

## APPLICATION ON NOTIFICATION – CROWN DEVELOPMENT

<b>Type of development:</b>	Section 49 – Public Infrastructure
<b>Development Number:</b>	850/V003/18
<b>Applicant:</b>	SIMEC ZEN Solar
<b>Nature of Development:</b>	Cultana Solar Farm
<b>Subject Land:</b>	McBryde Terrace and Industry Drive, Whyalla
<b>Development Plan:</b>	Land Not Within a Council Area (Whyalla) Development Plan (Consolidated 18 October 2012) Whyalla Council Development Plan (Consolidated 14 June 2017)
<b>Zone / Policy Area:</b>	Remote Areas Zone and Industry Zone
<b>Contact Officer:</b>	Laura Kerber
<b>Phone Number:</b>	7109 7073
<b>Consultation Start Date:</b>	Thursday 24 January 2019
<b>Consultation Close Date:</b>	Monday 25 February 2019
<p><b>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 St, 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).</b></p>	

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 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: [scapreps@sa.gov.au](mailto:scapreps@sa.gov.au)

Fax Number: (08) 8303 0753

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

**Applicant:** SIMEC ZEN Energy  
**Development Number:** 850/V003/18  
**Nature of Development:** Cultana Solar Farm  
**Zone / Policy Area:** Remote Areas Zone and Inudstry Zone  
**Subject Land:** McBryde Terrace and Industry Drive, Whyalla  
**Contact Officer:** Laura Kerber  
**Phone Number:** 7109 7073  
**Close Date:** Monday 25 February 2019

My Name: \_\_\_\_\_ My phone number: \_\_\_\_\_

Primary method(s) of contact: \_\_\_\_\_ Email: \_\_\_\_\_  
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: *(please tick one)*

- 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: \_\_\_\_\_

My interests are: *(please tick one)*

- I support the development
- I support the development with some concerns
- I oppose the development

**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)* *(Please tick one)*

**By:**

- appearing personally
- being represented by the following person

*(please tick one)* *(Please tick one)*

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_



## DEVELOPMENT ACT 1993

### SECTION 49 - PUBLIC INFRASTRUCTURE

#### NOTICE OF APPLICATION FOR CONSENT TO DEVELOPMENT

Notice is hereby given that an application has been made by **SIMEC ZEN Energy** for consent to develop the Cultana Solar Farm. **Development Number 850/V003/18.**

The Cultana Solar Farm is proposed over two sites (north and south) separated by the Lincoln Highway. The proposal comprises up to a 280MW solar farm (approximately 925,000 solar photovoltaic panels mounted on single axis tracker structures) and ancillary structures (including inverters, transformers, underground cabling and security fencing); operations and maintenance building; storage buildings; 33kV switching station (south site); switchyard comprising 275kV/33kV substation and 33kV switchroom (north site); 33kV overhead transmission line connecting the south and north sites; 275kV overhead transmission line connecting the north site to the Cultana substation; and site laydown areas. Access to the south site would be established off Industry Drive and access to the north site is from Kimberley Road.

The north site is situated at McBryde Terrace, Whyalla being Certificate of Title 6105/303 (Alotment 1, DP90755). The proposed transmission line to Cultana substation traverses Crown Record 5346/949 (Q6), Crown Record CR 6140/412 (A69), Certificate of Title 5983/544 (rail line) and Crown Lease 6164/360 (A67). Access to the north site is from Kimberley Road through Crown Record 5346/948.

The northern development site is located within the Remote Areas Zone of the Land Not Within a Council Area (Whyalla) Development Plan (Consolidated 18 October 2012). The southern development site is situated at Industry Drive, Whyalla being a portion of Certificate of Title 6144/358 and is located within the Industry Zone of the Whyalla Council Development Plan (Consolidated 14 June 2017).

The application may be examined during normal office hours at the office of the State Commission Assessment Panel (SCAP), Level 5, 50 Flinders Street and at the office of Whyalla Council, Civic Building, Darling Terrace, Whyalla. Application documentation may also be viewed on the SCAP website [http://www.saplanningcommission.sa.gov.au/scap/public\\_notices](http://www.saplanningcommission.sa.gov.au/scap/public_notices).

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 SA 5001 **NOT LATER THAN Monday 25 February 2019.** Submissions may also be emailed to: [scapreps@sa.gov.au](mailto: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 the representation.

Submissions may be made available for public inspection.

Should you wish to discuss the application and the public notification procedure please contact Laura Kerber on 7109 7073 or [Laura.Kerber@sa.gov.au](mailto:Laura.Kerber@sa.gov.au).

Alison Gill  
**SECRETARY**  
**STATE COMMISSION ASSESSMENT PANEL**  
[scapreps@sa.gov.au](mailto:scapreps@sa.gov.au)

PN3525

[www.sa.gov.au](http://www.sa.gov.au)

# SECTION 49 & 49A – CROWN DEVELOPMENT DEVELOPMENT APPLICATION FORM

**PLEASE USE BLOCK LETTERS**

**COUNCIL:** CITY OF WHYALLA  
**APPLICANT:** SIMEC ZEN ENERGY  
**ADDRESS:** PO BOX 141, OAKLANDS PARK  
**CROWN AGENCY:** DPTI

**FOR OFFICE USE**

DEVELOPMENT No: \_\_\_\_\_  
 PREVIOUS DEVELOPMENT No: \_\_\_\_\_  
 DATE RECEIVED:        /        /

**CONTACT PERSON FOR FURTHER INFORMATION**

Name: STURT DALY  
 Telephone: 0457 569 578 [work] \_\_\_\_\_ [Ah]  
 Fax: \_\_\_\_\_ [work] \_\_\_\_\_ [Ah]  
 Email: SDALEY@ZENENERGY.COM.AU

<input type="checkbox"/> Complying <input type="checkbox"/> Merit <input type="checkbox"/> Public Notification <input type="checkbox"/> Referrals	Decision: _____ Type: _____ Finalised:        /        /
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**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 public notification and advertising fees.  
 (2) Three copies of the application should also be provided.

	Decision required	Fees	Receipt No	Date
Planning:	_____	_____	_____	_____
Land Division:	_____	_____	_____	_____
Additional:	_____	_____	_____	_____
<b>Minister's Approval</b>				

**EXISTING USE:** VACANT, PARTIALLY WITHIN MINING LEASE

**DESCRIPTION OF PROPOSED DEVELOPMENT:** CULTANA SOLAR FARM - 280MW SOLAR PV PROJECT

**LOCATION OF PROPOSED DEVELOPMENT:** WHYALLA BARSON

House No: \_\_\_\_\_ Lot No: \_\_\_\_\_ Street: \_\_\_\_\_ Town/Suburb: \_\_\_\_\_  
 Section No [full/part] \_\_\_\_\_ Hundred: CULTANA Volume: 6105 Folio: 303  
 Section No [full/part] \_\_\_\_\_ Hundred: CULTANA + RANDELL Volume: 6144 Folio: 358

**LAND DIVISION:**

Site Area [m<sup>2</sup>] \_\_\_\_\_ Reserve Area [m<sup>2</sup>] \_\_\_\_\_ No of existing allotments \_\_\_\_\_  
 Number of additional allotments [excluding road and reserve]: \_\_\_\_\_ Lease:        YES         NO

**DEVELOPMENT COST** [do not include any fit-out costs]:        \$ 350,000,000

**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 the DPLG website ([www.dac.sa.gov.au](http://www.dac.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*.

**SIGNATURE:** 

Dated: 24 / 10 / 2018





REPORT

## Cultana Solar Farm

*Development Application Report*

Submitted to:

**Department of Planning, Transport and Infrastructure**

Submitted by:

**Golder Associates Pty Ltd**

On behalf of SIMEC ZEN Energy

+61 8 8213 2100

1898738-002-R-Rev0

24 October 2018



## Distribution List

1 e-copy: Department of Planning, Transport and Infrastructure

1 e-copy: SIMEC ZEN Energy

1 e-copy: Golder Associates

## Preface

This Development Application Report has been prepared by SIMEC ZEN Energy in support of an application for statutory consents for the construction and operation of Cultana Solar Farm Project (the Project), approximately 5 km north of Whyalla, South Australia.

The Project has been sponsored (13 July 2018) by the Department of the Premier and Cabinet as a development of public infrastructure as required by Section 49 of the Development Act 1993 (South Australia). This Development Application has been submitted to the Department of Planning, Transport and Infrastructure for lodgement to the State Commission Assessment Panel.

The Development Application has been prepared in three volumes:

- Volume 1: Executive Summary
- Volume 2: Development Application Report
- Volume 3: Technical Appendices.

The Development Application can be viewed during the statutory consultation period at the following locations:

Department of Planning, Transport and  
Infrastructure (DPTI)  
77 Grenfell St  
ADELAIDE SA 5001

Corporation of the City of Whyalla  
Civic Building, Darling Terrace  
WHYALLA SA 5600

## VOLUME 1: EXECUTIVE SUMMARY

## Introduction

SIMEC ZEN Energy is developing a 280 MW solar energy project over two connected greenfield sites (north and south) near the Liberty OneSteel Whyalla Steelworks.

The Cultana Solar Farm (the Project) will span over 1,000 ha of land owned by the GFG Alliance and the City of Whyalla. The Project will include an operations compound, a new substation and provisional battery energy storage, as well as a temporary lay-down area for construction. The Project will connect to the Cultana Substation via overhead power lines with some underground cabling.

## Applicant

This Development Application Report (DAR) has been prepared on behalf of SIMEC ZEN Energy.

SIMEC ZEN Energy serves as one of Australia's leading renewable energy brands in the design and installation of solar energy and energy storage systems. SIMEC ZEN Energy is a part of the GFG Alliance. The GFG Alliance owns iron ore mining assets in Whyalla and iron ore bulk handling facilities at the Whyalla port, which are part of SIMEC. Through acquisition and new developments, SIMEC is steadily building up its renewable energy portfolio and has set a target to become a large green power generator by 2021 with 1 Gigawatt of capacity. Existing and pending assets include hydro, wind, biodiesel, marine, waste-to-energy and other energy technologies. SIMEC has a controlling stake in ZEN Energy, creating SIMEC ZEN Energy.

## Approval pathway

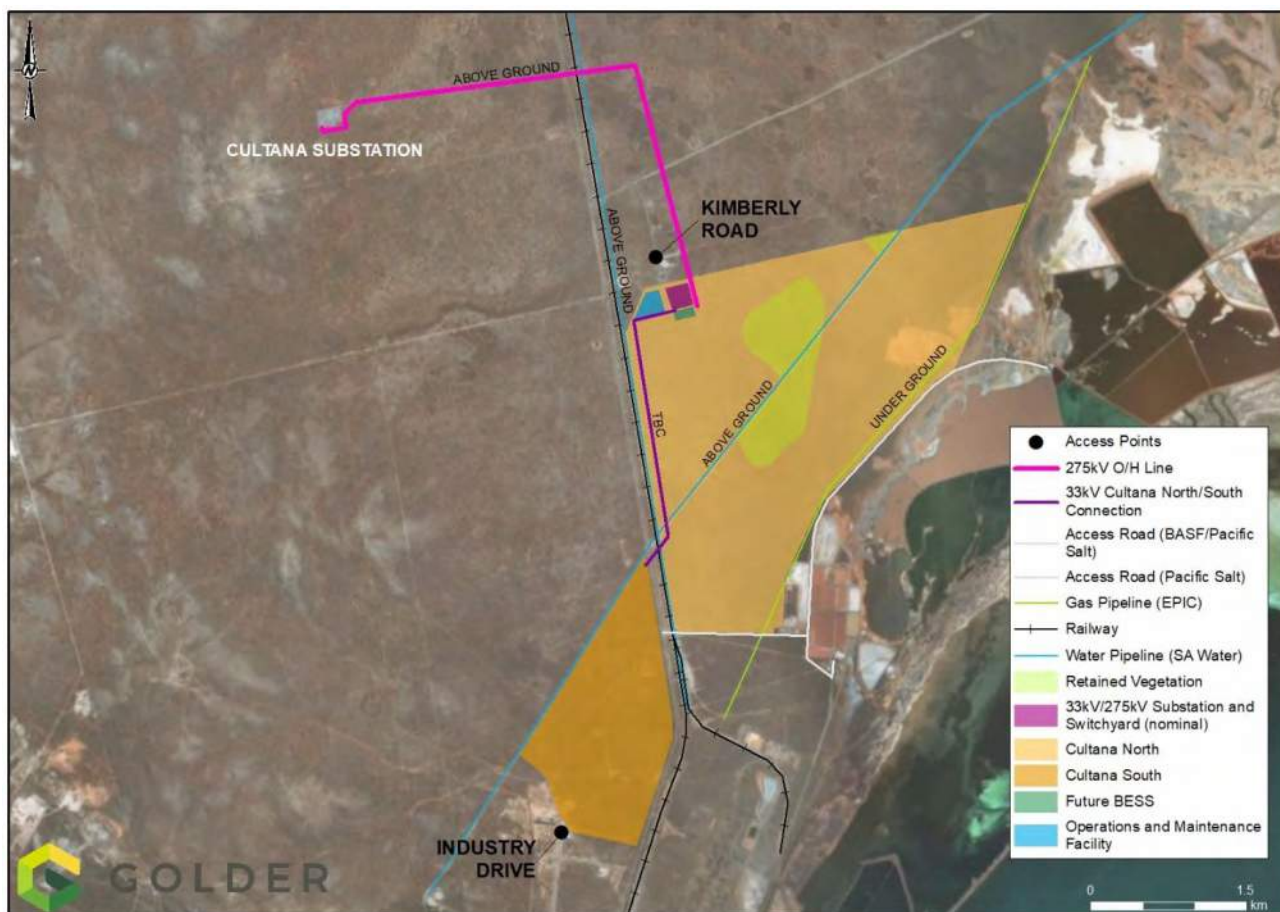
This Development Application (DA) has been prepared for submission to the State Commission Assessment Panel (SCAP) and relevant referral bodies, pursuant to Section 49(1)(a) of the Development Act 1999 (Development Act). In accordance with the Development Act, the Project, considered Public Infrastructure, has been granted Crown Sponsorship through the Department of Premier and Cabinet (DPC).

## Project description

Details of the north and south sites are included in Table 1, and the general layout is shown in Figure 1.

**Table 1: General overview of the Project**

Aspect	North	South
Land parcel size	784 ha	260 ha
Rated plant capacity	210 MW	70 MW
Certificate of Title	Volume 6105 Folio 303 as Allotment 1 Deposited Plan 90705, Hundred of Cultana	Volume 6144 Folio 358 as Allotment 1000 Deposited Plan 79748, Hundred of Cultana and Randell
Transmission connection	275 kV to Cultana substation	33 kV to North site switchyard and 275kV to Cultana substation
Land tenure	25 year lease from GFG Alliance - OneSteel Manufacturing Pty Ltd	Agreement to Lease with The Corporation of the City of Whyalla
Proposed site access	Kimberly Road via Lincoln Highway and Inkerman Road	Industry Drive via Lincoln Highway and Arthur Glennie Drive
Operations and Maintenance	O&M Building	Not applicable
Battery energy storage system (BESS)	4 ha	Not applicable



**Figure 1: General project layout**

The Project will be made up of a series of solar panels, designed to absorb light and transform it into useable energy by way of inverters. Up to 280 MW of generation capacity is expected from the Project.

Approximately 925,000 solar photovoltaic (PV) modules will be arranged in a north-facing direction and track the sun as it moves east-to-west. Solar modules will be treated with anti-reflection technology and are expected to be mounted up to a maximum of 4 m in height. Strings will take the wires from the different modules and combine them into one main feed. A string combiner will then combine the output of multiple strings of modules to connect to a common inverter. The trackers are 90 m long and will be installed to allow a 3 m wide access track between each row for maintenance purposes and to avoid shading issues. The energy generated by the PV modules will be converted from direct current to alternating current energy by the inverters and increased to medium voltage via integrated transformers. The inverters will be prefabricated and brought to site in a compact 12.2 m length x 2.4 m width shipping container.

A permanent operations compound to service the Project will be in the north western section of the northern site. The operations compound will include an Operations & Maintenance (O&M) building, 33 kV switch room, storage buildings, a 275 kV/33 kV substation and carparking facilities.

A 4 hectare area for a battery energy storage system (BESS) has been identified adjacent to the operations compound.

The Project is seeking to primarily use existing ElectraNet easements to connect to a switching bay at the Cultana Substation (Figure 1). Connections between the South and North site, and the road crossing from the North site to the Cultana Substation will be either overhead powerlines or directionally drilled under the road.

## Project benefits

The Project supports local, State and Commonwealth objectives by providing employment opportunities through regional investment, improving grid reliability and lowering electricity costs by increasing supply to the market.

## Existing environment and potential impacts

### *Surface water*

The site is within an area that experiences semi-arid climate, with an average annual rainfall between 250-280 mm per year and average monthly rainfall similar across the year (Government of South Australia, 2017). The low rainfall, high soil infiltration and high evaporative losses result in few surface drainage features and there are no drainage features within the Project footprint. A review of aerial images indicated a surface water drainage line to the west of the South site may experience pooling around the termination of Industry Drive (near the site access point) during high rainfall events before discharging through the swale to the east of the proposed access point.

The Project is not expected to have a significant impact on surface water drainage pathways. The South site will require the installation of drainage infrastructure at the access point to ensure the swale drainage pathway for high rainfall events is maintained and to ensure all-weather access to the site.

The removal of vegetation and disturbance of topsoil during construction could potentially increase the occurrence of soil erosion and surface water sedimentation during rainfall events. The increase in impervious areas during construction such as roads and hardstand areas is likely to change runoff volume and overflow paths and could also result in erosion in new drainage pathways. Further, accidental spills during construction have the potential to impact on surface water quality. Potential impacts during construction will be managed through the implementation of an EMP.

Permanent infrastructure will also have the potential to impact on surface water during operation of the plant including new hardstand areas (i.e. roads, substation, operations compound) and the solar panel modules.

The Project will be designed to ensure the overflow pathways constructed around new hardstand areas are adequate for the volume of water expected in a high rainfall event. This will include scour protection in drainage lines where required.

The solar panels themselves have the potential to alter infiltration regimes across the site. Further, in areas where there is no stabilising vegetation (or during rehabilitation) the concentration of runoff could result in erosion along the dripline of the solar panel. Potential erosion impacts will be managed through the EMP.



## Traffic impact and site access

### North Site

The North site will be accessed from the Lincoln Highway via Inkerman Road and Kimberly Road, as shown in Figure 2 (Kimberly Road Access Point).

The safe intersection sight distance (SISD) and minimum gap sight distance (MGSD) are achieved at the T junction between Kimberly Road and Inkerman Road. The SISD is not currently achieved at the access point intersection with Kimberly Road, however vegetation trimming or removal will be undertaken to rectify this. The approach site distance (ASD) of 40 m from inside the site to the access point intersection can be achieved.

Kimberly Road was observed to be in generally poor condition, with severe stripping and potholing, as well as moderate deformation and rutting observed on the bituminous surface. A comprehensive pavement condition assessment will be undertaken for Kimberly Road prior to construction with potential for subsequent remediation works.

The most significant increase in traffic will be on Kimberly Road, however, given that it is not currently used to provide access to any active properties nor is it considered a through route to other areas, the impact on existing road conditions is expected to be minor. The impact of the increased traffic load, including heavy vehicles, on the Inkerman Road and Lincoln Highway road conditions during the construction period is expected to be minor and temporary.

The traffic increase on all roads during the operational period is negligible due to the small volume of traffic generated.

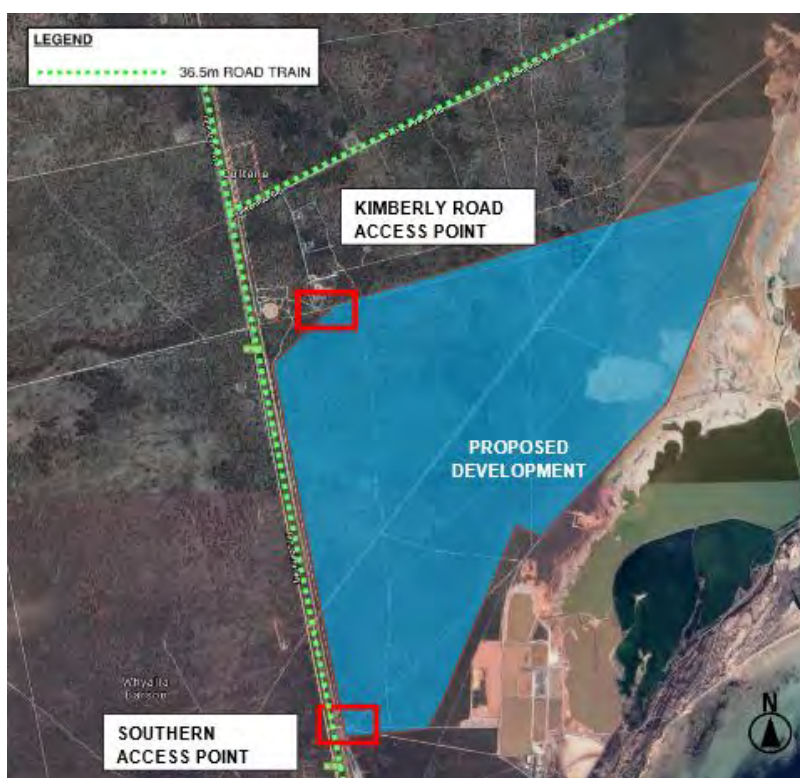


Figure 2: North site access point



## South Site

The South site will be access from Industry Drive, via Arthur Glennie Drive and the Lincoln Highway as shown in Figure 3. The access point is proposed to the north of a cul-de-sac at the end of Industry Drive (Figure 4), with access to another industrial facility currently branching from the cul-de-sac to the west. The access point is an unsealed road and re-construction is proposed as part of the site construction.

The ASD from inside the site to the access point intersection can be achieved. The SISD is achieved for this access point and the MGSD was not considered relevant based on the access point being at the end of a cul-de-sac.

Industry Drive consists of a two-way road, 16 m in width and straight on approach to the access point. The road is an asphaltic surface in good condition, constructed with the intention of being used as an industrial connection road and hence can structurally support the proposed heavy traffic.

Industry Drive will be most affected however, these increases are not expected to have a significant impact on existing road conditions.

The traffic increase on all roads during the operational period is negligible due to the small volume of traffic generated.



Figure 3: South site access route



Figure 4: South site access point

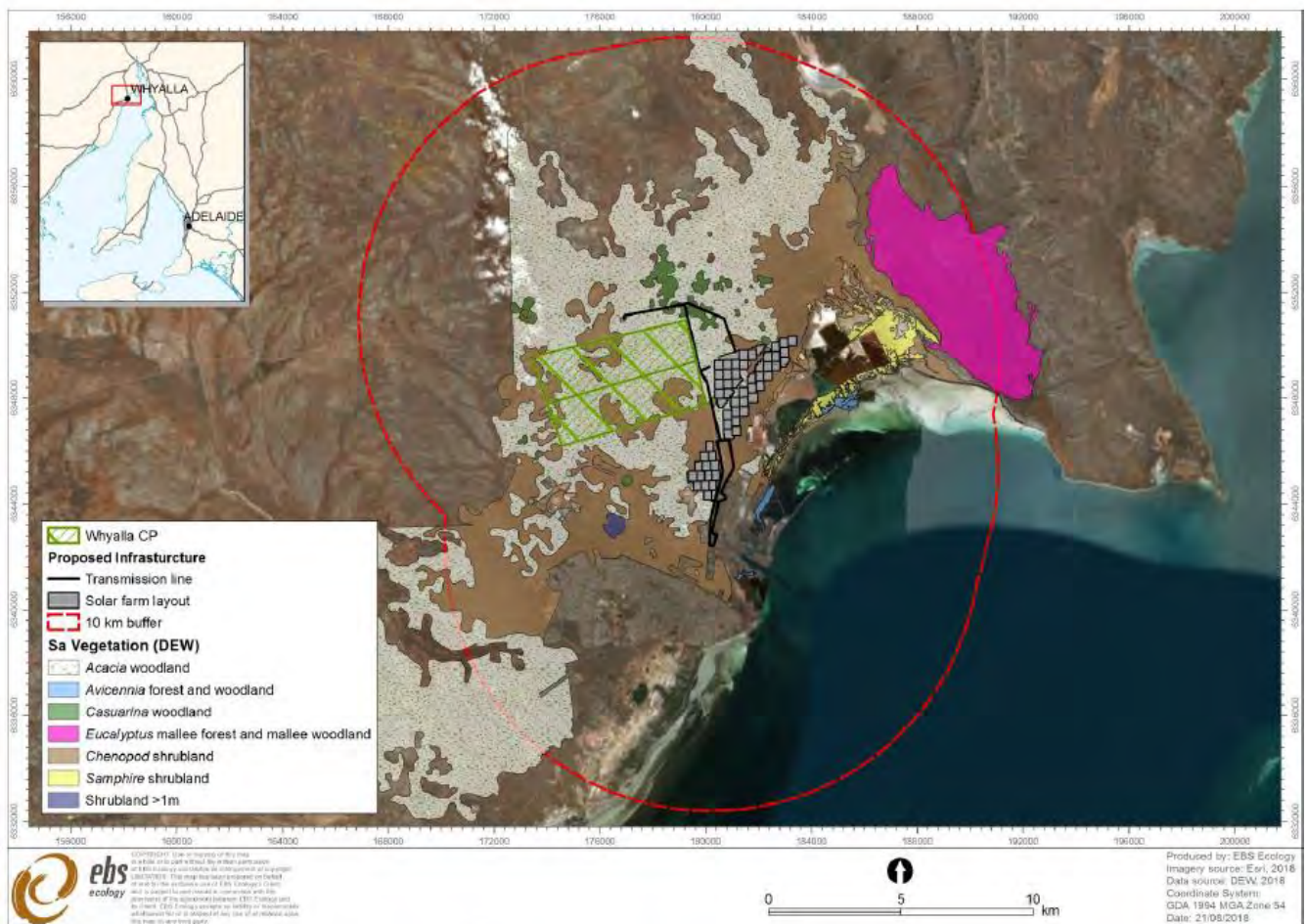
### Aboriginal heritage

An Aboriginal Affairs and Reconciliation (AAR) site search did not identify any Aboriginal sites within 500 m of the Project area. A subsequent desktop Aboriginal heritage risk assessment determined that there was a medium risk for *in situ* sub-surface archaeological material to be encountered during the planned works.

SIMEC ZEN Energy is collaborating with the Barngarla Determination Aboriginal Corporation to finalise a Heritage Agreement. Once an agreement has been reached, a detailed cultural heritage survey will be undertaken to further confirm the potential Project impacts and management requirements.

### Ecology

The Project site is characterised by Acacia woodland, chenopod shrubland and patches of Casuarina woodland (Figure 5) which has been lightly grazed.



**Figure 5: Overview of vegetation mapping with a 10 km buffer of the Project site**

A desktop likelihood assessment of significant flora and fauna defined within the *National Parks and Wildlife Act 1972* (NPW Act) identified no records of State threatened flora or fauna near the Project. One threatened ecosystem, two threatened flora and three threatened fauna were rated as having a possible likelihood of occurrence at the Project site.

The Project will require removal of vegetation to allow for the construction and operation of solar panels and associated Project infrastructure. A Bushland Assessment will be undertaken to determine the presence, condition and context of vegetation identified in the project area to more clearly define the ecological parameters and determine a Significant Environmental Benefit score for the Project.

The Project design has been optimised to minimise vegetation removal requirements, particularly within areas of the Acacia Woodland area. The construction methodology will also be designed to minimise vegetation disturbance and removal. Revegetation with local native species will be undertaken following construction.

Native vegetation at the site will be protected through construction as far as practicable through implementation of an EMP. SIMEC ZEN Energy will also support research into the interaction of wildlife with utility scale solar farms to better understand possible risk events as solar facilities become more common.

An *Environment Protection and Biodiversity Conservation Act 1999* self-assessment indicated that the Project is not expected to have a significant impact on any matters of National Environmental Significance and referral of the Project to the Minister for the Environment for assessment was not considered necessary.



### Visual amenity

There were no sensitive receptors (i.e. residences) within 2 km of the site. Viewpoints with the potential to be impacted by the Project were determined to be:

- Lincoln Highway
- Inkerman Road/Port Bonython Road
- Industry Drive.

The results of a GlareGauge analysis, which uses the Solar Glare Hazard Analysis Tool (SGHAT), indicated that the observation points for potential viewpoints received no glare.

Site infrastructure, including the operations compound, will be screened with vegetation where appropriate, and vegetation along roadsides will be retained to minimise the visual impact to highway users.

The overhead powerlines will be visible from the Lincoln Highway, however, given the existing visual prominence of electricity infrastructure, this impact is considered minor.

### Air quality

Dust is likely to be generated during construction because of vegetation clearance and increased traffic on unsealed areas.

The Project will be designed to ensure nuisance dust levels are minimised including avoiding vegetation removal and accelerated rehabilitation/revegetation following disturbance through seeding, watering and/or other methods.

Dust will also be managed during construction through the implementation of the EMP, including (but not limited to) the following measures:

- Dust curtains along boundary fencing
- Wetting-down of exposed surfaces
- Progressive rehabilitation/revegetation of disturbed areas
- Applying road base to highly trafficked areas.

### Planning Assessment

The Project is located within the Remote Areas Zone of the Land Not Within a Council Area Eyre, Far North, Riverland and Whyalla Development Plan (LNWCA Development Plan), consolidated 18 October 2018, and the Whyalla Council Development Plan, consolidated 14 June 2017.

The Project complies with the objectives and PDCs listed in both the general section and specific zone sections of the two relevant Development Plans.

While not explicitly stated as a land use in the PDCs, the solar farm is consistent with the objectives and PDCs of both Development Plans.

Solar development is not listed as a non-complying development and is consistent with the Desired Character of the relevant zones.

The solar farm is a compatible land use with all those listed for the zone, and the future land use of the site remains flexible following the Project's decommissioning.

## Conclusion

SIMEC ZEN Energy is seeking to develop the 280 MW Cultana Solar Farm over two connected greenfield sites (North and South) north of Whyalla and near the Whyalla Steelworks.

The Project has a Certificate from the OTR, certifying that the proposed development complies with the requirements of the Technical Regulator in relation to the security and stability of the State's power system.

The Project is aligned with the objectives and principles within the relevant Development Plans, as well as the local Government's objective of capitalising on the combination of excellent renewable resources with proximity to existing transmission infrastructure and high energy use facilities.

The proposal has sought to understand potential impacts, particularly those associated with the protection of flora and fauna, wind and water erosion control, traffic movements, visual amenity and Aboriginal heritage. The Project design has incorporated measures, such as protection of Acacia Woodland, to mitigate the identified impacts to the extent practicable. Potential construction impacts will be managed in accordance with the EMP incorporating appropriate measures to oversee the construction phase in an environmentally responsible manner, avoid degradation of the landscape and promote safe and efficient procedures.

Once constructed, the solar farm will be by design, relatively low impact.

The Cultana Solar Farm will be designed, managed and maintained to form an important feature at the entrance to Whyalla, highlighting the town and region as a renewable development hub.

## VOLUME 2: DEVELOPMENT APPLICATION REPORT

## Glossary

AADT: Annual average daily traffic	Ha: hectares
AARD: Aboriginal Affairs and Reconciliation Division	HV: heavy vehicles
AC: Alternating current	IHC: Independent Heritage consultants
AHD: Australian height datum	km: kilometre
ASD: Approach site distance	km/h: Kilometre per hour
ASRIS: Australian Soil Resource Information System	kV: kilowatts
ATCT: Air Traffic Control Tower	L: litre
bgl: below ground level	LGA: Local Government area
BPA: Bushfire Protection Area	LNWCA: Land Not Within a Council Area
CASA: Civil Aviation Safety Authority	LRET: large scale renewable energy target
CCTV: Closed Circuit TV	M: meters
CEMP: Contractor's Environmental Management Plan	mg/L: milligram per litre
CFS: Country Fire Service	MGSD: minimum gap sight distance
DA: Development Application	Mm: millimetres
DAR: Development Application Report	MW: mega watts
DC: Direct current	NES: National Environmental Significance
DEW: Department of Environment and Water	NPW: National Parks and Wildlife
DIS: Department of Industry and Skills	NRM: Natural Resources Management
DNI: Direct normal irradiance	NVMU: Native Vegetation Management Unit
DotEE: Department of the Environment and Energy	O&M: Operations and Maintenance
DPC: Department of the Premier and Cabinet	OTR: Office of the Technical Regulator
DPTI: Department of Planning, Transport and Infrastructure	PDC: principles of development control
EMP: Environmental Management Plan	PV: photovoltaic
EP: Environment Protection	RET: Renewable Energy Target
EPA: Environment Protection Authority	SAPN: South Australian Power Networks
EPBC: Environment Protection and Biodiversity Conservation Act	SCAP: State Commission Assessment Panel
FAA: Federal Aviation Administration	SEB: Significant Environmental Benefit
FTE: Full time equivalent	SEIFA: Socio-Economic Index for Areas
GIS: geological information system	SGHAT: Solar Glare Hazard Analysis Tool
GWh: Gigawatt hour	SISD: safe intersection sight distance
	SRES: small scale renewable energy scheme
	TDS: Total Dissolved Solids
	W: watts
	WAA: Water Affecting Activity

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## APPENDICES

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Certificate of Titles

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### APPENDIX C

Risk Assessment

### APPENDIX D

Traffic Impact and Access Point Assessment

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Ecological Desktop Assessment

### APPENDIX F

Aboriginal Heritage Risk Assessment

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ForgeSolar Glare Analysis

### APPENDIX H

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Scoped Environmental Management plan

### APPENDIX J

Important Information

## 1.0 GENERAL INFORMATION

### 1.1 The proponent

SIMEC ZEN Energy serves as one of Australia's leading renewable energy brands in the design and installation of solar energy and energy storage systems. SIMEC ZEN Energy is a part of the GFG Alliance. The GFG Alliance owns iron ore mining assets in Whyalla and iron ore bulk handling facilities at the Whyalla port, which are part of SIMEC. Through acquisition and new developments, SIMEC is steadily building up its renewable energy portfolio and has set a target to become a large green power generator by 2021 with 1 Gigawatt of capacity. Existing and pending assets include hydro, wind, biodiesel, marine, waste-to-energy and other energy technologies. SIMEC has a controlling stake in ZEN Energy, creating SIMEC ZEN Energy.

### 1.2 Project overview

SIMEC ZEN Energy is developing a 280 MW solar energy project over two connected greenfield sites (north and south) near the Liberty OneSteel Whyalla Steelworks.

**Table 1: General overview of the Project**

Aspect	North	South
Land parcel size	784 ha	260 ha
Rated plant capacity	210 MW	70 MW
Certificate of Title	Volume 6105 Folio 303 as Allotment 1 Deposited Plan 90705, Hundred of Cultana	Volume 6144 Folio 358 as Allotment 1000 Deposited Plan 79748, Hundred of Cultana and Randell
Zoning	Remote Area Zone- Land Not Within a Council Area	Industry Zone- Whyalla
Transmission connection	275 kV to Cultana substation	33 kV to North site switchyard and 275kV to Cultana substation
Land tenure	25 year lease from GFG Alliance - OneSteel Manufacturing Pty Ltd	Agreement to Lease with The Corporation of the City of Whyalla
Easements	Epic Energy ElectraNet Australian Rail Track Corporation SA Water Morgan –Whyalla pipeline	SA Water Morgan –Whyalla pipeline
Crown land	Transmission line	Transmission line

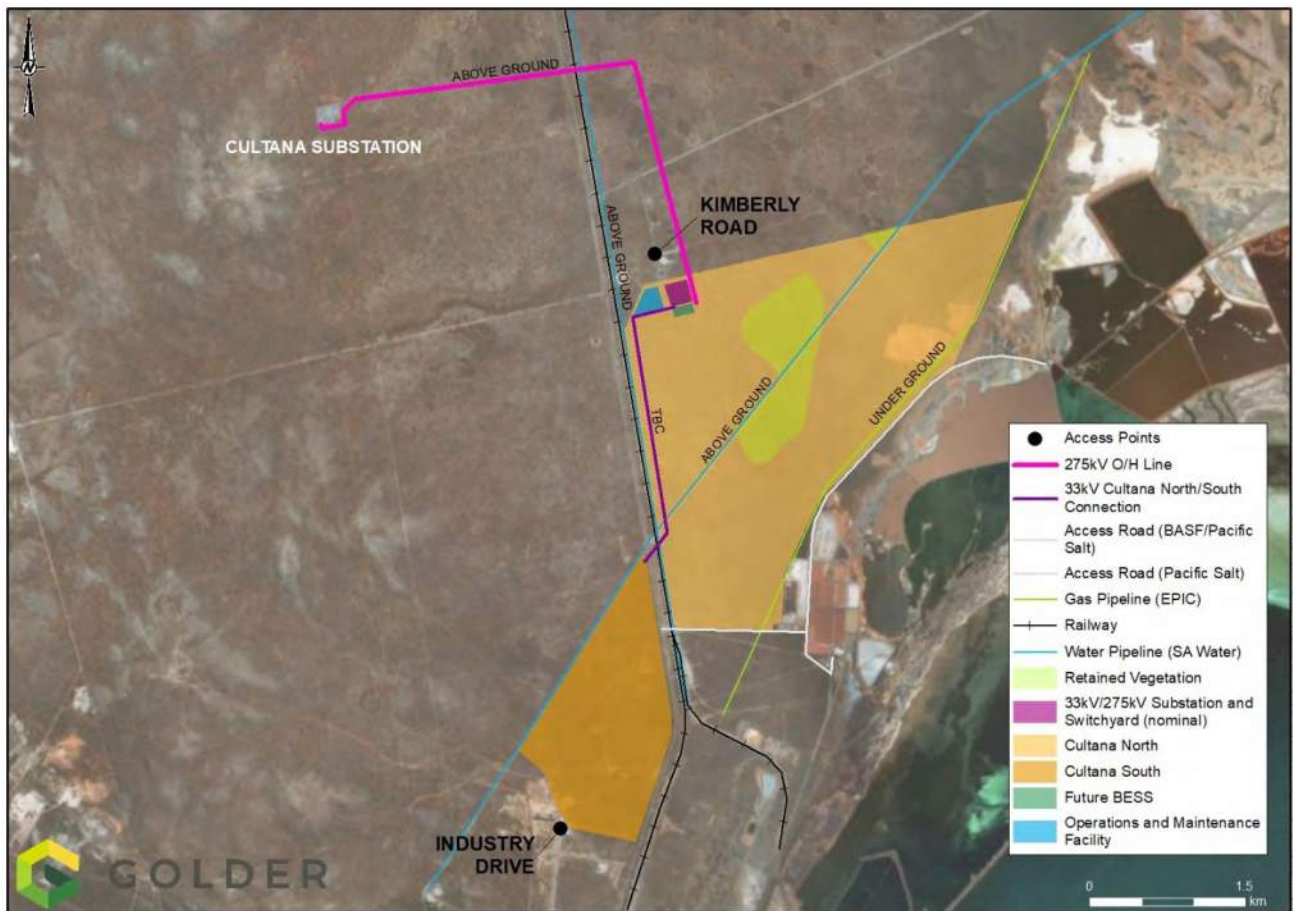


Figure 1: General project layout

### 1.3 Approval pathway

Pursuant to Section 49(1)(a) of the Development Act, the Project is classified as Public Infrastructure, in that it is infrastructure, equipment, structures, works and other facilities used in or in connection with the supply of electricity. Section 7(d) applies to works that exceed \$4 M.

The Project was granted Crown Sponsorship under Section 49 of the Development Act through the Department of Energy and Mining on 13 July 2018 (Appendix B).

This Development Application Report (DAR) will be lodged with the South Australian Government through the State Commission Assessment Panel (SCAP) and referred to other government entities for review and comment as required.

In accordance with Schedule 8 of the *Development Regulations 2008* (Development Regulations), the prescribed bodies for the application are the Department of Environment and Water (DEW), Whyalla City Council and Department of Planning, Transport and Infrastructure (DPTI).

In accordance with Section 49 (7d) of the *Development Act 1993* (Development Act), the Development Application (DA) will be publicly exhibited for at least 15 business days. This includes provision of the DA for public access at key local and State Government offices.

A report will be prepared by the SCAP, encompassing feedback from the referral agencies, and will be provided to the Minister for Planning for a final decision.

## 1.4 Stakeholder engagement

Preparation of this Application has been undertaken in consultation with:

- Department of the Premier and Cabinet (DPC; sponsoring agency and Office of the Technical Regulator)
- Department of Planning, Transport and Infrastructure (DPTI)
- Department for Environment and Water (DEW), including the Native Vegetation Management Unit (NVMU)
- Environment Protection Authority (EPA)
- City of Whyalla
- Easement holders – ElectraNet, Australian Rail Track Corporation, SA Water, SA Power Networks (SAPN).

The project is expected to be referred to these stakeholders, excluding EPA which indicated it was satisfied with the proposal in the preliminary phases of Project development.

## 1.5 Project timing

Milestone	Target Date
DA submission	Q3 2018
EPC contract tender period	Q3 2018
Final approvals and Financial Close	Q1 2019
Construction start	Q2 2019
First energisation	Q2 2020
Practical Completion	Q3 2020
Completion	Q4 2020

## 1.6 Structure and content of this report

This DAR has been prepared to support the DA and assessment process. The DAR includes a range of supporting information and technical studies which can be found in Volume 3:

- Certificates of Title (Appendix A)
- Letters of support – e.g. Crown Sponsorship, Office of the Technical Regulator (Appendix B)
- Technical Appendices
  - Appendix C: Risk Assessment
  - Appendix D: Traffic Impact and Access Point Assessment
  - Appendix E: Ecological Desktop Assessment
  - Appendix F: Aboriginal Heritage Risk Assessment
  - Appendix G: ForgeSolar Glare Analysis

## 2.0 PROJECT DESCRIPTION

### 2.1 Summary

The Cultana Solar Farm (the Project) will be made up of a series of solar panels. These panels are designed to absorb light and transform it into useable energy by way of an inverter. The inverter turns direct current (DC) energy into alternating current (AC) energy. The AC energy will be fed to the grid for subsequent use and/or storage.

Each of the components are summarised below noting that quantities and dimensions may be optimised during the detailed design phase.

**Table 2: Summary of proposal components**

	North	South
Proposed site access	Kimberly Road via Lincoln Highway and Inkerman Road	Industry Drive via Lincoln Highway and Arthur Glennie Drive
PV modules	~685,000	~240,000
Trackers	8,050 trackers	2,856 trackers
Inverters	39	14
Operations and Maintenance	O&M Building	Not applicable
Site security	Fully fenced and monitored via Closed Circuit TV (CCTV)	Fully fenced and monitored (CCTV)
Substation	Cultana 275 kV	Cultana 275 kV
Battery energy storage system (BESS)	4 ha	Not applicable

### 2.2 Solar PV modules

Solar Photo Voltaic (PV) modules convert sunlight into electricity. Up to 280 MW of generation capacity is expected from the Project. SIMEC ZEN Energy, through its early contractor involvement approach, has progressed initial designs based upon Q.PEAK L-G5.2 370 W solar modules, which are approximately 2,000 mm x 1,000 mm x 35 mm in size (including the frame) and treated with anti-reflection technology.

Solar modules will be arranged in a north-facing direction to optimise solar gain. Solar modules are expected to be mounted up to 4 m in height to allow 0.5 m of ground clearance for maintenance and to avoid shading effects.

Trackers will be arranged in rows in a north/south direction with approximately 85 solar modules mounted to each. The trackers are 90 m long and will be installed to allow a 3 m wide access track between each row for maintenance purposes and to avoid shading issues. The modules will then track the sun as it moves east-to-west. The tracking system will be designed and constructed in accordance with the Australian Standards. Strings take the wires from the different modules and combine them into a common feed. A string combiner is then used to combine the output of multiple strings of modules to connect to the inverter.



## 2.3 Power conditioning

The energy generated by the PV modules will be converted from DC to AC energy by the inverters and increased to medium voltage via integrated transformers.

The inverters will be prefabricated and brought to site in a standard 40ft (12.2 m length x 2.4 m width) shipping container (see Figure 2).



Figure 2: Indicative inverter layout showing different components within a shipping container to convert DC to AC.

## 2.4 Operations compound

A permanent operations compound to service the Project will be located in the north western section of the northern site. The operations compound will include:

- Operations & Maintenance (O&M) building
- 33 kV switch room
- Storage buildings
- 275 kV/33 kV substation
- Carpark for a minimum of 16 cars.

## 2.5 Battery energy storage system

A 4 Ha area for a battery energy storage system (BESS) has been identified adjacent to the operations compound (Figure 1).

## 2.6 Substation

The Project is seeking to use existing ElectraNet easements to connect to a switching bay at the Cultana Substation (Figure 1). The preferred route that has been used for consultation with AEMO and ElectraNet is identified in Figure 1. Connections between the South and North site, and the road crossing from the North site to the Cultana Substation will be either overhead powerlines or directionally drilled under the road.



## 2.7 Site access and security

The North site will be accessed via Inkerman Road and Kimberly Road and the south site will be accessed via Industry Drive.

Unsealed internal access tracks will be approximately 4 m in width and are provided between blocks and the connecting inverters for maintenance purposes.

Site access points have been identified in Figure 1.

A 2.4 m high chain link fence (or similar), with barbed/razor wire on top, will be constructed around the site perimeter with gates used at the access points. The site will be monitored using CCTV, and temporary and permanent buildings will be alarmed.

## 2.8 Construction

Adjacent to the operations compound, SIMEC ZEN Energy has identified an appropriate area (approximately 190,000 m<sup>3</sup>) for temporary site laydown and construction equipment.

Construction equipment is expected to include:

- generators
- excavators
- graders
- cranes
- trenching machine
- fuel truck
- water carts.

Temporary site facilities will include:

- transportable site office
- amenity facilities
- waste storage area.

### 2.8.1 Site preparation and earthworks

SIMZEC ZEN Energy is focused on minimising vegetation losses where possible, and reducing any environmental impacts associated with the establishment of the solar farm. As such, large areas of dense vegetation have been retained and the solar modules arranged around vegetation stands (Figure 1). There is a requirement for some vegetation losses to enable construction of solar arrays and associated infrastructure. Vegetation will be trimmed, mulched and redistributed on site to assist in minimising dust generation.

Earthworks for access tracks and temporary facilities will be minimised. Where permanent infrastructure will be located (such as substations and inverter foundations) grading and earthworks will be minimal.

## 2.8.2 Installation and commissioning

To secure the solar panel arrays, piles will be driven into the ground to a nominal depth of 2 m using a hydraulic piling machine. Cabling from the modules to the inverter, and inverter to transformers will generally be trenched or routed above ground using cable trays or conduits. Once the structural supports are in place, solar panels will be fitted, tested and commissioned.

## 2.8.3 Water and wastewater

Water will be either trucked to site during construction or taken from the water main. Water carts and sprinklers will be used on site for dust suppression. Wheelwashing stations will be established on site and all wastewater will be captured and managed onsite where possible using licensed waste contractors.

Wastes generated during construction are expected to be minimal and will be managed locally. Much of the waste, including pallets that transport the solar modules, will be recyclable. A dedicated area for waste will be established and wastes segregated for appropriate management. All wastes will be disposed of in accordance with regulations and licensed transporters will be used when required.

## 2.9 Operations

Operations are expected to be largely automated. A workforce of approximately 10 full time equivalent (FTE) staff is anticipated to respond to maintenance requirements.

Operational water is required for potable and amenity purposes. A combination of mains water and rainwater will be stored for these purposes adjacent to the O&M Building. A septic system will be designed and constructed for 10 FTE staff and an estimated number of visitors to the facility. The septic system will be pumped by an appropriately licensed waste removal company.

## 2.10 Decommissioning

At the end of the project life, SIMEC ZEN Energy will decommission, dismantle and demolish the facility. It is expected that the site would be returned to its former industrial land uses. It will be the responsibility of SIMEC ZEN Energy to ensure general environmental protection and mitigation measures would be implemented during the decommissioning and restoration phases.

## 2.11 Safety and emergency responses

All personnel will be inducted to site. Induction material will reference emergency and safety equipment and procedures. Site staff will be appropriately trained in the use of safety equipment.

An Emergency Response Plan will be developed as part of the construction and operational phases of the development. This will include relevant information relating to the site including plans, site contacts and emergency procedures specific to the site and facilities.

The Whyalla Country Fire Service (CFS) will be made aware of the Emergency Response Plan and information specific to the site and equipment as required.

The project is not located in a bushfire protection area (BPA). However, with regard to the South Australian Bushfire Code and Ministers Specifications, emergency access has been considered in design layout. Additional measures will include provision and regular maintenance of firefighting equipment at the operations compound, provision of extinguishers in site vehicles, as well as a prohibition of onsite burning of materials.

## 3.0 REGULATORY FRAMEWORK AND STRATEGIC DIRECTION

### 3.1 Local Government

#### 3.1.1 Upper Spencer Gulf

Whyalla City Council has joined the Port August City Council and Port Pirie Regional Council to form the Upper Spencer Gulf Common Purpose Group. The aim of the group is to share information, implement initiatives and provide a united voice in advocating for the region. The group developed the Transforming the Upper Spencer Gulf report (Tonkin Consulting, 2017) which aims to lead the region's transformation towards a competitive, vibrant and self-reliant economy and community.

The report identifies several areas of opportunity to build on and pursue economic growth, including renewable energy. The combination of excellent renewable resources with proximity to existing transmission infrastructure and high energy use facilities makes growth in renewable energy a source of competitive advantage for the Upper Spencer Gulf. Securing deployment of commercial-scale renewable energy generation facilities is listed as one of the Priority Actions in the report. The Project is directly aligned with this priority action and contributes to the broader objectives of transforming the region through diversification and creating employment opportunities.

#### 3.1.2 Whyalla City Council - Whyalla Development Plan

The Whyalla Council Development Plan (Government of South Australia, 2017), is a statutory policy document which guides the type of development that can occur within the council area. The development plan is designed to:

- inform the community about how an area is expected to be developed
- inform neighbours about the kinds of development they can expect in their neighbourhood
- inform applicants about the type of development that is encouraged in an area, therefore the type of information that may be required in a development application
- provide the basis against which development assessment decisions are made
- provide the basis upon which any appeal decisions are made.

The development plan separates land within the council area into a number of different zones, including commercial zones, residential zones and industrial zones amongst a range of others. This aims to ensure that the lifestyle needs of residents and business can be achieved in the most beneficial manner. Development plans outline what land uses are envisaged in a zone and those uses which are not contemplated.

The South site is in the Industry zone of the Whyalla Council Development Plan, while the North Site is in the Remote Area zone of the Land Not Within a Council Area Eyre, Far North, Riverland and Whyalla Development Plan (LWCA Development Plan), (Government of South Australia, 2012).

#### 3.1.3 State Government

The South Australian Government has announced a plan which aims to deliver more jobs, lower costs and better services. The Project supports these objectives by providing employment opportunities through regional investment, improving grid reliability and lowering electricity costs by increasing supply to the market

The Project will be assessed in consideration of State legislation as outlined in the following sections.

### 3.1.4 Department of Planning, Transport and Infrastructure

DPTI administers the Development Act and the Development Regulations. These are the planning and development instruments in South Australia. As discussed in Section 1.3, this Project will proceed using the Public Infrastructure provisions under Section 49 of the Development Act.

While there are no specific Terms of Reference associated with a Section 49 assessment, the SCAP will assess the application with consideration of relevant Development Plan(s), codes and standards. SIMEC ZEN Energy has engaged with regulatory bodies to define areas of interest prior to the preparation and lodgement of this DA.

### 3.1.5 Office of the Technical Regulator

Regulation 70 of the Development Regulations prescribes if the proposed development is for the purposes of the provision of electricity generating plant with a generating capacity of more than 5 MW that is to be connected to the State's power system, a certificate from the Office of the Technical Regulator (OTR) is required certifying that the proposed development complies with the requirements of the Technical Regulator in relation to the security and stability of the State's power system. This Certificate was achieved for the Project on 25 May 2018 (Appendix B).

### 3.1.6 Commissioner of Highways

The Project adjoins an arterial road (Lincoln Highway) and accordingly the planning authority is required to refer the application to the Commissioner of Highways (DPTI), in accordance with Schedule 8 – Part 2(3) of the Development Regulations.

Pursuant to Schedule 8 – Part 2(9B) of the Development Regulations, a referral may be required to the OTR. The proposed development incorporates electricity infrastructure that would be developed adjacent to existing infrastructure. However, this application is accompanied by a Certificate issued by the Technical Regulator, as outlined above, regarding the compliance of this infrastructure in relation to the security and stability of the State's power system. Accordingly, we understand that this agency referral will not be required.

### 3.1.7 Department for Environment and Water

The Department for Environment and Water (DEW) is responsible for the delivery of a range of state acts, most relevant to the Project including:

- Crown lands generally (*Crown Lands Management Act 2009*)
- Conservation, protection of vegetation and wildlife (*National Parks and Wildlife Act 1972*, 'NPW Act'; *Native Vegetation Act 1991*)
- Conservation, protection or management of natural assets including water (*Natural Resources Management Act 2004*, 'NRM Act').

### 3.1.8 Native Vegetation Council

On the understanding that the application will result in the removal of native vegetation, the application will be referred to the Native Vegetation Council pursuant to Schedule 8 – Part 2(26). Once further detail of the extent of vegetation clearance is known, recognising that micro-siting is proposed to minimise the removal of native vegetation where possible, a calculation of the Significant Environmental Benefit (SEB) payment will be calculated in accordance with the Native Vegetation Act and supporting regulations.

Once the Project design is finalised and the resulting vegetation clearance is understood, the SEB offset calculation and options will be further explored.

### 3.1.9 Natural Resources Eyre Peninsula

The NRM Act promotes sustainable and integrated management of the State's natural resources. Under the NRM Act, land holders have a legal responsibility to manage certain pest plants and animals and prevent land and water degradation.

The NRM Act is administered by regional boards through Natural Resource Management (NRM) Plans developed for each region, in accordance with Section 75 of the NRM Act. The Project is within the Eyre Peninsula NRM Board region. The Eyre Peninsula NRM Plan includes a Policy Framework which outlines the matters that the Board will consider when exercising its powers under the NRM Act, as follows:

- Declared plant and animal control
- Land management including minimising land degradation
- Water affecting activity (WAA) for management of water infrastructure and water take.

Specific permits are not expected to be required for the Project.

### 3.1.10 Environment Protection Authority

The EPA administers the *Environment Protection Act 1993* (the EP Act) which protects South Australia's environment, including land, air and water. The main objects of the Act are to promote the principles of ecological sustainable development, to protect, restore and enhance the environment. Under the Act, it is an offence to pollute the environment, which includes noise, air, water and/or waste pollution.

The EPA has advised that the proposal does not form an activity of major environmental significance and the EPA is therefore not anticipating being a referral body for the project.

### 3.1.11 Department of Industry and Skills

The Department of Industry and Skills administers the *Aboriginal Heritage Act, 1988* which provides for the protection of Aboriginal heritage in South Australia, and the process for managing any heritage impacts should they be likely.

Section 23 of the Aboriginal Heritage Act provides protection for Aboriginal Objects, Sites and Remains, making it a requirement to seek the consent of the Minister (Aboriginal Affairs and Reconciliation Division (AARD)) prior to undertaking any activity that would damage, disturb, interfere or remove items. SIMEC ZEN Energy is obliged to report the discovery of an Object, Remain or Site to the Minister, giving particulars of the nature and location of the Object, Remains or Site.

## 3.2 Commonwealth Government

### 3.2.1 Targets for emissions and renewable energy

As part of the international Paris Agreement, the Australian Government agreed to an emission reduction target of 26-28% below 2005 levels by 2030.

The Renewable Energy Target (RET) is an Australian Government scheme to reduce emissions of greenhouse gases in the electricity sector and encourage generation of electricity from sustainable and renewable resources. The RET consists of two main schemes – a large-scale renewable energy target (LRET) and a small-scale Renewable Energy Scheme (SRES) for rooftop solar and other small installations. The LRET for generation is 33,000 GWh by 2020. To achieve this target, approximately 23.5% of Australia's electricity generation in 2020 will be from renewable sources.

The Project will contribute toward achieving the LRET targets by providing additional renewable energy to the grid, reducing greenhouse gas emissions.

The Department of the Environment and Energy (DotEE) has developed a plan, “Powering forward: a better energy future for Australia” (Government of South Australia, 2017) which sets out the Government’s priorities in providing an affordable and reliable energy system that will help meet international commitments. Three main issues are identified in the current energy market; affordability, reliability and emissions. In response to these issues, the Government has been debating a National Energy Guarantee which is intended to provide investment certainty to deliver on its commitments.

The Project provides solutions to two of the issues identified; providing energy security through a reliable grid (via an ancillary storage project) and facilitating deployment of variable renewable energy to reduce emissions.

### **3.2.2 Department of the Environment and Energy**

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage matters of National Environmental Significance (NES), including nationally and internationally important flora, fauna, ecological communities and heritage places.

The EPBC Act establishes a process for environmental self-assessment to determine if the Project is likely to have a significant impact on a matter of NES. SIMEC ZEN Energy undertook a self-assessment and determined that the Project is not expected to have a significant impact on any matter of NES. The outcome of the self-assessment was supported by DEW, and accordingly this project was not referred to the DotEE.

## 4.0 SUBJECT SITE AND SURROUNDS

The Project is located at the northern entrance to Whyalla and includes a North and South site, intersected by the Lincoln Highway.

The North site is a vacant, densely vegetated parcel of land, approximately 6 km north of the Whyalla city centre. The site is owned by GFG Alliance, however, has been generally unused, with the exception of a small clay borrow pit in the north eastern portion. An easement for the SA Water Whyalla – Morgan pipeline runs through the centre of the North site. An Epic Energy gas pipeline easement also runs along the south eastern boundary. Surrounding land uses include the rail easement and Lincoln Highway adjacent to the west, Ollson's Pacific Salt directly to the south and east, and the Whyalla Steelworks further south.

The South site is located directly north of Whyalla's Industrial Estate, approximately 5 km north of the Whyalla city centre. The site was historically used as a dairy farm and is currently vacant. The historical use has resulted in high proportion of non-native vegetation and some regenerating native vegetation. The site has no formal improvements, however tracks across the site indicate recreational motorcycle use. The Whyalla – Morgan pipeline continues along the northern boundary of the South site. The Industrial Estate to the south of the site includes industrial businesses such as Muradel (biocrude production) and Max Crane & Equipment Hire. The South site is bound to the east by the Lincoln Highway with the Whyalla Steelworks further east. The Whyalla Conservation Park is located approximately 1 km to the north (west of the northern portion of the North site).

The preferred transmission line route will cross the Lincoln highway between the south and north site and likely use above-ground infrastructure within the project boundary to feed into a power transformer and switchyard. From there, further aboveground power lines will use existing access tracks and easements to connect to the Cultana Substation.

## 5.0 SOCIAL ENVIRONMENT AND CONSULTATION

### 5.1 Population of Whyalla

The closest population center to the Project is Whyalla, the third most populous city in South Australia, after Adelaide and Mount Gambier. The City of Whyalla has an integrated steel works and shipbuilding heritage and has port berthing facilities up to 10 m deep. The City of Port Augusta is the next nearest population center to the Project outside of Whyalla. Port Augusta is located at the junction of Australia's east-west and north-south road and rail corridors.

The general population statistics of Whyalla (Local Government area) are provided in Table 3 and compared to Port Augusta and South Australia. Based on the existing employment industries in Whyalla, skilled labour and workforces are expected to be locally available.

**Table 3: General population statistics of Whyalla, Port Augusta and South Australia from Census (Australian Bureau of Statistics, 2016)**

	Whyalla	Port Augusta	South Australia
<b>Population</b>	21,828	13,808	1,676,647
<b>Gender</b>	10,910 female 10,920 male	6,772 female 7,036 male	850,652 female 825,995 male
<b>Anchor employment industry</b>	Manufacturing	Social assistance and health care	Health care
<b>Labour force, (participation rate %)</b>	9,486 (43.5)	5,872 (42.5)	806,589 (48.1)
<b>Unemployment (Unemployment rate %)</b>	1,117 (12.4)	353 (5.8)	60,488 (7.5)
<b>Median age</b>	40	39	38
<b>Median weekly income (personal, \$)</b>	497	604	600

### 5.2 Socio-economic

The median weekly wage for people 15 years and over in Whyalla was \$497, which is substantially below the South Australian average (\$600) and the Australian average (\$662).

The main employment (2016) in the Local Government area (LGA) included iron smelting and steel manufacturing (12.3%), followed by iron ore mining (7.3%). Other major employment industries included hospitals, supermarkets and primary education centers.

The Socio-Economic Index for Areas (SEIFA) is a suite of four summary measures that have been created from 2011 Census data to investigate different variables of socio-economic conditions by geographic areas. The four SEIFA indices are:

- Index of Relative Socio-economic Advantage and Disadvantage: is a continuum of advantage (high values) to disadvantage (low values) and is derived from Census variables related to both advantage and disadvantage



- Index of Relative Socio-economic Disadvantage: focuses primarily on disadvantage, and is derived from Census variables such as low income, low educational attainment, unemployment, and dwellings without motor vehicles
- Index of Economic Resources: focuses on financial aspects of advantage and disadvantage, using Census variables relating to residents' incomes, housing expenditure and assets
- Index of Education and Occupation: includes census variables relating to the educational attainment, employment and vocational skills

The Socio-Economic Indices for Whyalla (City) reveals that the LGA is relatively disadvantaged when compared to South Australia, ranking 8th (out of 71) in the index of relative socio-economic disadvantage Table 4.

**Table 4: Socio-Economic Indices for Areas: Whyalla (Australian Bureau of Statistics, 2016)**

Index	Whyalla (C) Score (Percentile rank in State)	South Australia
Relative Socio-economic Advantage and Disadvantage	874 (8)	1045
Relative Socio-economic Disadvantage	882 (8)	1082
Economic Resources	883 (7)	1109
Education and Occupation	881 (6)	1045

### 5.3 Economic

It is anticipated this Project, together with other projects proposed in the Whyalla region, will aid the recovery of the suppressed employment levels the town has encountered during historical uncertainty around the steelworks. This benefit would be realised through both the construction and operational phases of the Project, including indirect economic benefits for local businesses through SIMEC ZEN Energy sourcing local products, materials and services (such as construction supplies and materials, accommodation, food and fuel).

### 5.4 Engagement

During development of this DA, SIMEC ZEN Energy has undertaken targeted engagement with local and regional stakeholders for the Project. The aim has been to provide a project overview, understand what is important to stakeholders, as well as gain early feedback and views regarding the Project.

