Energy Projects Solar Pty Ltd

Robertstown Solar Farm

Powerline Road & Lower Bright Road, Bright

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Robertstown Solar Site

OVERVIEW

Application No	433/V005/18
Unique ID/KNET ID	2018/23792/01
Applicant	Energy Projects Solar Pty Ltd
Proposal	Staged development of a 500MW solar farm with associated infrastructure and ancillary works
Subject Land	Various land parcels
Zone/Policy Area	Primary Production Zone
Relevant Authority	Minister for Planning
Lodgement Date	13 December 2018
Council	Regional Council of Goyder
Development Plan	Goyder Council Development Plan (Consolidated 24 November 2016)
Type of Development	Crown application
Public Notification	Yes - development exceeds $4 million
Representations	Nil
Referral Agencies	Native Vegetation Council (DEW) Commissioner of Highways (DPTI)
Report Author	Sharon Wyatt, Principal Project Officer

EXECUTIVE SUMMARY

The Robertstown Solar project is a 500MW facility to be located on 1800 hectares of land approximately 5km north-east of Robertstown in the State's mid-north.

The subject land is located adjacent to the existing Robertstown substation and consists of thirteen (13) parcels of land located to the east of Worlds End Highway between Powerline Road, Lower Bright Road and Junction Road.

The application has been sponsored by the Department for Energy and Mining as 'public infrastructure' pursuant to Section 49 of the *Development Act 1993*.

The development will be situated in an agricultural area, is largely cleared of native vegetation, and contains grazing and cropping land. The proposed solar farm has been sited to take advantage of efficiencies with the existing Robertstown substation, its connection to the National Energy Market and supports the future feasibility of the proposed SA/NSW interconnector.

The Robertstown Solar proposal underwent a public notification process from 23 January to 25 February 2019. No submissions were received. Council is supportive of the proposal.

Whilst the development will result in a marked change to the local landscape, and remove some agricultural land from primary production, the potential for environmental impacts during construction and/or operation can be appropriately managed through the implementation of comprehensive management plans, such as a Construction Environmental Management Plan (CEMP).

The Goyder Council Development Plan promotes the protection of primary production land from the encroachment of incompatible uses, however the general scheme also promotes the development of renewable energy facilities in areas that provide opportunity to harvest natural resources for the efficient generation of electricity (such as windfarms).

The Development Plan is silent in respect to large-scale solar developments, with these facilities being relatively new to South Australia, however the principles related to renewable energy facilities more generally can be applied in this instance.

On balance, the proposal can be recommended for approval, subject to appropriate conditions to manage external impacts during construction.

ASSESSMENT REPORT

1. BACKGROUND

On 10 October 2018, Paul Heithersay, Chief Executive, Department for Energy and Mining, confirmed that the Robertstown Solar project:

a) meets the definition of public infrastructure as outlined in Section 49(1) of the *Development Act 1993*; and
b) is specifically supported and endorsed pursuant to Section 49(2)(c) of the *Development Act 1993.*

A Development Application was subsequently lodged on 13 December 2018.

2. DESCRIPTION OF PROPOSAL

Application details are contained in the ATTACHMENTS.

The application is for the staged development of a large scale solar farm consisting of an integrated but separately operated grid connected 500MW generation capacity Photovoltaic Energy Generation System (PVS), a 250MW capacity and 1000MWh storage Battery Energy Storage System (BESS) and associated infrastructure, including but not limited to:

- Solar photovoltaic modules on ground mounted tracking racks
- Containerised or skid mounted Inverter stations
- Battery storage area
- Synchronous condensers (subject to requirement)
- Transformers
- Switching yard and project electrical substation
- Underground cables connecting groups of solar panels to invertor stations
- Overhead and/or underground transmission lines connecting invertor stations transformers
- Administration, maintenance and control buildings and facilities (site office, maintenance shed, laydown area, access tracks, car parking areas and perimeter fencing)
- Low level night time lighting
- Lightening protection masts

The application also seeks approval for the temporary construction components including, but not limited to workers construction camp, laydown areas, temporary (informal) car parking, site office, workshops and essential services. The temporary construction camp will be approx. 3-5ha in size and accommodate up to 275 FTE. The construction campsite and associated components will be decommissioned post construction.

No elevations or floor plans have been provided for the temporary buildings. The final design, specification and layout of the temporary construction camp would need to be subject of a conditional requirement that these details be provided prior to construction.

The BESS will connect the project to the existing Robertstown Substation (Electranet) via overhead and/or underground 275Kv transmission lines (depending upon the final design and location of the transformers and switch gear) which will enable the BESS to export and import electricity into and out of the national electricity grid. The final design for the connection is yet to be finalised. The construction, reconstruction, alteration, repair or maintenance of any drain, pipe or underground cable is exempt from the provisions of section 49 of the Act pursuant to Schedule 14(1)(1)(c) of the Regulations.

The detailed layout, make and model of panels and BESS components of the project is yet to be finalised.

The development is proposed to occur in four (4) stages:

- Phase 1: PVS up to approximately 125 MW with associated infrastructure
- Phase 2: PVS up to approximately 125 MW with associated infrastructure
- Phase 3: PVS up to approximately 125 MW with associated infrastructure
- Phase 4: PVS up to approximately 125 MW with associated infrastructure

The BESS is also proposed to be staged to meet business and constructability requirements. The BESS physical grid connection works would be completed as part of substantial completion with the battery capacity and storage incrementally added to until it reached 250MW.

The solar panels will be mounted on single axis tracking racks. The panels will be uniform in colour, size and shape. The panels will be installed in parallel rows with spacing being 4m to 10m subject to the type of racks selected as part of the final design. The ground clearance height of the solar modules will be in the range of 0.3m to 1.2m above ground level and the overall height of the modules will be between 2m to 4m subject to the model and configuration chosen. The modules will generally be aligned on the tracking system in a north-south row layout and rotate in position from east to west.

Installation of the solar array panels is likely to occur via the driven piles method. This is the most common form of installation for solar farms. Final footing selection will be determined following detailed geotechnical investigations.

Groups of solar panels will be connected to each invertor via underground cabling and the inverters are linked together to collect the total energy being produced. Step-up transformers, that increase the voltage, are housed in the invertor containers. These will run from each inverter station to the project switchyard/substation where the voltage will be stepped-up again to match the voltage of the transmission network at the Robertstown Substation.

The invertor stations will be up to 3m in height (industry standard height). The final type, design and quantity of inverter stations required is yet to be finalised.

The BESS storage area and project substation are to be co-located to the south of the site adjacent Lower Bright Road opposite the Robertstown Substation. The BESS would occupy approximately 20 ha of the subject land, representing 1.1% of the project area.

Security fencing comprised of a 1.8m high chain wire mesh fence with three strand barb-wire top will be installed around the perimeter of the subject site.

Low level night-time lighting will be installed in the administration area for safety and security purposes.

Lightening protection masts will be established near the inverter stations. The final number and siting will be determined during detailed design.

No landscaping is proposed.

The component delivery transport route is yet to be finalised, however, the application indicates that the most feasible trucking option (based upon preliminary analysis) is via National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81), Worlds End Highway, Powerline Road and Lower Bright Road.

The National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81) and Worlds End Highway are under the care and control of the Department of Planning Transport and Infrastructure (DPTI).

Powerline Road, Lower Bright Road, Eagle Hawke Gate Road, and Junction Road are under the care and control of Goyder Council.

Anticipated traffic volumes will be highest during the Project's construction while operational traffic volumes are expected to be minimal.

The project is expected to generate direct employment of up to 275 full time equivalent (FTE) jobs and an estimated additional 410 FTE indirect roles during the construction period with ongoing employment of 15 FTE during the operational phase.

Additional staff are expected to be employed on part-time and contract basis, for specialist electrical skills, module cleaning and other maintenance requirements associated with the Project

Construction is estimated to take 28 months and the operational life of the project is approximately 30 years.

Figure 1: examples of typical single axis tracking solar modules

Figure 2 & 3: example of a typical utility scale inverter

Figures 3a & 3b: examples of a typical office /site building

Figure 4: example of a typical switchroom

Figure 5a & 5b: Robertstown Substation

3. SITE AND LOCALITY

3.1 Site Description

The site consistent of thirteen (13) allotments, described as follows:

Lot/Plan or Sect/HD	Road	Locality	Hundred	Title
A91 FP212965	Govt Road	Bright	Bright	CT 5565/131
Section 227	Govt Road	Geranium Plains	Bright	CT 5431/657
Section 232	Govt Road	Bright	Bright	CT 5431/659
Section 13	Govt Road	Bright	Bright	CT 5465/354
Section 42	Govt Road	Bright	Bright	CT 5464/828
Section 43	Lower Bright Road	Bright	Bright	CT 5941/840
Section 229	Govt Road	Bright	Bright	CT 5561/287
Section 221	Govt Road	Bright	Bright	CT 5561/89
Sections 44 & 45	Powerline Road	Bright	Bright	CT 5951/34
A91 FP 212508	Powerline Road	Bright	Bright	CT 5550/784
A51 DP51338	Govt Road	Bright	Bright	CT 5689/928
A50 DP51338	Lower Bright Road	Bright	Bright	CT 5689/927

3.2 Locality

The project area is located on approximately 1,800 hectares of land in the areas identified as Bright and Geranium Plains, approximately 5km north-east of the township of Robertstown (which lies 115km north-east of Adelaide).

The subject land and immediate locality is primarily used for primary production purposes (broadacre cropping and grazing) and is within a Primary Production Zone.

The development site is bound by Powerline Road (also known as Government Road) to the north, Lower Bright Road to the south and Junction Road to the east. Eagle Hawke Gate Road runs north-south through the centre of the project area. All local roads are under the care and control of Goyder Council.

Primary access to the site will be via the existing access points along Powerline Road and one access point on Lower Bright Road opposite Robertstown Substation. Both roads are compacted rubble, graded public roads. Some access during construction may be required from Eagle Hawke Gate Road and/or Junction Road depending upon final location of the temporary construction camp. These roads are also unsealed.

The site has scattered groupings of native vegetation covering approximately 13% of the site. Preliminary design works avoid larger areas of native vegetation within the Project area however a number of individual scattered trees or clumps of trees are required to be removed to assist with the construction and the project’s operation.

The dominant landform in the project area is slightly undulating hills (244m to 362m above sea level) with stony plains.

The locality is sparsely populated, with no directly adjacent dwellings, with more isolated homesteads and outbuildings associated primary production activities.

