantly altered; • the introduction of the project does not change the mainly pastoral nature of the locality and wider contextual landscape; • the project does not impact on any significant viewpoints within the contextual landscape; • the project is proposed to be sited and designed to blend with the natural features of the landscape and to cause minimal damage to the natural landform; and • the likely visual impact on the identified sensitive receptor can be managed through visual mitigation introduced through vegetative screening. The project will therefore not detract from the form and character of the locality.

4.2 Assessment against key policy provisions

The following section provides further assessment against key policy provisions in the Clare and Gilbert Valleys Council Development Plan given it does not specifically reference solar farms per-se, but instead references renewable energy facilities and wind farms. In this regard, planning consideration has been given to:

- the capacity of the project to generate renewable energy;
- the siting and design of the project within the locality; and
- construction and operation of the project.

4.2.1 Capacity

The project will capture and generate 100 MW of clean energy to power up to 60,000 South Australian homes.

The 100 MW capacity will be achieved through the installation of photovoltaic solar panel that have been modelled by the proponent to maximise the electricity potential of the locality. The project site provides an ideal landscape and solar conditions with its gentle undulating topography and east-west allotment orientations which is predominantly clear of remnant native vegetation to maximise solar tracking as the sun moves across the sky during the day and throughout the year. These conditions will ensure that the solar panels are able to effectively and efficiency generate renewable energy for the South Australian power grid.

The proposed site layout and design will ensure the project maximises and harnesses the available natural solar resource for electricity generation. This outcome is a key objective of the renewable energy facilities provisions of the Clare and Gilbert Valleys Council Development Plan.

The specialist technical assessments undertaken to support the project have shown that the solar farm will not unduly impact the environment (ie flora and fauna), heritage (ie historic and Aboriginal site, places or objects) or people (ie visual amenity, gare, emissions, geotechnical, surface water, traffic and transport), while appropriate mitigation measures have been proposed to minimise impacts (where required).

The project site's proximity to ElectraNet's 132 KV transmission line and the South Australian grid provides an opportunity to connect renewable energy generated from the project directly into the transmission network for the State's domestic and commercial use.

The project is consistent with the relevant planning policy provisions to ensure renewable energy facilities maximise and harness the available natural solar resource for electricity generation.

4.2.2 Siting and design

The project is proposed to be located more than 3.5 km north-east of Mintaro in the Clare Valley.

Whilst Mintaro township is identified as a State Heritage Area, Hemisphere Design determined that the landscape character of the area is of a low scenic quality, while the sense of place and place attachment value would not be detrimentally affected by the project. This assessment also concluded that the visual amenity impacts of the project would be negligible given:

- the sense of place and place attachment values of Mintaro township will not be detrimentally affected;
- the nature and visual qualities of the Expansive Eastern Plains Character Unit will not be significantly altered (refer Figure 4.1);
- the introduction of the project does not change the mainly pastoral nature of the locality and wider contextual landscape, nor does it impact on any significant viewpoints within the contextual landscape;
- the project is proposed to be sited and designed to blend with the natural features of the landscape and to cause minimal damage to the natural landform; and
- the likely visual impact on the identified sensitive receptor can be managed through visual mitigation introduced through vegetative screening.

Environmental Ethos's glare assessment similarly concluded that no glare potential was identified for surrounding residences, Copper Ore Road and other minor roads for road users (refer Figure 4.2). The exception was a potential glare hazard for the nearest sensitive receptor to the east and travellers on Merildin Road with vegetative planting recommended to mitigate impacts.

The project has also assessed potential environmental impacts associated with ecology (flora and fauna), non-Aboriginal and Aboriginal cultural heritage, traffic and engineering design (ie geotechnical, surface water). All impacts are able to be avoided or managed through siting and best practice design and engineering.

By virtue of established native vegetation, topography and distance the project will not adversely impact the general public, adjacent landholders (with the exception of receptors that will be appropriately mitigated through vegetative planting) or the Mintaro State Heritage Area.

The project is considered a compatible land use and is appropriate within the locality.

Figure 4.1 Hemisphere Design visual assessment

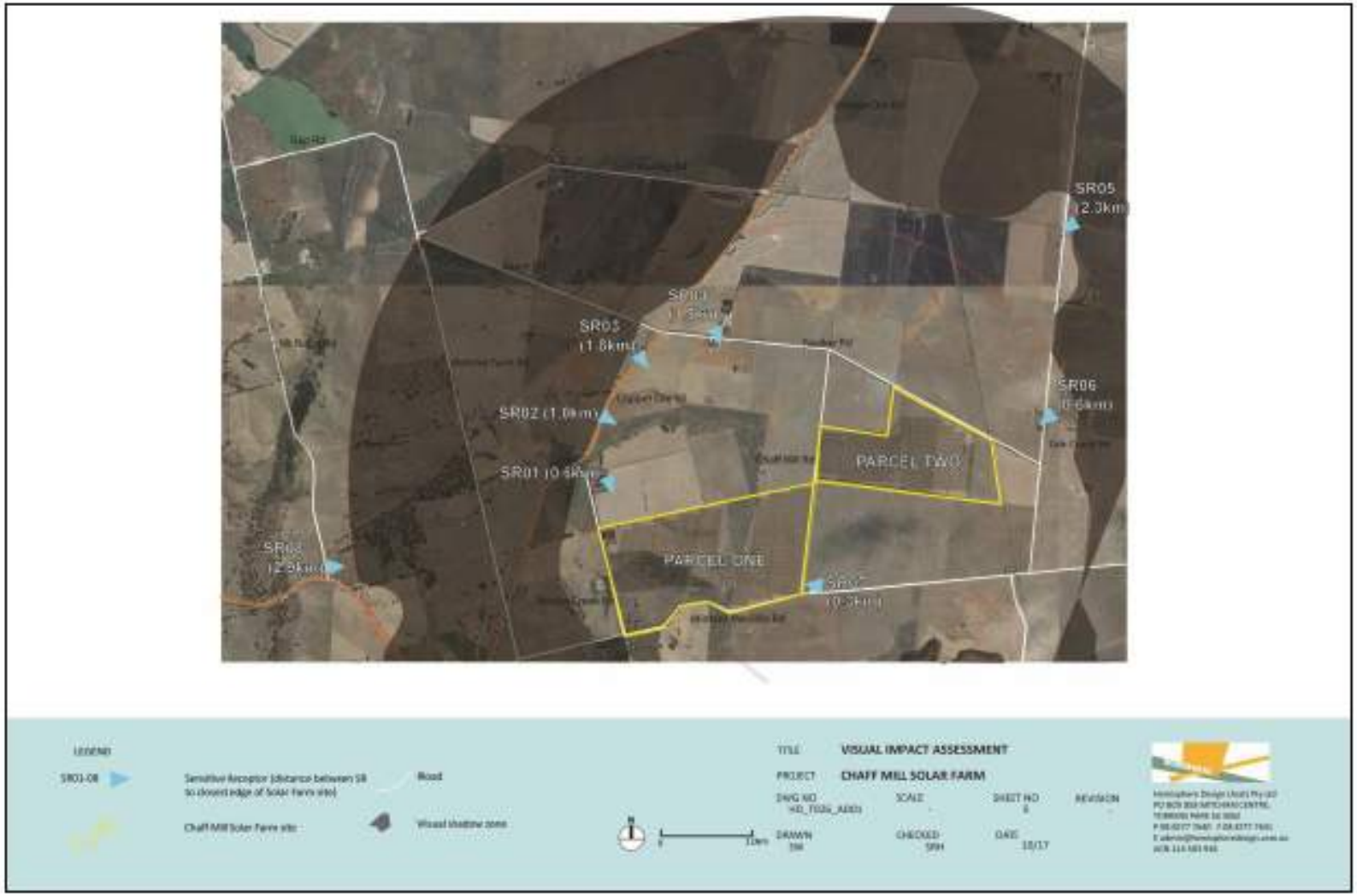
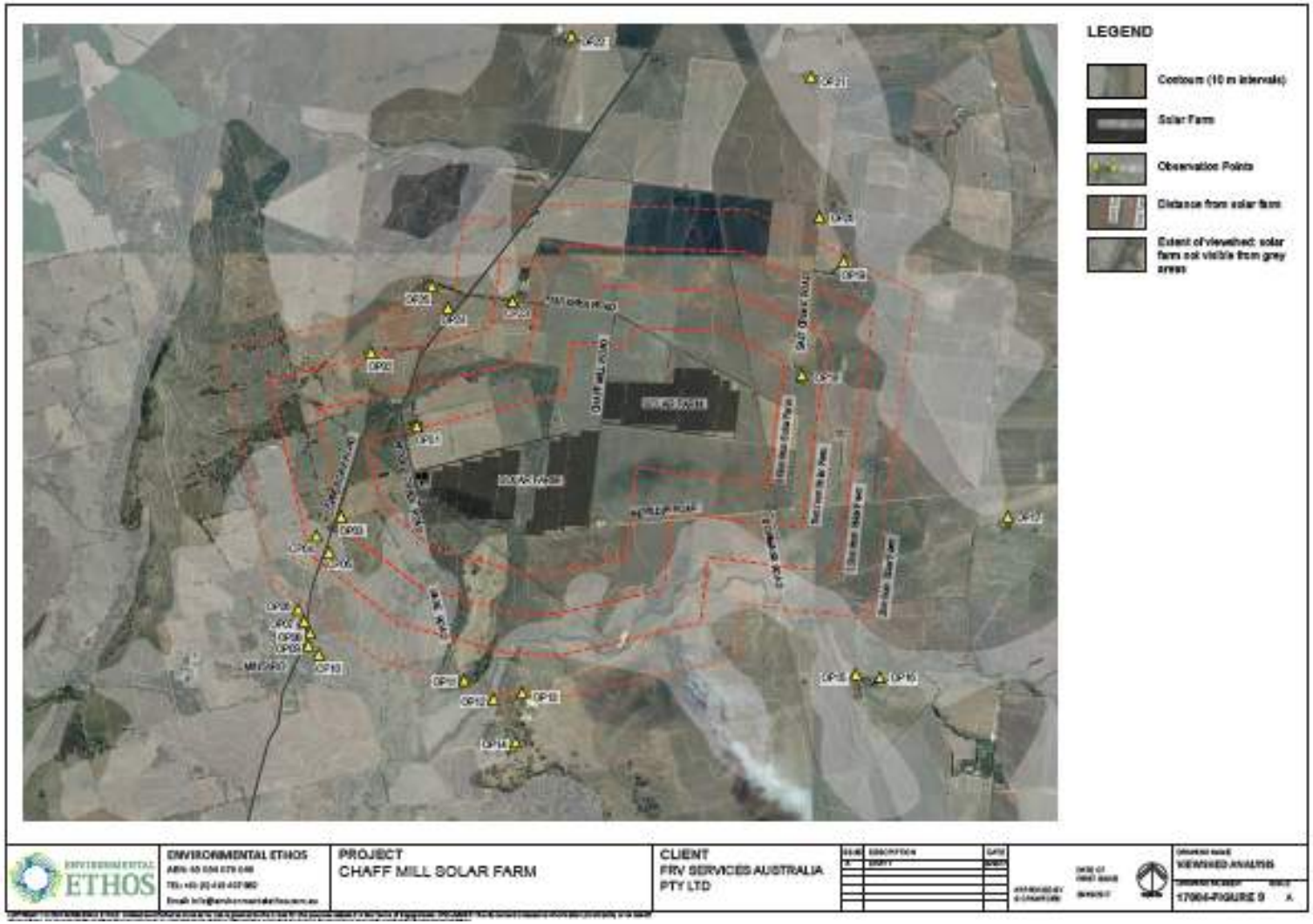


Figure 4.2 Environmental Ethos glare assessment



4.2.3 Construction and operation

A CEMP will be prepared for the project following the granting of development consent to outline the environmental management systems and procedures to be implemented during construction to ensure activities comply with relevant statutory requirements and provide adequate protection for the environment.

The purpose of the CEMP will provide guidance to the contractor(s) and will outline the need for a number of management plans to be developed for specific areas of potential impacts during construction, such as dust and air quality, water quality, traffic management, erosion control and stormwater management and weed and pest management.

Key environmental considerations and management measures to be implemented during construction will include (but are not limited to):

- **vegetation clearance** – vegetation removal to be kept to a minimum; no vegetation (native and non-native) disturbance or clearance to occur without approval; the stockpiling of vegetation/topsoil profiles for rehabilitation works;

- **Aboriginal cultural heritage** – no cultural sites, objects or places were identified within or adjacent to the project site. The CEMP will include a stop work procedures in the event that an aboriginal artefact is encountered during construction;

- **noise and vibration** – construction hours Monday to Saturday (ie 7.00 am to 7.00 pm), unless out of hours works approved; plant, vehicles and construction equipment would be properly maintained to reduce the potential of excessive noise emissions and comply with regulatory requirements; work generating high vibration levels would be scheduled during less sensitive time periods;

- **traffic and transport** – preparation of a Traffic Management Plan to address traffic and safety arrangements during construction; developing routes for the delivery of materials and parking of vehicles; vehicle and machinery movements during construction to be restricted to designated areas; and traffic movements to be monitored if any community complaints/concerns are received;

- **air quality** – vegetation clearance and disturbance areas to be stabilised as soon as possible to prevent or minimise wind-blown dust; dust generating activities (particularly clearing and excavating) to be avoided or minimised during dry and windy conditions; water to be applied to aggregate storage piles, internal unsealed access roadways and work areas with application rates reflective of weather conditions and the intensity of construction operations; vehicles transporting material to and from the site to be covered to prevent wind-blown dust emissions and spillages;

- **water quality** – preparation of a Sediment, Erosion and Drainage Management Plan to mitigate erosion and stormwater management issues during construction, particularly in and around Wookie Creek;

- **bushfire** – no construction work of any kind to be conducted on days rated as Catastrophic; for days rated as Extreme or Severe, consideration to be given to suspending activities or changing plans – work hours, work location, alternative access routes; establishment of a site evacuation plan which includes muster points, communication schedule, access and escape routes and emergency services notification forms to be prepared; all equipment bought to site to be inspected to ensure no faults which may pose an ignition source;

- **waste** – all waste requiring offsite disposal will be sent to appropriately licensed facilities; all waste would be recycled/disposed at an appropriately licensed facility; and
- **stakeholders** – a mechanism for receiving and responding to any complaints to be put in place for the duration of the construction phase.

5 Conclusion

The proposed 100 MW Chaff Mill Solar Farm presents a significant opportunity to enhance, diversify and achieve the region and State's renewable energy targets and regional economic development objectives.

The nature of development is recognised and provided for in the Clare and Gilbert Valleys Council Development Plan. Renewable energy facilities policy provisions are set out in the both the Council Wide and Primary Production Zone with such development considered a desired land use and activity within the project site.