Activities have included:

- Meetings with DEW (including the NVMU), the EPA and DPTI to identify and address concerns or queries with the proposal
- Meetings with DPC and the Department of Industry and Skills (DIS) for Crown Sponsorship
- Whyalla District Show information booth (18 and 19 August 2018)
- Distribution of a project newsletter (via letterbox drop throughout Whyalla)
- A community open house (9 October 2018)
- Stall at Westlands Shopping Centre (9 October 2018)
- A Whyalla businesses and suppliers open house (10 October 2018)

SIMEC ZEN Energy has also engaged with the Barngarla Aboriginal Corporation, Department of Defence, SA Water, ElectraNet and Epic Energy and will continue to undertake engagement activities with all interested parties and the community throughout the Project life.

#### **5.4.1 Outcomes of community engagement**

The community engagement activities were organised to ensure an inclusive engagement strategy. The community and businesses/suppliers open house sessions were targeted to times/days that would suit the local community and were widely advertised through a newsletter distribution as well as the local newspapers. A stall was also set up at the Whyalla District Show and Westlands Shopping Centre.

Overall feedback and conversations were positive and community members showed interest in the following aspects of the Project:

- Employment and services opportunities
- Construction timeline
- Details of the operational life and staffing numbers
- Dust suppression and management
- Flora and fauna impacts.

SIMEC ZEN Energy has also set up a dedicated email address that has been widely distributed and continues to receive and respond to several emails asking for clarification and offering services.

#### **5.4.2 Public notification**

In accordance with Section 49(7d) of the Development Act, applications where construction exceeds \$4m are publicly exhibited for a minimum of 15 days. Individuals or organisations are invited to submit representations on the application and can also request to appear before the SCAP.

## 6.0 RISK ASSESSMENT

The potential environmental impacts associated with the construction, operation and decommissioning of the Project were assessed in detail to ensure risks were appropriately characterised and effective management measures could be implemented to reduce or eliminate the risks.

The risk assessment involved mapping the potential source to receptor pathway and assigning an initial risk rating to each potential risk aspect. Where there was a clear and potentially substantive impact(s) from source to receptor, additional information was sourced to provide an appropriate understanding of the risks and suitable mitigation measures.

A review of the existing information regarding the biological, physical and social environment of the Project site and surrounding area was undertaken and used to describe the existing environment, potential impacts and relevant management/mitigation measures.

Where further information, specific to the Project, was required, technical studies were undertaken to inform the appropriate design modifications and management measures.

The outcomes of the risk assessment are summarised in the following sections. The full risk assessment can be found in Appendix C. The additional technical studies undertaken are also appended as follows:

- Appendix D: Traffic Impact and Access Point Assessment
- Appendix E: Ecological Desktop Assessment
- Appendix F: Aboriginal Heritage Risk Assessment
- Appendix G: ForgeSolar Glare Analysis.

## 7.0 ENVIRONMENTAL CONDITIONS AND INTERACTIONS

### 7.1 Geology, topography and soils

#### 7.1.1 Existing environment

A review of the Geological Mapping at 1:250,000 scale for the Port Augusta map sheet (Geological Survey of South Australia, 1968) indicates that most of the site geological conditions consists of Undifferentiated Quaternary profiles, as well as Saint Kilda and Semaphore Sand members.

The regional topography is considered relatively flat and the site is generally flat, with an elevation gain of only 20 m from east to west.

The Australian Soil Resource Information System (ASRIS, 2018) Australian Soils Classification indicates that two soil types are generally present at the Project site; Hydrosols and Calcarosols.

Hydrosols often occur in low lying coastal plains where they may be saturated for 2-3 months due to tidal influences. Calcarosols occur in low rainfall, arid and semi-arid areas. They contain calcium carbonate and because of their low water retention are subject to wind erosion. Calcarosols are often high in salinity.

#### 7.1.2 Project interactions

The site is generally flat, and construction will involve clearing and minor earthworks to facilitate installation of the solar panels and associated infrastructure. Construction works are not expected to significantly alter the geology or topography.

Soil composition has the potential to be impacted through chemical and hydrocarbon spills, either from machinery use or fuel and chemical storage. The risk will be managed through implementation of an Environmental Management Plan (EMP) and emergency response procedures. This will include having on site spill kits available within the Operations Compound, and mobile spill kits within vehicles.

Site clearance is expected to increase the likelihood of water and wind erosion and will be managed through implementation of an EMP (as discussed in Section 7.2 and 7.8).

During operations, there may be an increased risk of erosion and sedimentation due to solar panels altering surface water overflows (as discussed in Section 7.2).

### 7.2 Surface water

#### 7.2.1 Existing environment

The site is within an area that experiences semi-arid climate, with an average annual rainfall between 250-280 mm per year and average monthly rainfall similar across the year (Government of South Australia, 2018). The low rainfall, high soil infiltration and high evaporative losses result in few surface drainage features and there are no drainage features within the Project footprint.

There are no permanent watercourses in Whyalla, however there are several ephemeral creeks that drain the hills areas to the north of Port Bonython and west of Whyalla. A drain has been constructed around the township to prevent overland flow, and discharges to the south of the town over samphire flats. A review of aerial images indicated a surface water drainage line to the west of the South site may experience pooling around the termination of Industry Drive (near the site access point) during high rainfall events before discharging through the swale to the east of the proposed access point.

Permanent surface water bodies include Olsson's Pacific salt ponds to the south east of the Cultana North site and the Spencer Gulf further to the south east of the Site (approximately 1 km).

## 7.2.2 Project interactions and management

The Project is not expected to have a significant impact on surface water drainage pathways. The South site access point will require the installation of drainage infrastructure at the access point to ensure the swale drainage pathway for high rainfall events is maintained and to ensure all-weather access to the site.

The removal of vegetation and disturbance of topsoil during construction could potentially increase the occurrence of soil erosion and surface water sedimentation during rainfall events. The increase in impervious areas during construction such as roads and hardstand areas is likely to change runoff volume and overflow paths and could also result in erosion in new drainage pathways. Further, accidental spills during construction have the potential to impact on surface water quality.

Potential impacts during construction will be managed through the implementation of an EMP including:

- Progressive stabilisation and rehabilitation/revegetation
- Soil erosion and drainage control measures used in drainage lines
- Traffic to use defined tracks with appropriate temporary drainage infrastructure
- Emergency response procedures in place for accidental spills including the provision of spill kits

Permanent infrastructure will also have the potential to impact on surface water during operation of the plant including new hardstand areas (i.e. roads, substation, operations compound) and the solar panel modules.

Surface water overflow pathways and runoff volumes are likely to be altered where new hardstand areas are constructed. The Project will be designed to ensure the overflow pathways constructed around new hardstand areas are adequate for the volume of water expected in a high rainfall event. This will include scour protection in drainage lines where required.

The solar panels themselves have the potential to alter infiltration regimes across the site. In areas where there is no stabilising vegetation (or during rehabilitation) the concentration of runoff could result in erosion along the dripline of the solar panel.

Potential erosion impacts will be managed through the EMP.

The Project will have no interaction with permanent surface water bodies.

## 7.3 Groundwater

### 7.3.1 Existing environment

The Project is in the Pirie Basin, which is a shallow sedimentary groundwater basin in the Upper Spencer Gulf. Groundwater aquifers are likely to feature:

- Fractured rocks
- Precambrian rocks, including quartzite, sandstone, limestone, schist and gneiss.

Data from the DEW Waterconnect database indicated the standing water level of the shallow aquifer near the Project site is likely to be between 1.5 and 14 m bgl. Based on the limited data available, the shallow groundwater is expected to be highly saline with a Total Dissolved Solids (TDS) of greater than 20,000 mg/L. At this salinity the shallow groundwater is unlikely to have any beneficial uses.

### 7.3.2 Project interactions

The project is not expected to encounter groundwater during construction or operational phases, with module footings being driven in to a maximum depth of 2 m bgl.

The potential for minor indirect impacts to groundwater through accidental spills and release of contaminants will be managed through the implementation of an EMP and emergency response procedures including the provision of spill kits.

## 7.4 Traffic impact and site access

Independent traffic planners and engineers were engaged to examine the suitability of proposed access points to the North and South sites in relation to the existing road network, as well as the condition and capability of the network to accommodate the predicted vehicle movements (Appendix D).

Two potential access points were identified and assessed for the North site (Figure 3) and one for the South site. Based on the easements and safety concerns associated with the North site Southern Access Point, the Kimberly Road Access Point was selected as the preferred option. All three options are included in Appendix D, however only the preferred access points have been discussed below.

### 7.4.1 Existing environment

#### North site

The Kimberly Road Access Point (Figure 3) will be accessed from the Lincoln Highway via Inkerman Road and Kimberly Road.

Lincoln Highway is a sealed 327 km road that links Whyalla and Port Lincoln and connects to the Eyre Highway at its most northern point leading towards Port Augusta. Eyre Highway forms part of the national highway route and is the only sealed road linking South Australia and Western Australia. The Eyre Highway and Lincoln Highway are generally two lane, single carriageways with a speed limit of 110 km/h. Both highways are gazetted freight routes and can accommodate 36.5 m road trains.

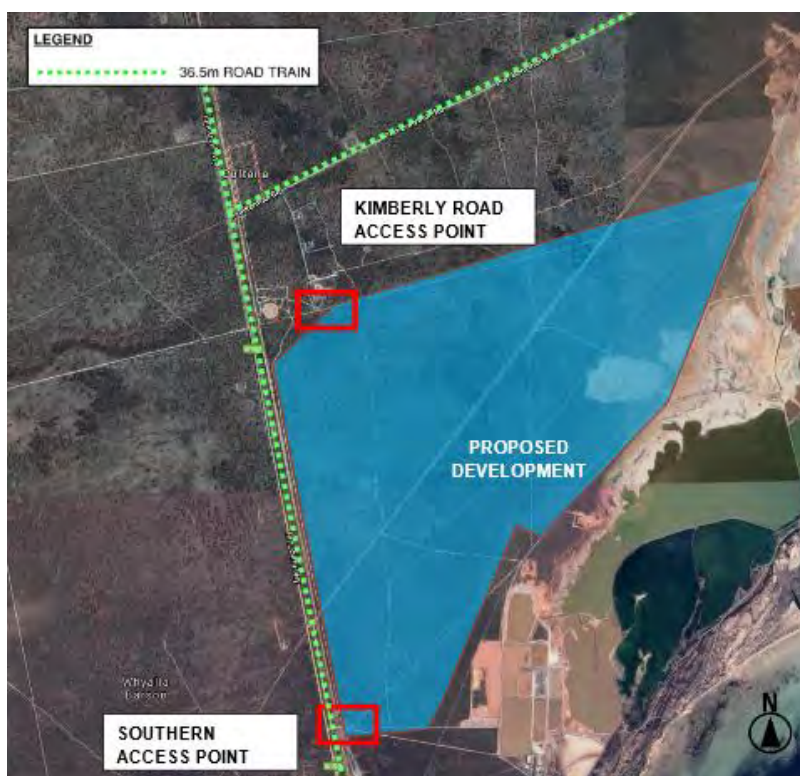


Figure 3: Proposed Cultana North site and access points

Existing and estimated 2018 traffic volumes for the Lincoln Highway, Inkerman Road and Kimberly Road are presented in Table 5.(data has been sourced from Location SA Viewer Website, given that no count information is currently held by Council).

Assuming that the majority of materials will be sourced from Port Adelaide, most vehicles will be coming from the north-east during the construction and operational periods. Hence, it has been assumed that all vehicle movements will access the site via the Lincoln Highway from the north (Port Augusta), with fewer traffic volumes coming from the south (Whyalla).

**Table 5: Cultana North traffic volumes**

Road	Year of count	Annual Average Daily Traffic (AADT)	Percentage of Heavy Vehicles (%HV)	Source	Predicted 2018 Annual Average Daily Traffic (AADT)*
<b>Lincoln Highway</b>	2017	2,000	17%	SA Viewer Website	2,040
<b>Inkerman Road</b>	2017	400	20%	SA Viewer Website	408
<b>Kimberly Road</b>	2018	20	10%	Estimated	20

\*Sourced traffic volumes have had an annual estimated growth rate of 2% applied to determine the likely traffic volumes in 2018.

The Kimberly Road Access Point is to the east of a sharp horizontal bend in the road and opposite an existing substation (Figure 4). Surrounding properties are unused and in disrepair, as can be seen in Figure 5.

Currently, the proposed access point is unsealed with upright kerbs on both sides and leads to several unsealed tracks. Kimberly Road meets Inkerman Road at a T-junction which has been assessed to be safe for two B-doubles to pass each other around the 90 degree curve and the T-junction.





Figure 4: Proposed North site access point on Kimberly Road.



Figure 5: Unsealed Kimberly Road Access Point for the North site

The project will be designed to ensure the approach site distance (ASD) of 40 m (assuming the site speed restriction is 40 km/h) from inside the site to the access point intersection is achieved.

The safe intersection sight distance (SISD) of 324 m and minimum gap sight distance (MGSD) of 153 m is achieved at the T junction between Kimberly Road and Inkerman Road. The SISD is not currently achieved at the access point intersection with Kimberly Road.

Kimberly Road was observed to be in generally poor condition, with severe stripping and potholing, as well as moderate deformation and rutting observed on the bituminous surface.

### South site

Access to the Cultana South site is from Industry Drive, via Arthur Glennie Drive and the Lincoln Highway, as shown in Figure 6. These three roads are gazetted freight routes and are capable of accommodating 36.5 m road trains.



**Figure 6: Proposed southern site and access point**

Existing and proposed traffic volumes for the Lincoln Highway, Arthur Glennie Drive and Industry Drive are presented in Table 6 (data sourced from Location SA Viewer Website and Whyalla Council).

Consistent with the North Site, most vehicles are expected to be coming from the north-east during the construction and operational period. All vehicle movements will likely access the site via the Lincoln Highway from the north (Port Augusta), with fewer traffic volumes coming from the south (Whyalla).

**Table 6: Cultana South traffic volumes**

Road	Year of count	Annual Average Daily Traffic (AADT)	Percentage of Heavy Vehicles (%HV)	Source	Predicted 2018 Annual Average Daily Traffic (AADT)*
<b>Lincoln Highway</b>	2017	2,000	17%	SA Viewer Website	2,040
<b>Arthur Glennie Drive</b>	2014	3,100	9.5%	SA Viewer Website	3,356
<b>Industry Drive</b>	2013	220	62.8%	Council	243

\*Sourced traffic volumes have had an annual estimated growth rate of 2 % applied to determine the likely traffic volumes in 2018.

The access point is proposed to the north of a cul-de-sac at the end of Industry Drive (Figure 7), with access to another industrial facility currently branching from the cul-de-sac to the west. The access point is an unsealed road and re-construction is proposed as part of the site construction (Figure 8).

A small swale exists approximately 30 m from the access point cul-de-sac, which could carry water in times of moderate to high rainfall.

The project will be designed to ensure the ASD of 40 m (assuming the site speed restriction is 40 km/h) from inside the site to the access point intersection is achieved.

The SISD is achieved for this access point and the MGSD was not considered relevant based on the access point being at the end of a cul-de-sac.

Industry Drive consists of a two-way road, 16 m in width and straight on approach to the access point. The asphaltic surface and unsealed shoulders of the road are in good condition. The road is an asphaltic surface in good condition, constructed with the intention of being used as an industrial connection road and hence can structurally support the proposed heavy traffic.



Figure 7: Proposed access point for South site via Industry Drive.





**Figure 8: Existing unsealed access road adjoining to the Industry Drive cul-de-sac to the site**

### **7.4.2 Potential impacts to traffic**

#### **North site**

Most vehicle movements generated will be within the approximate ten-month peak construction period, with minimal traffic anticipated when the site is operational. Within the construction period, there are expected to be approximately 21,175 vehicle trips in total, equivalent to 70 equivalent vehicle trips per day, 43% of which will be heavy vehicles.

Kimberly Road will be most affected by the increase in traffic during construction of the North Site, resulting in an approximate 349% growth in annual average daily traffic volumes (AADT), followed by Inkerman Road (17.1%) and Lincoln Highway (3.4%).

The most significant increase in traffic will be on Kimberly Road and equates to approximately 32 heavy vehicle trips during construction and 3 trips during the operational phase. Given that it is not currently used to provide access to any active properties nor is it considered a through route to other areas, the impact on existing road conditions is expected to be minor.

The impact of the increased traffic load, including heavy vehicles, on the Inkerman Road and Lincoln Highway road conditions during the construction period is expected to be minor and temporary.

Most of the vehicle traffic will be light vehicles, which are expected to have a minor impact on existing infrastructure. Furthermore, all access roads, except for Kimberly Road, are gazetted freight routes and capable of accommodating heavy vehicle traffic.

The traffic increase on all roads during the operational period is negligible due to the small volume of traffic generated.

## South site

The majority of vehicle movements generated will be within the approximate four month peak construction period, with minimal traffic anticipated when the site is operational. Within the construction period, there are expected to be approximately 8,239 vehicle trips in total, equivalent to 68 equivalent vehicle trips per day, 41% of which will be heavy vehicles.

Industry Drive will be most affected by the increase in traffic during construction, resulting in an approximate 28% growth in AADT, followed by Lincoln Highway (3.3%). These increases are not expected to have a significant impact on existing road conditions. The majority of the vehicle traffic will be light vehicles and all access roads are gazetted freight routes and capable of accommodating heavy vehicle traffic.

The traffic increase on all roads during the operational period is negligible due to the small volume of traffic generated.

### 7.4.3 Management and considerations

The following will be implemented prior to construction to ensure safe access to the sites:

- The Kimberly Road Access Point will be formalised to reduce confusion and potential conflict between vehicles. Operational controls such as warning signals, and/or radio contact between heavy vehicles will also be implemented by the construction contractor to manage this risk, especially upon entry and exit from the access point.
- Vegetation trimming or removal will be undertaken adjacent to the existing substation on Kimberly Road to achieve the required SISD. Additional operational controls and warning signage will also be considered if required.
- A comprehensive pavement condition assessment will be undertaken for Kimberly Road prior to construction with potential for subsequent remediation works.
- Minor re-sheeting will be undertaken on Industry Drive to create a flush surface in a slight depression in the unsealed shoulder to the cul-de-sac immediately adjacent the South site access point.
- A culvert will be installed at the swale crossing location off Industry Drive to prepare for all-weather access to the South site.

Airborne dust is likely to be generated by vehicles on unsealed access roads. A water truck will be employed to minimise airborne dust in dry periods, as required. Road base will also be applied to highly trafficked unsealed tracks and laydown areas, as required.

Appropriate approvals will be obtained from DPTI for oversize/overmass vehicles to access the Project during construction.

## 7.5 Aboriginal heritage

Independent Heritage Consultants (IHC) undertook an Aboriginal Heritage Risk Assessment (Appendix F) for the Project which included an overview of the archaeological context of the Project area as well as the results of heritage register searches to provide a risk rating and management recommendations.

The assessment summarised that the Project site does not display the required landforms, nor is it subjected to the long-term site formation processes required to contain sub - surface archaeological deposits. A search of the DPC- AARD Register of Aboriginal Sites and Objects did not identify any Aboriginal sites within 500 m of the Project area.

Notwithstanding the above, the Project site is close to the coastline where we can expect archaeological evidence of camping sites in the low-lying coastal dunes and sandy areas. This reflects what would have been a relatively intense occupation of the general area to harness the coastal resources.

### 7.5.1 Project interactions

Based on the assessment, IHC determined that there was a medium risk for in situ sub-surface archaeological material to be encountered during the planned works.

SIMEC ZEN is collaborating with the Barngarla Determination Aboriginal Corporation to finalise a Heritage Agreement. Once an agreement has been reached, a detailed cultural heritage survey will be undertaken to further inform the potential Project impacts and management requirements.

## 7.6 Ecology

### 7.6.1 Existing environment

The Project is encompassed by the Gawler bioregion and within the Myall Plains subregion (Interim Biogeographic Regionalisation of Australia), of which 97% is considered remnant native vegetation. The Project site is characterised dominantly by Acacia woodland, significant chenopod shrubland and patches of Casuarina woodland (Figure 9), and has been lightly grazed.

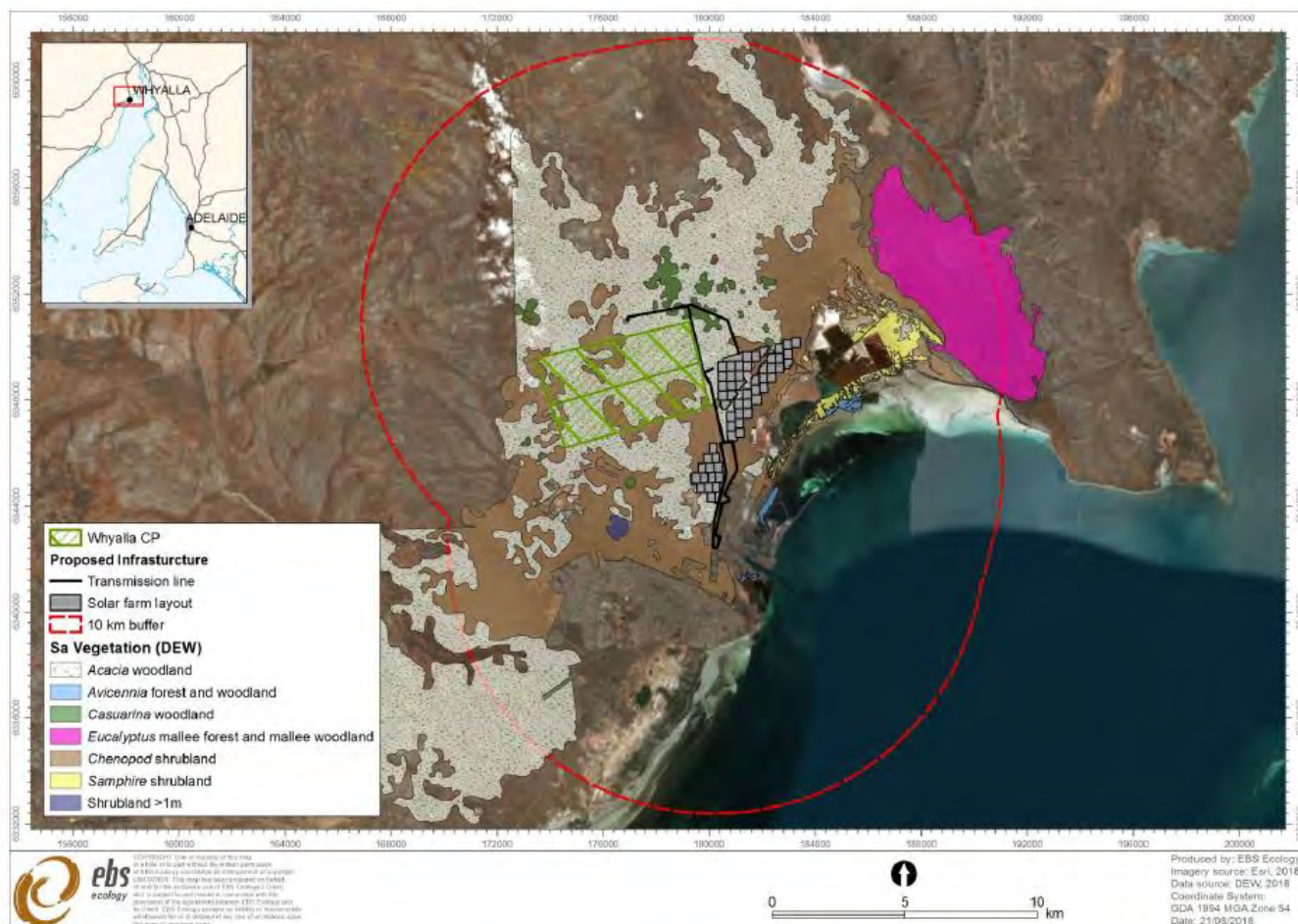


Figure 9: Overview of vegetation mapping with a 10 km buffer of the Project site

### State legislated flora and fauna

A desktop review of State legislated flora and fauna was undertaken by EBS Ecology to identify relevant constraints to be considered during Project and construction methodology design (Appendix E).

A desktop likelihood assessment of significant flora and fauna defined within the NPW Act identified no records of State threatened flora or fauna near the Project. One threatened ecosystem, two threatened flora and three threatened fauna were rated as having a possible likelihood of occurrence at the Project site, as follows:

- Tall Shrubland (*Alectryon oleifolius ssp. canescens*)- Threatened ecosystem  
Tall Shrubland is common in isolated patches and is listed as vulnerable under a provisional list of threatened ecosystems in SA and could potentially occur within the Project area.
- Australian Broomrape (*Orobancha cernua var. Australiana*) and Sandalwood (*Santalum spicatum*)- Threatened flora  
Australian Broomrape is restricted to coastal areas with sandy substrates and is not expected to be widespread in the project area. Sandalwood is highly conspicuous and, if present, is likely to be observed as scattered individuals.
- Western Slender-billed Thornbill (*Acanthiza iredelei iredelei*), Elegant Parrot (*Neophema elegans*), and White-bellied Sea Eagle (*Haliaeetus leucogaster*)- Threatened fauna  
The Western Slender-billed Thornbill is often detected within chenopod shrubland and the Elegant Parrot is often detected within all habitat found within the Project site. Both species have a stable population, a widespread distribution and extensive areas of habitat in the surrounding area.  
The White-bellied Sea Eagle may occur in the project site as a fly over area, with a significant distance to the closest known territory and hence the project would have negligible impacts on the species.

### **EPBC Protected Matters**

A self-assessment of actions that have or are likely to have a significant impact on a matter of national environmental significance (NES) under the EPBC Act was undertaken for the Project.

One listed threatened ecological community, thirty-two listed threatened species and forty-three listed migratory species were identified within a 5 km radius of the site.

Of these, only one species, the Western Grasswren (*Amytornis textilis*), was considered potentially likely to occur at the Project site based on the suitability of the habitat. The species is considered vulnerable and listed as an 'important population', with numbers concentrated in South Australia.

### **7.6.2 Project interactions**

The Project will require removal of vegetation to allow for the construction and operation of solar panels and associated Project infrastructure. A Bushland Assessment will be undertaken to determine the presence, condition and context of vegetation identified in the project area in order to more clearly define the ecological parameters and to determine a Significant Environmental Benefit (SEB) score for the Project.

The Project is not expected to have a significant impact on any matters of NES and referral of the Project to the Minister for the Environment for assessment was not considered necessary, based on the following:

- Suitable habitat is widespread around the wider region
- The known populations of the species are concentrated approximately 5.5 km west of the Project site and the home range is approximately 1.5 km.
- There are no known populations to the east of the site and therefore, the Project site is unlikely to be a connectivity corridor for the species
- The amount of clearance proposed by the Project is unlikely to lead to a long-term decrease in an important population.



The Project design has been optimised to minimise vegetation removal requirements, particularly within areas of the Acacia Woodland area. The construction methodology will also be designed to minimise vegetation disturbance and removal. Revegetation with local native species will be undertaken following construction.

Native vegetation at the site will be protected through construction as far as practicable through implementation of the EMP. SIMEC ZEN Energy will also support research into the interaction of wildlife with utility scale solar farms to better understand possible risk events as solar facilities become more common.

## 7.7 Visual amenity

### 7.7.1 Visual receptors

A viewshed model (Figure 10) was used to determine the viewpoints with the potential to be impacted by the Project. The viewshed model was developed using Geographical Information System (GIS) considering the relative elevation of the solar farm to the surrounding environment

The site is in a generally flat area at an elevation of between 7 and 30 m Australian Height Datum (AHD). The landscape rises to the east and west, peaking at approximately 100 m AHD 7 km to the east of the site and 115 m AHD 5 km west.

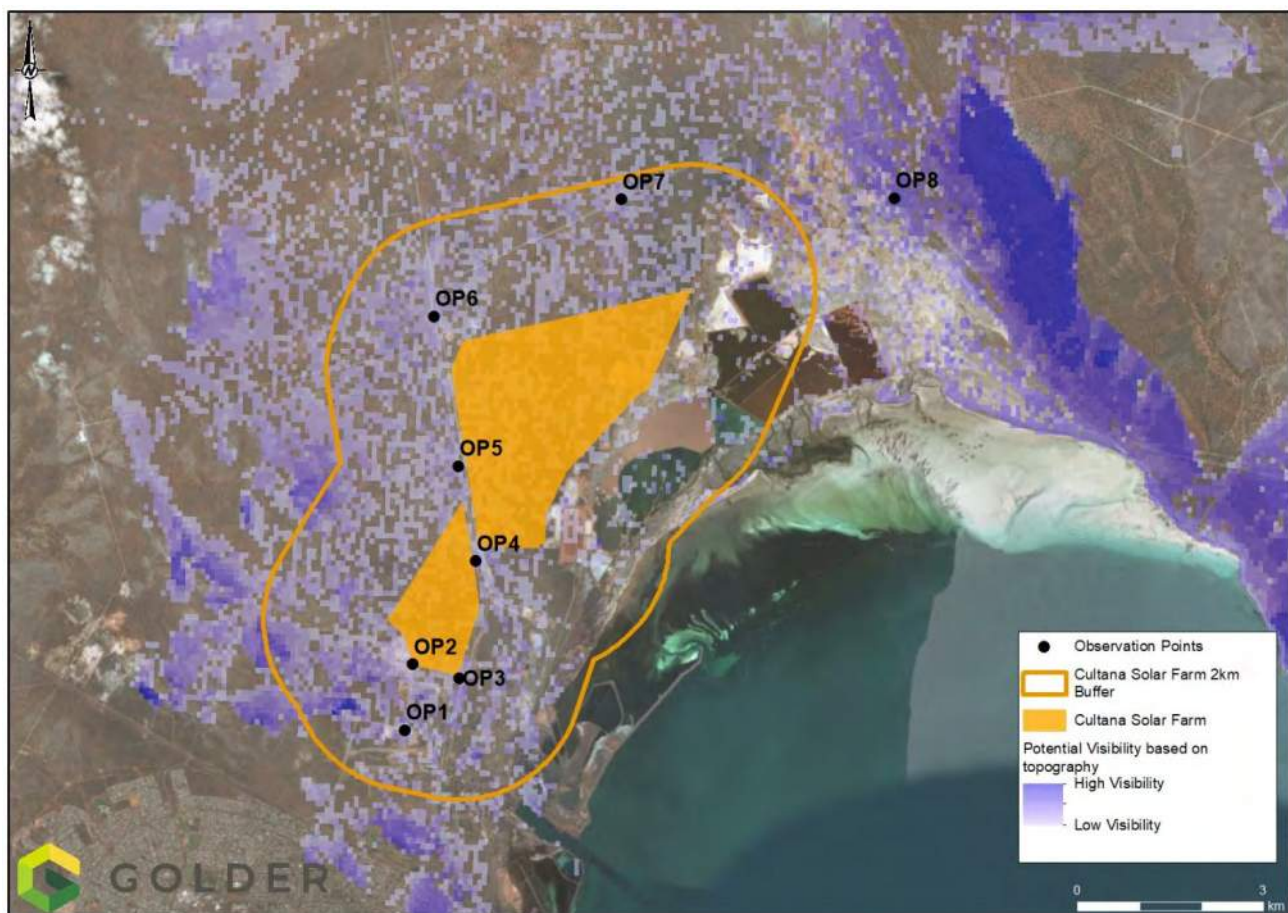


Figure 10: Viewshed model

### 7.7.2 Glare and glint

A glare and glint assessment was undertaken using the GlareGauge which uses the Solar Glare Hazard Analysis Tool (SGHAT), developed by Sandia National Laboratories to evaluate glare resulting from PV solar farms at different viewpoints, based on the location, orientation and specifications of the solar panels.

This tool is required by the United States Federal Aviation Administration (FAA) for glare hazard analysis near airports and is also recognised by the Australian Government Civil Aviation Safety Authority (CASA).

A 2 km radius from the site was considered appropriate for the glare and glint assessment based on it being highly unlikely for glare and glint impacts at distances greater than this.

### **GlareGauge**

In a fixed PV solar array, the angle of incidence varies as the sun moves across the sky, that is, the angle of incidence is at its lowest around noon where the sun is directly overhead and increases in the early mornings and late evenings as the incidence angles increase. If the PV array is mounted on a single axis tracking system as proposed for the Project, this variation is reduced because the panel is rotated to remain perpendicular to the sun. Therefore, a PV modular array using a tracking system has less potential to cause glare whilst it tracks the sun.

The GlareGauge analysis provides the annual Green glare and Yellow glare (in minutes) received at each identified potential receptor. Green glare is defined as glare with low potential to cause an after-image when observed prior to typical blink response time; and Yellow glare is glare with potential to cause an after-image when observed prior to a typical blink response time.

The analysis is on a minute-by-minute basis because sun reflections from PV modules are likely to last at least one minute. Glint which lasts for less than one minute is unlikely to occur from the sun, based on how slowly the sun and the panels move, and therefore is not considered relevant for the Project.

The parameters used in the SGHAT model for the Cultana Solar Farm are detailed in Table 7.

**Table 7: SGHAT specification inputs**

Parameters	Input
Time zone	UTC+9:30
Axis tracking	Single
Module surface material	Smooth glass with anti-reflective coating
Tilt of tracking axis	0°
Orientation of tracking axis	0°
Offset angle of module	0°
Maximum tracking angle	60°
Resting angle	60°
Rated power	0.36kW
Height of panels above ground	4 m

GlareGauge default settings were adopted for the analysis time interval, direct normal irradiance (DNI), observer eye characteristics and the slope error.

The heights of the observation points were assumed to be 1.5 m for a road user (i.e., sitting in a car) and 20 m for the air traffic control tower (ATCT).

### 7.7.3 Potential interaction

There were no sensitive receptors (i.e. residences) within 2 km of the site. Viewpoints with the potential to be impacted by the Project, were determined to be:

- Lincoln Highway
- Inkerman Road/Port Bonython Road
- Industry Drive.

While not within 2 km of the site, the Whyalla airport was also considered a potential receptor for glare. The ATCT, and the two landing scenarios in the orientations to potentially be impacted (facing approximately north and east) were included in the assessment. An observation point on Port Bonython Road was also included based on its elevation and associated high potential for visibility.

The results of the GlareGauge analysis (Appendix G) indicated that the selected observation points received no Green or Yellow glare.

Further, the analysis does not consider physical obstructions between reflectors and receptors, such as vegetation screening or buildings. Some roadside vegetation screening exists along Lincoln Highway and Inkerman Road/Port Bonython Road and will provide an additional visual barrier to highway users.

Site infrastructure, including the operations compound, will be screened with vegetation where appropriate, and vegetation along roadsides will be retained to minimise the visual impact to highway users.

The overhead powerlines will be visible from the Lincoln Highway, however, given the existing visual prominence of electricity infrastructure, this impact is considered minor.

## 7.8 Air quality

### 7.8.1 Existing environment

The two main issues for air quality in Whyalla are particle emissions from the Steelworks and windblown dust (Government of South Australia, 2018). The soils at the Project site and in the surrounding area are very fine and conducive to windblown dust, particularly where there is no vegetation to stabilise the topsoil.

EPA undertakes ambient air quality monitoring at two sites in the Whyalla township. Between April and June 2018, there were five exceedances of the 24-hour ground level concentrations criterion and all were attributed to regional dust events.

Liberty OneSteel also undertakes dust monitoring and measurement to ensure compliance with its EPA Licence.

### 7.8.2 Potential interaction

Dust is likely to be generated during construction because of vegetation clearance and increased traffic on unsealed areas.

The Project will be designed to ensure nuisance dust levels are minimised including avoiding vegetation removal and accelerated rehabilitation/revegetation following disturbance through seeding, watering and/or other methods.

Dust will also be managed during construction through the implementation of the EMP, including (but not limited to) the following measures:

- Dust curtains along boundary fencing
- Wetting-down of exposed surfaces

- Progressive rehabilitation/revegetation of disturbed areas
- Applying road base to highly trafficked areas.

## 8.0 PLANNING ASSESSMENT

As Council is an important stakeholder of the Project, SIMEC ZEN Energy has considered how the Project can align or acknowledge the desired characters and Principles of Development Control (PDC) in the relevant Development Plan.

The Cultana North site is within the Remote Areas Zone of the LNWCA Development Plan. This zone comprises coastal areas, swamps and plains adjacent industrial land.

The Cultana South site is within the Industry Zone of the Whyalla Council Development Plan. This area of the Industry Zone was created to facilitate development that requires ready access to Lincoln Highway and the rail system.

The Objectives and PDCs of the LNWCA Development Plan and Whyalla Development Plan that are considered relevant in the assessment of the Project are listed in Appendix H and discussed below.

### 8.1 Remote Area Zone- North site

The Remote Area Zone (LNWCA Development Plan) in the Whyalla area comprises industrial land use within a sensitive environment setting. Solar development is not listed as a non-complying development and is consistent with the Desired Character of the zone. A key objective of the zone is sustainable growth and protection of environmental and economic values. The Project is aligned with this objective.

The land uses listed in the PDCs do not specifically state solar farms, however other forms of renewable generation such as wind farms and ancillary developments (which could include substations, maintenance sheds, access roads and power lines) are listed and are considered comparable to the proposed solar farm land use.

The solar farm is a compatible land use with all those listed for the zone, and the future land use of the site remains flexible following the Project's decommissioning.

### 8.2 Industry Zone- South site

The primary objective of the Industry Zone (Whyalla Development Plan) is the encouragement of a wide range of industrial land uses. While not explicitly stated as a land use in the PDCs, the solar farm is consistent with the objectives and PDCs.

The Project maintains the desired character of the zone including minimising offsite impacts, preserving vegetation where possible and utilising the Lincoln Highway freight route. The Project also complies with the Form and Character of the zone such as access points situated on minor roads; landscaping and fencing requirements; progressive clearance of vegetation; and prevention of soil erosion and water pollution.

## 8.3 General section- North and South site

### 8.3.1 Hazards

The Project is not sited within an area which is susceptible to natural hazards.

Based on the site conditions and lack of surface water drainage pathways, there is a negligible level of risk of flooding. The site is over 1 km from the inter-tidal area of the coast. The Olsson's Pacific Salt evaporation ponds (south east boundary of the North site) are appropriately bunded to protect inland areas from flooding.

The site and surrounding area are dominated by various low fire risk plant species such as Bluebush and Saltbush and is not considered to be within a high bushfire risk area. The site infrastructure will be designed to be low fire risk and installed to the appropriate fire-ratings and standards. Tracks around and between the solar panels will be maintained to ensure emergency vehicles have relatively un-restricted access to the site. Fuel load (i.e. vegetation) will be appropriately managed and debris will be cleared from around buildings and infrastructure. A minimum 5,000 L water supply will be maintained onsite for emergency use and fire-fighting equipment will be available at the site and within vehicles and plant/machinery.

The site is within an area with an extremely low probability of occurrence of acid sulphate soils and site contamination is not expected to be present at the site.

Soils at the site have the potential to be naturally high in salinity. Seeding with locally indigenous plants and watering will be used to accelerate site rehabilitation and minimise the impact of any vegetation removal on soil salinity. The retention of the deep-rooted woodland vegetation at the site will also protect against the potential for rising groundwater and the associated salinity.

Hazardous materials will be appropriately stored, contained and handled during construction and operation, as outlined in the EMP.

### 8.3.2 Heritage conservation

While there are no registered sites or observed indicative landforms for discovery of Aboriginal sites within the Project footprint, the site has been assessed as a medium risk for encountering Aboriginal sites.

SIMEC ZEN Energy is negotiating an agreement with the Barngarla Aboriginal Corporation to ensure that the Project is managed to protect archaeological and ethnographic significant features throughout construction and operation.

### 8.3.3 Infrastructure

The Project has been sited and designed to minimise its environmental impact and to optimise the use of existing infrastructure and easements.

Roadside vegetation screening will be retained and enhanced with additional planting, where required, to reduce the visual impact of the solar panels. The operations and maintenance buildings and battery storage will be designed with neutral colours and appropriate screening.

The Project is sited where adequate utilities and services are available including electrical connections, water, all-weather public roads, telecommunications, and social infrastructure. Other facilities required (such as waste effluent and drainage) will be included in the Project design.

The transmission line will largely follow the existing easements.

Native vegetation clearance to facilitate construction and access will be minimised to the extent practicable. Revegetation will occur with locally native species and will be watered to accelerate rehabilitation success.

### 8.3.4 Interface between land uses

The development of a solar farm at the Project site will not detrimentally impact the surrounding land uses.

Potential impacts from construction noise, vibration and emissions will be managed through implementation of an EMP.

There are no neighbours to the site with the potential to be adversely impacted by light spill or construction hours and the solar panels will not result in glare to highway users.



Traffic impacts during construction will be minor and temporary and appropriate community notification will be undertaken.

Following construction and rehabilitation, operational impacts on surrounding land uses will be negligible.

Construction and operation will be managed to ensure no potential future land uses are precluded.

Locally indigenous and drought resistant plants will be planted where required to screen the operations compound. Landscaping will not interfere with current clearance zones from powerlines or other infrastructure.

### 8.3.5 Natural resources

The Project, including the permanent infrastructure as well as the construction methodology, has been designed to minimise its environmental impact and protect natural resources, as follows:

#### Water quality and quantity

- Surface water at the Project site will be protected during construction through the implementation of an EMP
- The Project has been designed to ensure appropriate drainage infrastructure and proposed maintenance to ensure surface water is protected during operation
- There will be no impact on marine or underground waters through construction or operation
- Stormwater runoff from the operations compound will be captured and re-used where practical. The Project design will ensure that stormwater runoff that is not captured is appropriately drained to protect the site and downstream infrastructure and environments
- Water will be responsibly used during construction for wetting down and rehabilitation and alternative water sources (such as treated water) will be considered where required.

#### Biodiversity and native vegetation

- The Project design has been optimised to ensure native vegetation and fauna habitats are protected to the extent practicable, and removal is limited
- An exclusion zone will be enforced around retained vegetation to ensure the quality of this vegetation is not impacted by the development
- Ecological surveys will be undertaken to confirm the species and communities at the site, and their significance; and an appropriate SEB offset will be calculated to ensure there is no net loss in native vegetation. Options for local revegetation or conservation projects will be preferential. Any proposed vegetation/habitat removal will be approved by the Native Vegetation Council
- Vegetation requiring trimming or removal will be progressively cleared, mulched and distributed across areas of bare soil
- The proposed native vegetation clearance is not expected to impact on significant wildlife corridors or bushfire safety
- The site will be rehabilitated/revegetated with local native species with the aim of restoring the existing ecosystem quality and maintaining habitat corridors. Rehabilitation will be undertaken progressively and will use seeding and watering to accelerate successful establishment
- There are no sensitive ecological areas within the Project site, and the Project is not expected to impact on the Whyalla Conservation Park

- Pest plants will be managed during construction through the implementation of an EMP. The site will be maintained during operation to ensure no increase in pest plants across the site and surrounding area
- There is not expected to be any offsite impacts on native vegetation from spray drift, soil compaction, modification of surface water or groundwater, or pollution.

### **Soil Conservation**

- The construction methodology has been designed to minimise potential impacts to soil from wind and water erosion, as detailed in the EMP
- Mulching and distribution of vegetation trimmings will assist in maintaining and restoring soil quality and reducing the potential for wind and water erosion
- The Project has been designed to maintain soil quality and quantity. Potential operational impacts are expected to be minor and will be managed through regular maintenance including introducing gravel to areas of observed erosion and seeding and wetting down in areas of low vegetation cover.

### **Landform and scenic value**

- The impact on the natural landform will be minimal
- The Project is set against the backdrop of the industrial area of the Whyalla Steelworks and the scenic value of this landscape will be maintained and enhanced with the addition of the renewable energy development. Vegetation screening will be maintained and enhanced where required to assist in protecting the scenic qualities of the landscape.

### **8.3.6 Renewable energy facilities**

The Project will benefit the environment, community and the State by providing an additional 280 MW of clean energy to the grid.

The Project's siting has optimised the ability to harvest solar power while using existing infrastructure and easements.

The Project design will ensure the impact on the environment is minimised to the extent practicable and there will be no impact on the safety of water or air transport.

### **8.3.7 Siting and visibility**

The Project is set against the backdrop of the industrial area of the Whyalla Steelworks at the entrance of Whyalla (from Adelaide). The Project will enhance the entrance to Whyalla to focus on the transformation to a renewable energy hub.

Vegetation screening will be maintained and enhanced where required to further improve the appearance of the solar farm.

The operations compound will be designed to minimise its visual impact on the landscape through appropriate set-backs and screening from the road, and neutral colouring on exterior walls. Screening will include vegetation planting with local indigenous species.

The overhead powerlines will be visible from the Lincoln Highway, however, given the existing visual prominence of electricity infrastructure, this impact is considered minor.



### 8.3.8 Transportation and access

The Project site is positioned on the Lincoln Highway to integrate with the existing freight route. Majority of the construction materials will be transported from Adelaide and the Lincoln Highway will be the main transport route. Access off Lincoln Highway will be via all-weather roads capable of accommodating the proposed traffic and heavy loads.

The expected traffic volume during construction and operation will not adversely impact on the existing freight route or other minor access roads.

Internal access roads will be constructed and maintained around and between solar panels with appropriate drainage infrastructure, avoiding native vegetation where possible.

Car parking facilities for a minimum of 16 cars will be provided within the operations compound.

### 8.3.9 Waste

Waste during construction will be managed through the implementation of an EMP utilising the waste hierarchy (avoid, minimise, reuse, recycle, treat and dispose).

Once the Solar Farm has been constructed, it will not produce any wastes or emissions. Wastes generated from the operations compound will be stored and disposed of appropriately. This includes recycling wherever possible. The operations compound facilities will include an approved septic system.

## 9.0 SCOPED ENVIRONMENTAL MANAGEMENT PLAN

A Scope EMP has been developed to provide a management framework and mitigation measures for potential impacts to the environment during the construction phase of the Project. The EMP is included as Appendix I.

The EMP:

- Provides a framework to demonstrate how the successful Contractor will implement measures to reduce potential environmental impacts of the Project during construction.
- Defines objectives and measurable targets associated with the significant environmental aspects of the project.
- Documents the policies, processes and procedures that the Contractor will adopt to identify, manage and control the potential environmental impacts, legislative requirements, approval conditions and other environmental obligations that relate to the construction phase of the project.
- Allocates responsibilities for ensuring the effective implementation of these policies, processes and procedures.

The successful construction contractor will use the EMP to develop a Contractor's Environmental Management Plan (CEMP) to ensure appropriate management of relevant environmental issues.

## 10.0 CONCLUSION

SIMEC ZEN Energy is seeking to develop the 280 MW Cultana Solar Farm over two connected greenfield sites (North and South) north of Whyalla and near the Whyalla Steelworks.

The Project has a Certificate from the OTR, certifying that the proposed development complies with the requirements of the Technical Regulator in relation to the security and stability of the State's power system.

The Project is aligned with the relevant Development Plans, as well as the local Government's objective of capitalising on the combination of excellent renewable resources with proximity to existing transmission infrastructure and high energy use facilities.

The proposal has sought to understand potential impacts, particularly those associated with the protection of flora and fauna, wind and water erosion control, traffic movements, visual amenity and Aboriginal heritage. The Project design has incorporated measures, such as protection of Acacia Woodland, to mitigate the identified impacts to the extent practicable. Potential construction impacts will be managed in accordance with the EMP incorporating appropriate measures to oversee the construction phase in an environmentally responsible manner, avoid degradation of the landscape and promote safe and efficient procedures.

Once constructed, the solar farm will be by design, relatively low impact.

The Cultana Solar Farm will be designed, managed and maintained to form an important feature at the entrance to Whyalla, highlighting the town and region as a renewable development hub.

## References

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## Signature Page

### Golder Associates Pty Ltd



Hannah Keynes  
*Environmental Scientist*



Lissa van Camp  
*Principal Environmental Consultant*

HK/LvC/gp

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<https://golderassociates.sharepoint.com/sites/20459g/deliverables/1898738-002-r-Rev0 da.docx>

## VOLUME 3: TECHNICAL APPENDICES

**APPENDIX A**

**Certificate of Titles**

# CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886



South Australia

VOLUME 6105 FOLIO 303

Edition 1

Date Of Issue 08/01/2013

Authority RTC 11860100

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

*B PI*



REGISTRAR-GENERAL

## REGISTERED PROPRIETOR IN FEE SIMPLE

ONESTEEL MANUFACTURING PTY. LTD. OF LEVEL 40/259 GEORGE STREET SYDNEY NSW  
2000

## DESCRIPTION OF LAND

ALLOTMENT 1 DEPOSITED PLAN 90705  
IN THE AREA NAMED WHYALLA BARSON  
HUNDRED OF CULTANA

## EASEMENTS

SUBJECT TO THE EASEMENT OVER THE LAND MARKED S TO TRANSMISSION LESSOR CORPORATION OF 1 UNDIVIDED 2ND PART (SUBJECT TO LEASE 9061500) AND ELECTRANET PTY LTD OF 1 UNDIVIDED 2ND PART (T 3540171)

SUBJECT TO THE EASEMENT OVER THE LAND MARKED B TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (T 3540171)

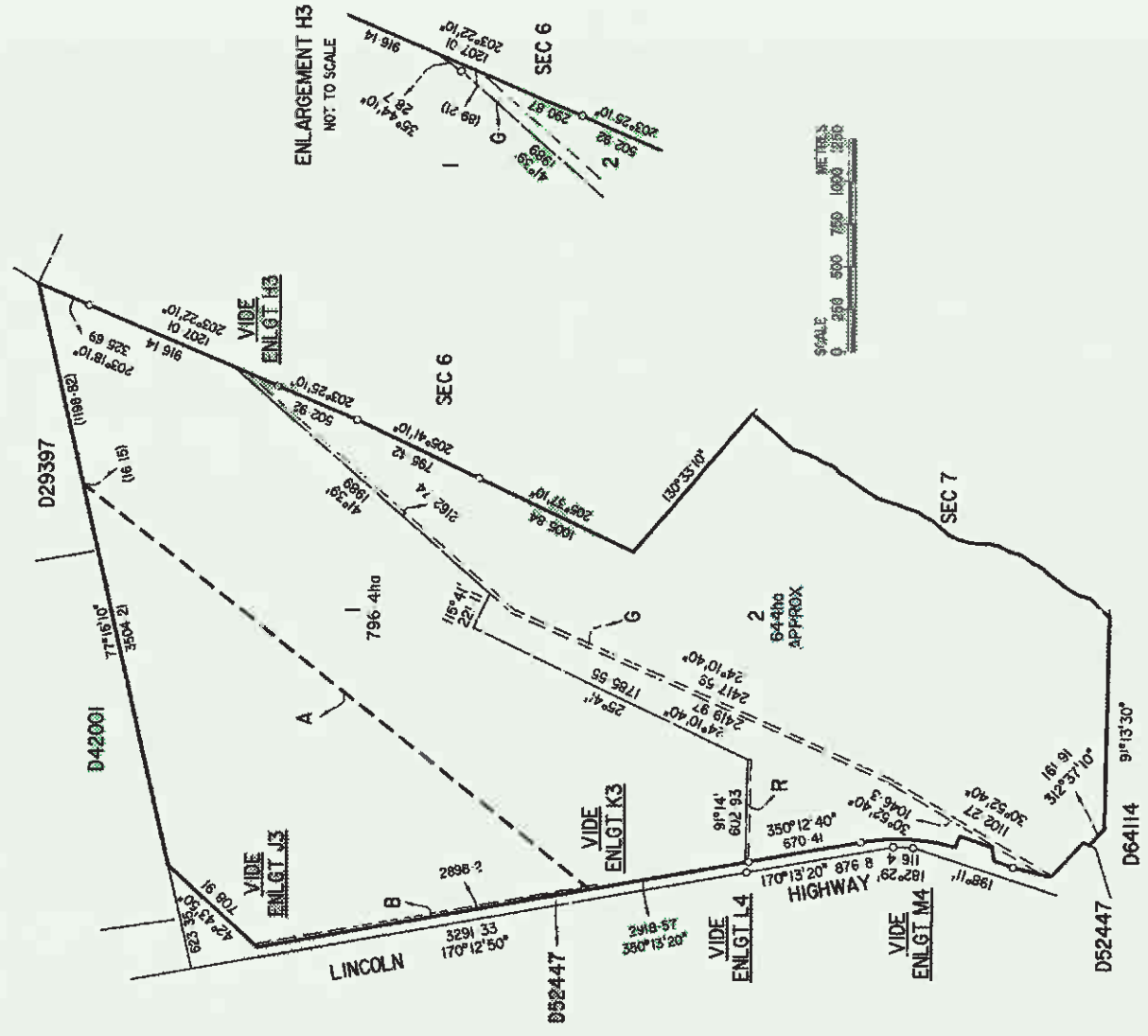
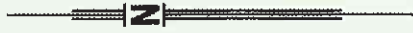
SUBJECT TO EASEMENTS OVER THE LAND MARKED A AND F TO THE MINISTER FOR INFRASTRUCTURE (T 3147696 AND TG 6184385 RESPECTIVELY)

TOGETHER WITH A FREE AND UNRESTRICTED RIGHT OF WAY OVER THE LAND MARKED R (RTC 11860100)

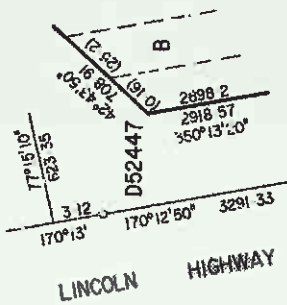
## SCHEDULE OF ENDORSEMENTS

NIL

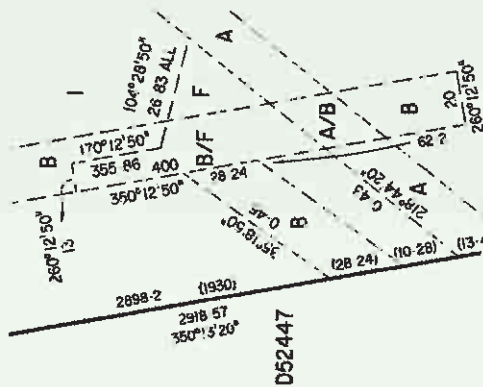




ENLARGEMENT J3  
NOT TO SCALE



ENLARGEMENT K3  
NOT TO SCALE



NATURAL BOUNDARY INFORMATION IS TAKEN FROM DEPOSITED PLAN 5244.7



PURPOSE:	DIVISION	AREA NAME:	WHYALLA BARSON, FALSE BAY	APPROVED:	
MAP REF:	6432/42, 6432/49, 6432/50, 6432/41	COUNCIL:	OUTSIDE L.G.A. BOUNDARIES	DEPOSITED/FILED:	
LAST PLAN:	D90705	DEVELOPMENT NO:		SHEET 1 OF 3	
				36915_text_01_v01	

AGENT DETAILS:	FYFE PTY LTD LEVEL 3, 80 FLINDERS STREET ADELAIDE SA 5000 PH: 82019600 FAX: 82019650	SURVEYORS CERTIFICATION:	
AGENT CODE:	ALRF		
REFERENCE:	21066/3/1 DU4-R3		

SUBJECT TITLE DETAILS:

PREFIX	VOLUME	FOLIO	OTHER	PARCEL	NUMBER	PLAN	NUMBER HUNDRED / IA / DIVISION	TOWN	REFERENCE NUMBER
CT	6105	304		ALLOTMENT(S)	2	D	90705 CULTANA		SECTION 2
CT	5184	637		SECTION(S)	6		CULTANA		
CT	5184	638		SECTION(S)	53		CULTANA		

OTHER TITLES AFFECTED:

EASEMENT DETAILS:

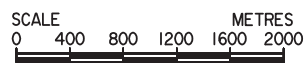
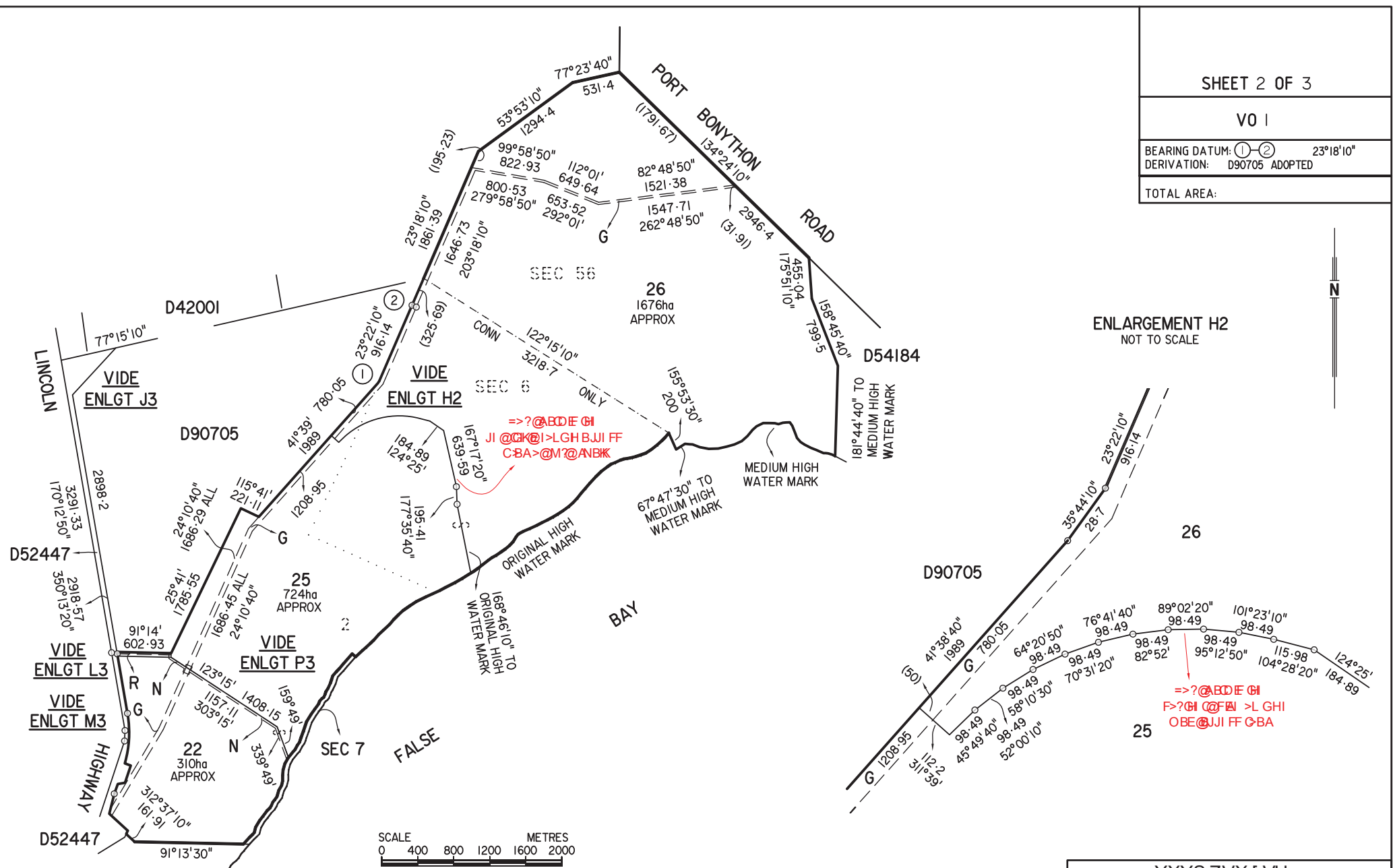
STATUS	LAND BURDENED	FORM	CATEGORY	IDENTIFIER	PURPOSE	IN FAVOUR OF	CREATION
EXISTING	22.25.26	LONG	EASEMENT(S)	G		NATURAL GAS AUTHORITY OF SOUTH AUSTRALIA	TG625021
EXISTING	25	SHORT	FREE AND UNRESTRICTED RIGHT(S) OF WAY	R			
EXISTING	22.25	LONG	EASEMENT(S)	N			

ANNOTATIONS: IRREGULAR BOUNDARIES AND HIGH WATER MARKS PLOTTED FROM D52447 AND DBPS 21 AND 33





ENLARGEMENT H2  
NOT TO SCALE



YXYS ZVX [ VU  
W^RTSX\_RWB@S] a SSRW  
80 Y[a]USRW WVRSSV QUS[C]US WQ 5000  
Zb\_] S (08) 8201 9600 YQc (08) 8201 9660  
NNN.II.I.J>O.B? Q=] 57 008 116 130  
RILICI@JI 21066/3/1 UN\] >. 21066U^4- R3  
PQ RST 3 UQVS 11/02/2013 UR `` T WTX





3540171

No.

ALBY

IN DUPLICATE

MEMORANDUM OF GRANT OF EASEMENT of the land within described.

TP35

THE BROKEN HILL PROPRIETARY COMPANY LIMITED

TO

THE ELECTRICITY TRUST OF SOUTH AUSTRALIA

*MEMORANDUM OF GRANT OF EASEMENT*

MEMORANDUM:—A Memorial of the within Instrument No. \_\_\_\_\_ was entered

in the Register Book

Vol. 3746 Folio 177 & 178

23 JAN 1974

the \_\_\_\_\_ at \_\_\_\_\_ o'clock.

21 DEC 1973

19

Appeared before me at the \_\_\_\_\_ day of \_\_\_\_\_ 19



(hereinafter called "the witness") a person known to me and of good repute attesting witness to this instrument and acknowledged his signature to the same and did further declare that

\_\_\_\_\_ described (hereinafter called the owner/mortgagor) the party/parties executing the same is/are personally known to him the witness and that the signature/signatures to the said instrument is/are in the handwriting of the owner/mortgagor and the owner/mortgagor and freely and voluntarily sign the same in the presence of the witness and was/were at that time of sound mind.

Justice of the Peace

Appeared before me at the \_\_\_\_\_ day of \_\_\_\_\_ one thousand nine hundred and \_\_\_\_\_ the within described

\_\_\_\_\_ the party executing the within instrument, being person well-known to me, and did freely and voluntarily sign the same.

THE ELECTRICITY TRUST OF SOUTH AUSTRALIA

Correct for the purposes of "The Real Property Act, 1886-1969."

RECORDED

15 JUL 1973

P. B. Rowley  
Licensed Land Broker  
Adelaide

18 NOV 1973	FEE PAID
TIME 11.30	
LTO FEES	\$12
NOTING	
ADVERTISING	
NEW C. T. TO ISSUE	

2 DEC 1973

VOLUME 4008 FILE 66/

Plan Requires Attention.

- Data circled to be clarified (enclgt.)
  - Angle 79°35' is to easement.
  - Is it intended for new easement to be 20.3m wide? *Followed*
- Plan shows "only 41 C.T." in sec 2. This is not so at present so easement will require fixing by other means.

TO THE REGISTRAR - GENERAL  
PLEASE

- ISSUE A CERTIFICATE OF TITLE FOR THE DOMINANT LAND.
- HOLD THE CERTIFICATES OF TITLE FOR THE SERVIENT LAND PARTIALLY CANCELLED.

P. B. Rowley

REFER	C. E. Hocking Sen. Drafting Officer
O.D.R.	Ref. 3746/28 dated _____

Appeared before me at the \_\_\_\_\_ day of \_\_\_\_\_ one thousand nine hundred and \_\_\_\_\_ the within described

\_\_\_\_\_ the part executing the within instrument, being person well-known to me, and did freely and voluntarily sign the same.