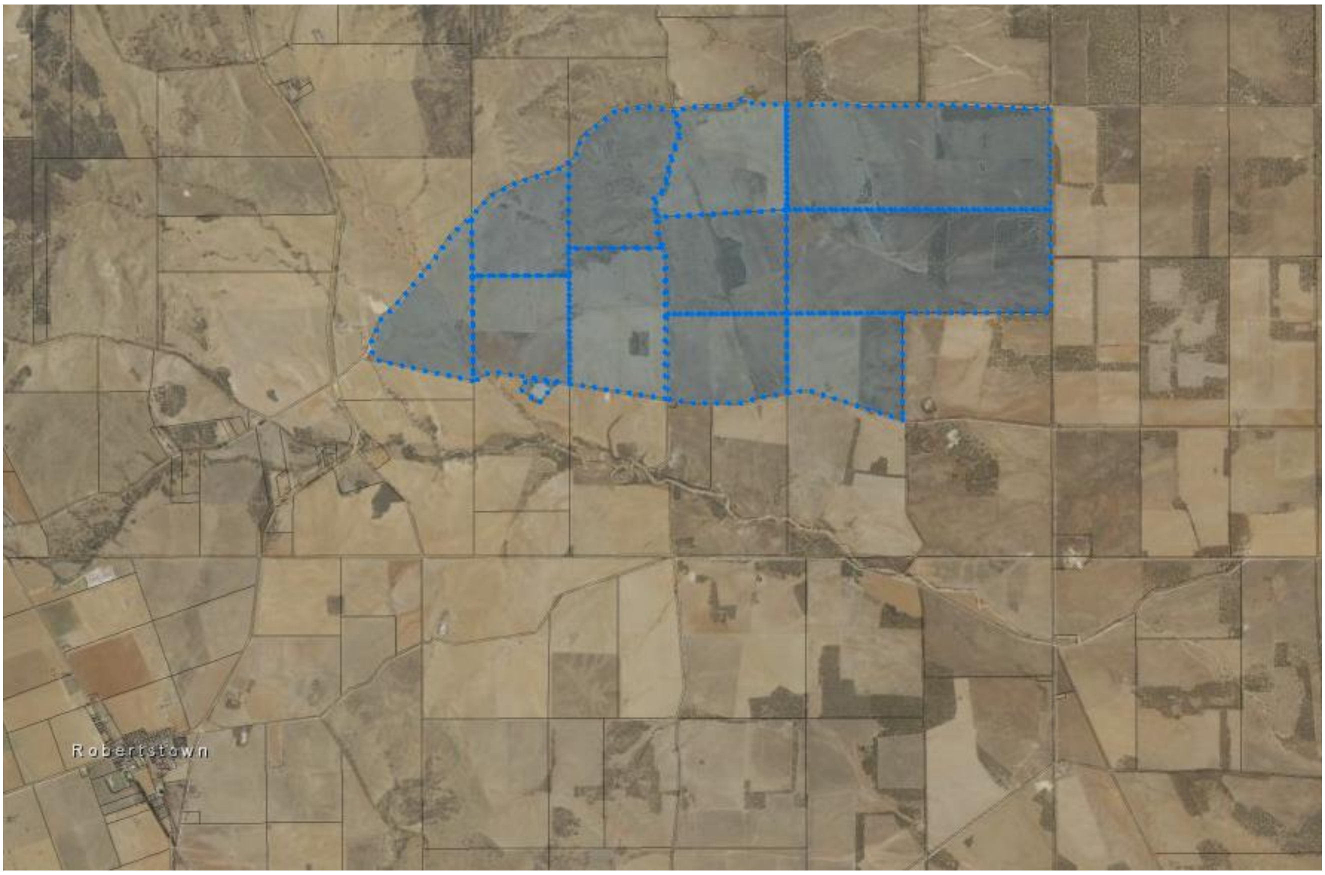


Figure 6: Location

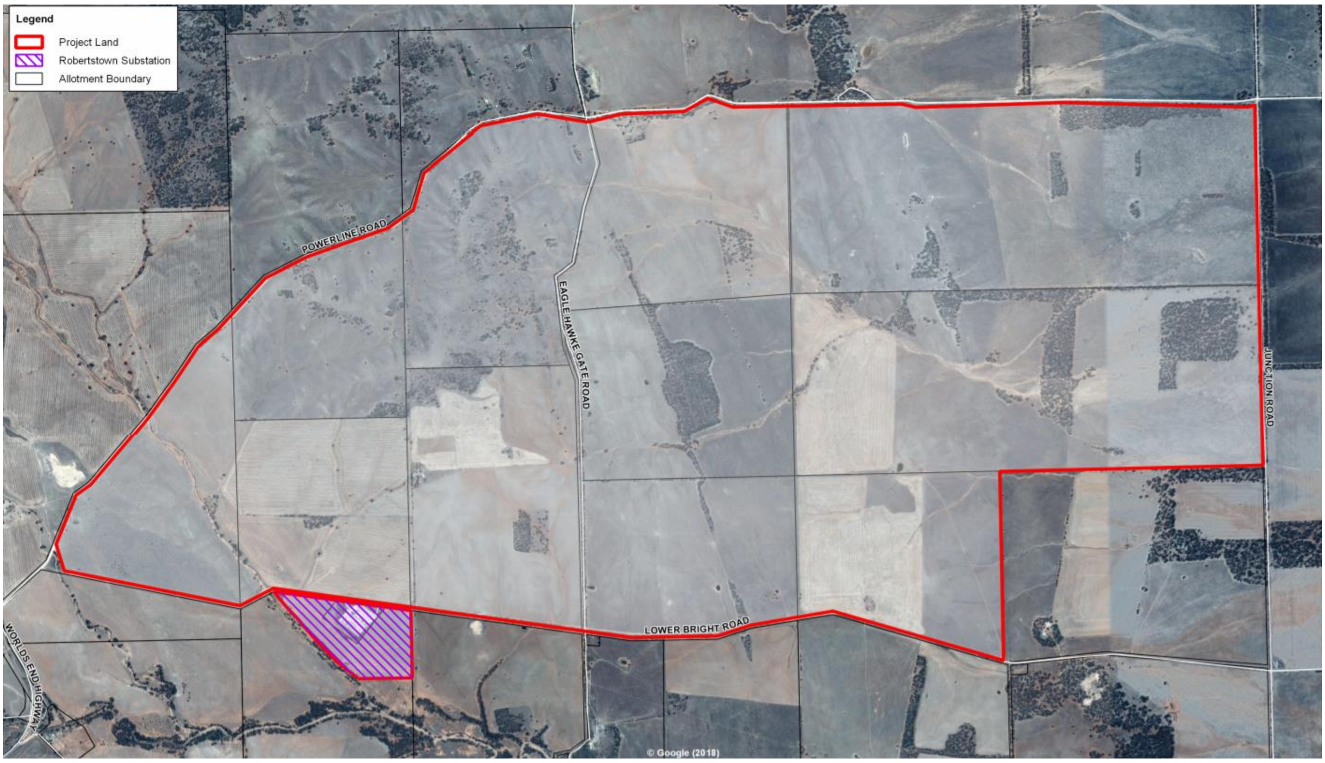


Figure 7: Project Area

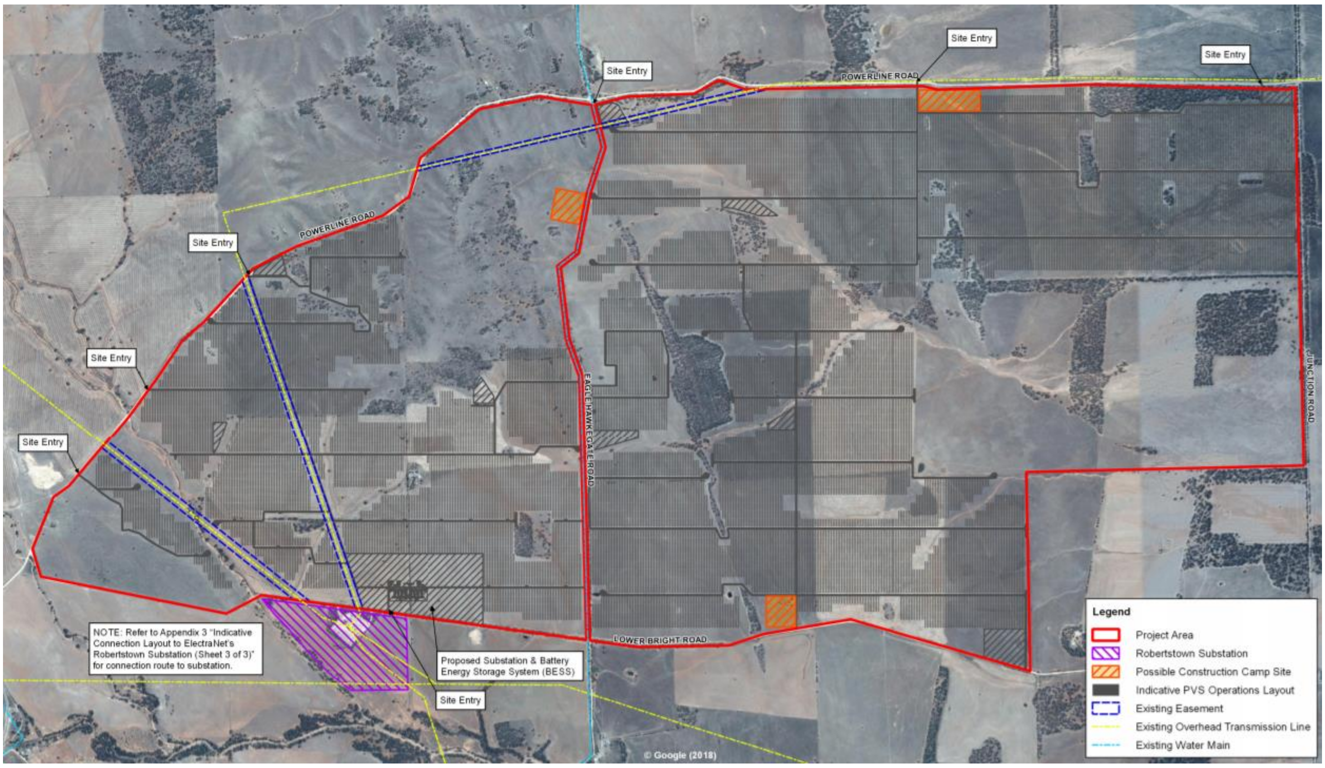


Figure 8: Site access points

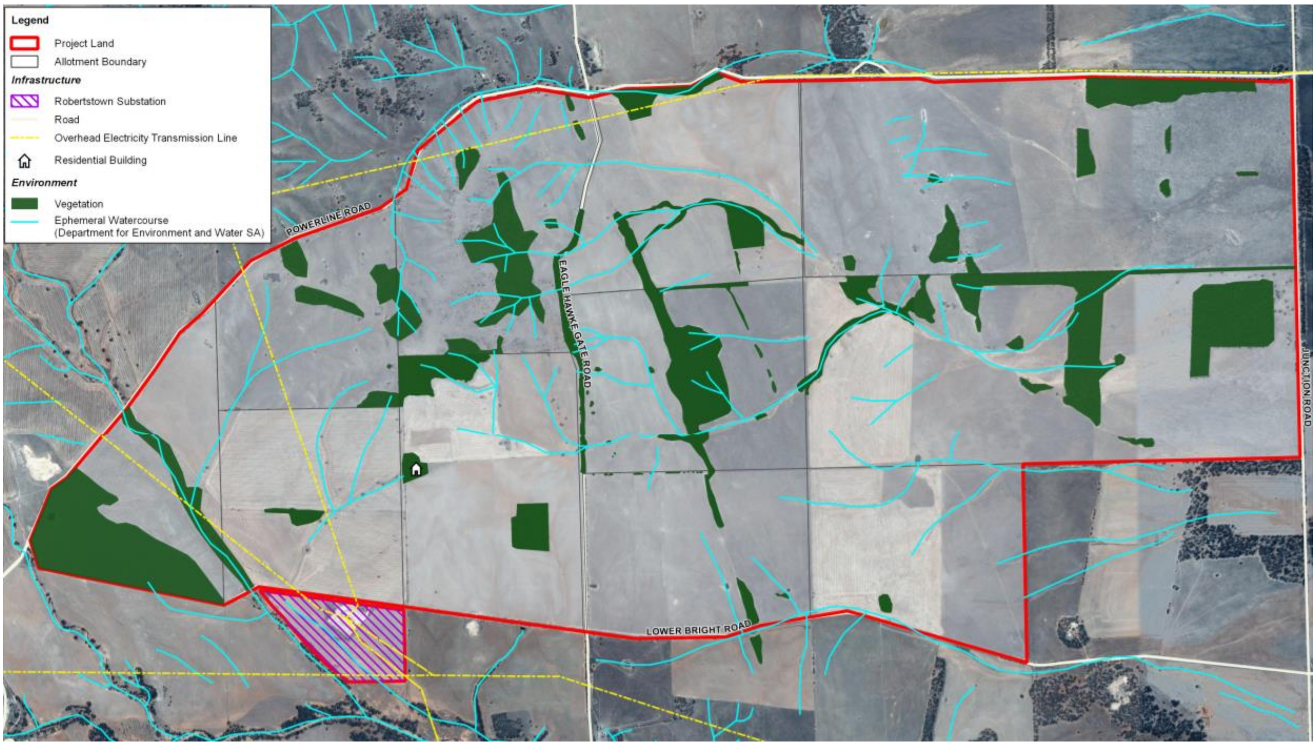


Figure 9: Areas of native vegetation and ephemeral waterways on the site

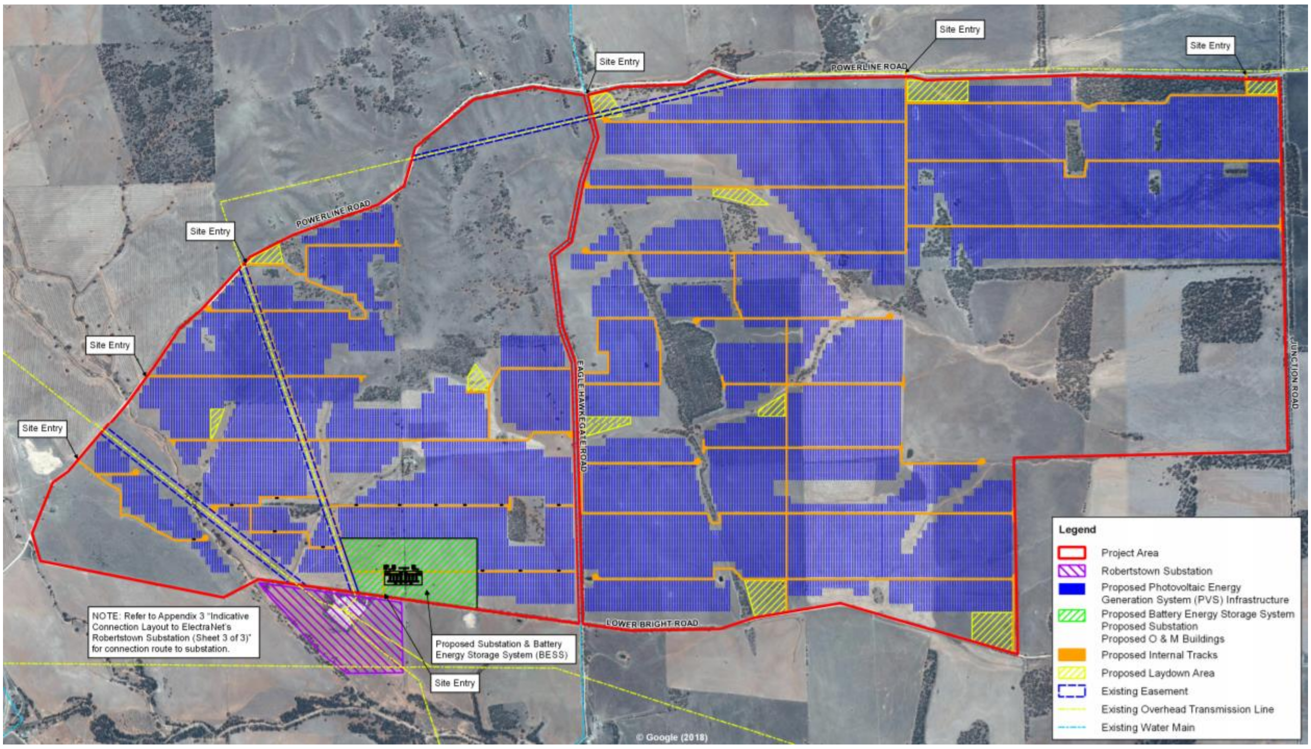


Figure 10: Preliminary site layout

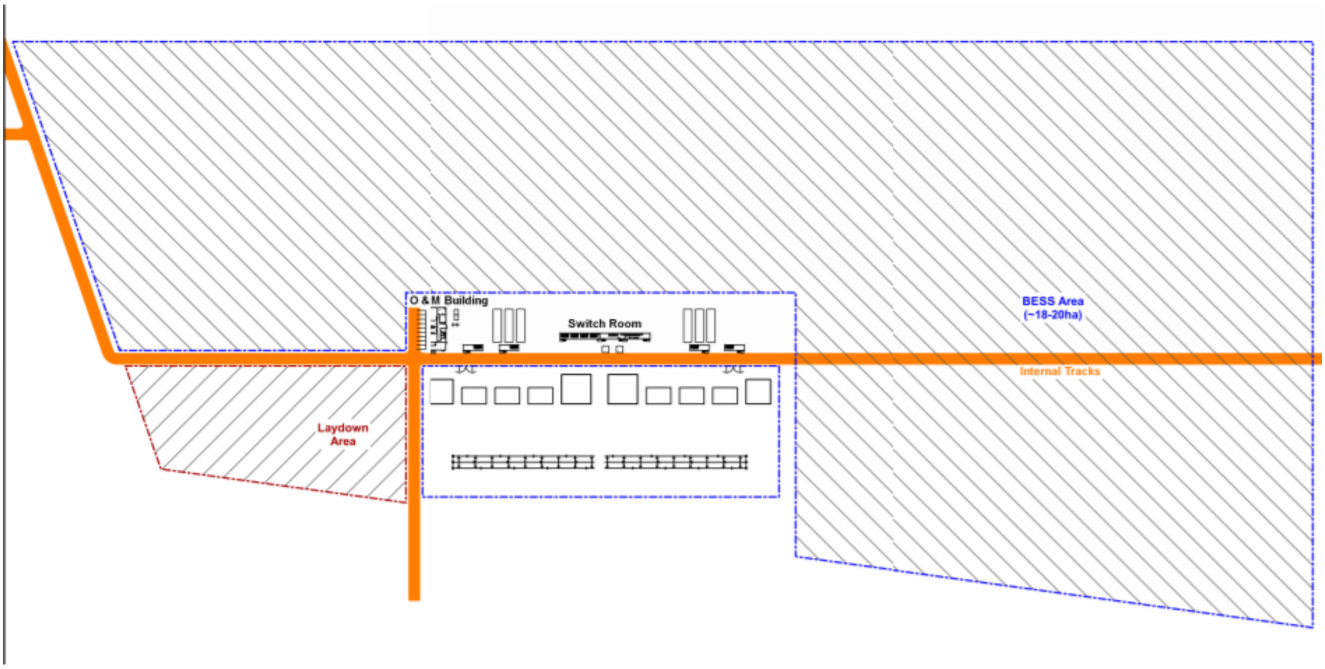


Figure 11: Indicative BESS, project substation and site office area layout

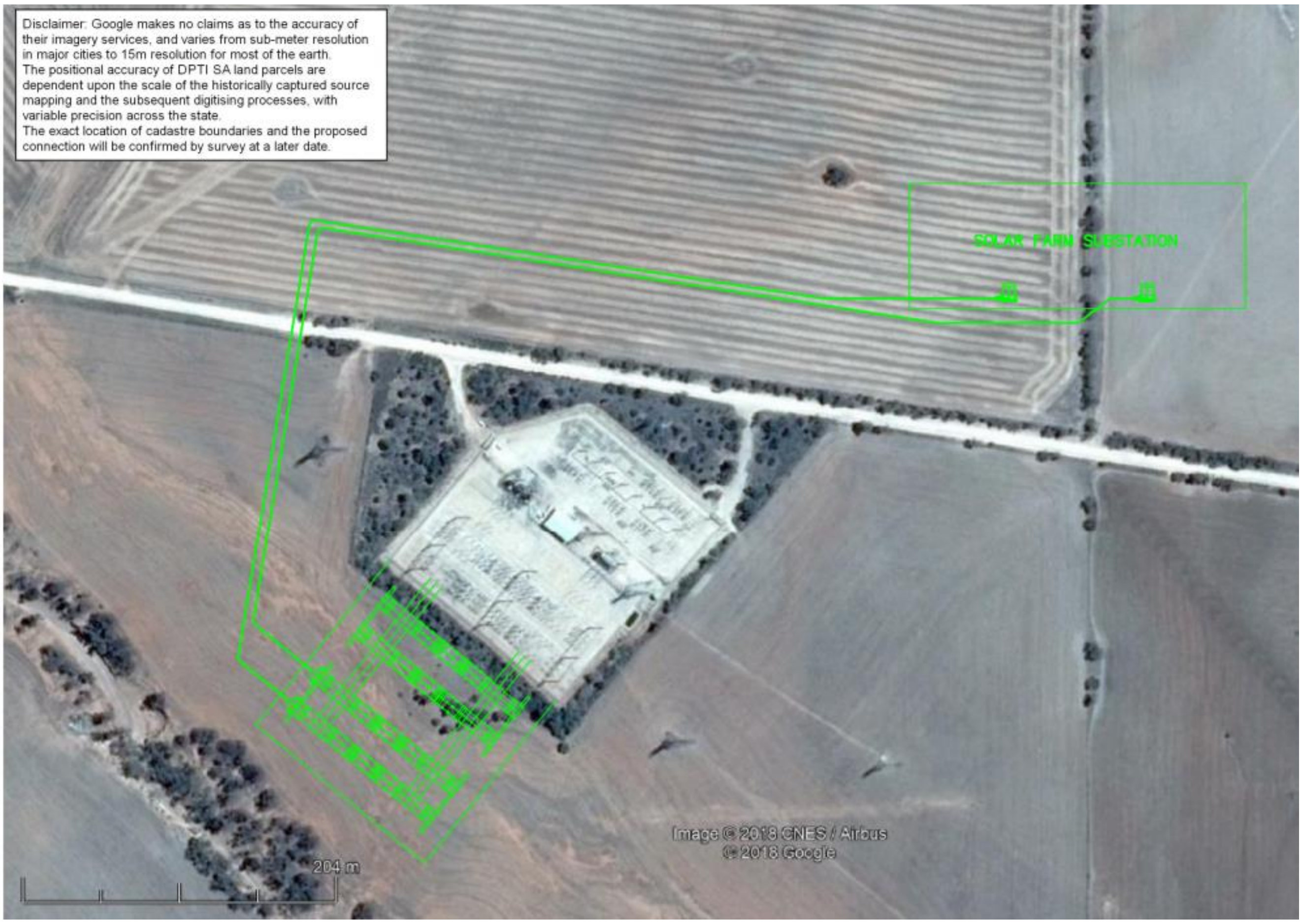


Figure 12: Indicative connection to Robertstown Substation

Figure 13: Undulating terrain within the Project area

Figure 14: Existing transmission lines within the Project area

4. COUNCIL COMMENTS

4.1 Regional Council of Goyder

Council is supportive of the proposed development and did not recommend any specific requirements or conditions.

5. REFERRAL BODY COMMENTS

Referral responses are contained in the ATTACHMENTS.

5.1 DPTI Transport (Commissioner of Highways)

The proposal does not include any land divisions abutting a controlled road or arterial road, nor will it alter an existing access, create a new access or change the nature of movement through an exciting access in relation to an existing or proposed arterial road or secondary arterial road. Notwithstanding the proposal was provided to the Commissioner for Highways for informal comment.

The Commissioner did not provide comment on the proposal.

5.2 Native Vegetation Council (NVC), DEW

The NVC advised that the proposed layout of the solar project on the whole appears to avoid areas of remnant native vegetation, including Iron-grass (Lomandra spp.) Tussock Grassland located in the southwest of the project area.

The development will result in minor clearance of native vegetation.

The NVC advised that:

- infrastructure placement should aim to avoid native vegetation where possible; and
- any native vegetation clearance will require approval under the *Native Vegetation Act 1991*.

Native vegetation clearance requirements need to be taken into account in any final recommendation to the Minister for Planning.

6. PUBLIC NOTIFICATION

The application was subject to public notification pursuant to Section 49(7d) of the *Development Act 1993* as the construction works totals more than $4 million.

Public notification was undertaken via public notice in The Advertiser, the Northern Argus and the Barossa & Light Herald on 23 January 2019. Public consultation closed on 25 February 2019. No submissions were received.

7. POLICY OVERVIEW

The subject site is within the Primary Production Zone as described within the Goyder Council Development Plan (Consolidated 24 November 2016).

Relevant planning policies are contained in the ATTACHMENTS and summarised below.

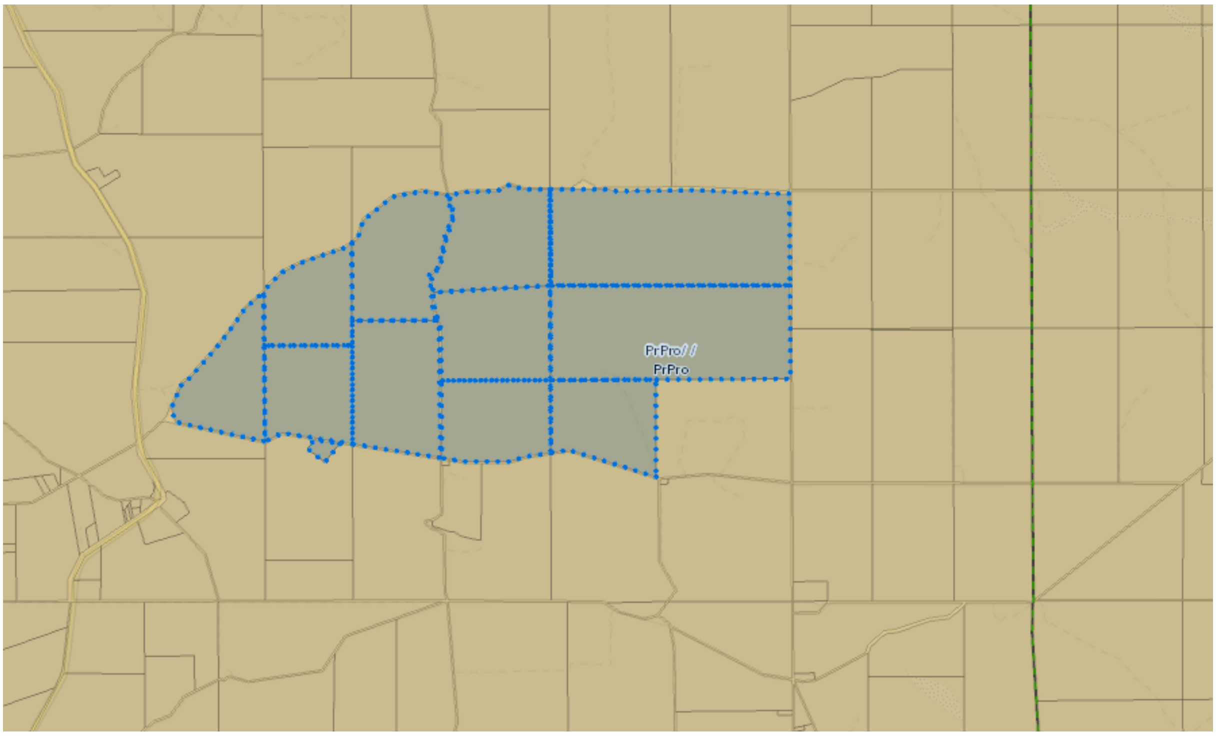


Figure 15: Zoning (Primary Production Zone)

7.1 Primary Production Zone

Desired Character; OB 1, 3, 4, 5; PDC 1, 4, 10, 11,

- Protection of primary production from encroachment by incompatible land uses and protection of scenic qualities of rural landscapes
- Wind farms and ancillary development are envisaged in the Zone
- Structures will be of a form that blends with, and does not detract from, the scenic qualities and function of the primary production area
- Wind farms and ancillary development may be sited in (a) visually prominent locations; and (b) closer to roads than envisaged by generic setback policy

The zone is the primary source of agriculture production in the Council area and is intended to accommodate cropping and grazing activities on large rural land holdings.

The rural area is characterised by rolling pastures with strands of remnant vegetation with a variety of agricultural activities.

Wind farms and ancillary development such as sub-stations, maintenance sheds, access roads and connecting power lines are an envisaged form of development in the zone. These facilities should be located in areas where they can take advantage of the natural resource upon which they rely.

It is acknowledged that this type of development may need to be:

- located in visually prominent locations;
- visible from scenic routes and valuable scenic and environmental areas; and
- located closer to roads than envisaged by generic setback policy.

Development should not be undertaken unless it is consistent with the desired character for the zone. Development should not result in the conversion of agricultural land to less productive uses.

7.2 Council Wide

Crime Prevention: OB 1; **Design and Appearance:** PDC 2, 6, 18; **Hazards:** OB 1, 2, 3, 4 PDC 4, 5, 6, 11, 13; **Heritage Conservation:** OB 1 PDC 1; **Infrastructure:** OB 1, 4, 5 PDC 10; **Interface Between Land Uses:** OB 1 PDC 1, 2, 6, 10; **Landscaping, Fences and Walls:** OB 2; **Natural Resources:** OB 1, 2, 5, 8, 10, 12 PDC 7, 13, 16, 17, 20, 30, 32, 33, 34, 35, 40, 41; **Orderly and Sustainable Development:** OB 2, 3, 4 PDC 1, 2, 6; **Renewable Energy Facilities:** OB 1, 2, 3 PDC 1, 2, 3; **Short-term Workers Accommodation:** OB 1 PDC 1, 2, 3, 4; **Siting and Visibility:** PDC 1, 2, 3, 4, 5 6, 7, 8; **Transport and Access:** OB 2 PDC 2, 6, 13, 21, 22, 24; **Waste:** OB 1, 2 PDC 1, 3, 4, 12, 13, 14

- A safe, secure, crime resistant environment where land uses are integrated and designed to facility community surveillance
- Building form should not unreasonably restrict existing views available from neighbouring buildings
- The setback of buildings from public roads should (a) be similar to, or compatible with, wetbacks of buildings on adjoining land and other buildings in the locality
- Maintenance of the natural environment and systems by limiting development in areas susceptible to natural hazard risk
- Development located away from areas that are vulnerable to and cannot be adequately and effectively protected from the risk of natural hazards
- Development located to minimise the threat and impact of bushfires on life and property
- The conservation of areas, places and their settings of indigenous and non-indigenous cultural significance
- The efficient and cost-effective use of existing infrastructure
- Utilities and services, should be sited on areas already cleared of native. If this is not possible, their siting should cause minimal interference or disturbance to existing native vegetation and biodiversity
- Development located and designed to prevent adverse impact and conflict between land uses
- Development should be designed and sited to minimise negative impact on existing and potential future land uses considered appropriate in the locality
- Functional fences and walls that enhance the attractiveness of the development
- Retention, protection and restoration of the natural resources and environment
- Native flora, fauna and ecosystems protected, retained, conserved and restored
- Minimal disturbance and modification of the natural landform

- Protection of areas prone to erosion or other land degradation processes from inappropriate development
- Development should ensure watercourses and their beds, banks, wetland and floodplains are not damaged or modified and are retained in the natural state, except where modification is required or essential access of maintenance purposes
- Development should retain existing areas of native vegetation and were possible contribute to revegetation using locally indigenous plant species
- Development should be designed and sited to prevent erosion
- Development should be located and staged to achieve the economical provision of public services and infrastructure, and to maximise the use of existing services and infrastructure
- Development should not prejudice the development of a zone for its intended use
- Development that does not jeopardise the continuance of adjoining authorised land uses
- Development of renewable energy facilities that benefit the environmental, the community and the State
- Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment
- Appropriately located accommodation types supplied to meet the housing needs of seasonal and short-term workers
- Short-term workers accommodation should not be adapted or used for permanent occupancy
- Development should be sited and designed to minimise its visual impact on (a) the natural, rural or heritage character of the area; (b) areas of high visual or scenic value, particularly rural areas; (c) views from public reserves, tourist routes and walking trails
- Buildings should be sited in unobtrusive locations and , in particular, should (a) be grouped together (b) where possible be sited in such a way as to be screened by existing vegetation when viewed from public roads
- The number of buildings and structures on land outside of urban areas should be limited to that necessary for the efficient management of the land
- Development should have access from an all-weather road
- Development should be provided with safe and convenient access
- 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

8. PLANNING ASSESSMENT

The application has been assessed against the relevant provisions of the Goyder Council Development Plan (Consolidated 24 November 2016).

8.1 Land Use and Character

The Goyder Council Development Plan encourages the development of renewable energy facilities that benefit the environmental, community and state strategic interests such that these facilities should be sited in areas that provide opportunity to harvest the natural resources to maximise efficient generation and supply of electricity (Objectives 1 & 2 - Renewable Energy Facilities).

The Primary Production Zone encourages the development of wind farms and ancillary development, and acknowledges that due to the large scale of these facilities, components may need to be located in visually prominent locations; visible from scenic routes and valuable scenic and environmental areas; and located closer to roads than envisaged by general setback policy (Desired Character, OB 4 and PDC 1 – Primary Production Zone).

Whilst wind farms and ancillary development form part of the desired character for the Primary Production Zone, other forms of renewable energy facilities (as per this proposal) are not specifically acknowledged (or precluded) in the zone provisions.

The Development Plan is relatively silent with respect to large-scale solar developments, with these facilities being relatively new to South Australia. However, it is considered that renewable energy facilities – subject to meeting other provisions of the scheme - are envisaged within the zone.

The subject site is a series of (largely) contiguous allotments used for primary production purposes. Whilst not all of the project area will be devoted to solar panels and related infrastructure, it remains to be determined whether all primary production activities will cease, as future opportunities for light grazing around the solar arrays (for the purposes of weed control etc.) may be possible.

The development has been assessed on the basis that the land will not be available for broadacre cropping purposes over the life of the project (30 years). The loss of primary production land represents 0.05% of the region's 3.2 million ha of agricultural lands, and must also be balanced against the other positive impacts the proposal will have on the local economy and farm diversification.

The introduction of the solar farm will not change the mainly pastoral nature of the locality and wider area; and should not impact upon the continuation of agricultural activities on adjoining lands, nor will it detract from the scenic qualities and function of the primary production area.

8.2 Design and Appearance

Primary Production Zone policy directs that new buildings should be appropriately sited, design and located away from native vegetation and be constructed using materials and colours that blend with the rural landscape, and be of a form that blends with and does not detract from the scenic qualities of the primary production area.

The height of the solar modules will be between 2m to 4m above ground level subject to the style chosen (at full tilt). The panels will not have frames, reducing potential glare. The invertor stations will be scattered thought the solar arrays, and will have a maximum height of 3 metres.

The BESS, substation, administration/ control building and associated facilities will be grouped together on the southern boundary of the subject site, adjacent Lower Bright Road and opposite the existing Robertstown Substation and high voltage transmission lines (have already altered the existing landscape character).

The operational buildings will be of similar size to hay sheds / implement buildings typically found in a primary production setting. Depending on final design, existing vegetation will help screen the buildings. PDC 4 of the Primary Production Zone allows for wind farm infrastructure (renewable energy facilities) to be sited in visually prominent locations. The location of these structures, as grouped, is unlikely to be a visually dominant feature on the landscape.

Where appropriate, additional screen plantings could be considered to help mitigate any direct impacts or provide an appropriate buffer from other uses or views.

Due to the variable layout of solar farms and local site conditions (e.g. native vegetation, topography), setbacks from side boundaries will vary – particularly when accounting for internal access roads and any hazard reduction requirements.

Whilst not a specific amenity measure, a 30m setback from side boundaries will be mandated to mitigate potential impacts from a photovoltaic heat island effect (discussed later).