This Development Application is seeking development approval from the State Commission Assessment Panel (as the relevant planning authority) for the construction and operation of the project, comprising:

- photovoltaic solar panels, tracking system, inverter/transformer stations;
- 50 MW/100 MWh BESS Area;
- MV Delivery Station;
- battery containers (up to 54);
- substation and tee-connection to existing 132 kV transmission line within the project site;
- internal underground and/or above ground (overhead) electrical connections and cabling;
- external electrical connections and cabling;
- modular site office for FRV personnel;
- internal access roads and on-site parking for operational staff (including one disabled parking space);
- new vehicular access onto Wookie Road; and
- security fencing (up to 2.1 m) around the perimeter of the project site.

The investigations and analysis supporting this planning and land use assessment have been underpinned by a number of specialist technical reports and concept designs, including visual amenity, glare, noise, ecology (flora and fauna), Aboriginal cultural heritage, traffic and engineering (ie geotechnical, surface water) to assess potential impacts and recommend mitigation measures (where required). In addition, a CEMP will be prepared by the proponent to provide guidance to contractor(s) to address environmental management during construction.

The project is considered appropriate for the project site and is not deemed at variance with the relevant Development Plan provisions and will provide reliable infrastructure to facilitate economic growth for the region, consistent with South Australia's strategic policies.

The purposeful location of the project away from sensitive receptors and the Mintaro State Heritage Area effectively minimises the potential impacts on residents of, and visitors, to the region, while proposed vegetative planting should mitigate visual impact and glare to the nearest sensitive receptor and road users on Merildin Road.

In summary, the project, when considered on its merits, warrants the granting of development consent.

References

Clare and Gilbert Valleys Development Plan (consolidated 10 November 2016)

IHS (2017), Aboriginal Cultural Heritage Assessment for Chaff Mill Solar Farm

EBS Ecology (2017), Ecological Assessment for Chaff Mill Solar Farm

Environmental Ethos (2017), Glare Impact Assessment for Chaff Mill Solar Farm

Hemisphere Design (2017), Landscape Character and Visual Assessment for Chaff Mill Solar Farm

WSP (2017), Geotechnical Desktop Study for Chaff Mill Solar Farm

WSP (2017), Engineering (Surface Water) Desktop Study for Chaff Mill Solar Farm

WSP (2017), Traffic and Transport Assessment for Chaff Mill Wind Farm

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APPENDIX G

FLORA AND FAUNA ASSESSMENT

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Chaff Mill Solar Farm

Ecological Assessment

Chaff Mill Solar Farm Ecological Assessment

11 January 2018

Version 3

Prepared by EBS Ecology for WSP Australia Pty Limited

Document Control					
Revision No.	Date issued	Authors	Reviewed by	Date Reviewed	Revision type
1	13/11/2017	EBS	EBS	11/11/2017	Draft
2	23/11/2017	EBS			Draft
3	11/01/2017	EBS			Final

Distribution of Copies			
Revision No.	Date issued	Media	Issued to
1	13/11/2017	Electronic	Bronte Nixon, WSP
2	23/11/2017	Electronic	Bronte Nixon, WSP
3	23/11/2017	Electronic	Bronte Nixon, WSP

EBS Ecology Project Number: E70315

CITATION: EBS Ecology (2018) Chaff Mill Solar Farm Ecological Assessment. Report to WSP Australia Pty Limited. EBS Ecology, Adelaide.

Cover photograph: Remnant *Eucalyptus leucoxylon* ssp. *pruinosa* in the western block.

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ABBREVIATION OF TERMS

BDBSA	Biological Databases of South Australia
CEMP	Construction Environmental Management Plan
DEWNR	Department of Environment, Water and Natural Resources (SA Government)
DOE	Department of the Environment (Australian Government)
DOEE	Department of the Environment and Energy (previously DOE) (Australian Government)
DPTI	Department of Planning, Transport and Infrastructure (SA Government)
EBS	EBS Ecology
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FRWL	Flinders Ranges Worm-lizard (*Aprasia pseudopulchella*)
FRV	FRV Services Australia Pty Ltd
IBRA	Interim Biogeographical Regionalisation of Australia
MNES	Matters of National Environmental Significance
NPW Act	*National Parks and Wildlife Act 1972*
NRM	Natural Resources Management
NRM Act	*Natural Resources Management Act 2004*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
PBTL	Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*)
SA	South Australia
SEB	Significant Environmental Benefit
spp.	Species (plural)
ssp.	Subspecies
TEC	Threatened Ecological Community
WSP	WSP Australia Pty Limited
+/-	Refers to flora species being present within a vegetation association but not in all locations surveyed.

EXECUTIVE SUMMARY

A desktop and field assessment were undertaken to identify the ecological constraints for the proposed Chaff Mill Solar Farm project area, northeast of Mintaro, in the Clare Valley of South Australia. The project area, approximately 380 ha, was split into an “eastern block” and a “western block”.

A vegetation survey was undertaken across the project area and bordering roadsides, using the 2017 Bushland Assessment Manual and Scattered Tree Assessment Manual, in line with the Native Vegetation Council (NVC) requirements. This methodology enables the calculation of a Significant Environment Benefit (SEB) area and a value for payment into the Native Vegetation Fund, once the native vegetation clearance requirement for the project is known. Additionally, a roaming style survey approach was adopted, opportunistically recording flora and fauna species as they were observed within the project area.

Native vegetation clearance requirements for the project will either fall under Native Vegetation Regulation 12(34) – Infrastructure, or 12(27) - Major projects. Both follow Approval Pathway 4 - Risk Assessment, requiring NVC approval and a SEB offset.

The project area was largely devoid of native vegetation and had few ecological constraints. No threatened flora species or threatened vegetation communities were recorded. A large group of remnant *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) occurred on the western side of the western block. These large trees have high conservation significance, with many containing hollows providing important fauna habitat. An ephemeral creek line runs through the western block; from a vegetation and habitat perspective this creek line is highly degraded, but provides habitat for birds and water-dependent fauna when water is present. A few isolated amenity trees were present within the paddocks. The roadsides were lined with a mix of native remnants and native amenity plantings. All roadside and rail corridors were very weedy with no native understorey species present.

Six vegetation associations were recorded:

- *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland
- *Allocasuarina verticillata* (Drooping Sheoak) Woodland
- *Acacia paradoxa* (Kangaroo Thorn) Shrubland
- Mixed Amenity Planting +/- scattered natives
- Exotic Grassland
- Crop.

A scattered tree assessment was undertaken for the large patch of *Eucalyptus leucoxylon* ssp. *pruinosa* within the western block. Many of these trees contained hollows of various sizes and were considered of high biodiversity value. The total tree score ranged from 0.36 to 8.13.

Two Bushland assessments were performed on the perimeter of the western block along Merildin Road. The condition of the areas described as *Eucalyptus leucoxylon* ssp. *pruinosa* Woodland was poor to moderate. The condition of the areas described as *Allocasuarina verticillata* (Drooping Sheoak) was poor.

Fifty-four flora species were recorded during the field survey (32 native, 22 exotic). None of these species had a conservation rating. Four of the exotic species were declared weeds.

Two listed flora species identified from database searches were assessed as possibly occurring, based on the proximity to known records and the species' relative inconspicuousness (and therefore potential for non-detection given the broad nature of the survey):

- *Dodonaea procumbens* (Trailing Hop-bush) – nationally vulnerable
- *Rytidosperma tenuius* (Short-awn Wallaby-grass) – state rare.

Thirty-six fauna species were recorded during the field survey (32 native, four exotic). One rated bird species was recorded: the state rare White-winged Chough (*Corcorax melanorhamphos*). Based on database search results, it is possible that a range of other listed fauna species could utilise the area, such as:

- Flinders Ranges Worm-lizard (*Aprasia pseudopulchella*) – nationally vulnerable
- Brown Toadlet (*Pseudophryne bibronii*) – state rare
- Common Brushtail Possum (*Trichosurus vulpecula*) – stare rare
- Elegant Parrot (*Neophema elegans*) – state rare
- Flame Robin (*Petroica phoenicea*) – state rare
- Painted Buttonquail (*Turnix varius*) – state rare
- Peregrine Falcon (*Falco peregrinus*) – state rare.

The suitability of habitat for the nationally endangered Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*) and nationally vulnerable Flinders Ranges Worm-lizard (*Aprasia pseudopulchella*) was assessed.

It was considered unlikely that Pygmy Blue-tongue Lizard would be present given the soil structure was impacted by cropping and the lack of spider burrows in the non-cropped area. A few spider holes were observed along the roadside in an area of remnant vegetation and were checked with a burrowscope. No Pygmy Blue-tongue Lizards were observed.

The habitat suitability for the Flinders Ranges Worm Lizard is considered low, however given the species' broad distribution across the region, it may possibly be present where suitable habitat characteristics (e.g. surface rock, leaf litter and fallen timber) occur.

Recommendations

Given the low remnancy within the region, all native vegetation is considered important to conserve. Impact where remnant vegetation is present should be avoided (i.e. the western corner of the project area and the roadsides). Impact on the creek line should also be avoided.

An EPBC referral is not considered to be required for the proposed development as no EPBC Act listed flora species or ecological communities were observed, and the only EPBC Act listed fauna species considered as potentially occurring in the area, the Flinders Ranges Worm-lizard and Fork-tailed Swift, will not be significantly impacted by development. The EPBC listed flora species, *Dodonaea procumbens* was conservatively assessed as potentially present for areas that were rapidly assessed; if infrastructure placement avoids native vegetation areas it is unlikely that the species (if present) would be impacted.

Any vegetation clearance that may be required needs approval under the *Native Vegetation Act 1991*. EBS Ecology can calculate the clearance requirements and Significant Environmental Benefit (SEB) offset once the infrastructure design is finalised.

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1 INTRODUCTION

Australian solar development company FRV Services Australia Pty Ltd (FRV) is proposing to develop the Chaff Mill Solar Farm north-east of Mintaro in the Clare Valley, South Australia. The proposed 100MW solar farm would be developed on a 380 hectare site adjacent to the existing Mintaro substation and its 132kV transmission line to Waterloo. The project would deliver clean, zero-emissions electricity via the latest in solar energy generation technology; PV-Polycrystalline modules with a horizontal, single-axis tracking system. The panels, including the mounting structures, would not exceed three metres in height. The solar farm will connect into the existing powerline which runs on the western boundary of the site. The site is well-placed to capture and export renewable solar energy into the national electricity grid.

EBS Ecology was contracted by WSP to undertake an ecological assessment of the proposed Chaff Mill Solar Farm site. The assessment involved desktop research and field survey. The field survey was performed on 24th to 26th September 2017 and included a vegetation survey in line with the Native Vegetation Council (NVC) methodology (Government of South Australia 2017b, 2017c).

This report summarises the data collected from the desktop and field study and provides an overview of:

- the type and condition of vegetation within the project site, including threatened ecological communities, threatened species and declared weeds;
- fauna species present or likely to occur, including targeted surveys for birds;
- the significance of vegetation as wildlife habitat;
- any ecological constraints associated with the project.

1.1 Project area

The proposed Chaff Mill Solar Farm project is located 3.5 kilometres north-east of Mintaro in the Clare Valley, 130 kilometres north of Adelaide. The project area is approximately 380 hectares, comprised of an “eastern” and a “western” block of land (Figure 1). The project area is intersected by Chaff Mill Road and Wookie Creek and is bordered by Wookie Creek Road, Merildin Road, Salt Creek Road and Faulkner Road. The site falls within the District Council of Clare and Gilbert Valleys. The project area is zoned as Primary Production. The existing land use is agricultural, including part grazing and part cropping land.

EBS assessed the vegetation and fauna habitat within the eastern and western land blocks and along the bordering roadsides. In addition, EBS undertook a rapid vegetation survey along Merildin Road and Flagstaff Road, to the east of the project area, to determine potential impacts in the event that the road required widening for vehicle access purposes.

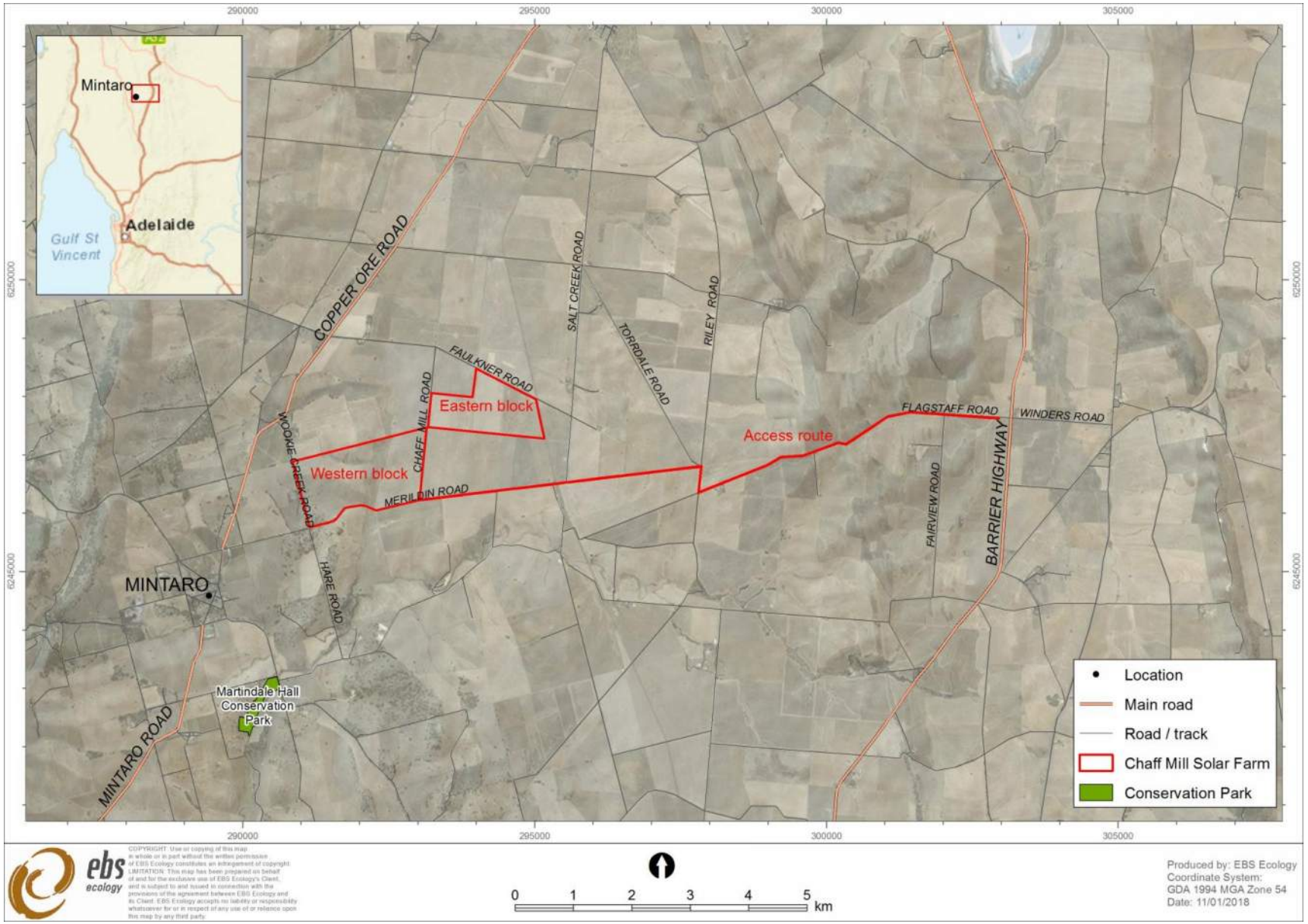


Figure 1. Location map of the Chaff Mill Solar Farm project area

1.1.1 Topography

The topography of the site ranges from approximately 400 to 430 m above sea level. The western block includes low hills with the highest and steepest area on the western side and the lowest area being the Wookie Creek. The eastern block is of gentle undulation.