MEMORANDUM OF GRANT OF BASEMENT

formerly but now of 140 William Street  
THE BROKEN HILL PROPRIETARY COMPANY LIMITED of 500 Bourke Street/Melbourne  
in the State of Victoria 3000 (hereinafter called "the Owner") being  
registered as the proprietor of an estate in fee simple subject however  
to such encumbrances liens and interests as are notified by memorandum  
underwritten or endorsed hereon in the whole of the land comprised in  
Certificates of Title Register Book

Volume 3746 Folio 177  
Volume 3746 Folio 178

IN CONSIDERATION of an agreement between the parties hereto and for no  
monetary consideration whatsoever hereby grants to The Electricity Trust  
of South Australia (hereafter with its successors and assigns sometimes  
called "the Trust") its successors and assigns and its and their  
respective servants agents and licencees and all other authorised by  
them or any of them hereafter and from time to time full and free right  
liberty licence power and authority:

1. To enter upon and to pass either with or without motor or other  
vehicles laden or unladen along or over that land delineated in  
the plan attached hereto and therein coloured blue (hereinafter  
referred to as "the subject land") being portion of the said land  
above described
2. To erect and lay on the subject land poles towers conductors and  
other works for the transmission of electricity and to inspect  
repair alter remove and replace the same
3. To transmit electricity by means of such works

PROVIDED that nothing herein contained shall prevent the Owner from  
growing cereal or vegetable or other crops on the subject land or from  
erecting fences across the subject land Provided that suitable gates  
shall be erected in such fences if required by the Trust and at the  
expense of the Trust to enable the Trust conveniently to exercise its  
rights hereunder AND the Trust hereby agrees to indemnify the Owner  
against all loss caused in the Trust's exercise of its rights hereunder  
(a) by the Trust or (b) by Act of God or (c) by inevitable accident.

DATED the *7th* day of *October*, 1973.

THE COMMON SEAL of THE BROKEN HILL  
PROPRIETARY COMPANY LIMITED was  
hereunto affixed by authority of  
the Board of Directors

*[Signature]* ..... Director  
*[Signature]* ..... Director  
*[Signature]* ..... Secretary

ACCEPTED

THE COMMON SEAL of THE ELECTRICITY  
TRUST OF SOUTH AUSTRALIA was affixed  
hereto in the presence of

*[Signature]* ..... Member  
*[Signature]* ..... Secretary  
 Transferee







Donor

No. 3147696

MEMORANDUM OF TRANSFER AND GRANT OF EASEMENT

THE BROKEN HILL PROPRIETARY COMPANY LIMITED

TEMPORARILY WITHDRAWN

MURTHALS OF WORKS

3147696

Grantor

Grantee

Correct for the purposes of the Real Property Act, 1886

P. H. Danno

Licensed Land Broker SOLICIT

ADELAIDE

MEMORANDUM: A Memorial of the within Instrument

No. 3742/137 was entered in the Register

Book, Vol. 3140 and 1046/199 Folio 206

the 16th day of 22. 12 1970

at 10 o'clock.

R. J. ...

Deputy Registrar-General.

6 Certificate of Registrar-General, Justice of the Peace, etc., before whom instrument may have been executed by the parties thereto.

Appeared before me at see my personal note on your request for temporary withdrawal of the said nine hundred and one thousand nine hundred and one ... further temporary withdrawal of the said instrument after partial withdrawal of the part ... person well known to me and did freely and voluntarily sign the same.

(Signed) A Justice of the Peace in and for the State of South Australia.

Certificate of Registrar-General, Justice of the Peace, etc., being declaration of attesting witness.

Appeared before me at

the one thousand nine hundred and one ...

a person known to me and of good repute, attesting witness to this instrument, and ... signature to the same;

and did further declare that

the part executing the same personally known to him,

the said

that the signature to the said instrument in the handwriting of the said

and that the said

did freely and voluntarily sign the same in the presence of the said

and

at the time of sound mind.

(Signed)

CTC	11-25
FEE PAID	370
23 MAY 1965	Time 315
L.T.O. Fees	
Noting	
Advertising	

NE 102  
S. 111 E  
- 17

VOLUME 3746  
BALANCE VOLUME 3746

In view of holding prior documents, the within instrument to be examined accordingly.

C-30  
C-30

18 SEP 1970

Searched and checked 20/5/70

1) Description of property in operative sense to be amended

2) To be temporarily withdrawn to allow prior registration of a further partial withdrawal of volume 26992 etc.

see free

STATE CROWN SOLICITOR'S OFFICE

Stamp: 1970



MEMORANDUM OF TRANSFER AND GRANT OF EASEMENT

THE BROKEN HILL PROPRIETARY COMPANY LIMITED of 500 Bourke Street, Melbourne in the State of Victoria 3000 sometimes described of 422 Little Collins Street, Melbourne in the State of Victoria being registered as the proprietor of an estate in fee simple, subject, however, to such encumbrances liens, and interests as are notified by memorandum underwritten or endorsed hereon in THOSE pieces of land situate in the County of York being FIRST portion of Sections 1 and 26 in the Hundred of Cultana and SECONDLY portion of Section 19 in the Hundred of Rendell more particularly delineated and marked "P", "Q", "R", "S" and "T" on Lands Titles Registration Office Plans C-3098 and C-3099 copies of which are annexed hereto THIRDLY portion of Section 2 in the Hundred of Cultana more particularly delineated and coloured red on plan marked "A" ~~a copy of which is~~ annexed hereto and being portion of the land comprised in Certificate of Title Register Book Volume 1804 Folio 179 and the land in Certificate under Road Order in Docket 2941/69 and Volume 3469 Folio 26/Except and Reserved as is therein excepted and reserved IN CONSIDERATION of the sum SEVENTY-FIVE DOLLARS (\$75.00) paid to it by the Minister of Works the ~~of~~ of which sum is hereby acknowledged do hereby transfer to the said MINISTER OF WORKS all its estate and interests in the said piece of land marked "P" on the said plan and also as appurtenant thereto do hereby grant unto the Minister of Works with or without horses, plant equipment carts motor vehicles and other ~~pieces~~ ~~under~~ ~~with~~ ~~all~~ ~~free~~ and unrestricted right and liberty of entry egress and regress from time to time and at all times hereafter for him and his agents servants and workmen in through over across and along the said pieces of land marked "Q", "R", "S" and "T" on Lands Titles Registration Office Plans C-3098 and C-3099 and ~~coloured red on the plan marked "A"~~ <sup>the piece</sup> AND ALSO full free and unrestricted right and liberty for the said Minister and his agents servants and workmen from time to time and at all times hereafter to break the surface of dig open up and use the said pieces of land for the purpose of laying down fixing taking up repairing relaying or examining pipes on under or above and of using and maintaining such pipes AND ALSO the right for the said Minister of Works and his agents servants and workmen to construct and maintain upon the said pieces of land a roadway of such type as the said Minister of Works shall determine.

DATED the 3<sup>rd</sup> day of MARCH, 1969.

The Common Seal of THE BROKEN HILL PROPRIETARY COMPANY LIMITED was hereunto affixed by authority of the Board of Directors

*W. D. Myerson* } Directors.  
 ..... }  
*R. Ball* } Secretary.

ACCEPTED for and on behalf of the MINISTER OF WORKS.

*[Signature]*  
 Conveyancing Clerk  
 State Crown Law Department

Witness:

*[Signature]*  
Crown Solicitor.

EWIS 6444

(7TC)



Pursuant to Memorandum of Transfer No. 3147696 ✓ Registered on Vol. 1804 Folio 179#

~~NEW CERTIFICATE of TITLE for~~ \_\_\_\_\_ of the LAND in VOL. 3742 FOL. 137 ✓

Minister of Works ✓

is the proprietor of an estate in fee simple,

subject, etc., or endorsed hereon, in ~~that~~ piece of land

cfy. 8 acs. 3 rds. & 10 pches. or thobts.

situated in the Hundred of Culltana County of York ✓

being PORTION of Sec. 26 ✓

~~and~~ more particularly delineated and bounded as appears in the plan in the margin hereof and therein coloured green ✓

TOGR. with the rt. of way & easmt. more particularly described and set forth in ~~the above mention~~ Mem. of Tr. # for the purpose of laying down and maintaining pipes in and over <sup>those</sup> ~~that~~ pieces of land as laid in the said plan and therein coloured blue and mkd. Easmt. ✓

Except Minis ✓

*[Handwritten signature]*

which said Section is delineated in the Public Map of the said Ad. ✓ deposited in the Land Office, at Adelaide

"P" in plan in above TR (C-3098) ✓

TOGR over "Q. R. S. & T" (on C-3098/9) } COL. BLUE  
TOGR also over pink piece on later plan } & mt. Easmt. ✓

Pursuant to Memorandum of Transfer No. \_\_\_\_\_ Registered on Vol. \_\_\_\_\_ Folio \_\_\_\_\_  
~~NEW~~ CERTIFICATE of TITLE for *from* \_\_\_\_\_ of the LAND in VOL. 3742 FOL. 137

*Copy above C.T. as bdd. in pencil*

~~is the proprietor of an estate in fee simple,~~

~~subject, etc., or endorsed hereon, in~~  
~~of land situated in the~~

*ALSO*  
Subj. ~~to the~~ ~~rt. of w. & east. with conditions~~  
grtd. by Memo. of Tr. No. *3147696*  
to The ~~RTSA~~ M. of W. in & over <sup>*other*</sup> ~~parts~~ *of the*  
*sd. land* as dcd. in the sd. plan & therefro  
mkd. Easement *C*

Except Mins.

X 2647214

which said Sections <sup>*are*</sup> ~~is~~ delineated in the Public Map of the said *Hds.* ✓  
deposited in the Land Office, at Adelaide. *Diag. as on above CT. (E.P.K. holds original of this Diagram)*  
*EXCEPT "P" in plan in above TR (C-3098) ✓*  
*Subj. over existing "Pine Rd." & "Easements A & B"*  
*Subj. also over "Q", "K" & "S" — ab. "EASEMENT C"* [ *of area of Pts. 26 to 4147 acs. ✓* ]

10M-4.63 8758



Pursuant to Memorandum of Transfer No. \_\_\_\_\_

Registered on Vol. \_\_\_\_\_

Folio \_\_\_\_\_

~~NEW~~ CERTIFICATE of TITLE for from ~~of the LAND in~~ VOL. 1804 FOL. 1791

The Broken Hill Proprietary Company Limited  
of 500 Bourke Street Melbourne in the  
State of Victoria 3000

is the proprietor of an estate in fee simple,

subject, etc., or endorsed hereon, in  
of land situated in the

those Secs.

Hd. of Cullinan, Coy. of York

Nos. 1 and 2 and add. etc. hereof

Subj. n/less to the rt. of w. & east. with conditions  
grtd. by Memo. of Tr. No. 3147696  
to The ~~E.T.S.A.~~ M. of W. In & over part of the  
sd. land as deld. in the sd. plan & therein  
mkd. Easement

Except Mins.

which said Section <sup>are</sup> delineated in the Public Map of the said Hd.  
deposited in the Land Office, at Adelaide.

10M-4.63 8759

Diag. as on above C.T.  
Subj. over pink piece on linen plan in above re  
& "T" on print of LTO C-3099  
Mark Pink piece and "T" - EASEMENT

IN REPLY PLEASE QUOTE  
AND ADDRESS TO  
CROWN SOLICITOR  
BOX 296A, G.P.O., ADELAIDE 5001

SOUTH



AUSTRALIA

CROWN INSTRUMENT  
NO FEE PAYABLE

CROWN LAW DEPARTMENT

24 FLINDERS STREET

ADELAIDE, .....19

IF CALLING PLEASE ASK FOR  
Mr. ....  
PHONE.....

TO THE REGISTRAR-GENERAL

Please temporarily withdraw from registration  
document no. 3137149 to enable prior registration  
of a partial withdrawal of caveat over the same property

Yours Faithfully  
L.K. GORDON

Crown Solicitor

*ALC*

CST 1804-179 ✓  
3469 - 28 ✓ ~~NOE~~ 28-10-70

*Handwritten scribbles and signatures*

CST checked

*Handwritten initials*

29-10-70

29/10

PLEASE QUOTE  
AND ADDRESS TO  
CROWN SOLICITOR  
PX 296A, G.P.O., ADELAIDE 5001



SOUTH AUSTRALIA  
CROWN LAW DEPARTMENT  
24 FLINDERS STREET

IF CALLING PLEASE ASK FOR  
Mr. ....  
PHONE.....

ADELAIDE, .....19

CROWN INSTRUMENT  
NO FEES PAYABLE

*Not this case  
a few days ago  
proposed to be  
registered  
No. 3119582*

To the Registrar General,

Please temporarily withdraw from registration  
document No. 3005319 to allow a partial withdrawal of  
Caveat No. 2647214 to be registered.

Yours faithfully,  
L.K. GORDON.  
Crown Solicitor.

per *ATC*

*2*




THE ENGINEERING AND WATER SUPPLY DEPARTMENT  
MORGAN-WHYALLA PIPELINE DUPLICATION  
HUNDRED OF CULTANA

## SECTION I

SCALE

0 2 4 6 8 10 CHAINS

## NOTES

Permanent Marks in Surveyor General's specifications shown thus:  P.M.

Datum X-Y -- Vide adjoining sheet.

Data from previous survey shown thus:  - - -

Note: Water main is laid in centre of easement.

Easement required for above-ground water main shown lettered T.

Also shown -- The Broken Hill Proprietary Co. Ltd.

Plan of Title -- 1924/179

C.S. 1015 6/11/56

C.S. 4/68 1/11/56

L. M. Collins  
Licenced Surveyor

PT 26

Angles shown herein to not  
added by Local Titles Office  
Reference to Old Definition

I, Joseph Steery, Licenced Surveyor of South Australia do hereby certify that this plan has been made from surveys executed by me or under my own personal supervision, inspection and field check and that both plan and survey are correct and have been made in accordance with Regulations under the Surveyors Act 1914-1951.

Dated this 25<sup>th</sup> day of August, 1956.

Joseph Steery  
Licenced Surveyor

PT 2

L. M. Collins  
Licenced Surveyor

SEARCHED BY X1000  
INDEXED BY X1000  
SERIALIZED BY X1000  
FILED BY X1000  
1956  
L. M. Collins  
Licenced Surveyor

C-3000



NOT APPROVED

# THE ENGINEERING AND WATER SUPPLY DEPARTMENT MORGAN-WHYALLA PIPELINE DUPLICATION

## HUNDRED OF CULTANA

### SECTION I

SCALE  
0 1 2 3 4 5 6 7 8 CHAINS

**NOTES**  
Termination Marks in Surveyor General's specifications shown thus:  P.M.  
Datum N.T. - Vide adjoining sheet.  
Beds from previous survey shown thus: 

Note: Water main is laid in centre of easement

Easement required for above-ground water main shown indicated T

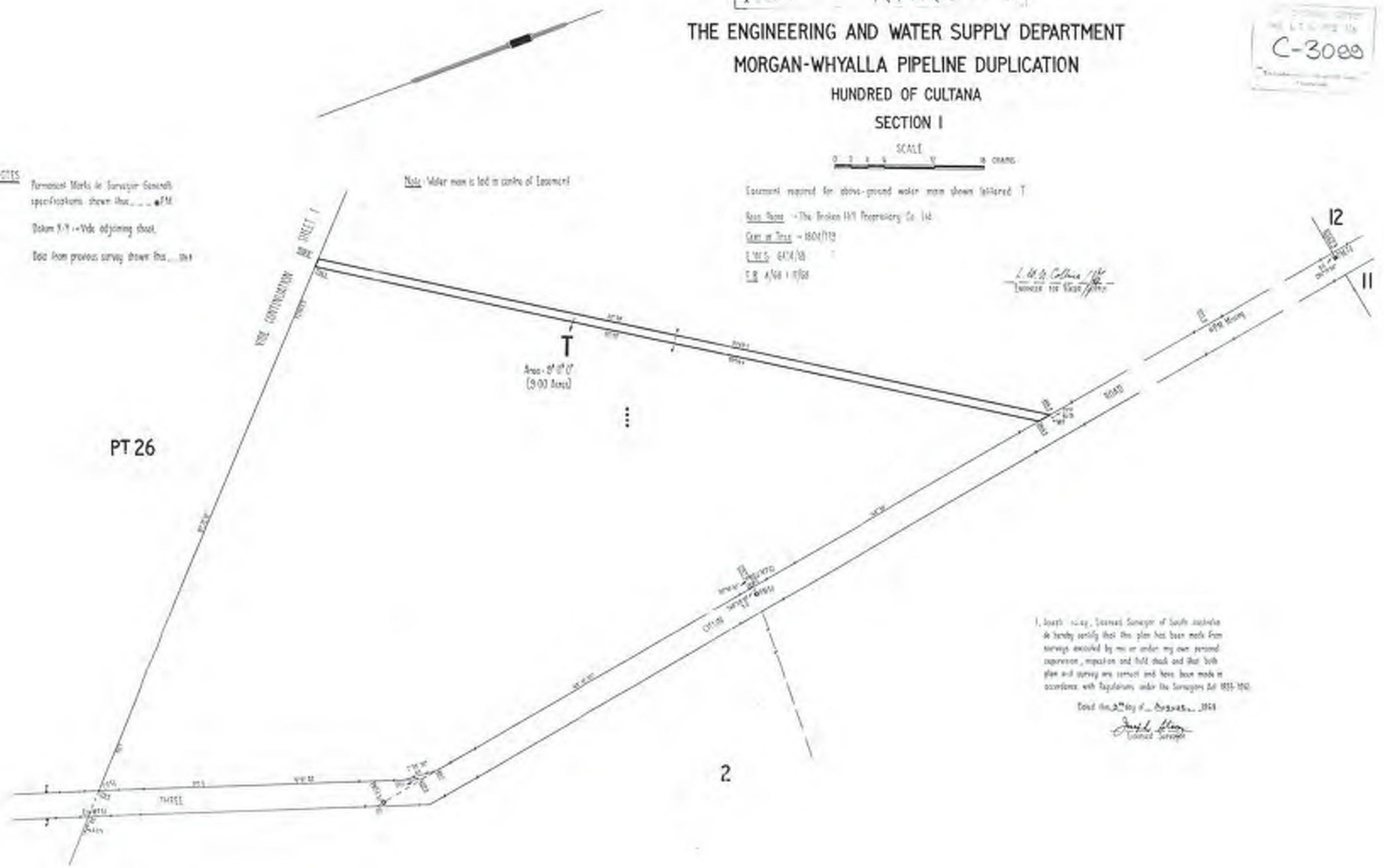
Base Map - The Broken Hill Proprietary Co. Ltd.

Plan of Title - 1804/113

1:100 S. 6/11/08

S.B. 4/98 1/1/08

L. M. G. Collins / J.H.  
Surveyor in Charge



I, Joseph Henry, Licensed Surveyor of South Australia do hereby certify that this plan has been made from surveys conducted by me or under my own personal supervision, inspection and field check and that both plan and survey are correct and have been made in accordance with Regulations under the Surveyors Act 1911-1912.

Dated this 2<sup>nd</sup> day of August, 1914

Joseph Henry  
Licensed Surveyor



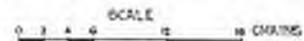
L.T.O. 630.

THE ENGINEERING AND WATER SUPPLY DEPARTMENT  
MORGAN-WHYALLA PIPELINE DUPLICATION  
HUNDRED OF CULTANA - PART SECTION 26  
HUNDRED OF RANDELL - PART SECTION 19

I, David Henry, Licensed Surveyor of South Australia do hereby certify that this plan has been made from surveys executed by me or under my own personal supervision, inspection and field check and that both plan and survey are correct and have been made in accordance with Regulations under the Surveyors Act 1935/1941.

Dated this 30<sup>th</sup> day of April 1965 - 1965

*David Henry*  
Licensed Surveyor



Land to be acquired for tank site shown lettered P  
Easement required for above ground water main shown lettered Q, R & S.

R Area = 10<sup>4</sup> 2' 38"  
(10.74 Acres)

*L. M. Collins*  
Engineer for Water Supply

100 chains  
60/0  
New Water Main is laid in centre of Easement

WIDE ENLARGEMENT

P

ENLARGEMENT

Q Area = 11<sup>3</sup> 3' 20"  
(12.88 Acres)

ENLARGEMENT 'B'

S Area = 0<sup>1</sup> 1' 07"  
(0.61 Acres)

PT 26

PT 19

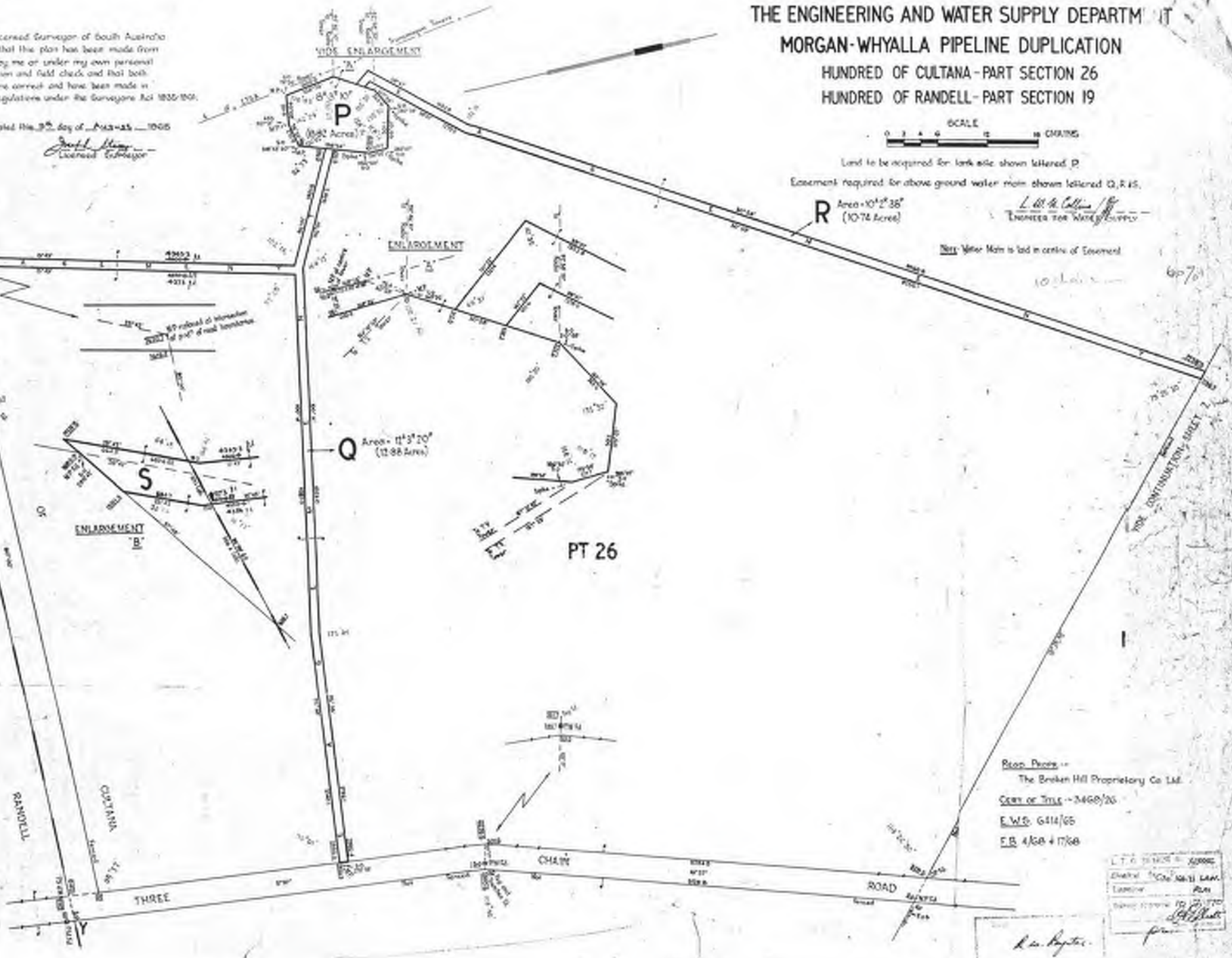
NOTE:  
Generalized Notes in Surveyor General's specifications shown thus: - - - - -  
Datum B.Y. adopted from Road Plan 244.  
Data from previous survey shown thus: - 1951

Angles shown herein in red  
added by Land Title Office  
Contract for Chief Engineer

Plan Done by  
The Broken Hill Proprietary Co. Ltd.  
Contract No. 2468/20  
E.W.S. 6414/65  
E.B. 4/65 + 17/68

L.T.O. 630  
Checked by  
L.M. Collins  
Engineer  
Date of Issue  
1965

*L. M. Collins*



















REAL PROPERTY ACT, 1886



The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



## Certificate of Title - Volume 6144 Folio 358

Parent Title(s) CT 6123/296  
Creating Dealing(s) TG 12153107  
Title Issued 04/09/2014 Edition 2 Edition Issued 19/01/2015

### Estate Type

FEE SIMPLE

### Registered Proprietor

THE CORPORATION OF THE CITY OF WHYALLA  
OF PO BOX 126 WHYALLA SA 5600

### Description of Land

ALLOTMENT 1000 DEPOSITED PLAN 79748  
IN THE AREA NAMED WHYALLA BARSON  
HUNDREDS OF CULTANA AND RANDELL

### Easements

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED A ON FP 55605 TO THE MINISTER FOR INFRASTRUCTURE (T 3147696)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED B ON FP 55605 TO TRANSMISSION LESSOR CORPORATION OF 1 UNDIVIDED 2ND PART (SUBJECT TO LEASE 9061500) AND ELECTRANET PTY. LTD. OF 1 UNDIVIDED 2ND PART (T 3540171)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED B ON FP 55605 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (T 3540171)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED M ON FP 55605 TO THE MINISTER FOR INFRASTRUCTURE (T 6481978)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED N ON FP 55605 TO THE MINISTER FOR INFRASTRUCTURE (T 6481979)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED P ON FP 55605 TO THE MINISTER FOR INFRASTRUCTURE (TG 6481980)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED T ON FP 55605 TO DISTRIBUTION LESSOR CORPORATION OF 2 UNDIVIDED 4TH PARTS (SUBJECT TO LEASE 8890000) AND TRANSMISSION LESSOR CORPORATION OF 1 UNDIVIDED 4TH PART (SUBJECT TO LEASE 9061500) AND ELECTRANET PTY. LTD. OF 1 UNDIVIDED 4TH PART (TG 7192380)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED D AND Y ON FP 55605 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (RTC 8859381)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED B ON FP 55605 (TG 9257115)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED U ON FP 55605 (TG 12015432)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED H ON FP 57453 FOR THE TRANSMISSION OF TELECOMMUNICATION SIGNALS BY UNDERGROUND CABLE TO TRANSMISSION LESSOR CORPORATION OF 1 UNDIVIDED 2ND PART (SUBJECT TO LEASE 9061500) AND ELECTRANET PTY. LTD. OF 1 UNDIVIDED 2ND PART (TG 12153107)

SUBJECT TO FREE AND UNRESTRICTED RIGHT(S) OF WAY OVER THE LAND MARKED G AND R ON FP 55605

SUBJECT TO SERVICE EASEMENT(S) OVER THE LAND MARKED E ON FP 55605 FOR ELECTRICITY SUPPLY PURPOSES TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (223LG RPA)

## Schedule of Dealings

Dealing Number	Description
9372809	ENCUMBRANCE TO ONESTEEL MANUFACTURING PTY. LTD.
11239477	LEASE TO TRANSMISSION LESSOR CORPORATION AND ELECTRANET PTY. LTD. COMMENCING ON 1/7/2009 AND EXPIRING ON 30/6/2034 OF PORTION (U IN FP 52902) TOGETHER WITH A RIGHT OF WAY AND EASEMENT AS TO THE SHARES SPECIFIED THEREIN
12498652	CAVEAT BY MURADEL PTY. LTD. (ACN: 147 754 425) OVER PORTION
12588844	HERITAGE AGREEMENT PURSUANT TO SECTION 23 OF NATIVE VEGETATION ACT 1991

## Notations

<b>Dealings Affecting Title</b>	NIL
<b>Priority Notices</b>	NIL
<b>Notations on Plan</b>	NIL

### Registrar-General's Notes

PLAN FOR HERITAGE AGREEMENT PURPOSES VIDE G16/2014  
PLAN FOR HERITAGE AGREEMENT PURPOSES VIDE G70/2011  
TEXTUAL AMENDMENT VIDE 12261908  
APPROVED FILED PLAN FOR LEASE PURPOSES FX52902  
APPROVED FX54914

### Administrative Interests

NATIVE VEGETATION HERITAGE AGREEMENT HA 1588  
SIGNIFICANT ENVIRONMENTAL BENEFIT 2007\_2001



This Crown Record Register Search is a true and correct extract of the Register of Crown Records maintained by the Registrar-General. Crown Land is administered pursuant to the Crown Land Management Act 2009 by the Department of Environment, Water and Natural Resources.

## Crown Record - Volume 5346 Folio 949

**Parent Title(s)** CR 5233/50  
**Creating Dealing(s)** RTD 7855225  
**Title Issued** 18/06/1996      **Edition** 2      **Edition Issued** 11/05/2013

### Estate Type

CROWN LAND (UNALIENATED)

### Owner

THE CROWN

### Custodian

MINISTER FOR SUSTAINABILITY, ENVIRONMENT AND CONSERVATION  
OF ADELAIDE SA 5000

### Description of Land

ALLOTMENT COMPRISING PIECES 6, 7, 8, 9, 10 AND 11 DEPOSITED PLAN 42001  
IN THE AREA NAMED WHYALLA BARSON  
HUNDRED OF CULTANA

TOTAL AREA: 183.7HA (CALCULATED)

### Easements

NIL

### Schedule of Dealings

NIL

### Schedule of Interests

Licence Number	Description
OL014619	ANNUAL LICENCE TO THE ELECTRICITY TRUST OF S A FOR INFRASTRUCTURE PURPOSES COMMENCING ON 01/03/1974 AND EXPIRING ON 30/04/2019
OL015255	ANNUAL LICENCE TO THE ELECTRICITY TRUST OF S A FOR INFRASTRUCTURE PURPOSES COMMENCING ON 01/09/1976 AND EXPIRING ON 30/04/2019

### Notations

<b>Dealings Affecting Title</b>	NIL
<b>Priority Notices</b>	NIL
<b>Registrar-General's Notes</b>	NIL
<b>Administrative Interests</b>	NIL

This Crown Record Register Search is a true and correct extract of the Register of Crown Records maintained by the Registrar-General. Crown Land is administered pursuant to the Crown Land Management Act 2009 by the Department of Environment, Water and Natural Resources.

## Crown Record - Volume 6140 Folio 412

**Parent Title(s)** CR 6140/92  
**Creating Dealing(s)** TG 12142523  
**Title Issued** 19/06/2014      **Edition** 1      **Edition Issued** 19/06/2014

### Estate Type

CROWN LAND (UNALIENATED)

### Owner

THE CROWN

### Custodian

MINISTER FOR SUSTAINABILITY, ENVIRONMENT AND CONSERVATION  
OF ADELAIDE SA 5000

### Description of Land

ALLOTMENT 69 DEPOSITED PLAN 85851  
IN THE AREA NAMED WHYALLA BARSON  
HUNDRED OF CULTANA

ALLOTMENT COMPRISING PIECES 70 AND 71 DEPOSITED PLAN 85851  
IN THE AREA NAMED WHYALLA BARSON  
HUNDRED OF CULTANA

TOTAL AREA: 1180HA (APPROXIMATE)

### Easements

SUBJECT TO THE EASEMENT(S) OVER PORTION OF PIECES 70 AND 71 MARKED AA ON DP 85851 TO THE SOUTH AUSTRALIAN WATER CORPORATION (TG 12142523)

### Schedule of Dealings

NIL

### Notations

**Dealings Affecting Title** NIL

**Priority Notices** NIL

### Registrar-General's Notes

APPROVED FX54924  
APPROVED FX59727

**Administrative Interests** NIL



This Crown Lease Register Search is a true and correct extract of the Register of Crown Leases maintained by the Registrar-General.

Crown Leases are granted and administered pursuant to the Crown Land Management Act 2009 by the Department of Environment, Water and Natural Resources.



## Crown Lease - Volume 6164 Folio 360

**Parent Title(s)** CL 1648/75  
**Creating Dealing(s)** RT 12390378  
**Title Issued** 22/10/2015      **Edition** 1      **Edition Issued** 22/10/2015

### Estate Type

CROWN LESSEE

### Owner

THE CROWN

### Crown Lessee

COMMONWEALTH OF AUSTRALIA  
OF ADELAIDE SA 5000

### Description of Land

SECTIONS 4, 13, 14 AND 15  
HUNDRED OF JENKINS  
IN THE AREA NAMED CULTANA

ALLOTMENT 7 DEPOSITED PLAN 29397  
IN THE AREA NAMED CULTANA  
OUT OF HUNDREDS (WHYALLA) AND HUNDREDS OF CULTANA AND JENKINS

ALLOTMENT COMPRISING PIECES 8, 9, 10 AND 11 DEPOSITED PLAN 29397  
IN THE AREA NAMED CULTANA  
OUT OF HUNDREDS (WHYALLA) AND HUNDREDS OF CULTANA AND JENKINS

ALLOTMENT COMPRISING PIECES 30, 31 AND 32 DEPOSITED PLAN 85850  
IN THE AREA NAMED CULTANA  
OUT OF HUNDREDS (PORT AUGUSTA) AND HUNDREDS OF ASH, CULTANA AND RANDELL

ALLOTMENTS 68 AND 72 DEPOSITED PLAN 85851  
IN THE AREA NAMED CULTANA  
HUNDRED OF CULTANA

ALLOTMENT COMPRISING PIECES 81, 82 AND 83 DEPOSITED PLAN 85852  
IN THE AREA NAMED CULTANA  
OUT OF HUNDREDS (PORT AUGUSTA)

ALLOTMENT 6 DEPOSITED PLAN 88907  
IN THE AREA NAMED CULTANA  
OUT OF HUNDREDS (PORT AUGUSTA) AND HUNDRED OF HANDYSIDE

ALLOTMENT 67 DEPOSITED PLAN 93251  
IN THE AREA NAMED CULTANA  
OUT OF HUNDREDS (PORT AUGUSTA) AND HUNDRED OF CULTANA

TOTAL AREA: 1590KM<sup>2</sup> (APPROXIMATE)

### Lease Details

**Lease Number** OM053500  
**Lease Type** TERM  
**Commencing On** 20/06/2014  
**Expiring On** 19/06/2089

## Conditions

CROWN LEASE CONDITIONS VIDE CL 1281/27, CL 1299/37, CL 1306/19, CL 1277/23

## Easements

SUBJECT TO EASEMENT(S) OVER PORTION OF ALLOTMENT 67 MARKED J ON D93251 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 12142528)

SUBJECT TO EASEMENT(S) OVER PORTION OF ALLOTMENT 67 MARKED P.Q.R AND S ON D93251 AND PORTION OF PIECES 8 AND 10 MARKED G AND M ON F54924 TO TRANSMISSION LESSOR CORPORATION OF 1 UNDIVIDED 2ND PART (SUBJECT TO LEASE 9061500) AND ELECTRANET PTY. LTD. OF 1 UNDIVIDED 2ND PART (TG 12142532A)

SUBJECT TO EASEMENT(S) OVER PORTION OF ALLOTMENT 68 MARKED EE ON D85851 TO SOUTH AUSTRALIAN WATER CORPORATION (TG 12142522)

SUBJECT TO EASEMENT(S) OVER PORTION OF ALLOTMENT 68 MARKED LL ON D85851 AND PORTION OF PIECE 8 MARKED LL ON F55012 (TG 12142530)

SUBJECT TO EASEMENT(S) OVER PORTION OF ALLOTMENT 72 MARKED FF ON D85851 AND PORTION OF PIECE 9 MARKED FF ON F55012 TO SOUTH AUSTRALIAN WATER CORPORATION (TG 12142521)

SUBJECT TO EASEMENT(S) OVER PORTION OF PIECE 32 MARKED A ON D85850 (TG 12142529)

SUBJECT TO EASEMENT(S) OVER PORTION OF PIECE 8 AND PORTION OF ALLOTMENT 68 MARKED C ON F54924 TO THE NATURAL GAS AUTHORITY OF SOUTH AUSTRALIA (TG 12142531)

SUBJECT TO EASEMENT(S) OVER PORTION OF PIECE 8 MARKED D AND T ON F54924 TO THE NATURAL GAS AUTHORITY OF SOUTH AUSTRALIA (TG 12142532)

SUBJECT TO EASEMENT(S) OVER PORTION OF PIECE 81 MARKED N ON D85852 (TG 12142526)

SUBJECT TO EASEMENT(S) OVER PORTION OF PIECE 82 MARKED P ON D85852 (TG 12142524)

SUBJECT TO EASEMENT(S) OVER PORTION OF PIECE 83 MARKED M ON D85852 (TG 12142525)

SUBJECT TO RIGHT(S) OF WAY OVER PORTION OF ALLOTMENT 67 MARKED L ON D93251 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 12142527)

## Schedule of Dealings

NIL

## Notations

**Dealings Affecting Title** NIL

**Priority Notices** NIL

### Registrar-General's Notes

APPROVED D29397  
APPROVED D85850  
APPROVED FX250455  
APPROVED FX54924

**Administrative Interests** NIL





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## Additional Information

This additional information is provided by the Department of Environment, Water and Natural Resources and does not constitute part of the Crown Leases Register maintained by the Registrar-General. Contact the Department of Environment, Water and Natural Resources to verify the currency of this information and to obtain further details.

### Annual Rent

Annual Rent:	\$13636
Rent Review:	Unknown

REAL PROPERTY ACT, 1886



The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



## Certificate of Title - Volume 5983 Folio 544

**Parent Title(s)** CT 4388/653  
**Creating Dealing(s)** RTC 10581428  
**Title Issued** 27/03/2007      **Edition** 1      **Edition Issued** 27/03/2007

### Estate Type

FEE SIMPLE

### Registered Proprietor

AUSTRALIAN RAIL TRACK CORPORATION LTD. (ACN: 081 455 754)  
OF OFF SIR DONALD BRADMAN DRIVE MILE END SA 5031

### Description of Land

SECTION 261  
HUNDRED OF COPLEY  
IN THE AREA NAMED PORT AUGUSTA WEST

SECTION 35  
HUNDRED OF CULTANA  
IN THE AREAS NAMED CULTANA AND WHYALLA BARSON

SECTION 52  
HUNDRED OF CULTANA  
IN THE AREA NAMED WHYALLA BARSON

SECTION 1184  
HUNDRED OF DAVENPORT  
IN THE AREA NAMED PORT AUGUSTA

SECTIONS 1186 AND 1243  
HUNDRED OF DAVENPORT  
IN THE AREA NAMED WAMI KATA

SECTION 58  
OUT OF HUNDREDS (PORT AUGUSTA)  
IN THE AREA NAMED PORT AUGUSTA

SECTION 487  
OUT OF HUNDREDS (PORT AUGUSTA)  
IN THE AREA NAMED PORT AUGUSTA WEST

SECTIONS 704, 705 AND 706  
OUT OF HUNDREDS (PORT AUGUSTA)  
IN THE AREA NAMED CULTANA

ALLOTMENT 8 DEPOSITED PLAN 28199  
IN THE AREAS NAMED LINCOLN GAP AND PORT AUGUSTA WEST  
HUNDRED OF COPLEY

DELINEATED IN FP 28629 FP 28630 FP 28641 FP 28642 FP 28643 FP 28644 FP 28645 AND FP 28646

## Easements

SUBJECT TO THE EASEMENT(S) OVER PORTION OF SECTION 704 MARKED A AND B ON FP 29774 TO TO TRANSMISSION LESSOR CORPORATION OF 1 UNDIVIDED 2ND PART (SUBJECT TO LEASE 9061500) AND ELECTRANET PTY. LTD. OF 1 UNDIVIDED 2ND PART (LAND GRANT VOL.4321 FOLIO 712 AND TG 7029218 RESPECTIVELY)

SUBJECT TO THE EASEMENT(S) OVER PORTION OF SECTION 704 MARKED A ON DP 28199 TO COMMONWEALTH OF AUSTRALIA (AQ 2559249)

SUBJECT TO THE EASEMENT(S) OVER PORTION OF ALLOTMENT 8 MARKED B ON DP 28199 TO THE MINISTER FOR INFRASTRUCTURE (LAND GRANT VOL.4321 FOLIO 713)

## Schedule of Dealings

NIL

## Notations

<b>Dealings Affecting Title</b>	NIL
<b>Priority Notices</b>	NIL
<b>Notations on Plan</b>	NIL
<b>Registrar-General's Notes</b>	NIL
<b>Administrative Interests</b>	NIL

**APPENDIX B**

Letters of support





Ref: 2017/01873.01 D18073816

25 May 2018

Jezac Crowe  
SIMEC ZEN Energy  
1284 South Rd  
Tonsley SA 5042  
By email: [jezac@clutchconsulting.com.au](mailto:jezac@clutchconsulting.com.au)

Energy and Technical  
Regulation

Office of the  
Technical Regulator

Level 8, 11 Waymouth Street  
Adelaide SA 5000

GPO Box 320  
Adelaide SA 5001

Telephone: 08 8226 5500  
Facsimile: 08 8226 5866

[www.sa.gov.au/otr](http://www.sa.gov.au/otr)

Dear Jezac,

**RE: CERTIFICATE FOR DEVELOPMENT OF THE CULTANA SOLAR POWER PROJECT**

The development of the Cultana Solar Power Project on has been assessed by the Office of the Technical Regulator (OTR) under Section 37 of the Development Act 1993.

Regulation 70 of the *Development Regulations 2008* prescribes if the proposed development is for the purposes of the provision of electricity generating plant with a generating capacity of more than 5 MW that is to be connected to the State's power system – a certificate from the Technical Regulator is required, certifying that the proposed development complies with the requirements of the Technical Regulator in relation to the security and stability of the State's power system.

In making a decision on your application, our office has taken the following information into account:

- Your application for a OTR certificate for the project 'SIMEC Zen Energy – Cultana and Whyalla Solar – OTR Application FINAL.pdf', emailed to the OTR on 23 May 2018.

After assessing the information provided, I advise that approval is granted for the proposed project, provided the required Fast Frequency Response required for the project, as prescribed by the OTR's Generator Development Approval Procedure Version 1.1, is provided by SIMEC ZEN Energy's Playford Utility Battery Project.



Should you have any questions regarding this matter, please do not hesitate to call David Bosnakis on (08) 8226 5521.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Rob Faunt'.

Rob Faunt  
**TECHNICAL REGULATOR**

cc: Joe Devries – SIMEC ZEN Energy



B232194  
DPC16/3528

GPO Box 320  
Adelaide SA 5001  
DX 541  
Tel 08 8303 2298  
[www.energymining.sa.gov.au](http://www.energymining.sa.gov.au)

13 July 2018

Mr Sturt Daley  
Project Manager  
SIMEC ZEN Energy  
PO Box 141  
OAKLANDS PARK SA 5046

Email: [sdaley@zenergy.com.au](mailto:sdaley@zenergy.com.au)

Dear Mr Daley

## **CROWN SPONSORSHIP CULTANA AND WHYALLA SOLAR ENERGY PROJECT**

Thank you for your letter of 10 June 2018 requesting Crown Sponsorship under section 49 of the *Development Act 1993* to assist with SIMEC ZEN Energy Pty Ltd's (SIMEC ZEN) proposed Cultana and Whyalla Solar Energy Project (Project) to be located across two greenfield sites near the Whyalla Steelworks.

This Project has been considered within the South Australian Department for Energy and Mining (DEM) with input from the Department of Planning, Transport and Infrastructure, the Department of Environment and Water, the Environmental Protection Agency and the Technical Regulator. In principle, the Project is supported, recognising the possible environmental and community issues that will need to be addressed through the development assessment process.

On balance, the development of the Project has the potential to benefit South Australia and can be considered public infrastructure. Accordingly I, as the Chief Executive of the DEM, will support the development and specifically endorse the Development Application to construct the Project comprising up to 210 MW of solar PV generation at the Cultana site and up to 70 MW of solar PV generation at the Whyalla site as a development of public infrastructure as required by section 49 of the *Development Act 1993* (the Act).

It is the responsibility of SIMEC ZEN to prepare all documentation as required by section 49 of the Act. All costs in the preparation of the development application,



lodgement and any other subsequent action in relation to this application are the responsibility of SIMEC ZEN.

The DEM makes no representations or gives no warranties in relation to the outcome of the Development Application or time that it takes to secure a planning outcome. It is SIMEC ZEN's responsibility to obtain all other statutory approvals, licences, connection agreements and permits from relevant authorities, manage community expectations and to fund the project. The State Government makes no commitment to purchase any product or service related to the project.

A Development Application under this Crown sponsorship must be lodged with the State Planning Commission and is valid for 12 months from the date of this letter. If this is not achieved by that time, my support under Section 49(2)(c) of the *Development Act 1993* for SIMEC ZEN's Project will lapse.

If you have any questions regarding the preparation of the material to support this section 49 application, please contact Mr Mark Jackson on (08) 8429 2722 or via email: [mark.jackson@sa.gov.au](mailto:mark.jackson@sa.gov.au).

Yours sincerely



Dr Paul Heithersay  
**CHIEF EXECUTIVE**



**APPENDIX C**

**Risk Assessment**

## Environment Risk Assessment

### Definitions

Likelihood	
Almost certain	The event is expected to occur
Likely	The event will probably occur
Possible	The event may occur occasionally; occurrence would not be unusual
Unlikely	The event is unlikely to occur
Rare	The event may only occur in exceptional circumstances
Consequence	
Severe	Long term, significant damage or impact on environmental systems and local community
Major	Significant damage or impact on environmental systems and local community
Moderate	Measureable adverse environmental or social impact; will result in temporary annoyance or nuisance to community
Minor	Short term, minor adverse social or environmental impact
Insignificant	The presence of the hazard will not result in adverse social or environmental impact

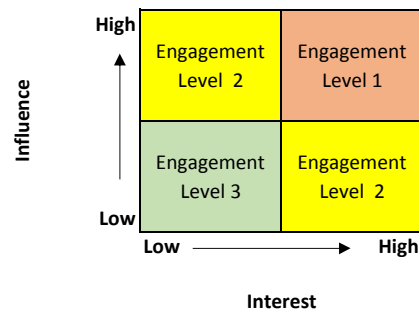
### Risk Assessment Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

## Stakeholder Risk Assessment

### Definitions

Influence	
High	Stakeholder has the potential to significantly influence the outcome of the project
Low	Stakeholder does not have the potential to significantly influence the outcome of the project.
Interest	
High	Project has a realistic possibility of having an impact on the stakeholder and spark significant interest
Low	Project may spark interest



Activity	Source	Pathway	Receptor	Potential Impact	Current Risk Rating			Additional information/considerations	
					Likelihood	Consequence	Rating		
Construction activities	Direct impact	Permanent vegetation removal	Vegetation protected by EPBC	No EPBC listed Veg				No EPBC listed vegetation species identified, survey to confirm	
			Vegetation protected by the Native Vegetation Act (State)	Yes	Almost certain	Minor	High	Survey to confirm native vegetation and SEB offsets	
			Other vegetation	Yes	Almost certain	Insignificant	Medium		
			Fauna protected by the EPBC Act	No EPBC listed fauna				No EPBC listed fauna (no records of Western Grasswren on Cultana), survey to confirm	
			Other fauna	Yes	Unlikely	Insignificant	Low		
		Vegetation disturbance	Vegetation protected by EPBC	No EPBC listed Veg					As above
			Vegetation protected by the Native Vegetation Act (State)	Yes	Almost certain	Minor	High		As above
			Other vegetation	Yes	Almost certain	Insignificant	Medium		
			Fauna protected by the EPBC Act	No EPBC listed fauna					As above
			Other fauna	Yes	Unlikely	Insignificant	Low		
		Displacement (Physical, noise, light or vibration)	Fauna protected by the EPBC Act	No EPBC listed fauna					As above
			Other fauna	Yes	Possible	Insignificant	Low		
		Disturbance	Area of Aboriginal spiritual significance	Yes	Possible	Major	High		Engagement with Barngarla
			Vibration or amenity	Locally, State, Nationally listed heritage areas	No heritage areas in close proximity therefore no impact.				
	Construction during night works	Insect and fauna attraction	Fauna protected by the EPBC Act	No EPBC listed fauna					
			Other fauna	Yes	Unlikely	Insignificant	Low	As above	
	Soil disturbance	Introduction and spread of weeds	Existing ecosystem	Yes	Possible	Minor	Medium	CEMP to minimise impact	
	Topsoil stripping	Removing seed bank and hummic material	Existing ecosystem	Yes	Possible	Minor	Medium	CEMP to minimise impact	
	Accidental spills (pollution)	Soil, surface water and groundwater	Groundwater	Yes	Rare	Major	Medium	Pollution control procedures included in the CEMP and Emergency Response Plan to be implemented during construction.	
			Surface water	Yes	Possible	Moderate	Medium		
			Soil	Yes	Possible	Minor	Medium		
	Construction activities including excavation, site traffic	Increased dust levels	Residences and businesses within close proximity	Yes	Possible	Moderate	Medium	CEMP to minimise impact	
			Highway users	Yes	Possible	Moderate	Medium		
			Plants	Yes	Possible	Moderate	Medium		
	Temporary change in surface water drainage pathways	Sedimentation	Surface water	Yes	Likely	Insignificant	Medium	Soil erosion and drainage management to be included in the CEMP	
			Soil	Yes	Possible	Moderate	Low	Soil erosion and drainage management to be included in the CEMP	
	Stockpiling	Sedimentation	Surface water	Yes	Likely	Minor	Medium	Soil erosion and drainage management to be included in the CEMP	
	Onsite plant and machinery	Noise and vibration	Sensitive receptors or residents	No sensitive receptors or residents in close proximity therefore no impacts					
		Increased greenhouse gas emissions (i.e. fossil fuel use and electricity)	Community	Yes	Almost certain	Insignificant	Medium	Measures to reduce greenhouse gas emissions as much as practicable to be included in the CEMP.	
		Physical degradation	Soil	Yes	Possible	Minor	Medium		
	General construction activities	Increase in generation of waste	Community and existing environment	Yes	Almost certain	Insignificant	Medium	Measures to reduce waste generation as much as practicable to be considered in design and included in the CEMP.	
	Dust suppression	Water use	Community and existing environment	Yes	Almost certain	Insignificant	Medium	Consider using recycled water where possible	
Excavation of contaminated material	Soil, surface water and groundwater	Soil	Yes	Rare	Minor	Low	Likelihood of contamination is low. Contamination management measures will be included in the CEMP.		
		Surface water	Yes	Rare	Moderate	Medium			
		Groundwater	Yes	Rare	Major	Medium			
Unauthorised access	Onsite plant and machinery	Public safety	Yes	Rare	Major	Medium	Appropriate access restrictions (fencing, alarms, security)		
Construction activities including hot works,	Bushfire	Community and existing environment	Yes	Possible	Severe	Extreme	Emergency response plan in consultation with CFS		
Entrainment of soils offsite (from site machinery and vehicles)	Soils/sediment	Surface water	Yes	Rare	Moderate	Medium	Measures for vehicle drag out in CEMP		
		Highway users	Yes	Possible	Minor	Medium			
Excavation	Disruption of aquifers	Groundwater quality	No impact on groundwater						
		Groundwater security	No impact on groundwater						
Excavation	Disturbance of Aboriginal artefacts	Barngarla	Yes	Likely	Major	High	Survey to be undertaken to determine likelihood for encountering artefacts/sites- Barngarla engagement for artefact salvage.		
Construction activities cranes	Encroach into airspace	Aviation	No interaction						

Construction vehicles	Direct impact	Collision	Livestock	Yes	Rare	Moderate	Medium	Access restrictions
			Native fauna	Yes	Possible	Minor	Medium	CEMP to minimise impact
	Soil disturbance	Introduction and spread of weeds	Existing ecosystem	Yes	Possible	Moderate	Medium	Survey to confirm weed species. Weed control measures in CEMP.
	Traffic and Heavy loads to site	Degradation of public infrastructure (roads)	Road users and Council/DPTI	Yes	Unlikely	Minor	Medium	Traffic/transport study
Nuisance		Road users	Yes	Possible	Minor	Medium	Traffic/transport study	
Decreased safety		Road users	Yes	Unlikely	Minor	Medium	Traffic/transport study	
Siting	Solar panels	Landscape character- industrial	Highway users	Yes	Unlikely	Insignificant	Low	Community engagement
		Landscape character- natural	Whyalla conservation park users	Yes	Possible	Minor	Medium	Community engagement
		Glare and reflectivity	Highway users	Yes	Unlikely	Minor	Low	Publicly available info suggests glare will not be an issue
			Aviation	Yes	Unlikely	Minor	Low	Publicly available info suggests glare will not be an issue
Operation	Increased impervious surfaces	Micro-climates under the solar modules (shading, rainfall, temperature and humidity changes)	Existing ecosystem	Yes	Possible	Moderate	Medium	SEB to take into account long term impacts to vegetation
		Surface water runoff	Erosion	Yes	Possible	Moderate	Medium	CEMP to minimise impact
	land use change	Decreased groundwater accumulation	Water security	No change to rainwater quantity				
		Changes to vegetation type	Existing ecosystem	Yes	Possible	Minor	Medium	Surveys to confirm vegetation associations
	land use change	Loss in agricultural production	Surrounding land use	Negligible impact on surrounding land use				
		Site maintenance	Permanent removal of vegetation	Existing ecosystem	Yes	Possible	Minor	Medium
	Site traffic	Increased dust levels	Residences within close proximity	Yes	Rare	Insignificant	Low	Gravel on highly trafficked areas
			Highway users	Yes	Rare	Insignificant	Low	Gravel on highly trafficked areas
			Plants	Yes	Rare	Insignificant	Low	Gravel on highly trafficked areas
		Collision	Fauna protected by the EPBC Act	No EPBC listed fauna				
	Other fauna		Yes	Rare	Insignificant	Low		
	Traffic and Heavy loads to site	Degradation of public infrastructure (roads)	Road users and Council/DPTI	Yes	Possible	Moderate	Medium	Traffic and transport study
		Nuisance	Road users	Yes	Possible	Moderate	Medium	Traffic and transport study
	Permanent change in surface water drainage pathways	Sedimentation	Surface water	Yes	Possible	Minor	Medium	Continued observation and management of erosion
Erosion		Soil	Yes	Possible	Moderate	Medium	Continued observation and management of erosion	
Land use change	Bushfire	Community and existing environment	Yes	Unlikely	Severe	High	Emergency response plan in consultation with CFS	



Activity	Source	Pathway	Receptor	Potential Impact	Current Risk Rating			Additional information/considerations	
					Likelihood	Consequence	Rating		
Construction activities	Direct impact	Permanent vegetation removal	Vegetation protected by EPBC	No EPBC listed Veg				No EPBC listed vegetation species identified, survey to confirm	
			Vegetation protected by the Native Vegetation Act (State)	Yes	Almost certain	Minor	High	Survey to confirm native vegetation and SEB offsets	
			Other vegetation	Yes	Almost certain	Insignificant	Medium		
			Fauna protected by the EPBC Act	No EPBC listed fauna				Survey to confirm EPBC listed fauna	
			Other fauna	Yes	Unlikely	Insignificant	Low		
		Vegetation disturbance	Vegetation protected by EPBC	No EPBC listed Veg					No EPBC listed vegetation species identified, survey to confirm
			Vegetation protected by the Native Vegetation Act (State)	Yes	Almost certain	Insignificant	Medium	As above	
			Other vegetation	Yes	Almost certain	Insignificant	Medium		
			Fauna protected by the EPBC Act	No EPBC listed fauna				Survey to confirm EPBC listed fauna	
			Other fauna	Yes	Unlikely	Insignificant	Low		
		Displacement (Physical, noise, light or vibration)	Fauna protected by the EPBC Act	No EPBC listed fauna					Survey to confirm EPBC listed fauna
			Other fauna	Yes	Possible	Insignificant	Low		
		Disturbance	Area of Aboriginal spiritual significance	Yes	Possible	Major	High	Engagement with Barngarla	
			Vibration or amenity	Locally, State, Nationally listed heritage areas	No heritage areas in close proximity therefore no impact.				
		Construction during night works	Insect and fauna attraction	Fauna protected by the EPBC Act	No EPBC listed fauna				Survey to confirm EPBC listed fauna
	Other fauna			Yes	Unlikely	Insignificant	Low		
	Soil disturbance	Introduction and spread of weeds	Existing ecosystem	Yes	Possible	Minor	Medium	CEMP to minimise impact	
	Topsoil stripping	Removing seed bank and hummic material	Existing ecosystem	Yes	Possible	Minor	Medium	CEMP to minimise impact	
	Accidental spills (pollution)	Soil, surface water and groundwater	Groundwater	Yes	Rare	Major	Medium	Pollution control procedures included in the CEMP and Emergency Response Plan to be implemented during construction.	
			Surface water	Yes	Possible	Moderate	Medium		
			Soil	Yes	Possible	Minor	Medium		
	Construction activities including excavation, site traffic	Increased dust levels	Residences within close proximity	Yes	Possible	Moderate	Medium	CEMP to minimise impact	
			Highway users	Yes	Possible	Moderate	Medium	CEMP to minimise impact	
			Plants	Yes	Possible	Moderate	Medium	CEMP to minimise impact	
	Temporary change in surface water drainage pathways	Sedimentation	Surface water	Yes	Likely	Insignificant	Medium	Soil erosion and drainage management to be included in the CEMP	
			Erosion	Soil	Yes	Possible	Moderate	Low	Soil erosion and drainage management to be included in the CEMP
	Stockpiling	Sedimentation	Surface water	Yes	Likely	Minor	Medium	Soil erosion and drainage management to be included in the CEMP	
	Onsite plant and machinery	Noise and vibration	Sensitive receptors or residents	No sensitive receptors or residents in close proximity therefore no impacts					
		Increased greenhouse gas emissions (i.e. fossil fuel use and electricity)	Community	Yes	Almost certain	Insignificant	Medium	Measures to reduce greenhouse gas emissions as much as practicable to be included in the CEMP.	
		Physical degradation	Soil	Yes	Possible	Minor	Medium		
	General construction activities	Increase in generation of waste	Community and existing environment	Yes	Almost certain	Insignificant	Medium	Measures to reduce waste generation as much as practicable to be considered in design and included in the CEMP	
	Dust suppression	Water use	Community and existing environment	Yes	Almost certain	Insignificant	Medium	Recycled water use to be considered where required	
	Excavation of contaminated material	Soil, surface water and groundwater	Soil	Yes	Rare	Minor	Low	Likelihood of contamination is low. Contamination management measures will be included in the CEMP	
Surface water			Yes	Rare	Moderate	Medium			
Groundwater			Yes	Rare	Major	Medium			
Unauthorised access	Onsite plant and machinery	Public safety	Yes	Rare	Major	Medium	Appropriate access restrictions (fencing, alarms, security)		
Construction activities including hot works,	Bushfire	Community and existing environment	Yes	Possible	Severe	Extreme	Emergency response plan in consultation with CFS		
Entrainment of soils offsite (from site machinery and vehicles)	Soils/sediment	Surface water	Yes	Rare	Moderate	Medium	Measures for vehicle drag out in CEMP		
		Highway users	Yes	Possible	Minor	Medium			
Excavation	Disruption of aquifers	Groundwater quality	No impact on groundwater						
		Groundwater security	No impact on groundwater						
Excavation	Disturbance of Aboriginal artefacts	Barngarla	Yes	Likely	Major	High	Survey to be undertaken to determine likelihood for encountering artefacts/sites- Barngarla engagement for artefact salvage.		
Construction activities cranes	Encroach into airspace	Aviation	No interaction						

Construction vehicles	Direct impact	Collision	Livestock	Yes	Rare	Moderate	Medium	Access restrictions
			Native fauna	Yes	Possible	Minor	Medium	CEMP to minimise impact
	Soil disturbance	Introduction and spread of weeds	Existing ecosystem	Yes	Possible	Moderate	Medium	Survey to confirm weed species. Weed control measures in CEMP.
	Traffic and Heavy loads to site	Degradation of public infrastructure (roads)	Road users and Council/DPTI	Yes	Possible	Moderate	Medium	Traffic/transport study
Nuisance		Road users	Yes	Possible	Moderate	Medium	Traffic/transport study	
Decreased safety		Road users	Yes	Possible	Moderate	Medium	Traffic/transport study	
Siting	Solar panels	Landscape character- industrial	Highway users	Yes	Unlikely	Insignificant	Low	Community engagement
		Landscape character- natural	Whyalla conservation park users	Yes	Possible	Minor	Medium	Community engagement
		Glare and reflectivity	Highway users	Yes	Unlikely	Minor	Low	Publicly available info suggests glare will not be an issue
			Aviation	Yes	Unlikely	Minor	Low	Publicly available info suggests glare will not be an issue
Operation	Increased impervious surfaces	Micro-climates under the solar modules (shading, rainfall, temperature and humidity changes)	Existing ecosystem	Yes	Possible	Moderate	Medium	Publicly available information on this issue
		Surface water runoff	Erosion	Yes	Possible	Moderate	Medium	CEMP and design to minimise impact
	land use change	Decreased groundwater accumulation	Water security	No change to rainwater quantity				
		Changes to vegetation type	Existing ecosystem	Yes	Possible	Minor	Medium	Confirm vegetation associations
	Site maintenance	Loss in agricultural production	Surrounding land use	No				Negligible impact on surrounding land use
		Permanent removal of vegetation	Existing ecosystem	Yes	Possible	Minor	Medium	EMP for operations
	Site traffic	Increased dust levels	Residences within close proximity	Yes	Possible	Moderate	Medium	CEMP to minimise impact
			Highway users	Yes	Possible	Moderate	Medium	CEMP to minimise impact
			Plants	Yes	Possible	Moderate	Medium	CEMP to minimise impact
		Collision	Fauna protected by the EPBC Act	No EPBC listed fauna				
	Other fauna		Yes	Rare	Insignificant	Low		
	Traffic and Heavy loads to site	Degradation of public infrastructure (roads)	Road users and Council/DPTI	Yes	Possible	Moderate	Medium	Traffic and transport study
		Nuisance	Road users	Yes	Possible	Moderate	Medium	Traffic and transport study
	Permanent change in surface water drainage pathways	Sedimentation	Surface water	Yes	Possible	Minor	Medium	CEMP and design to minimise impact
Erosion		Soil	Yes	Possible	Moderate	Medium	CEMP and design to minimise impact	
Land use change	Bushfire	Community and existing environment	Yes	Unlikely	Severe	High	Emergency response plan in consultation with CFS	

**APPENDIX D**

**Traffic Impact and Access Point  
Assessment**

# WGA

WALLBRIDGE GILBERT  
AZTEC

Golder

## Cultana Solar Farm

**TRAFFIC IMPACT & ACCESS  
POINT ASSESSMENT**

Job No. ADL189283 / Rev B  
15 August 2018

# WGA



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### Revision History

Rev	Date	Issue	Originator	Checker	Approver
<b>A</b>	14 Aug 2018	Initial Issue	SSS	JZ	JZ
<b>B</b>	15 Aug 2018	Revised	HL	SSS	SSS

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**Appendices**

**Appendix A** Traffic Counts



# 1

# INTRODUCTION

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## 1.1 BACKGROUND

Wallbridge Gilbert Aztec (WGA) has been engaged by Golder on behalf of SIMEC ZEN Energy to undertake a traffic impact and access point assessment for a proposed solar farm (Cultana Solar Farm) to the north of Whyalla, South Australia. The purpose of the assessment is to examine the suitability of the proposed access points in relation to the existing road network, the condition of the existing road network and its suitability to accommodate heavy vehicle movements and the proposed traffic demand to assist with the Development Application with the State Commission Assessment Panel.