The proposal includes a 1.8m high (topped with barbed wire) security fence around the entire perimeter of the subject site. Dependent on the type of fencing installed (and how this may allow the movement of native animals across the site), a post and wire fence (or its equivalent) would not be out of place within a rural landscape.

8.3 Heritage

The applicant undertook a search of the National Native Title register which returned one Native Tile claim applicable to the Project area: Ngadjuri Nation #2 (SC2001/002).

The contact for this claim is the Ngadjuri Nation Aboriginal Corporation.

The applicant also undertook a search of the Department of Premier and Cabinet Aboriginal Affairs and Reconciliation, Register of Aboriginal Sites and Objects and the SA Museum Database was completed. The search returned that no registered or reported sites are located within the current project area. However, they indicated it is likely that unrecorded Aboriginal sites are located within the undisturbed sections of the project area. During the preliminary field investigations survey one Aboriginal site, three isolated artefacts and one culturally sensitive landscape were located.

The applicant has commenced discussions with the Ngadjuri Nation Aboriginal Corporation regarding further archaeological survey assessment of the Project area to identify the presence of Aboriginal heritage within the Project area. The Cultural heritage survey works and discussion with the Ngadjuri Nation Aboriginal Corporation will inform the Project's final layout plans.

There are no State Heritage Places or Local Heritage Places registered in the Project area. All heritage sites currently identified have been excluded in the preliminary site layout. It is recommended that a Cultural Heritage Management Plan be prepared in consultation with the Ngadjuri Nation Aboriginal Corporation as a condition of approval.

Standard advisory notes in relation to the discovery of archaeological artefacts, and/or Aboriginal sites, objects or remains are also recommended.

8.4 Traffic Impact, Access and Parking

The application includes a Traffic Impact Assessment report for the proposed assessment, but not a Traffic Management Plan

<u>Traffic</u>

The traffic generated by the proposal during the construction phase is considered to be low in comparison to existing traffic volumes for delivery vehicles utilising the National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81) and Worlds End Highway.

The identified heavy vehicle haulage routes are under the care and control of DPTI, and based on the expected use, not expected to compromise their safety or function.

It is noted that traffic volume data for Powerline Road and Lower Bright Road is unavailable, however based upon the existing traffic volumes of Worlds End Highway within the vicinity of the project area of less than 170 vehicles per day (Location SA – Traffic Volume Estimates, base year 2014) it is expected that the traffic generated by the proposal during the construction phase, whilst within the tolerance of these local roads, would still represent a significant increase.

The sealed roadway (Worlds End Highway) stops at Powerline Road, and given the size of the site, all other access is via formed but unsealed local roads which will need to be appropriately maintained (especially if Eagle Hawke Gate Road and Junction Road are relied upon for both construction and local traffic especially during winter).

The solar farm will employ up to fifteen (15) full time equivalent staff once operational with periodic contractors for maintenance activities. Working hours of solar farms are typically 9am to 5pm, with some out of hours work required. Deliveries to the site will general occur during 7am and 7pm.

Traffic movement during the operational phase are expected to be low, and predominantly light vehicles. Ongoing traffic impacts are expected to be negligible.

It is recommended that a Traffic Management Plan (TMP) for the construction phase be prepared in consultation with Department of Planning, Transport and Infrastructure (DPTI) and Goyder Regional Council before the commencement of construction. A dilapidation report of pre-construction road conditions should be undertaken (such that an appropriate baseline is provided).

The TMP should also address construction vehicle access arrangements and identify traffic management measures to address traffic safety, maintenance and access issues inherent with using oversized vehicles and general construction traffic – and to take account of local stock movements.

It is recommended that any upgrades to the local roads or intersections that may be required to provide suitable access (and maintain existing service levels) to the development are at the applicants cost.

Eagle Hawk Gate Road – central access to east and west sites.

Parking
The Development Plan does not provide car parking rates for any form of development that is comparable to a solar farm.

The primary access to the site is via the existing access points along Powerline Road and one access point on Lower Bright Road opposite Robertstown Substation. Off street parking will be available within the administration/control area. Given the significant site areas available, the development has sufficient space to provide adequate car parking to meet both construction and operational staffing requirements which will be lower (up to 15 staff plus periodic contractors).

8.5 Interface between Land Uses

The General provisions of the Development Plan seek that renewable energy facilities (and development in general) be located, designed and operated in a manner that avoids or minimises adverse impact to, and conflict with, the environment and other land uses (OB 1 - Interface Between Land Uses; OB 3 – Renewable Energy Facilities).

The proposed solar farm will be located in a predominantly agricultural, rural locality with low levels of existing background noise and air quality levels tied to existing agricultural practices.

Visual Impact
Whilst the solar farm will comprise a relatively low scale (but expansive) built form across the landscape, it does represent a significant change to the appearance of the subject site and is anticipated to have some visual impact.

The application includes a desktop Visual Impact Assessment (VIA) (Appendix 7 of the application) of the proposed development which considers its visual impact from several vantage points.

The VIA identified 29 potential residential receptors within a 2km visual catchment area of the project, 5 of which are owned by project landowners. It is noted that the tool used to generate the VIA is unable to distinguish between residences or structures (e.g. a shed), nor is it able to distinguish receptors as occupied or unoccupied residences. On ground assessment determined that some of the potential residential receptors were not unoccupied.

Of the 29 potential residential receptors, 18 were rated low impact, 5 were rated moderate to low, and 1 was rated Moderate.

A total of 17 viewpoints were identified in the VIA. The project in its entirety cannot be viewed from one single view point.

Of the 17 viewpoints, 15 were rated low impact, 1 moderate and 1 moderate to high.

The undulating nature of the landscape, existing stands of native and roadside vegetation, actively limits direct views of the overall project area (such that only various components of the solar farm are visible at any given location). In addition, it is noted that transmission infrastructure and electrical substation on the western edge of the project area are prominent features of the existing rural landscape.

Overall the visual impact of the project is considered to be low, in terms of its overall visibility and situational context within an expansive rural landscape.

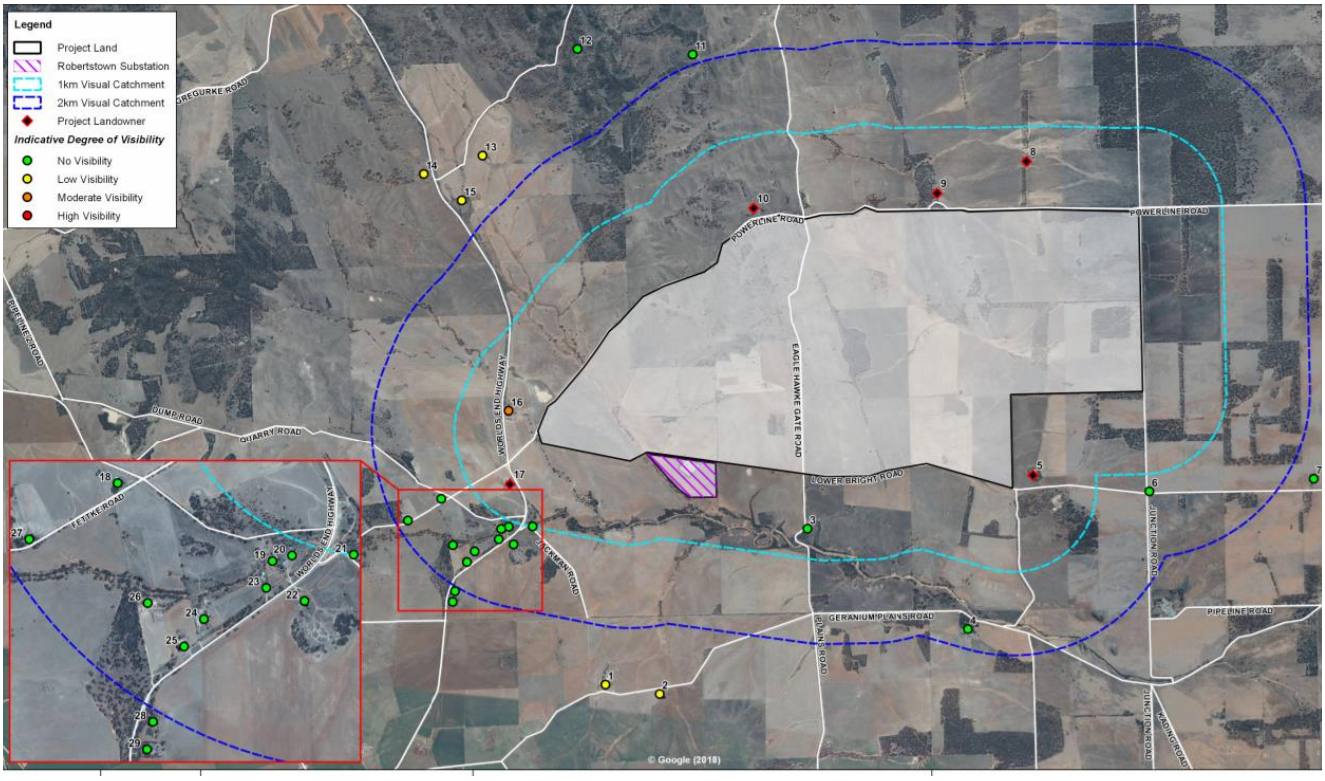


Figure 15a: Indicative visibility from potential residential receptors

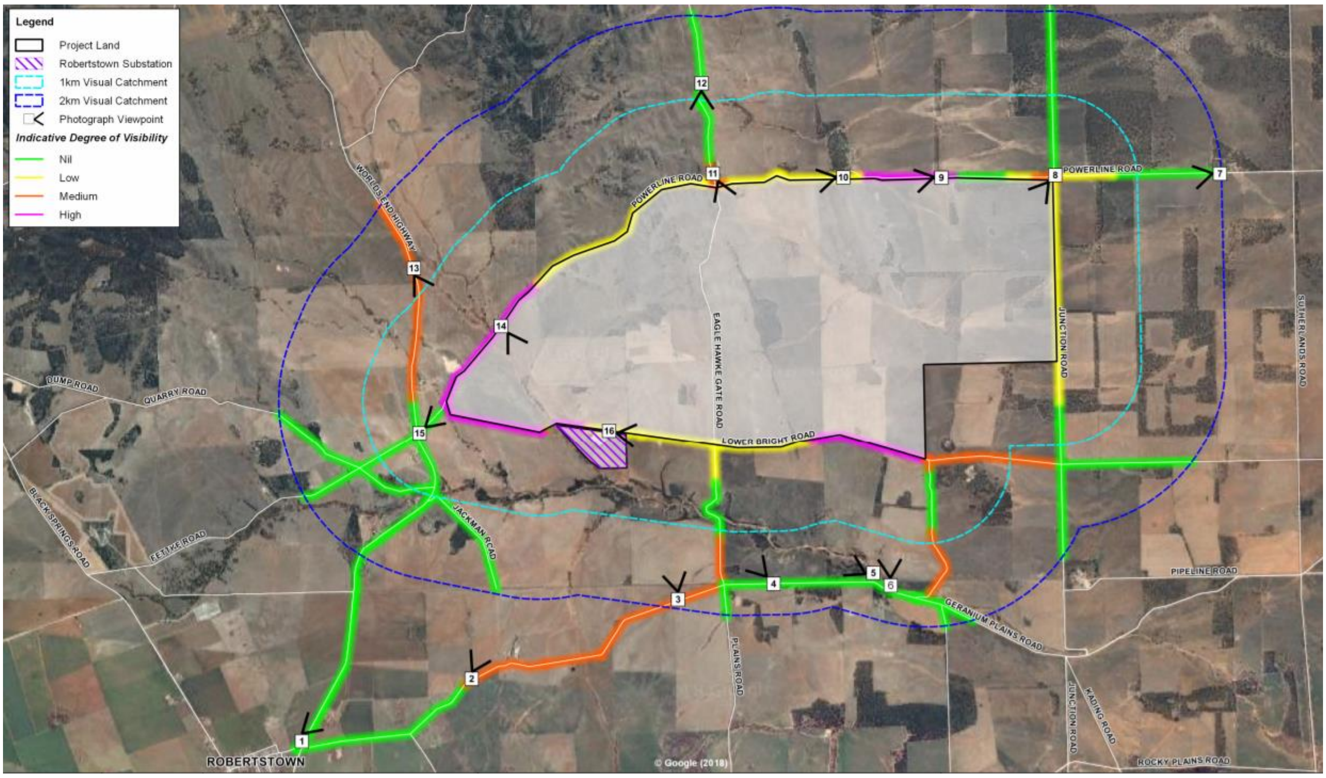


Figure 15b: Indicative visibility from viewpoints

The application includes a desktop Glint and Glare Analysis (GGA) (Appendix 12 of the application) of the proposed development which considers the project's potential effect on certain parts of relevant roads and some houses in adjacent areas.

It is noted that the tool used to generate the GGA does not consider any obstacles (e.g. trees, structures, topography, buildings) between observation points and the solar panel arrays that may obstruct glare.

The subject site is more than 50km from the nearest commercial airport therefore no calculation was required for potential glint and glare for air traffic.

Six residences were identified that may experience low level glare. In all instances, existing vegetation and topography between the residences and the solar panels obscures and/or mitigates the potential for this glare impact.

No glare effect was identified along Worlds End Highway. Some sections of Lower Bright Road, Powerline Road and Junction Road may experience some low level glare for a small duration of the morning during the winter months. It is noted that existing vegetation and topography assists in reducing any likely impacts – which will also be dependent on seasonal and weather conditions.

Noise

The operation of the solar farm is unlikely to generate significant noise impacts. Maintenance activities such as weed control and repair are not expected to generate excessive noise beyond that experienced in a primary production area.

Noise impacts during construction, however, have the potential to generate nuisance for local residents. This may include noise from heavy vehicles, excavators, and general machinery noise during the installation of the solar arrays and associated equipment.

It is recommended that the applicant prepare a Construction Environmental Management Plan (CEMP). The CEMP should include mitigation measures to manage noise to within the requirements of the *Environment Protection (Noise) Policy 2007*.

Air Quality

The operation of a solar farm is unlikely to generate any significant air pollution. The maintenance of adequate ground cover under and around the solar arrays will prevent dust. The internal access roads should be constructed of an appropriate material that will not cause the creation of excessive dust. The development should not comprise any machinery or equipment that generates air emissions.

Impacts during the construction phase are likely to include raised dust, which have the potential to generate nuisance for local residents and a loss of amenity. It is recommended that the applicant prepare a Dust Management sub-plan under a Construction Environmental Management Plan (CEMP). It is noted that given the size of the project area, such impacts could be for a prolonged period if not properly managed – either through a combination of active and passive measures.

Social impacts

A dedicated workers camp is proposed for up to 275 employees. This may create some localised impacts on services (social, health, emergency or community facilities), or alternatively improve their viability, in the townships of Robertstown, Point Pass and Eudunda, and provide opportunities for local businesses to provide convenience goods and services.

Recognising that these impacts will be temporary, but locally significant given the size of the surrounding townships (Robertstown: 248 persons; Point Pass 110 persons; Eudunda: 828 persons from 2016 Census), it is recommended that the applicant proactively address these potential impacts in consultation with the local community, service organisations and the Goyder Regional Council.

Photovoltaic Heat Island Effect (PVHI)

A 'Photovoltaic Heat Island' effect (PVHI) has recently been the subject of further study with the rapid rise in large-scale solar installations around the world, mostly sited in agricultural areas and pasturelands.

Studies have shown that the PVHI effect may occur within the perimeter of solar arrays, but remains a localised phenomenon, with the affect dissipating within close proximity of the solar field. Consequently, use of appropriate setbacks from property boundaries should prevent any impacts on non-involved landholders (such as to more sensitive crops, horticultural activities or areas of environmental significance).

The potential extent and impact of PVHI from large solar farms has recently been considered by the Victorian Civil and Administrative Tribunal (VCAT) in the matter of *ESCO Pacific Pty Ltd v Wangaratta RCC [2019] VCAT 219 (14 February 2019)*.

A 30m setback was recommended to ensure that any potential impacts from this affect are fully contained within a solar development site, although a lesser distance could be considered based on existing vegetation, roadways or similar buffer feature to neighbouring land. It is not clear the extent of setback proposed from site boundaries from the applicant's conceptual layout, although vegetation buffers, roadways and easements will generally meet this requirement.

A condition requiring the submission of final plans and a 30m boundary setback to solar infrastructure is recommended.

8.6 Natural Resources

Planning policy seeks the retention and protection of natural resources, the environment and water quality (OB 1 and 2 – Natural Resources); native flora, fauna and ecosystems protected, retained conserved and restored (OB 8 – Natural resources); with minimal disturbance and modification of the natural landform (OB 10 – Natural Resources).

The Development Plan seeks development in line with Water Sensitive Design principles. Stormwater should be captured and re-used where practical and safe, and water quality should be protected (PDC 5 – Natural Resources).

Native vegetation

Approximately 223ha (13%) of the 1800ha site contains native vegetation. There is sparse to low density vegetation along Powerline Road (north and west of the site), Lower Bright Road (south) and medium density vegetation along Junction Road (east) and Eagle Hawke Road (running north-south in the centre of the subject site).

The preliminary layout has been designed to avoid significant areas of native vegetation. To enable effective operation of the project, the removal of some scattered native paddock trees and/or clumps of native paddock trees will be required. Exact vegetation clearance requirements are yet to be confirmed. This will be determined as part of the final site layout and design.

The Native Vegetation Council has advised that the proposed clearance is expected to be minor. Removal of native vegetation is subject to the provisions of the *Native*

Vegetation Act 1991. A standard advisory note is recommended that a clearance approvals process will be required.

Native fauna

The proponent has undertaken targeted searches on the subject site for the following species:

- Southern Hairy-nosed Wombat (*Lasiorhinus latifrons*);
- Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*); and
- Flinders Ranges Worm-Lizard (*Aprasia pseudopulchella*).

Figure 16a: Vegetation within the Project area

Figure 16b: Vegetation within the Project area

No Southern Hairy-nosed Wombats were observed during the preliminary Project area investigations, however it was considered that there could be potential for their presence and habitat to be located in other parts of the Project area, where components of the PVS element could be positioned.

The proponent has committed to undertake a targeted wombat survey to inform the appropriate management options.

No Pygmy Blue-tongue Lizards were observed during targeted assessment and it was established that there is no suitable habitat for the Pygmy Blue-tongue Lizard in the Project area.

Figure 16c: Vegetation within the Project area

No Flinders Ranges Worm-Lizards were observed during targeted assessment and it was established that it is highly unlikely that the Flinders Ranges Worm-Lizard would be present in the small areas of disturbed and fragmented habitat on the Project area.

No species listed under the *Environment Protection and Biodiversity Conservation Act 1999* and *National Parks and Wildlife Act 1972* were observed during the surveys and it was determined that none of the scattered trees were considered to provide suitable habitat for any threatened fauna species listed under these Acts.

The proponent has committed to undertake further Flora and Fauna field survey work will be carried out to inform the Project's final layout plans.

Flora and fauna impacts can be successfully managed through the implementation of any recommended Environmental Management Plans.

<u>Stormwater</u>

There are several minor ephemeral watercourses and drainage lines on the subject site that flow into the areas water system including small dams. An ephemeral watercourse running through the western portion of the subject site feeds into Spring Hut Creek that lies approximately 5km south of the Project area.

Post development run-off from the subject site is expected to be substantially the same as pre-development flows for the majority of the site, as the ground around the solar arrays will remain pervious during rainfall events.

There may be a small increase in runoff from the additional structures and hardstand surfaces within the administration/control area however this is expected to be minimal as this area represents only 1.1% (24ha) of the overall site.

The applicant intends to manage these additional flows within the boundaries of the subject site. Any required drainage works will be designed to match existing drainage patterns as much as possible.

It is recommended that an Erosion and Stormwater Management Plan be prepared as part of the recommended Environmental Management Plans.

8.7 Hazards

Bushfire
The Project area is within a General Bushfire area. The majority of the subject site is largely cleared land with scattered pockets of native vegetation.

The risk of ignition from solar panels, inverters and other solar infrastructure is very low due to the high quality of the components. Potential ground cover on the project area does pose a potential risk, but more from fire fronts entering the project area or being started from other sources (such as lightning strikes or machinery).

The project area contains dry pastures and crop stubble, sparse woody vegetation in areas, and dense stands of woody vegetation in other areas. The solar farm is to be located on a site that has been predominantly cleared of vegetation and has been used for agricultural purposes for a long period of time. The subject site will be periodically maintained to manage ground cover around the solar arrays, thereby keeping the fuel load low.

The highest risk of ignition will be during the construction period and any maintenance activities. It is expected that appropriate firefighting equipment will be kept on the subject site at all times during the operation of the facility.

It is recommended that a Fire and Emergency Management Plan be prepared as part of the recommended Environmental Management Plans.

Site Contamination
The Project area is not listed on the South Australian Contamination index.
As the land has been previously used for agricultural purposes the most likely source of any potential contamination would be from historical use of agricultural chemicals and weedicides.

It is unlikely that the potentially contaminating activities would impact the proposed future land use of the site as a solar farm

Other hazards
With the exception of low bushfire risk, the project site is not located within an area identified as being susceptible to other natural hazards, such as flooding, contamination, acid sulphate soils or landslips.

8.8 Waste Management

The Development Plan seeks the prevention or minimisation of waste generation through the application of the waste management hierarchy (OB 1 & PDC 1– Waste).

Waste product will be generated during construction. The applicant has indicated that all waste requiring offsite disposal will be sent to appropriately licensed facilities and that all waste would be recycled/disposed at an appropriately licensed facility. Minor waste from the administration from the administration/control area can be disposed of through Council’s kerbside garbage collection service.

It is recommended that a Waste and Recycling Management Plan be prepared as part of the recommended Environmental Management Plans.

8.9 Orderly and Sustainable Development

The development of the solar farm and substation will connect with the existing Robertstown substation. This supports general Development Plan policy that development should only occur where it has access to adequate utilities and service, including electricity supply (PDC 1 - Infrastructure).

9. CONCLUSION

The establishment of renewable energy facilities is specifically envisaged and encouraged within the Primary Production Zone, and consistent with the overall objectives of the Goyder Council Development Plan to provide facilities that benefit the environment, the community and the State.

The construction of a large scale solar farm on the subject land is an appropriate one, noting its proximity to utility scale electricity infrastructure and the short distance required for grid connection. The proposal will also assist in the reduction of greenhouse gas emissions and have a positive impact for State and National Electricity Markets (in terms of increased competition and additional supplies regulated with the BESS).

Whilst the development will result in a significant change to the landscape, the overall loss of land from primary production activities (for the life of the project) represents a minor percentage (0.05%) reduction of the region’s overall area of agricultural production potential (3.2 million ha). It is also noted that the subject site is in an area that is sparsely populated, with no directly adjacent dwellings, or located on major tourist routes.