1.1.2 Climate

The most comprehensive available climate dataset is from Clare, approximately 14 km north-west of the Chaff Mill project area. Both rainfall and temperature follow typical Mediterranean seasonal climate, with cool wet winter months and warm dry summer months (Figure 2). The long-term mean annual rainfall for the area is 633.7 mm, with June through to August typically the wettest months. The data used to create the graph displayed in Figure 2 is provided by the Bureau of Meteorology (Commonwealth of Australia 2017).

The mean annual rainfall (1976 – 2005) is mapped for the project area as being 537 mm (Commonwealth of Australia 2017).

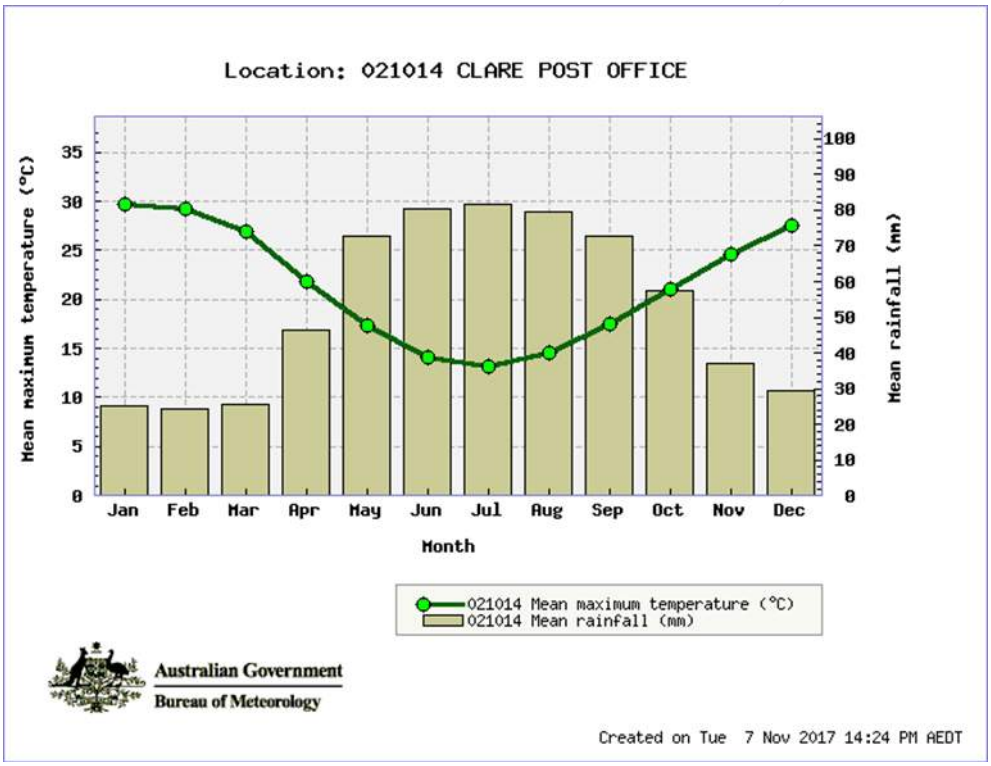


Figure 2. Long term means for temperature and rainfall for Clare Post Office (1926-1994).

1.2 Previous surveys

This is the first ecological survey specifically undertaken for the proposed Chaff Mill Solar Farm. To EBS' knowledge, no previous ecological survey has been undertaken within the project area.

DEWNR has undertaken flora and fauna surveys at selected bushland sites within the region as part of the Mid North and Yorke Peninsula Survey (2003), Mid North Survey (1992) and Burra Hills Survey (1994). These surveys form part of the broader Biological Survey of South Australia program, which aims to improve our knowledge of the state's vegetation and vertebrate fauna through systematic survey, assisting our ability to measure ecological change and manage nature conservation into the future. The nearest DEWNR flora survey sites are located in a patch of *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland approximately 1.9 km northwest of the western block (ID10729) and in *Eucalyptus camaldulensis* var. *camaldulensis* Woodland along the river approximately 1.5 km south of the western block (ID10730, 19624). There is also a DEWNR flora site directly north of Flagstaff Road within *Allocasuarina verticillata* (Drooping Sheoak) Low Woodland (APO1901). The nearest DEWNR fauna sites are along the river, approximately 1.6 km south (ID19624), and 3.4 km northwest of the western block (ID19622) (DEWNR 2017b).

Vegetation mapping has previously been undertaken along the rail corridor (2000) on the eastern boundary of the eastern block, as part of the Mid North Transport SA Railway Corridor Survey (Gawler to Burra). The vegetation was described as exotic/native grassland in poor condition. Vegetation mapping was undertaken along Merildin Road (east of Salt Creek Road intersection), Riley Road and Flagstaff Road (2001) as part of the Clare and Gilbert Valley District Council Standard Roadside Survey. The vegetation was described as a mix of mixed grassland, plantation, *Acacia paradoxa* (Kangaroo Thorn) Shrubland and *Allocasuarina verticillata* Woodland (DEWNR 2017b).

Bushland condition monitoring (BCM), as developed by the Nature Conservation Society of SA, has been undertaken in the Northern and Yorke region since 2007. BCM provides a cost effective method to identify, assess and score key environmental indicators of bushland condition. These indicators are benchmarked using available data and provide objective measures of change in the condition of vegetation. The nearest bushland condition monitoring sites are along the river directly south of the eastern block, and approximately 1.25 km south-east of the western block (DEWNR 2017b).

2 COMPLIANCE AND LEGISLATIVE SUMMARY

The following section is a summary of the relevant legislation that applies to this project.

2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the Act as 'matters of national environmental significance'. The nine matters of national environmental significance protected under the Act are:

- World Heritage properties
- National Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development

Any action that has, will have, or is likely to have a significant impact on matters of national environmental significance requires referral under the EPBC Act.

This report is focused on listed threatened species and ecological communities which are recognised as a matter of national environmental significance. Consequently, any action that is likely to have a significant impact on listed threatened species and ecological communities under the EPBC Act must be referred to the Minister and undergo an environmental assessment and approval process.

The EPBC Act Significant Impact Guidelines (DOE 2013) provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance. In terms of nationally threatened species, the guidelines define an action as likely to have a significant impact if there is a real chance or possibility that it will:

- Lead to a long term decrease in the population
- Reduce the area of occupancy of the species
- Fragment an existing population
- Adversely affect critical habitat
- Disrupt breeding cycles
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in the establishment of invasive species that are harmful to the species
- Introduce disease that may cause the species to decline

- Interfere with the recovery of the species.

2.2 Native Vegetation Act 1991

In South Australia, under the *Native Vegetation Act 1991* (NV Act), all clearance of native vegetation requires the approval of the Native Vegetation Council (NVC) unless it is covered by a specific exemption contained within the *Native Vegetation Regulations 2003*.

Native vegetation refers to any naturally occurring local plant species that are indigenous to South Australia, from small ground covers and native grasses to large trees and water plants.

“Clearance", in relation to native vegetation, means:

- the killing or destruction of native vegetation
- the removal of native vegetation
- the severing of branches, limbs, stems or trunks of native vegetation
- the burning of native vegetation
- any other substantial damage to native vegetation including the draining or flooding of land.

Approval must be obtained before performing any activity that could cause substantial damage to native plants. This also applies to dead trees that may provide habitat for animals. These activities include but are not limited to:

- the cutting down, destruction or removal of whole plants
- the removal of branches, limbs, stems or trunks (including brushcutting and woodcutting)
- burning
- poisoning
- slashing of understorey
- drainage and reclamation of wetlands
- grazing by animals (in some circumstances).

Under the NV Act, the NVC considers applications to clear native vegetation under ten principles. Native vegetation should not be cleared if it is significantly at odds with the principles outlined below:

- it contains a high level of diversity of plant species
- it is an important wildlife habitat
- it includes rare, vulnerable or endangered plant species
- the vegetation comprises a plant community that is rare, vulnerable or endangered
- it is a remnant of vegetation in an area which has been extensively cleared
- it is growing in, or association with, a wetland environment
- it contributes to the amenity of the area
- the clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding

- the clearance of vegetation is likely to cause deterioration in the quality of surface or underground water
- after clearance, the land is to be used for a purpose which is unsustainable.

The principles apply in all cases, except where the vegetation has been considered exempt under the *Native Vegetation Regulations 2017* or can be classified as an 'intact stratum'. 'Intact stratum' means that applications will usually be denied when the vegetation has not been seriously degraded by human activity within the last 20 years.

All approved vegetation clearance must also be conditional on achieving a Significant Environmental Benefit (SEB) to offset the clearance. The requirement for a SEB also applies to several of the exemptions. Potential SEB offsets include:

- the establishment and management of a set-aside area to encourage the natural regeneration of native vegetation.
- the protection and management of an established area of native vegetation.
- entering into a Heritage Agreement on land where native vegetation is already established to further preserve or enhance the area in perpetuity.
- a payment to the Native Vegetation Fund (only where the above options are not possible).

The project area is situated within the Clare and Gilbert Valleys Council region which is subject to the *Native Vegetation Act 1991* and *Regulations 2017*. The project is likely to fall under Regulation 12(34) – Infrastructure or 12(27) - Major Projects. The process to undertake clearance and requirements are outlined in Section 7.

2.3 National Parks and Wildlife Act 1972

Vascular plants and vertebrate animals (e.g. mammals, birds, reptiles and amphibians) are protected in South Australia under the threatened species schedules of the *National Parks and Wildlife Act 1972* (NPW Act): Schedule 7 (endangered species), Schedule 8 (vulnerable species) and Schedule 9 (rare species). The criteria used to define threatened species in South Australia are generally based on categories and definitions from the IUCN Red List Categories and Criteria.

The current schedules do not include non-vascular plants, fish, insects, butterflies, spiders, scorpions and other invertebrates, fungi and other life forms which do not have a current legal conservation status in South Australia.

Under the NPW Act, persons must not:

- take a native plant on a reserve, wilderness protection area, wilderness protection zone, land reserved for public purposes, a forest reserve or any other Crown land
- take a native plant of a prescribed species on private land
- take a native plant on private land without the consent of the owner (such plants may also be covered by the *Native Vegetation Act 1991*)
- take a protected animal or the eggs of a protected animal without approval

- keep protected animals unless authorised to do so
- kill a protected animal without approval.

2.4 Natural Resources Management Act 2004

Under the *Natural Resources Management Act 2004* (NRM Act), landholders have a legal responsibility to manage declared pest plants and animals and prevent land and water degradation.

Key components under the Act include the establishment of regional Natural Resource Management (NRM) Boards and development of regional NRM Plans; the ability to control water use through prescription, allocations and restrictions; requirement to control pest plants and animals, and activities that might result in land degradation.

A 'duty of care' is a fundamental component of this Act, i.e. ensuring one's environmental and civil obligation by taking reasonable steps to prevent land and water degradation. Persons can be prosecuted if they are considered negligent in meeting their obligations.

The project area is within the Northern and Yorke Natural Resources Management Board Region.

3 BACKGROUND INFORMATION

3.1 Environmental setting

3.1.1 Interim Biogeographical Regionalisation of Australia (IBRA) zones and remnancy

Interim Biogeographical Regionalisation of Australia (IBRA) is a landscape based approach to classifying the land surface across a range of environmental attributes, which is used to assess and plan for the protection of biodiversity (DEWNR 2011). The survey area is located within the Flinders Lofty Block IBRA bioregion, the Broughton sub-region and the Hansen environmental association (Table 1).

Table 1. IBRA bioregion, subregion, and environmental association environmental landscape summary.

Flinders Lofty Block IBRA bioregion	
Temperate to arid Proterozoic ranges, alluvial fans and plains, and some outcropping volcanics, with the semi-arid to arid north supporting native cypress, black oak (*belah*) and mallee open woodlands, *Eremophila* and *Acacia* shrublands, and bluebush/saltbush chenopod shrublands on shallow, well-drained loams and moderately-deep, well-drained red duplex soils. The increase in rainfall to the south corresponds with an increase in low open woodlands of *Eucalyptus obliqua* and *E. baxteri* on deep lateritic soils, and *E. fasciculosa* and *E. cosmophylla* on shallower or sandy soils.	
Broughton IBRA subregion	
This subregion is characterised by a series of wide undulating intramontane basins with red duplex soils, separated by low but distinct northerly trending strike ridges. In the north the region leads into the Southern Flinders Ranges with no sharply defined landform boundary but a land use boundary marking the northern extremity of wheat cultivation. Due to widespread clearing for farming the only significant remnant of native vegetation is found in the Mt Remarkable area, where an open forest dominated by *Eucalyptus cladocalyx* or by *E. goniocalyx* and *E. leucoxylon* on reddish dense loams remains. Degraded remnants of *E. leucoxylon* and *E. odorata* woodlands can still be found on stony crests and steep slopes.	
Remnant vegetation	Approximately 10% (106330 ha) of the subregion is mapped as remnant native vegetation, of which 3% (3064 ha) is formally conserved
Landform	Hills and valleys; alternating subparallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland
Geology	Dissected lateralised surface in south
Soil	Hard setting loams with red clayey subsoils, Highly calcareous loamy earths, Hard setting loams with mottled yellow clayey subsoil, Coherent sandy soils, Cracking clays
Vegetation	Assumed native vegetation cover
Conservation significance	55 species of threatened fauna, 113 species of threatened flora. 0 wetlands of national significance.
Hansen IBRA environmental association	
Remnant vegetation	Approximately 3% (3738 ha) of the association is mapped as remnant native vegetation, of which 1% (28 ha) is formally conserved
Landform	Gentle foot slopes forming extensive intramontane plains, with occasional narrow strike ridges on metasediments.
Geology	Colluvium, metasediments and alluvium.
Soil	Hard pedal red duplex soils, reddish powdery calcareous loams, brown self-mulching cracking clays and black self-mulching cracking clays.

Vegetation	Low shrubland of samphire.
Conservation significance	24 species of threatened fauna, 43 species of threatened flora. 0 wetlands of national significance.

Source (DEWNR 2011).

3.1.2 Protected areas

The nearest NPW Act reserve is Martindale Hall Conservation Park, 2.6 km southwest of project area and Spring Gully Conservation Park, 11.8 km west of the project area (DEWNR 2017b).