## 1.2 PROJECT DESCRIPTION

### 1.2.1 General

Cultana Solar Farm will consist of two separate sites (denoted Northern Site and Southern Site), located approximately 5km North of Whyalla and 50km SSW of Port Augusta as shown in Figure 1-1. Central Adelaide is located approximately 235km to the SSE. The sites currently consist chenopod shrublands and an Acacia woodland, with informal unsealed tracks providing access throughout the site.



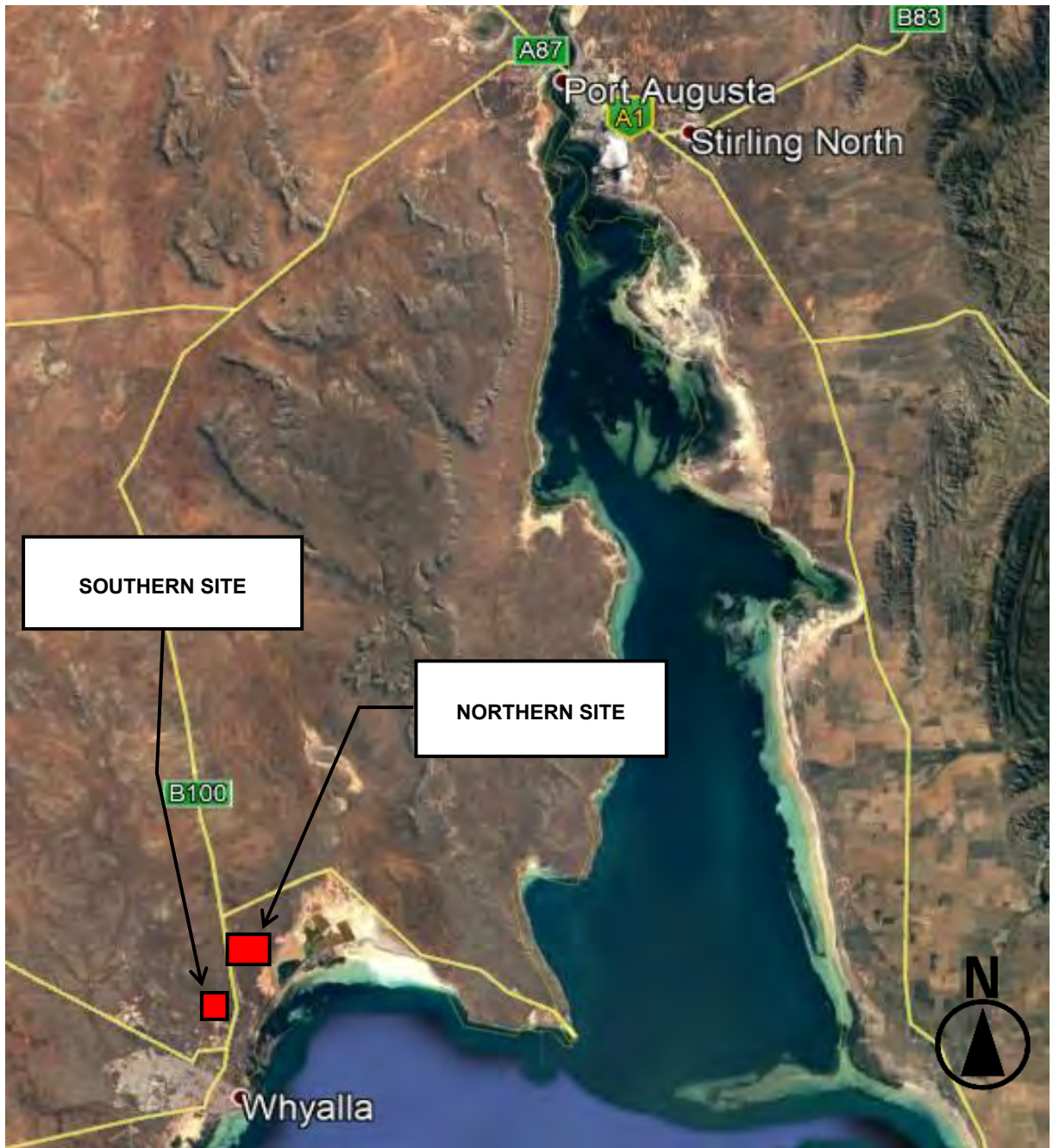


Figure 1-1 - Proposed location of Cultana Solar Farm

### 1.2.2 Northern Site

It is understood that the Northern Site will consist of a fixed or single axis tracking solar PV plant targeting up to 210MW capacity and will comprise a number of panels and inverters. The site is shown in Figure 1-2 below and is located adjacent Lincoln Highway and Inkerman Road.



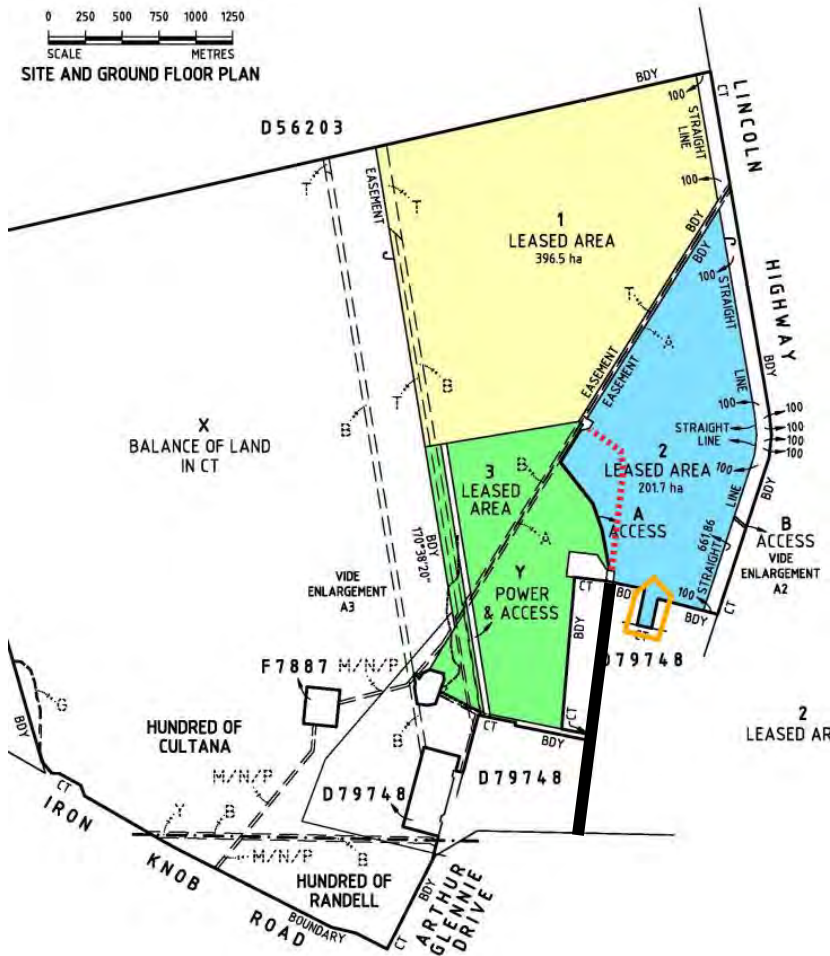


Figure 1-3 - Proposed site layout – Southern Site

### 1.3 SCOPE OF THE ASSESSMENT

The transportation of materials for the Cultana Solar Farm will lead to a temporary increase in the number of heavy vehicles on surrounding roads and SIMEC ZEN Energy is seeking to ensure that the network and the proposed access points are in a suitable condition to accommodate the anticipated volumes and the potential impact to amenity on the surrounding road network is minimised.

The assessment incorporates the following elements:

- Identification of proposed site access points
- Calculation of vehicle volumes likely to be generated by the proposed solar farm facility
- Assessment of the current condition of the identified access points, identifying hazards and impediments to heavy vehicle movements and recommending treatments where required

### 1.4 INFORMATION SOURCES

A site assessment was undertaken on 02 May 2018 by WGA and incorporated reviewing the proposed access points as well as the immediate surrounding road network of each of the sites.

Information on projected vehicle volumes during the construction and operational periods has been provided by Golder based on previous similar projects.



# 2 DEVELOPMENT ACCESS

## 2.1 GENERAL

The majority of vehicles generated by the Cultana Solar Farm are assumed to be travelling from the north-east (Port Augusta) during both the construction and operational period, based on the assumption that the majority of building components will be sourced from Port Adelaide.

### 2.1.1 Northern Site

It has therefore been assumed that all vehicle movements will access the Northern Site via the Lincoln Highway, with two potential access points assessed – the Kimberly Road Access Point and the Lincoln Highway Access Point. The location of both access points is shown in Figure 2-1 below. The Kimberly Road Access Point is accessed from the Lincoln Highway via Inkerman Road and Kimberly Road whilst the Lincoln Highway Access Point is accessed directly from the Lincoln Highway.

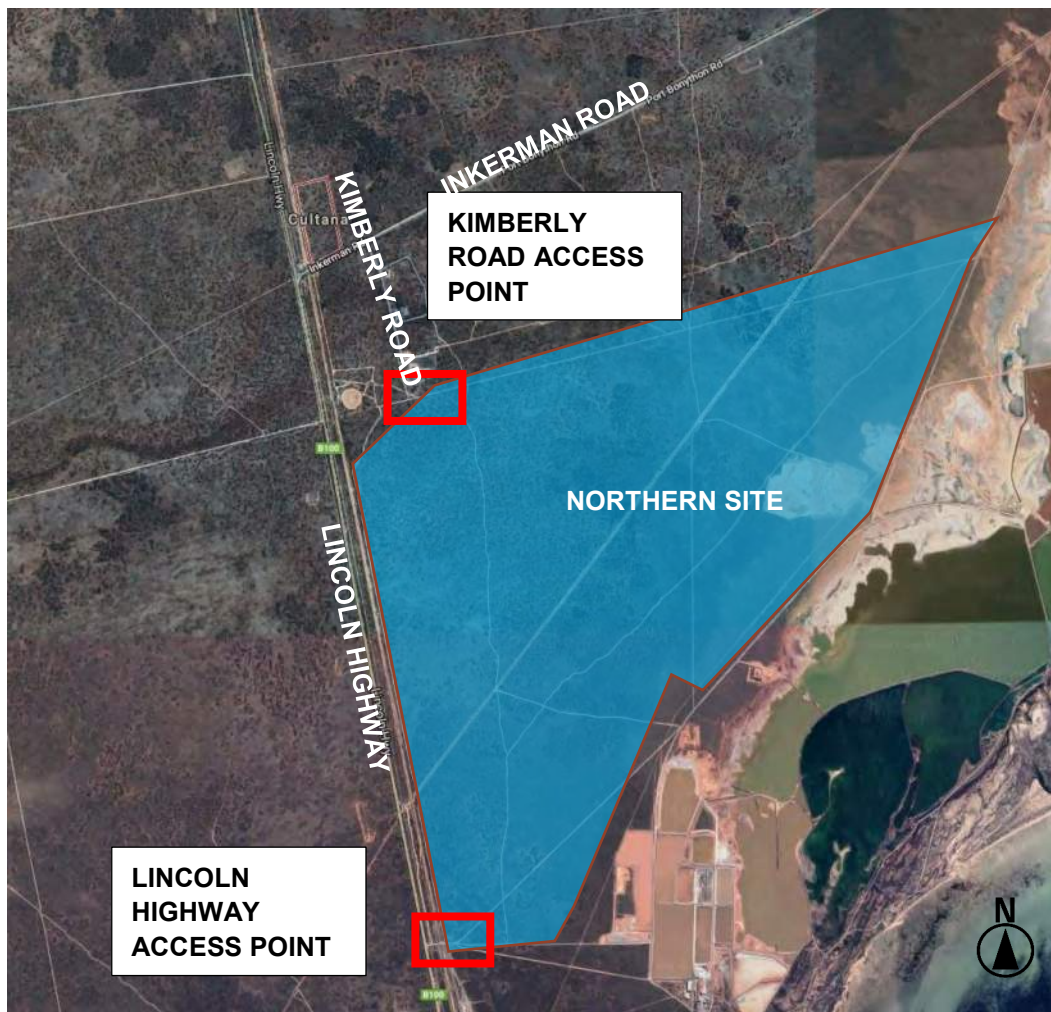


Figure 2-1- Proposed access points



### 2.1.2 Southern Site

It is understood that the Southern Site will be accessed from Industry Drive, a local access road providing access to a number of industrial properties from Arthur Glennie Drive which is accessed from a signalised junction at Lincoln Highway.

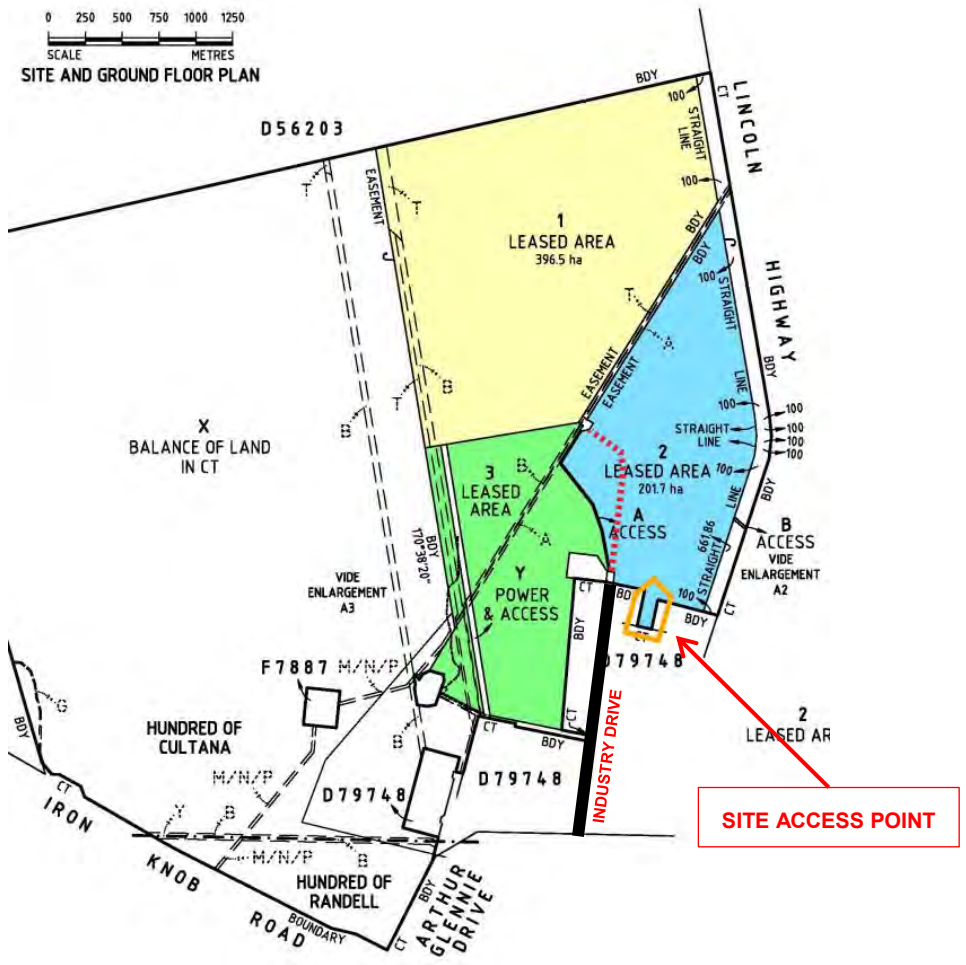


Figure 2-2 - Proposed site layout

## 2.2 GAZETTED FREIGHT ROUTES

The gazetted freight routes in the vicinity of the Cultana Solar Farm have been obtained from the Department of Transport and Infrastructure’s (DPTI’s) RavNet website.

### 2.2.1 Northern Site

The gazetted freight routes in the vicinity of the Northern Site are illustrated in Figure 2-3 below, where it can be seen that all surrounding roads in proximity of the site are gazetted 36.5 m road train routes, with the exception of Kimberly Road.

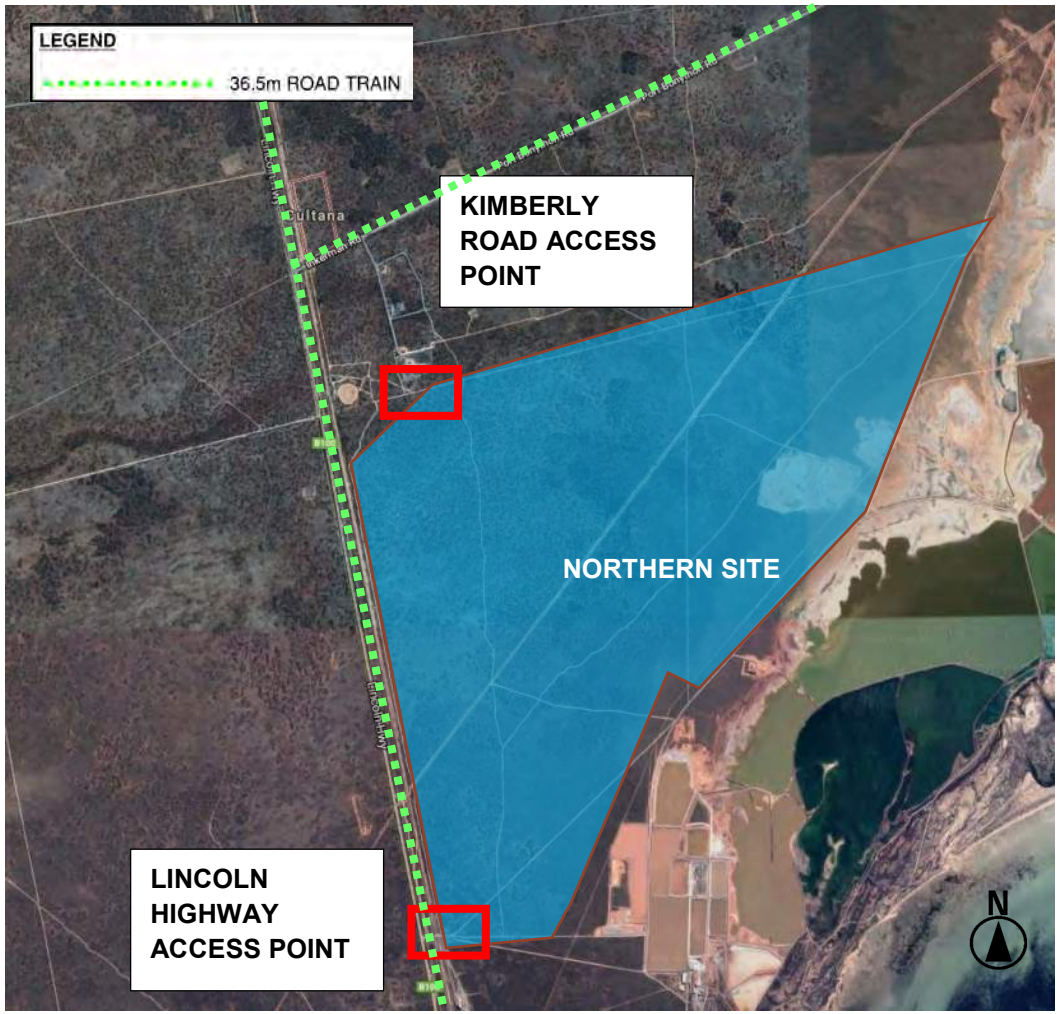


Figure 2-3- Gazetted freight routes – Northern Site

**2.2.2 Southern Site**

The gazetted freight routes in the vicinity of the Southern Site are illustrated in Figure 2-4 below, where it can be seen that all surrounding roads in proximity of the site are gazetted 36.5 m road train routes.



Figure 2-4 - Gazetted freight routes – Southern Site



# 3 VEHICLE VOLUMES

## 3.1 EXISTING TRAFFIC

### 3.1.1 General

Traffic volumes on surrounding DPTI operated roads have been obtained from the SAVIEWER Website, including the annual average daily traffic volumes (AADTs) and the percentage of heavy vehicles (%HV) on each road.

In addition, Whyalla City Council have provided information obtained from a traffic count undertaken in 2013 on Industry Drive (raw traffic count data contained within Appendix A). Unfortunately, no further traffic count information was available on any additional roads in the direct area of the site. Therefore, the current traffic volume on Kimberly Road has been estimated for the purposes of this report, noting that it is understood that Kimberly Road is not currently used to provide access to any active properties nor is it considered a through route to other areas.

For the purposes of this report, the sourced traffic volumes have had an annual estimated growth rate of 2% applied to determine the likely traffic volumes in 2018. It is assumed that this growth rate is applicable to both heavy and light vehicles.

### 3.1.2 Northern Site

The existing traffic volumes of surrounding roads of the Northern Site are summarised in Table 3-1.

Table 3-1 – Existing traffic volumes – Northern Site

Road	Year of Count	Annual Average Daily Traffic (AADT)	Percentage of Heavy Vehicles (%HV)	Source	Predicted 2018 Annual Average Daily Traffic (AADT)
Lincoln Highway	2017	2,000	17.0%	SAViewer Website	2,040
Inkerman Road	2017	400	20.0%	SAViewer Website	408
Kimberly Road	2018	20	10%	Estimated	20

### 3.1.3 Southern Site

The existing traffic volumes of surrounding roads of the Southern Site are summarised in Table 3-2.



Table 3-2 – Existing traffic volumes – Southern Site

Road	Year of Count	Annual Average Daily Traffic (AADT)	Percentage of Heavy Vehicles (%HV)	Source	Predicted 2018 Annual Average Daily Traffic (AADT)
Lincoln Highway	2017	2,000	17.0%	SAViewer Website	2,040
Arthur Glennie Drive	2014	3,100	9.5%	SAViewer Website	3,356
Industry Drive	2013	220	62.8%	Council	243

### 3.2 GENERATED TRAFFIC

#### 3.2.1 General

Information on the amount and type of traffic expected to be generated by the construction and operation of the Cultana Solar Farm has been provided by Golder and is understood to have been developed by adopting similar rates to a recently developed similar site. The use of the term ‘Trip’ represents a one-way vehicular movement from one point to another. Therefore, a vehicle entering and leaving the solar farm facility will correspond to two trips.

The majority of vehicle movements generated by the Northern and Southern Site will be within the (approximate) ten-month and four-month construction periods respectively, with minimal traffic expected to be generated by the site once operational.

#### 3.2.2 Northern Site

A summary of estimated construction period volumes provided by Golder for the Northern Site is shown in Table 3-3, including an estimate of the average daily volume of vehicle trips based on a ten-month construction period (and 365 days per year).

Table 3-3 – Construction period traffic volumes – Northern Site

Vehicle	Vehicle Trips (Total)	Equivalent Trips (Veh/Day)
Heavy Vehicles	9,042	30
Light Vehicles	12,133	40
<b>Total</b>	<b>21,175</b>	<b>70</b>
% HV	43%	43%

It can be seen from information contained in Table 3-3 that the majority of movements to the Northern Site during the construction period are expected to be by light vehicles.

Golder has advised that the Cultana Solar Farm facility will have minimal traffic during the operational period. There will be a small workforce (approximately 4 people) that will maintain and operate the site on a daily basis and the expected movements and volumes are summarised in Table 3-4.

Table 3-4 – Operational period traffic volumes – Northern Site

Vehicle Type	Vehicle Trips - Average Per Week	Vehicle Trips - Average Per Day
Semi-trailers	1	<1

Vehicle Type	Vehicle Trips - Average Per Week	Vehicle Trips - Average Per Day
Light Vehicles	48	8
<b>Total</b>	<b>49</b>	<b>8</b>

### 3.2.3 Southern Site

A summary of estimated construction period volumes provided by Golder for the Southern Site is shown in Table 3-5, including an estimate of the average daily volume of vehicle trips based on a four-month construction period.

Table 3-5 – Construction period traffic volumes – Southern Site

Vehicle	Vehicle Trips (Total)	Equivalent Trips (Veh/Day)
Heavy Vehicles	3,386	28
Light Vehicles	4,853	40
<b>Total</b>	<b>8,239</b>	<b>68</b>
% HV	41%	41%

It can be seen from information contained in Table 3-5 above that the majority of movements to the site during the construction period are expected to be by light vehicles. The expected movements and volumes of the operational period are summarised in Table 3-6.

Table 3-6 – Operational period traffic volumes – Southern Site

Vehicle Type	Vehicle Trips - Average Per Week	Vehicle Trips - Average Per Day
Heavy Vehicles	1	<1
Light Vehicles	48	8
<b>Total</b>	<b>49</b>	<b>8</b>

## 3.3 NETWORK TRAFFIC IMPACT

### 3.3.1 General

The estimated impact on the surrounding road network resulting from the traffic to be generated by the development during the operational and construction phases has been calculated on the assumption that the forecast traffic will be the sum of the existing traffic volume and 100% of the traffic trips generated by the Cultana Solar Farm facility (that is, all generated traffic will access the site via the same route). Note that it is understood that the works at the two sites will be undertaken in stages, that is, the Northern and Southern Site will not have concurrent construction periods.

### 3.3.2 Northern Site

Table 3-7 and Table 3-8 below show the estimated impact of the Northern Site during the operational and construction phases.

Table 3-7 Northern Site Network traffic impact- construction

Road	AADT			Daily Number of HV	
	Existing	Forecast	% Increase	Existing	Forecast
Lincoln Highway	2040	2110	3.4%	347	377
Inkerman Road	408	478	17.1%	82	111
Kimberly Road	20	90	349.0%	2	32

Table 3-8 – Northern Site Network traffic impact- operational

Road	AADT			Daily Number of HV	
	Existing	Forecast	% Increase	Existing	Forecast
<b>Lincoln Highway</b>	2040	2048	0.4%	347	348
<b>Inkerman Road</b>	408	416	2.0%	82	83
<b>Kimberly Road</b>	20	28	40.0%	2	3

During the construction period, Kimberly Road would see the highest increase in traffic volumes due to the Northern Site construction period, resulting in an approximate 349% growth in AADT. This is considered realistic, given that Kimberly Road currently appears to be largely unused. The second highest increase would be seen on Inkerman Road, with an approximately 17% increase, although given the short length of Inkerman Road that the vehicles will traffic, this is not expected to have a significant impact.

It can be seen from Table 3-7 and Table 3-8 above that the traffic generated by the proposed Solar Farm facility will have only a small impact on the number of heavy vehicles on the subject roads, with the exception of Kimberly Road during the construction period. During the operational period, there would be only a small impact on traffic volumes and heavy vehicle percentages, with Kimberly Road likely to see the highest increase in AADT of 40%.

### 3.3.3 Southern Site

Table 3-9 and Table 3-10 below show the estimated impact on the surrounding road network of the Southern Site.

Table 3-9 - Southern Site Network traffic impact- construction

Road	AADT			Daily Number of HV	
	Existing	Forecast	% Increase	Existing	Forecast
<b>Lincoln Highway</b>	2040	2108	3.3%	347	375
<b>Arthur Glennie Drive</b>	3356	3423	2.0%	319	347
<b>Industry Drive</b>	243	311	28.0%	153	180

Table 3-10 – Southern Site Network traffic impact- operational

Road	AADT			Daily Number of HV	
	Existing	Forecast	% Increase	Existing	Forecast
<b>Lincoln Highway</b>	2040	2048	0.4%	347	348
<b>Arthur Glennie Drive</b>	3356	3364	0.2%	319	320
<b>Industry Drive</b>	243	251	3.3%	153	154

During the construction period, Industry Drive would be most affected by the increase in traffic volumes due to the Southern Site construction, resulting in an approximate 28% growth in AADT,

followed by Lincoln Highway (3.3%). It is noted that the majority of the traffic resulting in the increase are light vehicles, which are considered to cause minimal damage to existing infrastructure.

It can be seen from Table 3-9 and Table 3-10 above that the traffic generated by the Southern Site will only have a small impact on the number of heavy vehicles on the subject roads during both the operational and construction periods. During the operational period, there would be only a small impact on traffic volumes and heavy vehicle percentages, with Industry Drive likely to see the highest increase in AADT of 3.3%.

### **3.4 SUMMARY**

Although the traffic volumes and percentage of heavy vehicles may increase slightly on the surrounding roads during construction, each of these roads is already a gazetted freight route (with minimal residences and generally good pavement condition) and as such the increase in traffic is expected to have minimal impact.

The exception to this is Kimberly Road, which would see a considerable increase in traffic volumes due to the fact that it is currently largely unused.

The increase on all roads during the operational period is considered negligible due to the small volume of traffic generated.



# 4 ACCESS POINT ASSESSMENT

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## 4.1 GENERAL

On 02 May 2018, WGA undertook a site assessment of the proposed access points assessing the following:

- Typical road geometry;
- Pavement condition;
- Stormwater drainage; and
- Sight distance

As discussed in Section 2.1, it is understood that the Northern Site will be accessed from one of two potential access points – the Kimberly Road Access Point and/or the Lincoln Highway Access Point. The Southern Site will be accessed solely from an access point to be located at the end of Industry Drive.

Each potential access point is discussed further in the sections below.

## 4.2 NORTHERN SITE ACCESS POINT – KIMBERLY ROAD

### 4.2.1 General

The proposed access point to the Northern Site on Kimberly Road is shown in Figure 4-1. The access point is understood to be located at the end of Kimberly Road, just to the east of a sharp horizontal bend in the road and opposite an existing substation. Other properties in the vicinity of the proposed access point appear to be unused and in disrepair, such as a large warehouse just to the west of the proposed access point (visible in Figure 4-2).



Figure 4-1 - Proposed access point on Kimberly Road



Figure 4-2 - Proposed access point on Kimberly Road

#### 4.2.2 Geometry

On the approach to the proposed access point, Kimberly Road has two-way crossfall and upright kerb on both sides, with an approximate width of 10 m from kerb to kerb. The existing access point has an approximate width of 10m where it meets with Kimberly Road, with multiple unsealed access tracks utilising the same access point. It is envisaged that the access point will be formalised as part of the proposed development in order to reduce confusion to drivers entering the site, as well as reduce potential conflict between vehicles.

Kimberly Road is relatively straight, with the exception of a 90-degree horizontal curve just adjacent the proposed access point, and the surrounding topography is generally flat. Two B-doubles have been tracked around the horizontal bend to ensure that they can pass each other safely, as shown in Figure 4-3. There may however be conflict introduced at the access point if a B-double is leaving the site at the same as a B-double arrives. Consideration should therefore be given to introducing additional operational controls to manage this risk, particularly given the average sight distance currently available. These additional controls could include warning signage to advise outgoing vehicles to give way to incoming vehicles if required and regular radio contact between heavy vehicle drivers when departing/entering the proposed access point.

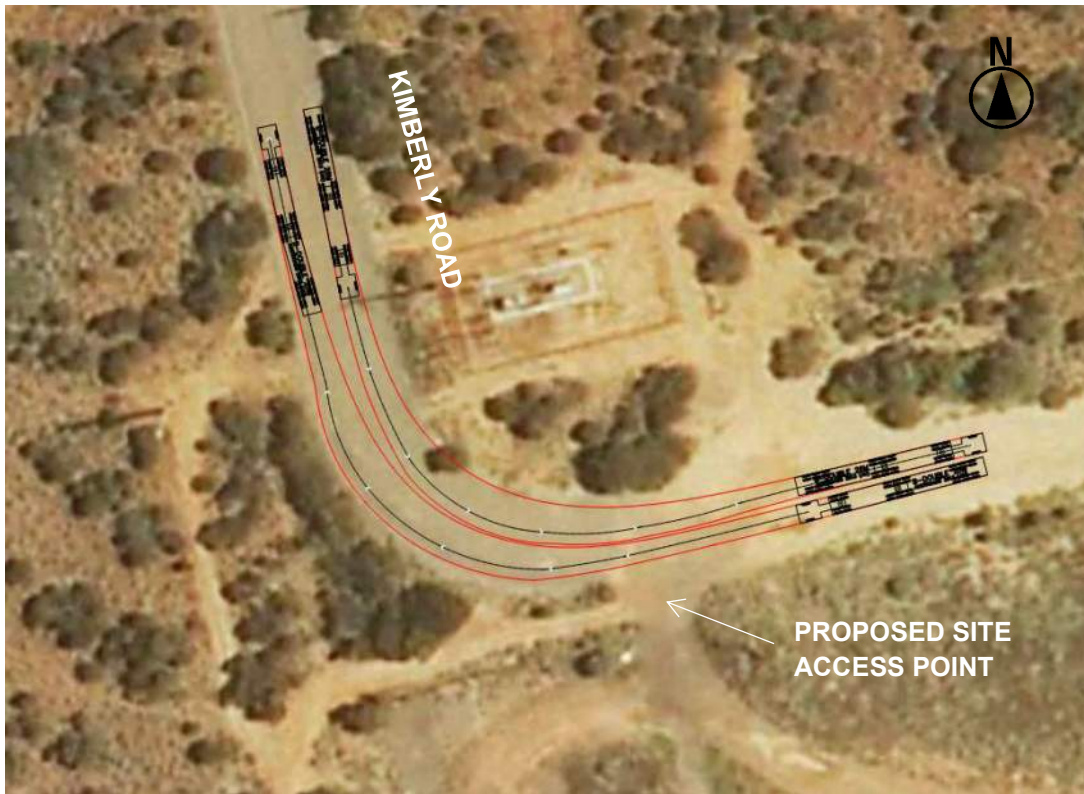


Figure 4-3- B-Double tracking horizontal bend on Kimberly Road

Kimberly Road intersects Inkerman Road at a T-junction, with the unsealed shoulder on the northern side of Inkerman Road widening to up to 5 m at the junction. It can be seen in Figure 4-4 that two B-doubles can navigate the junction at the same time without introducing any additional risk to other road users.



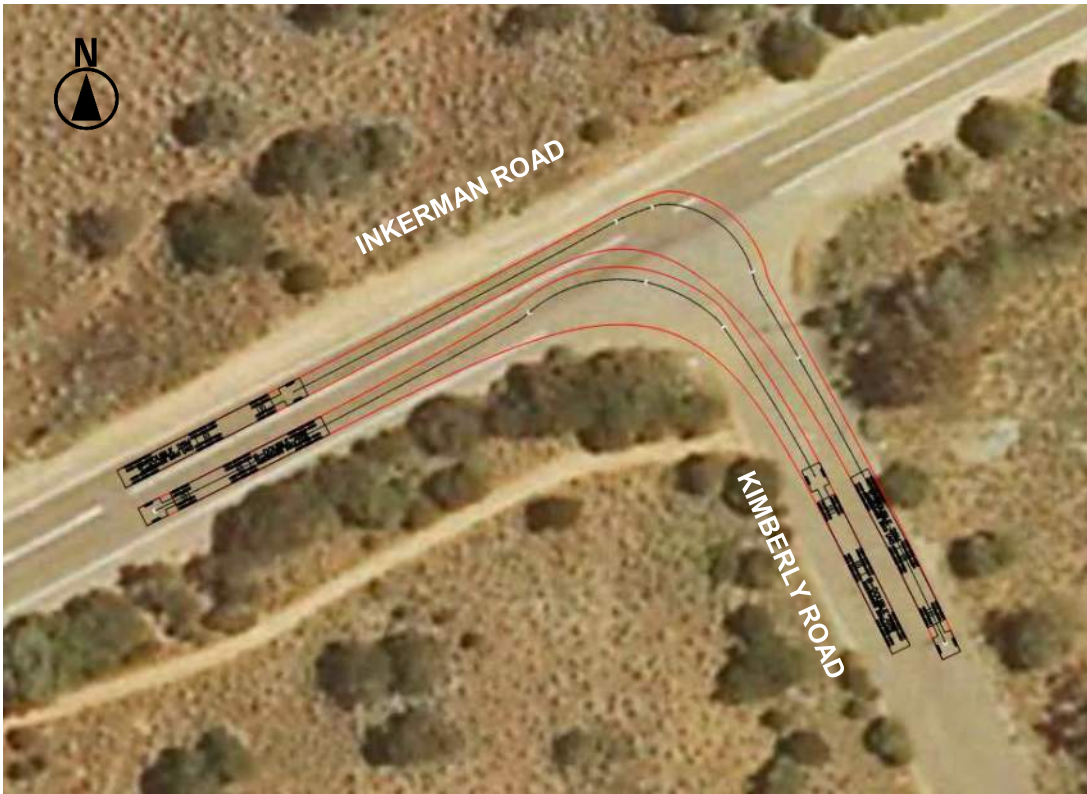


Figure 4-4 - B-Double tracking Kimberly Road/Inkerman Road junction

#### 4.2.3 Pavement Condition

Kimberly Road was observed to be in a generally poor condition, previously sealed with thin bituminous surfacing up to the proposed access point. A typical section of the road is shown in Figure 4-5, where the severe stripping and potholing observed along its length can be seen. In addition, moderate deformation and rutting was also observed at selected locations. It is recommended that a comprehensive pavement condition assessment is undertaken on Kimberly Road to ensure that it can support the increased traffic loading proposed, as it is highly likely that remediation works may need to be undertaken.





Figure 4-5 - Typical condition of Kimberly Road

At the proposed access point, which is currently unsealed, severe rutting and deformations were observed (refer to Figure 4-6). It is therefore recommended that consideration is given to providing a new sealed or unsealed surface at the access point in order to improve safety to motorists and ensure the access point is accessible in all weather conditions.



Figure 4-6 - Existing pavement condition adjacent proposed access point

#### 4.2.4 Stormwater Drainage

The two-way cross fall on Kimberly Road drains water away from the pavement to upright kerb on both sides of the road. Substantial silt and eroded wearing course was present adjacent the kerb along the length of road, and appeared to have been there for some time, indicating likely low levels of maintenance in recent times along the disused road. If Kimberly Road is to be adopted for access, it is therefore recommended that the road be maintained as required during the construction period, to ensure the existing drainage infrastructure is able to function to full capacity.

It is envisaged that adoption of the recommended pavement sealing/re-sheeting works at the access point mentioned above will rectify any minor drainage issues currently existing at the proposed access point.

#### 4.2.5 Sight Distance

Sight distance requirements for the proposed access point have been based on Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, which states that for property accesses, sight distances should desirably comply with the sight distance requirements for intersections i.e. approach sight distance (ASD), safe intersection sight distance (SISD) and minimum gap sight distance (MGSD). In addition, the sight distances at the junction of Kimberly Road and Inkerman Road have also been assessed.

##### ***Approach Sight Distance (ASD)***

ASD is the minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection. Figure 4-7 below provides a diagrammatic representation of ASD.

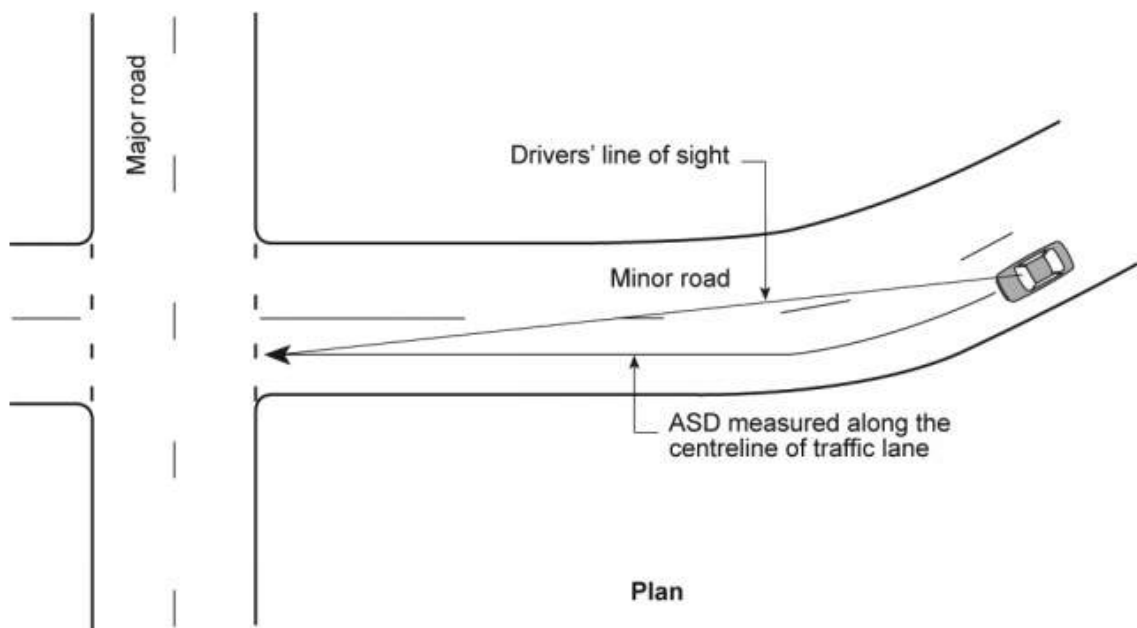


Figure 4-7 - Approach Sight Distance

The ASD requirements for the access point and the Kimberly Road/Inkerman Road junction based on the requirement of Table 3.1 AGRD 4A and a reaction time of 2.0 seconds are summarised in Table 4-1.

Table 4-1 - ASD Requirements

Location	Adopted Design Speed	ASD Required	ASD Met?
<b>Access Point on Kimberly Drive</b>	40 km/hr (assuming that vehicles will be restricted to travelling at a relatively slow speed within the site)	40m	Unknown. As this is the sight distance that will need to be provided internal to the site to the access point, this requirement should be considered when developing the internal access road for the site.
<b>Kimberly Road/Inkerman Road Junction</b>	90 km/hr (assuming the posted speed limit along Kimberly Road is 80km/h and adding 10km/hr for design speed)	139m	Yes

**Safe Intersection Sight Distance (SISD)**

SISD provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation and to decelerate to a stop before reaching the collision point. Figure 4-8 provides a diagrammatic representation of SISD.

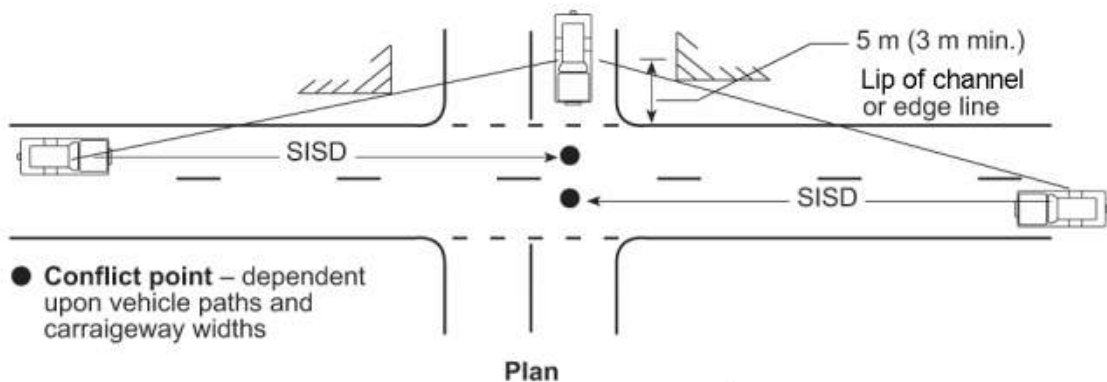


Figure 4-8 – Safe Intersection Sight Distance

The SISD requirements for the access point and the Kimberly Road/Inkerman Road junction based on the requirement of Table 3.3 AGRD 4A and a reaction time of 2.0 seconds are summarised in Table 4-2.

Table 4-2 - SISD Requirements

Location	Adopted Design Speed	SISD Required	SISD Met?
<b>Access Point on Kimberly Drive</b>	90 km/hr  (assuming the posted speed limit along Kimberly Road is 80km/h and adding 10km/hr for design speed)	214m	Currently not achieved at the proposed access point due to existing vegetation adjacent the existing substation, shown in Figure 4-9. It is therefore recommended that consideration be given to trimming/removing this vegetation if possible to further increase sight distance. Consideration could also be given to placing additional warning signage of the upcoming access point for motorists approaching on Kimberly Road.
<b>Kimberly Road/Inkerman Road Junction</b>	120 km/hr  (posted speed limit on Inkerman Road is 110km/h and adding 10km/hr for design speed)	324m	Yes (East)  Yes (West)



Figure 4-9 - Vegetation restricting sight distance at proposed access point

**Minimum Gap Sight Distance (MGSD)**

MGSD is based on distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. The MGSD requirements for the access point and the Kimberly Road/Inkerman Road junction based on the requirement of



Table 3.5, AGRD 4A and a critical acceptance gap of 5 seconds (left turn from minor road) are summarised in Table 4-3. As the left turning movement from the minor road is the worst-case scenario and will be the movement that the proposed development will generate, it is considered applicable for assessment.

Table 4-3 - MGSD Requirements

Location	85 <sup>th</sup> Percentile Speed	MGSD Required	MGSD Met?
<b>Access Point on Kimberly Drive</b>	NA - Given the location of the proposed access point (at the end of the road), MGSD it is not considered applicable.		
<b>Kimberly Road/Inkerman Road Junction</b>	120 km/hr  (posted speed limit on Inkerman Road is 110km/h and adding 10km/hr for design speed)	153m	Yes (East)

#### Summary of Sight Distance Requirements

Table 4-4 provides a summary of the sight distances at the proposed access point on Kimberly Drive and at the junction of Kimberly Road/Inkerman Road.

Table 4-4 - Summary of Sight Distance requirements

Sight Distance Requirement	Criteria Assessment	
	Access Point on Kimberly Drive	Kimberly Road/Inkerman Road Junction
<b>Approach Sight Distance (ASD)</b>	Internal design criteria – can only be assessed once the design of the access track is known	Requirements met
<b>Safe Intersection Sight Distance (SISD)</b>	Currently not achieved	Requirements met
<b>Minimum Gap Sight Distance (MGSD)</b>	Not applicable	Requirements met

## 4.3 NORTHERN SITE ACCESS POINT – LINCOLN HIGHWAY ACCESS POINT

### 4.3.1 General

The proposed Lincoln Highway Access Point for the Northern Site is shown in Figure 4-10, and utilises an existing access track off of the Lincoln Highway which crosses the adjacent rail line. The rail is understood to be operated by Genesee and Wyoming (G&W), and the rail crossing is unsignalised, consisting of STOP signage and lit with solar powered lights (shown in Figure 4-11). A double gate is present between the Lincoln Highway and the rail crossing, with signage indicating that access is prohibited to unauthorised persons. If this access point is to be adopted for access to the proposed development, negotiations would therefore need to be held with both G&W and owners of the adjacent land to ensure that access will not impact on their operations.

The access road is understood to currently provide access to a railyard to the south, as well as some unsealed access tracks providing access to the east. An above ground pipe also runs between the rail and the Lincoln Highway, transitioning underground either side of the access point to provide vehicular access to the rail crossing. Similarly, overhead power lines also terminate just to the north of the access point, resulting in no overhead power lines at the proposed access point. An unsealed access track running adjacent the above ground pipe also intersects the access point at this location.



Figure 4-10 - Proposed Lincoln Highway Access Point



Figure 4-11 - *Proposed Lincoln Highway Access Point*

#### **4.3.2 Geometry**

At the Lincoln Highway Access Point junction with the Lincoln Highway, Lincoln Highway consists of one lane in each direction, each with an approximate width of 3.5m. Lincoln Highway also has unsealed shoulders approximately 3 m wide on each side, with additional width provided to the south of the access point likely to cater for left turning vehicles from the access point. The existing unsealed access track has an approximate width of 15m at the junction with the Lincoln Highway, narrowing to 10m at the rail crossing.

Tracking has been undertaken to confirm that a B-double can access the Lincoln Highway Access Point from the Lincoln Highway, as shown in Figure 4-12. It should be noted that an entering B-double to the site will need to utilise the whole access point to manoeuvre into the site, which may introduce conflicts with any vehicles exiting the site. The risk of this is considered to be minimal given the good sight distance at this location and the low volume of B-doubles that will be accessing the site (approximately three B-doubles entering and three B-doubles exiting a day during the peak construction period); however, consideration should be given to introducing additional operational controls to manage this risk. These additional controls could include warning signage to advise outgoing vehicles to give way to incoming vehicles if required and regular radio contact between heavy vehicle drivers when departing/entering the proposed access point.





Figure 4-12 - *B-Double* accessing Lincoln Highway Access Point

#### 4.3.3 Pavement Condition

At the junction of the existing access point with the Lincoln Highway, the asphaltic surfacing on the Lincoln Highway was observed to be in generally good condition. However, some moderate edge break was observed at the interface of the Lincoln Highway Access Point with the Lincoln Highway, as shown in Figure 4-13.



Figure 4-13 – Existing condition of pavement at Lincoln Highway Access Point



At the existing access point, which is currently unsealed, some corrugations and rutting was observed. It is therefore recommended that consideration is given to providing a new sealed or unsealed surface at the access point in order to improve safety to motorists and ensure the access point is accessible in all weather conditions.

The condition of the pavement at the rail crossing was not able to be assessed at the time of the WGA site visit as it was located on private land. However, it is understood that the rail crossing was recently used as a main access point for construction vehicles associated with upgrade works undertaken at the rail yard to the south. It would therefore be likely that the crossing is in a suitable condition for heavy vehicle access, although this should be confirmed if the Lincoln Highway Access Point is nominated as a site access point for the proposed development.

#### **4.3.4 Stormwater Drainage**

No formal stormwater drainage infrastructure was observed at the existing access point during the site assessment. The two-way crossfall on the Lincoln Highway drains water away from the pavement and shoulders to shallow informal table drains and vegetation located adjacent to the Lincoln Highway. No visible severe erosion or scour was present at the access point, with the pavement defects observed more likely due to vehicle loadings than high volume overland flow paths.

It is envisaged that adoption of the recommended pavement sealing/re-sheeting works at the access point mentioned above will rectify any minor drainage issues currently existing at the proposed access point.

#### **4.3.5 Sight Distance**

##### ***Approach Sight Distance (ASD)***

For a design speed of 40 km/hr (assuming that vehicles will be restricted to travelling at a relatively slow speed within the site) and a reaction time of 2.0 seconds, the ASD required is 40 m (Table 3.1, AGRD 4A). This is achieved at the current access point.

##### ***Safe Intersection Sight Distance (SISD)***

For a design speed of 120 km/hr (posted speed limit on the Lincoln Highway is 110km/hr) and a reaction time of 2.0 seconds, the SISD required is 324m (Table 3.2, AGRD 4A). This appears to be achieved in both directions on the Lincoln Highway at the existing access point.

##### ***Minimum Gap Sight Distance (MGSD)***

For an 85<sup>th</sup> percentile speed of 110 km/hr (the maximum available) and a critical gap acceptance time of 5 seconds, the MGSD requirement is 153 m, which is achieved on both approaches at the Lincoln Highway.

##### ***Summary of Sight Distance Requirements***

Table 4-5 provides a summary of the sight distances at the access point on the Lincoln Highway.

Table 4-5 - *Summary of Sight Distance Requirements*

<b>Sight Distance Requirement</b>	<b>Criteria Assessment</b>
<b>Approach Sight Distance (ASD)</b>	Met at current access point location

Sight Distance Requirement	Criteria Assessment
Safe Intersection Sight Distance (SISD)	Met at current access point location
Minimum Gap Sight Distance (MGSD)	Achieved on both approaches at the Lincoln Highway.

#### 4.4 SOUTHERN SITE ACCESS POINT – INDUSTRY DRIVE

##### 4.4.1 General

The proposed site access point of the Southern Site is located at the site of a current cul-de-sac on Industry Drive, as shown in Figure 4-14. Adjacent the proposed access point is an existing access to the Muradel Demonstration Plant, understood to be a biofuel processing facility. In addition, there is also access to another industrial property approximately 70 m to the south of the proposed access point.

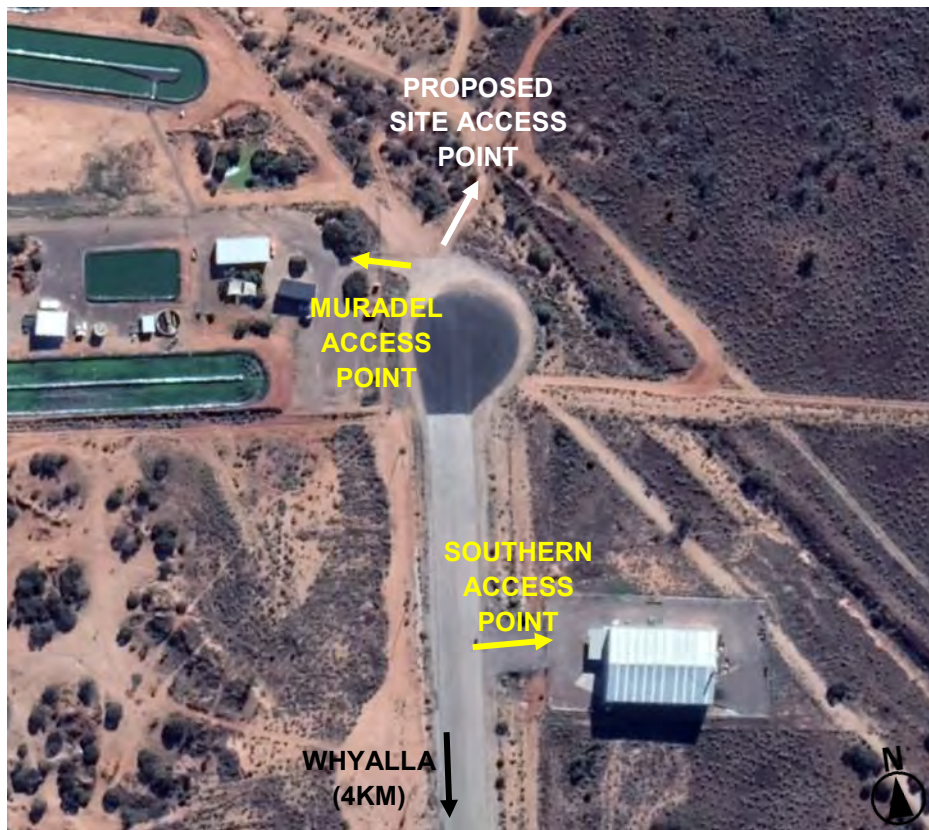


Figure 4-14 - Proposed access point on Industry Drive

An existing unsealed access point exists at the proposed access point location, as shown in Figure 4-15 below. However, it is understood that this will likely be re-constructed as part of the proposed works.



Figure 4-15 – Existing unsealed access point

#### **4.4.2 Geometry**

At the proposed access point, Industry Drive contains a cul-de-sac approximately 34 metres in diameter and on the approach to the cul-de-sac, Industry Drive consists of a two way two lane road, with an approximate 16 m width. The road has no centreline or edge line pavement marking, a two-way crossfall and approximately 4 m wide unsealed shoulders on both sides. Industry Drive is straight on approach to the access point with no horizontal curves.

#### **4.4.3 Pavement Condition**

A high-level assessment of the existing pavement condition along Industry Drive was undertaken as part of the site assessment. Adjacent the proposed access point, Industry Drive was observed to be surfaced with an asphaltic surface in good condition. The unsealed shoulder was observed to be in generally good condition with minimal signs of erosion, with the exception of immediately adjacent the proposed access point where the unsealed shoulder was found to be no longer flush with the adjoining pavement, as shown in Figure 4-16.



Figure 4-16 - *Current condition of Cul-de-sac*

It is understood that Industry Drive was constructed with the aim of providing access to industrial properties, and the existing pavement profile should therefore be able to structurally support the heavy vehicles generated by the construction and operational periods of the proposed development. Due to this and the generally good visual condition of the existing pavement there is expected to be minimal works required during construction or operation of the site, outside of general maintenance requirements. Nevertheless, the pavement should be monitored during construction and operation of the proposed development, with any defects identified and treated as required.

It is recommended that at the time of construction of the proposed access point that the adjacent unsealed shoulder also be re-sheeted to create a flush surface with the adjoining pavement and improve drainage of overland flows.

#### **4.4.4 Stormwater Drainage**

The two-way cross fall on Industry Drive drains water away from the pavement and shoulders to shallow table drains on both sides of the road. No visible erosion or scour was present adjacent the table drains, with some small deformations likely caused by water ponding following rainfall events visible within the unsealed shoulder adjacent the cul-de-sac. It is envisaged that adoption of the recommended shoulder re-sheeting works mentioned above will rectify any minor drainage issues currently existing.

During the site assessment it was also observed that there is a swale situated approximately 30 m from the edge of seal of the cul-de-sac that the proposed access road will likely need to cross to provide access to the site. At the time of the assessment there was no water visible in the swale, however this could be expected given that there had only been 0.6 mm of rainfall in the 30 days prior to the site assessment (Source: BOM website). It is recommended that a culvert or other similar treatment is considered at the crossing location to ensure that current flow paths are maintained whilst still retaining all weather access to the site.



#### 4.4.5 Sight Distance

##### **Approach Sight Distance (ASD)**

For a design speed of 40 km/hr (assuming that vehicles will be restricted to travelling at a relatively slow speed within the site) and a reaction time of 2.0 seconds, the ASD required is 40 m (Table 3.1, AGRD 4A). As this is the sight distance that will need to be provided internal to the site to the access point, this requirement should be considered when developing the internal access road for the site.

##### **Safe Intersection Sight Distance (SISD)**

For a design speed of 90 km/hr (assuming the posted speed limit along Industry Drive is 80km/h and adding 10km/hr for design speed) and a reaction time of 2.0 seconds, the SISD required is 214 m (Table 3.2, AGRD 4A). This is achieved at the current site access point.

##### **Minimum Gap Sight Distance (MGSD)**

Given the location of the proposed access point (at a cul-de-sac), it is not considered applicable.

##### **Summary of Sight Distance Requirements**

Table 4-6 provides a summary of the sight distances at the access point on Industry Drive.

Table 4-6 - Summary of Sight Distance Requirements

Sight Distance Requirement	Criteria Assessment
Approach Sight Distance (ASD)	Internal design criteria – can only be assessed once the design of the access track is known
Safe Intersection Sight Distance (SISD)	Met at current access point location
Minimum Gap Sight Distance (MGSD)	Not applicable to access point location

## 4.5 GENERAL NETWORK ISSUES

### 4.5.1 Environmental Impact

During dry periods, airborne dust may be generated by heavy vehicles using the unsealed access road, creating an environmental hazard. During dry periods, it is recommended that a water truck is employed on haulage routes to dampen the surface and reduce the creation of airborne dust and it is recommended that an environmental procedure is developed for haulage operations. The procedure should outline measures to be implemented to minimise the environmental impact of haulage operations.

### 4.5.2 Advanced Warning

During the construction period, heavy vehicle volumes on the access roads will be increased (minimally). During periods of heavily increased traffic, it is recommended that advance warning methods are implemented to alert the public to the presence of heavy vehicles. It is considered that a portable variable message sign (VMS) would be suitable for providing advance warning of additional heavy vehicles around the access points. It is considered that the use of VMS and signage at the access points will assist in improving safety for all road users during the construction period. If adopted, advance warning methods should be in accordance with DPTI signage requirements and AS1742.

### 4.5.3 Oversize/Overmass Vehicles

It is understood that oversize and overmass vehicles may need to access the site during the construction period. Permits will need to be obtained during the construction period from DPTI for each specific vehicle prior to travel, and consideration may need to be given to existing overhead power lines which cross Kimberly Road just to the north of the proposed access point if the Kimberly Road Access Point is to be utilised for the Northern Site.

During the site inspection undertaken by WGA, an oversize vehicle was observed to be using Industry Drive near to the proposed Southern Site access point, shown in Figure 4-17 below. The vehicle is understood to be owned and operated by Max Crane and Equipment Hire, which is also accessed off of Industry Drive, approximately 300 m to the south of the proposed access point.



Figure 4-17 - Oversize vehicle using Industry Drive

Although permits will need to be obtained during the construction period from DPTI for each specific vehicle prior to travel, the presence of other oversize/overmass vehicles on Industry Drive indicates that approval has been granted by DPTI before for travel by this route.

# 5 SUMMARY

## 5.1 GENERAL

WGA has been engaged by Golder to undertake a traffic impact and access point assessment for a proposed solar farm facility to be located near Cultana, South Australia. The purpose of the assessment is to examine the suitability of proposed access points for both the Northern and Southern sites in relation to the existing road network, the condition of the existing road network and its suitability to accommodate heavy vehicle movements and the proposed traffic demand to assist with the Development Application with the State Commission Assessment Panel.

## 5.2 IMPACT ON TRAFFIC

Information on the amount and type of traffic expected to be generated by the construction and operation of the Cultana Solar Farm has been provided by Golder and is understood to have been developed by adopting similar rates to a recently developed similar site. The majority of vehicle movements generated by the Northern and Southern Site will be within the (approximate) ten-month and four-month construction periods respectively, with minimal traffic expected to be generated by the sites once operational.

Although the traffic volumes and percentage of heavy vehicles may increase slightly on the surrounding roads during construction due to the Northern Site, each of these roads is already a gazetted freight route (with minimal residences and generally good pavement condition) and as such the increase in traffic is expected to have minimal impact. The exception to this is Kimberly Road, which would see a considerable increase in traffic volumes due to the fact that it is currently largely unused.

During the construction period of the Southern Site, Industry Drive would be most affected by the increase in traffic volumes resulting in an approximate 28% growth in AADT, followed by Lincoln Highway (3.3%). It is noted that the majority of the traffic resulting in the increase are light vehicles, which are considered to cause minimal damage to existing infrastructure.

The increase on all roads during the operational period of both the Northern Site and the Southern Site is considered negligible due to the small volume of traffic generated.

## 5.3 SITE ACCESS ASSESSMENT

It is understood that the Northern Site will be accessed from one of two potential access points – the Kimberly Road Access Point and/or the Lincoln Highway Access Point. The Southern Site will be accessed solely from an access point to be located at the end of Industry Drive.