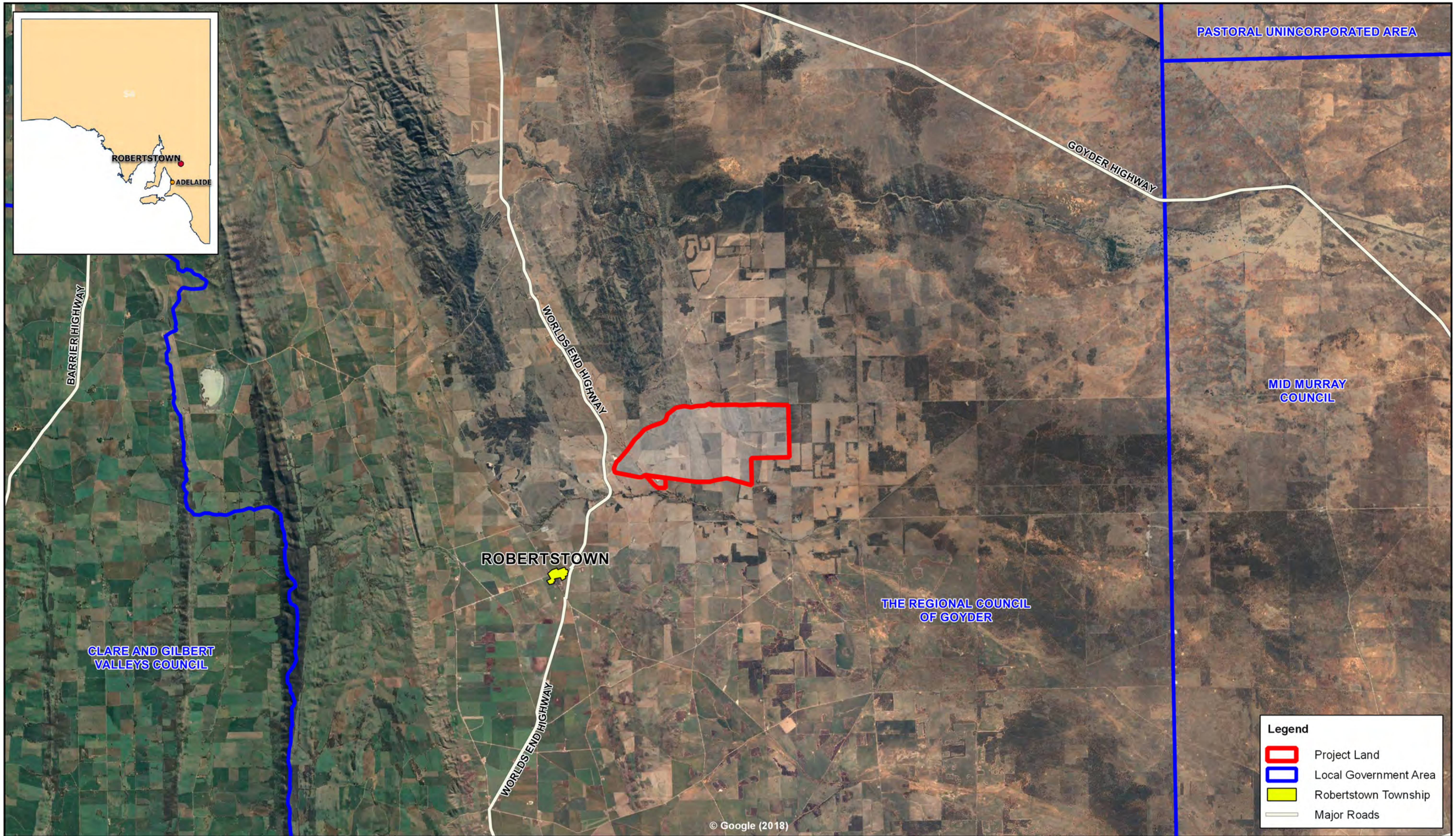
The greatest impacts are likely to be during construction: traffic generation, dust, road maintenance and the accommodation of on-site workers in close proximity to a small township during the 28 month construction period. To practically and sensitively manage these impacts, it is recommended that the applicant prepare a number of management plans that can be readily implemented and then adapted (where required).

Pursuant to Section 49(8) of the *Development Act 1993,* and having undertaken an assessment of the application against the relevant Development Plan, the application is <u>NOT</u> seriously at variance with the provisions of that plan.

Overall, the development is in accordance with the key objectives and policies for the construction of renewable energy facilities encouraged by the relevant Development Plan. In addition, it is noted that there was no formal state agency or council objection to the development, whilst the Office of the Technical Regulator has assessed the project and granted a certificate to ensure that it meets network connection and stability guidelines.

If no further information is required, and all relevant assessment matters have been considered, this planning report can be endorsed by the State Commission Assessment Panel pursuant to Section 49 (7e) of the *Development Act 1993,* and a formal recommendation with appropriate conditions provided to the Minister for Planning for his further review and decision.

Sharon Wyatt
PRINCIPAL PROJECT OFFICER
PLANNING AND LAND USE SERVICES



Author:	MB
Reviewer:	SMC/ JB
A3 Scale:	1:150,000
Job Ref/Version:	11314/ V06

0 2.5 5 7.5 10 km

Map Projection: GDA 1994 MGA Zone 54

Figure 2-1

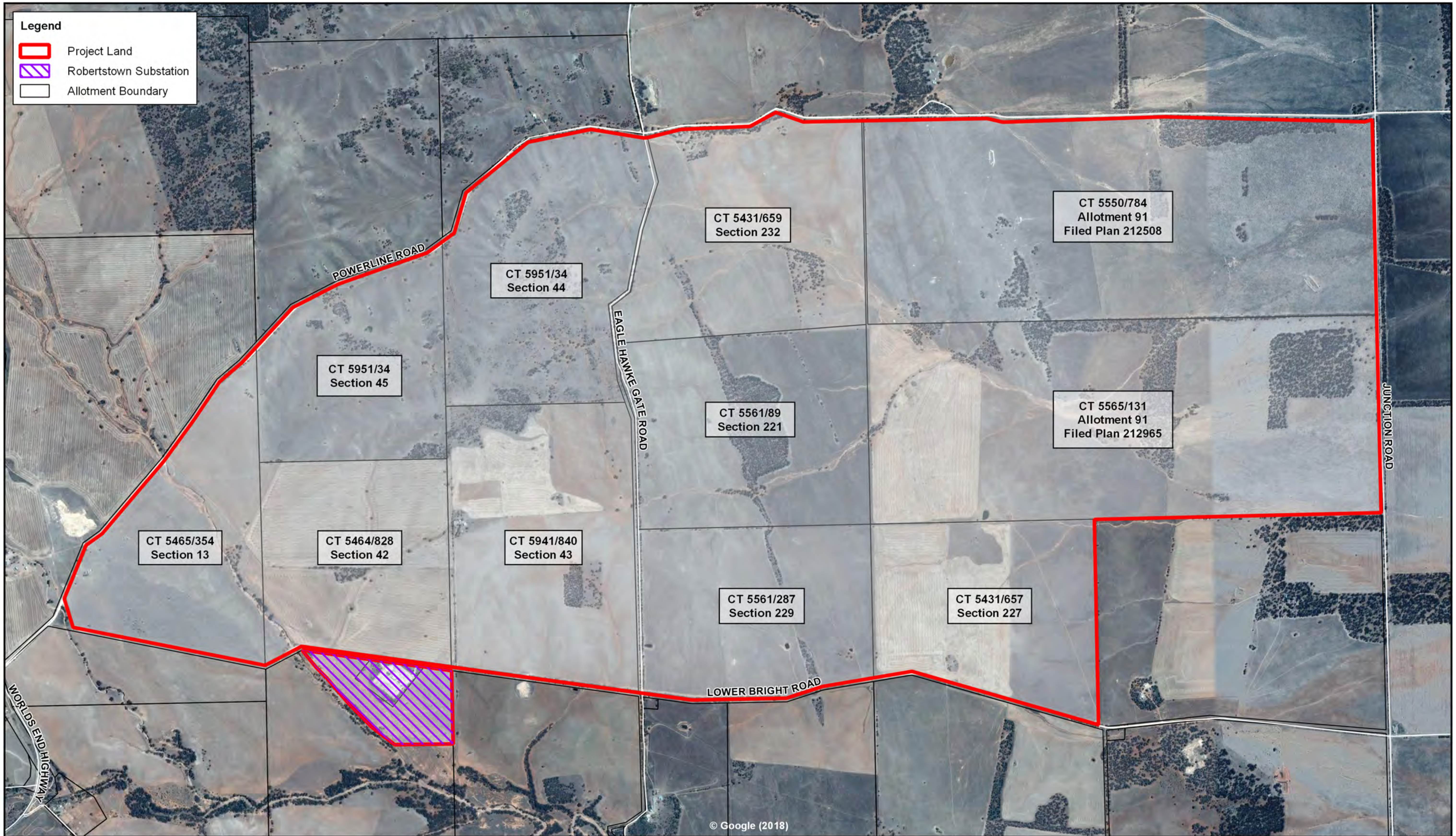
Location Plan

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_PR_Locality Plan.qgs



Author:	MB
Reviewer:	SMC/ JB
A3 Scale:	1:20,000
Job Ref/Version:	11314/ V05

0 0.25 0.5 0.75 1 km

Map Projection: GDA 1994 MGA Zone 54

Figure 2-2

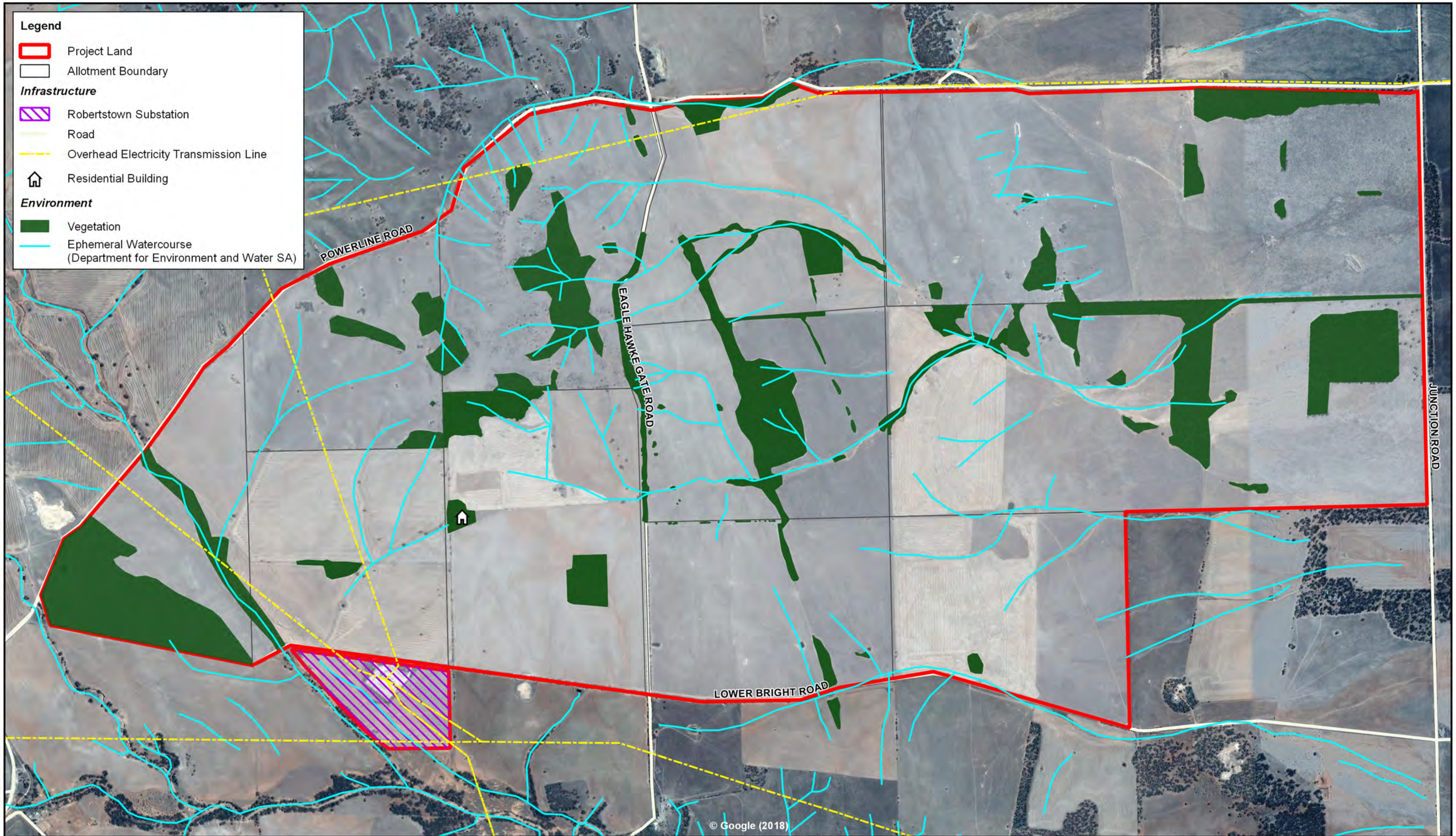
Project Land Plan

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_PR_Project Land.qgs



Author:	SW	
Reviewer:	SM/JB	
A3 Scale:	1:19,000	
Job Ref/version:	11314/ V04	

Accuracy: location and scale of features is indicative only

Map Projection: GDA 1994 MGA Zone 54

Figure 2-3

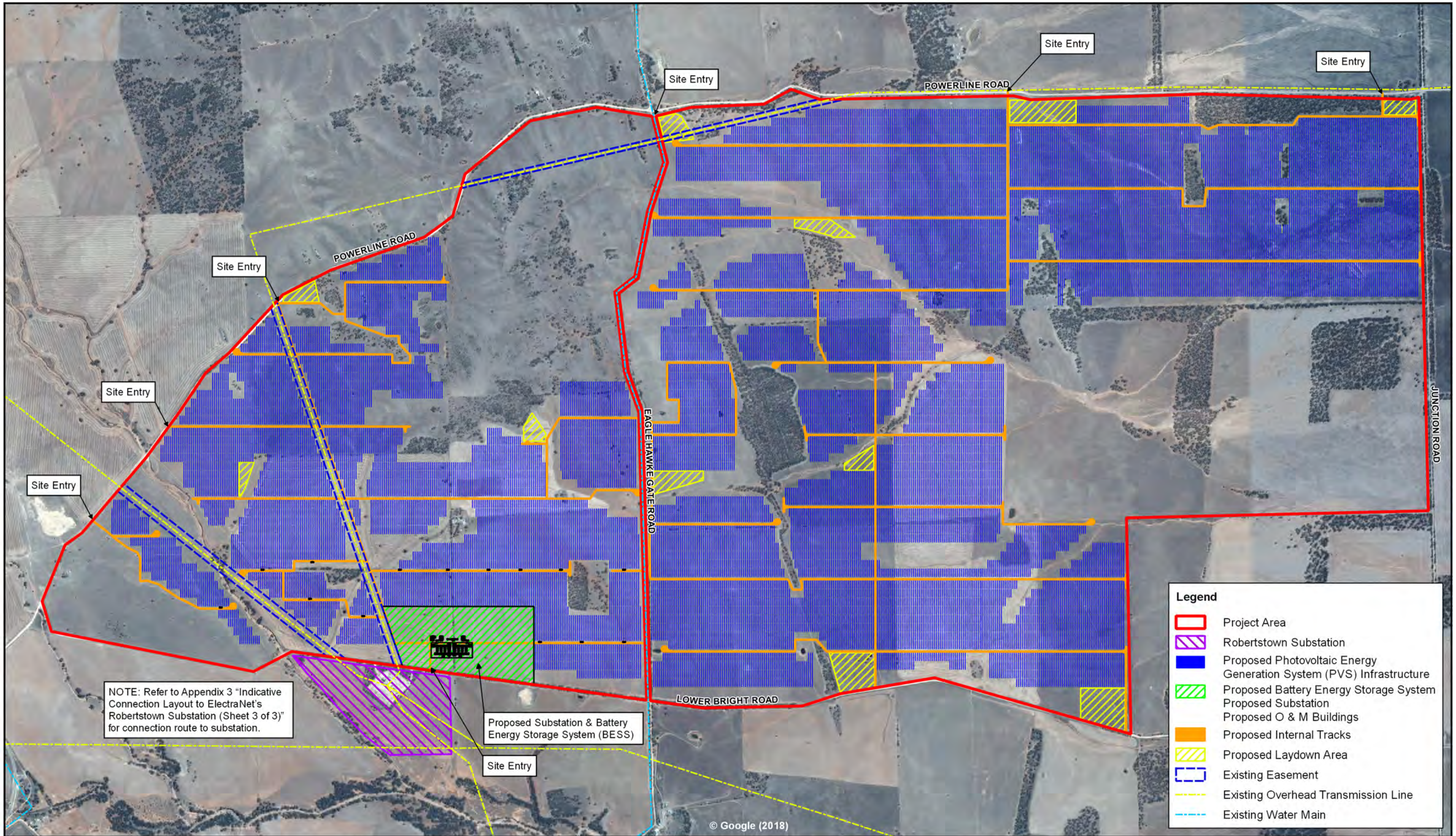
Key Physical Features of the Project Land

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_PR_Key Features of Project Land.qgs



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:19,000
Job Ref/Version:	11314/ V03

0 0.25 0.5 0.75 1 km

Accuracy: location and scale of features is indicative only

Map Projection: GDA 1994 MGA Zone 54

Sheet 1 of 3

Indicative PVS Operations Layout

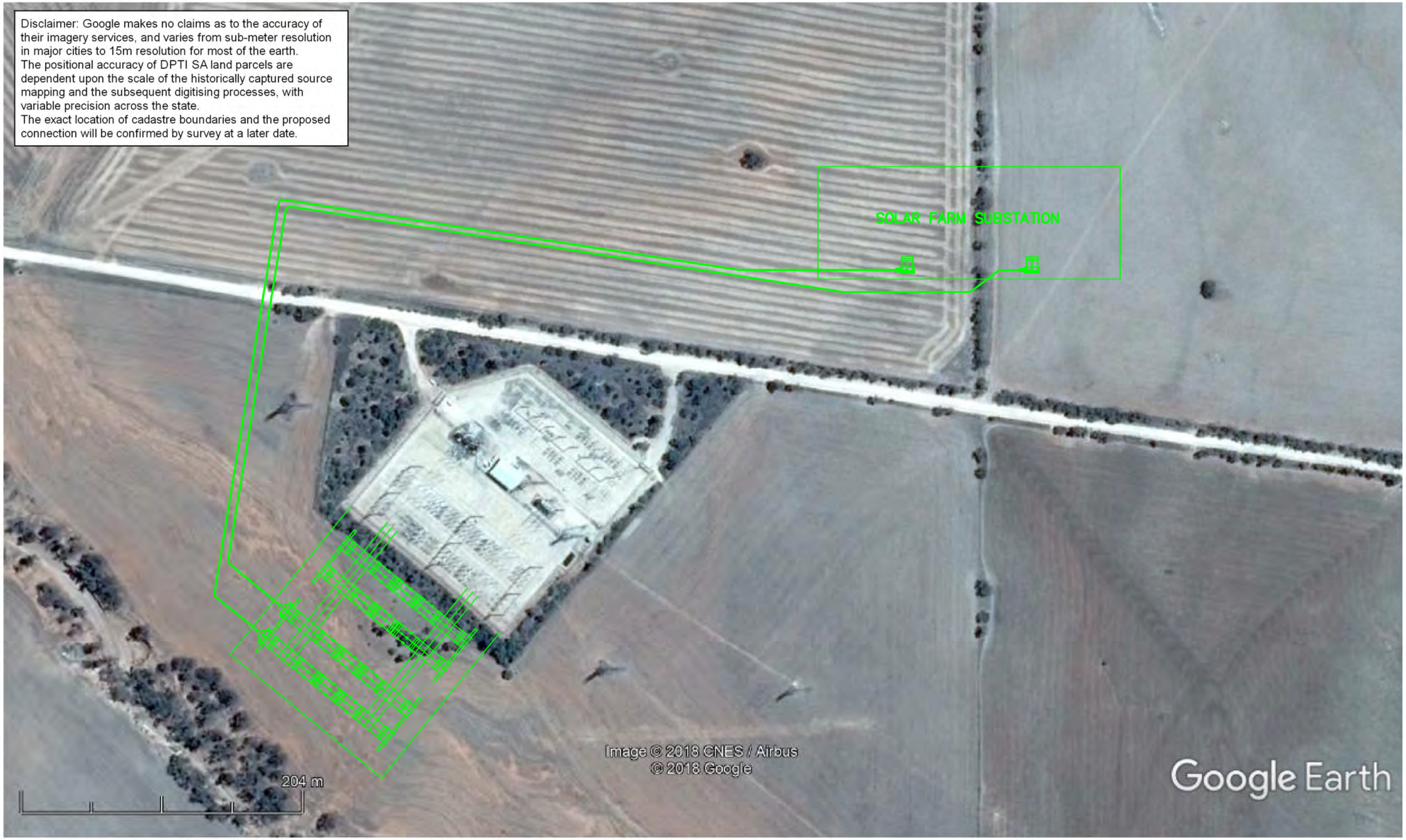
Robertstown Solar | Robertstown SA Australia

23/11/2018

ROBERTSTOWN SOLAR

11314_PR_Preliminary_Layout.qgs

Disclaimer: Google makes no claims as to the accuracy of their imagery services, and varies from sub-meter resolution in major cities to 15m resolution for most of the earth.
The positional accuracy of DPTI SA land parcels are dependent upon the scale of the historically captured source mapping and the subsequent digitising processes, with variable precision across the state.
The exact location of cadastre boundaries and the proposed connection will be confirmed by survey at a later date.