Within the project area and surrounds, there are no existing heritage agreements, clearance applications or SEB offset areas under the *Native Vegetation Act 1991*. There are no DPTI road or rail significant sites (DEWNR 2017b).

3.1.3 Other

The project area is within a medium risk area for Phytophthora. There are no nearby records of Phytophthora (DEWNR 2017b).

4 METHODS

4.1 Database searches

A Protected Matters Report was generated on 4 October 2017 to identify matters of national environmental significance under the EPBC Act that may occur or may have suitable habitat occurring within the project area. A buffer of 10 km was applied for this search (DOEE 2017).

A Biological Database of South Australia (BDBSA) search was obtained from the Department of Environment Water and Natural Resources (DEWNR) on 27 September 2017, to identify flora and fauna species previously recorded within and around the project area (10 km buffer) (DEWNR 2017a). The BDBSA is comprised of an integrated collection of corporate databases which meet DEWNR standards for data quality, integrity and maintenance. In addition to DEWNR biological data the BDBSA also includes data from partner organisations (Birds Australia, Birds SA, Australasian Wader Study Group, SA Museum, and other state government agencies). This data is included under agreement with the partner organisation for ease of distribution but they remain owners of the data and should be contacted directly for further information.

Existing spatial datasets, relevant literature, aerial imagery and previous survey information where relevant was reviewed. This information was used to build a picture of:

- native vegetation cover within the project area and immediate surrounds;
- previous survey effort in the area;
- vegetation associations present (including associations of significance) and their condition;
- flora and fauna species (including species of national or state conservation significance) known or likely to occur in the area.

Any threatened species previously recorded within the area, or highlighted as potentially occurring in the area, were researched (if necessary) to determine whether suitable habitat for these species exists within the project area.

4.2 Field survey

4.2.1 Vegetation

A field survey was undertaken on 24th to 26th September 2017. The project area was traversed via vehicle and on foot to map vegetation associations. A roaming-style survey approach was adopted, opportunistically recording flora species as they were observed within the project area. The locations of any threatened flora species (if present) and significant weed infestations were recorded. Species nomenclature used in this report follows that used in the Biological Database of South Australia (BDBSA) as at November 2017.

A vegetation survey was performed in accordance with the Native Vegetation Council (NVC) methodology as outlined in the following documents:

- Bushland Assessment Manual (Government of South Australia 2017b)
- Scattered Tree Assessment Manual (Government of South Australia 2017c).

Representative patches of intact native vegetation were assessed using the Small Site Bushland Assessment Scoresheet. Scattered remnant trees (where <5 % native understorey was present) were assessed individually or as clumps.

Once the clearance footprint is known; and if clearance of scattered trees is proposed, the SEB offset will be calculated using the DEWNR Scattered Tree Assessment Scoresheet. Where clearance of remnant vegetation patches is proposed, the SEB offset area will be calculated using the DEWNR Bushland Assessment Scoresheet.

4.2.2 Fauna

The project area was traversed via vehicle and on foot where accessible. All fauna species opportunistically observed (including scats, tracks and heard) were recorded. A visual assessment was undertaken of the habitat value of the project area for native fauna. The suitability of habitat was assessed for the nationally endangered Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*) and the nationally vulnerable Flinders Ranges Worm-lizard (*Aprasia pseudopulchella*). Rocks and fallen trees were flipped and the loose soil underneath raked to check for the presence of Flinders Ranges Worm-lizard. Spider holes were checked with a burrowscope in areas with appropriate habitat for the presence of Pygmy Blue-tongue Lizard.

Species nomenclature used in this report follows that used in the Biological Database of South Australia as at November 2017.

4.3 Constraints and limitations

4.3.1 Desktop assessment

BDBSA flora and fauna records were limited to a 10 km buffer around the project area. It is acknowledged that the presence of species, including species of conservation significance, may not be adequately represented by database records.

4.3.2 Field survey

The findings, observations and conclusions expressed by EBS Ecology are based solely upon site conditions and information in existence at the time of the investigation.

Rapid assessment was undertaken along the roadsides. The railway line was not driveable. Vegetation data was estimated for this area based on walking the first 100 m and a visual assessment of the remainder. Given the low likelihood of this area being impacted and the lack of native species observations, estimate data only was recorded for the amenity trees present.

The October timing of the survey was suitable for the detection and identification of many plant species however some species could only be identified to genus level due to a lack of distinguishing features. It is possible that some species were not visibly present and therefore not detected. The fauna survey was limited to opportunistic records and represents a limited snapshot of the fauna that would utilise the site.

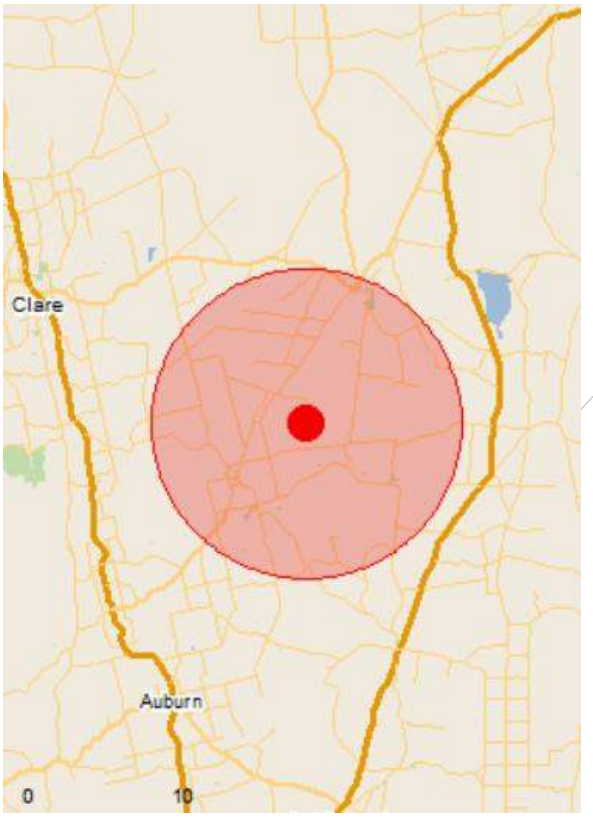
The field assessment combined with database records was however considered adequate to make a reasonable assessment of potential impacts of the project.

5 RESULTS

5.1 Matters of national environmental significance

The results of the EPBC Protected Matters Search are summarised in Table 2 and the relevant matters of national environmental significance (MNES) further discussed below.

Table 2. Summary of the results of the EPBC Act Protected Matters Search.

Search area (10 km buffer around centroid of project area)	Matters of national environment significance under the EPBC Act 1999	Identified within the search area
	World heritage properties	None
	National heritage properties	None
	Wetlands of international significance	None
	Great Barrier Reef Marine Park	None
	Commonwealth marine areas	None
	Threatened ecological communities	2
	Threatened species	23
	Migratory species	12
	Commonwealth land	None
	Commonwealth heritage places	None
	Listed marine species	17
	Whales and other cetaceans	None
	Critical habitats	None
	Commonwealth reserves terrestrial	None
	Commonwealth reserves marine	None
	State and territory reserves	2
	Regional forest agreements	None
	Invasive species	33
	Nationally important wetlands	None
	Key ecological features (Marine)	None

5.1.1 Threatened ecological communities

Two Threatened ecological communities (TECs) were identified in the Protected Matters Search:

- Iron-grass Natural Temperate Grassland of South Australia - Critically Endangered
- Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia - Critically Endangered.

The field survey found that neither vegetation community was present within the project area.

5.1.2 Threatened flora species

Sixteen EPBC listed flora species were identified in the EPBC Protected Matters Search as potentially occurring or having habitat potentially occurring within the vicinity of the project area (Table 3). None of these species have been detected or are likely to occur within the project area.

One of the species, *Dodonaea procumbens* (Trailing Hop-bush), listed as nationally vulnerable, is considered as possibly occurring given nearby records and the species' relative inconspicuousness (and hence potential for non-detection given the broad nature of the survey). *Dodonaea procumbens* has been previously recorded within the following vegetation associations:

- Open *Eucalyptus camaldulensis*, *E. fasciculosa* and *E. leucoxylon* Woodlands in low-lying areas
- *Lepidosperma viscidum*, *Themeda triandra*, *Rhytidosperma* spp., *Austrostipa* spp. Native Grasslands
- With shrubs, including *Acacia acinacea, D. viscosa* and *Bursaria spinosa*.

There are 32 records of *Dodonaea procumbens* within 10 km of the project area, including from Mintaro Cemetery, within roadside vegetation, along the Barrier Highway, within plantation reserve east of Holm Hill and south-west of Black Springs (DEWNR 2017a).

Dodonaea procumbens was conservatively assessed as potentially present for areas that were rapidly assessed, such as the road and rail reserves. It is unlikely to be present within the cropped and mixed grassland areas, where it is presumed infrastructure will be focused.

Two of the other EPBC listed flora species have BDBSA records within 10 km of the project area:

- *Acacia glandulicarpa* (Hairy-pod Wattle) – EPBC vulnerable. Two records; Flagstaff Road 3.7 km WNW of Black Springs, along roadside in Mixed Native sp. / Exotic sp. Grassland; and 5.5 km WNW of Farrell Flat.
- *Acacia spilleriana* (Spiller's Wattle) – EPBC endangered. Two records; 2.6 km NNW of Manoora, and another 1.5 km SSW of Porter Lagoon in the bed of quarry.

Neither species was observed during the field survey.

Table 3. Threatened flora species identified by EPBC Protected Matters Search as possibly occurring within the project area.

Scientific name	Common name	Conservation status		Likelihood of occurrence within project area
		Aus.	SA	
Acacia glandulicarpa	Hairy-pod Wattle	VU	E	Unlikely
Acacia spilleriana	Spiller's Wattle	EN	E	Unlikely
Caladenia argocalla	White-beauty Spider-orchid	EN	E	Unlikely
Caladenia gladiolata	Bayonet Spider-orchid	EN	E	Unlikely
Caladenia macroclavia	Large-club Spider-orchid	EN	E	Unlikely
Caladenia tensa	Greencomb Spider-orchid	EN		Unlikely
Caladenia woolcockiorum	Woolcock's Spider-orchid	VU	E	Unlikely

Scientific name	Common name	Conservation status		Likelihood of occurrence within project area
		Aus.	SA	
Caladenia xantholeuca	White Rabbits	EN	E	Unlikely
Dodonaea procumbens	Trailing Hop-bush	VU	V	Possible
Euphrasia collina subsp. osbornii	Osborn's Eyebright	EN	E	Unlikely
Glycine latrobeana	Clover Glycine	VU	V	Unlikely
Olearia pannosa subsp. pannosa	Silver Daisy-bush	VU	V	Unlikely
Prasophyllum pallidum	Pale Leek-orchid	VU	R	Unlikely

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare.

5.1.3 Threatened fauna species

Ten EPBC listed fauna species were identified in the EPBC Protected Matters Report as potentially occurring or having habitat potentially occurring within the vicinity of the project area (Table 4). This includes six bird, two fish and two reptile species. None of these species have BDBSA records within 10 km of the project area. None of the bird species identified are likely to occur based on species records, known distribution, lack of preferred habitat and survey results.

Both threatened fish are considered unlikely to occur within the ephemeral creek line. Flathead Galaxias (*Galaxias rostratus*) is considered extinct in SA in the Action Plan for South Australian Freshwater Fishes (Hammer et al. 2009). There is a single record of Murray Cod (*Maccullochella peelii*) from the Hutt River at the main road crossing south of Spalding, from 2002. This record represents an outlier in the known distribution of the species (ALA 2017).

Pygmy Blue-tongue Lizards (PBTL) are considered unlikely to occur based on the habitat conditions within the project area (see Section 5.3.6 and Section 6.2.1). The Flinders Ranges Worm-lizard (FRWL) could possibly occur along the creek line and within areas of exotic grassland where undisturbed surface, surface rock, litter/fallen trees are present (see Section 5.3.7 and Section 6.2.2).

Table 4. Threatened fauna species identified by EPBC Protected Matters Search as possibly occurring within the project area.

Scientific name	Common name	Conservation status		Likelihood of occurrence within project area
		Aus	SA	
Birds				
Calidris ferruginea	Curlew Sandpiper	CE, Mi (W)		Unlikely
Grantiella picta	Painted Honeyeater	VU	V	Unlikely
Numenius madagascariensis	Eastern Curlew	CE, Mi (W)	V	Unlikely
Pedionomus torquatus	Plains-wanderer	CE	E	Unlikely
Pezoporus occidentalis	Night Parrot	EN	E	Unlikely
Rostratula australis	Australian Painted Snipe	EN	V	Unlikely
Fish				
Galaxias rostratus	Flathead Galaxias	CE		Unlikely
Maccullochella peelii	Murray Cod	VU		Unlikely
Reptiles				
Aprasia pseudopulchella	Flinders Ranges Worm-lizard	VU		Possible

Tiliqua adelaidensis	Pygmy Blue-tongue Lizard	EN	E	Unlikely

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. Mi: Migratory (Ma: Marine, T: Terrestrial, W: Wetland).

5.1.4 Migratory species

Twelve bird species listed as migratory under the EPBC Act were identified in the EPBC Protected Matters Search as potentially occurring or having habitat potentially occurring within the vicinity of the project area (Table 5). None of the twelve species have been recorded during surveys. The Fork-tailed Swift (*Apus pacificus*) could possibly occur as occasional visitors to the project area.

Listed Marine species have not been listed as the rating is only relevant to Commonwealth Marine areas, which is not relevant to the project.

Table 5. Migratory bird species identified by EPBC Protected Matters Search Tool as possibly utilising or flying over the project area.

Scientific name	Common name	Conservation status		Likelihood of occurrence within project area
		Aus	SA	
Actitis hypoleucos	Common Sandpiper	Mi (W)		Unlikely
Apus pacificus	Fork-tailed Swift	Mi (Ma)		Possible
Calidris acuminata	Sharp-tailed Sandpiper	Mi		Unlikely
Calidris ferruginea	Curlew Sandpiper	CE, Mi (W)		Unlikely
Calidris melanotos	Pectoral Sandpiper	Mi		Unlikely
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Mi (W)	R	Unlikely
Hirundapus caudacutus	White-throated Needletail	Mi (T)		Unlikely
Motacilla cinerea	Grey Wagtail	Mi (T)		Unlikely
Motacilla flava	Yellow Wagtail	Mi (T)		Unlikely
Myiagra cyanoleuca	Satin Flycatcher	Mi (T)	E	Unlikely
Numenius madagascariensis	Eastern Curlew	CE, Mi (W)	V	Unlikely
Pandion haliaetus	Osprey	Mi (W)	E	Unlikely

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. Mi: Migratory (Ma: Marine, T: Terrestrial, W: Wetland).

5.2 Matters of state environmental significance

This section summarises the BDBSA search results for flora and fauna that are matters of state environment significance.

5.2.1 Flora

The BDBSA search identified 25 state conservation rated flora species with records within 10 km of the project area (Figure 3) (DEWNR 2017a). These species are shown in Table 6 with an assessment of their likelihood of occurrence within the project area.