On 02 May 2018, WGA undertook a site assessment of the proposed access points assessing the following:

- Typical road geometry;
- Pavement condition;

- Stormwater drainage; and
- Sight Distance

The assessment identified that each potential access point could be suitable, with the following to be taken into consideration if they are to be utilised as access points for the proposed development:

- Northern Site Access Point – Kimberly Road
  - It is envisaged that the access point will be formalised as part of the proposed development in order to reduce confusion to drivers entering the site, as well as reduce potential conflict between vehicles.
  - It is recommended that a comprehensive pavement condition assessment is undertaken on Kimberly Road to ensure that it can support the increased traffic loading proposed by the development if the Kimberly Road Access Point is to be adopted for the proposed development, as it is highly likely that remediation works may need to be undertaken.
  - Consideration should be given to providing a new sealed or unsealed surface at the access point in order to ensure that the access point is accessible in all weather conditions and to improve safety to motorists.
  - Kimberly Road should be maintained as required during the construction period in particular to ensure the existing drainage infrastructure is able to function to full capacity.
  - Consideration should be given to trimming/removing existing vegetation adjacent the proposed access point if possible to further increase sight distance. Consideration could also be given to placing additional warning signage of the upcoming access point for motorists approaching on Kimberly Road.
- Northern Site Access Point – Lincoln Highway
  - This access point utilises an existing access track and rail crossing, understood to be operated by Genesee and Wyoming (G&W). If this access point is to be adopted for access to the proposed development, negotiations would therefore need to be held with both G&W and owners of the adjacent land to ensure that access will not impact on their operations.
  - It is understood that the rail crossing was recently used as a main access point for construction vehicles associated with upgrade works undertaken at the rail yard to the south. It would therefore be likely that the crossing is in a suitable condition for heavy vehicle access, although this should be confirmed if the Lincoln Highway Access Point is nominated as a site access point for the proposed development.
  - It is recommended that consideration is given to providing a new sealed or unsealed surface at the access point in order to improve safety to motorists and ensure the access point is accessible in all weather conditions.
- Southern Site Access Point – Industry Drive
  - Due to the generally good condition of the existing pavement, there should be minimal works required during construction or operation of the site, outside of general maintenance requirements. It is however recommended that the unsealed shoulder adjacent the cul-de-sac be re-sheeted to create a flush surface with the adjoining pavement and improve drainage of overland flows. The pavement should be monitored during construction and operation of the proposed development, with any defects identified and treated as required.
  - The ASD of the proposed access point on Industry Drive should be assessed during design of the access track to ensure that the required distance of 40m is met
  - During the site assessment it was also observed that there is a swale situated approximately 30 m from the edge of seal of the cul-de-sac that the proposed access road will likely need to cross to provide access to the site. It is recommended that a culvert or other similar treatment is considered at the swale crossing location to ensure that current flow paths are maintained whilst still retaining all weather access to the site.



- Other Considerations
  - During dry periods, airborne dust may be generated by heavy vehicles using unsealed roads, creating an environmental hazard. During dry periods, it is therefore recommended that a water truck is employed on haulage routes to dampen the surface and reduce the creation of airborne dust and it is recommended that an environmental procedure is developed for haulage operations. The procedure should outline measures to be implemented to minimise the environmental impact of haulage operations.
  - During the construction period, heavy vehicle volumes on the access roads will be increased (minimally). During periods of heavily increased traffic, it is recommended that advance warning methods are implemented to alert the public to the presence of heavy vehicles. It is considered that a portable variable message sign (VMS) would be suitable for providing advance warning of additional heavy vehicles around the access points. It is considered that the use of VMS and signage at the access points will assist in improving safety for all road users during the construction period. If adopted, advance warning methods should be in accordance with DPTI signage requirements and AS1742.
  - Consideration should be given to introducing additional operational controls to manage the risk to two B-doubles passing each other at the access point(s). These additional controls could include warning signage to advise outgoing vehicles to give way to incoming vehicles if required and regular radio contact between heavy vehicle drivers when departing/entering the proposed access points.
  - It is understood that oversize and overmass vehicles may need to access the sites during the construction period. Permits will need to be obtained during the construction period from DPTI for each specific vehicle prior to travel, and consideration may need to be given to existing overhead power lines which cross Kimberly Road just to the north of the proposed access point if the Kimberly Road Access Point is to be utilised to access the Northern Site.

# 6

## REFERENCES

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- **Austroads, 2009.** Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections
- **ARRB Group, 2009.** Unsealed Roads Manual, Guidelines to Good Practice 3<sup>rd</sup> Edition
- **BOM Website,** <http://www.bom.gov.au/climate/dwo/201804/html/IDCJDW5071.201804.shtml>
- **Standards Australia, 2009.** Australian Standard 1742 Manual of Uniform Traffic Control Devices, Part 2: Traffic Control Devices for General Use

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# APPENDIX A

## TRAFFIC COUNTS

## MetroCount Traffic Executive Daily Classes

### DailyClass-130 -- English (ENA)

#### Datasets:

**Site:** [] Industry Drive  
**Direction:** 7 - North bound A>B, South bound B>A. Lane: 0  
**Survey Duration:** 9:00 Friday, 5 April 2013 => 13:49 Tuesday, 16 April 2013  
**Zone:**  
**File:** 16Apr2013.EC0 (Plus)  
**Identifier:** V1782S78 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default (v3.21 - 15322)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 9:00 Friday, 5 April 2013 => 13:49 Tuesday, 16 April 2013  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 10 - 160 km/h.  
**Direction:** North, East, South, West (bound)  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (NAASRA)  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 2417 / 2452 (98.57%)



Daily Classes**DailyClass-130**

**Site:** .0.0NS  
**Description:** Industry Drive  
**Filter time:** 9:00 Friday, 5 April 2013 => 13:49 Tuesday, 16 April 2013  
**Scheme:** Vehicle classification (NAASRA)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 1 April 2013

	1	2	3	4	5	6	7	8	9	10	11	12	Total
<b>Mon*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
<b>Tue*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
<b>Wed*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
<b>Thu*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
<b>Fri*</b>	31	1	39	3	0	1	0	1	3	1	4	0	84
(%)	36.9	1.2	46.4	3.6	0.0	1.2	0.0	1.2	3.6	1.2	4.8	0.0	84
<b>Sat</b>	60	8	67	12	4	2	0	12	17	1	1	0	184
(%)	32.6	4.3	36.4	6.5	2.2	1.1	0.0	6.5	9.2	0.5	0.5	0.0	184
<b>Sun</b>	55	1	54	7	0	0	0	8	1	0	0	1	127
(%)	43.3	0.8	42.5	5.5	0.0	0.0	0.0	6.3	0.8	0.0	0.0	0.8	127

Average daily volume

<b>Entire week</b>	57	4	60	9	1	1	0	10	8	0	0	0	155
(%)	36.8	2.6	38.7	5.8	0.6	0.6	0.0	6.5	5.2	0.0	0.0	0.0	155
<b>Weekdays</b>	No complete days.												
<b>Weekend</b>	57	4	60	9	1	1	0	10	8	0	0	0	155
(%)	36.8	2.6	38.7	5.8	0.6	0.6	0.0	6.5	5.2	0.0	0.0	0.0	155

\* - Incomplete

Daily Classes**DailyClass-130**

**Site:** .0.0NS  
**Description:** Industry Drive  
**Filter time:** 9:00 Friday, 5 April 2013 => 13:49 Tuesday, 16 April 2013  
**Scheme:** Vehicle classification (NAASRA)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0)

**Monday, 8 April 2013**

	1	2	3	4	5	6	7	8	9	10	11	12	Total
<b>Mon</b>	101	6	136	9	6	0	8	4	19	4	6	1	300
(%)	33.7	2.0	45.3	3.0	2.0	0.0	2.7	1.3	6.3	1.3	2.0	0.3	
<b>Tue</b>	71	13	136	16	1	2	6	7	10	1	6	1	270
(%)	26.3	4.8	50.4	5.9	0.4	0.7	2.2	2.6	3.7	0.4	2.2	0.4	
<b>Wed</b>	97	11	140	25	4	0	4	8	9	1	11	4	314
(%)	30.9	3.5	44.6	8.0	1.3	0.0	1.3	2.5	2.9	0.3	3.5	1.3	
<b>Thu</b>	71	8	125	15	2	3	4	2	5	3	7	0	245
(%)	29.0	3.3	51.0	6.1	0.8	1.2	1.6	0.8	2.0	1.2	2.9	0.0	
<b>Fri</b>	94	7	109	15	1	1	4	5	18	1	8	1	264
(%)	35.6	2.7	41.3	5.7	0.4	0.4	1.5	1.9	6.8	0.4	3.0	0.4	
<b>Sat</b>	31	3	61	4	1	0	6	0	0	0	1	0	107
(%)	29.0	2.8	57.0	3.7	0.9	0.0	5.6	0.0	0.0	0.0	0.9	0.0	
<b>Sun</b>	47	5	55	7	3	0	3	4	0	0	2	1	127
(%)	37.0	3.9	43.3	5.5	2.4	0.0	2.4	3.1	0.0	0.0	1.6	0.8	

Average daily volume

<b>Entire week</b>	73	7	108	12	1	0	4	3	8	1	5	0	232
(%)	31.5	3.0	46.6	5.2	0.4	0.0	1.7	1.3	3.4	0.4	2.2	0.0	
<b>Weekdays</b>	86	8	128	15	2	1	4	5	11	1	7	0	278
(%)	30.9	2.9	46.0	5.4	0.7	0.4	1.4	1.8	4.0	0.4	2.5	0.0	
<b>Weekend</b>	38	3	58	5	2	0	4	1	0	0	1	0	117
(%)	32.5	2.6	49.6	4.3	1.7	0.0	3.4	0.9	0.0	0.0	0.9	0.0	

\* - Incomplete

Daily Classes**DailyClass-130**

**Site:** .0.0NS  
**Description:** Industry Drive  
**Filter time:** 9:00 Friday, 5 April 2013 => 13:49 Tuesday, 16 April 2013  
**Scheme:** Vehicle classification (NAASRA)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0)

Monday, 15 April 2013

	1	2	3	4	5	6	7	8	9	10	11	12	Total
<b>Mon</b>	68	14	115	18	3	0	1	3	10	0	1	2	235
(%)	28.9	6.0	48.9	7.7	1.3	0.0	0.4	1.3	4.3	0.0	0.4	0.9	
<b>Tue*</b>	39	5	87	12	3	0	0	3	7	1	2	1	160
(%)	24.4	3.1	54.4	7.5	1.9	0.0	0.0	1.9	4.4	0.6	1.3	0.6	
<b>Wed*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Thu*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Fri*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Sat*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<b>Sun*</b>	0	0	0	0	0	0	0	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Average daily volume

<b>Entire week</b>	68	14	115	18	3	0	1	3	10	0	1	2	235
(%)	28.9	6.0	48.9	7.7	1.3	0.0	0.4	1.3	4.3	0.0	0.4	0.9	
<b>Weekdays</b>	68	14	115	18	3	0	1	3	10	0	1	2	235
(%)	28.9	6.0	48.9	7.7	1.3	0.0	0.4	1.3	4.3	0.0	0.4	0.9	

Weekend No complete days.

\* - Incomplete



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**APPENDIX E**

# Ecological Desktop Assessment



**Cultana Solar Farm**  
**Ecological Desktop Assessment**

# Cultana Solar Farm Ecological Desktop Assessment

29 August 2018

Final

Prepared by EBS Ecology for SIMEC ZEN Energy

Document Control					
Revision No.	Date issued	Authors	Reviewed by	Date Reviewed	Revision type
1	20/07/2018	G. Oerman	Dr Marina Louter	13/07/2018	Draft
2	31/07/2018	G. Oerman	-	-	Draft
3	21/08/2018	G. Oerman	Dr Marina Louter	21/08/2018	Draft
4	29/08/2018	G. Oerman	Dr Marina Louter	29/08/2018	Final

Distribution of Copies			
Revision No.	Date issued	Media	Issued to
1	20/07/2018	Electronic	Lissa van Camp, Principal Environmental Consultant, Golder Associates Pty Ltd
2	31/07/2018	Electronic	Lissa van Camp, Principal Environmental Consultant, Golder Associates Pty Ltd
3	21/08/2018	Electronic	Lissa van Camp, Principal Environmental Consultant, Golder Associates Pty Ltd
4	29/08/2018	Electronic	Lissa van Camp, Principal Environmental Consultant, Golder Associates Pty Ltd

EBS Ecology Project Number: E80308

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**CITATION:** EBS Ecology (2018) Cultana Solar Farm Ecological Desktop Assessment. Report to SIMEC ZEN Energy. EBS Ecology, Adelaide.

Cover photograph: *Acacia papyrocarpa* (Western Myall) woodland located at a site near the proposed Cultana Solar Farm (EBS 2017).

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## GLOSSARY AND ABBREVIATION OF TERMS

ALA	Atlas of Living Australia
BAM	Bushland Assessment Methodology
BDBSA	Biological Database of South Australia
CP	Conservation Park
DEH	Department of Environment and Heritage (currently DEW)
DEW	Department of Environment and Water (formerly DEWNR)
DotEE	Department of Environment and Energy (formerly DotE)
EBS	EBS Ecology
EPBC Act	<i>Environment Protection Biodiversity Conservation Act 1999</i>
Golder	Golder Associates Pty Ltd
IBRA	Interim Biogeographical Regionalisation of Australia
LGA	Local Government Area
MW	Megawatt
NPW Act	<i>National Parks and Wildlife Act 1972</i>
NRM	Natural Resource Management
Project area	the area where the proposed Cultana Solar Farm is proposed to be constructed
Project footprint	the area of native vegetation clearance associated with construction of the Project
Project	The proposed development of a solar farm at Cultana
PV	Photovoltaic
SA	South Australia
SEB	Significant Environmental Benefit
SASCC	South Australian Seed Conservation Centre



## EXECUTIVE SUMMARY

EBS Ecology (EBS) was engaged by Golder Associates Pty Ltd (Golder) to conduct a desktop review of the State legislated flora and fauna species that may be impacted by the proposed development of the Cultana Solar Farm (the Project area), located near Cultana, South Australia. The ecological desktop assessment involved a search of State databases to identify flora and fauna species listed as threatened under the *National Parks and Wildlife Act 1972* (NPW Act) that may occur within the Project area.

This report utilised data from the Biological Database of South Australia (BDBSA) to identify State threatened species only that may occur in the Project area. For each NPW Act listed species identified by the database searches the likelihood of occurrence within the Project area was then assessed based on the species distribution, habitat availability, date of last record, and the conspicuousness of the species. The provisional list of threatened ecosystems of South Australia was also reviewed to determine whether any State threatened ecosystems could occur within the Project area.

The BDBSA database search identified four flora species and 19 fauna species listed as threatened under the NPW Act that have been recorded within 10 km of the Project area. The desktop likelihood assessment determined that two flora and three fauna species listed under the NPW Act had potential to occur within the Project area. The State threatened species with potential to occur in the Project area are:

- Australian Broomrape (*Orobancha cernua* var. *australiana*) (SA: Rare);
- Sandalwood (*Santalum spicatum*) (SA: Vulnerable);
- Elegant Parrot (*Neophema elegans*) (SA: Rare);
- Western Slender-billed Thornbill (*Acanthiza iredelei iredelei*) (SA: Rare); and
- White-bellied Sea-eagle (*Haliaeetus leucogaster*) (SA: Endangered).

Review of the provisional list of threatened ecosystems of South Australia identified one threatened ecosystem - *Alectryon oleifolius* ssp. *canescens* Tall Shrubland - that may occur within the Project area.

The threatened species and ecosystems identified with the potential to occur in the Project area, except for the White-bellied Sea-eagle, could be impacted by the clearance of native vegetation associated with the Project. As numerous large scale developments are currently proposed for the Upper Spencer Gulf region, the cumulative effects of habitat loss on threatened species could become pronounced at a regional scale.

A Bushland Assessment will be required for the Project. The Bushland Assessment would assess the vegetation condition, conservation value and landscape context to determine a Significant Environmental Benefit (SEB) offset for the proposed clearance. The Bushland Assessment should consider the suitability of habitat for the State threatened species identified and nationally listed species, which were not included within this report.



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# 1 INTRODUCTION

EBS Ecology (EBS) was engaged by Golder Associates Pty Ltd (Golder) to conduct a desktop review of the State legislated flora and fauna species that may be impacted by the proposed development of the Cultana Solar Farm (the Project area), located near Cultana, South Australia. The ecological desktop assessment involved a search of State databases to identify flora and fauna species listed as threatened under the *National Parks and Wildlife Act 1972* (NPW Act) that may occur within the Project area.

## 1.1 Objectives

The specific objectives of the flora and fauna assessment were to:

- Conduct a review of biological databases; including the Biological Database of South Australia (BDBSA) and Atlas of Living Australia (ALA) to identify potential State threatened flora and fauna species within the Project area;
- Conduct background research of State threatened species identified and determine if they could occur within the Project area;
- Identify and highlight areas of concern where matters of state significance could be impacted; and
- Review relevant literature and existing spatial data.

## 1.2 Project area

The Project area is located between Whyalla and Cultana, South Australia (Figure 1), approximately 370 km north north west of Adelaide.

The land containing the proposed solar photovoltaic (PV) farm and associated infrastructure is bisected by the Lincoln Highway, with the northern part of the solar farm located between the eastern side of the highway below Kimberley Road, Whyalla Conservation Park (CP) to the north-west, and the Whyalla Saltfields to the south-east (Figure 1). The southern part of the solar farm on the western side of the highway is located in the industrial zone south of an approved 160MW solar farm.



Figure 1. Location and layout of the proposed Cultana Solar Farm Project area.

## 2 BACKGROUND

### 2.1 Environmental setting

#### 2.1.1 Interim Biogeographical Regionalisation of Australia (IBRA)

The Interim Biogeographical Regionalisation of Australia (IBRA) identifies geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information, which is used to assess and plan for the protection of biodiversity (DotEE 2011). The bioregions are further refined into subregions and environmental associations. Native vegetation remnancy figures for IBRA subregions and environmental associations are useful for setting regional landscape targets.

The entire Project area is located within the Gawler IBRA bioregion and falls within the Myall Plains IBRA subregion (Table 1). Native vegetation remnancy within the Myall Plains IBRA subregion is very high (97%); however, only 8% is formerly conserved.

**Table 1. IBRA bioregion, subregion, and environmental association environmental landscape summary.**

Gawler IBRA bioregion	
Semi-arid to arid, flat topped to broadly rounded hills of the Gawler Range Volcanics and Proterozoic sediments, low plateaux on sandstone and quartzite with an undulating surface of aeolian sand or gibbers and rocky quartzite hills with colluvial footslopes, erosional and depositional plains and salt encrusted lake beds, with black oak (belah) and Myall low open woodlands, open mallee scrub, bluebush/saltbush open chenopod shrublands and tall mulga shrublands on shallow loams, calcareous earths and hard red duplex soils.	
Myall Plains IBRA subregion	
Gently undulating calcrete plains and occasional quartzite or granite hills. Includes a zone of salt lakes and gypsum dunes at Lake Gillies and steep strike ranges at the Middleback Ranges. To the east out cropping conglomerate occurs with mangrove flats along the coastal margin. <i>Acacia papyrocarpa</i> / <i>Casuarina pauper</i> low woodland is found on grey brown calcareous earths, red calcareous earths and dense brown loams on the plains. Rocky outcrops support <i>Eucalyptus incrassata</i> / <i>Melaleuca uncinata</i> open scrub and <i>Allocasuarina verticillata</i> low woodland on dense brown loams. The lowest areas support chenopod shrubland of <i>Halosarcia halocnemoides</i> on grey calcareous loams. Light grazing occurs in most areas.	
Remnant vegetation	Approximately 97% (1050684 ha) of the subregion is mapped as remnant native vegetation, of which 8% (86146 ha) is formally conserved.
Landform	Gently undulating calcrete plains and occasional hills. Includes a zone of salt lakes and gypsum dunes at Lake Gillies and steep strike ranges at the Middleback Ranges.
Geology	Calcrete development; gypsum dunes; play lakes with silt & clay deposits & evaporites
Soil	Red calcareous earths, Sandy soils with mottled yellow clayey subsoils.
Vegetation	Assumed native vegetation cover.
Conservation significance	59 species of threatened fauna, 40 species of threatened flora. 4 wetlands of national significance.

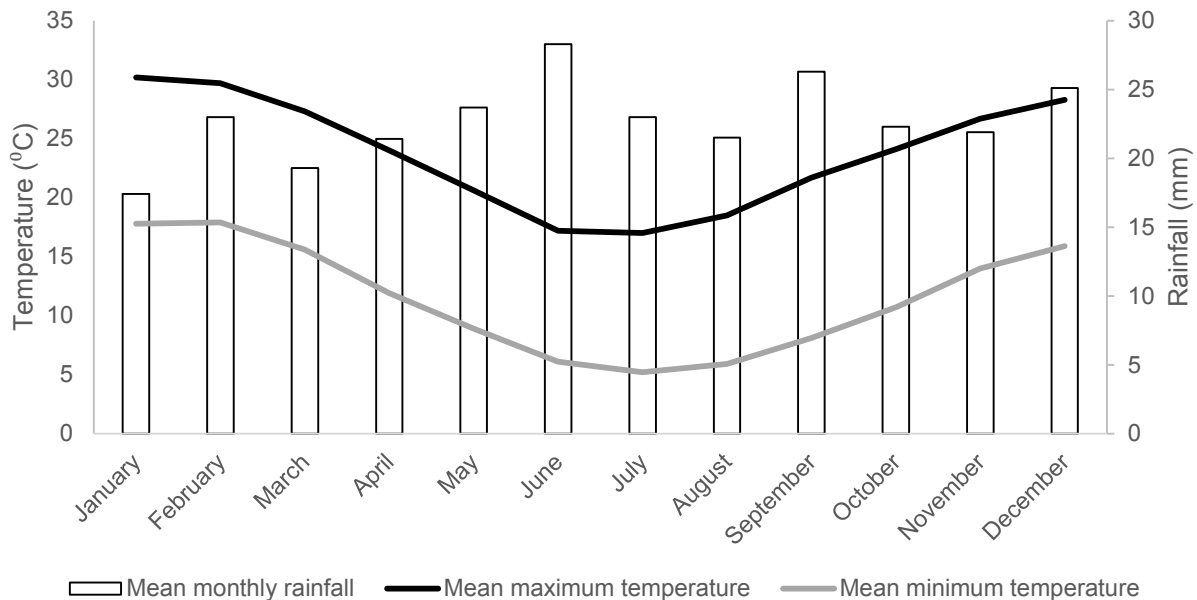


### 2.1.2 Administrative Boundaries

The Project area is distributed within the Whyalla and Uia Whyalla Local Government Area (LGA) boundaries, the Hundreds of Cultana and the Eyre Peninsula Natural Resource Management (NRM) region.

### 2.1.3 Climate

Climate data were sourced from the Whyalla Aero station (site number: 018120), located 6.7 km from the western boundary of the Project area. Whyalla has a Mediterranean climate characterised by cool winters and hot summers, with mean maximum temperatures ranging from 17°C in July to 30.2°C in January. The wettest months are June (28.3 mm), September (26.3 mm) and December (25.1 mm), and therefore, while rainfall is greatest in winter, the variability of mean seasonal rainfall is low (Figure 2) (Commonwealth of Australia 2018).



**Figure 2. Mean maximum and minimum monthly temperatures and mean monthly rainfall recorded at Whyalla Aero Station (site number: 018120) from 1945 to 2018.**

### 2.1.4 DEWNR Vegetation Mapping

NatureMaps was used to determine the broad vegetation types that occur within a 10km buffer of the Project area (DEW 2018a). A total of seven vegetation associations are located within 10km of the Project area (Figure 3). Of these, three vegetation types are located within 20m buffer of the Project area (Table 2):

- Chenopod shrubland - dominant vegetation type within the Project area (Figure 4 to Figure 6).
- Acacia woodland - significant coverage within the Project area (Figure 4 to Figure 6).
- Casuarina woodland - small patches located within the transmission line route options (Figure 4).

The environmental description, dominant plant species, and hectares (ha) for each vegetation type are detailed within Table 2.

**Table 2. Vegetation types mapped over a 20m infrastructure buffer, including on either side of the transmission line routes.**

Vegetation type	Environmental description	Vegetation description	Area (ha) within 20m infrastructure buffer of the Project area
Chenopod shrubland	Pan; saline soils; sandy loams – Loamy clay; over moist compact clay; salt lake margin.	<i>Atriplex vesicaria</i> ssp., +/- <i>Maireana sedifolia</i> , +/- <i>Maireana pentatropis</i> low shrubland over <i>Sclerolaena diacantha</i> , <i>Austrostipa nitida</i> , <i>Sclerolaena obliquicuspis</i> , <i>Tetragonia eremaea</i> , <i>Brassica tournefortii</i> , <i>Stenopetalum lineare</i> , <i>Senecio pinnatifolius</i>	364.0
Acacia woodland	Plains	<i>Acacia papyrocarpa</i> low woodland over <i>Atriplex vesicaria</i> ssp., <i>Maireana sedifolia</i> , <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Rhagodia ulicina</i> low shrubs	338.5
Casuarina woodland	Range of soil types, often red/orange in colour; semi-arid regions	<i>Casuarina pauper</i> low woodland over <i>Geijera linearifolia</i> , <i>Scaevola spinescens</i> tall shrubs over <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> , <i>Austrostipa nitida</i> , +/- <i>Ptilotus obovatus</i> var. <i>obovatus</i> , +/- <i>Maireana sedifolia</i> , +/- <i>Atriplex stipitata</i> low shrubs over <i>Carrichtera annua</i>	4.0
No data			72.7
<b>TOTAL</b>			<b>779.2</b>

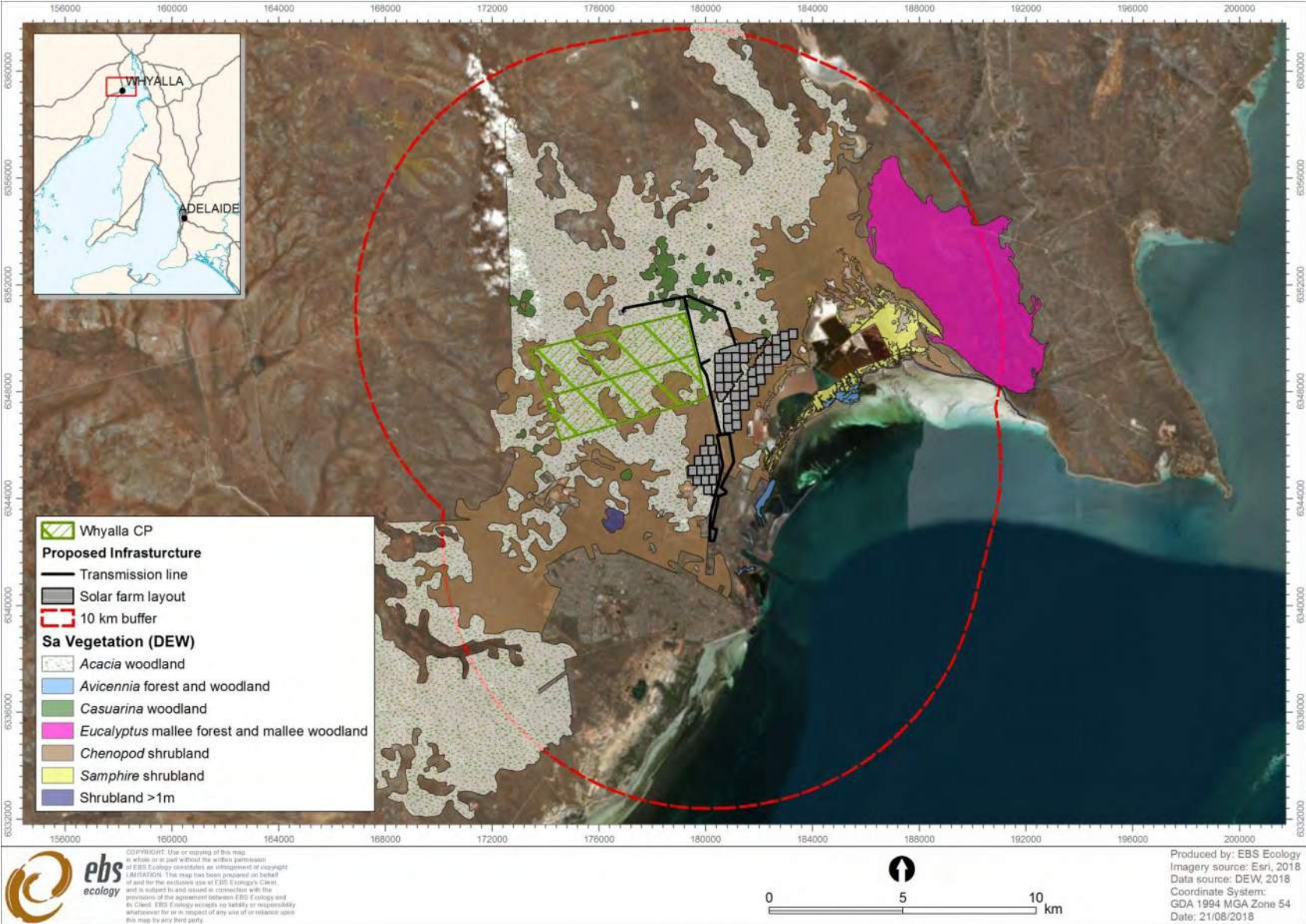


Figure 3. Overview of vegetation mapping within 10km buffer of the Project area (DEW 2018a).





Figure 4. Detailed vegetation mapping within 20m infrastructure buffer of the Project area (Map 1 of 3).



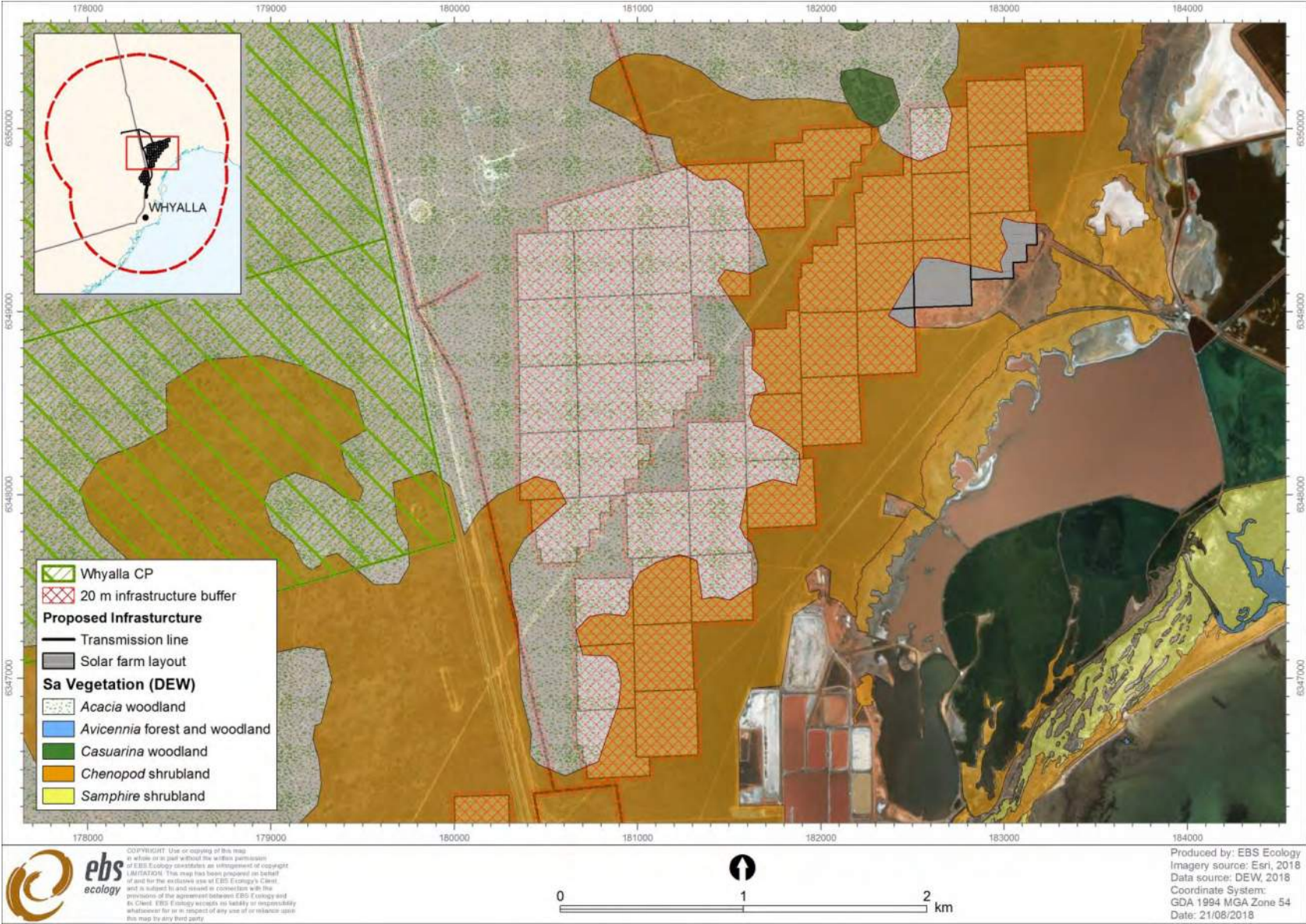


Figure 5. Detailed vegetation mapping within 20m infrastructure buffer of the Project area (Map 2 of 3).





Figure 6. Detailed vegetation mapping within 20m infrastructure buffer of the Project area (Map 3 of 3).

## 3 METHODS

### 3.1 Desktop assessment

Databases compiled and managed by the Department of Environment and Water (DEW) (South Australia) were analysed to determine the flora and fauna known to or which may potentially occur within 10 km of the Project area. The aim of the desktop assessment was to determine whether any species or threatened ecological communities listed under the NPW Act have potential to occur within the Project area.

#### 3.1.1 *Biological Database of South Australia (BDBSA)*

An extraction from the BDBSA was obtained to identify flora and fauna species that have been recorded within 10 km of the Project area (DEW 2018b, accessed 09/07/2018, *Record set number DEWNRBDBSA180709-1*). The BDBSA is comprised of an integrated collection of species records from the South Australian (SA) Museum, conservation organisations, private consultancy companies, Birds SA, Birdlife Australia and the Australasian Wader Study Group, which meet DEW standards for data quality, integrity and maintenance.

#### 3.1.2 *Likelihood of occurrence assessment*

An assessment to determine the likelihood of occurrence for threatened species and ecosystems within the Project area was conducted. Each of the threatened species and ecosystems identified by the BDBSA data extract were assigned a rating (highly likely, likely, possible and unlikely), which described their likelihood of occurrence with the Project area. The following criteria were considered when assigned a likelihood rating:

- date of the most recent record (taking into consideration the date of the last surveys conducted in the area);
- proximity of the records (distance to the Project area);
- landscape location of the records, vegetation remnancy and vegetation type of the record location (taking into consideration the landscape, remnancy and vegetation type of the Project area, with higher likelihood assigned to species that were found in similar locations/condition/vegetation associations); and
- knowledge of the species: habitat preferences, causes of its decline, the conspicuousness of the species and local population trends.

A summary of the likelihood criteria is shown below in Table 3.

**Table 3. Likelihood criteria for the presence of threatened species.**

Likelihood category	Criteria
Unlikely	No records despite survey effort considered adequate, or No records and survey effort is considered not adequate, and no suitable habitat is known to occur in the area, or No records and survey effort is not considered adequate, and no suitable habitat is known to occur in the area, and species of similar habitat needs have no records either.
Possible	No records, survey effort is considered not adequate, suitable habitat does occur (or isn't known if it does occur) and species of similar habitat needs have been recorded in the area, or Records within the last 40 years, and the area is not largely intact, or Records in the last 10 years, the species does not have highly specific needs, and habitat is largely intact.
Likely	Records in the last 10 years, the species does not have highly specific habitat needs and the habitat is largely intact, or Records in the last 10 years, the species does have highly specific habitat needs and these needs occur in the area.
Highly likely/Known	Records in the last 10 years, the species does not necessarily have highly specific needs, and the habitat is largely intact.

### 3.1.3 Limitations

Flora and fauna records were sourced from the BDBSA. The BDBSA only includes verified flora and fauna records submitted to DEW or partner organisations. It is recognised that knowledge is poorly captured, and it is possible that threatened species occur that are not reflected by database records. Although much of the BDBSA data have been through a variety of validation processes, the lists may contain errors and should be used with caution. DEW gives no warranty that the data are accurate or fit for any particular purpose of the user or any person to whom the user discloses the information.

BDBSA flora and fauna records were limited to a 10 km buffer around the Project area. The reliability of the BDBSA data ranges from 100 m to over 100 km. Fauna species, especially birds, can traverse distances more than the 10 km search buffer, and therefore, additional species may occur. It is also acknowledged that the presence of species may not be adequately represented by database records. Hence, the BDBSA results that have been clipped to a 10 km buffer of the Project area may not highlight all potential threatened flora and fauna species that may occur in the Project area.

The findings and conclusions expressed by EBS are based solely upon information in existence at the time of the assessment.

## 4 RESULTS

### 4.1 Matters of State Significance

#### 4.1.1 *Threatened ecosystems*

One State threatened ecosystem, *Alectryon oleifolius* ssp. *canescens* Tall Shrubland, listed as Vulnerable under provisional list of threatened ecosystems of SA, could potentially occur within the Project area (Neagle 2009). Regionally, this vegetation community is common as isolated patches, which are threatened by limited regeneration.

#### 4.1.2 *Threatened flora*

The BDBSA database search identified four State threatened flora species that have been recorded within 10 km of the Project area (Figure 7). Two of the four species identified are considered to have potential to occur within the Project area:

- State Rare *Orobranche cernua* var. *australiana* (Australian Broomrape) may possibly occur within the Project area; and
- State Vulnerable *Santalum spicatum* (Sandalwood) may possibly occur within the Project area.

The rationale for the potential occurrence of each state threatened flora species is provided in Table 4. The locations of all State threatened flora identified by the BDBSA search with records within 10km of the Project area are presented in Figure 7.



Table 4. BDBSA records of State threatened flora species potentially occurring within 10km of the Project area (DEW 2018b).

Scientific name	Common name	Conservation status	Last sighting (year)	Likelihood of occurrence within Project area	Likelihood rationale
		SA			
<b>Plantae</b>	<b>Plants</b>				
<i>Acacia rhigiophylla</i>	Dagger-leaf Wattle	R	1983	Unlikely	<i>Acacia rhigiophylla</i> (Dagger-leaf Wattle) is distributed in two populations in South Australia; one near Monarto and Murray Bridge and the second located in the eastern Eyre Peninsula (ALA 2018). The extent of the eastern Eyre Peninsula population does not overlap with the Project area, and therefore, the species is unlikely to occur. Furthermore, <i>A. rhigiophylla</i> is associated with <i>Euclayptus socialis</i> and <i>E. gracilis</i> mallee (SASCC 2018a), and therefore, no suitable habitat is expected to exist in the Project area.
<i>Austrostipa plumigera</i>	Hairy-bristle Spear-grass	R	1952	Unlikely	<i>Austrostipa plumigera</i> (Hairy-bristle Spear-grass) is distributed across western South Australia; however, there is an isolated historical record of the species near Whyalla (ALA 2018). Given the time since the last record of <i>A. plumigera</i> , it is considered unlikely to occur in the Project area.
<i>Orobranche cernua</i> var. <i>australiana</i>	Australian Broomrape	R	2016	Possible	<i>Orobranche cernua</i> var. <i>australiana</i> (Australian Broomrape) is scattered throughout the semi-arid and arid zone in South Australia, except for the far west of the state (ALA 2018). There are recent records near the Whyalla township (ALA 2018). Therefore, it may occur within the Project area due to the close proximity of recent records.
<i>Santalum spicatum</i>	Sandalwood	V	1998	Possible	<i>Santalum spicatum</i> (Sandalwood) is scattered throughout South Australia's semi-arid zone. The species grows on sands, sandy loams and clay soils of sand plains, watercourses and gravelly ridges, mainly in woodland communities (Kutsche and Lay 2003). The Western Myall ( <i>A. papyrocarpa</i> ) woodland in the Project area would comprise suitable habitat for this species.

**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.

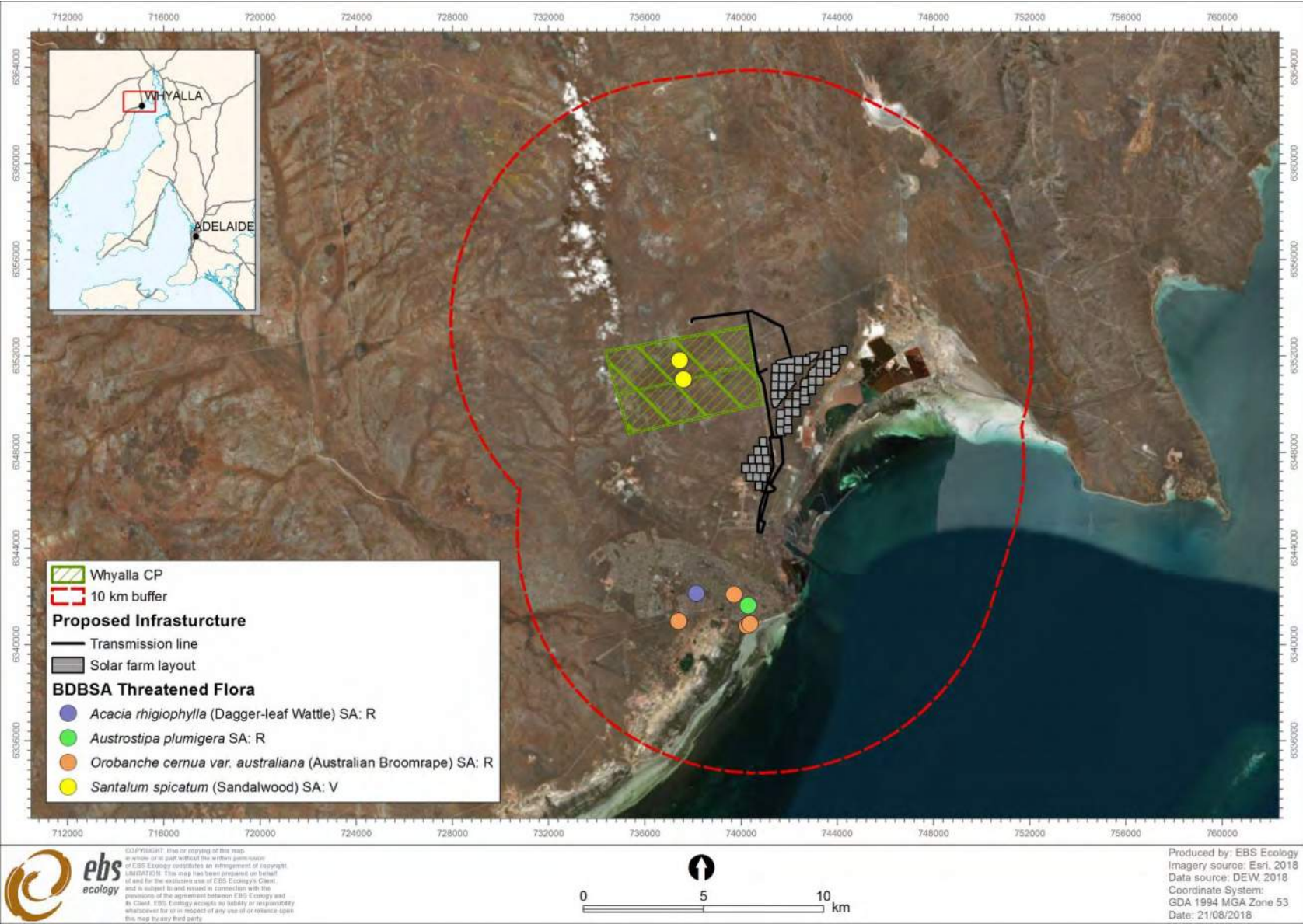


Figure 7. BDBSA records of State threatened flora species within 10km of the Project area (DEW 2018b).

#### 4.1.3 Threatened fauna

The BDBSA database search identified a total of 19 State threatened fauna species (all birds) that have been recorded within 10 km of the Project area (Table 5). Overall three species could occur within the Project area:

- State Endangered White-bellied Sea Eagle (*Haliaeetus leucogaster*) may possibly occur within the Project area; and
- State Rare Western Slender-billed Thornbill (*Acanthiza iredelei iredelei*) is likely to occur within the Project area; and
- State Rare Elegant Parrot (*Neophema elegans*) is likely to occur within the Project area.

The rationale for the potential occurrence of each state threatened fauna species is provided in Table 5.

Thirteen of the 19 State threatened fauna species identified in the BDBSA search are considered unlikely to occur within the Project area (Table 5). However these species could potentially utilize the Whyalla Saltfields, which are located adjacent to the Project area (discussed in Section 5.2 below).

The locations of all state threatened fauna species identified by the BDBSA search with records within 10km of the Project area are presented in Figure 8.

Table 5. BDBSA records of State threatened fauna species potentially occurring within 10km of the Project area (DEW 2018b).

Scientific name	Common name	Conservation status	Last sighting (year)	Likelihood of occurrence within Project area	Likelihood rationale
		SA			
<i>Acanthiza iredalei iredalei</i>	Slender-billed Thornbill (western)	R	2016	Likely	The Slender-billed Thornbill (Western) ( <i>Acanthiza iredalei iredalei</i> ) is a passerine that inhabits chenopod shrublands that are dominated by samphires or <i>Maireana</i> and <i>Atriplex</i> associations (TSSC 2013). The species may also occur in acacia shrublands. As chenopod shrublands are widespread in the Project area and the species has been recently recorded within proximity of the Project area, the Slender-billed Thornbill (Western) is considered likely to occur.
<i>Actitis hypoleucos</i>	Common Sandpiper	R	2016	Unlikely*	The Common Sandpiper ( <i>Actitis hypoleucos</i> ) is a shorebird species that inhabits coastal and inland environments, including fresh and saline lakes, wetlands and floodwaters (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. *The species is expected to use the Whyalla Saltfields adjacent to the Project area, and therefore, may also occur as a fly-over in the Project area.
<i>Ardea intermedia</i>	Intermediate Egret	R	2001	Unlikely*	The Intermediate Egret ( <i>Egretta intermedia</i> ) is a large wading bird that inhabits wetlands, tidal mudflats and floodplains (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. *The species is expected to use the Whyalla Saltfields adjacent to the Project area, and therefore, may also occur as a fly-over in the Project area.
<i>Biziura lobata</i>	Musk Duck	R	2000	Unlikely*	The Musk Duck ( <i>Biziura lobata</i> ) is a diving duck species that inhabits fresh and brackish deep waterbodies, including wetlands, and lakes (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. *This species could occur within the Whyalla Saltfields where deeper water (>30 cm) is available (Pers Obs). As such, this could enter the Project area when flying-over.
<i>Cladorhynchus leucocephalus</i>	Banded Stilt	V	2016	Unlikely*	The Banded Stilt ( <i>Cladorhynchus leucocephalus</i> ) is a shorebird species that inhabits shallow salt lakes, saltmarshes, tidal mudflats, saltfields, flooded claypans and shallow freshwater lakes and wetlands (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. *The species is expected to occur at the Whyalla Saltfields adjacent to the Project area



Scientific name	Common name	Conservation status	Last sighting (year)	Likelihood of occurrence within Project area	Likelihood rationale
		SA			
					and could enter the Project area when flying-over.
<i>Corcorax melanorhamphos</i>	White-winged Chough	R	2014	Unlikely	The White-winged Chough ( <i>Corcorax melanorhamphos</i> ) is a large passerine that inhabits the edges of eucalypt woodland and mallee remnants (Pizzey and Knight 2014; Pers Obs). As the Project area does not include any eucalypt associations, the species is considered unlikely to occur.
<i>Egretta garzetta</i>	Little Egret	R	2000	Unlikely*	The Little Egret ( <i>Egretta garzetta</i> ) is a large wading bird that inhabits tidal mudflats, saltmarshes, mangroves, freshwater wetlands, sewage ponds and saltfields (Pizzey and Knight 2014; Pers Obs). The species is considered unlikely to occur within the Project area. *The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	R	2016	Unlikely*	The Sooty Oystercatcher ( <i>Haematopus fuliginosus</i> ) is a species of shorebird that primarily inhabits rocky intertidal reefs and on occasion sandspits and tidal mudflats (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. *The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.
<i>Haematopus longirostris</i>	(Australian) Pied Oystercatcher	R	1983	Unlikely*	The (Australian) Pied Oystercatcher ( <i>Haematopus longirostris</i> ) is a species of shorebird that primarily inhabits sandy beaches and tidal mudflats and on occasion rocky reefs (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. *The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	E	2015	Possible	The White-bellied Sea-eagle ( <i>Haliaeetus leucogaster</i> ) is a species of raptor that occurs along the coast. This species very rarely occurs within the upper Spencer Gulf (ALA 2018); however, unpaired individuals may on occasion pass through the Project area.
<i>Limosa limosa</i>	Black-tailed Godwit	R	1982	Unlikely*	The Black-tailed Godwit ( <i>Limosa limosa</i> ) is a shorebird species that inhabits coastal and inland environments including fresh and brackish lakes, beaches, tidal mudflats and

Scientific name	Common name	Conservation status	Last sighting (year)	Likelihood of occurrence within Project area	Likelihood rationale
		SA			
					<p>saltfields (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area.</p> <p>*The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.</p>
<i>Neophema elegans</i>	Elegant Parrot	R	2006	Likely	The Elegant Parrot ( <i>Neophema elegans</i> ) is considered likely to occur in the Project area. Chenopod shrublands dominated by <i>M. pyramidata</i> (Blackbush) and <i>M. sedifolia</i> (Bluebush) and Western Myall woodland are all habitats suitable for the presence of the Elegant Parrot (Pizzey and Knight 2014).
<i>Numenius madagascariensis</i>	Far Eastern Curlew	V	1984	Unlikely*	<p>The Far Eastern Curlew (<i>Numenius madagascariensis</i>) is a shorebird species that inhabits coastal environments including beaches, tidal mudflats and saltfields (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area.</p> <p>*The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.</p>
<i>Numenius phaeopus</i>	Whimbrel	R	1973	Unlikely*	<p>The Whimbrel (<i>Numenius phaeopus</i>) is a shorebird species that inhabits estuaries, mangroves, tidal flats, sewage ponds and saltfields (Purnell <i>et al.</i> 2011; Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area.</p> <p>*The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.</p>
<i>Oxyura australis</i>	Blue-billed Duck	R	2016	Unlikely*	<p>The Blue-billed Duck (<i>Oxyura australis</i>) is a diving duck species that inhabits fresh and brackish deep waterbodies, including wetlands, lakes (Pizzey and Knight 2014). This species could occur within the Whyalla Saltfields where deeper water (&gt;30 cm) is available (Pers Obs). The species is considered unlikely to occur within the Project area.</p> <p>*The species could enter the Project area when flying-over.</p>
<i>Petroica boodang boodang</i>	Scarlet Robin (SE, MLR, FR, EP)	R	2016	Unlikely	The Scarlet Robin ( <i>Petroica boodang boodang</i> ) is a small passerine that inhabits eucalypt woodland and forest associations. As the distribution for the Scarlet Robin occurs outside of the Project area and no eucalypt associations are present (ALA 2018; DEW 2018a), it is unlikely that this species would occur.

Scientific name	Common name	Conservation status	Last sighting (year)	Likelihood of occurrence within Project area	Likelihood rationale
		SA			
<i>Psophodes nigrogularis</i>	Western Whipbird	E	2015	Unlikely	The Western Whipbird ( <i>Psophodes nigrogularis</i> ) is a small to medium sized passerine that is distribution in the southern extent of the Eyre Peninsula and Yorke Peninsula, and the Murray Mallee in South Australia (Pizzey and Knight 2014). As such, the Project area is outside the distribution for this species. Furthermore, the Western Whipbird inhabits dense thickets of heath and mallee (Pizzey and Knight 2014), and therefore, no suitable habitat is present within the Project area.
<i>Sternula nereis nereis</i>	Australian Fairy Tern	E	2017	Unlikely*	The Australian Fairy Tern ( <i>Sternula nereis nereis</i> ) is a coastal bird species that inhabits sheltered waters including bays, inlets and saltfields (Pizzey and Knight 2014). The species is considered unlikely to occur within the Project area. The species is considered unlikely to occur within the Project area. *The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.
<i>Stictonetta naevosa</i>	Freckled Duck	V	2003	Unlikely*	The Freckled Duck ( <i>Stictonetta naevosa</i> ) is a waterfowl species that inhabits fresh and brackish wetlands, lakes, dams and floodwaters (Pizzey and Knight 2014; Pers Obs). The species is considered unlikely to occur within the Project area. *The species is expected to occur at the Whyalla Saltfields adjacent to the Project area and could enter the Project area when flying-over.

**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.

**SE:** South East, **MLR:** Mount Lofty Ranges, **FR:** Flinders Ranges, **EP:** Eyre Peninsula

\* could occur within the Whyalla Saltfields, located directly adjacent to the Project area.

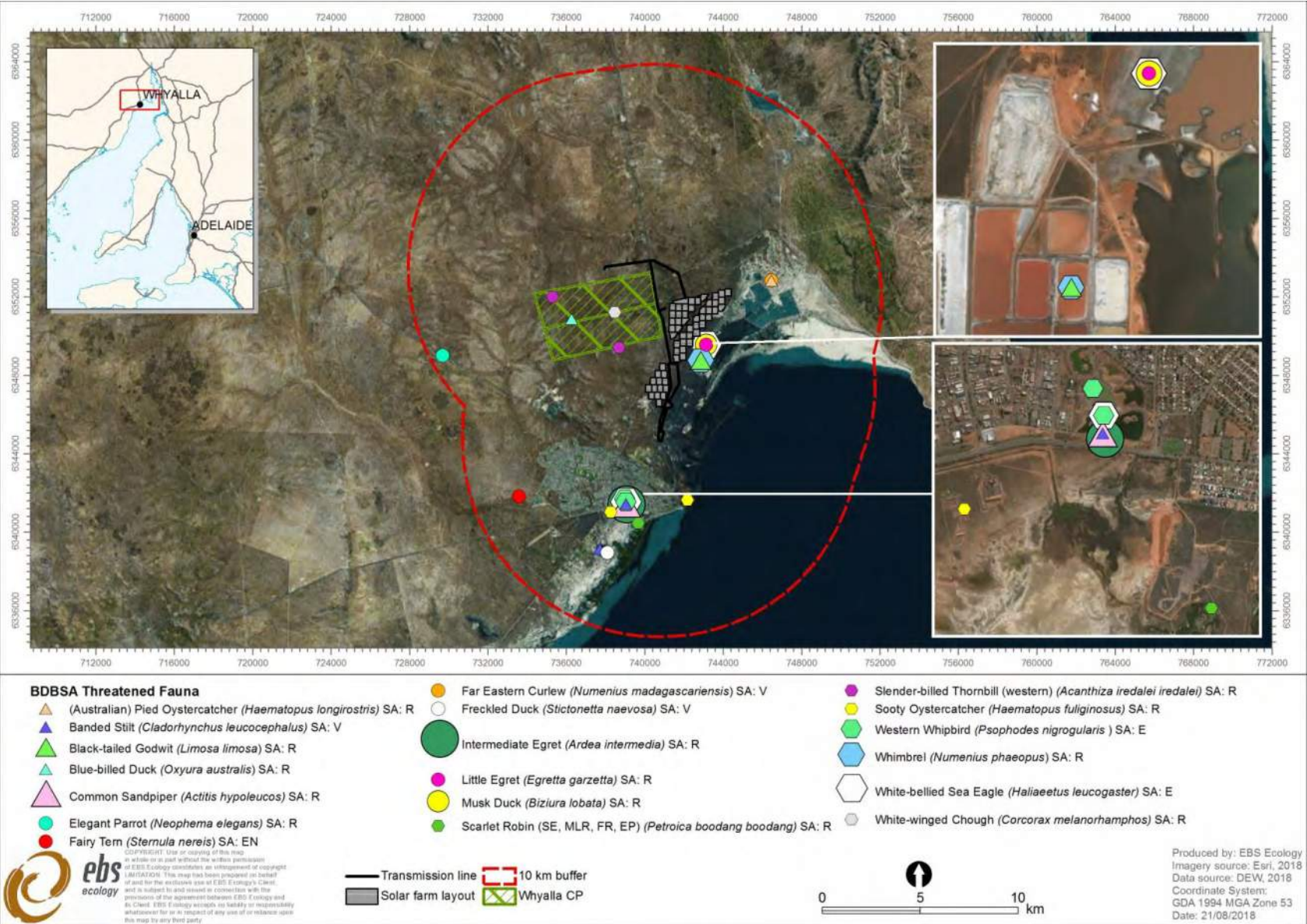


Figure 8. BDBSA records of State threatened fauna within 10km of the Project area (DEW 2018b).



## 5 DISCUSSION

### 5.1 Matters of State Significance

#### 5.1.1 State threatened flora

There were no database records of State threatened flora in the vicinity of the proposed solar photovoltaic farm and associated infrastructure. Two flora species were rated as having a possible likelihood of occurrence. These are described in more detail below.

##### ***Orobranche cernua var. australiana* (Australian Broomrape)**

*Orobranche cernua var. australiana* (Australian Broomrape) is considered possible to occur within the Project area. This species has only been recorded within coastal areas on the Eyre Peninsula (ALA 2018), which may be in response to the availability of sandy substrate (SASCC 2018b). Australian Broomrape also occurs in sand dunes and sandy dry creek beds (SASCC 2018b). As such, this species is not expected to be widespread. In this assessment, records of individuals were found within and south of the Whyalla Township (see Figure 7). A targeted field survey will be required to determine the availability or lack thereof of suitable habitat within the Project area. Australian Broomrape emerges following rainfall events, and therefore, even if the species is undetected following a field survey, it still may be present if conditions are unsuitable for emergence.

##### ***Santalum spicatum* (Sandalwood)**

*Santalum spicatum* (Sandalwood) is considered possible to occur within the Project area. If the species were to occur, it could be widespread as scattered individuals within woodland communities (Kutsche and Lay 2003), i.e. *A. papyrocarpa* woodland. In this assessment, records of individuals were found within the Whyalla Conservation Park (Figure 7). A targeted field survey will be required to determine the availability or lack thereof of suitable habitat within the Project area. Sandalwood is highly conspicuous and therefore, if present, should be detected during a targeted field survey.

#### 5.1.2 State threatened fauna

There were no database records of State threatened fauna in the vicinity of the proposed solar photovoltaic farm and associated infrastructure. The species that were rated as having a possible likelihood of occurrence are described in more detail below.

##### ***Western Slender-billed Thornbill (Acanthiza iredelei iredelei)***

The Western Slender-billed Thornbill is considered likely to occur in the Project area within chenopod shrublands. EBS has regularly detected this species within chenopod shrublands where the dominant species include *Maireana sedifolia*, *Maireana astrosticha* and *Atriplex vesicaria* (G. Oerman, *Pers Obs*). The 364 ha of chenopod shrublands that are proposed to be cleared for this Project (Table 2). This Project in combination with numerous other regional projects will result in substantial clearance of native vegetation that supports the Western Slender-billed Thornbill. As this species is resident, the accumulated loss of habitat may impact their regional population.

***Elegant Parrot (Neophema elegans)***

The Elegant Parrot (*Neophema elegans*) is considered likely to occur in the Project area. EBS has regularly detected this species in surveys between Port Augusta and Whyalla within various habitats, including: *A. papyrocarpa* woodland, *Acacia victoriae* shrubland and chenopod shrubland, where dominant species included *M. sedifolia*, *M. pyramidata* and *A. vesicaria* (*Pers Obs*). Elegant Parrots usually feed on the ground, where they take the seeds of grasses or low-growing shrubs, and they breed in hollow branches of trees. The entire Project area contains suitable habitat for this species. Similar to the Western Slender-billed Thornbill, the regional Elegant Parrot population may be impacted by the extensive clearance of suitable habitat within the region.

***White-bellied Sea-eagle (Haliaeetus leucogaster)***

The White-bellied Sea-eagle (*Haliaeetus leucogaster*) is considered possible to occur in the Project area, as fly-overs by transient and/or dispersing individuals. This species irregularly occurs within the upper Spencer Gulf region as there are no known territories in the upper Spencer Gulf region (Dennis *et al.* 2011). The closest known territory is located near Cowell (Dennis *et al.* 2011), approximately 100 km south-west from the Project area. However, historical nest sites were recorded from 1890-1910 in the upper Spencer Gulf region (Dennis *et al.* 2011). As the Project footprint does not extend to the coastline and White-bellied Sea-eagles do not have important habitat in the upper Spencer Gulf region, the Project is expected to have no adverse impact on the species.

**5.2 Potential impacts on fauna**

The desktop assessment identified thirteen state listed waterbird species that are considered unlikely to occur within the Project area. However, these thirteen species are likely to occur within the Whyalla Saltfields, located adjacent to Project area. Many of these species are therefore likely to occur as a fly-over in the Project area.

Since 2015 there has been an increase in studies investigating the potential effect of solar energy facilities (reviewed in Waltson *et al.* 2015) and solar power plants flux hazards (e.g. Ho *et al.* 2017) on wildlife. A report by Huso *et al.* (2016) identified a potential impact of Solar farms on birds and other wildlife, referred as the 'lake effect'. The 'lake effect' refers to the relative glare of closely positioned solar panels, which have the potential to create an illusion of a water body or 'lake' (Huso *et al.* 2016). Solar collectors/reflectors are typically raised off the ground, and vegetation below them is usually actively managed to varying degrees. High panels and cleared vegetation can result in very high visibility across several independent structures.

The report by Huso and colleagues describes that the illusion of a large 'lake' could cause birds to attempt to land on the solar panels. Waterbirds may be of particular concern, as they may attempt to land upon the solar panels, which could cause birds to become stranded. Huso *et al.* (2016) identified two causes of stranding; the first is caused by injuries sustained from a potential collision with a solar panel being such that the bird is unable to fly, and the second is due to the absence of a waterbody enabling large waterbirds to reach a sufficient velocity for take-off, which would usually be reached by running over the water's surface (Huso *et al.* 2016). Stranded birds are at a higher risk of predation and heat exhaustion (Huso *et al.* 2016).

The Solar panels that will be utilized for the proposed Cultana Solar Farm are Q.PEAK L-G5.2 370W solar modules with each module treated with anti-reflection technology. Consequently, all modules are equal with respect to reflectivity.

Studies on effect of solar energy facilities on wildlife have been undertaken in the United States (e.g. Walston *et al* 2015, Walston *et al* 2016) and in South Africa (Visser 2016). To EBS's knowledge, there are no published studies to date that have directly addressed the methodology needed to accurately estimate mortality of birds and bats at Australian solar facilities. The degree of reflection at the proposed Cultana Solar Farm and the associated potential impacts of reflection on waterbirds are therefore currently unknown. However, there is a possibility that the proposed solar photovoltaic farm and associated infrastructure may impact fauna and in particular waterbirds that use the adjacent the Whyalla Saltfields, located within 500 m of the proposed solar farm. The Whyalla Saltfields are known to be one of the most important waterbird sites within the upper Spencer Gulf, as well as an area of international importance for shorebird species (Watkins 1993). Bird species, such as waterfowl fly often fly at night during long-term movements (Dirksen *et al.* 1998), and as such they are may be particularly prone to the potential risks of the lake effect.