Author:	SW	
Reviewer:	SMC/ JB	
A3 Scale:	N/A	
Job Ref/Version:	11314/ V02	

Sheet 3 of 3

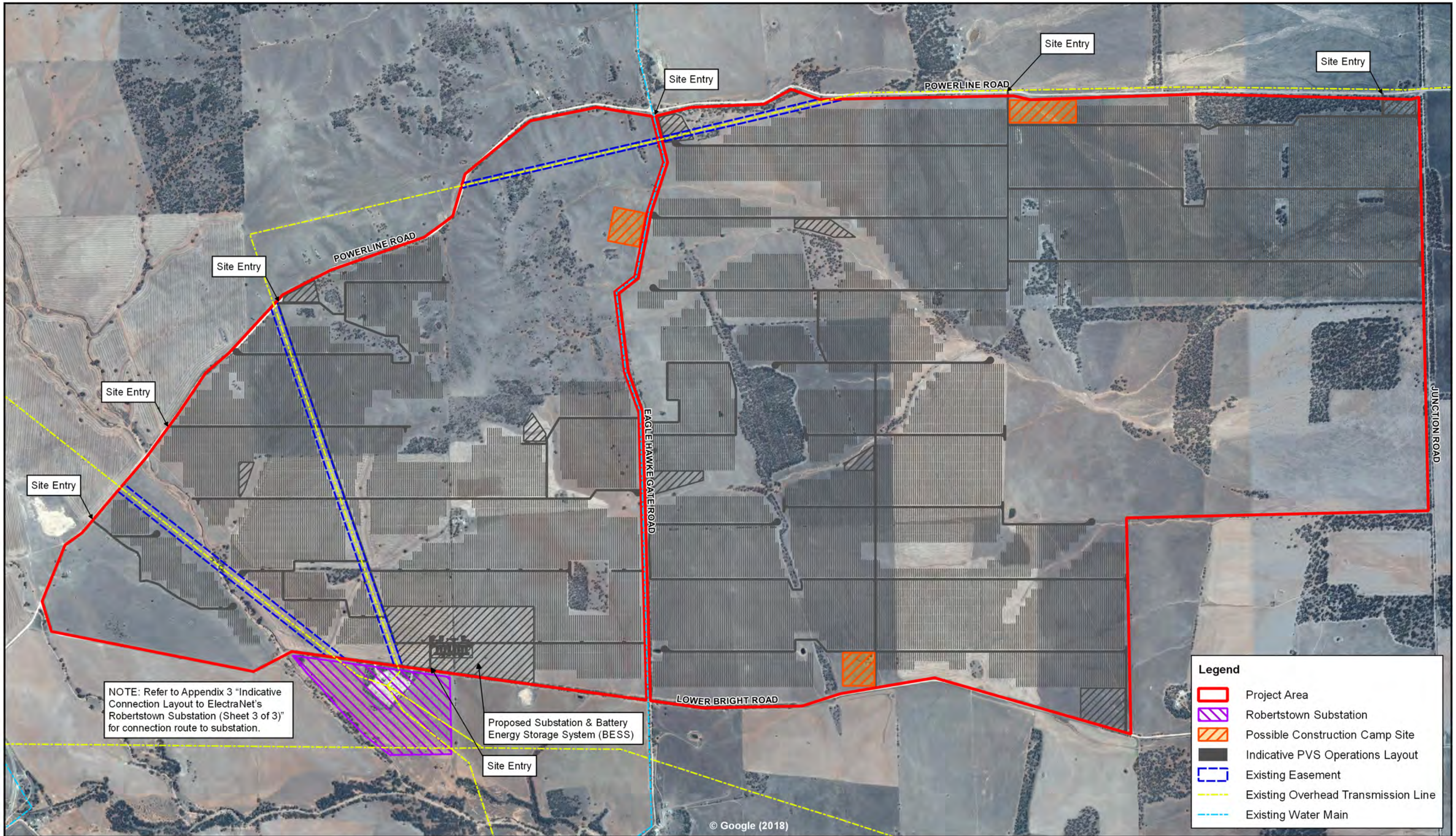
Indicative Connection Layout to ElectraNet's Robertstown Substation (Underground Cable)

Robertstown Solar | Robertstown SA Australia

29/11/2018

ROBERTSTOWN SOLAR

11314_PR_Indicative_Connection_Layout.qgs



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:19,000
Job Ref/Version:	11314/ V01

0 0.25 0.5 0.75 1 km

Accuracy: location and scale of features is indicative only

Map Projection: GDA 1994 MGA Zone 54

Sheet 1 of 3

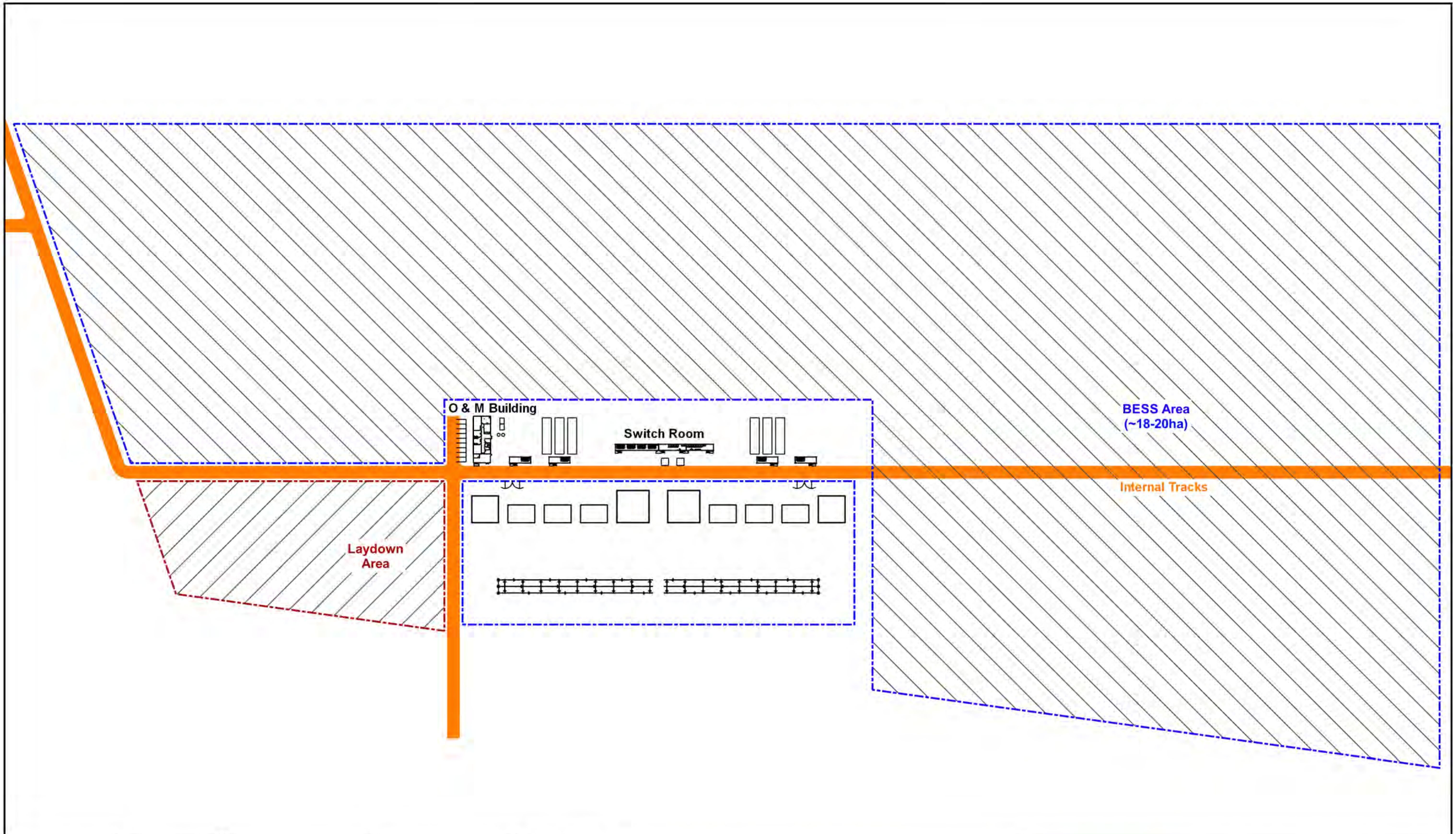
Possible Locations of Construction Camp

Robertstown Solar | Robertstown SA Australia

23/11/2018

ROBERTSTOWN SOLAR

11314_PR_Potential_Construction_Camps.qgs



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:2,000
Job Ref/Version:	11314/ V01

Sheet 2 of 3

Indicative BESS Operations Layout, Project Substation Layout and Operations and Maintenance Layout

Robertstown Solar | Robertstown SA Australia

23/11/2018

ROBERTSTOWN SOLAR

11314_PR_Indicative_BESS_Substation_OM.qgs

Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	N/A
Job Ref/Version:	11314/ V01

Sheet 3 of 3

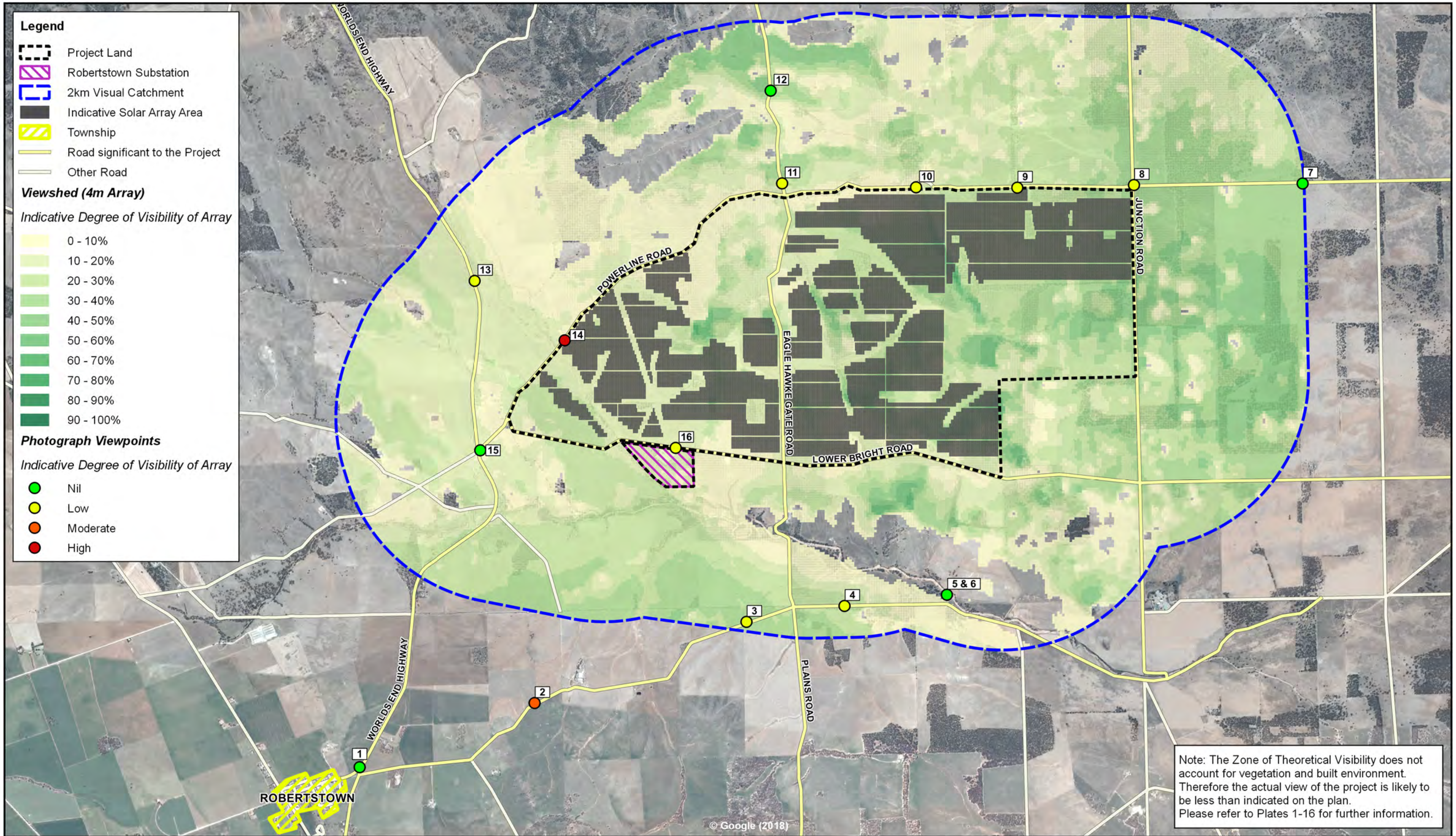
Photograph of Typical Construction Camp

Robertstown Solar | Robertstown SA Australia

23/11/2018

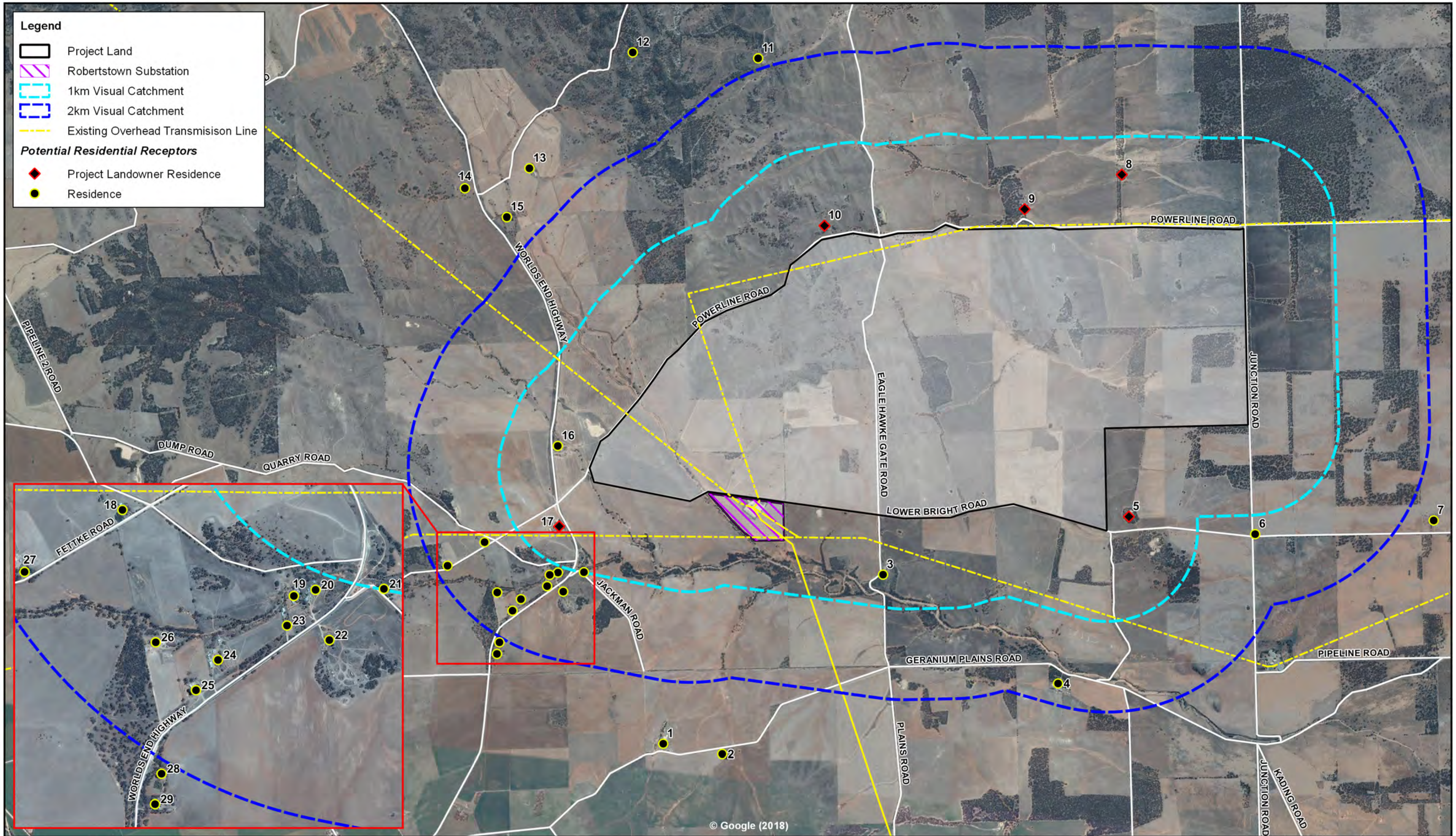
ROBERTSTOWN SOLAR

11314_PR_Typical_Camp_Layout.qgs



Author:	SW	0 0.5 1 1.5 2 km	**Figure 5-1** **Zones of Theoretical Visibility (4m Array)**	ROBERTSTOWN SOLAR
Reviewer:	SMC/ JB			
A3 Scale:	1:42,000		**Robertstown Solar | Robertstown SA Australia**	
Job Ref/Version:	11314/ V05	Map Projection: GDA 1994 MGA Zone 54	23/11/2018	

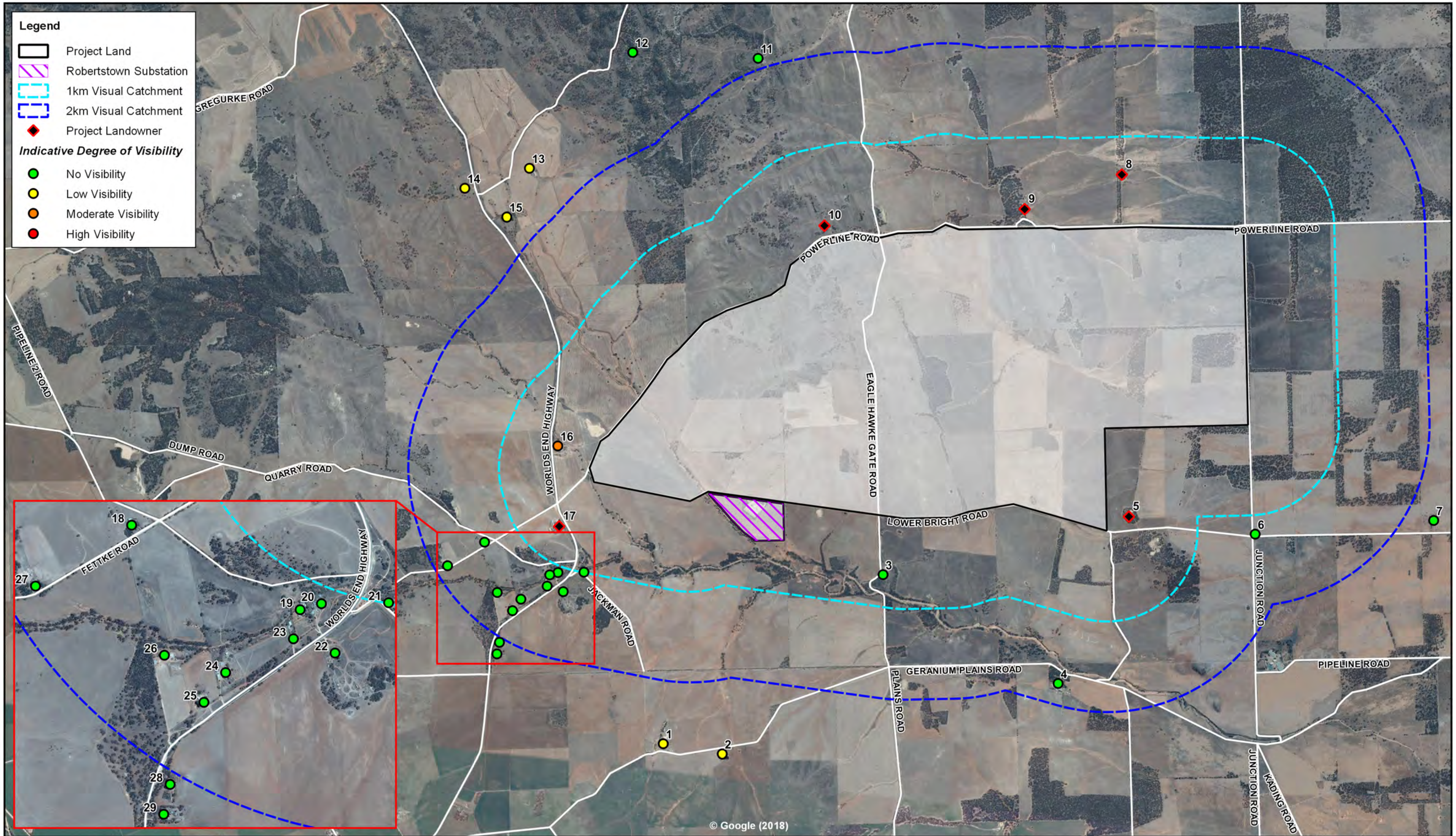
11314_VIA_Viewshed_Analysis.qgs



Author:	SW		**Figure 5-2** Potential Residential Receptors
Reviewer:	SMC/ JB	0 0.5 1 1.5 2 km	
A3 Scale:	1:40,000		Robertstown Solar | Robertstown SA Australia
Job Ref/Version:	11314/ V05	Map Projection: GDA 1994 MGA Zone 54	21/11/2018

ROBERTSTOWN SOLAR

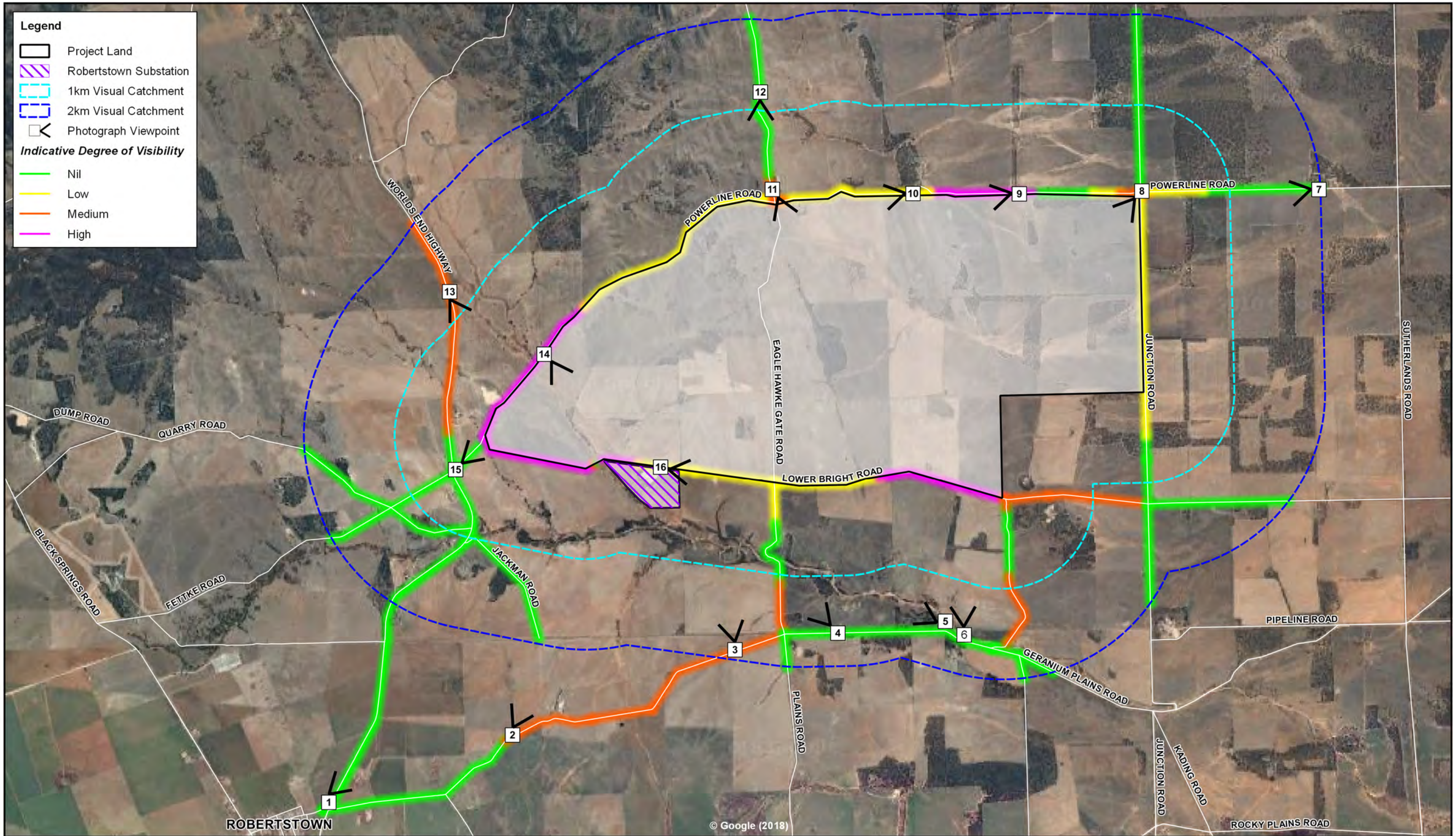
11314_VIA_Potential Residential Receptors.qgs



Author:	SW		**Figure 5-3** **Indicative Visibility from Potential Residential Receptors**
Reviewer:	SMC/ JB		
A3 Scale:	1:40,000	0 0.5 1 1.5 2 km	**Robertstown Solar | Robertstown SA Australia**
Job Ref/Version:	11314/ V10	Map Projection: GDA 1994 MGA Zone 54	21/11/2018

ROBERTSTOWN SOLAR

11314_VIA_Indicative Visibility_Potential Residential Receptors.qgs



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:40,000
Job Ref/Version:	11314/ V07

0 0.5 1 1.5 2 km

Map Projection: GDA 1994 MGA Zone 54

Figure 5-4 Indicative Visibility from Viewpoints within Landscape

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_VIA_Indicative Visibility_Potential Viewpoint Receptors.qgs

SECTION 49 & 49A – CROWN DEVELOPMENT
DEVELOPMENT APPLICATION FORM

PLEASE USE BLOCK LETTERS

COUNCIL: THE REGIONAL COUNCIL OF GOYDER

APPLICANT: SEE ANNEXURE A

ADDRESS: PO BOX 195, CHARLESTOWN, NSW 2290

CROWN AGENCY: DEPTARTMENT FOR ENERGY AND MINING

FOR OFFICE USE

DEVELOPMENT No: ______

PREVIOUS DEVELOPMENT No: ______

DATE RECEIVED: / /

CONTACT PERSON FOR FURTHER INFORMATION

Name: STEVE MCCALL

Telephone: 02 9258 1362 [work] 0418 426 769 [Ah]

Fax: ______ [work] ______ [Ah]

Email: stevemccall@epsenergy.com.au

☐ Complying	Decision: ______
☐ Merit	Type: ______
☐ Public Notification	Finalised: / /
☐ Referrals	

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:				
Minister's Approval				

EXISTING USE: AGRICULTURE - CROPPING/ GRAZING

DESCRIPTION OF PROPOSED DEVELOPMENT: SEE ANNEXURE A

LOCATION OF PROPOSED DEVELOPMENT: ROBERTSTOWN - POWERLINE ROAD/LOWER BRIGHT ROAD

House No: ______ Lot No: ______ Street: ______ Town/Suburb: ROBERTSTOWN, 5381

Section No [full/part] ______ Hundred: SEE ANNEXURE A Volume: ______ Folio: ______

Section No [full/part] ______ Hundred: ______ Volume: ______ Folio: ______

LAND DIVISION:

Site Area [m^2] 18,000,000 Reserve Area [m^2] ______ No of existing allotments ______

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

DEVELOPMENT COST [do not include any fit-out costs]: $ 1.17 BILLION

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).