No threatened flora species were recorded during the field survey. Based on the database records and the species' relative inconspicuousness (and hence potential for non-detection during the broad level survey), two state listed flora species are considered as possibly occurring within the project area:

- *Dodonaea procumbens,* discussed above in Section 5.1.2
- *Rytidosperma tenuius* – one record is known from 1.3 km WSW of Mount Horrocks. This species is known more generally from disturbed road verges

Table 6. Threatened flora species identified from the BDBSA search.

Scientific name	Common name	Conservation status		Last sighting (year)	Likelihood of occurrence within project area
		Aus	SA		
Acacia genistifolia	Broom Wattle		E	1990	Unlikely
Acacia glandulicarpa	Hairy-pod Wattle	VU	E	2001	Unlikely
Acacia spilleriana	Spiller's Wattle	EN	E	1989	Unlikely
Austrostipa breviglumis	Cane Spear-grass		R	1953	Unlikely
Austrostipa gibbosa	Swollen Spear-grass		R	2005	Unlikely
Bothriochloa macra	Red-leg Grass		R	1988	Unlikely
Crassula peduncularis	Purple Crassula		R	1993	Unlikely
Cryptandra campanulata	Long-flower Cryptandra		R	1997	Unlikely
Dianella longifolia var. grandis	Pale Flax-lily		R	1992	Unlikely
Dodonaea procumbens	Trailing Hop-bush	VU	V	2008	Possible
Eragrostis infecunda	Barren Cane-grass		R	1987	Unlikely
Eryngium ovinum	Blue Devil		V	1997	Unlikely
Eucalyptus macrorhyncha ssp. macrorhyncha	Red Stringybark		R	1980	Unlikely
Goodenia heteromera	Spreading Goodenia		R	1995	Unlikely
Maireana excavata	Bottle Fissure-plant		V	1994	Unlikely
Maireana rohrlachii	Rohrlach's Bluebush		R	1994	Unlikely
Montia australasica	White Purslane		R	1993	Unlikely
Philotheca verrucosa	Bendigo Wax-flower		V	1962	Unlikely
Podolepis muelleri	Button Podolepis		V	1992	Unlikely
Ptilotus erubescens	Hairy-tails		R	1997	Unlikely
Pultenaea kraehenbuehlii	Tothill Bush-pea		R	1971	Unlikely
Rumex dumosus	Wiry Dock		R	1993	Unlikely
Rytidosperma tenuius	Short-awn Wallaby-grass		R	2013	Possible

Scientific name	Common name	Conservation status		Last sighting (year)	Likelihood of occurrence within project area
		Aus	SA		
Sclerolaena muricata var. villosa	Five-spine Bindyi		R	1993	Unlikely
Swainsona behriana	Behr's Swainson-pea		V	1996	Unlikely

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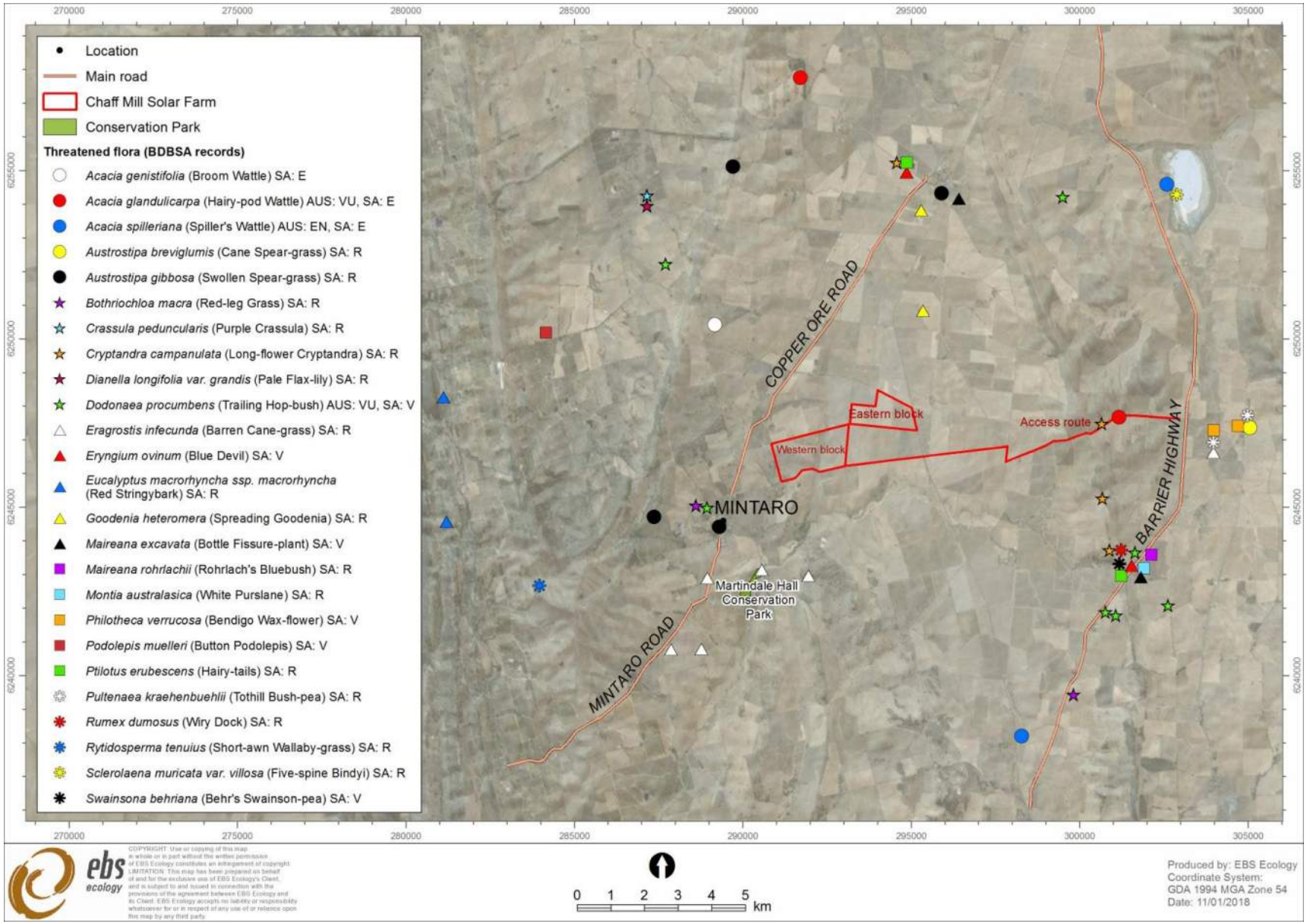

Figure 3. Location of threatened flora species records identified with the BDBSA search.

5.2.2 Fauna

The BDBSA search identified six state threatened bird species, one state threatened mammal and one state threatened amphibian with records within 10 km of the project area (Figure 4) (DEWNR 2017). These species are shown in Table 7 with an assessment of their likelihood of occurrence within the project area. The White-winged Chough (*Corcorax melanorhamphos*) was recorded during the field survey. Four other bird species could possibly occur based on species distribution and available habitat. The Brown Toadlet (*Pseudophryne bibronii*) could possibly be present along the ephemeral creek line within the western block. The Common Brushtail Possum (*Trichosurus vulpecula*) may occupy the established trees (remnant and planted).

Table 7. Threatened fauna species identified from the BDBSA search.

Scientific name	Common name	Conservation status		Last sighting (year)	Likelihood of occurrence within project area
		Aus	SA		
Amphibian					
Pseudophryne bibronii	Brown Toadlet		R	2003	Possible
Bird					
Corcorax melanorhamphos	White-winged Chough		R	2006	Known
Falco peregrinus	Peregrine Falcon		R	2003	Possible
Neophema elegans	Elegant Parrot		R	2006	Possible
Oxyura australis	Blue-billed Duck		R	2003	Unlikely
Petroica phoenicea	Flame Robin		V	2001	Possible
Turnix varius	Painted Buttonquail		R	2003	Possible
Mammal					
Trichosurus vulpecula	Common Brushtail Possum		R	2003	Possible

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Park and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare.

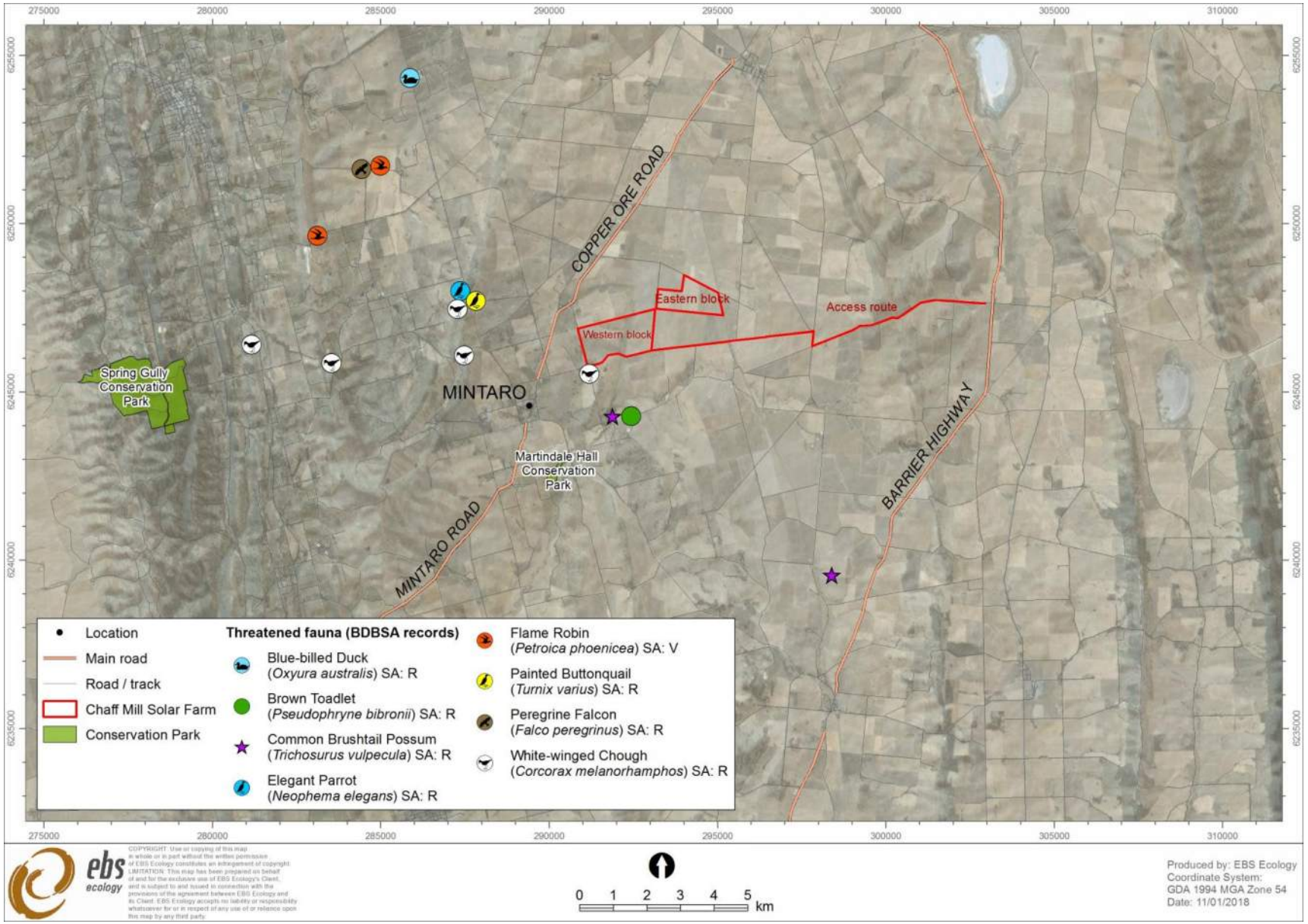

Figure 4. Location of threatened fauna species records identified with the BDBSA search.

5.3 Field survey

5.3.1 Landscape summary

The project area is mostly cleared of native vegetation and is under crop. There is a large patch of remnant *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland Blue Gum) in the western corner of the project area where it is too steep to cultivate. The understory is grazed and comprised of exotic grassland species. The creek line running through the western block is highly degraded with very limited native understory species present. The western block is bordered on the western side by a relatively steep rocky escarpment. Amenity plantings, mostly comprised of native species, occur as small patches within the project area and as narrow strips along the roadsides. Small strips of remnant native woodland and shrubland also occur along some roadside.

5.3.2 Vegetation associations

Six broad vegetation associations were recorded within the project area:

- *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland
- *Allocasuarina verticillata* (Drooping Sheoak) Woodland
- *Acacia paradoxa* (Kangaroo Thorn) Shrubland
- Mixed Amenity Planting +/- scattered natives
- Exotic Grassland
- Crop.

Table 8 summarises the extent and location of the surveyed vegetation associations.

Table 8. Location and area (ha) of vegetation associations surveyed.

Vegetation association	Location			Total (ha)
	Access route	**Eastern block**	**Western block**	
1. *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland		0.09	19.87	**19.96**
2. *Allocasuarina verticillata* (Drooping Sheoak) Woodland	1.50		0.32	**1.82**
3. *Acacia paradoxa* (Kangaroo Thorn) Shrubland	0.81		0.54	**1.36**
4. Mixed Amenity Planting +/- scattered natives	7.38	3.06	1.03	**11.47**
5. Exotic Grassland	12.29		76.43	**88.71**
6. Crop		141.66	146.26	**287.92**
Total (ha)	**21.98**	**144.82**	**244.44**	**411.24**

The vegetation associations are further described below and are shown within the eastern block (Figure 5), western block (Figure 6) and the access route along Flagstaff Road (Figure 7).