## 6 RECOMMENDATIONS

### 6.1 Vegetation assessment

In order to meet the requirements of the *Native Vegetation Regulations 2017*, a Bushland Assessment should be performed in accordance with the Bushland Assessment Method (BAM) devised by the NVC (NVC 2017). The Bushland Assessment will be required over the Project footprint to determine a Significant Environmental Benefit score for the Project (DEW 2017).

The BAM involves determining and mapping the extent of each vegetation association within the Project footprint, and scoring its condition. Bushland Assessment sites should be established within each of the different vegetation associations that occur within the area proposed for clearance.

At each BAM site, scores for three parameters (vegetation condition, conservation value and landscape context) are to be measured. These three component scores are combined to provide a 'Unit Biodiversity Score' (per ha) and then multiplied by the size (hectares) of the Project footprint to provide a 'Total Biodiversity Score' for the site. This score is used to calculate a SEB area and the associated SEB value for payment in to the Native Vegetation Fund derived from the clearance of native vegetation within the Project footprint (NVC, 2017).

### 6.2 Potential impact of solar farms on fauna

As discussed in Section 5.2 the potential impacts on fauna caused by reflection of solar panels is generally poorly understood and to EBS's knowledge there are no published studies on fauna impacts at Australian solar farms. EBS therefore recommends that a monitoring program should be established at the Cultana Solar Farm, for example via a Masters scholarship to Flinders University or University of SA. Wildlife monitoring programs at photovoltaic solar energy facility have been undertaken in South Africa (Visser, 2016) and studies like these could inform the development of a monitoring program at the proposed Cultana Solar Farm.

A Monitoring program at the proposed Cultana Solar Farm would provide a general understanding of the numbers and species of birds and bats impacted (e.g. injured/killed) by the facility over a defined period, for example a year or a season and comparing night versus day. Data collected during such a program could potentially identify high-risk species, improve project design, and develop adaptive management strategies to reduce impacts. Monitoring will not only increase our understanding of the potential impacts of solar farms in South Australia, but will also contribute to the worldwide knowledge of potential impacts of clean energy solutions on wildlife.



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**APPENDIX F**

**Aboriginal Heritage Risk  
Assessment**



2018

**IHC**

Independent Heritage Consultants



Cultana Solar Farm

# Aboriginal Heritage Assessment

<b>Place</b>	Cultana Solar Farm, South Australia
<b>Report Description</b>	Aboriginal Heritage Assessment
<b>Issue Date</b>	August 2018
<b>Author(s)</b>	Steve Damhuis, Guadalupe Cincunegui
<b>Version</b>	Final
<b>Associates</b>	N/A
<b>Client</b>	Golder
<b>Disclaimer</b>	This report expresses the professional opinion of the authors based on the information cited and presented in this report.
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<b>Citation</b>	<i>IHC 2018. <b>Cultana Solar Farm Aboriginal Heritage Assessment</b>. Report prepared by IHC for Golder Pty Ltd. Adelaide, South Australia.</i>

**Abbreviations**

<b>Term</b>	<b>Meaning</b>
AHA	South Australian <i>Aboriginal Heritage Act 1988</i> (amended 2016)
ACHM	Australian Cultural Heritage Management SA Pty Ltd
DPC-AAR	Department of Premier and Cabinet – Aboriginal Affairs and Reconciliation
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
IHC	Independent Heritage Consultants
NTA	<i>Native Title Act 1993</i>
SAM	South Australian Museum

## EXECUTIVE SUMMARY

Independent Heritage Consultants (IHC) has been engaged by Golder Pty Ltd (Golder) to carry out a desktop Aboriginal heritage assessment for the Cultana Solar Farm, located near Whyalla on the Eyre Peninsula, South Australia.

This report includes an overview of the archaeological context of the project area, which establishes the types of archaeological sites that may be encountered during ground disturbance and informs the risk assessment. The report also includes the results of heritage register searches, including the Department of State Development – Aboriginal Affairs and Reconciliation Site Register and a review of previous ground disturbance levels, and provides a risk assessment based on a review of the above information. Recommendations in light of this assessment and the relevant heritage legislation are also included.

As a result of this assessment, IHC has highlighted that the project the project areas do not display the required landforms, nor are they subjected to the long term site formation processes required to contain sub-surface archaeological deposits. Furthermore, no known Aboriginal sites have been identified within 500 m of the project areas. Regardless, the project areas are close to the coastline where we can expect archaeological evidence of camping sites in the low lying coastal dunes and sandy areas. This reflects what would have been a relatively intense occupation of the general area to harness the coastal resources.

Based on this review, IHC believe that there is a **medium** risk for in situ sub-surface archaeological material to be encountered during the planned works.

Based on the background desktop review IHC provide the following recommendations to best manage heritage risk for this project;

- a) An archaeological site inspection to further refine the risk assessment and inform future heritage management.
- b) It is unlikely that the planned works will disturb ethnographic sites, given the project areas are flat featureless and lack the environmental landforms typically associated with such sites. The best way to mitigate against inadvertently impacting an ethnographic site is to consult with the relevant Aboriginal group.

If the above is not undertaken, although not as effective, as a minimum approach the following can be used to lessen heritage risk for this project;

- c) mitigate project risk by implementing a site discovery procedure for any unexpected finds (see Appendix 1).



- d) manage heritage risk during construction by ensuring all contractors and workers are aware of heritage risks and how to manage them accordingly (site inductions, discovery protocols, take 5 etc.)
- e) engage an archaeologist on call to assist in identifying any heritage items found by site works

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# 1 INTRODUCTION

Independent Heritage Consultants (IHC) has been engaged by Golder to carry out a desktop Aboriginal heritage risk assessment for a proposed Cultana Solar Farm on the Eyre Peninsula, South Australia (SA) (Map 1).

This report provides an overview of the archaeological context of the project area, which includes a history of Aboriginal occupation and also historical and modern land use. This establishes the type and likelihood of archaeological sites being encountered during ground disturbance and informs the risk assessment. The report also includes the results of heritage register searches, including the Department of State Development – Aboriginal Affairs and Reconciliation (DSD-AAR) Site Register. A risk assessment based on a review of the obtained information and the proposed work program is provided. Recommendations in light of this assessment, and the relevant heritage legislation, are also included. Along with confirmation of the relevant Aboriginal stakeholder group and group contact.

This assessment has been written with the available project information (May 2018) to fulfil the project's requirements to identify sites of significance before the detailed design phase, so they can be avoided or appropriately managed.

## 1.1 Objectives

The specific objectives of this cultural heritage assessment are as follows:

- Review of Aboriginal background information for the project area
- An overview of the archaeological context for the project area
- Carry out relevant heritage register searches
- Identify and review the relevant heritage legislation
- Confirm the Aboriginal stakeholder group and group contact
- Undertake a risk assessment for the proposed development
- Provide clear recommendations for the management of heritage to ensure project compliance with governing legislation

## 2 PROJECT

The following project description is derived from preliminary information provided by Golder for the proposed Cultana Solar Farm.

### 2.1 Project Description

IHC understands that Golder requires a desktop Aboriginal heritage risk assessment for a proposed Cultana Solar Farm, located on the Eyre Peninsula, SA. The risk assessment will facilitate the development of appropriate heritage management measures for the construction works.

The large-scale solar photovoltaic farm being proposed by SIMEC ZEN Energy are:

- North Site: the 210 MW Solar Farm, located approximately 6 km north of Whyalla and requiring a 7 km transmission line to connect to Electranet's 275 kV Cultana Substation, and
- South Site: the 70 MW Solar Farm, located directly west of the Whyalla Steelworks, which will connect to SAPN's 33kV Whyalla Terminal Substation, or to the Cultana Solar Farm by an overhead line.

The proposed works at the Cultana Solar Farm will involve the installation of mounting structures, solar modules and associated infrastructure, including maintenance and storage buildings, substations, switch rooms, car parks and temporary laydown areas. Presumably ground clearance and some excavation will be required during the construction of infrastructure. Excavation to a depth of 3 m has been proposed for the solar module mounting structures. But this is yet to be confirmed.

### 2.2 Project Areas

The project areas are set back marginally from the sheltered eastern Gulf Coast of Eyre Peninsula. This side of the peninsula has a subdued morphological character in comparison to the west coast, due to restrictions on ocean swell, much calmer wind and wave action and greater tidal activity. This has resulted in the development of less sand dunes on the east coast in comparison to the west coast where modern and aeolianite (lithified dunes) are widespread and have eroded into spectacular high cliffs (Bourman et al. 2016).

Tidal processes dominate the coastline north of Whyalla which is characterised by thick seagrass meadows, wide intertidal sand flats, mangrove woodlands and supratidal saline marshland (Bourman et al. 2016).



The beaches at Whyalla are enclosed by seawall structures. Beyond the seawalls, mangrove woodland is interspersed with small sandy beaches, sand spits, ridges and tidal creeks which fringe the coast. Further inland an extensive supratidal flat is underlain by terrestrial red/brown alluvium of the last interglacial Pooraka Formation and shelly sand (Bourman et al. 2016).

### **2.3 Project Area Background**

Early European settlers recorded their observations of Aboriginal people on the Eyre Peninsula. Among them was Pastor Clamor Schürmann, who documented the following comments in his book titled, *The Aboriginal Tribes of Port Lincoln*, in 1897:

The Aborigines inhabiting the Peninsula of Port Lincoln are divided into several tribes, with two of whom the European settlers are in daily contact, namely, the Nauo and Parnkalla (Barngarla) tribes. Besides these, three other tribes are mentioned by the natives as known to them: the Nukunnus in the north-east, the Kukatas (Kokatha) in the north-west, and the Ngannityiddis in the north (Schürmann 1897:248).

On language, Schürmann (1897:249-250) documented the following:

The Parnkalla dialect, with which I have made myself principally acquainted, is spoken by this tribe of the same name, inhabiting the eastern coast of this peninsula from Port Lincoln northward probably as far as the head of Spencer's Gulf. The Nauo is spoken in the southern and western parts of this district, and seems to deviate from the Parnkalla by a broader and harsher pronunciation and different inflexions of terminations of the words, verbs as well as nouns; many words, are totally different.

Early ethnographic data suggests that there was a situation of territorial flexibility prior to European settlement on the Eyre Peninsula. Berndt (1985:127-128) asserted, in contrast to Tindale's insistence on normally clear cut tribal boundaries that speakers of Western Desert languages were advancing into the territories of other Eyre Peninsula tribes, such as the Barngarla and Nauo. This was attributed to environmental pressures, including extended severe drought around the beginning of the 19<sup>th</sup> Century. This affected the ability of the central desert people to find adequate water and food resources and placed demographic pressure on groups closer to the coast as they adapted and roamed in response to the dearth in resources.

This demographic stress was further encouraged by European colonisation. The arrival of European settlers and the spread of pastoralism in the region had a profound impact on Aboriginal people, bringing conflict and disease. Although it is likely the Barngarla population was decimated by two small pox

epidemics before SA was officially established as a colony. It is believed that the disease travelled westwards from New South Wales after 1800 and again around 1820, along the densely populated river systems, including the River Murray (Curr 1886-7). Disease may have also spread through sealers and whalers who were reportedly living on islands and travelling from as far as from Kangaroo Island to the region in search of 'wives' (Hill 1967).

Gradually the Barngarla were displaced from their traditional lands, resulting in conflict, with atrocities committed on both sides. Naturally the lands favoured by pastoralists and best suited to cultivation or grazing, were also favoured by the Aboriginal people themselves (Walshe and Bonell 2005).

There are also accounts of good relations between the settlers and Aboriginal people, such as the provision of rations and the employment of Aboriginal workers on pastoral runs, whose knowledge of the country made the early period of European pastoral settlement possible (Bell 1998). During seasonal breaks in the pastoral work many returned to the bush to hunt, visit family or participate in initiations and other ceremonies (Gara 1989).

Ration depots were setup in Port Lincoln, Port Augusta and Iron Knob, encouraging a concentration of displaced Aboriginal people at these locations during the 1800's (Walshe and Bonell 2005).

## **2.4 Archaeological Context**

A number of assessments have been carried out in the greater region and provide an archaeological context and record for the types of heritage sites recorded in the region.

### **2.4.1 Gara 1982**

Gara was engaged to assess the impact of a proposed transmission line between Port Augusta and Whyalla on Aboriginal archaeological sites. The development proposal included the construction of a substation at Cultana, a 275kV transmission line from the Davenport Substation to the Cultana Substation and a 132kV transmission line to the Whyalla Substation.

During a combined pedestrian/vehicular inspection of the proposed alignment and substation locations, the survey participants stopped at areas considered likely to contain Aboriginal archaeological materials, such as, sandy areas, creek banks, hills and other natural features in the landscape.

Three Aboriginal sites were located during the survey, consisting of stone artefact scatters and stone arrangements. They were located on a sandy ridge, along creek banks and in sand dunes.

Gara notes in his report that urban, industrial and pastoral developments over the last 150 years have obliterated many of the sites that stood as a record of the Aboriginal occupation of this State.

#### **2.4.2 Australian Cultural Heritage Management 2005**

Australian Cultural Heritage Management (ACHM) carried out a desktop heritage assessment for the Whyalla-Port Lincoln Transmission Line upgrade project alignment (including Whyalla Substation). No previously recorded Aboriginal sites were identified within 100 m of the transmission line route. One anthropological site was mentioned, the Mount Laura Myth Site (DSD-AAR 6432-5675), as being outside of the 100 m search area, but within the vicinity of the alignment.

ACHM put forward some principles of association between Aboriginal sites and environmental features as a general guide to where Aboriginal sites may be located within the landscape. The features listed were sand dunes, water sources, clay pans, cane grass swamps, drainage channels with quartzite bedrock and rock shelters with quartzite pavements. Gibber plains were identified as containing few sites, although the density of sites increases where dunes are located on the plain. Outcrops of quartzite, sandstone and silcrete, along with mesa tablelands were said to be often associated with stone quarries.

#### **2.4.3 ACHM 2009**

This 2009 ACHM report commented on the relatively sparse archaeological and anthropological record for the Wudinna Substation project area region. It highlights that Aboriginal sites on the central Eyre Peninsula are usually found near water-holes, rockshelters and prominent hills, and that the sites usually consist of camping grounds, rock art sites and mythological associations. ACHM also make the point in this report that the area surrounding the Wudinna project site is flat, featureless and presumably previously disturbed and therefore has a low risk of works encountering archaeological or anthropological sites. The current Whyalla and Cultana project areas also appear to be flat and featureless and so the same can be assumed, considering that the Wudinna project area (although a considerable distance to the west) also falls within the traditional lands of the Barngarla.

### **2.5 Discussion**

The previous work discussed above has provided an indication of where to expect Aboriginal sites and expected site types. Associations between specific landforms and Aboriginal sites were highlighted. The effects of historical disturbances on Aboriginal sites over the last 150 years was also discussed, with many having been destroyed.

Considering that the Cultana Solar Farm project sites appear to be flat and featureless and devoid of any marked landscape features commonly associated with Aboriginal sites, together with obvious signs of historical disturbances which are known to have removed many archaeological sites across the State, it is unlikely that any Aboriginal sites exist within the current project areas.

### 3 COMPLIANCE AND LEGISLATIVE SUMMARY

The principal pieces of legislation relevant to the current heritage assessment are summarised below.

#### 3.1 Aboriginal Heritage Act 1988 (amended 2016)

The SA *Aboriginal Heritage Act 1988* (amended 2016) (AHA) is administered by the Department of State Development, Aboriginal Affairs and Reconciliation (DSD-AAR). Any Aboriginal site, object or remains whether previously recorded or not is covered under the blanket protection of this Act. The AHA provides the following definition of an Aboriginal site in section 3:

*“Aboriginal site” means an area of lands;*

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

Under section 23 of the AHA it is an offence to damage, or interfere with an Aboriginal site, objects or remains unless written authorisation from the Minister for Aboriginal Affairs and Reconciliation has been obtained. Penalties for an offence under this section are up to \$10,000 or six months imprisonment in the case of an individual and \$50,000 in the case of a corporate body.

In 2016, the Minister for Aboriginal Affairs and Reconciliation introduced changes to the AHA to make the Act more inclusive of Aboriginal people in decision making about Aboriginal heritage in the State.

The changes introduce an agreement making process that allows land use proponents and Recognised Aboriginal Representative Bodies (RARB) to agree on the direct management of Aboriginal heritage. Regulations and guidelines have been developed to provide detail and assistance with Act compliance (Department of State Development 2018).

There is currently no RARB for the project area and so the original section 23 process will apply if Aboriginal sites are identified and cannot be avoided during development.

#### 3.2 Native Title Act 1993

The Commonwealth *Native Title Act 1993* (NTA) is part of the Commonwealth’s response to the High Court’s decision in *Mabo v Queensland* (No.2) and adopts the common law definition of native title, defined as the rights and interests that are possessed under the traditional laws and customs of Aboriginal people in land and waters.

The NTA recognises the existence of Aboriginal land ownership tradition where connections to country have been maintained and where acts of government have not extinguished this connection.

Native title can co-exist with other types of land title (such as pastoral leases), but is extinguished by others (such as freehold title).

The future act process provides native title holders and registered native title applicants with specific rights from the time the claim is registered, until it is determined. These rights vary from the right to be consulted, to the right to negotiate over some future acts, or activities on the land.

### **3.3 Aboriginal and Torres Strait Islander Heritage Protection Act 1984**

The Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* provides a mechanism for the Commonwealth Minister for Environment to make declarations regarding the protection of an Aboriginal area when the Minister is not satisfied that under State or Territory Law there is effective protection of the area from a threat of injury or desecration. Declarations made under this Act involve restricting activities and/or access to an Aboriginal site.

Under section 21H of the *Aboriginal and Torres Strait Islander Protection Act 1984* it is an offence to conduct behaviour or partake in an action that contravenes a declaration made by the Minister. Penalties under this section are \$10,000 or imprisonment for 5 years, or both for an individual, or \$50,000 for a corporate body where an Aboriginal place is concerned and \$5,000 and imprisonment for 2 years or both for an individual, or \$25,000 for a corporate body where an Aboriginal object is concerned.

If the requirements of the AHA are adhered to and sufficiently protect any Aboriginal heritage in the eyes of the Federal Minister, the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* will not be relevant within the project area.

### **3.4 Environment Protection & Biodiversity Conservation Act 1999 (amended 2003)**

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects places of national cultural and environmental significance from damage and interference by establishing a National Heritage list (for places outside of Commonwealth land) and a Commonwealth Heritage List (for places within Commonwealth land). Under the EPBC Act any action that has, will have, or is likely to have a significant impact on a place of national cultural and/or environmental significance must be referred to the Minister for the Environment for approval. The EPBC Act sets out a procedure for obtaining approval, which may include the need to prepare an environmental impact statement for the proposed action (an action is defined in section 523 to include a project, development or undertaking or an activity or series of activities).

The EPBC Act is only relevant in relation to Aboriginal heritage sites if the site is entered onto the National Heritage List or the Register of the National Estate. If not, there is no current referral process required to



the Commonwealth Department for Environment under the EPBC Act and this Act has little relevance for an Aboriginal site that may be in the project area.

## 4 HERITAGE REGISTER SEARCHES

### 4.1 DPC-AAR Register Search

The Central Archive is maintained by DPC-AAR and includes the Register of Aboriginal Sites and Objects. The Central Archive is a record of previously recorded heritage sites in SA and can be used to identify previously reported sites in new project areas. It should be noted that the Central Archive is not an exhaustive list of all Aboriginal sites, but a record of sites that have been reported and/or registered.

A request for a search of the DPC-AAR Register for known sites within 500 m of the proposed works zone area was made by IHC on the 21<sup>st</sup> May 2018. IHC was subsequently advised that the Register of Aboriginal Sites and Objects has no entries for Aboriginal sites within 500 m of the project area.

### 4.2 Relevant Group Contact

IHC was advised by DPC-AAR that the relevant Aboriginal group contact for the project area is:

#### **Barnjarla Determination Aboriginal Corporation**

**Address:** c/ - Norman Waterhouse, Level 15, 45 Pirie Street, Adelaide, SA 5000

**Telephone:** (08) 8210 1200

**Email:** [normans@normans.com.au](mailto:normans@normans.com.au)

### 4.3 SA Museum Database

The South Australian Museum (SAM) database is an inventory of Aboriginal cultural material and skeletal remains held by the South Australian Museum. A search of the database using key words revealed 25 entries for the Whyalla region. These entries highlight the potential for works to encounter buried cultural remains in undisturbed soil deposits. More broadly, the database search establishes previous cultural activity near the project area and the potential for sub-surface cultural material and remains to be unearthed in intact soil deposits during earthworks. It should be noted that the SAM database is not a complete list of Aboriginal sites for a given area and that most of the collection represents cultural material turned over to the Museum when dug up during earthworks. The records are therefore without archaeological context and often incomplete, with minimal details and frequently very approximate or general references to material provenance. As such, they should only be considered a guide to the types of materials likely to be found in a general region.

## 5 HERITAGE RISK ASSESSMENT

To assess the likelihood of the project areas yielding sub-surface cultural material, a number of factors have been considered. These include the;

- Archaeological context
- Historical and modern impacts
- Landform type/soil
- Proposed works

### 5.1 Archaeological Context

The background research above has highlighted that Aboriginal archaeological sites and objects on the Barngarla traditional lands are found in association with rock outcrops, sandy areas, hills, clay pans, cane grass swamps, waterways and other geological formations. However, the desktop investigation suggests that it is unlikely that these landform features are common within the project areas. Also, the project areas do not display the required landforms, nor are they subjected to the long term site formation processes required to contain sub-surface archaeological deposits. Furthermore, no known Aboriginal sites have been identified within 500 m of the project areas. Regardless, the project areas are close to the coastline where we can expect archaeological evidence of camping sites in the low lying coastal dunes and sandy areas. This reflects what would have been a relatively intense occupation of the general area to harness the coastal resources (for examples see Lourandos 2010, Bowdler 1977).

### 5.2 Historical Impacts/Soil Profile

The project areas are located on flat featureless ground comprised of red/brown alluvium and shelly sand with interspersed salt bush and blue bush. Sandy exposures appear limited to areas of disturbance and de-vegetation. Signs of modern ground surface disturbance are evident from industry, farming practices and recreational pursuits (off road motorbike/vehicle tracks etc.).

### 5.3 Proposed Works

Ground disturbance from the proposed works will consist of ground clearance and some excavation for infrastructure installation to a tentative depth of 3 m.

## 5.4 Risk Profile Categories

After consideration of the archaeological context, the planned works, the historical impacts, and landform/soil profile in relation to the project areas, levels of risk have been assigned indicating the likelihood of encountering Aboriginal sites or objects during the proposed works.

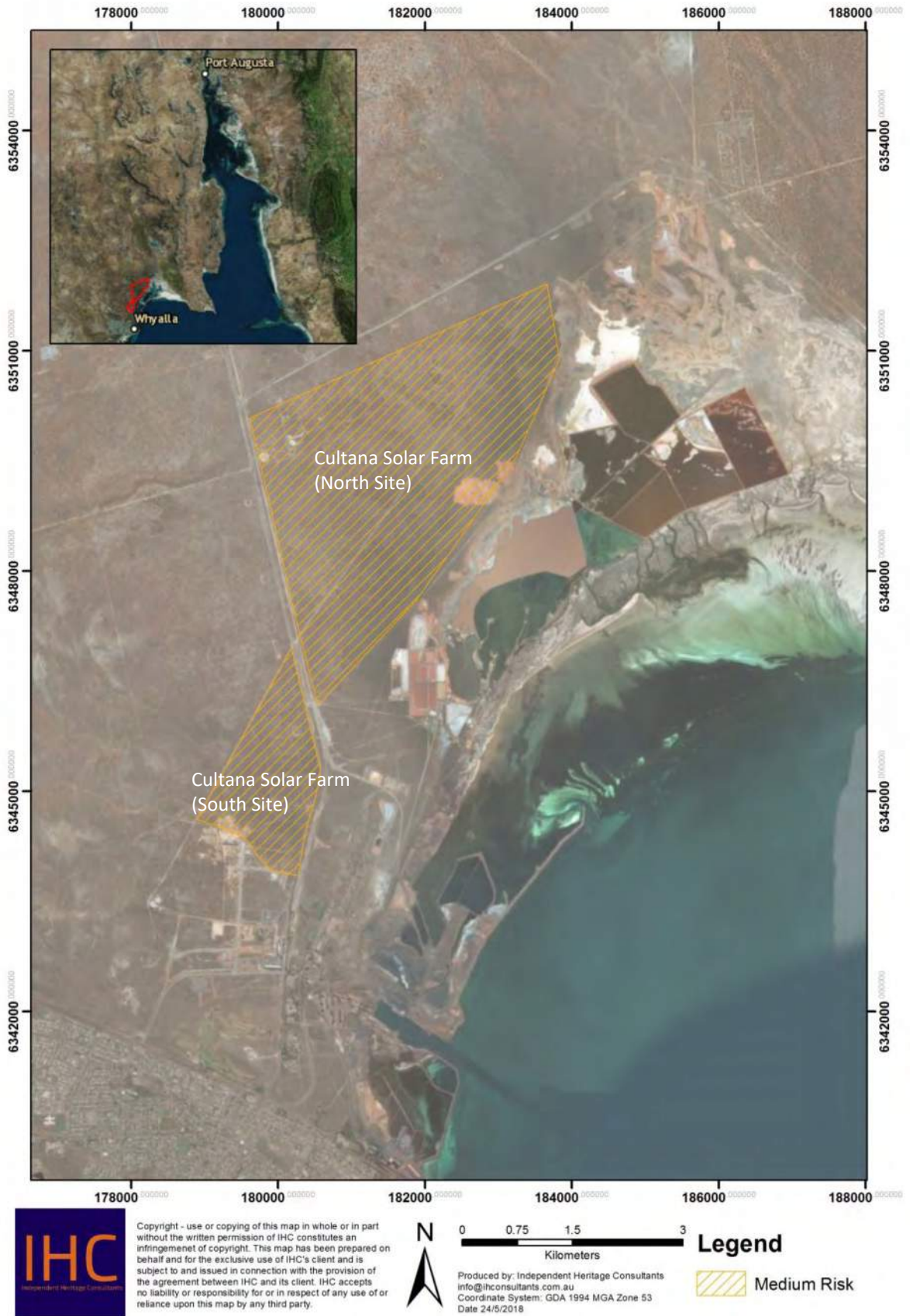
The level of risk is categorised as high, moderate, or low, and while the factors above have been taken into account during the risk assessment, the following risk matrix illustrates in a simplified way on how each level of risk is determined.

Table 1. Risk Matrix

Landform	Activity Risk		
	Low	Medium	High
<b>Low</b> Low Risk Landforms	Very Low Risk	Low Risk	Medium Risk
<b>Medium</b> Medium Risk Landforms	Low Risk	Medium Risk	High Risk
<b>High</b> High Risk Landform	Medium Risk	High Risk	Very High Risk

## 5.5 Assessed Project Risk Profile

The project areas themselves are not considered high risk heritage locations, however they are close to the marine resource rich coastline, low lying coastal dunes and sandy areas, known to be favoured camping locations for Aboriginal people. Based on this, a relatively intense Aboriginal occupation of the general area can be inferred. Therefore, IHC has determined that there is a 'medium' risk of impacting heritage site during the planned works. This risk rating could be refined through a site inspection.



Map 1. Heritage Risk Assessment



## 6 SUMMARY AND RECOMMENDATIONS

IHC has been engaged by Golder to carry out a desktop Aboriginal heritage assessment for the Cultana Solar Farm on the Eyre Peninsula, SA.

As a result of this assessment, IHC has highlighted that the project areas do not display the required landforms, nor are they subjected to the long term site formation processes required to contain sub-surface archaeological deposits. Furthermore, no known Aboriginal sites have been identified within 500 m of the project areas. Regardless, the project areas are close to the coastline where we can expect archaeological evidence of camping sites in the low lying coastal dunes and sandy areas. This reflects what would have been a relatively intense occupation of the general area to harness the coastal resources.

Based on this review, IHC believe that there is a **medium** risk for in situ sub-surface archaeological material to be encountered during the planned works.

Based on the background desktop review IHC provide the following recommendations to best manage heritage risk for this project;

- f) An archaeological site inspection to further refine the risk assessment and inform future heritage management.
- g) It is unlikely that the planned works will disturb ethnographic sites, given the project areas are flat featureless and lack the environmental landforms typically associated with such sites. The best way to mitigate against inadvertently impacting an ethnographic site is to consult with the relevant Aboriginal group.

If the above is not undertaken, although not as effective, as a minimum approach the following can be used to lessen heritage risk for this project;

- h) mitigate project risk by implementing a site discovery procedure for any unexpected finds (see Appendix 1).
- i) manage heritage risk during construction by ensuring all contractors and workers are aware of heritage risks and how to manage them accordingly (site inductions, discovery protocols, take 5 etc.).
- j) engage an archaeologist on call to assist in identifying any heritage items found by site works

## 7 REFERENCES

Aboriginal Heritage Act 1998 (South Australia).

Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth).

ACHM 2005 Heritage Desktop Research for the Proposed Whyalla- Port Lincoln Transmission Line Upgrade Works, Eyre Peninsula, SA. Unpublished report prepared for ElectraNet.

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Berndt, R. 1985, 'Traditional Aborigines' in Twidale, Tyler and Davies (eds.) *Natural History of Eyre Peninsula*, Royal Society of South Australia.

Bourman, R., Murray-Wallace, C. and N. Harvey 2016 *Coastal Landscaped of South Australia*. University of Adelaide Press, Adelaide.

Bowdler, S. 1977. The coastal colonization of Australia. In J. Allen et.al. (eds), *Sunda and Sahul: prehistoric studies in South East Asia, Melanesia and Australia*. London: Academic Press, 205-246.

Department of State Development 2018. Aboriginal Heritage Regulations and Guidelines. Government of South Australia Website.

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Gara, T. 1982 Archaeological Survey of the Proposed Route of the Port Augusta to Whyalla Transmission Line. Unpublished report prepared for the Electricity Trust of South Australia.

Gorring, D. 2017 Lincoln Gap Wind Farm Heritage Clearance Report. Unpublished report prepared for the Barnjarla Aboriginal Corporation.

Lourandos, H. 2010. Change or stability? Hydraulics, hunter gatherers and population in temperate Australia. *World Archaeology*, Vol 11, 1980, Issue 3: Water Management.

Native Title Act 1993 (Commonwealth)

Tindale, N.B. 1974 *Aboriginal tribes of Australia; their terrain, environmental controls, distribution, limits and proper names*. Canberra.

Schürmann, C.W. 1897. *The Aboriginal tribes of Port Lincoln in South Australia: their mode of life, manners, customs etc*. Adelaide: George Dehane 1846.

## 8 APPENDIX – SITE DISCOVERY PROCEDURE

### Aboriginal Heritage Stop Work Procedure

**Have you found a site, object or skeletal remains that may be Aboriginal Heritage?**

(see examples over page)

# STOP

**All works in vicinity**

Do not disturb/remove or touch the site, object or skeletal remains. It is an offence to disturb or interfere with Aboriginal heritage or skeletal remains (SA Aboriginal Heritage Act 1988).

# Protect

**Restrict Access.**

- Location in relation to site works (GPS)
- Identify any immediate threats to heritage e.g. construction activities, vandalism, water level
- Do not proceed with any works (or move or touch objects) until advice has been sought from archaeologists.

# Notify

**Notify Site Supervisor Immediately.**

- Site supervisor to notify client representative
- Archaeologists
- Aboriginal representatives
- Aboriginal Affairs and Reconciliation

# Manage

**Area managed appropriate with appropriate guidance from**

- Archaeologists
- Aboriginal representatives
- Aboriginal Affairs and Reconciliation
- The Police

# Resume

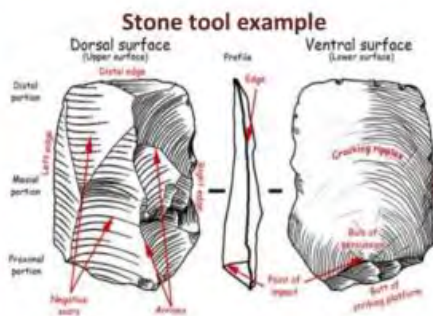
**Site manager to advise when works can resume**

The decision to resume works is made in consultation with the archaeologists and Aboriginal representatives. There may be conditions that need to be followed in order to work to resume.

Independent Heritage Consultants  
E: [info@ihconsultants.com.au](mailto:info@ihconsultants.com.au)  
P: 0451 364 567

## Aboriginal Heritage Stop Work Procedure

Please contact IHC archaeologists on 0451 364 567 if you need specialist heritage advice in identifying any unexpected finds.



Stone Tools



Shell Middens/Skeletal Remains



Burials/ Hearths/Stone Tool Types

Independent Heritage Consultants  
E: [info@ihconsultants.com.au](mailto:info@ihconsultants.com.au)  
P: 0451 364 567



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*PO Box 60 Unley*  
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[www.ihconsultants.com.au](http://www.ihconsultants.com.au)



**APPENDIX G**

# ForgeSolar Glare Analysis

# FORGESOLAR GLARE ANALYSIS

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Project: **Cultana Solar Farm**

Site configuration: **Cultana**

Analysis conducted by Hannah Keynes (hkeynes@golder.com.au) at 22:46 on 18 Oct, 2018.

## U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
Flight path(s)	PASS	Flight path receptor(s) do not receive yellow glare
ATCT(s)	PASS	Receptor(s) marked as ATCT do not receive glare

Default glare analysis and observer eye characteristics are as follows:

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at <https://www.federalregister.gov/d/2013-24729>

# SITE CONFIGURATION

## Analysis Parameters

DNI: peaks at 1,000.0 W/m<sup>2</sup>  
 Time interval: 1 min  
 Ocular transmission coefficient: 0.5  
 Pupil diameter: 0.002 m  
 Eye focal length: 0.017 m  
 Sun subtended angle: 9.3 mrad  
 Site Config ID: 18415.2960



## PV Array(s)

**Name:** North 1  
**Axis tracking:** Single-axis rotation  
**Tracking axis orientation:** 0.0°  
**Tracking axis tilt:** 0.0°  
**Tracking axis panel offset:** 0.0°  
**Max tracking angle:** 60.0°  
**Resting angle:** 60.0°  
**Rated power:** 0.36 kW  
**Panel material:** Smooth glass with AR coating  
**Reflectivity:** Vary with sun  
**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-32.946464	137.580028	18.32	4.00	22.32
2	-32.962236	137.582260	19.36	4.00	23.36
3	-32.962236	137.583805	17.31	4.00	21.31
4	-32.941349	137.602344	12.05	4.00	16.05

**Name:** North 2

**Axis tracking:** Single-axis rotation

**Tracking axis orientation:** 0.0°

**Tracking axis tilt:** 0.0°

**Tracking axis panel offset:** 0.0°

**Max tracking angle:** 60.0°

**Resting angle:** 60.0°

**Rated power:** 0.36 kW

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-32.940905	137.604404	11.32	4.00	15.32
2	-32.938240	137.614876	7.68	4.00	11.68
3	-32.940257	137.612816	7.59	4.00	11.59
4	-32.946739	137.610670	7.77	4.00	11.77
5	-32.959487	137.598740	9.46	4.00	13.46
6	-32.959055	137.596765	9.16	4.00	13.16
7	-32.974537	137.589556	11.03	4.00	15.03
8	-32.974682	137.584835	17.41	4.00	21.41
9	-32.964024	137.583290	18.33	4.00	22.33

**Name:** South

**Axis tracking:** Single-axis rotation

**Tracking axis orientation:** 0.0°

**Tracking axis tilt:** 0.0°

**Tracking axis panel offset:** 0.0°

**Max tracking angle:** 60.0°

**Resting angle:** 60.0°

**Rated power:** 0.36 kW

**Panel material:** Smooth glass with AR coating

**Reflectivity:** Vary with sun

**Slope error:** correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
1	-32.992515	137.570764	26.65	4.00	30.65
2	-32.993451	137.578060	17.69	4.00	21.69
3	-32.984236	137.581579	21.08	4.00	25.08
4	-32.972788	137.578661	22.05	4.00	26.05
5	-32.972860	137.576258	24.35	4.00	28.35
6	-32.987188	137.566902	30.39	4.00	34.39

## Flight Path Receptor(s)

**Name:** FP 1

**Description:**

**Threshold height:** 15 m

**Direction:** 54.0°

**Glide slope:** 3.0°

**Pilot view restricted?** Yes

**Vertical view:** 30.0°

**Azimuthal view:** 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
Threshold	-33.058796	137.506687	13.60	15.24	28.84
Two-mile	-33.075782	137.478738	14.90	182.62	197.52

**Name:** FP 2

**Description:**

**Threshold height:** 15 m

**Direction:** 353.9°

**Glide slope:** 3.0°

**Pilot view restricted?** Yes

**Vertical view:** 30.0°

**Azimuthal view:** 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (m)	Height above ground (m)	Total elevation (m)
Threshold	-33.065662	137.520185	9.15	15.24	24.39
Two-mile	-33.094413	137.523832	3.50	189.57	193.07



## Discrete Observation Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (m)	Height (m)
OP 1	1	-33.002216	137.569402	25.05	1.50
OP 2	2	-32.996848	137.570042	25.11	1.50
OP 3	3	-32.994639	137.579373	16.00	1.50
OP 4	4	-32.978855	137.582130	21.00	1.50
OP 5	5	-32.963837	137.577964	20.40	1.50
OP 6	6	-32.943434	137.572954	23.30	1.50
OP 7	7	-32.924445	137.604346	12.75	1.50
OP 8	8	-32.923267	137.651103	8.94	1.50
9-ATCT	9	-33.052904	137.521986	11.91	20.00

Map image of 9-ATCT



## GLARE ANALYSIS RESULTS

### Summary of Glare

PV Array Name	Tilt (°)	Orient (°)	"Green" Glare min	"Yellow" Glare min	Energy kWh
North 1	SA tracking	SA tracking	0	0	1,145.0
North 2	SA tracking	SA tracking	0	0	1,144.0
South	SA tracking	SA tracking	0	0	1,144.0

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
FP 1	0	0

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
FP 2	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
9-ATCT	0	0

## Results for: North 1

Receptor	Green Glare (min)	Yellow Glare (min)
FP 1	0	0
FP 2	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
9-ATCT	0	0

### Flight Path: FP 1

0 minutes of yellow glare

0 minutes of green glare

### Flight Path: FP 2

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 1

0 minutes of yellow glare

0 minutes of green glare

### **Point Receptor: OP 2**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: OP 3**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: OP 4**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: OP 5**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: OP 6**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: OP 7**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: OP 8**

0 minutes of yellow glare  
0 minutes of green glare

### **Point Receptor: 9-ATCT**

0 minutes of yellow glare  
0 minutes of green glare

## **Results for: North 2**

<b>Receptor</b>	<b>Green Glare (min)</b>	<b>Yellow Glare (min)</b>
FP 1	0	0
FP 2	0	0

Receptor	Green Glare (min)	Yellow Glare (min)
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
9-ATCT	0	0

### **Flight Path: FP 1**

0 minutes of yellow glare

0 minutes of green glare

### **Flight Path: FP 2**

0 minutes of yellow glare

0 minutes of green glare

### **Point Receptor: OP 1**

0 minutes of yellow glare

0 minutes of green glare

### **Point Receptor: OP 2**

0 minutes of yellow glare

0 minutes of green glare

### **Point Receptor: OP 3**

0 minutes of yellow glare

0 minutes of green glare

### **Point Receptor: OP 4**

0 minutes of yellow glare

0 minutes of green glare

### **Point Receptor: OP 5**

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 6

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 7

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: OP 8

0 minutes of yellow glare

0 minutes of green glare

### Point Receptor: 9-ATCT

0 minutes of yellow glare

0 minutes of green glare

## Results for: South

Receptor	Green Glare (min)	Yellow Glare (min)
FP 1	0	0
FP 2	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
9-ATCT	0	0

### Flight Path: FP 1

0 minutes of yellow glare

0 minutes of green glare

### Flight Path: FP 2

0 minutes of yellow glare

0 minutes of green glare



**Point Receptor: OP 1**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 2**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 3**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 4**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 5**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 6**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 7**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: OP 8**

0 minutes of yellow glare  
0 minutes of green glare

**Point Receptor: 9-ATCT**

0 minutes of yellow glare  
0 minutes of green glare

# Assumptions

---

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.

Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.

The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values may differ.

Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.

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**APPENDIX H**

# Development Plan Provisions

**Cultana North- LNWCA Development Plan provisions**

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Hazards</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> Maintenance of the natural environment and systems by limiting development in areas susceptible to natural hazard risks.</p> <p><b>4 &amp; 5:</b> Development located and designed to minimise the risks to safety and property from flooding and bushfires</p> <p><b>7:</b> The environmental values and ecological health of receiving waterways and marine environments protected from the release of acid water resulting from the disturbance of acid sulphate soils.</p> <p><b>8:</b> Protection of human health and the environment wherever site contamination has been identified or suspected to have occurred.</p> <p><b>9:</b> Appropriate assessment and remediation of site contamination to ensure land is suitable for the proposed use and provides a safe and healthy living and working environment.</p> <p><b>10:</b> Minimisation of harm to life, property and the environment through appropriate location of development and appropriate storage, containment and handling of hazardous materials.</p> <p><b><u>Principles of Development Control</u></b></p> <p><i><u>Flooding</u></i></p> <p><b>4:</b> Development should not occur on land where the risk of flooding is likely to be harmful to safety or damage to property.</p> <p><i><u>Bushfire</u></i></p> <p><b>7:</b> buildings and structures should be located away from areas that pose an unacceptable bushfire risk as a result of vegetation cover (trees and/or shrubs), poor access, rugged terrain, inability to provide adequate building protection zone and inadequate supply of water.</p> <p><b>9:</b> Habitable buildings should have a dedicated water supply comprising a minimum of 5,000 L available at all times for firefighting which is located adjacent to the building or in another convenient location on the allotment accessible for fire fighting vehicles.</p> <p><b>13:</b> Vehicle access and driveways to properties and public roads created by land division should be designed and constructed to facilitate safe and effective operational use for fire-fighting, other emergency vehicles and residents.</p> <p><i><u>Salinity</u></i></p> <p><b>15:</b> Development should not increase the potential for, or result in an increase in, soil and water salinity.</p> <p><b>16:</b> Preservation, maintenance and restoration of locally indigenous plant species should be encouraged in areas affected by dry land salinity.</p> <p><i><u>Containment of chemical and hazardous materials</u></i></p> <p><b>21:</b> Hazardous materials should be stored and contained in a manner that minimises the risk to public health and safety and the potential for water, land or air contamination</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Infrastructure</b></p>	<p><b><u>Objectives</u></b></p> <ul style="list-style-type: none"> <li>1: Infrastructure provided in an economical and environmentally sensitive manner.</li> <li>4: The visual impact of infrastructure facilities minimised.</li> <li>5: The efficient and cost-effective use of existing infrastructure.</li> </ul> <p><b><u>Principles of Development Control</u></b></p> <ul style="list-style-type: none"> <li>1: Development should not occur without the provision of adequate utilities and services (electrical, water, drainage and stormwater, waste effluent, all-weather public roads, telecommunications, social infrastructure, gas)</li> <li>2: Development should not take place until adequate and coordinated drainage of the land is assured</li> <li>5: Electricity infrastructure should be designed and located to minimise its visual and environmental impacts</li> <li>6: Utilities and services, including access roads and tracks, should be sited on areas already cleared of native vegetation. If this is not possible, their siting should cause minimal interference or disturbance to existing native vegetation and biodiversity</li> </ul>
<p><b>Interface between land uses</b></p>	<p><b><u>Objectives</u></b></p> <ul style="list-style-type: none"> <li>1: Development located and designed to prevent adverse impact and conflict between land uses</li> <li>2: Protect community health and amenity and support the operation of all desired land uses</li> </ul> <p><b><u>Principles of Development Control</u></b></p> <ul style="list-style-type: none"> <li>1: Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through emissions, noise, vibration, electrical interference, light spill, glare, hours of operation, traffic impacts.</li> <li>2: Development should be designed and sited to minimise negative impact on existing and potential future land uses considered appropriate in the locality.</li> </ul>
<p><b>Natural resources</b></p>	<p><b><u>Objectives</u></b></p> <ul style="list-style-type: none"> <li>1: Retention, protection and restoration of the natural resources and environment.</li> <li>2: Protection of the quality and quantity of South Australia’s surface waters, including inland, marine and estuarine and underground waters</li> <li>3: The ecologically sustainable use of natural resources including water resources, including marine waters, ground water, surface water and water courses</li> <li>7: Native flora, fauna and ecosystems protected, retained, conserved and restored.</li> <li>8: Restoration, expansion and linking of existing native vegetation to facilitate habitat corridors for ease of movement of fauna.</li> <li>9: Minimal disturbance and modification of the natural landform</li> </ul>



Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p><b>10:</b> Protection of the physical, chemical and biological quality of soil resources.</p> <p><b>11:</b> Protection of areas prone to erosion or other land degradation processes from inappropriate development.</p> <p><b>12:</b> Protect the scenic qualities of natural and rural landscapes.</p> <p><b><u>Principles of Development Control</u></b></p> <p><b>1:</b> Development should be undertaken with minimum impact on the natural environment, including air and water quality, land, soil, biodiversity and scenically attractive areas</p> <p><b>2:</b> Development should ensure that South Australia's natural assets, such as biodiversity, water and soil, are protected and enhanced.</p> <p><b>3:</b> Development should not significantly obstruct or adversely affect sensitive ecological areas such as creeks, wetlands, estuaries and significant seagrass and mangrove communities.</p> <p><b>4:</b> Development should not have an adverse impact on the natural, physical, chemical or biological quantity and characteristics of soil resources.</p> <p><b>5:</b> Development should be appropriate to land capability and the protection and conservation of water resources and biodiversity.</p> <p><b><u>Stormwater</u></b></p> <p><b>19:</b> Development should include stormwater management systems to protect it from damage during a minimum of a 1 in 100 year average return interval flood.</p> <p><b>20:</b> Development should, where practical, capture and re-use stormwater</p> <p><b>21:</b> Development should have adequate provision to control any stormwater over-flow run-off from the site and should be sited and designed to improve the quality of stormwater and minimised pollutant transfer to receiving waters.</p> <p><b>22:</b> Development should include stormwater management systems to mitigate peak flows and managed the rate and duration of stormwater discharges from the site to ensure downstream systems are not overloaded.</p> <p><b><i>Biodiversity and native vegetation</i></b></p> <p><b>28:</b> Development should retain existing areas of native vegetation and where possible contribute to revegetation using locally indigenous plant species.</p> <p><b>29:</b> Development should be designed and sited to minimise the loss and disturbance of native flora and fauna, including marine animals and plants and their breeding ground and habitats.</p> <p><b>30:</b> the provision of services including power, water, effluent, and waste disposal, access road and tracks should be sited on areas already cleared of native vegetation.</p> <p><b>31:</b> Native vegetation should be conserved, and its conservation value and function not compromised by development if the native vegetation does any of the following- has a high plant species diversity or includes rare, vulnerable or endangered plant species or plant associations and communities.</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p><b>32:</b> Native vegetation should not be cleared if such clearing is likely to lead to, cause or exacerbate decreased soil stability.</p> <p><b>33:</b> Development that proposes the clearance of native vegetation should address or consider the implications that removing the native vegetation will have on the following: Provision for linkages and wildlife corridors between significant areas of native vegetation; the amenity of the locality; bushfire safety; the net loss of native vegetation and other biodiversity.</p> <p><b>34:</b> Where native vegetation is to be removed, it should be replaced in a suitable location on the site with vegetation indigenous to the local area to ensure that there is not a net loss of native vegetation and biodiversity.</p> <p><b>35:</b> Development should be located and occur in a manner which does not increase the potential for, or result in the spread of pest plants, or the spread of any non-indigenous plants into areas of native vegetation or a conservation zone; avoids the degradation of remnant native vegetation by any other means including as a result of spray drift, compaction of soil, modification of surface water flows, pollution to groundwater or surface water or change to groundwater levels; incorporated a separation distance and/or buffer area to protect wildlife habitats and other features of nature conservation significance.</p> <p><b>36:</b> Development should promote the long-term conservation of vegetation by; avoiding substantial structures, excavations, and filling of land in close proximity to the trunk of trees and beneath their canopies; minimising impervious surfaces beneath the canopies of trees; taking other effective and reasonable precautions to protect both vegetation and the integrity of structures and essential services</p> <p><u>Soil conservation</u></p> <p><b>39:</b> Development should not have an adverse impact on the natural, physical, chemical or biological quality and characteristics of soil resources</p> <p><b>40:</b> Development should be designed and sited to prevent erosion</p> <p><b>42:</b> Development should minimise the loss of soil from a site through soil erosion or siltation during the construction phase of any development and following the commencement of an activity.</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Renewable Energy Facilities</b></p>	<p><b><u>Objectives</u></b></p> <ul style="list-style-type: none"> <li>1: Development of renewable energy facilities that benefit the environment, the community and the state.</li> <li>2: The development of renewable energy facilities, such as wind farms and ancillary development in areas that provide opportunity to harvest natural resources for the efficient generation of electricity.</li> <li>3: Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.</li> </ul> <p><b><u>Principles of Development Control</u></b></p> <ul style="list-style-type: none"> <li>1: Renewable energy facilities, including wind farms and ancillary development should be located in areas that maximise efficient generation and supply of electricity; and designed and sited so as not to impact on the safety of water or air transport and the operation of ports, airfields and designated landing strips.</li> </ul>
<p><b>Siting and Visibility</b></p>	<p><b><u>Objectives</u></b></p> <ul style="list-style-type: none"> <li>1: Protection of scenically attractive areas, particularly natural, rural, and coastal landscapes.</li> </ul> <p><b><u>Principles of Development Control</u></b></p> <ul style="list-style-type: none"> <li>1: Development should be sited and designed to minimise its visual impact on the natural, rural or heritage character of the area.</li> <li>3: Buildings and structures should be designed to minimise their visual impact in the landscape</li> <li>4: The nature of external surface materials of buildings should not detract from the visual character and amenity of the landscape</li> <li>6: Development should be screened through the establishment of landscaping using locally indigenous plant species.</li> </ul>
<p><b>Transportation and access</b></p>	<p><b><u>Objectives</u></b></p> <ul style="list-style-type: none"> <li>2: Development that provides safe and efficient movement for all motorised and non-motorised transport modes; ensures access for vehicles including emergency services, public infrastructure maintenance and commercial vehicles; provides off street parking; is appropriately located so that is supports and makes best use of existing transport facilities and networks.</li> </ul> <p><b><u>Principles of Development Control</u></b></p> <p><i><u>Land use</u></i></p> <ul style="list-style-type: none"> <li>1: Land uses arranged to support the efficient provision of sustainable transport networks and encourage their use.</li> </ul> <p><i><u>Movement systems</u></i></p> <ul style="list-style-type: none"> <li>2: Development should be integrated with existing transport networks, particularly major rail and road corridors, and designed to minimise its potential impact on the functional performance of the transport networks</li> </ul> <p><i><u>Access</u></i></p> <ul style="list-style-type: none"> <li>16: Development should have direct access from an all-weather public road</li> </ul>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p><b>17:</b> Development should be provided with safe and convenient access which: avoids unreasonable interference with the flow of traffic on adjoining roads; accommodates the type and volume of traffic likely to be generated by the development or land use and minimise induced traffic through over-provision;</p> <p><b>19:</b> The number of vehicle access point onto arterial roads should be minimised and where possible, access points should be: limited to local roads ad shared between developments.</p> <p><b>22:</b> Driveways, access tracks and parking areas should be designed and constructed to: follow the natural contours of the land; minimise excavation and/or fill; minimise the potential for erosion from run-off; avoid the removal of existing vegetation; be consistent with Australian Standard AS 2890 Parking Facilities.</p>
<p><b>Waste</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> Development that, in order of priority, avoids the production of waste, minimises the production of waste, reuses waste, recycles waste for reuse, treats waste and disposes of waste in an environmentally sounds manner</p> <p><b>2:</b> Development that includes the treatment and management of solid and liquid waste to prevent undesired impacts on the environment including soil, plant and animal biodiversity, human health and the amenity of the locality.</p> <p><b><u>Principles of Development Control</u></b></p> <p><b>2:</b> The storage, treatment and disposal of waste materials from any development should be achieved without risk to health or impairment of the environment.</p> <p><i><u>Waste treatment systems</u></i></p> <p><b>10:</b> Development that produces any effluent should be connected to an approved waste treatment system</p>
<p><b>Remote Areas Zone</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> A zone accommodating the remote areas of the state suited to pastoral, conservation, mining and remote townships, settlements, Aboriginal land, and accommodating defence related activities</p> <p><b>2:</b> A zone recognising the associated Aboriginal and Non-Aboriginal cultural significance of the region, including remote townships and settlements, places of heritage significance and established pastoral, grazing and farming activities.</p> <p><b>3:</b> Protection of the conservation value of the region with a variety of environments including arid and wetland environments, ranges and riverine environments.</p> <p><b>5:</b> Development of the zone to reflect the sustained growth in mining, petroleum exploration and related activities, recognising the significance of mineral deposits throughout the region</p> <p><b>8:</b> Development that contributes to the desired character of the zone</p> <p><b><u>Principles of Development Control</u></b></p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p>1: Land use- airfields, heliports, industry in association with mining, prescribed mining activities, Australian defence related activities, pastoral, grazing and farming activities, remote townships and settlements, tourism development mining settlements in association with an approved mining lease, wind farm and ancillary development, wind monitoring mast and ancillary development.</p> <p>2: Development listed as non-complying is generally inappropriate and not acceptable unless it can be demonstrated that it does not undermine the objectives and principles of the Development Plan.</p> <p>4: The natural features and scenic beauty of the zone should be protected Tourist routes, sites and localities throughout the region should be protected and enhanced.</p> <p>7: Development should not be undertaken unless it is consistent with the desired character of the zone.</p> <p><b><u>Desired character</u></b></p> <p>The area covered by the Remote Area Zone in the Whyalla area comprises coastal areas, swamps and plains adjacent the Steelworks and industry lands. The combination of industrial land use in a sensitive environmental setting is considered important and future development of this area will aim to result in sustainable growth and preservation of coastal environments, swamps and waterways.</p>



**Cultana South- Whyalla Development Plan provisions**

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Hazards</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> Maintenance of the natural environment and systems by limiting development in areas susceptible to natural hazard risk.</p> <p><b>3:</b> Development located to minimise the threat and impact of bushfire on life and property.</p> <p><b>6:</b> The environmental values and ecological health of receiving waterways and marine environments protected from the release of acid water resulting from the disturbance of acid sulphate soils.</p> <p><b>7:</b> Protection of human health and the environment wherever site contamination has been identified or suspected to have occurred</p> <p><b>8:</b> Appropriate assessment and remediation of site contamination to ensure land is suitable for the proposed use and provides a safe and healthy living and working environment</p> <p><b>9:</b> Minimisation of harm to life, property and the environment through appropriate location of development and appropriate storage, containment and handling of hazardous materials</p> <p><b><u>Principles of Development Control</u></b></p> <p><b>1:</b> Development should: be excluded from areas that are vulnerable to, and cannot be adequately and effectively protected from, the risk of natural hazards; be sited, designed and undertaken with appropriate precautions being taken against fire, flood, coastal flooding, storm surge, landslip, earthquake, toxic emissions or other hazards such as vermin; not occur on land where the risk of flooding is likely to be harmful to safety or damage property.</p> <p><b>2:</b> There should not be any significant interference with natural processes in order to reduce the exposure of development to the risk of natural hazards</p> <p><b><u>Bushfire</u></b></p> <p><b>14:</b> Vehicle access and driveways to properties and public roads created by land division should be designed and constructed to facilitate safe and effective operational use for fire-fighting and other emergency vehicles and residents.</p> <p><b><u>Contamination</u></b></p> <p><b>21:</b> Development should not occur on contamination land or on potentially contaminated land unless either of the following applies: remediation of the site is undertaken to a standard that makes it suitable and safe for the proposed use; the site will be maintained in a condition, or the development will be undertaken in a manner that will not pose a threat to the health and safety of the environment or to occupiers of the site or land in the locality.</p> <p><b><u>Containment of chemical and hazardous materials</u></b></p> <p><b>22:</b> Hazardous materials should be stored and contained in a manner that minimises the risk to public health and safety and the potential for water, land or air contamination.</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Heritage conservation</b></p>	<p><b><u>Objectives</u></b></p> <p>1: The conservation of areas, places and their settings of indigenous and non-indigenous cultural significance.</p> <p><b><u>Principles of development control</u></b></p> <p>1: Development should conserve and not adversely impact on the cultural or natural significance of places, areas, artefacts and shipwrecks with Heritage value.</p>
<p><b>Infrastructure</b></p>	<p><b><u>Objectives</u></b></p> <p>1: Infrastructure provided in an economical and environmentally sensitive manner</p> <p>2: The visual impact of infrastructure facilities minimised</p> <p>3: the efficient and cost-effective use of existing infrastructure</p> <p><b><u>Principles of Development Control</u></b></p> <p>1: Development should not occur without the provision of adequate utilities and services, including electricity supply, water supply, drainage and stormwater systems, waste disposal, effluent disposal systems, formed all-weather public access roads, telecommunications services, social infrastructure, community services and facilities and gas services</p> <p>2: Development should only occur where it provides, or has access to, relevant easements for the supply of infrastructure.</p> <p>3: Development should incorporate provision for the supply of infrastructure services to be located within common service trenches where practicable.</p> <p>4: Development should not take place until adequate and coordinated drainage of the land is assured.</p> <p>7: Electricity infrastructure should be designed and located to minimise its visual and environmental impacts</p> <p>9: Utilities and services, including access roads and tracks, should be sited on areas already cleared of native vegetation. If this is not possible, their siting should cause minimal interference or disturbance to existing native vegetation and biodiversity.</p> <p>10: Development in proximity to infrastructure facilities should be sited and be of a scale to ensure adequate separation to protect people and property.</p>
<p><b>Interface between Land Uses</b></p>	<p><b><u>Objectives</u></b></p> <p>1: Development located and designed to minimise adverse impact and conflict between land uses</p> <p>2: Protect community health and amenity from adverse impacts of development</p> <p>3: Protect desired land uses from the encroachment of incompatible development</p> <p><b><u>Principles of Development Control</u></b></p> <p>1: Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following: emissions; noise; vibration; electrical interference; light spill; glare; hours of operation; traffic impacts.</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p>2: Development should be sited and designed to minimise negative impacts on existing and potential future land uses desired in the locality</p>
<p><b>Natural Resources</b></p>	<p><b><u>Objectives</u></b></p> <p>1: Retention, protection and restoration of the natural resources and environment</p> <p>2: Protection of the quality and quantity of South Australia's surface waters, including inland, marine and underground waters</p> <p>3: The ecologically sustainable use of natural resources including water resources, including marine waters, ground water, surface water and water courses</p> <p>6: Development sited and designed to: protect natural ecological systems; achieve the sustainable use of water; protect water quality, including receiving waters; reduce runoff and peak flows and prevent the risk of downstream flooding; minimise demand on reticulated water supplies; maximise the harvest and use of stormwater; protect stormwater from pollution sources</p> <p>8: Native flora, fauna and ecosystems protected, retained, conserved and restored</p> <p>10: Minimal disturbance and modification of the natural landform</p> <p>11: Protection of the physical, chemical and biological quality of soil resources</p> <p>12: Protection of areas prone to erosion or other land degradation processes from inappropriate development</p> <p>13: Protection of the scenic qualities of natural and rural landscapes.</p> <p><b><u>Principles of Development Control</u></b></p> <p>1: Development should be undertaken with minimum impact on the natural environment, including air and water quality, land, soil, biodiversity and scenically attractive areas</p> <p>2: Development should ensure that South Australia's natural assets such as biodiversity, water and soil are protected and enhanced</p> <p>4: Development should be appropriate to land capability and the protection and conservation of water resources and biodiversity.</p> <p><i>Water sensitive design</i></p> <p>5: Development should be designed to maximise conservation, minimise consumption and encourage re-use of water resources</p> <p>7: Development should be sited to: minimise surface water runoff; prevent soil erosion and water pollution</p> <p>9: Development should include stormwater management systems to protect it from damage during a minimum of a 1-in-100 year average return interval flood</p> <p>10: Development should have adequate provision to control any stormwater over-flow runoff from the site and should be sited and designed to improve the quality of stormwater and minimise pollutant transfer to receiving waters</p> <p>11: Development should include stormwater management systems to mitigate peak flows and manage the rate and duration of stormwater discharges from the site to ensure the carrying capacities of downstream systems are not overloaded</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p><u>Biodiversity and Native Vegetation</u></p> <p><b>26:</b> Development should retain existing areas of native vegetation and where possible contribute to revegetation using locally indigenous plant species</p> <p><b>27:</b> Development should be designed and sited to minimise the loss and disturbance of native flora and fauna, including marine animals and plants and their breeding grounds and habitats</p> <p><b>28:</b> Native vegetation should be conserved and its conservation value and function not compromised by development if the native vegetation does any of the following: Provides an important habitat for wildlife or shared and shelter for livestock; has a high plant species diversity or includes rare, vulnerable or endangered plant species or plant associations and communities; Provides an important seed bank for locally indigenous vegetation; has high amenity value and/or significantly contributes to the landscape quality of an area including the screening of building and unsightly views; has high value as a remnant of vegetation associations characteristic of a district or region prior to extensive clearance for agriculture.</p> <p><b>29:</b> Native vegetation should not be cleared if such clearing is likely to lead to, cause or exacerbate: erosion or sediment within water catchments; decreased soil stability; soil or land slip;</p> <p><b>30:</b> Development that proposes the clearance of native vegetation should address or consider the implications that removing the native vegetation will have on the following: provision for linkages and wildlife corridors between significant native vegetation; the amenity of the locality; bushfire safety; the net loss of native vegetation and other biodiversity.</p> <p><b>31:</b> Where native vegetation is to be removed, it should be replaced in a suitable location on the site with locally indigenous vegetation to ensure that there is not a net loss of native vegetation and biodiversity</p> <p><b>32:</b> Development should be located and occur in a manner which: does not increase the potential for, or result in, the spread of pest plants, or spread of any non-indigenous plants into areas of native vegetation or a conservation zone; avoids the degradation of remnant native vegetation by any other means including as a result of spray drift, compaction of soil, modification of surface water flows, pollution to groundwater or surface water or change to groundwater levels; incorporated a separation distance and/or buffer area to protect wildlife habitats and other features of nature conservation significance.</p> <p><b>33:</b> Development should promote the long-term conservation of vegetation by: avoiding substantial structures, excavations, and filling of land in close proximity to the trunk of trees and beneath their canopies; minimising impervious surfaces beneath the canopies of trees; taking other effective and reasonable precautions to protect both vegetation and the integrity of structures and essential services</p> <p><u>Soil conservation</u></p> <p><b>36:</b> Development should not have an adverse impact on the natural, physical, chemical or biological quality and characteristics of soil resources</p> <p><b>37:</b> Development should be designed and sited to prevent erosion</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
	<p><b>38:</b> Development should take place in a manner that will minimise alteration to the existing landform</p> <p><b>39:</b> Development should minimise the loss of soil from a site through soil erosion or siltation during the construction phase of any development and following the commencement of an activity.</p>
<p><b>Renewable Energy Facilities</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> Development of renewable energy facilities that benefit the environment, the community and the state.</p> <p><b>2:</b> The development of renewable energy facilities, such as wind farms and ancillary development, in areas that provide opportunity to harvest natural resources for the efficient generation of electricity.</p> <p><b>3:</b> Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.</p> <p><b><u>Principles of Development Control</u></b></p> <p><b>1:</b> Renewable energy facilities, including wind farms and ancillary development should be: located in areas that maximise efficient generation and supply of electricity; and designed and sited so as not to impact on the safety of water or air transport and the operation of ports, airfield and designated landing strips</p>
<p><b>Siting and Visibility</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> Protection of scenically attractive areas, particularly natural, rural and coastal landscapes</p> <p><b><u>Principles of Development Control</u></b></p> <p><b>1:</b> Development should be sited and designed to minimise its visual impact on: the natural, rural or heritage character of the area; areas of high visual or scenic value, particularly in rural and coastal areas; view from coast, public reserves, tourist routes and walking trails</p> <p><b>2:</b> Buildings should be sited in unconstructive locations and, in particular, should: be grouped together; where possible be located in such a way as to be screened by existing vegetation when viewed from public roads.</p> <p><b>8:</b> Development should be screened through the establishment of landscaping using locally indigenous plant species: along allotment boundaries to provide permanent screening of buildings and structures when viewed from adjoining properties and public roads.</p>



Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Transportation and Access</b></p>	<p><b><u>Objectives</u></b></p> <p><b>2:</b> Development that: provides safe and efficient movement for all motorised and non-motorised transport modes; ensures access for vehicles including emergency services, public infrastructure maintenance and commercial vehicles; provides off street parking; is appropriately located so that it supports and makes best use of existing transport facilities and networks.</p> <p><b><u>Principles of Development Control</u></b></p> <p><i>Land Use</i></p> <p><b>1:</b> Land uses are arranged to support the efficient provision of sustainable transport networks and encourage their use.</p> <p><i>Movement systems</i></p> <p><b>2:</b> Development should be integrated with existing transport networks, particularly major rail and road corridors and designed to minimise its potential impact on the functional performance of the transport networks</p> <p><i>Access</i></p> <p><b>21:</b> Development should have direct access from an all-weather public road.</p> <p><b>22:</b> Development should be provided with safe and convenient access which: avoids unreasonable interference with the flow of traffic on adjoining roads; accommodates the type and volume of traffic likely to be generated by the development or land use and minimise induced traffic through over-provision; is sited and designed to minimise any adverse impacts on the occupants of and visitors to neighbouring properties.</p> <p><b>23:</b> The number of vehicle access points onto arterial roads should be minimised, and where possible access points should be: limited to local roads; shared between developments.</p>
<p><b>Waste</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> Development that, in order of priority, avoids the production of waste, minimises the production of waste, reuses waste, recycles waste for reuse, treats waste and disposes of waste in an environmentally sound manner</p> <p><b>2:</b> Development that includes the treatment and management of solid and liquid waste to prevent undesired impacts on the environment including soil, plant and animal biodiversity, human health and the amenity of the locality.</p> <p><b><u>Principles of Development Control</u></b></p> <p><b>1:</b> Development should be sited and designed to prevent or minimise the generation of waste (including waste water) by applying the following waste management hierarchy in the order of priority- avoid, minimise, reuse, recycle, recover, treatment, dispose.</p> <p><b>2:</b> The storage, treatment and disposal of waste materials from any development should be achieved without risk to health or impairment of the environment.</p>

Development Plan Section	Summary of Objectives and Principles of Development Control (PDC)
<p><b>Industry Zone</b></p>	<p><b><u>Objectives</u></b></p> <p><b>1:</b> A zone primarily accommodating a wide range of industrial, warehouse, storage and transport land uses.</p> <p><b>2:</b> Development that contributes to the desired character of the zone.</p> <p><b><u>Principles of Development Control</u></b></p> <p><i>Land use</i></p> <p><b>1:</b> The following forms of development are envisaged in the zone: handling, transportation and storage of bulk commodities; industry; transport distribution; warehouse.</p> <p><b>2:</b> Development listed as non-complying is generally inappropriate and not acceptable unless it can be demonstrated that it does not undermine the objectives and principles of the Development Plan.</p> <p><b><u>Desired Character</u></b></p> <ul style="list-style-type: none"> <li>- Minimise offsite impacts</li> <li>- Fencing to take the form of chain mesh fencing</li> <li>- Areas of conservation significance are to be preserved where possible with retention of natural vegetation cover and supplementary plantings encouraged as one means of limiting the impacts that may be felt by adjoining zones.</li> <li>- Allow for development of the Whyalla Industrial Estate on the Lincoln Highway adjacent the Steelworks and to facilitate development that require ready access to the Highway and rail system and will service companies associated with mining, the Steelworks and the residents of Whyalla.</li> </ul> <p><b><u>Form and Character</u></b></p> <p><b>7:</b> Direct access should not be provided from the Lincoln Highway or Arthur Glennie Drive</p> <p><b>9:</b> Landscaping should be:</p> <ul style="list-style-type: none"> <li>- in the form of drought tolerant native species</li> <li>- of trees with mature sizes appropriate to the scale of adjoining buildings and also comprise shrubs, ground covers, mulch and earth shaping and mounding where appropriate</li> <li>- in the form of screen tree plantings of a minimum height of 8 meters when fronting the Lincoln Highway or Arthur Glennie Drive</li> </ul> <p><b>10:</b> Native vegetation on-site should be retained until such time as the land is required for development</p> <p><b>11:</b> Fencing, where of a transparent nature, should be no more than 2.4 meters height.</p> <p><b>14:</b> Development should be sited and designed to prevent soil erosion and water pollution</p>

**APPENDIX I**

**Scoped Environmental  
Management plan**



REPORT

# Cultana Solar Farm

## *Scope Environmental Management Plan*

Submitted to:

**SIMEC ZEN Energy**

Submitted by:

**Golder Associates Pty Ltd**

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1898738-006-R-Rev0

24 October 2018



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## 1.0 INTRODUCTION

SIMEC ZEN Energy is developing a 280 MW solar energy project over two connected greenfield sites (north and south) near the Liberty OneSteel Whyalla Steelworks.