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: 30 / 11 / 2018

SECTION 49 & 49A – CROWN DEVELOPMENT DEVELOPMENT APPLICATION FORM: ANNEXURE A

APPLICANT: ENERGY PROJECTS SOLAR PTY LTD ACN: 609 935 588 ON BEHALF OF ROBERTSTOWN SOLAR 1 PTY LTD ACN: 621 450 940 FOR THE PHOTOVOLTAIC ENERGY GENERATION SYSTEM (PVS) AND ASSOCIATED INFRASTRUCTURE AND ON BEHALF OF ROBERTSTOWN SOLAR 2 PTY LTD ACN: 621 451 161 FOR THE BATTERY ENERGY STORAGE SYSTEM (BESS) AND ASSOCIATED INFRASTRUCTURE.

DESCRIPTION OF PROPOSED DEVELOPMENT: DEVELOPMENT OF AN INTEGRATED BUT SEPARATELY OPERATED GRID CONNECTED PHOTOVOLTAIC ENERGY GENERATION SYSTEM (PVS) AND ASSOCIATED INFRASTRUCTURE AND BATTERY ENERGY STORAGE SYSTEM (BESS) AND ASSOCIATED INFRASTRUCTURE INCLUDING BUT NOT LIMITED TO:

> SOLAR MODULES, INVERTER STATIONS, TRANSFORMERS, SWITCHING SUBSTATION, UTILITY SCALE BATTERY FACILITY, ONE OR MORE SYNCHRONOUS CONDENSERS (SUBJECT TO REQUIREMENT) ASSOCIATED UNDERGROUND CABLES, UNDERGROUND AND/OR OVERHEAD TRANSMISSION LINES, ASSOCIATED CABLES, POLES, TO CONNECT THE PROJECT TO ELECTRANET'S ROBERTSTOWN SUBSTATION, ADMINISTRATION AND CONTROLS AREA, DRAINAGE WORKS, SECURITY MEASURES INCLUDING FENCING, CCTV AND LOW-LEVEL NIGHT TIME LIGHTING.

LOCATION OF PROPOSED DEVELOPMENT:

TITLE	LOT/PLAN/SECTION	STREET/ROAD	AREA	HUNDRED
CT 5565/131	A91 FP212965	LOWER BRIGHT ROAD	BRIGHT	BRIGHT
CT 5431/657	SECTION 227	LOWER BRIGHT ROAD	GERANIUM PLAINS	BRIGHT
CT 5431/659	SECTION 232	POWER LINE ROAD	BRIGHT	BRIGHT
CT 5465/354	SECTION 13	LOWER BRIGHT ROAD	BRIGHT	BRIGHT
CT 5464/828	SECTION 42	LOWER BRIGHT ROAD	BRIGHT	BRIGHT
CT 5941/840	SECTION 43	LOWER BRIGHT ROAD	BRIGHT	BRIGHT
CT 5561/287	SECTION 229	LOWER BRIGHT ROAD	BRIGHT	BRIGHT
CT 5561/89	SECTION 221	LOWER BRIGHT ROAD	BRIGHT	BRIGHT
CT 5951/34	SECTION 44 & 45	POWER LINE ROAD	BRIGHT	BRIGHT
CT 5550/784	A91 FP212508	POWER LINE ROAD	BRIGHT	BRIGHT
CT 5689/928	A51 DP51338	PUBLIC ROAD	BRIGHT	BRIGHT
CT 5689/927	A50 DP51338	PUBLIC ROAD	BRIGHT	BRIGHT

Signature: ____________________ **Dated:** 30 / 11 / 2018

DEVELOPMENT REGULATIONS 2008
Form of Declaration (Schedule 5 clause 2A)

Government of South Australia

To:

From:

Date of Application: 30 / 11 / 2018

Location of Proposed Development: See below.

House No: _____ Lot No: _____ Street: _____

Town/Suburb: ROBERTSTOWN, 5381

Section No (full/part): _____ Hundred: _____

Volume: _____ Folio: _____

CT 5565/131 - A91 FP212965; CT 5431/657 - SECTION 227; CT 5431/659 - SECTION 232; CT 5465/354 - SECTION 13; CT 5464/828 - SECTION 42; CT 5941/840 - SECTION 43; CT 5561/287 - SECTION 229; CT 5561/89 - SECTION 221; CT 5951/34 - SECTION 44 & 45; CT 5550/784 - A91 FP212508; CT 5689/928 - A51 DP51338; CT 5689/927 - A50 DP51338.

Nature of Proposed Development:

Development of an integrated but separately operated grid connected Photovoltaic Energy Generation System (PVS) and associated infrastructure and Battery Energy Storage System (BESS) and associated infrastructure including but not limited to:

Solar modules, inverter stations, transformers, switching substation, utility scale battery facility, one or more synchronous condensers (subject to requirement) associated underground cables, underground and/or overhead transmission lines, associated cables, poles, to connect the project to Electranet's Robertstown substation, administration and controls area, drainage works, security measures including fencing, CCTV and low-level night time lighting.

I STEPHEN MCCALL **being ~~the applicant~~/ a person acting on behalf of the applicant (delete the inapplicable statement) for the development described above declare that the proposed development will involve the construction of a building which would, if constructed in accordance with the plans submitted, not be contrary to the regulations prescribed for the purposes of section 86 of the Electricity Act 1996. I make this declaration under clause 2A(1) of Schedule 5 of the Development Regulations 2008.**

Signed: _____ **Date:** 30 / 11 / 2018

Government
of South Australia

Note 1

This declaration is only relevant to those development applications seeking authorisation for a form of development that involves the construction of a building (there is a definition of 'building' contained in section 4(1) of the Development Act 1993), other than where the development is limited to –

a) an internal alteration of a building; or
b) an alteration to the walls of a building but not so as to alter the shape of the building.

Note 2

The requirements of section 86 of the Electricity Act 1996 do not apply in relation to:

a) an aerial line and a fence, sign or notice that is less than 2.0 m in height and is not designed for a person to stand on; or
b) a service line installed specifically to supply electricity to the building or structure by the operator of the transmission or distribution network from which the electricity is being supplied.

Note 3

Section 86 of the Electricity Act 1996 refers to the erection of buildings in proximity to powerlines. The regulations under this Act prescribe minimum safe clearance distances that must be complied with.

Note 4

The majority of applications will not have any powerline issues, as normal residential setbacks often cause the building to comply with the prescribed powerline clearance distances. Buildings/renovations located far away from powerlines, for example towards the back of properties, will usually also comply.

Particular care needs to be taken where high voltage powerlines exist; or where the development:

- is on a major road;
- commercial/industrial in nature; or
- built to the property boundary.

Note 5

An information brochure: 'Building Safely Near Powerlines' has been prepared by the Technical Regulator to assist applicants and other interested persons.

This brochure is available from council and the Office of the Technical Regulator. The brochure and other relevant information can also be found at **sa.gov.au/energy/powerlinesafety**

Note 6

In cases where applicants have obtained a written approval from the Technical Regulator to build the development specified above in its current form within the prescribed clearance distances, the applicant is able to sign the form.

PLANNING REPORT

Prepared for Robertstown Solar

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

EPS ENERGY

Reference No. 11314

November 18

QUALITY ASSURANCE AND DECLARATION

Quality Assurance and Version Control Table		
Project:	Robertstown Solar	
Client:	Robertstown Solar 1 Pty Ltd and Robertstown Solar 2 Pty Ltd	
Rev:	**Date:**	**Reference:**
V01	29.11.2018	11314_Robertstown Solar Planning Report
Checked By:	Simon Duffy	
Approved By:	Steve McCall	
Declaration:	*The opinions and declarations in this document are ascribed to EPS Energy and are made in good faith and trust that such statements are neither false nor misleading.* *In preparing this document, EPS Energy has considered and relied upon information obtained from the public domain, supplemented by discussions between key EPS Energy staff, representatives from governing agencies and independents, including the client and specialist consultants.*	
Applicant:	EPS Energy PO Box 195 Charlestown NSW 2290 (02) 9258 1362	
Prepared By:	Alina Tipper and Simon Duffy	
Project Land:	CT 5565/131 CT 5431/657 CT 5431/659 CT 5465/354 CT 5464/828 CT 5941/840 CT 5561/287 CT 5561/89 CT 5951/34 CT 5550/784 CT 5689/928 CT 5689/927	A91 FP212965 Section 227 Section 232 Section 13 Section 42 Section 43 Section 229 Section 221 Section 44 & 45 A91 FP212508 A51 DP51338 A50 DP51338

EXECUTIVE SUMMARY

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

This Planning Report (PR) has been prepared by Energy Projects Solar (EPS) Pty Ltd ACN: 609 935 588 for Robertstown Solar 1 Pty Ltd ACN: 621 450 940 the special purpose vehicle for the (PVS) and Robertstown Solar 2 Pty Ltd ACN: 621 451 161 the special purpose vehicle for the (BESS).

Robertstown Solar 1 Pty Ltd, the special purpose vehicle for the PVS, has applied to the Australian Energy Market Operator (AEMO) to become a Registered Generator in the National Electricity Market (NEM). The PVS will connect to the Robertstown Substation via its own dedicated connection allowing the PVS to export electricity into the national electricity grid.

Robertstown Solar 2 Pty Ltd, the special purpose vehicle for the BESS, has applied to the Australian Energy Market Operator (AEMO) to become a Registered Generator in the National Electricity Market (NEM). The BESS will connect to the Robertstown Substation via its own dedicated connection allowing the BESS to export and import electricity into and out of the national electricity grid.

PROJECT LAND LOCATION

The Project land comprises the Project area on which the PVS, BESS, Project's substation, Operations and Maintenance buildings and associated infrastructure will be built and operated, and land required to connect the Project's elements to ElectraNet's Robertstown Substation. The Project land is shown in Figure 2-2.

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

Land within the immediate surrounding area of the Project area is predominately used for agriculture.

PROJECT AREA SELECTION

On behalf of Robertstown Solar, EPS Energy undertook an extensive solar site identification assessment across the Eastern Australian National Electricity Network examining potential project areas based on several criteria including:

- Proximity to electrical substations;
- Access to existing electrical substations and capacity of each substation to accept new generation;
- Marginal loss factors and future forecasts;
- Consideration of known solar projects proximate to a proposed project area and the potential for impact on capacity and connection;
- Irradiation levels;
- Agreements with landowners to host a project;
- Utilised land such as land used for agricultural land uses to reduce the likelihood of the solar development encountering significant areas of native vegetation, Aboriginal cultural heritage items or other environmental constraints;
- Environmental analysis of ecology, archaeology and potential environmental constraints including flooding;
- Favourable topography and geotechnical conditions for constructing and operating a solar development;
- Proximity to towns but equally enough distance between the site and urban populated areas;
- Suitable infrastructure surrounding the project area e.g. roads access for construction and operation of a solar development;
- NEM capacity, grid strength and the ever-increasing market demand for renewable energy;
- Favourable response from enquires with the Transmission Network Service Provider (ElectraNet); and
- Details on interstate connectors and relevant known transmission constraints.

The initial assessment of the 1,800ha (approximately) Project area found it met several key criteria including:

- The Project area adjoins and can access the Robertstown Substation;
- Robertstown Substation has the capacity to accept new electricity generation;
- The area has a strong electrical transmission network;
- The landowners of the Project area were receptive to hosting a solar development;
- The Project area is used for agricultural land uses including cropping and grazing thereby reducing the likelihood of the Project encountering significant areas of native vegetation, Aboriginal cultural heritage items or other environmental constraints;
- Suitable infrastructure surrounding the Project area including good State and Local road access to the Project area for construction and operation of a solar development;
- Good irradiation levels; and

- Proximity to the town of Robertstown and Burra but equally enough distance between the Project area and Robertstown.

Based on the positive outcomes of the initial assessment and with strong landowner support the next phase of assessment was commenced including detailed grid connection studies, financial feasibility modelling, specific Project area investigations including preliminary field works to identify any unknown environmental and cultural constraints and preliminary Project design works. The assessment found:

- Power generated by the Project can be exported into the grid without any significant constraints;
- Co-location of the Project close to the Robertstown Substation minimises the connection transmission line distance thereby reducing the need for transmission tower structures, electrical transmission losses and consequently improving the economics of the Project on the Project area;
- The Project will not be constrained by environmental constraints such as flooding, ecology or archaeology; and
- Favourable topography and geotechnical conditions for constructing and operating a solar and battery development.

Based on the findings the Project was considered feasible. Consideration then turned to the social aspect of the Project including ascertaining relevant stakeholder opinions on the Project in the Project area's locality.

On behalf of Robertstown Solar, EPS Energy carried out pre-Development Application lodgment community and stakeholder engagement to understand the opinions of relevant stakeholders on the Project in the Project area's locality. Details of the consultation are set out in the following section - Consultation.

CONSULTATION

The following stakeholders were identified as key to the Project:

- Landowners and occupiers of the properties forming the proposed Project area and adjacent properties;
- Key government and agency members;
- The Ngadjuri Nation Aboriginal Corporation;
- The wider Robertstown community and established groups; and
- The relevant authorities who manage the registered easements across the Project area.

Noting that Robertstown has a population of 248 (2016 Census), an estimated 52 guests attended the Community Information Sessions and Neighbour Information Session at the Robertstown Peace Institute on 29-30 May 2018 including seven (7) of the nine (9) adjacent landowners and a number of representatives from the Regional Council of Goyder and ElectraNet.

The response from the key members of the State Government and other agencies has been positive and supportive of the Project in the Project area’s locality. Members of the Regional Council of Goyder expressed their commendation of EPS Energy’s early and comprehensive engagement approach.

The response from the general community has been positive and supportive of the Project in the Project area’s locality.

Pre-development application engagement did not raise any uncertainty or concerns for the Project in the Project area’s locality that cannot be adequately managed.

PROJECT DESCRIPTION

The PVS element of the Project will have a maximum output capacity of approximately 500MW (AC). The BESS element of the Project includes up to 250MW capacity battery with up to 1,000MWh of storage. The Project may also include one or more synchronous condensers to assist in providing inertia for managing power system strength. Further detailed assessments are underway to ascertain the option and appropriate sizing of any synchronous condensers.

The Project will include, but not be limited to, the following components:

- Solar photovoltaic modules and ground mounted tracking racks;
- DC/AC containerised or skid mounted inverter stations;
- Battery storage area;
- Synchronous condensers (subject to requirement);
- Transformers;
- Switching yard and electrical substation;
- Associated underground cables connecting groups of solar panels to inverter stations and inverter stations via overhead and/or underground transmission lines to a transformer in the substation;
- Ancillary infrastructure and buildings associated with the development including a site office, maintenance sheds, laydown area/compound access tracks and perimeter fencing; and
- Connection to Robertstown Substation via overhead and/or underground transmission lines.

The Project will likely connect to Robertstown Substation via two 275 kV circuit overhead and/or underground transmission lines having a route length of between 0.5-3km (approximately) dependant on the final design and location of the Project's transformers and switch gear. These network connection facilities will be designed, constructed and operated to ensure compliance with all statutory requirements.

Extensive technical assessments and National Electricity Market rules for connection to the high voltage transmission network require a separate approval process, coordinated with Australian Energy Market Operator (AEMO) and ElectraNet, for the PVS and BESS connection to the Robertstown Substation.

In line with other utility scale solar developments the Project includes three broad phases, the development or construction phase, the operation phase and the decommissioning phase.

The development/construction phase of the Project with a maximum output capacity of approximately 500MW (AC) and a battery energy storage system with 1,000MWh capacity is multifaceted and consequently is likely to be constructed in a number of phases over a number of years.

STATUTORY PLANNING CONTEXT

The development application is submitted pursuant to Section 49 of the *Development Act 1993*.

ENVIRONMENTAL ASSESSMENT

Initial Project technical studies conclude there will be minimal impact to the surrounding environment. The studies underpin the key findings and recommendations outlined in this Planning Report.

The following is a summary of the key environmental considerations:

Visual Amenity

The Visual Impact Assessment (VIA) found the that the overall visual impact rating to residential and viewpoint receptors is "Low".

The existing landscape and scenic quality of the Project Area and surrounding area indicates the site is appropriate for the Project for the following reasons:

- The Project is located on land zoned Primary Industry Zone. The Development Plan expressly seeks the development of Renewable Energy Facilities within the Primary Production Zone;

- The bulk and scale of the Project is consistent with the existing electricity infrastructure;
- The uniform and linear layout of the Project is not considered out of character with the existing rural landscape;
- The Project will not be a dominant feature in the landscape; and
- The Project cannot be viewed in its entirety, even from Inspiration Point lookout.

Traffic and Transport

Anticipated traffic volumes will be highest during the Project's construction while operational traffic volumes are expected to be minimal.

A Transport Impact Assessment (TIA) assessed the potential impact of the Project's construction traffic movements on transport routes and other road users and assessed the potential impact of the Project's operational traffic movements on transport routes and other road users based on the Project being completely operational. The assessment reaches several conclusions including the traffic generated by the Project during the construction and operational phases is very low in comparison to existing traffic volumes on the State controlled roads and therefore is not expected to compromise the safety or function of the surrounding State road network and the traffic generated by the proposed Project area during the construction and operational phases is not expected to compromise the safety or function of the local roads that experience low volumes of traffic.

A Traffic Management Plan for the construction phase will be prepared before the commencement of construction in consultation with Department of Planning, Transport and Infrastructure (DPTI) and Goyder Regional Council. The Traffic Management Plan will address construction vehicle access arrangements and identify traffic management measures to address traffic safety and access issues inherent with using oversized vehicles and general construction traffic.

Biodiversity

The Project's area is predominately used for cropping and grazing livestock. Only approximately 13% of the Project Area is covered in native vegetation.

Desktop and initial field survey assessment of the Project area's ecological values were completed to determine the presence of species of conservation significance (i.e. species protected under Commonwealth or State legislation).

Preliminary design works aim to avoid larger areas of native vegetation within the Project area however a number of individual scattered trees or clumps of trees will be removed to assist with the construction and the Project's effective operation. The removal of the individual scattered trees and clumps of trees will not cause any significant impact on local biodiversity.

Initial fauna surveys identified the presence of the Southern Hairy – nosed Wombat burrows generally located in some drainage lines. A targeted wombat survey will be carried out to inform the appropriate management options.

Further Flora and Fauna field survey work will be carried out to inform the Project's final layout plans.

Cultural Heritage

Desktop and initial archaeological survey assessment of the Project area were completed to understand the possible presence of Aboriginal and/or European archaeological value within the Project area.

The initial assessment identified one Aboriginal site, three isolated artefacts (Complete Flake, Silcrete), one culturally sensitive landscape and four European sites of local significance.

Preliminary design works aim to avoid the Aboriginal site and the four European sites of local significance.

Discussions have commenced with the Ngadjuri Nation Aboriginal Corporation regarding further archaeological survey assessment of the Project area to identify the presence of Aboriginal heritage within the Project area.

The Cultural heritage survey works and discussion with the Ngadjuri Nation Aboriginal Corporation will inform the Project's final layout plans.

Land Use

The possible medium - term change of land use of approximately 18km² of agricultural land is a very minor (0.05%) change on the region's 3.2 million ha + agricultural production potential (Based on Australian Bureau of Agricultural and Resource Economics land use data 2011).

Investigations are being undertaken to assess if sheep grazing under the panels or cropping between the panels is feasible during the operation phase.

After the Project's decommissioning the Project area will be available for agricultural production. Consequently, the Project will not have an adverse impact on the long-term agricultural use of the land.

Flooding

The Project will not have a demonstrable impact on local flooding.

Hydrology

The Project will not affect basic landholder water rights and harvestable rights.

Soils and Salinity

The Project will involve short - term construction, followed by decades of operation with either limited co-location agricultural land uses or no agricultural land uses. The Project will not contribute to an increase in the existing salinity levels or adversely impact the existing soil conditions.

Surface Water and Erosion

The majority of the Project area will be retained in its current condition allowing infiltration of rainfall. A small part of the Project area (approximately 6-20 ha or 0.3 – 1.1% of the Project area), could potentially increase the runoff volumes and velocities however with appropriate management the potential for erosion and migration of sediment is considered unlikely.

During the construction and operational phases, the Project will implement measures to ensure peak runoff rates or long-term runoff yields are not increased or are minimal and the possibility of soil erosion is limited.

Groundwater

The risk of groundwater contamination is very low. Fuel, oils and lubricants required during construction and operation will be stored and managed in accordance with relevant standards.

Water Resource

Australia is one of the world's top 20 water-stressed nations.

A report by the World Resources Industry notes the following key points:

- It identified Australia as one country vulnerable to water stress where the potential for cheap renewable energy, solar and wind as opposed to fossil fuels, could reduce water consumption country-wide as these technologies use minimal water;

- Every megawatt hour of electricity generated by coal withdraws around 60,700 litres and consumes about 2,600 litres of water; and
- In the 2017-2018 financial year, Australian's have consumed 147 terrawatt hours of electricity, about 73 per cent of which comes from coal, which equates to around 455 billion litres of water.

The Project will contribute to reducing the amount of water required to generate electricity.

Climate

The Project will deliver clean and renewable energy to the South Australian people in the face of climate change, assist in meeting renewable energy targets for the State and the nation, displace the annual equivalent of 815,000 tonnes of greenhouse gas emissions, comparable to planting 116,500 trees or removing 326,500 cars from the road and provide clean energy to power an equivalent of 144,000 homes per annum for the Project's 30 year life.