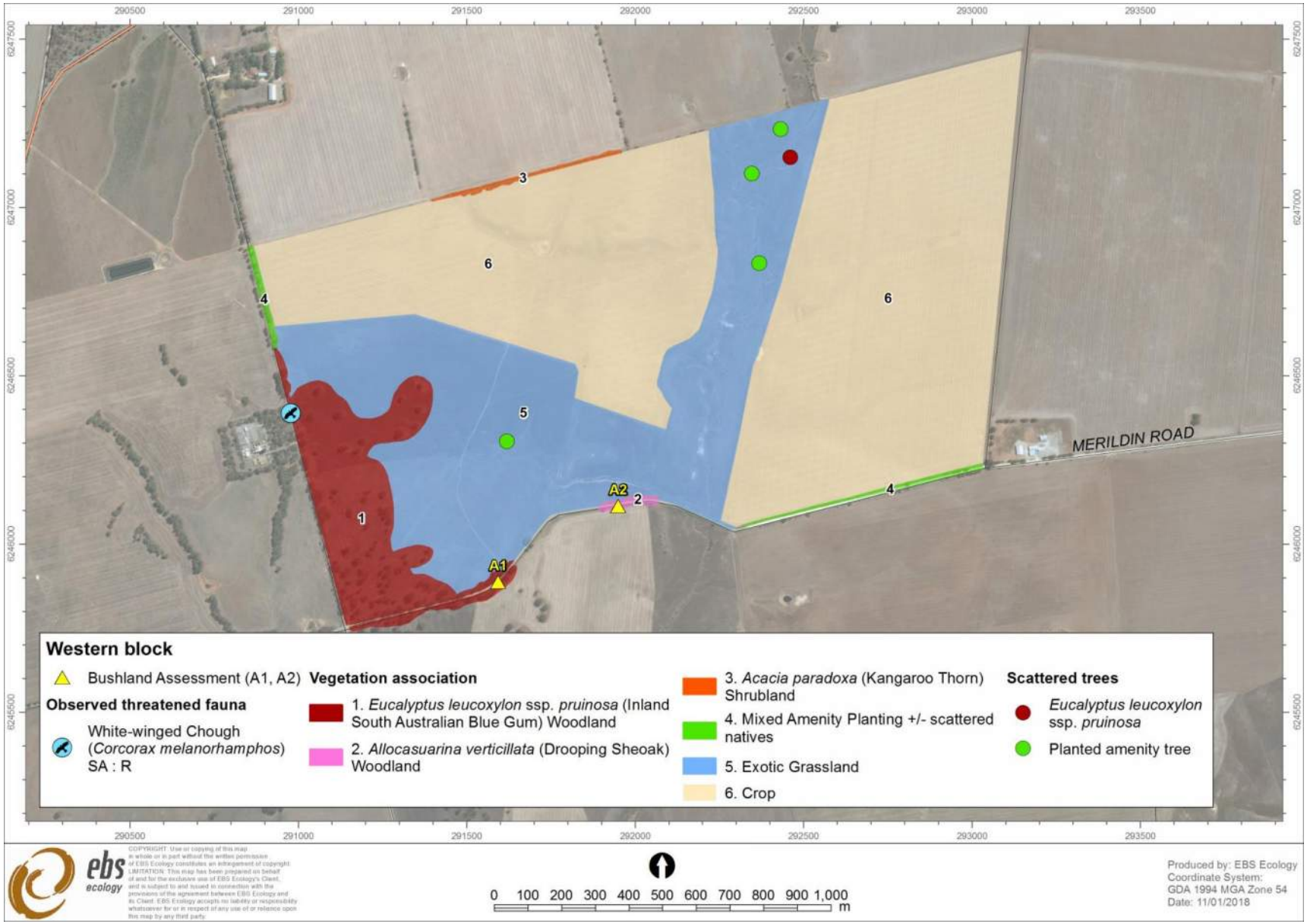

Figure 5. Vegetation associations across the western block of the project area.

Figure 6. Vegetation associations across the eastern block of the project area.

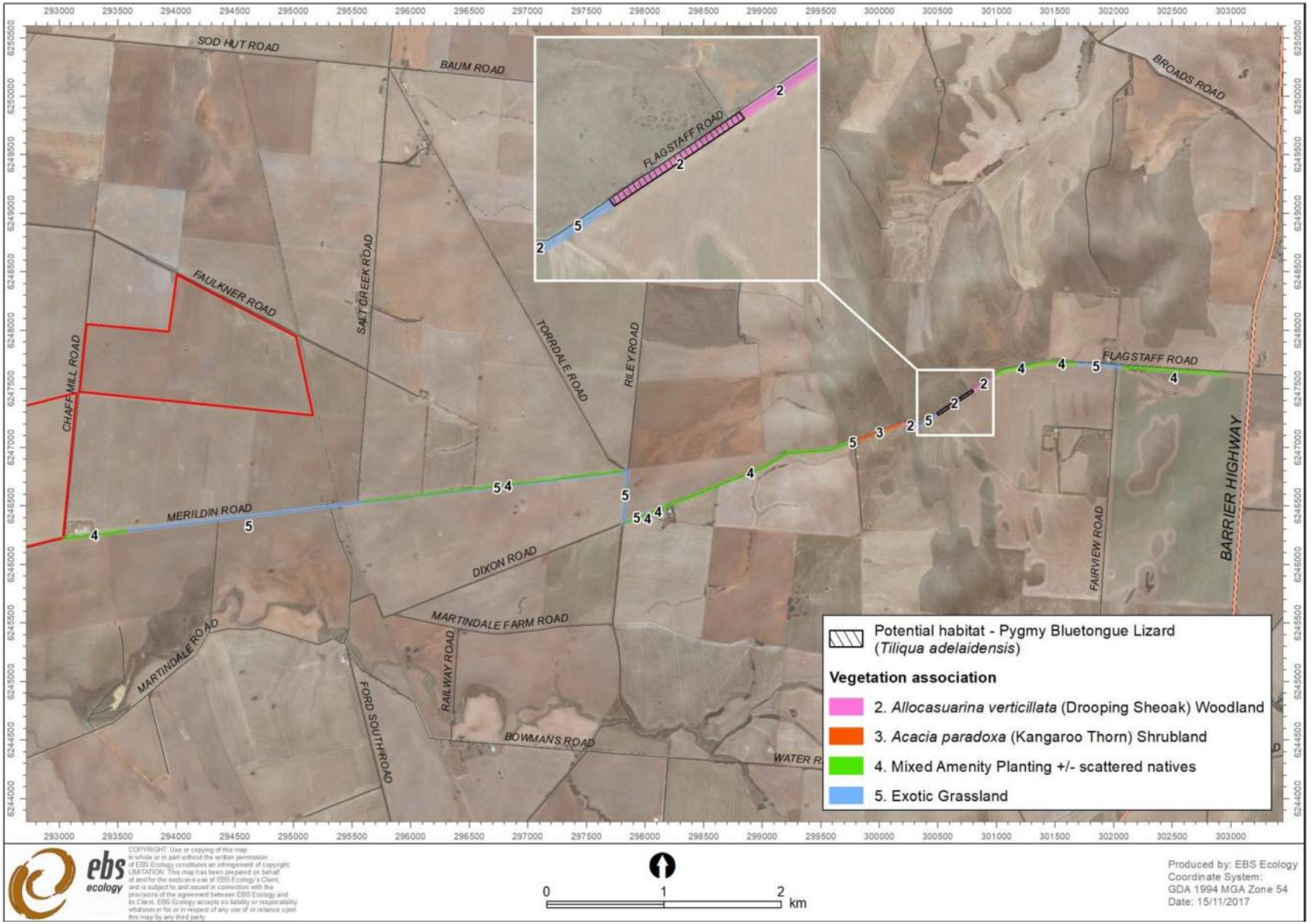

Figure 7. Vegetation associations along the access route of the project area.

Vegetation Association 1: *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland

Remnant *Eucalyptus leucoxylon* were present in the SW corner of the western block. These provide excellent bird habitat with lots of hollows in the mature trees. No recruitment of young trees was observed. The scattered remnant *E. leucoxylon* extended into *Eucalyptus leucoxylon* ssp. *pruinosa* Woodland over *Acacia paradoxa* at the southern end of Wookie Creek Road and continued into Merildin Road where a bushland assessment was performed. A small patch of remnant *Eucalyptus leucoxylon* ssp. *pruinosa* Woodland occurred on the western boundary of the eastern block.

Impact to this remnant vegetation should be avoided (i.e. the south western corner with remnant trees and the roadsides). On the western block, the *Eucalyptus leucoxylon* ssp. *pruinosa* Woodland occurred on a steep and rocky slope.

Figure 8. Vegetation Association 1: *Eucalyptus leucoxylon* ssp. *pruinosa* Woodland, SW corner of the western block.

Vegetation Association 2: *Allocasuarina verticillata* (Drooping Sheoak) Woodland

Three patches of remnant *Allocasuarina verticillata* Woodland occurred on the project area along Flagstaff Road. One remnant patch contained *A. verticillata* over native understorey species +/- introduced grasses. A second group contained *A. verticillata* over *Xanthorrhoea quadrangulata* and had a good diversity of native understorey species. This area would require further investigation if clearing was proposed due to the conservation value of the vegetation and potential for spider holes (PBTL habitat). The third patch contained *A. verticillata* and *Acacia pycnantha* over exotic grasses. The condition of this association was primarily determined by the presence of native understorey species and varied from poor to moderate.

Another group of remnant *Allocasuarina verticillata* over *Lomandra multiflora dura* occurred on the southern boundary of the western block along Merildin Road. The condition of the understorey was assessed as poor.

Figure 9. Vegetation Association 2: *Allocasuarina verticillata* Woodland over *Xanthorrhoea quadrangulata* along the access route Flagstaff Road.

Vegetation Association 3: *Acacia paradoxa* (Kangaroo Thorn) Shrubland

One patch of remnant *Acacia paradoxa* Shrubland occurred within the project area along Flagstaff Road. This association consisted of *A. paradoxa* over exotic grasses and herbs. A second patch of *Acacia paradoxa* over *Lycium ferocissimum* was observed on the northern boundary of the western block but this area was not accessible and was therefore not assessed.

Figure 10. Vegetation Association 3: *Acacia paradoxa* Shrubland along the access route, Flagstaff Road.

Vegetation Association 4: Mixed Amenity Planting +/- scattered natives

The perimeter of the project area around both the eastern and western blocks mostly contained roadside vegetation comprised of mixed amenity plantings.

Around the eastern block the amenity plantings occurred along Faulkner Road and the railway corridor as well as within the paddock. These plantings included *Eucalyptus leucoxylon* over exotic grasses and herbs, one *Pinus* tree species and groups of deciduous trees over cropping. Around the western block, Wookie Creek Road contained amenity planted *Eucalyptus camaldulensis* and *E. leucoxylon* over *Acacia paradoxa*, *Acacia notabilis* and other native and exotic grasses and herbs.

The roadside vegetation along Meridlin Road contained:

- remnant *Acacia pycnantha*, *Allocasuarina verticillata* and *Acacia* spp.
- amenity planted *A. paradoxa* and *Eucalyptus* spp. over exotic species
- *E. leucoxylon*, *A. pycnantha* and *Eucalyptus* spp.
- *A. verticillata* over exotic grasses.

The roadside vegetation along Flagstaff Road contained:

- *Casuarina cunninghamiana*, *A. verticillata*, *Bursaria spinosa*, *Pinus* spp., *Melaleuca* spp., *Eucalyptus* spp. and *Fraxinus* spp.
- *Callitris* spp. and *Eucalyptus* spp. over *Acacia* spp. and exotic grasses.
- *A. verticillata*, *Eucalyptus* spp., *A. pycnantha*, *Callitris* spp. and *Melaleuca* spp.

Figure 11. Vegetation Association 4: Mixed Amenity Planting +/- scattered natives along Faulkner Road, the northern perimeter of eastern block.

Vegetation Association 5: Exotic Grassland

Exotic Grassland covered a large proportion of the western block. Exotic Grassland bordered a creek line that passes through the western block and surrounded a group of remnant *Eucalyptus leucoxylon* ssp. *pruinosa*. The groundcover in the Exotic Grassland was pasture grass used for grazing and contained the exotic species *Rosa canina* (Dog rose), which is state listed as a declared plant. There were small areas of native grass and sedge that were extremely degraded as they were surrounded by weeds. Some native and non-native amenity plantings were also present within the Exotic Grassland near the creek line. The Exotic Grassland had a few stony outcrop areas that contain spider holes however these did not occur in habitat suitable for Pygmy Blue-tongue Lizards. Although Flinders Ranges Worm-lizard was not detected in this area, the habitat is suitable for this species. Apart from the remnant scattered *Eucalyptus leucoxylon* ssp. *pruinosa*, the Exotic Grassland was surrounded by cropping and roadsides containing native and non-native amenity plantings.

A large proportion of the access route along Meridlin Road also contained Exotic Grassland.

Figure 12. Vegetation Association 5: Exotic Grassland following the creek line on the western block.

Vegetation Association 6: Crop

The cropping area dominated the landscape across both blocks within the project area. The eastern block was completely covered with cropping and over 50% of the western block was cropped. There is no native vegetation present within the cropped areas however there are four areas of amenity plantings within the eastern block. The areas surrounding this association comprise Exotic Grassland and roadside/rail corridors. The surrounding roadside/rail corridors contain either weeds with no native understorey species or a mix of native and non-native amenity plantings.

Figure 13. Vegetation Association 6: Crop along SW corner of eastern block.

5.3.3 Bushland and scattered tree assessment scores

A scattered tree assessment was performed on the large patch of Vegetation Association 1: *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland. A total of 200 trees that were all *Eucalyptus leucoxylon* ssp. *pruinosa* were assessed. Many of these trees contained hollows of various sizes and were considered of high biodiversity value.

Two Bushland assessments were performed on the perimeter of the western block along Meridlin Road. The first assessment (A1) determined that the condition of the vegetation within Vegetation Association 1:

Eucalyptus leucoxylon ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland was poor to moderate. The second assessment (B1) determined that the condition of the vegetation within Vegetation Association 2: *Allocasuarina verticillata* (Drooping Sheoak) Woodland was poor.

5.3.4 Flora

A total of 54 flora species were recorded during the survey, this included 32 native species and 22 exotic species (Appendix 1). None of the native species recorded have a conservation rating. Four of the exotic species recorded are listed as declared under the *Natural Resources Management Act 2004* (Table 9).

Table 9. Declared species recorded within the project area.

Family name	Species name	Common name
BORAGINACEAE	*Echium plantagineum*	Salvation Jane
LABIATAE	*Marrubium vulgare*	Horehound
OLEACEAE	*Olea europaea* ssp.	Olive
ROSACEAE	*Rosa canina*	Dog Rose

5.3.5 Fauna

A total of 34 bird species were recorded across the project area (Appendix 2). One species had a conservation rating under the NPW Act: *Corcorax melanorhamphos* (White-winged Chough) is listed as rare in SA and was found in Vegetation Association 1: *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland South Australian Blue Gum) Woodland. All other species observed are considered to be common and widespread.

One mammal species was observed in the project area (Appendix 2): *Macropus fuliginosus* (Western Grey Kangaroo). This species is also considered to be common and widespread.

Frogs (unknown species) were observed within the creek line where water was present.

5.3.6 Pygmy Blue-tongue Lizard

The Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*), herein referred to as PBTL, is listed as Endangered under the EPBC Act and the NPW Act.

The PBTL is a moderate sized skink with short limbs, a relatively heavy body and large head, with a total length of less than 20 cm (Duffy et al, 2012). It is endemic to South Australia and occurs within the mid-north region of the state. The Pygmy Blue-tongue Lizard had been considered extinct until it was rediscovered near Burra in 1992 (the first record for 36 years). Since this time other small isolated populations of this species have been found in the mid-north region of South Australia, from north of Port Wakefield in the Hummocks to south of Peterborough and west of Clare.