The Cultana Solar Farm (the Project) will span over 1,000 ha and will include an operations compound, a new substation and battery energy storage, as well as a temporary lay down area for construction. The Project will connect to the Cultana Substation via overhead power lines and limited underground cabling.

Environmental risks and potential impacts have been assessed for the Project considering the proposed construction activities and with input from technical studies including a Traffic Impact and Access Point Assessment, Ecological Desktop Assessment and Aboriginal Heritage Assessment. This Scope Environmental Management Plan (EMP) has been developed to provide a management framework and potential mitigation measures for impacts to the environment during the construction phase of the Project.

The proposed general layout is shown in Figure 1.

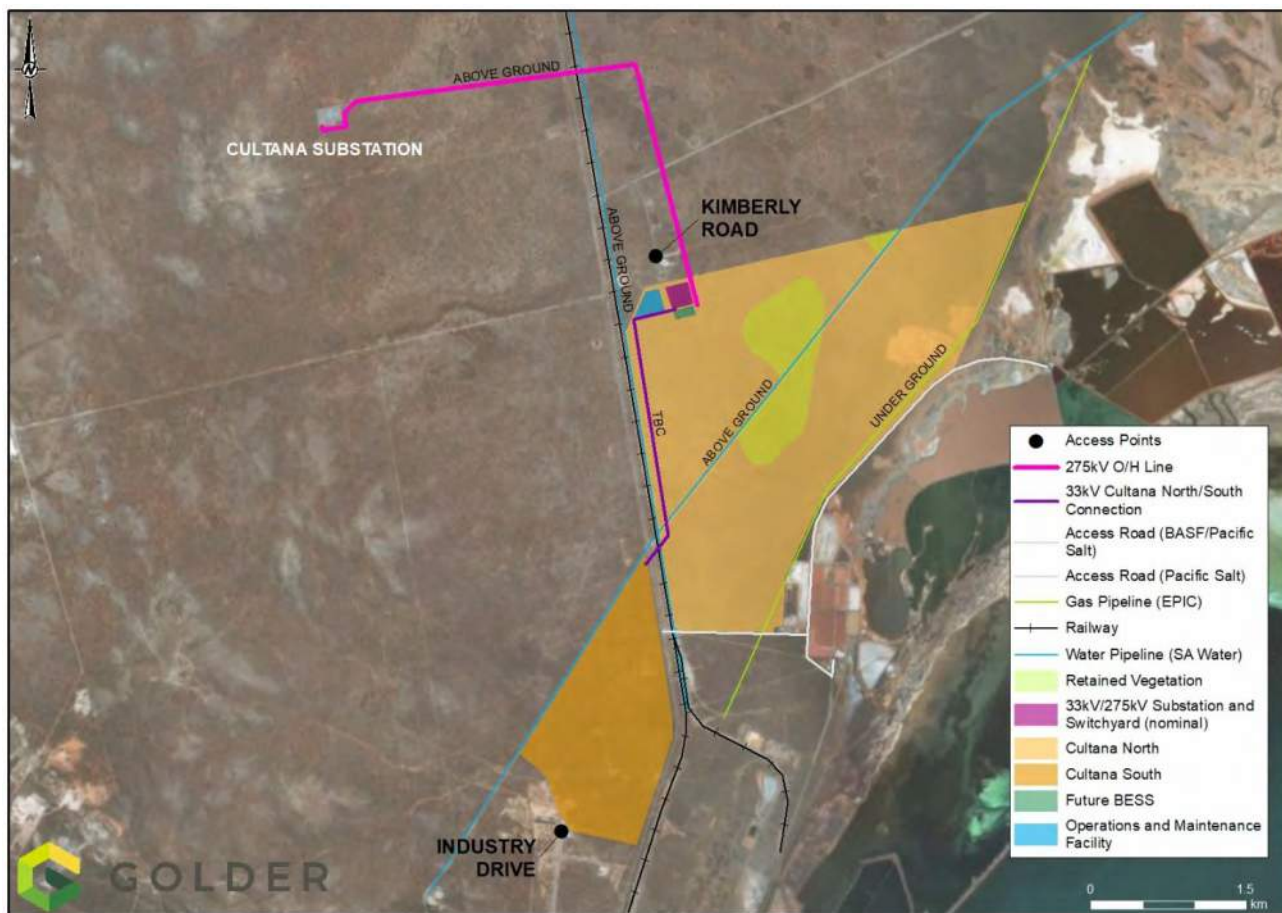


Figure 1: Proposed general layout

## 1.1 Purpose

The successful contractor will be required to protect the environment and community during construction to ensure that SIMEC ZEN Energy's reputation as a responsible developer is maintained.

The purpose of this EMP is to:

- Provide a framework to demonstrate how the successful Contractor will implement measures to reduce potential environmental impacts of the Project during construction.
- Define objectives and measurable targets associated with the significant environmental aspects of the project.
- Documents the policies, processes and procedures that the Contractor will adopt to identify, manage and control the potential environmental impacts, legislative requirements, approval conditions and other environmental obligations that relate to the construction phase of the project.
- Allocate responsibilities for ensuring the effective implementation of these policies, processes and procedures.

The EMP will be used by the contractor to develop the Contractor's Environmental Management Plan (CEMP) for the construction phase of the project and will ensure appropriate management of relevant environmental issues.

## 2.0 REGULATIONS AND COMPLIANCE

### 2.1 Relevant legislation and permits

**Table 1: Project approval requirements**

Relevant Legislation	Approval Authority	Type of approval	Responsibility and timing
<i>Development Act 1993</i> (Development Act)	Department of Planning, Transport and Infrastructure	Development Approval  A Development Application will be submitted for assessment	SIMEC ZEN Energy  Prior to construction
<i>Environment Protection Act 1993</i> (EP Act)	South Australia Environment Protection Authority	No specific approval permits- all activities onsite must comply with the EP Act	SIMEC ZEN Energy and contractors  Throughout construction
<i>Natural Resource Management Act 1994</i> (NRM Act)	Department of Environment and Water (DEW)- including Natural Resources Eyre Peninsula	No specific approval permits- all activities must comply with the NRM Act and must not lead to land degradation	SIMEC ZEN Energy and contractors  Throughout construction
<i>Native Vegetation Act 1991</i>		Native Vegetation Clearance approval	SIMEC ZEN Energy  Prior to construction

## 2.2 Management responsibilities and general duties

The Project will be undertaken in a manner that addresses the requirements of the EP Act general environmental duty, specifically:

*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.*

Table 2 identifies the key stakeholders for the project, their representative(s) and the respective roles and responsibilities.

**Table 2: Project responsibilities**

Stakeholder	Role	Responsibilities	Contact details
<b>Principal – SIMEC ZEN Energy</b>	Principal Site Owner	<ul style="list-style-type: none"> <li>▪ Overarching responsibility for the project</li> <li>▪ Site inspections and auditing of site works against the CEMP to ensure appropriate measures are implemented</li> <li>▪ Management of Stakeholder engagement</li> </ul>	To be confirmed
<b>Construction Contractor</b>	Project Manager	<ul style="list-style-type: none"> <li>▪ Delivery of the construction of the Project</li> <li>▪ Engaging contractors to implement the works</li> <li>▪ Control of site operations</li> <li>▪ Ensuring overall works compliance with the CEMP</li> </ul>	To be confirmed
	Environmental Manager	<ul style="list-style-type: none"> <li>▪ Ensuring compliance to requirements of this EMP and creating a CEMP</li> <li>▪ Undertaking the required monitoring and reporting</li> <li>▪ Responding where mitigating measures are not adequate or where the EMP requires amendments.</li> </ul>	To be confirmed



## 2.3 Training and awareness

### 2.3.1 Inductions

Prior to commencement on site, all project personnel will undergo a Site Induction covering awareness of quality, safety, site rules and administration; and environmental issues and measures specific to this Project. Part of the induction will relate to the CEMP and may include, but not be limited to:

- Purpose, objective and key issues of the CEMP
- Conditions of environmental licences, permits and approvals
- Emergency response procedures and reporting processes for environmental incidents
- Site-specific issues such as location of refuse bins, refuelling and maintenance of vehicles, plant and equipment
- Aboriginal heritage issues, including identification of heritage sites and procedures for discovery of heritage sites
- Management of dust from construction activities
- Management of construction noise and vibrations
- Contamination management procedure
- Protection of significant trees
- Soil erosion and drainage management measures.

Induction records will be kept confirming that all relevant personnel have been appropriately inducted. Inductions will be updated as required, i.e. when significant changes occur on site or within the environmental management framework of the project.

### 2.3.2 Pre-starts and Toolbox talks

In addition to the site inductions, pre-start talks will be undertaken at the beginning of each day (before work commences). Environmental issues will be raised and discussed at these meetings, as required.

Records of Toolbox talks and the issues discussed will be retained.

## 2.4 Emergency contacts

Organisation		Contact Details
SIMEC ZEN Energy		TBA
Construction Contractor		TBA
CFS – Whyalla		(08) 8204 3600
Natural Resource Centre- Port Lincoln		(08) 8625 3144
Wildlife hotline (Fauna Rescue SA)		(08) 8289 0896
Environment Protection Authority		(08) 8204 2004
Underground Services	AAPT/Power Tel	1800 786 306
	APA SA	1800 427 532
	NBN Co SA/NT	1800 626 762
	Nextgen NCC-SA	1800 032 532
	Optus and/or Uecomm SA	1800 505 777
	PIPE Networks SA	1800 201 100
	SA Power Networks	131 366
	SA Water	(08) 7424 1117
	SEA Gas	1800 103 542
	Telstra SANT	Submit Form via DB4YD website
Vocus Communications	1800 262 663	

## 3.0 ENVIRONMENTAL MANAGEMENT

### 3.1 Key environmental aspects

This EMP provides strategies for the management of potential impacts associated with the construction phase of the project. The EMP strategies address the following environmental aspects:

- Flora and fauna (Section 3.2.1)
- Soil erosion and drainage management (Section 3.2.2)
- Air quality, noise and vibration (Section 3.2.3)
- Contamination (Section 3.2.4)
- Heritage (Section 3.2.5)
- Waste management (Section 3.2.7).

Emergency response planning will be addressed under Project Environmental Health and Safety documentation.

### 3.2 Management strategies

#### 3.2.1 Flora and fauna

The Project site is characterised by Acacia woodland, chenopod shrubland and patches of Casuarina woodland. The Project design has been optimised to avoid removal of the woodland vegetation. Trimming and/or removal of the chenopod shrubland will be required to facilitate construction. Removal of native vegetation will require an approval from the Native Vegetation Council and an associated Significant Environmental Benefit (SEB) offset.

Further ecological site surveys will be undertaken prior to construction to confirm vegetation community distribution and fauna present on site, and identify declared plants under the *Natural Resources Management Act 2004*.

Tables 3, 4 and 5 outline potential impacts to native vegetation and fauna, as well as those associated with weeds and pests, resulting from construction activities and mitigating measures to minimise these impacts.

**Table 3: Native vegetation management**

Aspect	Clarification
<b>Environmental Objectives</b>	Minimise adverse impacts to existing native vegetation Comply with the obligations under the <i>Native Vegetation Act 1991</i>
<b>Potential Impacts</b>	Destruction and disturbance of native vegetation from construction activities
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>■ Induct all site personnel to provide an understanding of the relevant vegetation protection issues i.e. exclusion zones.</li> <li>■ Restrict vehicle movement to defined tracks</li> <li>■ Minimise vehicle movement and machinery disturbance within and around retained vegetation</li> <li>■ Appropriate approvals to be sought prior to any vegetation removal and/or pruning.</li> </ul>

**Table 4: Fauna management**

Aspect	Clarification
<b>Environmental Objectives</b>	Minimise adverse impacts to fauna and habitats.
<b>Potential Impacts</b>	<ul style="list-style-type: none"> <li>▪ Destruction and disturbance of fauna habitats</li> <li>▪ Increased potential for collision with vehicles due to increased traffic in the site area.</li> </ul>
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Induct all site personnel to provide an understanding of the fauna potentially present including important fauna habitat (i.e. native grassland), and measures to minimise adverse impacts on fauna</li> <li>▪ Minimise vehicle movement and machinery disturbance within and around retained vegetation</li> <li>▪ Dedicate vehicle movement to defined tracks</li> <li>▪ Contact the relevant authority in the event of encountering trapped or injured fauna</li> <li>▪ Monitor interactions between fauna and the solar arrays</li> </ul>

**Table 5: Weed and pest management**

Aspect	Clarification
<b>Environmental Objectives</b>	Prevent the spread of pest plants and animals. Comply with the NRM Act
<b>Potential Impacts</b>	Spread of weeds through Project activities including excavation and traffic movement. Site-based waste attracting pest animals.
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Induct all site personnel to provide an understanding of the declared plants present onsite and requirements of the NRM Act</li> <li>▪ Movement, control and destruction of declared plants to be in accordance with the NRM Act. This includes obtaining appropriate approvals prior to transporting declared plants on public roads.</li> <li>▪ Ensure imported fill is clean and free of weed propagules</li> <li>▪ Restrict vehicle access to defined tracks and access/egress points</li> <li>▪ Manage entry/exit point (i.e. using a rumble pad) so that site soils (potentially containing weed propagules) are not tracked to or from the site.</li> <li>▪ Ensure waste is appropriately stored to discourage pest animals. This includes covering putrescible and organic storages associated with crib rooms and offices.</li> </ul>

### 3.2.2 Soil erosion and drainage management

It is not expected that runoff from the construction site will have a significant impact on surface water drainage pathways. However, to mitigate any potential impacts the management measures listed in Table 6 should be implemented during construction where runoff is expected/observed.

**Table 6: Soil erosion and drainage management**

Aspect	Clarification
<b>Environmental Objectives</b>	Minimise erosion of soils and protect surface water drainage pathways. Comply with the NRM Act.
<b>Potential Impacts</b>	Increased erosion due to soil cover disturbance and changes to surface water flow patterns.
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Induct all site personnel to provide an understanding of the issues associated with erosion and drainage and the management zones and strategies in place.</li> <li>▪ Progressive stabilisation of soil and areas disturbed by earthworks using vegetation (hydro seeding), matting and various other techniques.</li> <li>▪ Soil to be stockpiled away from drainage pathways.</li> <li>▪ Treatment measures such as sediment fences, silt socks and temporary swales and basins placed to manage erosion and drainage. These should be used in sequence where sediment loads are expected to be high.</li> <li>▪ Prevent contaminants including waste, fuels, sediment and other potentially contaminated runoff from entering surface water drainage pathways using measures including containment, bunding, cover, separation buffers and spill response and clean up contingencies.</li> <li>▪ Control the entry and exit of stormwater runoff from work areas including to divert clean stormwater away from and around materials storage areas.</li> <li>▪ Stop work in the event of encountering potentially contaminated soil and reassess site drainage to ensure sediments from potentially contaminated soils are contained.</li> </ul>

### 3.2.3 Air quality, noise and vibration

Dust levels will require careful management to ensure there is no significant adverse impact on air quality following a reduction in vegetation cover.

Operation of construction plant and machinery will cause a noticeable level of noise during construction activities, however, based on the distance of the Project to sensitive receptors, the impact is expected to be negligible.

Vibration impacts are expected to be negligible.

Engagement with local community, and particularly those residents near the Project site, is planned prior to starting and during construction works.

Table 7 outlines the potential impacts to air quality because of Project construction activities and measures to minimise these impacts.



Table 8 summarises the potential impacts because of the increase in noise and mitigating measures to minimise these impacts.

**Table 7: Air quality management**

Aspect	Clarification
<b>Environmental Objectives</b>	Minimise impacts to air quality such as dust, vehicle emissions and odours. Comply with the National Environment Protection (Ambient Air Quality) Measure 1998 and SA EPA guidance.
<b>Potential Impacts</b>	Increased levels of dust generated during construction activities Increased level of vehicle emission and particles by plant machinery
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Induct all site personnel to provide an understanding of the issues associated with air quality management and the mitigating strategies in place.</li> <li>▪ Regularly water exposed surfaces, including exposed stockpiles and unsealed roadways.</li> <li>▪ Seal high use access tracks to suppress dust generation.</li> <li>▪ Designated vehicle access routes and protocols to be determined and communicated to all contractors.</li> <li>▪ Covering or wetting-down soil and construction material stockpiles to minimise dust mobilisation.</li> <li>▪ Install dust curtains (or similar) along boundary fences.</li> <li>▪ Consider the use of onsite mulch to reduce exposed surfaces</li> <li>▪ Stop work in areas where construction activities are generating unacceptable levels of dust.</li> <li>▪ Minimise use of on-site cutting and grinding. Where used, employ equipment and techniques such as dust extractors and surface wetting to minimise dust. Consider use of specific plant such as wet cutting saws, vacuum extraction or block/slab splitters.</li> <li>▪ Maintain all plant machinery and equipment for efficient operation and minimise engine idle times and queuing.</li> <li>▪ Maintain transparent communication lines for community members to contact the Construction Manager (or delegate).</li> </ul>

**Table 8: Noise management**

Aspect	Clarification
<b>Environmental Objectives</b>	Comply with the <i>Environment Protection (Noise) Policy 2007</i> , SA EPA guidance for the construction industry and general environmental duty of care regarding construction noise.  Comply with legislative and regulated construction vibration levels.
<b>Potential Impacts</b>	Increase in noise causing nuisance to businesses near the site.
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Induct all site personnel to provide an understanding of the issues associated with noise management and the mitigating strategies in place.</li> <li>▪ Ensure EPA approvals for night works are obtained if required.</li> </ul>

Aspect	Clarification
	<ul style="list-style-type: none"> <li>▪ Machinery at the site to operate in accordance with relevant sections of the SA <i>Environment Protection (Noise) Policy 2007</i> and the SA EPA Noise Information Sheet (2014).</li> <li>▪ Proactive noise control strategies if required, such as shielding for compressors, power generators and other fixed plant; and temporary acoustic barriers or enclosures.</li> <li>▪ Substitution of alternative construction processes if excessive noise is produced.</li> <li>▪ Truck movements to be limited to the designated freight route.</li> <li>▪ All vehicles and equipment will be appropriately serviced and maintained.</li> <li>▪ Ongoing communication with the community regarding times of excessive noise if required.</li> </ul>

### 3.2.4 Contamination

The risk of encountering contaminated material is considered low. Surplus soils requiring offsite disposal are not expected.

There is not expected to be interaction with groundwater during Project activities. Groundwater has not been discussed further in this EMP.

Table 9 outlines the potential impacts associated with soil contamination because of Project activities and measures to minimise these impacts.

**Table 9: Contamination management**

Aspect	Clarification
<b>Environmental Objectives</b>	Comply with <i>Environment Protection Act 1993</i> and relevant SA EPA Guidelines. Minimise adverse impacts to soil and groundwater as a result of contamination.
<b>Potential Impacts</b>	Contaminated soil mixing with 'clean' soil, further contaminating the site. Illegal disposal of contaminated material. Contaminated soil becoming airborne or entering surface water drainage pathways.
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Induct all site personnel to provide an understanding of the issues associated with contamination management and the mitigating strategies in place.</li> <li>▪ Spill kits to be available on site</li> <li>▪ Hazardous materials to be appropriately stored on sealed areas with bunding, and not in close proximity to drainage pathways</li> <li>▪ Refuelling to be undertaken on sealed areas not in close proximity to drainage pathways</li> </ul>

Aspect	Clarification
	<ul style="list-style-type: none"> <li>▪ Mixing of soil types to be avoided (i.e. contaminated/non-contaminated).</li> <li>▪ Any material removed from the site to landfill, or for reuse at another site, will be done so in accordance with SA EPA regulatory requirements such as a Waste Soil Assessment on surplus soils.</li> <li>▪ Only clean materials will be imported to the site.</li> <li>▪ Any soil or other material spilled onto roadways having originated from vehicles to be removed.</li> <li>▪ Erosion and sedimentation controls to be put in place, as described in Section 3.2.2.</li> <li>▪ Air quality controls to be put in place, as described in Section 3.2.3.</li> <li>▪ Emergency response plan to be followed for accidental spills</li> </ul>

### 3.2.5 Aboriginal heritage

The Project site is considered to present a medium risk of encountering Aboriginal sites.

SIMEC ZEN Energy will enter an agreement with the Barngarla Aboriginal Corporation and all conditions of the agreement must be incorporated into final site procedures (i.e. CEMP).

Table 10 outlines the potential impacts to Aboriginal heritage resulting from Project activities and measures to minimise these impacts.

**Table 10: Aboriginal heritage management**

Aspect	Clarification
<b>Environmental Objectives</b>	Minimise impacts to Aboriginal sites. Comply with the South Australian Aboriginal Heritage Act 1988.
<b>Potential Impacts</b>	Disturbance of Aboriginal sites or objects within the project site
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Site personnel to be inducted to the site, including providing an understanding of the cultural heritage considerations associated with the project, including examples of indications of potential cultural significance.</li> <li>▪ If suspected Aboriginal heritage items, including stone artefacts, hearths or burials are exposed during excavations, work will stop immediately, and the Principal and an appropriately qualified Heritage Consultant will be contacted.</li> <li>▪ Works must cease until direction has been provided by an appropriately qualified Heritage Consultant, and/or appropriate authorities.</li> <li>▪ If human skeletal remains are found, these must be immediately reported to the Whyalla Police Station and Division of State Aboriginal Affairs (if suspected to be of Aboriginal origin).</li> </ul>

### 3.2.6 Waste management

A variety of wastes, both potentially hazardous and non-hazardous and including general refuse, may be produced during construction activities.

The waste hierarchy will be implemented during all construction activities at the site, as practicable.

Table 11 outlines the potential impacts of waste as a result of Project activities and measures to minimise these impacts.

**Table 11: Waste management**

Aspect	Clarification
<b>Environmental Objectives</b>	Prevent negative environmental impacts associated with construction waste. Prevent waste from impacting on land and surface water. Comply with <i>Environment Protection Act 1993</i> and relevant SA EPA Guidelines.
<b>Potential Impacts</b>	Inappropriate storage and disposal of waste impacting on land and surface water. Accumulation of pest animals.
<b>Mitigation Measures</b>	<ul style="list-style-type: none"> <li>▪ Site personnel inductions to include appropriate storage (including separation) and disposal/recycling of waste.</li> <li>▪ Work areas to be maintained in a neat and orderly manner.</li> <li>▪ Waste to be disposed of regularly by the persons/organisation undertaking the activities, with appropriate signage and separation of hard organic material from putrescible organic material. Off-site waste disposal will be in accordance with SA EPA and Zero Waste SA guidelines/requirements.</li> </ul>

## 4.0 INCIDENT PLAN

A contingency plan is provided to guide site personnel if environmental concern is raised during Project activities.

Examples of events that warrant concern could include (but is not limited to):

- Chemical spills
- Encountering potential Aboriginal artefacts
- Community complaints
- Encountering trapped or injured fauna.

The following contingency plan will be followed:

- 1) **Stop Work:** where required, works will cease in the area of the environmental issue, or entire site (depending on severity of the event)
- 2) **Secure the Area:** the area will be made safe. This could include the following:
  - Containment of chemicals
  - Containment of contaminated water to prevent runoff going offsite
  - Flagging off areas
- 3) **Communicate:** the incident will be communicated as soon as practicable to the Principal and any relevant authorities
- 4) **Resolve:** the offending activity will not continue until the issue/concern has been resolved, corrective actions have been put in place, and the Principal has given approval to proceed.

## 5.0 MONITORING, REPORTING AND REVIEW

Reporting requirements, site inspections and any audits of compliance with the EMP will be in accordance with SIMEC ZEN Energy requirements.

## 6.0 IMPORTANT INFORMATION

Your attention is drawn to the document – “Important Information”, which is included at the end of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.



## Signature Page

### **Golder Associates Pty Ltd**



Hannah Keynes  
*Environmental Scientist*



Lissa van Camp  
*Principal Environmental Consultant*

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**APPENDIX J**

# Important Information

The document ("Report") to which this page is attached and which this page forms a part of, has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

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At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

**Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification**



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21 December 2018

1898738-009-R-Rev0

**Laura Kerber**

Department of Planning, Transport and Infrastructure  
 Level 5, 50 Flinders Street  
 Adelaide SA 5000

**CULTANA SOLAR FARM- REQUEST FOR INFORMATION RESPONSE  
 APPLICATION NUMER 850/V003/18**

Dear Laura,

Golder Associates (Golder) provides the following additional information for SIMEC Zen Energy's Development Application for the proposed Cultana Solar Farm (application number 820/V003/18), lodged on 7 November 2018.

**1.0 DPTI REQUEST FOR INFORMATION**

Below are the responses to the DPTI's request for information (ref. 2018/21983/01) received on 20 November 2018.

***Item 1: Indicative plans***

The site location and general layout is shown on Figure 1.

An updated suite of plans has been included in Attachment 1. The items requested have been included, as is summarised in the table below.

**Table 1: Requested plans and reference**

Item	Information requested	Attachment 1 reference
1b	Site plan and project layout including <ul style="list-style-type: none"> <li>- Solar arrays</li> <li>- Ancillary infrastructure</li> <li>- Operations and maintenance compounds</li> <li>- Waste storage, hardstands etc.</li> <li>- Access points and internal access tracks</li> <li>- Buffers / set backs</li> <li>- Construction laydown areas and temporary site facilities</li> <li>- Transmission lines</li> </ul>	Figure 1000: Site Plan Figure 2000: 275/33 kV switchyard plan Figure 2100: 275/33 kV switchyard elevation Figure 1001: Northern Entry Site Plan
1c	Rehabilitation and landscape screening plan	Figure: 1000 Site Plan (and below)

Item	Information requested	Attachment 1 reference
1d	Fencing plan including typical fence detail	Figure: 1000: Typical Fence Details
1e	Lighting and CCTV plan including typical lighting and CCTV details	Figure 1002: Southern Entry Site Plan Figure 1001: Northern Entry Site Plan
1f	Diagrams/elevations/arrangements of solar modules, substation, overhead transmission poles and other electrical infrastructure including dimensions	Figure 1000: Site Plan Figure 2000: 275/33kV Switchyard Plan Figure 2100: 275/33kV Switchyard Elevation Figure 2200: 6.8MVA Turnkey Solution for SG3400HV
1g	Elevations/layout of all proposed buildings	Figure 2300: O&M Shed Elevation

**Item 1C: Rehabilitation and landscape screening plan**

EBS Ecology has been consulted on construction management to protect vegetation to the extent practicable, methodology for rehabilitation and suitable species characteristics for rehabilitation. The details of the landscaping and rehabilitation plan will be finalised during detailed design.

The North and South sites include an approximate 100 m buffer along the Lincoln Highway. The vegetation within these buffers will be maintained and enhanced with plantings of local native species where required. Vegetation screening will also be planted using local native species, around the operations and maintenance compound.

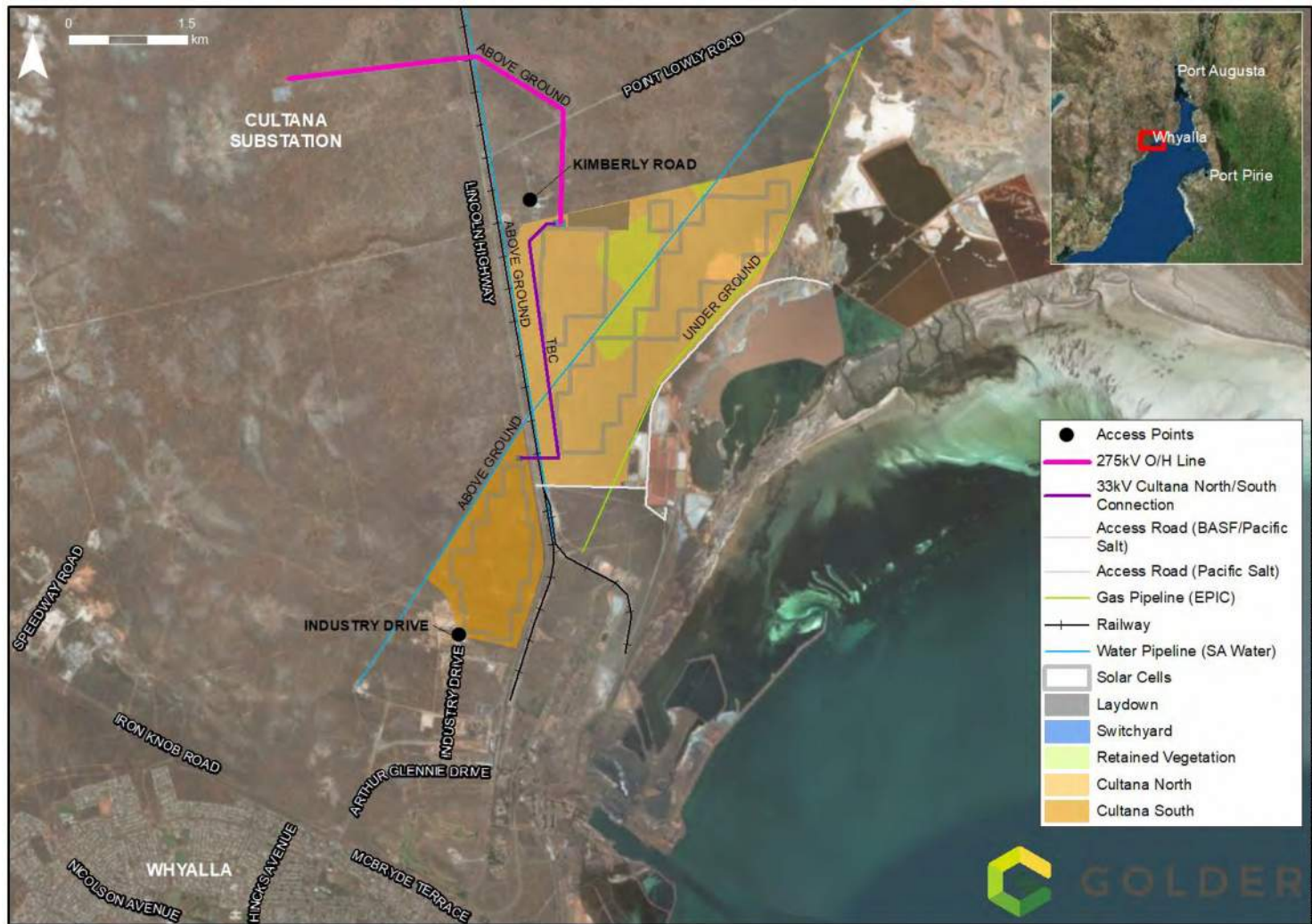


Figure 1: Site location and general layout

### ***Item 2a: Battery Energy Storage System***

The option for the Battery Energy Storage System (BESS) as part of this Project has been withdrawn. Instead, SIMEC ZEN Energy's Playford Battery Project will provide the Fast Frequency Response (FFR) for the Project required by the Office of the Technical Regulator (OTR). This is in line with the conditions of the original OTR certificate (Attachment 2).

The Crown sponsorship request accepted by the Department for Energy and Mining also included the Playford Battery Project. Therefore, the Crown sponsorship is not compromised by the withdrawal of the on-site BESS from the Project.

### ***Item 2b: Transmission line route***

A number of options for the transmission line route and substation connections were explored in the early stages of the Project. As such, technical studies included an assessment of, and reference to, more than one transmission line route (presented as options). The preferred transmission line route was subsequently selected, as was described in the DA.

The preferred transmission line route includes a 33 kV above ground cable crossing the Lincoln highway between the South and North site. Above-ground infrastructure within the project boundary will then feed into a power transformer and switchyard in the north of the North site. From there, 275 kV aboveground power lines will connect to the Cultana Substation.

The preferred transmission line route is shown on Figure 1. The transmission line will traverse the following land parcels (in sequence from the site to the substation):

- CR 5346/949
- CR 6140/412
- CT 5983/54 (Rail line)
- Public Road or Other Tenure (Lincoln Highway)
- CL 6164/360 (through existing ElectraNet easements)

Negotiations are continuing with the stakeholders including the Barngarla Determination Aboriginal Corporation for the final transmission line route.

### ***Item 2c: Access – North site***

Access from the North site is proposed to be via Kimberly Road at the northern end of the site. Kimberly Road stops approximately 250 m north of the site, requiring a new access track to be constructed. This is likely to traverse Crown Record land (CR 5346/948).

SIMEC ZEN Energy is negotiating road access between Kimberly Road and the site during subsequent design phases.

### ***Item 3: Preliminary decommissioning and rehabilitation plan***

A Preliminary Decommissioning Plan (PDP) has been developed to describe the framework and strategies to facilitate a range of future land use options following decommissioning of the Project (Attachment 3).

The PDP includes a preliminary list of the plant and equipment with proposed decommissioning actions. The management actions have been based on minimum disturbance methodology to ensure the impact on vegetation and topsoil stabilisation with the aim of mitigating potential ongoing dust issues.

The PDP outlines a rehabilitation strategy which assumes that the site will be returned to the previous land use. Following decommissioning, onsite vegetation is expected to recover over time. Recovery will be accelerated through direct-seeding of fast-germinating, resilient locally- native species. Watering and the use of polymer-based surface treatments will also be used to air water retention, improve germination rates and recovery.

#### ***Item 4: Waste Management Plan***

A Waste Management Plan (WMP) has been developed to manage wastes generated as a result of construction and operation (Attachment 4).

The WMP lists the typical waste products expected to be generated by the Project and uses the waste management hierarchy to apply waste management measures for each.

The main construction waste products are expected to be solid inert wastes, green waste and commercial waste such as packaging. Minimum packaging will be requested for all project supplies and waste products will be reused and recycled where possible. Materials that require disposal will be appropriately stored and disposed in accordance with SA EPA guidelines.

Operational activities will generate minimal wastes, which will be restricted to general office/amenity refuse. These wastes will be appropriately stored, segregated and disposed.

#### ***Item 5: Surface water***

The Whyalla Council Development Plan (Development Plan), consolidated 14 June 2017, indicates that the South site is within an area which may be susceptible to a 1-in-100 year Average Recurrence Interval (ARI) Flood Event.

The Project will be designed to ensure the risk to property, personal and public safety are mitigated including:

- Solar panels will be elevated above the 1-in-100 ARI flood level
- Land clearance will be minimised and disturbed areas will be progressively rehabilitated throughout and following construction
- Fencing will be constructed of chain-wire mesh to not impede flood waters or obstruct any surface water flows. The maximum chain-wire mesh size possible has been selected (50 mm) with considerations of safety and security. The fence line will be monitored and cleared prior to high rainfall events to ensure there are no obstructions
- Fencing will be designed to withstand flood waters
- Driveway widths will be minimised as much as practicable, while maintaining appropriate access
- The Project will not prevent access by emergency vehicles or essential utility services vehicles
- There will be no buildings within the area susceptible to 1-in-100 year Average Recurrence Interval (ARI) Flood Events.



## **Item 6: Airfields and controlled airspace**

The Project is within 15 km of two airstrips:

- Whyalla Airport is approximately 6 km to the south west
- Cultana Training Area airstrip is approximately 13.5 km to the north

Based on the Australian Government, Civil Aviation Safety Authority, *Manual of Standards Part 139 – Aerodromes*, published January 2017, the Obstacle Limitation Surface within 15 km of an approach runway is set at 150 m above ground. This height is well above the maximum Project infrastructure height of approximately 50 m (transmission poles).

The potential for glare impacts on aircrafts using the Whyalla Airport was assessed and it was shown that aircrafts and the air traffic control tower will not receive glare from the Solar Farm.

In accordance with industry standards, the Cultana Training Area airstrip was greater than 10 km from the Project site and does not require a glare assessment.

## **Item 7: Visual impact**

### **North site**

The SIMEC Mining set-back of approximately 100 m from the Lincoln Highway will allow for the existing low to medium height shrubs along the site boundary to be retained and act as a screen for highway users. Local native species will be planted in areas where there is sparse (or no) vegetation screening between the Project infrastructure and the Lincoln Highway. Vegetation screening will also be planted using local native species around the operations and maintenance compound and ancillary infrastructure, as required.

### **South site**

The Project infrastructure will be set-back a minimum of 100 from the boundary fence. This will allow for the existing low to medium height shrubs along the site boundary to be retained. Local native species will be planted in areas where there is sparse (or no) vegetation screening between the Project infrastructure and the Lincoln Highway.

## **Item 8: Ecological assessment**

An Ecological Desktop Assessment was undertaken in August 2018 to assess the potential impact to flora and fauna from the Project and determine any constraints that need to be considered in the design. Based on the results of the desktop assessment, the Project was not expected to have a significant impact on any matters of National Ecological Significance (NES).

The methodology for vegetation assessment and clearance was discussed with the Native Vegetation Management Unit (NVMU) on 12 September 2018.

Based on the results of the desktop assessment and discussions with the NVMU, SIMEC ZEN Energy has included retention of native vegetation where practicable, including protecting a large area of acacia woodlands (shown on Figure 1000, Attachment 1) and trimming of vegetation under the solar panels to a height of 500 mm (rather than removing).

While at the time of submitting the Development Application the field survey had not yet been undertaken, it was identified that a Bushland Assessment would be undertaken, and a Significant Environmental Benefit (SEB) applied to the development. Since then a field survey including Bushland Assessment has since been undertaken by EBS Ecology and a clearance application submitted to the Native Vegetation Unit.

A map of the vegetation assessed during the site survey is included on the figures below (Figure 2 and Figure 3). The key results of the field survey were as follows:

- A total of eight vegetation associations were mapped and assessed within the North Site and five vegetation associations were mapped and assessed within the South site
- The species inventory from the vegetation assessment identified 42 native flora species and four weed species;
- Weeds were widespread over the Project area including Ward's Weed (*Carrichtera annua*), Common Iceplant (*Mesembryanthemum crystallinum*) Onion Weed (*Asphodelus fistulosus*), African Boxthorn (*Lycium ferocissimum*), Prickly Pear (*Opuntia stricta*) and Horehound (*Marrubium vulgare*)
- A total of 384 birds from 39 species were recorded during point counts and opportunistically within the Project area
- There were no Western Grasswrens observed in the Project area nor areas of their preferred habitat
- No species of state or national significance recorded within the Project area.

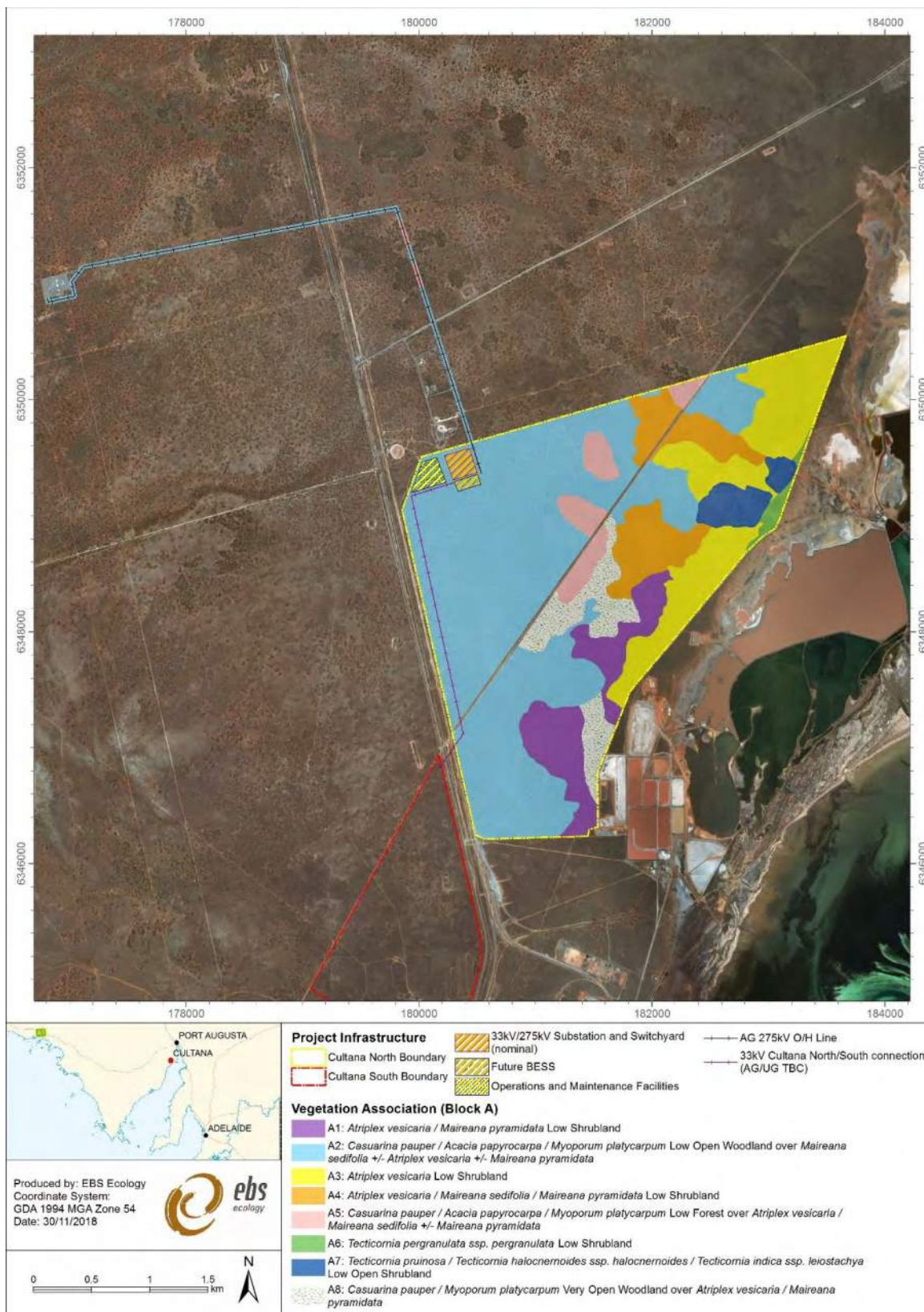


Figure 2: Vegetation associations observed on the North Site



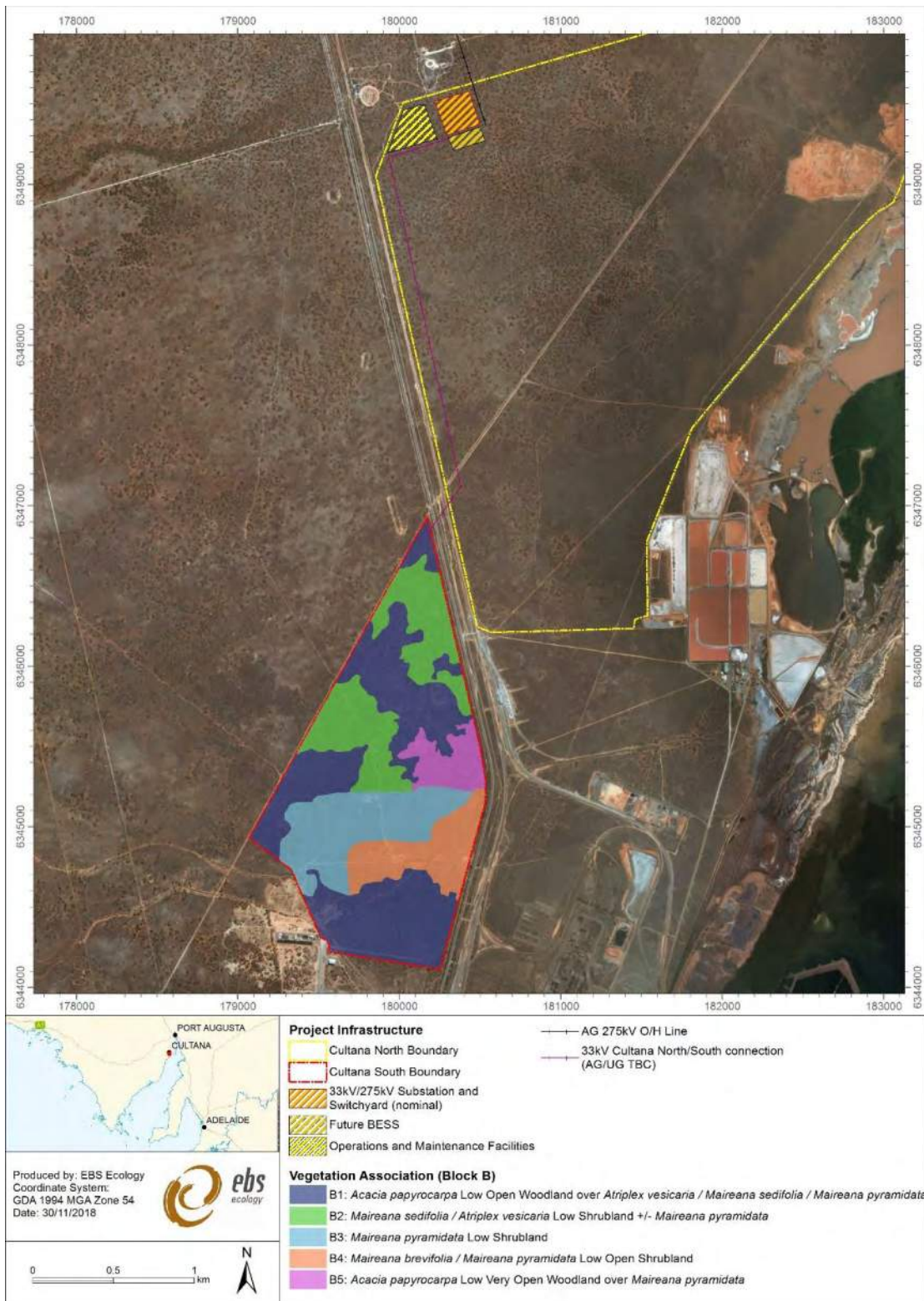


Figure 3: Vegetation associations on the South Site

### ***Item 9: Construction staging***

Construction of the Project is expected to take approximately 18 months. Three work teams will be building simultaneously over three construction sites- North site 1 (north of the water pipeline easement), North site 2 (south of the pipeline easement) and South site.

We trust this clarifies the items included on your RFI.

### **Golder Associates Pty Ltd**



Hannah Keynes  
*Environmental Scientist*



Lissa van Camp  
*Principal Environmental Consultant*

HK/LvC/gp

#### **Attachments:**

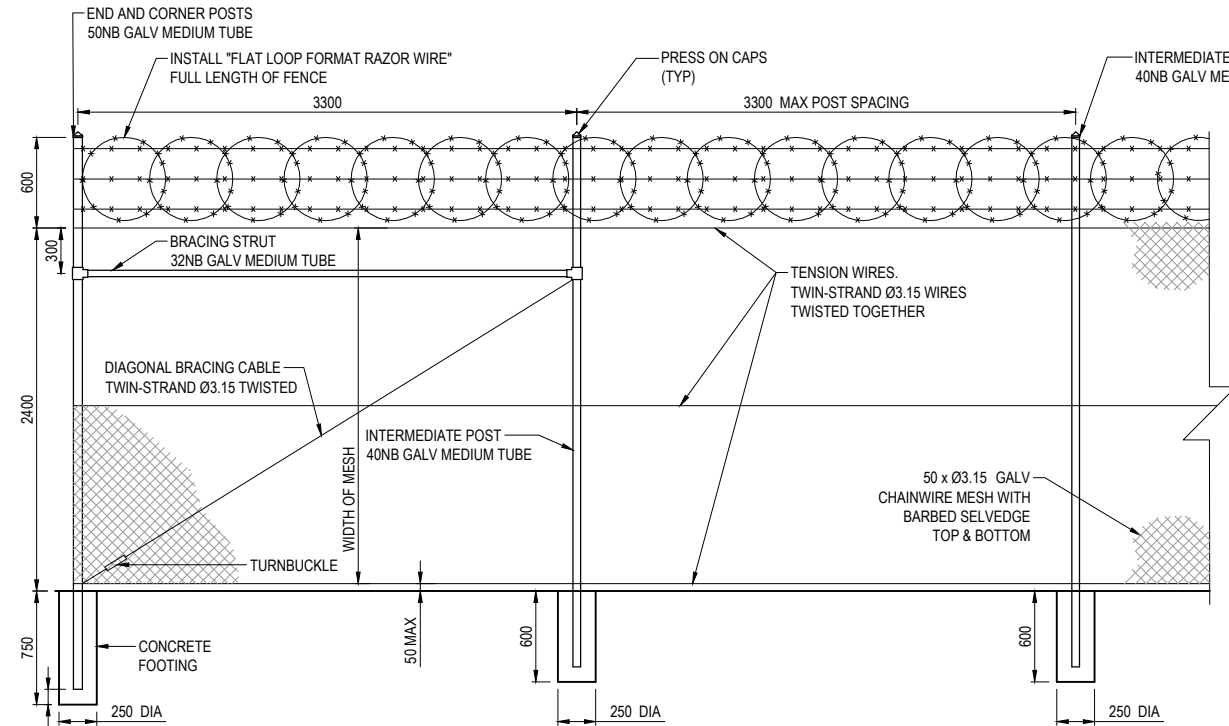
- Attachment 1: Indicative Plans
- Attachment 2: OTR Certificate
- Attachment 3: Preliminary Decommissioning Plan
- Attachment 4: Waste Management Plan

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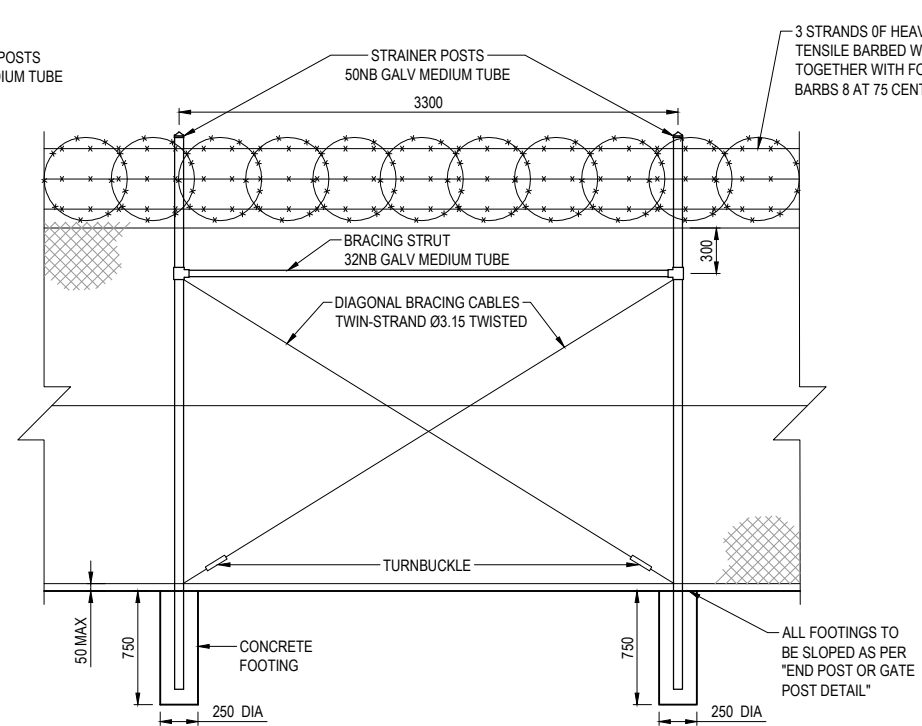


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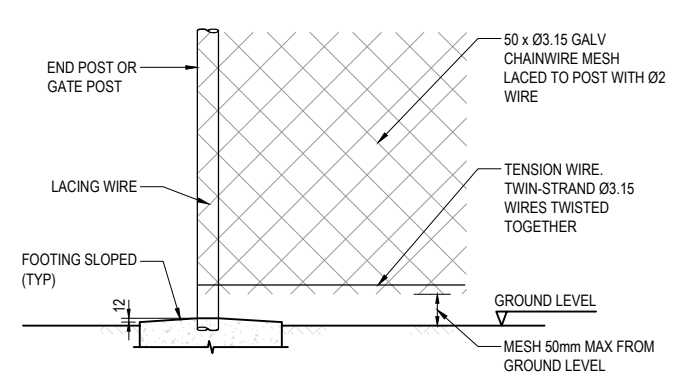
**Indicative Plans**



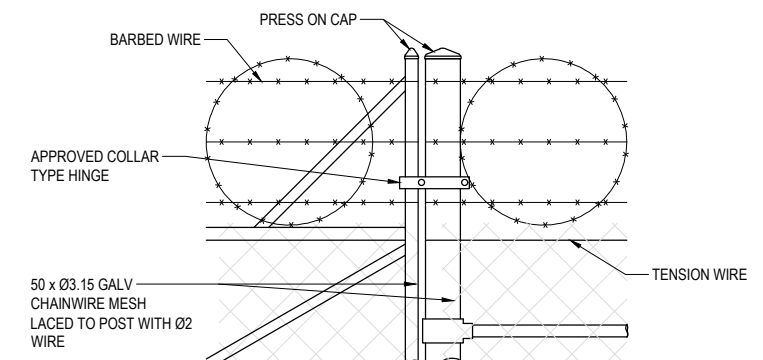
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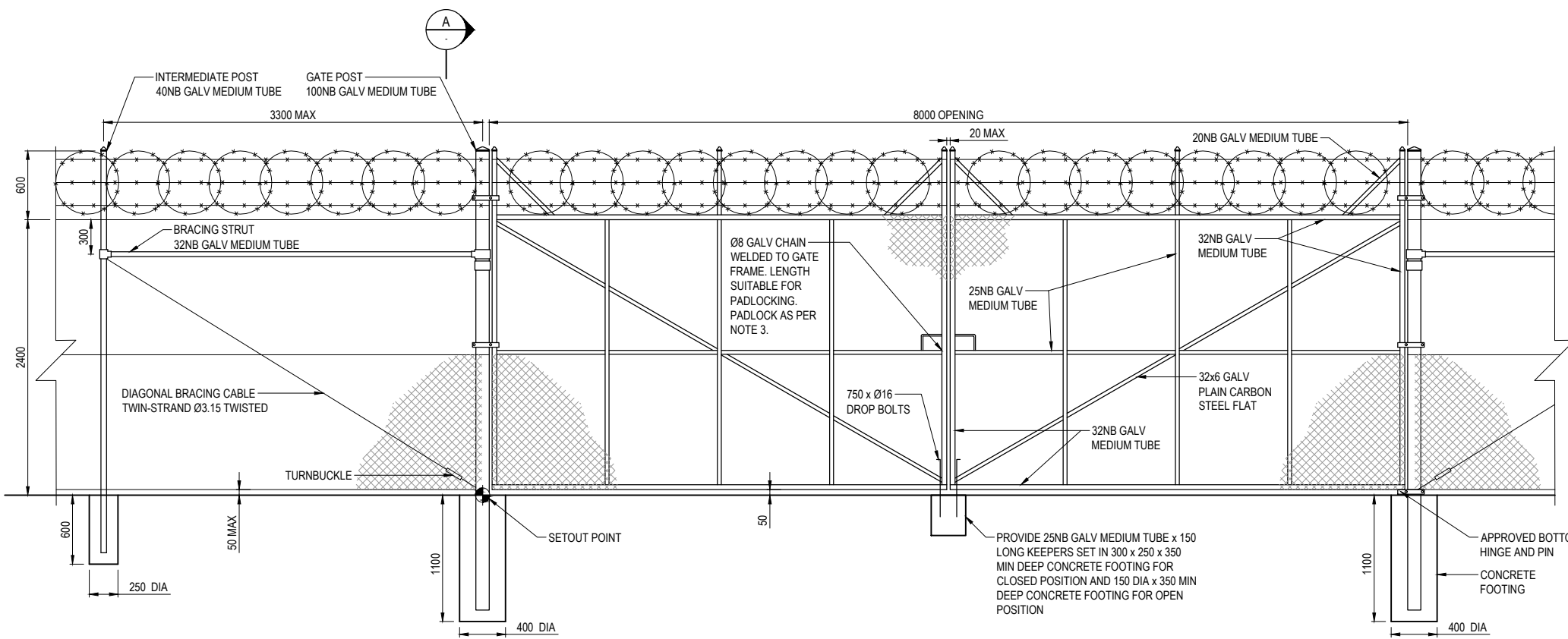
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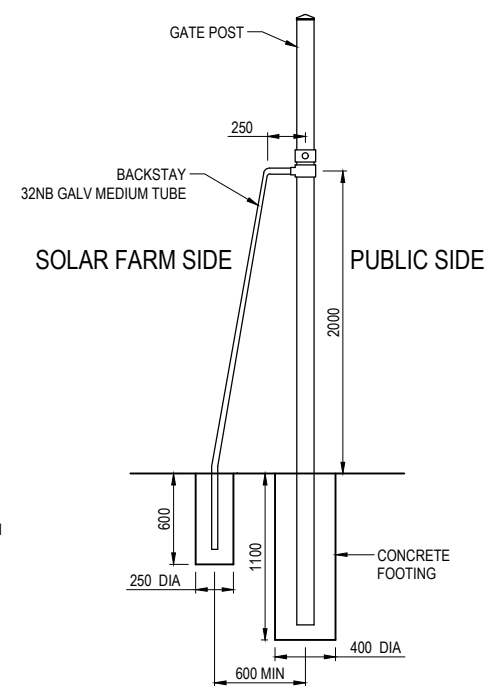
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 NTS



**GATE DETAIL**  
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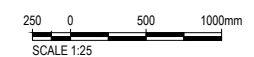


**TYPICAL GATE**  
 1:25



**SECTION A**  
 1:25

- NOTES:**
- DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
  - PROVIDE SL2 RATED PADLOCK, WITH A RESTRICTED KEYING SYSTEM, FOR ALL VEHICLE GATES.