Noise

The Project's construction phase will generate noise emissions. Noise emissions will occur during site preparation, the installation of the Project's infrastructure (including the panel system) and from the construction vehicles / machinery.

Adopting standard environmental management controls, shutting down equipment when not in use and use of noise reduction devices will minimise the construction noise impacts at sensitive receivers which are expected to be negligible.

Operating the Project will generate nominal noise emissions. Consequently, no noise impacts to sensitive receivers are anticipated during the Project's operation phase.

Bushfire

The risk of initiating fire from the solar panels, inverters and other solar infrastructure is very low due to high quality of the components. Potential ground cover on the Project area does pose a potential risk of fire. Mitigation of this risk will include the internal access roads being maintained for access and where relevant as a firebreak.

Air Quality

Potential dust generated by construction traffic on internal access roads and unsealed public roads will be mitigated by standard management controls. The Project is not expected to generate measurable dust during operations.

Electric and Magnetic Fields

The Project design will adhere to the clearance distances from sensitive receivers for safety purposes and incorporate suitable buffers to limit exposures in accordance with several technical and legislative requirements.

Socio-Economic

The Project will:

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

Glint and Glare

The assessment identified six residences where the residents of the houses may potentially view low-level glare for a small amount of time (minutes) when looking towards the PVS solar panels early in the morning or late in the evening on some months through the middle of the year. Based on observations, existing obstacles (including existing vegetation, topography, and structures) between the residents of these six houses and the PVS panel arrays obstruct and ameliorate the low-level glare identified in the Glint and Glare report.

The assessment concluded Worlds End Highway does not experience glare issues. Sections of Lower Bright Rd, Powerline Rd and Junction Rd experience some low-level glare for a small duration (less than 10 minutes) during the early morning for a few months a year.

The roads experience very limited local traffic and observations of existing obstacles (including existing vegetation, topography and structures) between the relevant sections of roads and the PVS panel arrays obstruct and ameliorate the low-level glare identified in the Glint and Glare report.

Environmental Management Framework

Environmental Management Plans for the Project's construction phase and operation phase will be prepared detailing the management measures for any potential environmental risk.

CONCLUSION

The Planning Report concludes the Project:

- Is consistent with the relevant statutory provisions;
- Will not result in significant environmental impacts;
- Is suitable at the proposed Project area; and
- Is in the public interest.

Therefore, it is respectively requested the Project be approved subject to final Project documents and plans being approved by relevant Government authorities prior to the commencement of construction and operation.

ABBREVIATIONS

Abbreviation	Description
AADT	Annual Average Daily Traffic
AC	Alternating Current
ACMA	The Australian Communications and Media Authority
AEMO	Australian Energy Market Operator
APZ	Asset Protection Zones
Asl	Above Sea Level
BESS	Battery Energy Storage System
CASA	Civil Aviation Safety Authority
CMP	Construction Management Plan
DC	Direct Current
DRP	Decommissioning and Rehabilitation Plan
DPTI	Department of Planning, Transport and Infrastructure
EMF	Electromagnetic Fields
EMP	Environmental Management Plan
EPA	Environment Protection Authority
ESCOSA	Essential Services Commission of South Australia
FTE	Full Time Equivalent
GHG	Greenhouse Gases
LGA	Local Government Area
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market
OEMP	Operational Environmental Management Plan
OP	Observer locations
OTR	Office of the Technical Regulator
PBS	Performance Based Standards
PR	Planning Report
Project	Robertstown Solar
PV	Photovoltaic
PVS	Photovoltaic Energy Generation System
RFI	Radio Frequency Interface
RO	Route locations
RET	Renewable Energy Target

Abbreviation	Description
The Act	*Development Act 1993*
TIA	Transport Impact Assessment
SA	South Australia
SARIG 2018	South Australian Resource Information Gateway
VIA	Visual Impact Assessment

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APPENDICES

1. INTRODUCTION

Robertstown Solar (Project) is situated approximately 5 km north-east of Robertstown, and 115 km north-east of the State's capital, Adelaide. The Project is within the Local Government Area (LGA) of Regional Council of Goyder. The Project land comprises the Project area on which the PVS, BESS, Project's substation, Operations and Maintenance buildings and associated infrastructure will be built and operated, and land required to connect the Project's elements to ElectraNet's Robertstown Substation. The Project area is approximately 1,800ha.

This Planning Report (PR) has been prepared to explain the environmental, social and economic matters associated with the Project. At this stage the Project is proposed to be an integrated but separately operated grid connected Photovoltaic Energy Generation System (PVS) of approximately 500MW (AC) generation capacity and a 250MW capacity Battery Energy Storage System (BESS) with 1,000MWh of storage. The PVS element, the BESS element and associated infrastructure, together "the Project", requires an estimated capital investment of AUD $1.17 billion. The Project's detailed design will be completed prior to construction.

Attached as Appendix 1 is Department for Energy and Mining's endorsement of the Project for the purposes of section 49 of the *Development Act 1993* (SA). The Development Application is submitted for the approval of construction, operation and decommissioning of the Project including the Project's connection to the Robertstown Substation.

1.1. APPROVALS SOUGHT

The Development Application seeks development approval for the following Project components and approach:

- Development approval for the construction, operation and decommissioning of the following components:
  - A Photovoltaic Energy Generation System (PVS) of approximately 500MW (AC) generation capacity and associated infrastructure;
  - A 250MW capacity Battery Energy Storage System (BESS) with 1,000MWh of storage and associated infrastructure;
  - Temporary construction components required to construct the Project's PVS element and BESS element including (but not limited to) access points, construction camp, workshops, outbuildings, site office, amenities, laydown areas, waste storage areas, car parking areas, refuelling areas, clean-down facilities, roads, fences;

- Permanent operations components of the PVS element including (but not limited to) the series of mounted photovoltaic modules set out in arrays, inverter/ transformer stations, interconnector substations, switching station, all overhead transmission and/or underground cabling and operational, maintenance and control buildings;
- Permanent operations components of the BESS element including (but not limited to) the battery energy storage area, sheds (if required) and all overhead transmission and underground cabling;
- Connection of the Project's PVS element and BESS element to ElectraNet's Robertstown Substation and required connection infrastructure including but not limited to overhead transmission and/or underground cabling and associated poles;
- Infrastructure upgrades to ElectraNet's Robertstown Substation to allow the Project's PVS element and BESS element to export and import electricity into and out of the national electricity grid;
- Any synchronous condensers if included in the Project;
- Permanent operations ancillary components of the Project including (but not limited to) all internal roads, car parking areas, fencing, and access points to the road network, and any other relevant matter; and
- Landscaping plan(s) if required.

- An approval validity timeframe providing for four (4) years after the operative date of the development approval to substantially commence construction, and six (6) years after the operative date of the development approval to substantially complete construction;
- Temporary construction facilities to be dismantled post construction; and
- Staging of building rules consent and commencement of construction for different Project elements and/or components, as described in section 1.3 of this document.

1.2. TIMING

Construction, including the commissioning, of a 500MW(AC) PVS element with an integrated; but separately operated 250MW/1,000MWh BESS element is complex, multifaceted and dependant on a number of factors including:

- Development of the required final detailed construction/engineering plans;
- Tender process for the PVS technology and BESS technology, the construction of the PVS technology and BESS technology and the operation of the PVS technology and BESS technology;

- Project financing, which is itself dependent on a number of factors including a feasible development consent, the economic and political environment at the time of construction, the time required for a financial organisation's diligence enquires for an estimated capital investment of AUD $1.17 billion, the financial arrangements/requirements for constructing the Project and possibly negotiating and entering into offtake agreements;
- Lead times for the delivery from overseas suppliers of the various components for the Project. The lead times are influenced by the selected technology which will not be known until the final design stage. Given the world's current interest in solar development, some components are anticipated to have delivery lead times of up to 2 years from order;
- Phased completion of construction;
- Efficiencies associated with both economies of scale and with reduced demobilisation and remobilisation costs, which influences the timing of the phases for construction; and
- The time required to comply with AEMO's commissioning tests and verification testing requirements prior to grid connection.

To adequately manage the factors influencing the construction of a 500MW(AC) PVS element with an integrated but separately operated 250MW/1,000MWh BESS element, the development timeframes provided in Table 1-1 and Table 1-2 are proposed for the Project with the option of the relevant approval authority being permitted to extend these periods if required.

Table 1-1: Development Milestone Timeframes – PVS – Robertstown Solar 1 Pty Ltd

Milestone	Timeframe Sought
Substantial Commencement	4 years after the Development Approval operative date
Substantial Completion	6 Years after the Development Approval operative date

Table 1-2: Development Milestone Timeframes – BESS – Robertstown Solar 2 Pty Ltd

Milestone	Timeframe Sought
Substantial Commencement	4 years after the Development Approval operative date
Substantial Completion	6 Years after the Development Approval operative date

1.3. STAGING OF CONSTRUCTION WORKS AND BUILDING RULES CONSENT

A project's PVS element, of this size, would typically be constructed in 4 phases. The PVS phases would typically comprise the following works:

- PVS Phase 1: PVS up to approximately 125MW(AC) with associated infrastructure;
- PVS Phase 2: PVS up to approximately 125MW(AC) with associated infrastructure;
- PVS Phase 3: PVS up to approximately 125MW(AC) with associated infrastructure; and
- PVS Phase 4: PVS up to approximately 125MW(AC) with associated infrastructure.

The BESS construction would also typically be phased to meet incremental project maturity.

The BESS grid connection infrastructure is proposed to be constructed adjacent to the switchyard for the Project. The Project seeks development approval to incrementally add to the BESS up to and after, substantial completion, up to a total capacity of 250MW.

The BESS physical grid connection works will be completed as part of substantial completion while the battery capacity and storage will be incrementally added over the life of the Project to allow flexibility in increasing the BESS as technology and commerciality of utility scale batteries matures.

On that basis, it is proposed that once development approval for the entire Project has been obtained, building rules consent will be obtained and construction will proceed in stages.

Works which do not require building rules consent will comprise a separate stage so that construction can commence as soon as practicable subject to compliance with development approval conditions and reserved matters (if any). This stage will encompass such things as site mobilisation activities, establishing temporary laydown areas and facilities, access roads formation or widening, underground cable works and other civil works.

For works that do require building rules consent, it is proposed that building rules consent may be obtained separately for each structure and for each stage of construction as exemplified but not limited to the following list:

- PVS Phase 1: PVS up to approximately 125MW(AC) with associated infrastructure;
- PVS Phase 2: PVS up to approximately 125MW(AC) with associated infrastructure;
- PVS Phase 3: PVS up to approximately 125MW(AC) with associated infrastructure;
- PVS Phase 4: PVS up to approximately 125MW(AC) with associated infrastructure;
- BESS Phased storage area suitable for a BESS up to approximately 250MW(AC) and 1,000/hrs with associated infrastructure;
- Battery units (in incremental sub-stages) up to a total capacity of 250MW;

- Temporary construction components required to construct the Project's PVS element and BESS element including (but not limited to) access points, construction camp, workshops, outbuildings, site office, amenities, laydown areas, waste storage areas, car parking areas, refuelling areas, clean-down facilities, roads, fences;
- Permanent operations components of the PVS element including (but not limited to) the series of mounted photovoltaic modules set out in arrays, inverter/ transformer stations, interconnector substations, switching station, all overhead transmission and underground cabling and operational, maintenance and control buildings;
- Permanent operations components of the BESS element including (but not limited to) the battery energy storage area, sheds (if relevant) and all overhead transmission and underground cabling;
- Connection of the Project's PVS element and BESS element to ElectraNet's Robertstown Substation and required connection infrastructure including but not limited to overhead transmission and/or underground cabling and associated poles;
- Infrastructure upgrades to ElectraNet's Robertstown Substation to allow the Project's PVS element and BESS element to export and import electricity into and out of the national electricity grid;
- Any synchronous condensers if included in the Project; and
- Permanent operations ancillary and associated components of the Project including (but not limited to) all internal roads, car parking areas, fencing, and access points to the road network, landscaping plan(s) if required and any other relevant matter.

The Office of the Technical Regulator (OTR) prescribes technical requirements that Generators must meet in order to lodge an application for Development Approval. In summary the technical conditions to be met include:

- The Generator shall provide either Real Inertia (real physical inertia provided by a synchronous system) or Fast Frequency Response;
- The Generator is connected to the network via a switched connection (breaker and half connection) or other connection approved by the OTR; and
- The Essential Services Commission of South Australia's (ESCOSA) current Generator Licencing conditions must be met.

The OTR has issued a certificate of approval for the Project which is provided in Appendix 1.

1.4. OBJECTIVES

The Project's objectives are:

- To provide a large-scale, grid connected solar power development that can contribute to SA's electricity supply;

- To provide dispatchable clean energy via energy storage in the form of a battery system;
- To contribute to Australia’s competitive electricity market with a renewable energy resource;
- To contribute to Australia’s growing solar industry;
- To encourage development in regional SA areas;
- To develop infrastructure and technical knowledge that will contribute to the Australian renewable energy industry;
- To assist in reducing electricity prices in South Australia; and
- To assist in South Australia’s electricity network and increase resilience to operation of the network.

1.5. PROPONENT

Robertstown Solar 1 Pty Ltd is the special purpose vehicle for the Photovoltaic Energy Generation System (PVS) and Robertstown Solar 2 Pty Ltd is the special purpose vehicle for the Battery Energy Storage Systems (BESS). The PVS element and BESS element and associated infrastructure, together are “the Project”.

Energy Projects Solar (EPS) Pty Ltd is the development consultant for the Project.

2. LAND DESCRIPTION

2.1. PROJECT AREA SELECTION

On behalf of Robertstown Solar, EPS Energy undertook an extensive solar site identification assessment across the Eastern Australian National Electricity Network examining potential project areas based on several criteria including:

- Proximity to electrical substations;
- Access to existing electrical substations and capacity of each substation to accept new generation;
- Marginal loss factors and future forecasts;
- Consideration of known solar projects proximate to a proposed project area and the potential for impact on capacity and connection;
- Irradiation levels;
- Agreements with landowners to host a project;
- Utilised land such as land used for agricultural land uses to reduce the likelihood of the solar development encountering significant areas of native vegetation, Aboriginal cultural heritage items or other environmental constraints;
- Environmental analysis of ecology, archaeology and potential environmental constraints including flooding;
- Favourable topography and geotechnical conditions for constructing and operating a solar development;
- Proximity to towns but equally enough distance between the site and urban populated areas;
- Suitable infrastructure surrounding the project area e.g. roads access for construction and operation of a solar development;
- NEM capacity, grid strength and the ever-increasing market demand for renewable energy;
- Favourable response from enquires with the Transmission Network Service Provider (ElectraNet); and
- Details on interstate connectors and relevant known transmission constraints.

The initial assessment of the 1,800ha (approximately) Project area found it met several key criteria including:

- The Project area adjoins and can access the Robertstown Substation;
- Robertstown Substation has the capacity to accept new electricity generation;
- The area has a strong electrical transmission network;
- The landowners of the Project area were receptive to hosting a solar development;

- The Project area is used for agricultural land uses including cropping and grazing thereby reducing the likelihood of the Project encountering significant areas of native vegetation, Aboriginal cultural heritage items or other environmental constraints;
- Suitable infrastructure surrounding the Project area including good State and Local road access to the Project area for construction and operation of a solar development;
- Good irradiation levels; and
- Proximity to the town of Robertstown and Burra but equally enough distance between the Project area and Robertstown.

Based on the positive outcomes of the initial assessment and with strong landowner support the next phase of assessment was commenced including detailed grid connection studies, further financial modelling, specific Project area investigations including preliminary field works to identify any unknown environmental and cultural constraints and preliminary Project design works. The assessment found:

- Power generated by the Project can be exported into the grid without any significant constraints;
- Co-location of the Project close to the Robertstown Substation minimises the connection transmission line distance thereby reducing electrical transmission losses through long transmissions and consequently improving the economic rationalisation of the Project on the Project area;
- The Project will not be constrained by environmental constraints such as flooding, ecology or archaeology; and
- Favourable topography and geotechnical conditions for constructing and operating a solar development.

Based on the findings the Project on the Project area was considered feasible. Consideration then turned to the social aspect of the Project including ascertaining relevant stakeholder opinions on the Project in the Project area's locality.

On behalf of Robertstown Solar, EPS Energy carried out pre-Development Application lodgement community and stakeholder engagement to understand the opinions of relevant stakeholders on the Project in the Project area's locality. Details of the consultation are set out in Section 6 Community and other Stakeholders.

2.2. PROJECT AREA CONTEXT

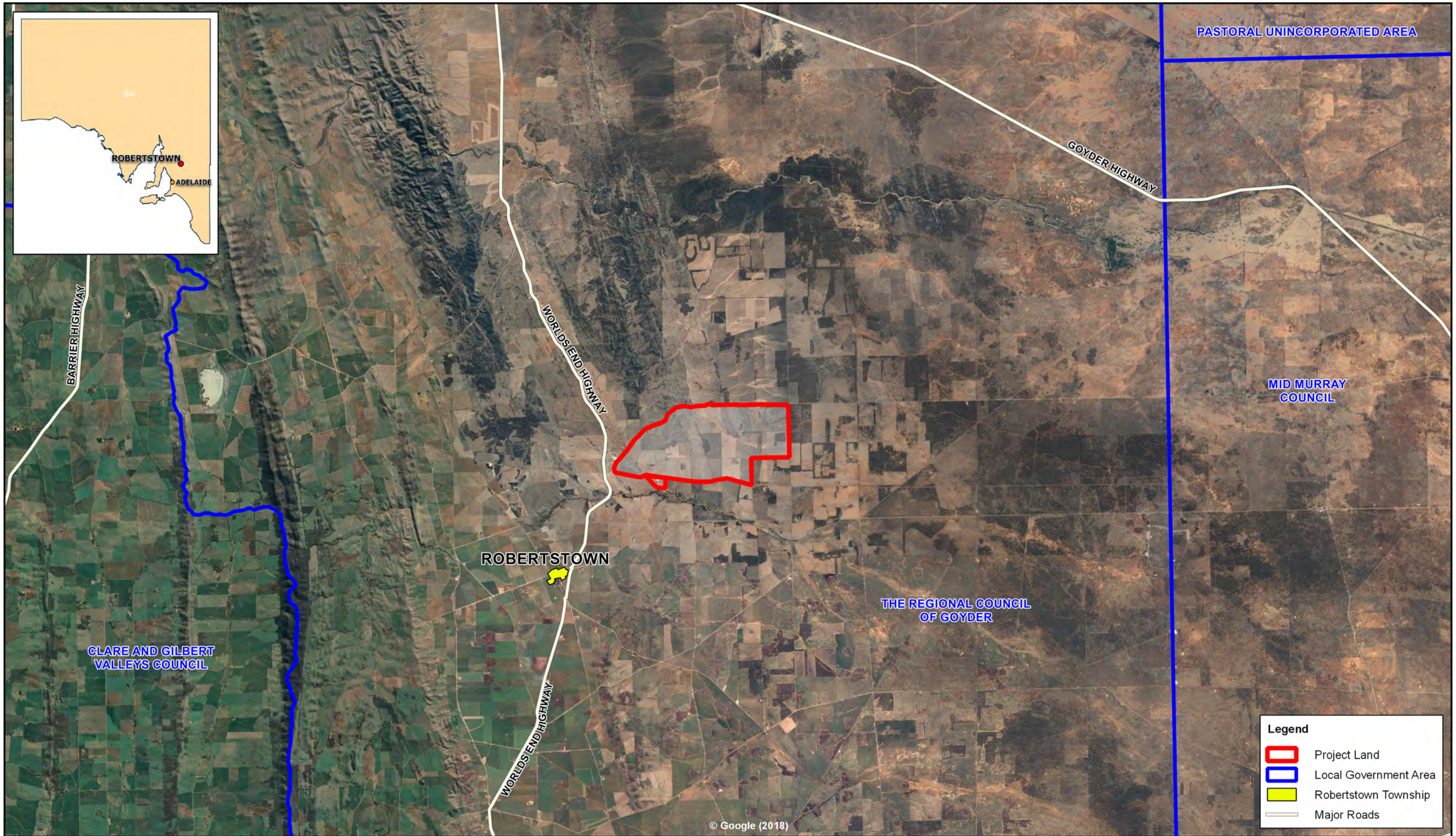
The Project area is approximately 1,800ha (18km^2) located in the suburbs of Bright and Geranium Plains in South Australia. The Project is situated approximately 5km north-east of Robertstown, and 115km north-east of the State's capital, Adelaide. The Project is within the Local Government Area (LGA) of Regional Council of Goyder.

The Regional Council of Goyder is in the Mid North region of South Australia. The area is reliant on agriculture, primarily associated with cereal crops, such as wheat and barley, as well as sheep grazing for merino wool, as a mainstay of its economy, with manufacturing and tourism also becoming prominent. The council seat lies at Burra, with a branch office situated at Eudunda.

The Regional Council of Goyder area is approximately 6,718.9 km^2 with a population of 4,136 (2016 census). The Regional Council of Goyder area is located within the Mid North Region of South Australia which covers about 23,000km^2 with a population of 33,500 (2016 census).

Agriculture east of Goyder's Line is highly influenced by annual rainfall. The opportunity to diversify agriculturally based income with solar farm lease payments provides significant certainty for host landowners as well as the opportunity for economic multipliers in the Project region.

Figure 2-1 shows the location of the Project land.