The PBTL relies on spider burrows (made by wolf spiders and trapdoor spiders) as refuge sites and this can be used as an indicator of the species' potential presence. Availability of suitable spider holes which are stable and not subject to winter flooding has proven to restrain the species distribution (Milne 1999;

Milne et al. 2003; Souter et al. 2004). Suitable spider holes utilised as burrows are typically vertical and circular up to 20 mm in diameter (Milne et al. 2000) and 23 cm deep, although burrows as short as 12 cm have been utilised (Milne 1999). This species is known to occupy native grassland habitats (Milne 1999) and even highly degraded grasslands (dominated by exotic species) are potential habitat, providing that the area is unploughed and the soil structure remains intact (J. Schofield pers. comm. 2008).

The nearest known records of PBTL are approximately 15 km west (near Spring Gully Conservation Park) and 20 km south-west and north-east of the project area (DEWNR 2017b; Duffy et al. 2012).

The likelihood of PBTL being present is considered low given that most of the area was cropped and hence unsuitable and targeted searches revealed a lack of spider burrows in the remaining parts of the project area. Some spider burrows were observed along the access route on Flagstaff Road. These were checked with a burrowscope for PBTL occupancy but no PBTLs were observed.

5.3.7 Flinders Ranges Worm-lizard

The Flinders Ranges Worm-lizard *(Aprasia pseudopulchella*), herein referred to as FRWL, is listed as vulnerable under the EPBC Act.

The FRWL is a small cryptic legless lizard endemic to SA. It was delisted under the state *National Parks and Wildlife Act 1972* in 2008 as it is now believed to be relatively common and widespread in the region. At the time (approximately 1993) when the national conservation rating was assigned, little was known about the habits and abundance of the species (Threatened Species Scientific Committee 2008).

The preferred habitat of FRWL is open woodland, native tussock grassland, riparian habitat and rocky isolates within stony or clay soils with a stony surface. It can occur in quite degraded areas but surface rock, leaf litter, grass clumps and fallen timber are key habitat features. It can also burrow in sand and loose soil and may be found under debris or logs (Cogger *et al.* 1993, Cogger 2000), or under rocks (Wilson and Swan 2003).

FRWL is difficult to survey systematically because if the temperature is too hot or cold, the species will generally retreat underground. Temperatures between 24ºC and 30ºC are considered ideal as worm-lizards will come to the near surface for warmth in autumn and winter. Due to its nature, this species is not readily trapped in pitfall traps or funnel traps. Active search is considered the most efficient means of survey. This involves lifting rocks and searching through leaf litter and fallen timber in areas considered as potential habitat.

The nearest FRWL records are approximately 14.7 km east and 15.5 km northeast of the project area (DEWNR 2017b).

The habitat is largely unsuitable for FRWL with most of the soil structure disturbed due to cropping, and the lack of surface rock in grassland areas. FRWL could possibly occur along the creek line and within areas of exotic grassland where suitable habitat characteristics exist. A few stony outcrops and some loose rocks were present; these were actively searched however no Flinders Ranges Worm-lizards were observed. The temperature at the time of the survey was suitable for detection of FRWL.

Whilst the habitat suitability is assessed as low, the presence of FRWL cannot be discounted where the soil structure remains intact and surface cover is present.

6 POTENTIAL IMPACTS AND MITIGATION MEASURES

6.1 Vegetation

Native vegetation was mostly restricted to the steep area on the western side of the western block and along the road and railway corridors, either bordering the project area or on the proposed access route to the project area. The vegetation was generally in poor condition with the understory dominated by exotic species.

It is recommended that the infrastructure and access routes are aligned with cropping land where practical, as this vegetation association covers a high proportion of the project area, is of negligible value for fauna and occupies the flatter land. Areas of native woodland and shrubland (Associations 1, 2 and 3) and scattered trees should be avoided as they offer habitat for a range of fauna species within a surrounding landscape largely devoid of shrubs and trees.

The EPBC listed *Dodonaea procumbens* was conservatively assessed as potentially present for areas that were rapidly assessed, such as the road and rail reserves. If infrastructure placement is within the cleared areas and avoids native vegetation, it is unlikely that the species (if present) would be impacted.

6.2 Fauna

The fauna survey recorded one threatened species, the state rare White-winged Chough (*Corcorax melanorhamphos*). Given the isolation of the project area (4 km) from large remnants >50 ha (DEWNR 2017b), the habitat present may be non-preferable for species that are moderately or highly sensitive to remnant size and isolation. The remnant vegetation within the project area is expected to be most valuable for highly mobile threatened species, such as the Elegant Parrot (*Neophema elegans*) and Flame Robin (*Petroica phoenicea*), which make broad-scale movements in response to season and the abundance of food resources. The presence of highly mobile species within the project would be expected to be temporal with respect to the availability of food resources.

Many trees on the site contained hollows that are valuable for resident or nesting threatened species such as the Common Brushtail Possum (*Trichosurus vulpecula*) and the Elegant Parrot (*Neophema elegans*). The protection of trees with hollows is important for the reproductive success of nesting birds which can affect population recruitment.

Clearance of vegetation, either on the project site or along the access route, may have a direct impact on fauna through loss of habitat. The construction and operation of a solar farm may result in indirect loss of fauna through displacement due to disturbance, visual intrusion, physical barriers and altered conditions.

Research on impacts to birds and bats from solar farms is currently limited. A review of the current literature (Natural England 2017) suggests that solar farms have a low impact to birds and bats through collision with the solar panels. Overhead power lines may pose a risk of collision but this is considered minor and is no different to the collision risk for other transmission lines. The only overhead line proposed for the project is a short connection line to the existing overhead transmission line. It is possible that the reflected

polarised light from solar panels may attract insects that impact the behaviour of specific guilds of birds and bats, and birds may mistake the solar panels for drinking water. The client has advised that the solar panels are designed to absorb rather than reflect light and new models do not have reflective metals frames as in the past.

The mid-north has become a hub for clean energy projects, with the focus to date being wind generated power. The cluster of wind turbines and associated infrastructure across the region could have a cumulative effect on habitat utilisation of birds in the area.

Ideally, provision of a buffer between infrastructure and stands of native vegetation is recommended to reduce the level of interaction and potential impact on fauna utilising the area.

6.2.1 Pygmy Blue-tongue Lizard

The absence of PBTL is attributed to the large area of land that has been cropped. The area of exotic grassland/and *E. leucoxylon* Open Woodland within the western block is broadly considered potential habitat however no spider holes were detected therefore it is considered unlikely that PBTL occur. Some spider burrows were observed along the access route on Flagstaff Road but given the small and isolated nature of the area it is also considered unlikely that they occur. Based on the results, there is no need for further targeted surveys or an EPBC referral for this species. If

6.2.2 Flinders Ranges Worm-lizard

The habitat suitability for Flinders Ranges Worm-lizard is considered low, however given the species' broad distribution across the region, it is considered as possibly present in non-cropped areas where surface rock, leaf litter and fallen timber occurs. Overall the habitat is considered as low suitability.

A small number of individual FRWL (if present) may be directly impacted (direct loss, or loss of habitat) by the construction of the solar farm. The scale of loss of potential habitat and individual FRWL is considered minor and inconsequential to the local population.

Based on the criteria in the EPBC Act Significant Impact Guidelines (Department of the Environment 2013) the project is not considered to have a significant impact on FRWL. An EPBC referral is not considered necessary for this species.

6.2.3 Fork-tailed Swift

The Fork-tailed Swift (*Apus pacificus*), listed as migratory, could occur as an occasional visitor but would not be significantly impacted by the development.

7 VEGETATION CLEARANCE

EBS Ecology is advised that the project will be assessed through a Section 49 approval process (Crown Development / Public Infrastructure) under the *Development Act 1993*. The project has received sponsorship. FRV wants to avoid as much native vegetation clearance as possible.

The vegetation clearance requirements for the project are not yet known. EBS has collected the necessary data to calculate the area of vegetation clearance and required significant environmental benefit (SEB) offset under the *Native Vegetation Act 1991* should this be required for a Native Vegetation Clearance Application once the construction footprint has been determined.

It should be possible to avoid the clearance of the vast majority of native vegetation within the project area. The area of most value from a native vegetation perspective is the western side of the western block. Given the steepness of this part of the project area, it is envisaged that infrastructure placement in this area will be avoided anyway.

It is envisaged that clearance along the bordering roadside would only be needed at access points, and should therefore be micro-sited to avoid vegetation where possible. If the assessed roads require widening for large vehicle access, native vegetation clearance should be minimised by utilising already cleared areas where possible. The southern side of the road is the best option along Merildin Road. The best option for widening of Flagstaff Road varies depending on the specific location.

Additional survey is required should there be impacts outside of the assessed area.

7.1 Vegetation clearance approval process

The project will likely fall under **Native Vegetation Regulation 12(34) – Infrastructure**. This regulation applies to clearance of vegetation incidental to the construction or expansion of a building or infrastructure (and associated services) where the Minister has declared that the clearance is in the public interest. If clearance falls under Regulation 12(34) it follows the process to undertake clearance for “other activities” as follows:

Process to undertake Clearance for c) 'Other activities'

- Part 3, Division 5, Regulation 12 & 16

Table 16. Requirements of the proponent to undertake clearance for 'Other activities'

General process	Requirements of proponent
Application to NVC	Application to the NVC via email nvc@sa.gov.au, or in accordance with an NVC-approved Standard Operating Procedure (SOP). *Note, you must submit the written permission of the landowner if you are acting on behalf of the landowner for any clearance activity.*
Assessment	When making a decision for these activities in relation to the information to be provided by an applicant to inform whether approval should be granted, the NVC will assess the level of risk to biodiversity presented by the clearance proposal. The NVC will also assess the proposed clearance against whether there are any other alternatives that involve no clearance, less clearance or clearance of vegetation that is less significant (or has been degraded to a greater extent than the vegetation proposed to be cleared). If an NVC-approved SOP exists, the assessment approach will occur in accordance with the SOP.
Approval	NVC approval required, or in accordance with the approval process outlined in the NVC-approved SOP. Proponent is required to develop an SEB Management Plan that will be approved by the NVC for implementation. Clearance is only permitted for these activities if any conditions (including the SEB) that apply to the approval are complied with. *Conditions imposed in connection with an approval are binding and enforceable against the person to whom the approval is granted as well as subsequent owners and occupiers of the land.* *Permitted clearance must be undertaken 2 years within approval being granted, unless otherwise specified.*
Significant Environmental Benefit (SEB)	SEB required in accordance with the Management Plan (or payment into the Native Vegetation Fund). If an NVC-approved SOP exists, the approval of the SEB will occur in accordance with the SOP.

Source: Government of South Australia (2017a).

If the project is awarded major development status under the *Development Act 1993*, then it may fall under **Regulation 12(27) – Major projects**. This regulation is to facilitate the interactions between the *Native Vegetation Act 1991* and the *Development Act 1993* in relation to the approvals for projects of major social, economic or environmental significance. The NVC will comment on the proposal as part of the assessment for major projects as to whether it avoids and minimises clearance a far as practicable, and at the same time determine the SEB required to offset the impact of the clearance. If clearance falls under Regulation 12(27) the process is as follows:

Process to undertake Clearance for a) Major Developments and Projects

- Part 3, Division 5, Regulation 12 & 13

Table 12. Requirements of the proponent to undertake clearance for Major Developments and Projects.

General process	Requirements of proponent
Notification or application to NVC	In accordance with the *Development Act 1993*, the NVC is provided an environmental impact statement, public environment report or development report for comment. *Note, you must submit the written permission of the landowner if you are acting on behalf of the landowner for any clearance activity.*
Assessment	The NVC will assess the clearance against whether there are any other alternatives that involve no clearance, less clearance or clearance of vegetation that is less significant (or has been degraded to a greater extent than the vegetation proposed to be cleared).
Approval	Clearance can occur if development consent is granted under the *Development Act 1993* and the provision of an SEB (on-ground or payment) is approved by the NVC. For an on-ground SEB, an NVC-approved management plan is required.
Significant Environmental Benefit (SEB)	Required as per SEB approval (or payment into the Native Vegetation Fund).

Source: Government of South Australia (2017a).

Under the *Native Vegetation Regulations 2017*, the project will fall under approval pathway 4: risk assessment. The risk assessment pathway is designed to streamline the approval process for activities with low or undefined levels of risk to biodiversity to be identified early, so that the focus of the NVC's assessment can be on activities that pose a high risk to biodiversity. The purpose of performing a risk assessment is to ensure that assessment and approval processes are consistent with the objects of the *Native Vegetation Act 1991*, defensible, transparent and at a level commensurate with the level of risk. The risk assessment determines the level of assessment to be undertaken, and therefore the SEB which will offset the impact of the clearance (Government of South Australia 2017a).

Applications are risk-assessed against criteria that categorises four (4) levels of clearance according to the significance of the vegetation proposed to be cleared (Figure 14). The risk level determines the level of assessment required. There are several escalating factors that will raise the clearance assessment to the next level if found to be positive (Government of South Australia 2017a).

For more information on how the NVC assesses applications, see the Guide for applications to clear native vegetation under the *Native Vegetation Act 1991* or the *Native Vegetation Regulations 2017*.

	Agricultural (AMLR, EP, N&Y, SAMDB, KI and SE Region)		**Pastoral** (SAAL and AW NRM regions)		**Escalating matters** Clearance assessment will be raised to the next level if;	**Approval**
	Patches - clearance	**Trees - clearance**	**Patches - clearance**	**Trees - clearance**		
Level 1	**0.05 ha** or less	**5 trees** or less	**3 ha** or less	**5 trees** or less	Clearance involves **any** trees with a trunk circumference measured at 1m above the ground of (for multi-stemmed trees, measure the largest trunk/stem): - 50cm or more for Agricultural zone, or - 30cm of more for the Pastoral zone, *or* There is an associated application within the last 5 years *or* There is a high likelihood (as determined by NVC delegate) that the site contains or is habitat for a species listed under the NP&W Act or a threatened community under EPBC Act	**Delegation:** NVMU, DPC Mining, SOPs
Assessment	Desktop assessment (Applicant to provide information) – a map of area of impact, site photographs, explanation of the purpose of clearance, why there is no alternative and whether there has been any other clearance application in the last 5 years					
SEB	$500 payment into the Native Vegetation Fund					
Level 2	**>0.05 ha to 0.5 ha**	**6 - 20 trees**	**>3 ha to 10 ha**	**6 - 20 trees**	The clearance is seriously at variance with Principle of Clearance b, c or d.	**Delegation:** NVMU, DPC Mining, SOPs
Assessment	Field assessment (Accredited consultant) – Bushland or Rangeland assessment method or Scattered tree assessment					
SEB	Determined as per SEB Policy and Guide					
Level 3	Total Biodiversity Score of less than or equal to **250**		Total Biodiversity Score of less than or equal to **2500**.		The clearance is seriously at variance with Principle of Clearance b, c or d.	**Delegation:** NVMU, DPC Mining
Assessment	Field assessment (Accredited Consultant) - Bushland, Rangeland or Scattered tree assessment and a documented Fauna survey.					
SEB	Determined as per SEB Policy and Guide					
Level 4	Total Biodiversity Score of greater than **250**		Total Biodiversity Score of greater than **2500**			**Delegation:** NVAP, DPC Mining
Assessment	Field assessment (Accredited Consultant) - Bushland, Rangeland or Scattered tree assessment and a documented Fauna Survey. Application made available to the public and referred to relevant agency or body for comment					
SEB	Determined as per SEB Policy and Guide					

Figure 14. Criteria, assessment process and SEB for levels of clearance to be risk-assessed (Government of South Australia 2017a).