**CLIENT**

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 zenenergy.com.au

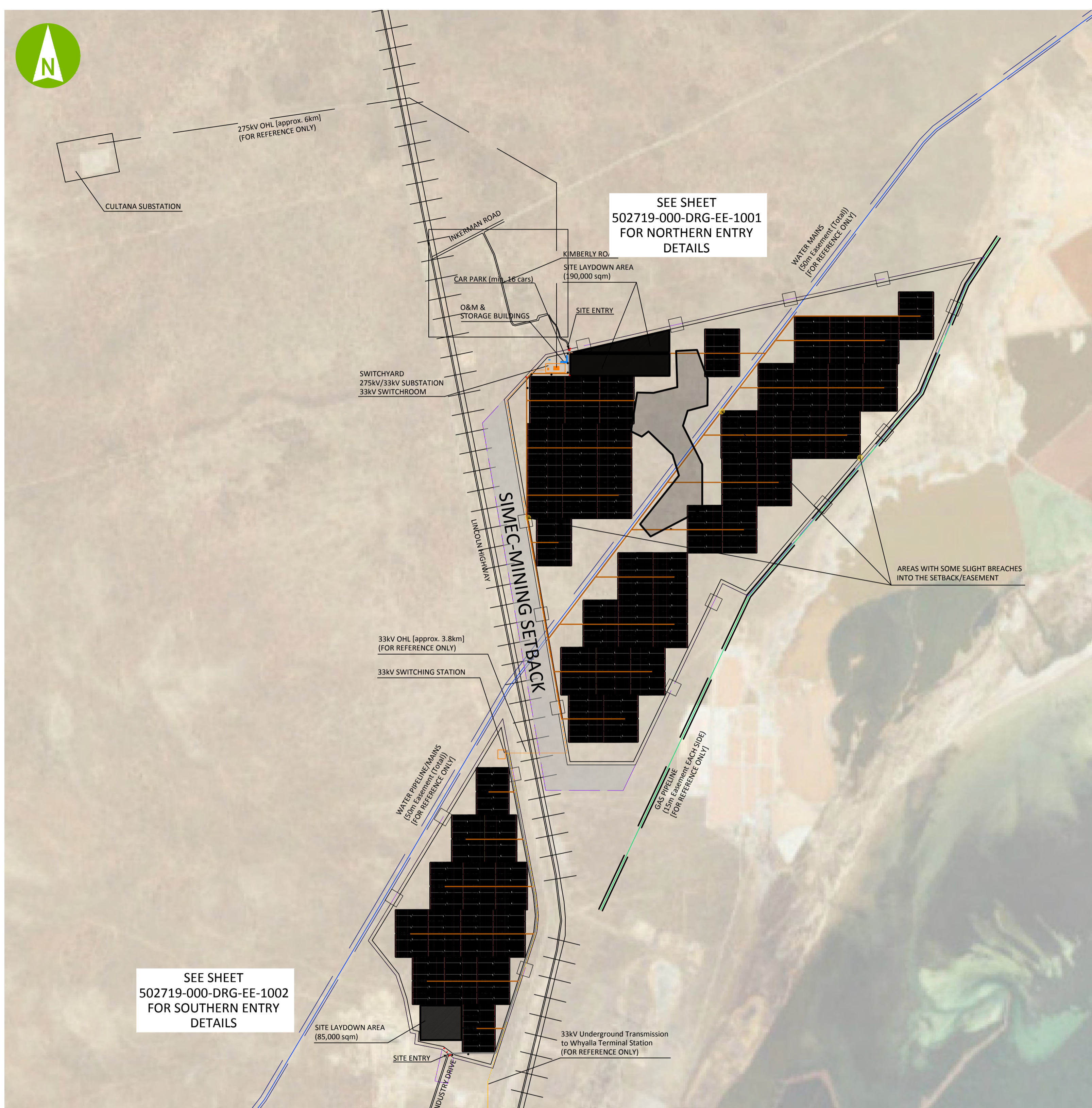
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DESIGNED	
REVIEWED	

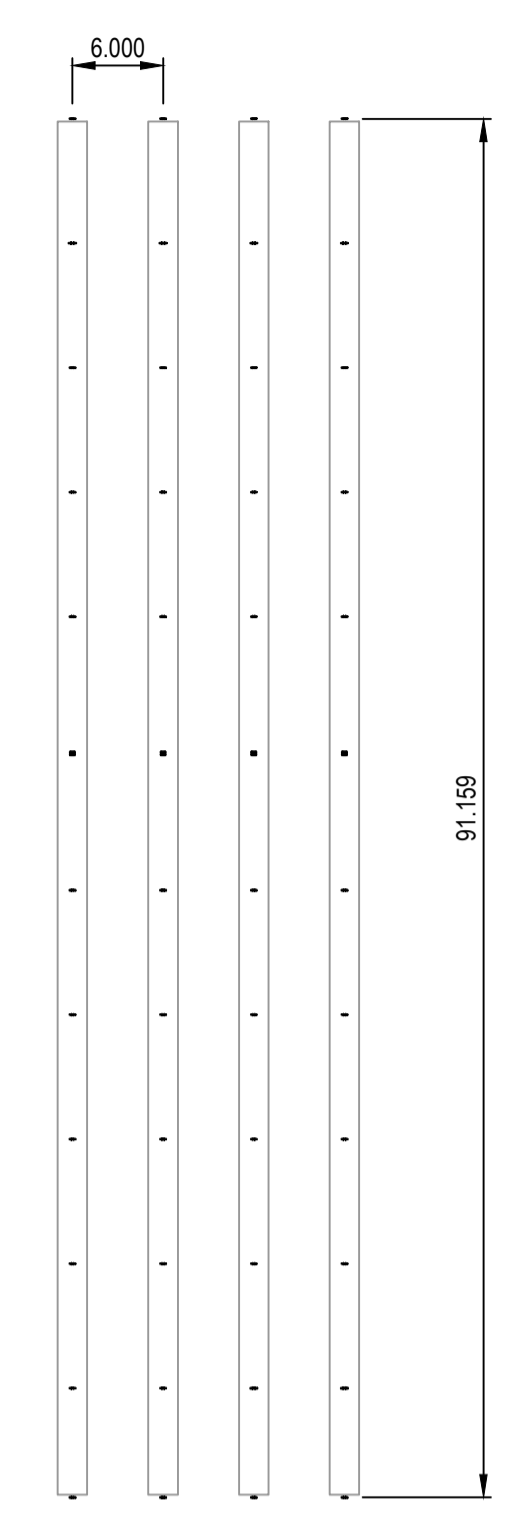
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APPROVED	GENERAL CONCEPT
DATE	TITLE
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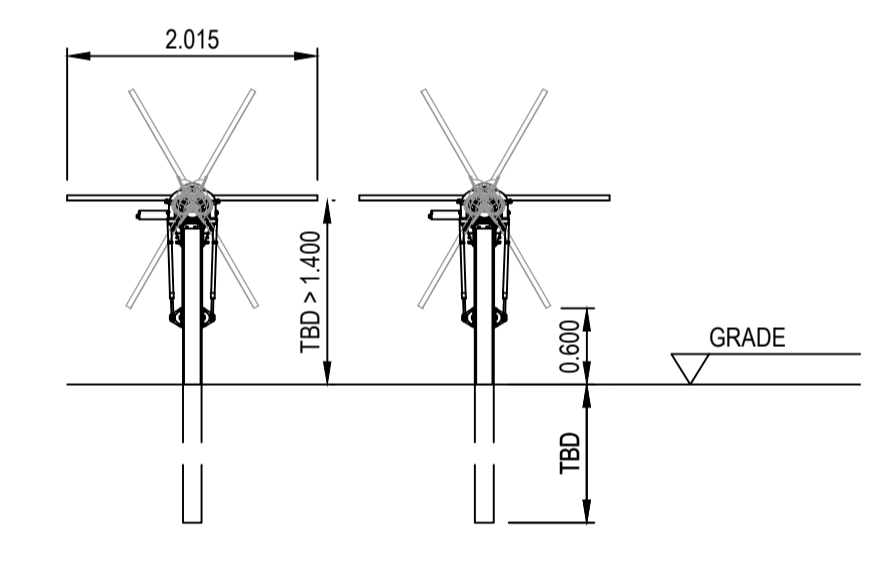




**SITE PLAN**  
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**TRACKER LENGTHS**  
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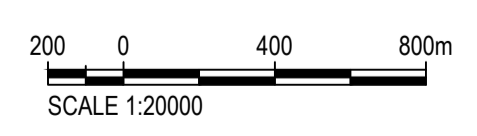


**TRACKER ELEVATION**  
NTS  
\*SEE SYSTEM SPECIFICATIONS

**LEGEND**

	SITE ACCESS		WOODLAND AREA
	TRACKER TABLES		CAR PARK
	PCU STATION		O&M & STORAGE BUILDINGS
	4m WIDE INTERNAL ROADS (to PCUs)		33kV SWITCHROOM
	FENCING		SWITCHYARD & 275kV/33kV SUBSTATION
	8m WIDE INTERNAL ROADS (to Substation)		LAND BOUNDARY
	TRACKER ROW MOTOR		GAS LINE
	LIGHT POLE		WATER MAINS
	CCTV		33kV OHL (Connecting A to B)
	TRACKER ROW MOTOR		DC CABLE ROUTE (from Tracker rows to Joint Point) [Cable management system TBD]
	DC STRINGS JOINT POINT (without Monitoring) [Combiner system TBD]		COMMON TRENCH (from PCU to tracker AC motors)
	Tracker Tables		4m WIDE INTERNAL ROADS (to PCUs)
	PCU STATION		

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<b>REVIEWED</b>	

<b>PRELIMINARY</b> NOT FOR CONSTRUCTION	<b>APPROVED</b> DATE
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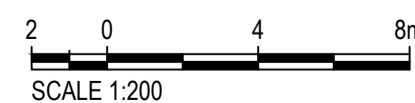
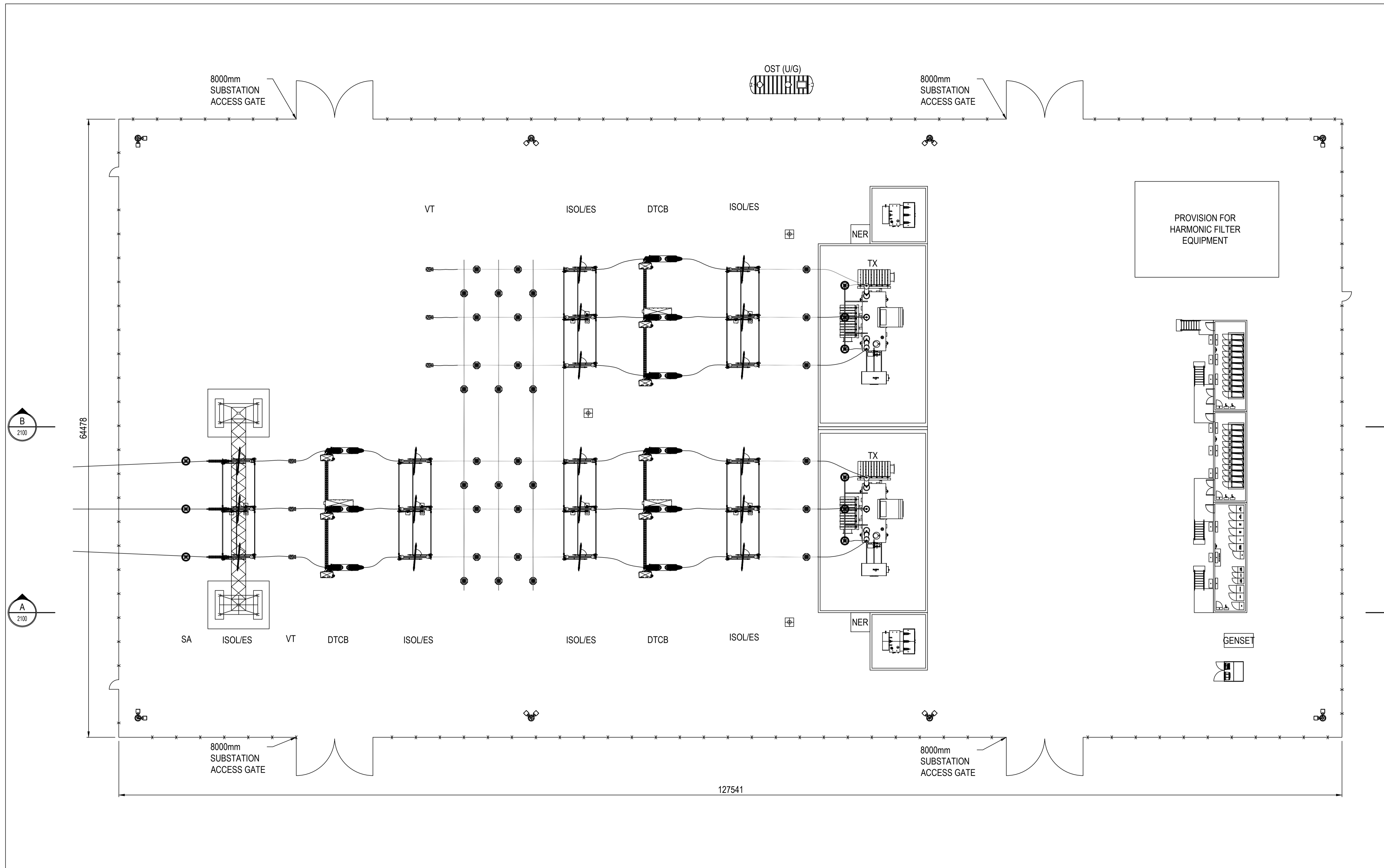
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<b>TITLE</b>	SITE PLAN					
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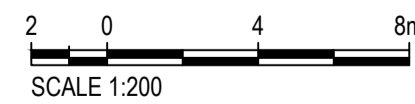
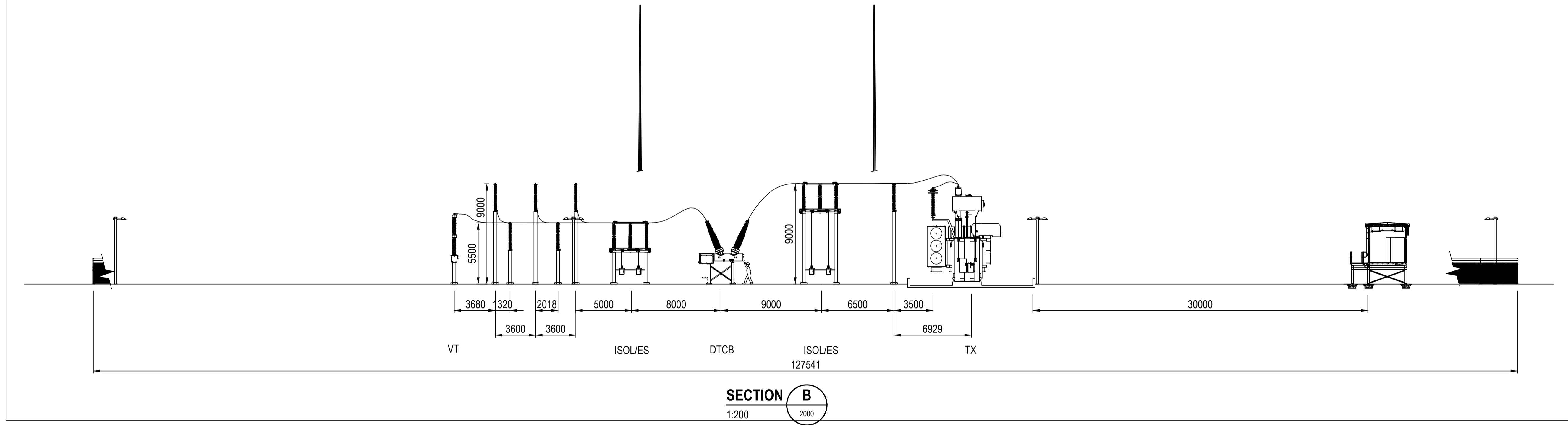
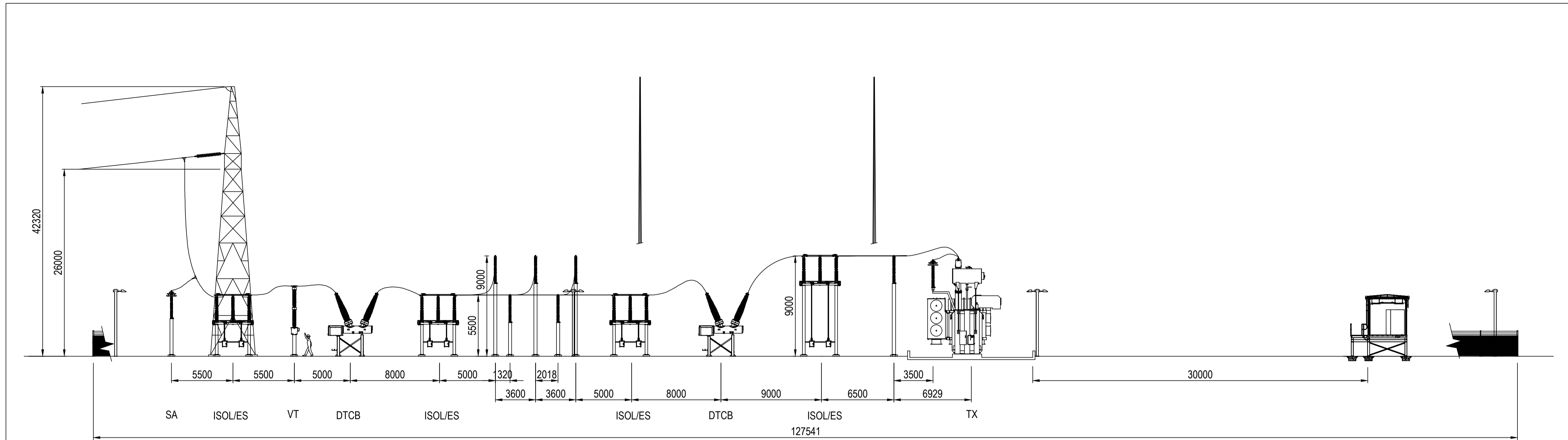
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**SIMEC**  
**ZEN Energy**  
 PO Box 141  
 Oaklands Park SA 5046  
 zenenergy.com.au

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SIZE	A1
DRAWN	C.TOMASZEK
DESIGNED	
REVIEWED	

PRELIMINARY  
 NOT FOR CONSTRUCTION  
 APPROVED  
 DATE

PROJECT	CULTANA SOLAR FARM				
TITLE	GENERAL CONCEPT 275/33kV SWITCHYARD PLAN				
DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER
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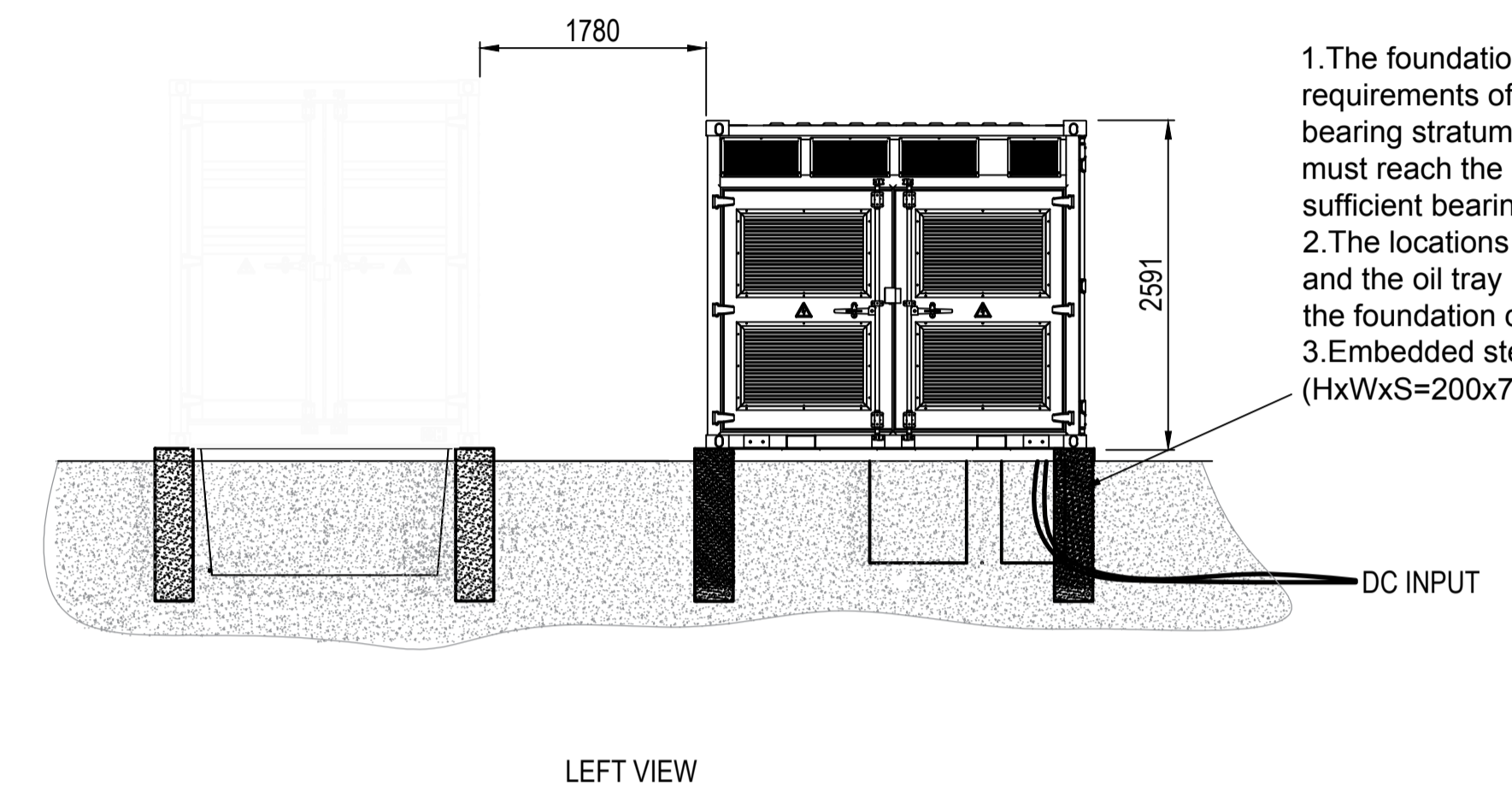
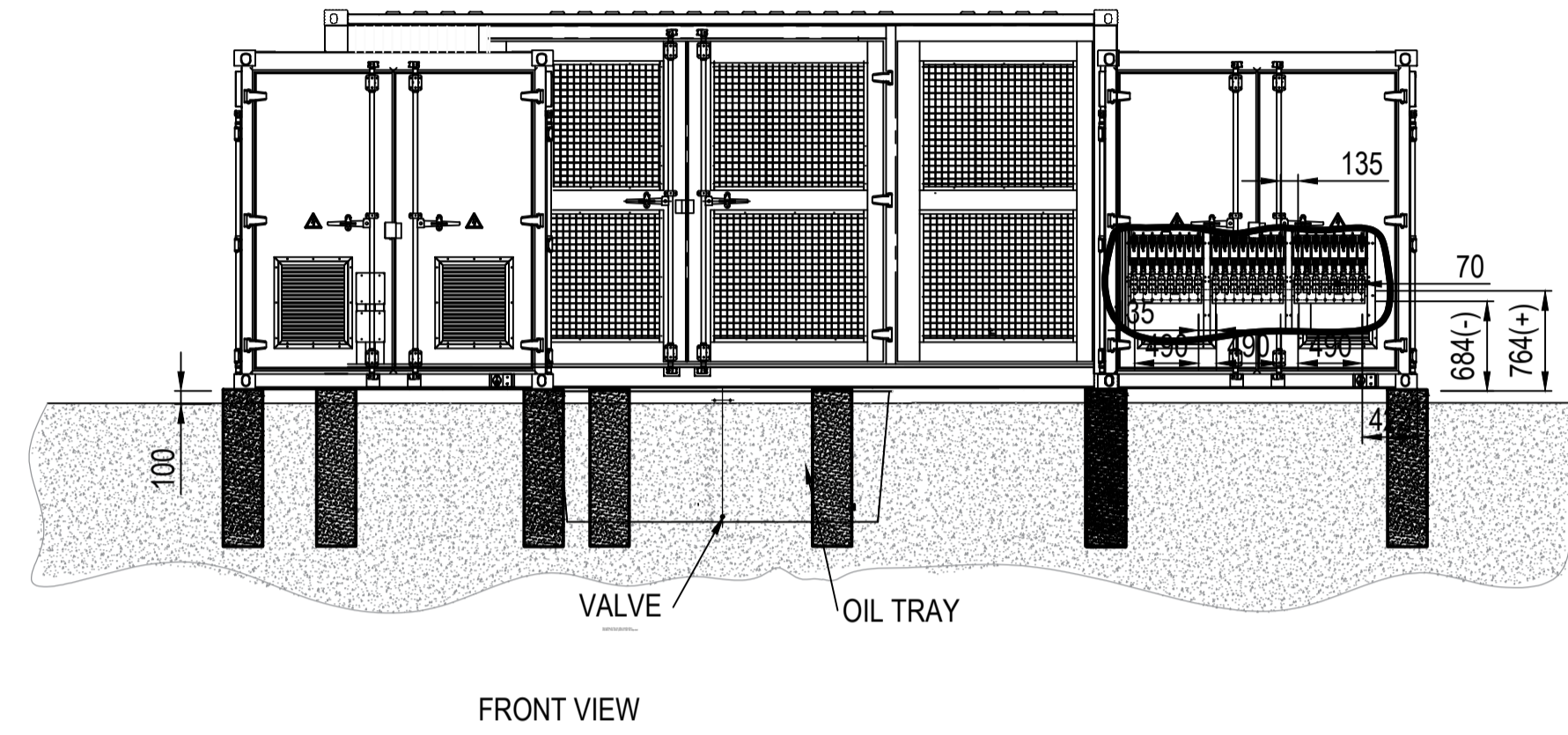
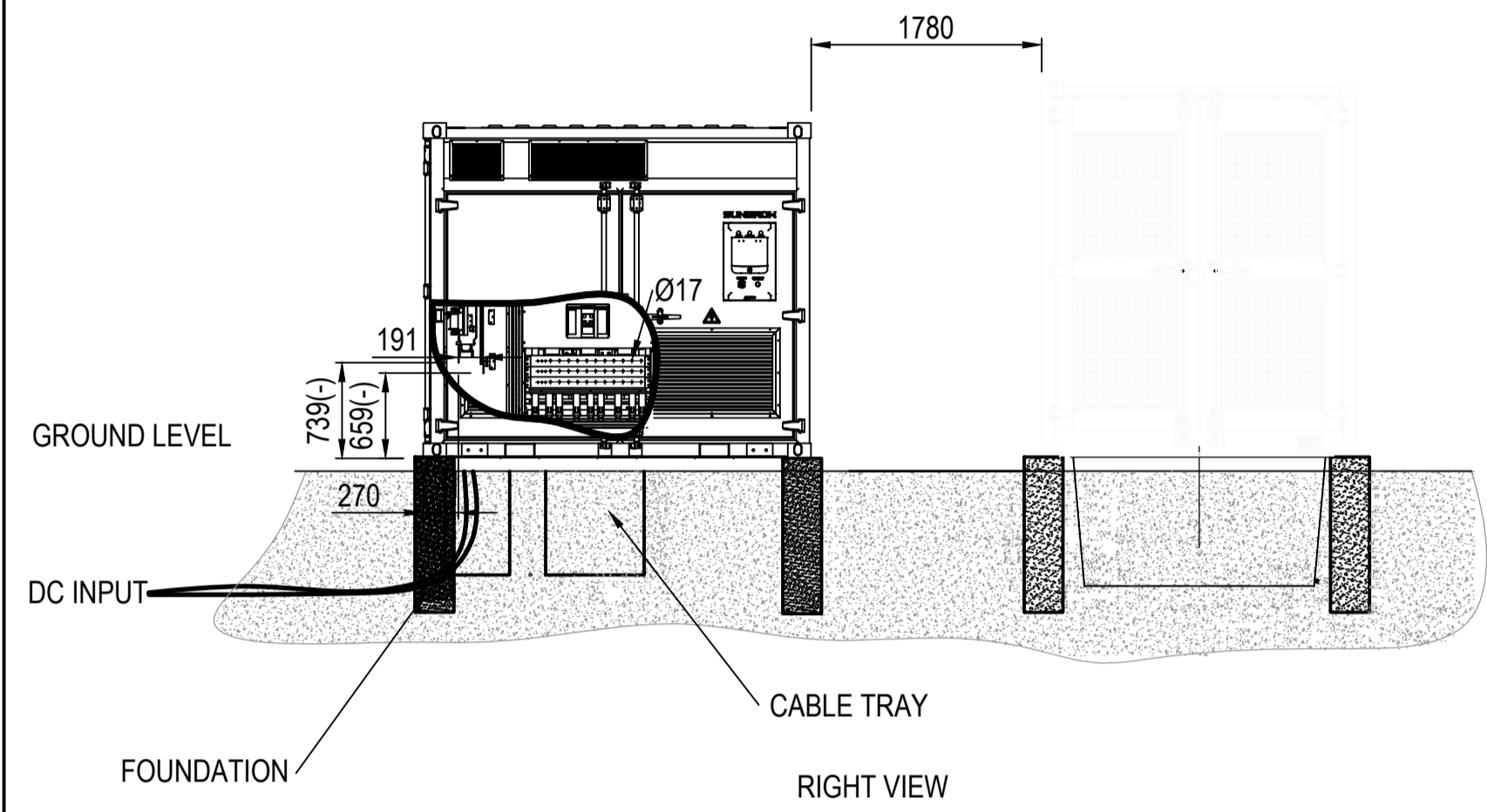
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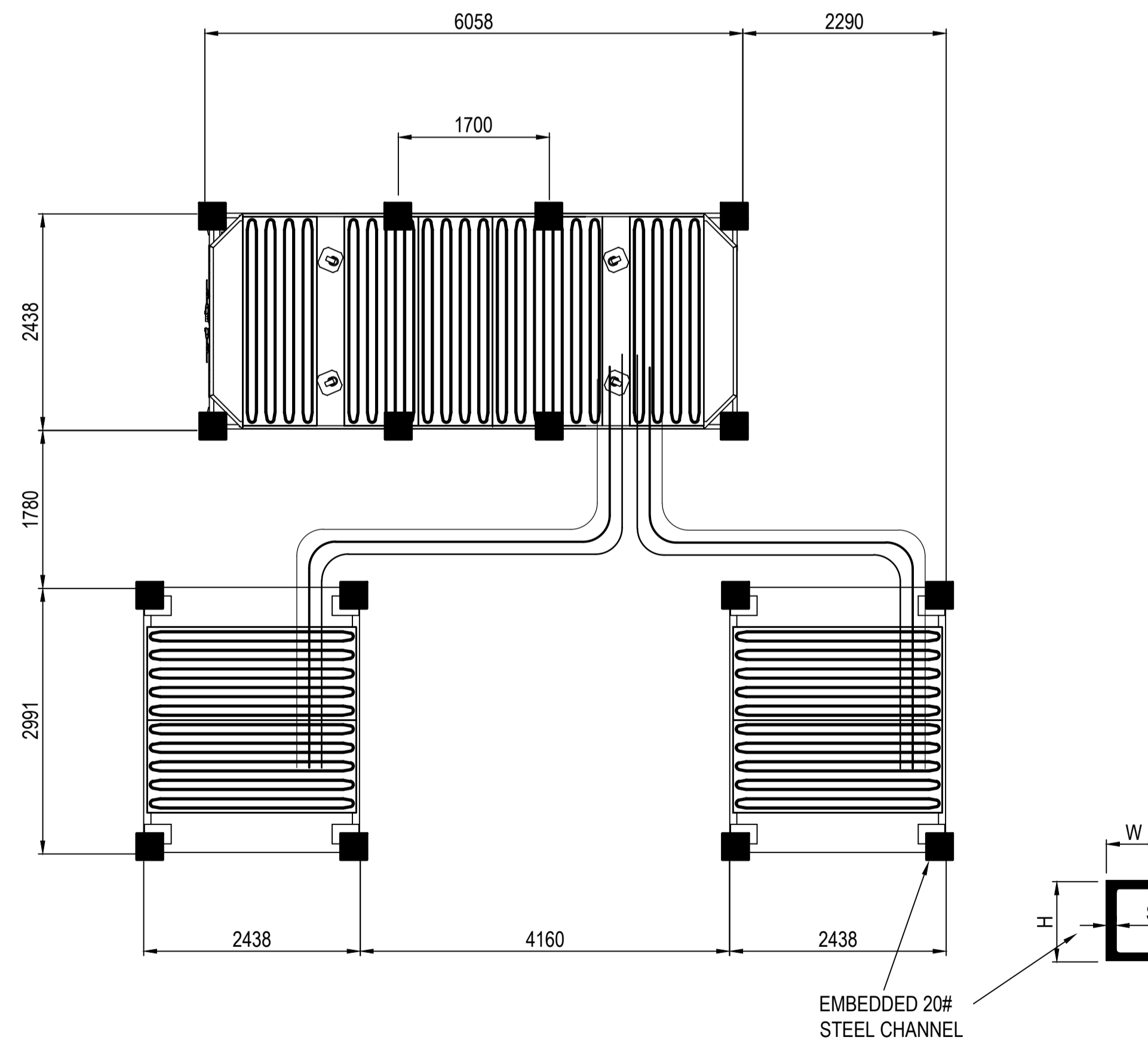
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DRAWING No.	502719 - 0000 - DRG - EE - 2100 - A





1. The foundation dimensions must meet the requirements of the bearing capacity of the bearing stratum. The depth of the foundation must reach the bearing stratum with the sufficient bearing capacity.
2. The locations and sizes of the cable entries and the oil tray must be taken into account for the foundation design.
3. Embedded steel channel 20# (HxWxS=200x75x9mm or equivalent)



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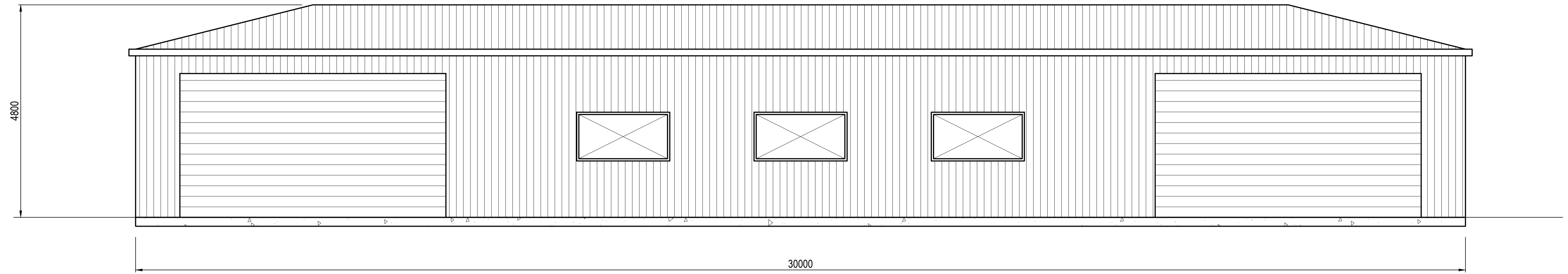
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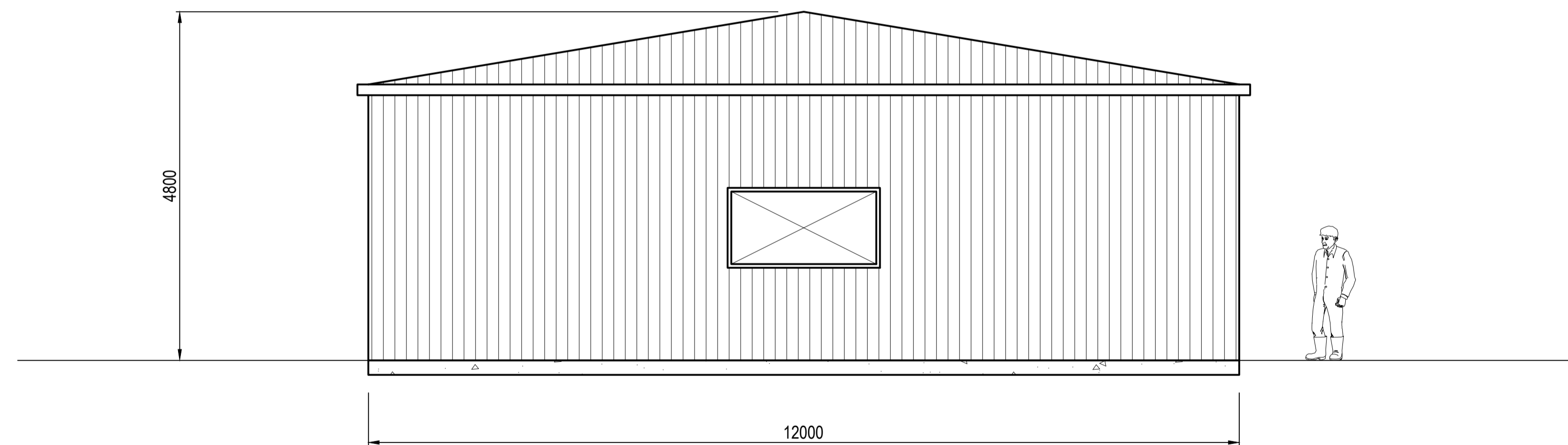
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APPROVED \_\_\_\_\_  
 DATE \_\_\_\_\_

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DRAWING No.	502719	PROJECT No.	0000	WBS	DRG	TYPE	EE	DISC	2200	NUMBER	A



ELEVATION A  
1:50



ELEVATION B  
1:50

500 0 1000 2000mm  
SCALE 1:50

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**ZEN Energy**  
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Oaklands Park SA 5046  
zenenergy.com.au

REV	DATE	REVISION DETAILS	APPROVED
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D.JEFFERS	
DESIGNED	
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PRELIMINARY	APPROVED
NOT FOR CONSTRUCTION	DATE

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CULTANA SOLAR FARM	GENERAL CONCEPT O&M SHED ELEVATION	502719	0000	DRG	EE	2300	A	

**ATTACHMENT 2**  
**OTR Certificate**





Ref: 2017/01873.01 D18073816

25 May 2018

Jezac Crowe  
SIMEC ZEN Energy  
1284 South Rd  
Tonsley SA 5042  
By email: [jezac@clutchconsulting.com.au](mailto:jezac@clutchconsulting.com.au)

Energy and Technical  
Regulation

Office of the  
Technical Regulator

Level 8, 11 Waymouth Street  
Adelaide SA 5000

GPO Box 320  
Adelaide SA 5001

Telephone: 08 8226 5500  
Facsimile: 08 8226 5866

[www.sa.gov.au/otr](http://www.sa.gov.au/otr)

Dear Jezac,

**RE: CERTIFICATE FOR DEVELOPMENT OF THE CULTANA SOLAR POWER PROJECT**

The development of the Cultana Solar Power Project on has been assessed by the Office of the Technical Regulator (OTR) under Section 37 of the Development Act 1993.

Regulation 70 of the *Development Regulations 2008* prescribes if the proposed development is for the purposes of the provision of electricity generating plant with a generating capacity of more than 5 MW that is to be connected to the State's power system – a certificate from the Technical Regulator is required, certifying that the proposed development complies with the requirements of the Technical Regulator in relation to the security and stability of the State's power system.

In making a decision on your application, our office has taken the following information into account:

- Your application for a OTR certificate for the project 'SIMEC Zen Energy – Cultana and Whyalla Solar – OTR Application FINAL.pdf', emailed to the OTR on 23 May 2018.

After assessing the information provided, I advise that approval is granted for the proposed project, provided the required Fast Frequency Response required for the project, as prescribed by the OTR's Generator Development Approval Procedure Version 1.1, is provided by SIMEC ZEN Energy's Playford Utility Battery Project.



Should you have any questions regarding this matter, please do not hesitate to call David Bosnakis on (08) 8226 5521.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Rob Faunt'.

Rob Faunt  
**TECHNICAL REGULATOR**

cc: Joe Devries – SIMEC ZEN Energy

**ATTACHMENT 3**

**Preliminary Decommissioning  
Plan**



REPORT

# Preliminary Decommissioning Plan

## *Cultana Solar Farm*

Submitted to:

**SIMEC ZEN Energy**

Submitted by:

**Golder Associates Pty Ltd**

118 Franklin Street Adelaide, South Australia 5000 Australia

+61 8 8213 2100

1898738-008-R-Rev0

07 December 2018



# Distribution List



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## 1.0 INTRODUCTION

SIMEC ZEN Energy is developing the 280 MW Cultana Solar Farm (the Project) over two connected sites near the Liberty OneSteel Whyalla Steelworks. With no existing facilities on the sites, all infrastructure will be delivered to the Project location.

This Preliminary Decommissioning Plan (PDP) has been prepared to describe the framework and strategies to facilitate a range of future land use options, following the decommissioning of the Project.

The main objectives of the PDP are to reduce or eliminate adverse environmental impacts post decommissioning and protect the environment and public health and safety by using safe and responsible decommissioning practices.

The PDP will also be useful in forward planning for decommissioning and rehabilitation costing.

### 1.1 Approvals and legislation

The environmental considerations for development of the Project, including approvals and permitting, are discussed in detail in the Development Application, which has been submitted to the State Commission Assessment Panel (SCAP) for assessment.

The Project's decommissioning will be in accordance with relevant legislation including:

- *Development Act 1993*
- *Environmental Protection Act 1993*
- *National Environment Protection (Assessment of Site Contamination) Measures 1999*
- *Work Health and Safety Act 2012*
- *National Electricity Rules, Version 107* (Australian Energy Market Commission, 2018)

## 2.0 PROJECT DESCRIPTION

### 2.1 Location and land use

The Project is located at the northern entrance to Whyalla and includes a North and South site, intersected by the Lincoln Highway.

The North site is approximately 6 km north of the Whyalla city centre. The site is owned by GFG Alliance and has been generally unused, with the exception of a small clay borrow pit in the north eastern portion. An easement for the SA Water Whyalla – Morgan pipeline runs through the centre and an Epic Energy gas pipeline easement runs along the south eastern boundary. Surrounding land uses include the rail easement and Lincoln Highway adjacent to the west, Olsson’s Pacific Salt directly to the south and east, and the Whyalla Steelworks further south.

The South site is located directly north of Whyalla’s Industrial Estate, approximately 5 km north of the Whyalla city centre. The site was historically used as a dairy farm and is currently vacant. The historical use has resulted in a high proportion of non-native vegetation and some regenerating native vegetation. The site has no formal improvements, however, tracks across the site indicate recreational motorcycle use. The Whyalla – Morgan pipeline continues along the northern boundary of the South site. The Industrial Estate to the south of the site includes industrial businesses such as Muradel (biocrude production) and Max Crane & Equipment Hire. The South site is bound to the east by the Lincoln Highway with the Whyalla Steelworks further east. The Whyalla Conservation Park is located approximately 1 km to the north (west of the northern portion of the North site).

The preferred transmission line route will cross the Lincoln highway between the South and North site and likely use above-ground infrastructure within the project boundary to feed into a power transformer and switchyard. From there, further aboveground power lines will use existing access tracks and easements to connect to the Cultana Substation.

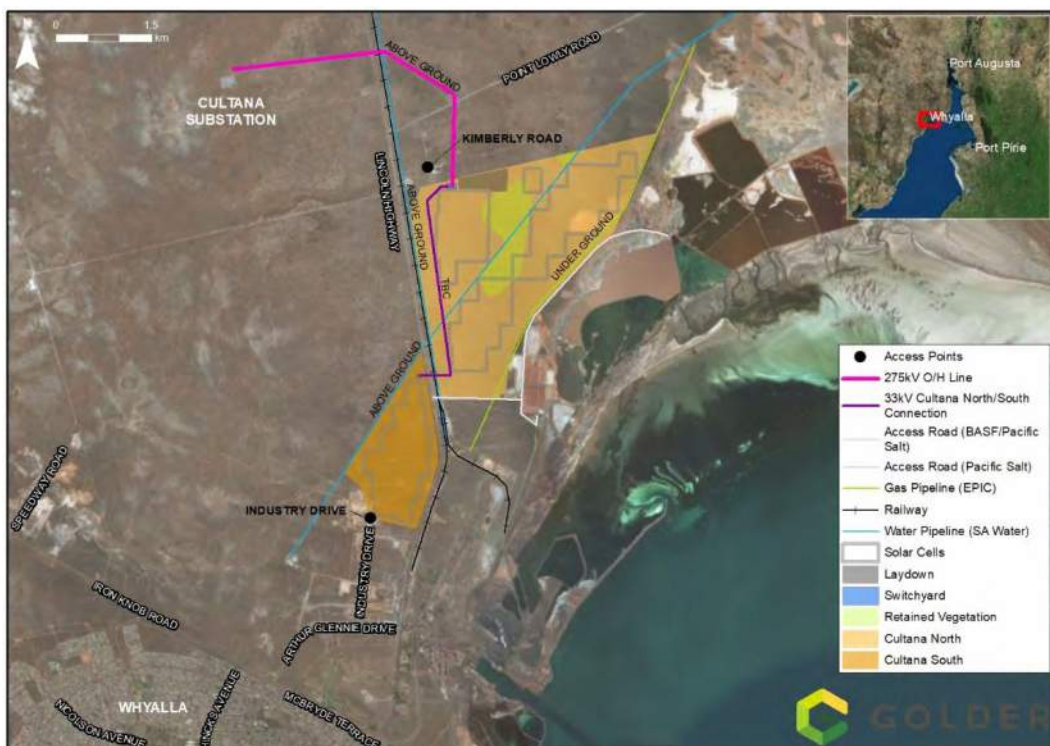


Figure 1: Site location and proposed layout

## 2.2 The Project

The Project consists of a series of solar panels. These panels are designed to absorb light and transform it into useable energy by way of an inverter. The inverter turns direct current (DC) energy into alternating current (AC) energy. The AC energy will be fed to the grid for subsequent use and/or storage.

Each of the components are summarised below noting that quantities and dimensions may be optimised during the detailed design phase.

Table 1: Summary of proposal components

	North	South
Proposed site access	Kimberly Road via Lincoln Highway and Inkerman Road	Industry Drive via Lincoln Highway and Arthur Glennie Drive
PV modules	~685,000	~240,000
Trackers	8,050 trackers	2,856 trackers
Inverters	39	14
Operations and Maintenance	O&M Building	Not applicable
Site security	Fully fenced and monitored via closed circuit TV (CCTV)	Fully fenced and monitored (CCTV)
Substation	Cultana 275 kV	Cultana 275 kV

### 2.2.1 Infrastructure

#### **Solar PV modules**

Solar photo voltaic (PV) modules are expected to be approximately 2,000 mm x 1,000 mm x 35 mm in size (including the frame) and treated with anti-reflection technology. The modules will be arranged in a north-facing direction and are expected to be mounted to allow 0.5 m of ground clearance for maintenance and to avoid shading effects.

Trackers will be arranged in rows in a north/south direction with approximately 85 solar modules mounted to each. The trackers are 90 m long and will be installed to allow a 3 m wide access track between each row. The modules will then track the sun as it moves east-to-west. Strings take the wires from the different modules and combine them into a common feed. A string combiner is then used to combine the output of multiple strings of modules to connect to the inverter.

#### **Power conditioning**

The energy generated by the PV modules will be converted from DC to AC energy by the inverters and increased to medium voltage via integrated transformers. The inverters will be prefabricated and brought to site in a standard 40ft (12.2 m length x 2.4 m width) shipping container (see Figure 2).



Figure 2: Indicative inverter within a shipping container.

### ***Operations compound***

A permanent operation(s) compound will service the Project. The operations compound will include:

- Operations & Maintenance (O&M) building
- 33 kV switch room
- Storage buildings
- 275 kV/33 kV substation
- Carpark for a minimum of 16 cars.

### ***Transmission***

The Project is seeking to use existing ElectraNet easements to connect to a switching bay at the Cultana Substation (Figure 1). Connections between the South and North site, and the road crossing from the North site to the Cultana Substation will be either overhead powerlines or directionally drilled under the road.



Plant/equipment	Proposed management action
Substation	Leave in place for future use
Underground cables	De-energise and leave in place
Transmission lines	Remove or retain- based on need at time of decommissioning

### 3.3 Rehabilitation

Following the removal of infrastructure, the site will be rehabilitated in accordance with agreed land use scenario(s). For the purpose of this PDP, it is assumed that the site will be returned to its previous land use.

While the removal of site infrastructure will be undertaken in consideration of the retained vegetation and areas that have revegetated over the Project's operational life, some areas of vegetation may be disturbed. Following decommissioning, it is anticipated that much of the onsite vegetation will recover over time. To accelerate rehabilitation, direct-seeding of locally-native species will occur.

Direct-seeding efforts will focus on fast-germinating and resilient species suited to the climatic and environmental conditions. A mix of perennial and annual species will be used to allow the areas to most effectively re-establish the natural balance of vegetation species post-construction whilst suppressing establishment of weed species. Watering and the use of polymer-based surface treatments will be employed as required to aid water retention of the soil, improve germination rates and recovery of existing vegetation.

Environmental assessments will be undertaken as required including a soil contamination assessment to confirm the site's suitability for the proposed land use scenario, in accordance with SA EPA guidance.

### 3.4 Materials management

Visual inspection of the site will be carried out regularly to ensure waste materials are disposed of appropriately and in accordance with the site's waste management procedures. Waste collection will be monitored on a weekly basis and waste tracking documentation will be maintained.

Waste will be segregated into separate waste streams for reuse, recycling and/or disposal in line with the *Environment Protection (Waste to Resources) Policy 2010* waste management hierarchy.

Hazardous materials will be segregated, stored and disposed in accordance with the appropriate Australian Standards.

### 3.5 Environmental management

The management measures implemented during construction will be employed during decommissioning to minimise the potential risks to the environment.

### 3.6 PDP review and scheduling

The PDP will be subject to internal review on a regular basis to ensure it remains relevant.

The final decommissioning plan will be prepared progressively and by no later than 12 months prior to decommissioning. The preparation of the plan will be undertaken in consultation with the community and State Government agencies.

## 3.0 PRELIMINARY DECOMMISSIONING PLAN

### 3.1 Decommissioning objective

At the end of the project life, SIMEC ZEN Energy will decommission, dismantle and demolish the facility. The future land use of the Project site is currently unknown. As such, the main objective of the decommissioning activities is to allow for flexible land use options at the Project's end of life.

Detailed strategies for decommissioning will be progressively developed and outlined in the final decommissioning plan for the site. Final land use and closure criteria will incorporate closure objectives as determined by SIMEC ZEN Energy, in consultation with the land owners (Whyalla City Council and OneSteel Manufacturing Pty Ltd), the community and other relevant stakeholders.

The site will be left in a state that does not compromise safety or the environment. It is envisioned that plant and equipment will be removed from the site and recycled or disposed of according to legislative requirements at the time of decommissioning. It will be the responsibility of SIMEC ZEN Energy to ensure general environmental protection and mitigation measures are implemented during the decommissioning and restoration phases.

While it is anticipated that the Project will have an operational lifespan of 20 or more years, if economics and energy demand remain viable, there is a possibility for the Project to be refurbished with new technology and/or upgrading of components to maintain the Project as a continuing asset.

### 3.2 Infrastructure register

The final decommissioning plan will include a technical specification for the demolition of plant and equipment in accordance with *Australian Standard (AS) 2601-2001 – The demolition of structures*. The standard sets out the requirements and provides best practise guidance on the planning procedures for the demolition of a structure.

A complete register of plant and equipment to be decommissioned and removed will be developed as part of the final decommissioning plan. Table 2 provides a preliminary list of the plant and equipment with proposed management actions.

The management actions have been proposed based on minimum disturbance methodology to ensure a minimum impact on vegetation and topsoil stabilisation with the aim of mitigating potential ongoing dust issues.

Table 2: Preliminary register of plant and equipment

Plant/equipment	Proposed management action
PV modules	De-energise and dismantle- recycle or dispose
Trackers	Dismantle- reuse, recycle or dispose
Inverters (shipping container)	De-energise and remove from site- reuse
O&M and storage buildings	Remove from site – preferentially reused; recycled where reuse is not possible
Hardstand areas, concrete footings and roads	Removal- reuse, recycle (where appropriate for ground stabilisation) or disposal
Switch room	Remove from site – preferentially reused; recycled where reuse is not possible

## 4.0 IMPORTANT INFORMATION

Your attention is drawn to the document – “Important Information”, which is included in Appendix A of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

**APPENDIX A**

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**ATTACHMENT 4**

# Waste Management Plan



REPORT

# Waste Management Plan

*Cultana Solar Farm*

Submitted to:

**SIMEC ZEN Energy**

Submitted by:

**Golder Associates Pty Ltd**

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1898738-007-R-Rev0

07 December 2018



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## 1.0 INTRODUCTION

SIMEC ZEN Energy is developing the 280 MW Cultana Solar Farm (the Project) over two connected sites near the Liberty OneSteel Whyalla Steelworks. With no existing facilities on the sites, all infrastructure will be delivered to the Project location.

This Waste Management Plan (WMP) has been developed in order to manage wastes generated as a result of construction and operation.

The objectives of the WMP are to:

- Minimise resource use and waste generation
- Provide guidance on efficient segregation of waste
- Maintain a healthy, clean and safe working environment
- Ensure waste is disposed in an environmentally responsible manner.

This plan will form an integral part of the overall Environmental Management System. As a subsidiary to the Contractors Environmental Management Plan (CEMP), the Waste Management Plan will interface with a range of other management plans for the Project.

### 1.1 Regulations

The Project will be undertaken in a manner that addresses the requirements of the EP Act general environmental duty, specifically:

*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.*

Further to this, the WMP has been prepared in accordance with:

- *Environmental Protection Regulations 2009*
- Whyalla Council Development Plan (consolidated 14 June 2017)
- South Australia's Waste Strategy 2015-2020
- AS 1940 - The storage and handling of flammable and combustible liquids (2004).
- *Waste Avoidance and Resource Recovery Act 2001*
- Environment Protection (Waste to Resources) Policy (2010).
- *Work Health and Safety Act 2011.*



## 2.0 WASTE MANAGEMENT

### 2.1 Waste streams

Typical wastes that may be generated from Project related activities include:

#### ***Industrial wastes***

- Solid inert wastes such as steel, concrete, asphalt, building rubble, concrete, cement pieces, wood and timber products, and other sheet metal
- Hazardous waste (i.e. hydrocarbons)

#### ***Natural waste***

- Organic matter (e.g. mulched vegetation)
- Green waste created by pruning, clearing and grubbing of the site

#### ***Commercial/domestic wastes***

- Commercial waste such as waste paper, packaging, glass, plastic and aluminium
- Putrescible wastes such as food waste and wet organic matter
- Sewerage waste

#### ***Waste soils***

- Contaminated soils
- Clean fill

#### ***Wastewater/stormwater***

- Liquid wastes such as wash down water
- Materials used for environmental controls such as sediment fences.

### 2.2 Waste management strategy

The SA EPA Environment Protection (Waste to Resources) Policy (2010) seeks to achieve sustainable waste management by applying the waste management hierarchy (Figure 1).

The waste management hierarchy will be used throughout the Project to ensure the most efficient use of resources and the continual reduction in waste generation.



**Figure 1: Waste management hierarchy (South Australia's Waste Strategy 2015-2020)**

A summary of the management measures to be applied for the expected waste categories is outlined Table 1, using the principles of the waste management hierarchy.

**Table 1: Waste management hierarchy implementation**

Construction Waste	Management Measures
<b>Avoidance</b>	
Commercial waste (packaging materials)	Proper planning to avoid surplus packaging materials. Where possible, sustainable procurement practices to minimise amount of packaging material.
Water	Collect and reuse rainwater from site buildings for toilet flushing and dust suppression.
<b>Reuse Opportunities</b>	
Timber (wood, form materials, packaging timber, etc.)	Provide clearly marked bins or identified stockpile locations for reuse.
Sediment fences	Where possible, provide to community / land care groups / council for reuse.
Building rubble	Reuse for permanent road maintenance and other high-traffic areas within the site.
Natural waste	Reuse of mulched vegetation for soil stabilisation, compost and/or soil conditioner.
Clean fill	Reuse of excess soil for filling and construction of drainage features to prevent overland flow of water during high rainfall events.
Waste water	Capture and reuse where waste water is of appropriate quality.

Construction Waste	Management Measures
<b>Recycling Opportunities</b>	
Concrete materials	Provide clearly marked bins or identified stockpile locations for collection by recycling organisation.
Steel (structural, mechanical parts, metalwork off cuts, etc.)	Place in clearly marked bins for collection by recycling organisation.
Timber (wood, form materials, packaging timber, etc)	Provide clearly marked bins or identified stockpile locations for collection by recycling organisation.
Domestic waste (paper, packaging, glass, plastic, aluminium)	Provide clearly marked bins with covers for collection by recycling organisation.
Electrical (cables, terminations, switch gear, etc)	<p>Electrical wastes to be placed in bins for collection by recycle organisation, or recycled by electricians.</p> <p>Terminations and switch gear to be placed in bins used for steel waste.</p>
<b>Dispose</b>	
General construction waste (which cannot be recycled or reused)	Provide clearly marked bins with covers for collection and transport to an offsite licensed landfill site.
Office and mess shed waste	Provide plastic lined bins with covers in offices and mess sheds for placement in general waste bin.
Putrescible waste (food waste / scraps)	Provide clearly marked covered and plastic lined bins for placement in general waste bin.
Plastic / fibre-glass	Provide segregated bins for safe disposal.
Contaminated soil	Appropriately stockpiled, classified and disposed offsite (in accordance with SA EPA regulations) using appropriately licensed contractors.
Hazardous waste	Provide appropriate storage facilities for collection by appropriately licenced contractor.
Sewerage waste	Capture for disposal by appropriately licenced contractor.

## 2.3 General waste management measures

The following general management measures will be implemented throughout the Project construction to minimise waste generation, and storage and disposal requirements:

### ***Pre-construction***

- Identify opportunities for the use of recycled products as part of the project where practicable
- Minimum packaging to be requested for all project supplies
- Appropriate disposal/recycling contractors to be arranged and scheduled for regular waste removal
- Materials laydown, storage and segregation areas will be designated as well as designated solid and liquid waste containment areas

### ***Construction***

- Waste will be contained and covered in appropriate receptacles and regularly removed from site to an authorised waste depot for disposal
- Hazardous waste (including fuels and chemicals) will be appropriately and safely contained in line with Dangerous Substances requirements and AS 1940 (covered and banded) in locations away from sensitive areas and secured against vandalism and unauthorised access
- Storage areas will be elevated and / or otherwise divert runoff to prevent stormwater entering waste storage areas and to prevent potentially contaminated runoff
- Soil stockpiles will be no greater than 3 m in height and oriented to minimise dust emissions and potentially contaminated / uncontrolled runoff
- Potentially contaminated materials will be segregated on a low permeability surface, banded and covered; and appropriately classified prior to disposal
- Waste transporters used to remove waste will have the appropriate licences issued by the EPA and that waste is transported (using waste transport certificate system) only to suitably authorised waste depots for recovery, recycling, treatment or disposal
- Site to be kept in a clean and tidy condition through construction. Regular maintenance of shared areas such as temporary toilets and communal areas
- Appropriate emergency response procedures will be followed in the event of any incident where harmful waste material is released to the environment, or a risk to sensitive receptors or human health is identified

### ***Post-construction***

- All waste to be removed and construction laydown areas to be rehabilitated
- Temporary site buildings and furniture to be collected and re-used on future projects

### 2.3.1 Operational waste management

Operational activities will generate minimal wastes, which will be restricted to general office/amenity refuse. These wastes will be appropriately stored in secure and covered bins, segregated into waste streams where applicable. Waste, including wastewater and sewerage will be removed regularly by an appropriately licenced contractor.

No hazardous waste is expected to be generated from operational activities.

Where opportunities exist, recycling and reuse of materials will be undertaken to minimise the amount of waste requiring offsite disposal.

### 3.0 RESPONSIBILITIES AND REPORTING

The key stakeholders for the project, their representative(s) and the respective roles and responsibilities relevant to this WMP are identified in Table 2.

**Table 2: Project responsibilities**

Stakeholder	Role	Responsibilities	Contact details
<b>Principal – SIMEC ZEN Energy</b>	Principal Site Owner	<ul style="list-style-type: none"> <li>▪ Overarching responsibility for the Project</li> <li>▪ Site inspections and auditing of site works against the environmental management procedures (including the WMP) to ensure appropriate measures are implemented</li> </ul>	To be confirmed
<b>Construction Contractor</b>	Project Manager	<ul style="list-style-type: none"> <li>▪ Delivery of the construction of the Project</li> <li>▪ Engaging contractors to implement the works</li> <li>▪ Control of site operations</li> <li>▪ Ensuring overall works compliance with environmental management procedures</li> </ul>	To be confirmed
	Environmental Manager	<ul style="list-style-type: none"> <li>▪ Ensuring compliance to requirements of environmental management procedures and creating a Construction Environmental Management Plan (CEMP)</li> <li>▪ Undertaking the required tracking, monitoring and reporting</li> <li>▪ Responding where mitigating measures are not adequate or where the environmental management procedures require amendments</li> </ul>	To be confirmed

### 3.1 Material tracking system

A material tracking system (MTS) will be established to identify the source, volume and final destination of waste generated by the project.

Where waste must be disposed offsite by EPA licensed contractors (eg the disposal of lubricants and used oil filters; liquid waste such as effluent, water contaminated with oils; contaminated soils; hazardous substances), EPA tracking certificates will be obtained and stored.

A record of all materials movements will be collated detailing each truck transporting material offsite, including registration and EPA license where required. The system will include data required to facilitate traceability of all material generated by the project:

- Time and date the material was removed
- Location of the material when loaded



- Quantity loaded
- Type of material (including classification of material)
- Site receiving the material
- Disposal certificates.

The MTS will include movement of recycled materials used onsite as well as those imported to the site.

The development of this system will ensure volumes of waste produced by the Project are accurately tracked and material is reused at every opportunity.

### **3.2 Monitoring and reporting**

This WMP will be regularly reviewed and updated to ensure it remains current and the waste materials produced by the Project are captured.

Waste collection and disposal practices will be monitored regularly by the construction contractor's environmental representative.

Records of WMP revisions, material tracking and monitoring observations will be kept for provision to SIMEC ZEN Energy on request.

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