7.2 Mitigation hierarchy

The *Native Vegetation Regulations 2017* place a great emphasis on the proponent applying the Mitigation Hierarchy, a fundamental principle which encourages proponents to consider all possible ways to avoid and minimise clearance to reduce the level of clearance required. Reducing the level of clearance also reduces the SEB offset (where required) and associated cost to the proponent. EBS can address the mitigation hierarchy and principles of clearance once the proposed construction layout is known.

7.3 Significant Environment Benefit

Approval for native vegetation clearance is conditional on providing a Significant Environmental Benefit (SEB). An SEB can be achieved through several options including managing and/or formally protecting an area of native vegetation for conservation purposes (Heritage Agreement), undertaking a revegetation program on the site of the operation or within the same region of the state, or alternatively, making a payment into the Native Vegetation Fund. The primary aim of the SEB is to achieve a net environmental gain, which contributes to improving the biodiversity values of the region, rather than simply off-setting the vegetation clearance.

There is little room for the rehabilitation of areas within the project footprint as the solar farm is considered long-term and it is unlikely that any re-establishment of vegetation within this area can occur for the life of the project. EBS has been advised by the client that a suitable grass cover will be grown across the site following construction, in accordance with planning obligations. This is considered separate to SEB obligations for native vegetation clearance.

8 SUMMARY AND RECOMMENDATIONS

8.1 Legislative approvals

8.1.1 Seek Native Vegetation Council approval for any vegetation clearance required

Any vegetation clearance that may be required needs approval under the *Native Vegetation Act 1991*. Once the infrastructure design is finalised, the extent of vegetation removal required will need to be determined to calculate the required Significant Environmental Benefit (SEB) offset. The provision of an SEB can be undertaken in several forms including managing and conserving areas of native vegetation, undertaking native vegetation restoration activities or making a payment into the Native Vegetation Fund. Potential opportunities to achieve an SEB offset within or surrounding the project area should be identified.

8.1.2 EPBC referral

The project is not considered to have a significant impact on any EPBC Act listed flora, fauna or ecological communities, and hence a referral is not required based on the current assessment area.

8.2 General

8.2.1 Infrastructure placement

- Infrastructure placement should avoid the need for tree clearance, in particular; the western side of the western block, where numerous scattered *Eucalyptus leucoxylon* ssp. *pruinosa* (Inland SA Blue Gum) are located. It is presumed this area will be unsuitable anyway due to steepness.
- Infrastructure and access routes should be aligned, where practical, with cropping/cleared land. Areas containing the woodland and shrubland associations and scattered trees should be avoided where possible as they offer valuable habitat for fauna species in an area largely devoid of shrubs and trees.
- Ideally, locate infrastructure away from areas of native vegetation/fauna habitat to reduce impacts associated with disturbance, weed invasion etc.
- If any Wedge-tailed Eagle nests are observed (none were recorded during the survey), a buffer between the nest and infrastructure/maintenance access is recommended to avoid disturbance.
- Further assessment is required if any impact is proposed outside of the assessed area.

8.2.2 Construction

- In general, avoid construction or disturbance to any areas of high ecological value i.e. remnant trees in western block and remnant roadside vegetation patches.
- A Construction Environmental Management Plan (CEMP) should be in place, prior to construction. This will provide specific, detailed methods to avoid environmental damage during the construction phase.
- Ensure vegetation clearance is restricted to the designated clearance envelope.

- A site induction session with clearance contractors should be arranged whereby the project area is defined and areas designated for clearance are delineated. The purpose of the site induction would be to prevent inappropriate clearance of vegetation not within the clearance envelope.
- Native fauna disturbed during vegetation clearance/construction should if possible be relocated to suitable habitat nearby.
- Ensure that construction machinery is clean and free from soil pathogens and any weed seed materials before entering/exiting the area. This includes performing appropriate hygiene when leaving the subject site to avoid potential spread.
- Any soil/material brought to site should be certified clean and free of weed propagules and soil pathogens. Suitable management measures in relation to Phytophthora should be included in the CEMP.
- Vegetative material removed from the site must be managed appropriately (i.e. any dumping should occur at a licensed waste facility to ensure there is no spread of material contaminated with weed propagules amongst native vegetation).
- Stockpile sites, vehicle / machinery parking areas and general laydown areas should be located away from any native vegetation.
- Weed management strategies (including weed hygiene procedures) should be implemented to ensure that weed species are not introduced or spread throughout the construction area.

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10 APPENDICES

Appendix 1. Plant species recorded within survey area.

Scientific name	Common name	Conservation status		Introduced	Vegetation Association					
		Aus.	SA		1	2	3	4	5	6
Acacia acenacea	Gold Dust Wattle							✓		
Acacia notabilis	Notable Wattle							✓		
Acacia paradoxa	Kangaroo Thorn				✓		✓	✓		
Acacia pycnantha	Golden Wattle					✓		✓		
Acacia spp.	Wattle							✓		
Allocasuarina verticillata	Drooping Sheoak					✓		✓		
Amyema spp.	Mistletoe							✓		
Austrostipa spp.	Spear-grass					✓		✓		
Bromus diandrus	Great Brome			*						
Bulbine bulbosa	Bulbine Lily					✓				
Bulbine semibarbata	Small Leek-lily									
Bursaria spinosa	Christmas Bush							✓		
Callitris spp.	Conifer							✓		
Cannabis sativa	Hemp			*			✓			
Casuarina cunninghamiana	River Oak							✓		
Chrysocephalum spp.	Everlasting					✓				
Dianella revoluta var.	Blueberry Lily					✓		✓		
Digitaria brownii	Cotton Panic-grass					✓				
Echium plantagineum	Salvation Jane			DP			✓			
Epacris spp.	Heath					✓				
Eucalyptus camaldulensis	River Red Gum							✓		
Eucalyptus leucoxylon ssp. *pruinosa*	Inland South Australian Blue Gum				✓			✓		
Eucalyptus spp.	Gum Tree							✓		
Foeniculum vulgare	Fennel			EW				✓		
Fraxinus spp.	Ash Tree							✓		
Hordeum vulgare	Barley			*		✓				
Lagurus ovatus	Hare's Tail Grass			*						
Lomandra multiflora ssp. *dura*	Hard Mat-rush									
Lomandra spp.	Mat-rush					✓				
Malva parviflora	Small-flower Marshmallow			*		✓				
Marrubium vulgare	Horehound			DP				✓		
Melaleuca spp.	Teatree							✓		
Microlaena stipoides var. *stipoides*	Weeping Rice-grass									
Olea europaea ssp.	Olive			DP				✓		
Oxalis pes-caprae	Soursob			*			✓	✓		
Phalaris aquatica	Phalaris			*						
Pinus spp.	Pine Tree			*				✓		

Scientific name	Common name	Conservation status		Introduced	Vegetation Association					
		Aus.	SA		1	2	3	4	5	6
Plantago lanceolata	Ribwort Plantain			EW				✓		
Romulea rosea	Onion Grass			EW				✓		
Rosa canina	Dog Rose			DP			✓	✓	✓	
Rumex spp.	Dock							✓		
Rytidosperma spp.	Wallaby Grass					✓		✓		
Salvia verbenaca var.	Wild Sage			EW				✓		
Scabiosa atropurpurea	Pincushion			*						
Scabiosa spp.	Honeysuckle			*			✓	✓		
Schinus molle	Peppercorn Tree			*				✓		
Sisymbrium spp.	Mustard			*				✓		
Themeda triandra	Kangaroo Grass					✓				
Unknown	Deciduous Tree							✓		
Unknown	Introduced grasses			*		✓	✓	✓	✓	✓
Vicia spp.	Vetch			*						
Vittadinia gracilis	Woolly New Holland Daisy									
Vittadinia spp.	New Holland Daisy									
Xanthorrhoea quadrangulata	Grass Tree					✓				
Acacia acenacea	Gold Dust Wattle							✓		

Conservation status

Aus.: Australia (Environment Protection and Biodiversity Conservation Act 1999). SA: South Australia (National Parks and Wildlife Act 1972). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level. DP: Declared Plant. EW: Environmental Weed.

Appendix 2. Fauna species recorded within survey area.

Scientific name	Common name	Conservation status		Introduced
		Aus.	SA	
Bird				
Acanthiza chrysorrhoa	Yellow-rumped Thornbill			
Alauda arvensis	Eurasian Skylark			*
Anas gracilis	Grey Teal			
Anas superciliosa	Pacific Black Duck			
Anthochaera carunculata	Red Wattlebird			
Anthus australis	Australian Pipit			
Cacatua sanguinea	Little Corella			
Chenonetta jubata	Maned (Australian Wood Duck)			
Cincloramphus cruralis	Brown Songlark			
Circus assimilis	Spotted Harrier			
Columba livia	Feral Pigeon [Rock Dove]			*
Coracina novaehollandiae	Black-faced Cuckooshrike			
Corcorax melanorhamphos	White-winged Chough		R	
Corvus spp.	Raven or Crow			
Dacelo novaeguineae	Laughing Kookaburra			
Egretta novaehollandiae	White-faced Heron			

Scientific name	Common name	Conservation status		Introduced
		Aus.	SA	
Elanus axillaris	Black-shouldered Kite			
Eolophus roseicapilla	Galah			
Epthianura albifrons	White-fronted Chat			
Falco cenchroides	Nankeen Kestrel			
Gavicalis virescens	Singing Honeyeater			
Glossopsitta concinna	Musk Lorikeet			
Grallina cyanoleuca	Magpielark			
Gymnorhina tibicen	Australian Magpie			
Manorina melanocephala	Noisy Miner			
Pardalotus striatus	Striated Pardalote			
Passer domesticus	House Sparrow			*
Petrochelidon nigricans	Tree Martin			
Platycercus elegans	Crimson Rosella			
Psephotus haematonotus	Red-rumped Parrot			
Rhipidura albiscapa	Grey Fantail			
Rhipidura leucophrys	Willie Wagtail			
Sturnus vulgaris	Common Starling			*
Trichoglossus haematodus	Rainbow Lorikeet			
Mammal				
Macropus fuliginosus	Western Grey Kangaroo			

Conservation status

Aus.: Australia (Environment Protection and Biodiversity Conservation Act 1999). SA: South Australia (National Parks and Wildlife Act 1972). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. ssp.: the conservation status applies at the sub-species level.

Appendix 3. Assessment criteria for the condition of vegetation communities.

Condition	SEB ratio	% indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)
Very Poor	**0:1**	<10%	No overstorey stratum remaining.	Complete destruction of indigenous understorey* (by grazing &/or introduced plants).	Vegetation structure no longer intact (e.g. removal of one or more vegetation strata). Scope for regeneration, but not to a state approaching good condition without intensive management. Dominated by very aggressive weeds. Partial or extensive clearing (> 50% of area). Evidence of heavy grazing (tracks, browse lines, species changes, complete depletion of soil surface crust).	Where proposed clearance is considered to be minor and of limited biodiversity impact, e.g. lopping of overhanging limbs only or minor clearance of shrubs in areas otherwise considered as highly disturbed.
	1:1	10-19%	Scattered trees in poor health and/or representing an immature stand.	Almost complete destruction of indigenous understorey* (by grazing &/or introduced plants) - reduced to scattered clumps and individual plants.		Where proposed clearance is in areas dominated by introduced species, the area of native vegetation is largely reduced to scattered trees, indigenous understorey reduced to scattered clumps and individual plants.
	2:1	20-29%	Scattered trees either immature in good health or mature in poor/moderate health. Alternatively, the dominant overstorey stratum is largely intact and is an immature stand (or regrowth), and is generally in poor health.			
Poor	**3:1**	30-39%	Dominant overstorey stratum is largely intact and is a moderately healthy mature stand.	Heavy loss of native plant species (by grazing &/or introduced plants). The understorey* consists predominately of alien species, although a small number of natives persist.	Vegetation structure substantially altered (e.g. one or more vegetation strata depleted). Retains basic vegetation structure or the ability to regenerate it. Very obvious signs of long-term or severe disturbance. Weed dominated with some very aggressive weeds. Partial clearing (10 – 50% of area). Evidence of moderate grazing (tracks, browse lines, soil surface crust extensively broken).	Where the proposed clearance is of mostly intact overstorey vegetation but there is still considerable weed infestation amongst the understorey flora.
	4:1	40-49%	Dominant overstorey stratum is largely intact and is a healthy mature stand with high wildlife habitat value (e.g. hollows).			
Moderate	**5:1**	50-59%	Dominant overstorey stratum is largely intact – any condition+	Moderate loss of native understorey diversity. Weed-free	Vegetation structure altered (e.g. one or more vegetation	Where the proposed clearance is of mostly intact

Condition	SEB ratio	% indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)
				areas small. Substantial invasion of aliens resulting in significant competition, but native understorey* persists; for example, may be a low proportion of native species and a high native cover, or a high proportion of native species and low native cover.	strata depleted). Most seed sources available to regenerate original structure. Obvious signs of disturbance (e.g. tracks, bare ground). Minor clearing (<10% of area). Considerable weed infestation with some aggressive weeds. Evidence of some grazing (tracks, soil surface crust patchy).	overstorey vegetation with moderate but not severe weed infestation amongst the understorey flora. Clearance is not seriously at variance with the Principles.
	6:1	60-69%	Dominant overstorey stratum is largely intact – any condition+	Moderate but not severe weed infestation amongst the understorey flora.		
Good	**7:1**	70-79%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.	Vegetation structure intact (e.g. all strata intact). Disturbance minor, only affecting individual species. Only non-aggressive weeds present. Some litter build-up.	Where the proposed clearance is of mostly intact overstorey and understorey vegetation, weed infestation is moderate to low, but the original vegetation is still dominant. Clearance is assessed by the NVC to be at variance with the Principles.
	8:1	80-89%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.		
Excellent	**9:1**	> 89%	Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand.	Diverse vegetation with very little weed infestation. Understorey largely undisturbed, minimal loss of plant species diversity. Very little or no sign of alien vegetation in the understorey*; resembles probable pre-European condition.	All strata intact and botanical composition close to original. Little or no signs of disturbance. Little or no weed infestation. Soil surface crust intact. Substantial litter cover.	Where the proposed clearance is of diverse vegetation with very little weed infestation. Clearance is assessed by the NVC to be seriously at variance with the Principles.
	10:1		Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand, with high habitat value (e.g. hollows).			

* Or all strata if the upper and lower strata are difficult to distinguish.

+ Ratio assessment will largely depend upon condition of understorey associated with an intact overstorey stratum.

Adapted from *Guide to Roadside Vegetation Survey Methodology for South Australia* (Stokes et al. 1998) and *Guidelines for a Native Vegetation Significant Environmental Benefit Policy* (DWLBC 2005).

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