Author:	MB	
Reviewer:	SMC/ JB	
A3 Scale:	1:150,000	
Job Ref/Version:	11314/ V06	Map Projection: GDA 1994 MGA Zone 54

Figure 2-1

Location Plan

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_PR_Locality Plan.qgs

2.3. PROJECT LAND

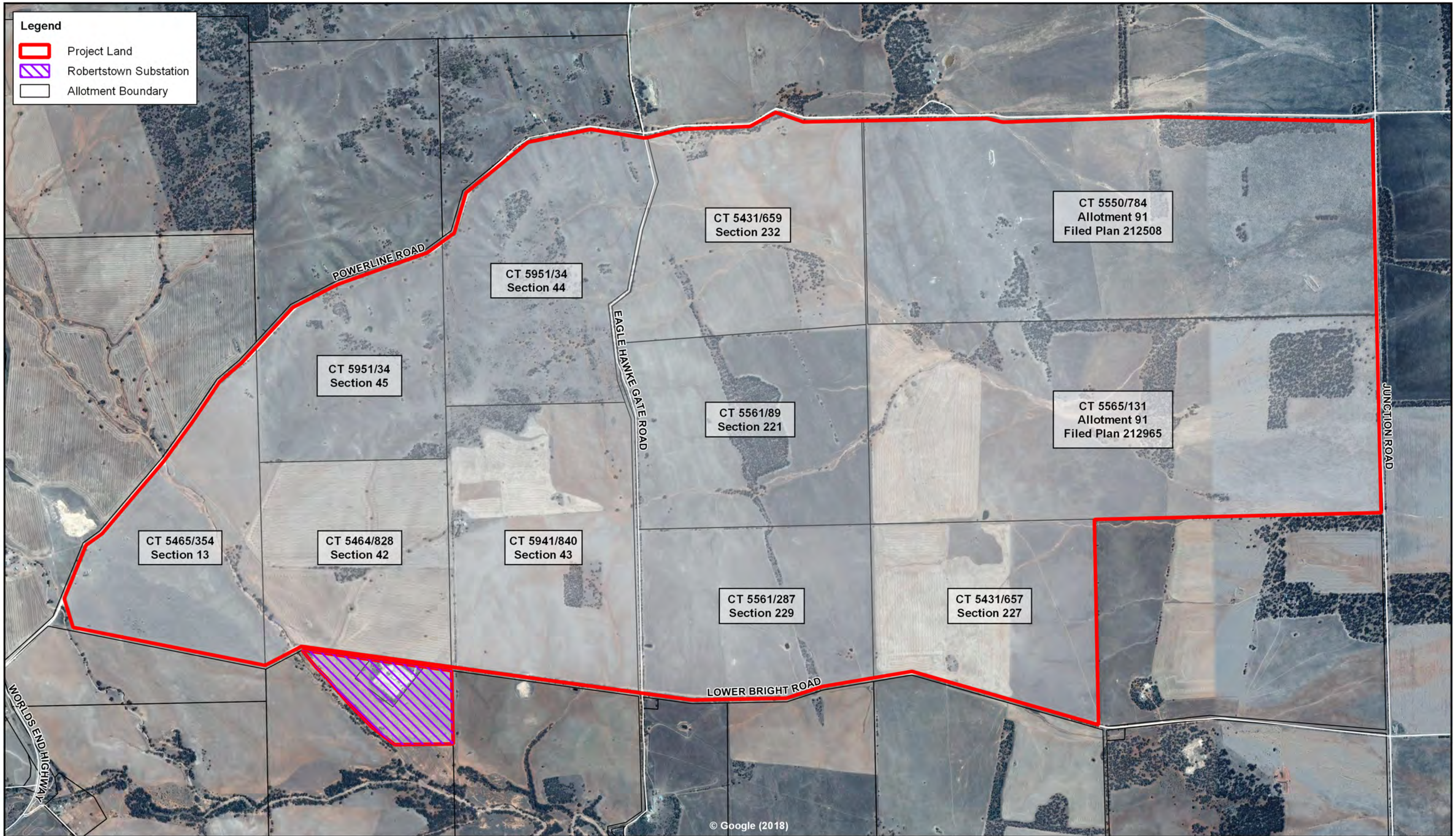
The Project land title particulars are:

Title	Lot/Plan/Section
CT 5565/131	A91 FP212965
CT 5431/657	Section 227
CT 5431/659	Section 232
CT 5465/354	Section 13
CT 5464/828	Section 42
CT 5941/840	Section 43
CT 5561/287	Section 229
CT 5561/89	Section 221
CT 5951/34	Section 44 & 45
CT 5550/784	A91 FP212508
CT 5689/928	A51 DP51338
CT 5689/927	A50 DP51338

The Project land comprises the Project area on which the PVS, BESS, Project's substation, Operations and Maintenance buildings and associated infrastructure will be built and operated, and land required to connect the Project's elements to ElectraNet's Robertstown Substation.

A copy of the Project land Certificates of Titles are attached as Appendix 2

Figure 2-2 shows the Project land.



Author:	MB
Reviewer:	SMC/ JB
A3 Scale:	1:20,000
Job Ref/Version:	11314/ V05

Map Projection: GDA 1994 MGA Zone 54

Figure 2-2

Project Land Plan

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

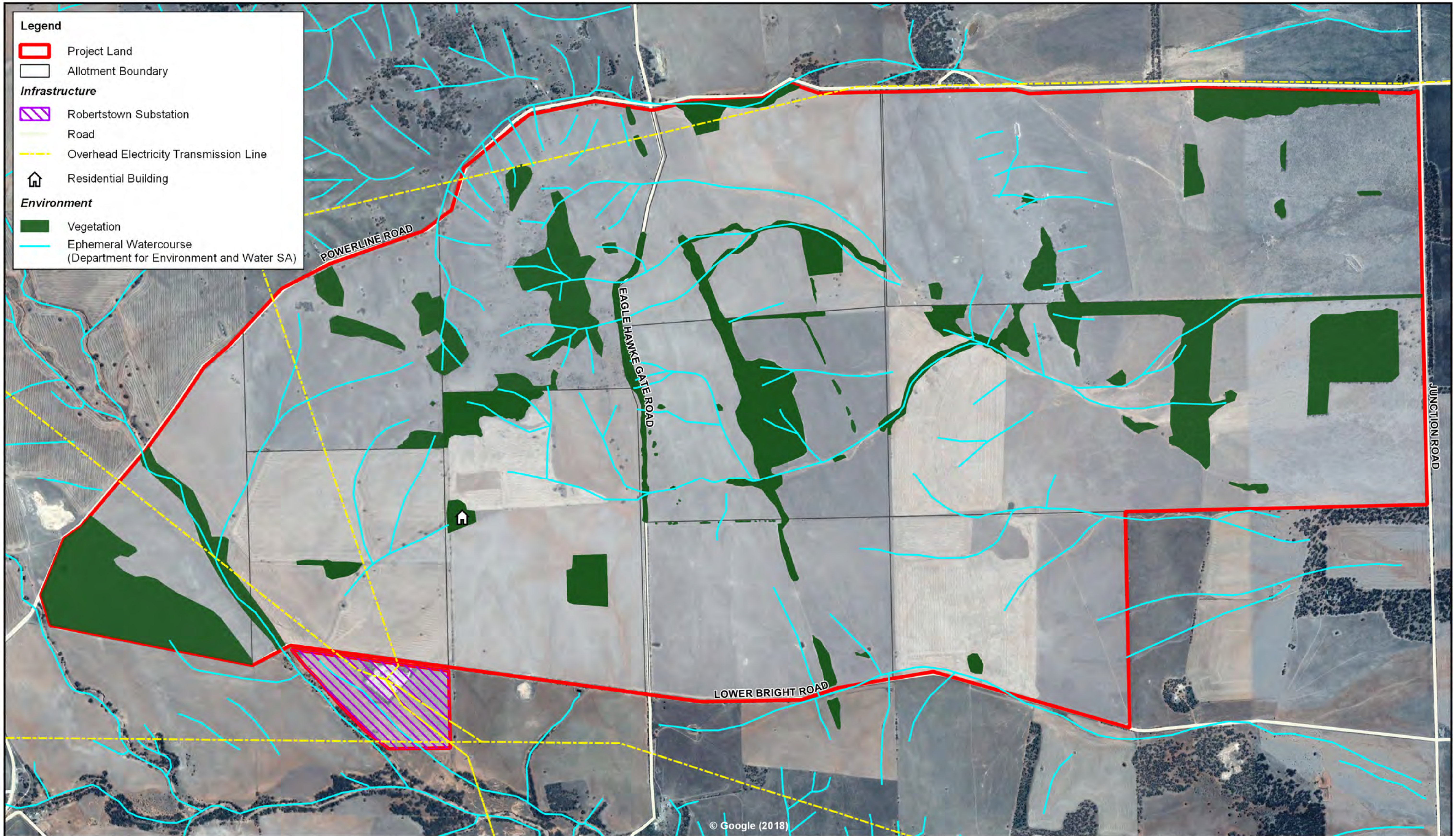
11314_PR_Project Land.qgs

2.4. EXISTING LAND USE OPERATIONS

The Project area has been used for many years for cereal cropping and grazing. Land within the immediate area of the Project area is predominately used as agricultural land.

There is existing utility scale electricity infrastructure in the immediate area including the Robertstown Substation.

Figure 2-3 shows key physical features of the Project land.



Author:	SW
Reviewer:	SM/JB
A3 Scale:	1:19,000
Job Ref/version:	11314/ V04

0 0.25 0.5 0.75 1 km

Accuracy: location and scale of features is indicative only

Map Projection: GDA 1994 MGA Zone 54

Figure 2-3

Key Physical Features of the Project Land

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_PR_Key Features of Project Land.qgs

3. PROJECT DESCRIPTION

3.1. PROJECT CAPACITY

3.1.1. Description of Development

The Project land comprises the Project area on which the PVS, BESS, Project's substation, Operations and Maintenance buildings and associated infrastructure will be built and operated, and land required to connect the Project's elements to ElectraNet's Robertstown Substation.

The Project area is approximately 1,800ha and the Project development footprint is approximately 870 ha (approximately 50% of the Project Area).

The predominance of the development footprint comprises the PVS which will have a maximum capacity of approximately 500MW (AC).

The BESS element of the Project will have a maximum energy storage capacity of 250MW/1,000MWh and depending on the final BESS technology could occupy a footprint of up to approximately 20ha being approximately 2.3% of the Project development footprint or 1.1% of the Project area.

The PVS element & BESS element will be connected to the adjacent Robertstown Substation via 275 kV circuit over-head and poles or underground transmission lines having a route length of between 0.5-3km (approximately) dependant on the final design and location of the Project's transformers and switch gear.

<u>PVS description</u>

Solar photovoltaic (solar panel) technology uses manufactured semiconductor material to absorb and convert sunlight into electricity. Each solar panel contains a series of interconnected cells that convert sunlight directly into electricity. The solar panels produce energy in the form of direct current (DC), which is converted to alternating current (AC) via a solar inverter.

The solar panels will be mounted on single axis tracking racks. The panels will be installed in parallel rows with the spacing being between approximately 4m to 10m depending on the type of the single axis tracking racks selected as part of the final design.

Groups of solar panels are connected to each inverter by underground cabling and the inverters are linked together to collect the total energy being produced. Step-up transformers, that increase the voltage are housed in the inverter containers. Underground or overhead lines are run from each inverter station to the Project's on-site switching substation where the voltage is again stepped up via one or more transformers to match the voltage of the transmission network.

The PVS will connect to the Robertstown Substation via the 275Kv transmission line to the Robertstown Substation allowing the PVS to export a maximum capacity of approximately 500MW (AC) into the national electricity grid.

<u>BESS description</u>

A utility-scale BESS encompasses multiple battery units and associated infrastructure housed in a storage structure or structures.

The BESS will connect to the Robertstown Substation via the 275Kv transmission line to the Robertstown Substation allowing the BESS to export and import electricity into and out of the national electricity grid.

The BESS can support the South Australian electricity grid through a variety of services such as frequency control and short-term network security services and can assist stabilise the South Australian electricity grid, facilitate integration of renewable energy in the State, provide arbitrage and assist in preventing load-shedding events.

3.2. PROJECT DESIGN AND LAYOUT

The Project's integrated but separately operated PVS and BESS elements together with supporting associated and ancillary infrastructure includes (but is not limited to):

- Solar modules – mounted on single axis tracking racks;
- Module footings and racking for solar modules;
- Inverter stations;
- Transformers;
- Switching substation;
- One or more synchronous condensers (subject to requirement);
- Utility scale battery facility;
- Associated underground cables connecting groups of solar panels to inverter stations and underground and/or overhead transmission lines from inverter stations to the Project's switching substation;

- Associated cables and poles to connect the Project to ElectraNet's Robertstown Substation;
- Administration and controls area including:
    - Control room and site office with amenities;
    - Maintenance and spare parts building;
    - Other buildings;
    - Car parking sufficient for employees and contractors during operation;
    - Laydown/compound area and future battery storage area;
    - Internal access roads;
- Drainage works, including stormwater management systems;
- Areas not to be developed e.g. native vegetation areas, heritage areas;
- Security fencing and CCTV;
- Low-level night time lighting; and
- Lightning protection.

Indicative layout and preliminary PVS Operation design drawings are attached as Appendix 3. Illustrative examples of typical project componentry are included within the visual impact assessment at Appendix 7.

The following subsections examine the Project's proposed key components identified in the indicative layout and preliminary PVS Operations design drawings. The Project's final key components will be identified in the final design plans.

3.2.1. Single Axis Panel Solar Photovoltaic Modules

Further site layout assessments and detailed engineering will define the preferred configuration of panels to ensure:

- Maximum exposure to sun;
- Efficient layout of solar panels across the Project area;
- Efficient connection to the substation;
- Ease of construction;
- Efficient access for maintenance and long-term operation; and
- Technology advances can be incorporated.

The solar panels will be mounted on single axis tracking racks. Depending on the type of single axis panel solar photovoltaic modules selected for the final design and layout, the height of the bottom of the solar modules could be in the range of 0.3 to 1.2m (approximately) above ground level while the height of modules could be approximately 2 - 4m above ground level.

Based on preliminary designs the Project's photovoltaic area, including the spaces between the arrays and undeveloped land, will cover the predominance of the 1,800ha Project area. The modules will generally be aligned on the tracking system in a north/south row and rotate in position from east to west.

Prior to the commencement of construction final layout and design drawings will be submitted to the authority specified in the development approval for endorsement.

3.2.2. Module Foundation Systems

Foundation systems for photovoltaic solar panel arrays typically comprise driven piles (most common), screw piles or mass concrete foundations that are sized to resist uplift and lateral loading during wind events.

The results of preliminary geotechnical investigations indicate driven piles is the likely foundation for the Project's geotechnical conditions. Additional investigations will be conducted prior to final design to confirm the Project's optimum foundation solution.

3.2.3. Inverter Stations

The solar panels produce energy in the form of direct current (DC), which is converted to alternating current (AC) via a power conversion unit (inverter), to allow the solar generated energy to be fed into the electricity grid. Utility-scale inverters harvest the maximum power from the solar photovoltaic array over a wide range of operating conditions (e.g. solar irradiation, temperature and shading). Typically, the inverter units will be approximately 3m in height.

The final type, design and therefore quantity of the inverter stations to be used for the Project are yet to be finalised. Final selection will be dependent on several factors including suitability for the Project area, relative cost, maintenance requirements, efficiency and reliability of units available on the market at the time of detailed design.

3.2.4. Solar Modules Connection to Inverter Stations

Groups of solar panels are connected to each inverter by underground cabling and the inverters are linked together to collect the total energy being produced. Step-up transformers, that increase the voltage, are housed in the inverter containers. Underground lines and or overhead transmission lines may be used due to the long distances across the Project area.

These will run from each inverter station to the Project's switchyard/substation where the voltage is again stepped up via one or more transformers to match the voltage of the transmission network. The solar energy generated from the Project will be exported to the transmission network.

Existing SA Power Networks and ElectraNet's Robertstown Substation is located adjacent to the Project's southern boundary. The Project's network connection will be made to the ElectraNet substation via the Project's switchyard/substation. Formal connection enquiries with ElectraNet confirmed the feasibility of connecting to the electricity network at this location.

3.2.5. Project's Switchyard/Substation

275/33/33 kV transformers are likely to be installed to provide reliable supply reticulation to the solar farm. These network connection facilities will be designed, constructed and operated in accordance with all statutory requirements. The number and size of transformers will be a function of technical requirement and confirmed in the Project's final design.

3.2.6. Battery Energy Storage Systems (BESS)

The Project's BESS, to be integrated although operated independently from the PVS, will allow the Project to appropriately distribute power outside PVS generating periods. Utility-scale battery storage structures are typically constructed according to two design methodologies; modular systems and building-based systems. A number of technologies are being assessed to provide the optimum solution for the Project and integration in the South Australian transmission electricity network. The BESS footprint and storage structure is subject to the final technology decision.

At this stage the storage of the battery energy storage system could include a combination of solid structures representative either of typical agricultural style storage buildings e.g. intensive animal keeping sheds used in the Primary Production Zone, or Tesla style battery units, or 40-foot shipping containers. The specific height of storage structures within the battery storage area is yet to be determined.

The Indicative layout and preliminary BESS Operations design drawings are attached as Appendix 3. The BESS storage area will be located near the Project substation (refer to Appendix 3). The battery storage structures to be implemented will be a function of technical requirement coupled with economic viability and confirmed in the Project's final detailed design.

3.2.7. Synchronous Condensers

Fundamentally, a synchronous condenser is simply a large generator similar to those found in thermal power plants, with the difference being that rather than being powered from an external source such as a gas or steam turbine, the generator can be operated as an electric motor. In this way, the synchronous condenser stores rotational energy (inertia). The synchronous condenser can therefore instantaneously absorb/deliver both real and reactive power from/to the grid to maintain grid stability.

The Project may include one or more synchronous condensers to assist in providing inertia for managing power system strength requirements. The synchronous condensers, if required, will most likely be located within the switchyard or substation.

At this stage the storage/housing of a synchronous condenser could be outdoors and/or could include a combination of solid structures representative of typical agricultural style storage buildings e.g. intensive animal keeping sheds used in the Primary Production Zone. The specific height of structures is yet to be determined.

Further detailed assessments are underway to ascertain the option and appropriate sizing of any synchronous condensers. Final design and synchronous condenser inclusion will be a function of technical requirement and confirmed in the final Project design.

3.2.8. Administration and Controls Area

The administration and control area will incorporate several buildings including a single ancillary office building and control room, together with a maintenance and spare parts building. These structures have been located adjacent to Lower Bright Road and sited to allow for ease of access of the workforce and to maximise the area available for solar panels. Amenities and car parking will also be provided in the administration and controls area. This area may also be used as a laydown and storage area during the construction phase.

3.2.9. Control Room and Site Office / Maintenance and Spare Parts Buildings

The proposed buildings will likely be single storey structures with heights of approximately 6m. The control room will be the centralised control area for managing operations associated with the Project. The site office will be the administrative centre for the Project and will house permanent operational staff associated with the facility.

3.2.10. Car Parking

Car parking will be in the vicinity of the control room and site office to accommodate staff, visitors and temporary contractor parking (note that following sign-in to the site, contractors/tradespeople required to access the solar fields will drive their vehicle directly to the site of work and will not require a formal car parking area).

3.2.11. Amenities

Depending on availability and approval the administration and control area may be connected to mains water and electricity supply where available at Lower Bright Road to provide water and electricity services for the buildings. A suitably sized sewage treatment system will be installed to manage wastewater from the amenities.

3.2.12. Laydown/Compound Area

An indicative layout of the Operations administration/controls and laydown/compound area are illustrated in Appendix 3.

3.2.13. Site Access and Internal Access Roads

Site access is proposed from the existing road network surrounding the Project Area. Access will be via existing site access points and possibly additional access points. An indicative internal access road layout and design is provided in Appendix 3. The internal access roads will be designed and constructed to allow for vehicle maneuvering including large vehicle deliveries.

3.2.14. Drainage Works, Including Stormwater Management System

The Project’s final design will determine the drainage and stormwater management design.

3.2.15. Fencing and Security

Security fencing will be installed around the perimeter of the Project and within the Project area. Signage will be clearly displayed identifying hazards present within the Project area.

Perimeter fencing will likely be approximately 1.8m chain wire mesh fencing with three strand barb-wire top. Fencing of this nature is required for security, insurance and to minimise wildlife interaction with the Project.

CCTV with infrared capability will be used to manage security on the Project area.

3.2.16. Lighting

Low-level night time lighting will be installed in the administration area for safety and security purposes.

3.2.17. Lightning Protection

Lightning protection will be incorporated into the Project. Lightening protection masts will likely be established for every third or fourth inverter station, with the final numbers and siting to be determined during detailed design. The lightning protection masts are thin, tubular structures, approximately 8m high with a concrete base and earthing.

3.2.18. Landscaping

Given the scale and extent of the proposed development and the low level of visual impact, providing landscaping which is adequate to screen the entire Project area's 19km perimeter is not considered practical. Targeted landscaping may be established to support erosion control and improved amenity adjacent to car parking areas and control room/site office, battery energy storage areas and the Project's substation but this is anticipated to be minimal.

3.2.19. Connection to ElectraNet's Robertstown Substation

To enable the Project's PVS element and BESS element to export and import electricity into and out of the national electricity grid the following works including (but is not limited to) will be required:

- Connection of the Project's PVS element and BESS element to ElectraNet's Robertstown Substation and required connection infrastructure including but not limited to overhead transmission and/or underground cabling and associated poles; and
- Infrastructure upgrades to ElectraNet's Robertstown Substation to allow the Project's PVS element and BESS element.

The Indicative connection layout to ElectraNet's Robertstown Substation is attached as Appendix 3.

3.2.20. Final Project Layout

The indicative PVS Operations layout (Appendix 3) and indicative BESS Operations layout (Appendix 3) depict the Project's development footprint. The PVS final footprint and BESS final footprint will be determined following the completion of detailed design, and influenced by:

- Final selection of panels and other Project components: the physical and operational requirements of the various components required by the Project (e.g. solar panels, inverters and Battery storage system) will influence the final layout, spacing between panels and the number of ancillary components required (inverters, lightning protection etc.);
- Detailed geotechnical investigation: an investigation to determine the geotechnical characteristics of the Project area will influence the final footing selection and may result in alterations to the Project layout; and
- Outcomes of a final network constraints and opportunity analysis to determine export constraints, network constraints and sizing and staging of the Project elements.

As a result, the following information will be submitted to the relevant authority for approval prior to the commencement of construction for each Phase of the Project:

- The final design, specification and layout of all temporary construction components required to construct the Project's PVS element and BESS element including (but not limited to) construction camp, access points, workshops, outbuildings, site office, amenities, laydown areas, waste storage areas, car parking areas, refuelling areas, clean-down facilities;
- The final design, specification and layout of all permanent operations components of the PVS element including (but not limited to) the series of mounted photovoltaic modules set out in arrays, inverter/ transformer stations, interconnector substations, switching station, all overhead transmission and underground cabling and operational, maintenance and control buildings;
- The final design, specification and layout of any synchronous condensers if included in the Project;
- The final design specification and layout of all permanent operations components of the BESS element including (but not limited to) the battery energy storage area, sheds (if relevant), transformers, ancillary connection components and all overhead transmission and underground cabling;
- The final design, specification and layout of all permanent operations associated and ancillary components of the Project including (but not limited to) all internal roads, car parking areas, fencing, and access points to the road network, and any other relevant matter;

- The final landscaping plan(s) if required;
- The final design for the connection of the Project's PVS element and BESS element to ElectraNet's Robertstown Substation and required connection infrastructure including but not limited to overhead transmission and/or underground cabling and associated poles; and
- The final design infrastructure upgrades to ElectraNet's Robertstown Substation to allow the Project's PVS element and BESS element.

3.3. PROJECT PHASES

3.3.1. Construction Phase

The PVS development timeframes are explained in Section 1 "Introduction" provided in Table 1-1.

The BESS development timeframes are explained in Section 1 "Introduction" provided in Table 1-2.

The majority of construction works is associated with the PVS element with relevant BESS phases most likely constructed concurrently. The key construction works required to complete the construction phase include (but are not limited to):

- Construction of internal access tracks and laydown areas;
- Installation of site office, maintenance sheds and other buildings;
- Site preparation earthworks for installation of panel supports;
- Installation of panel supports;
- Solar panel erection;
- Installation of the battery system/technology and battery storage structures;
- Electrical substations and connection between solar panels and central inverters, substations and battery storage;
- Provision of other utility services (electricity, communications, etc.) as required;
- Overhead or underground electrical connections to the Robertstown substation;
- Robertstown Substation infrastructure works;
- Installation of the remaining system components (including synchronous condensers if included);
- Landscaping (if required), fencing and signage; and
- Commissioning.

3.3.2. Construction Workforce

Direct employment generation during the construction period is up to approximately 275 full time equivalent (FTE) jobs. An estimated additional 410 FTE roles are anticipated to be indirectly generated by the Project. Additional support to local employment is also anticipated during the construction period with a preference for local goods and skills if available and practicable and spending in local retail and services by construction employees if available and practicable.

3.3.3. Temporary Construction Facilities

Temporary facilities will be established during construction to provide basic amenities for construction workers and temporary laydown and storage areas for construction materials. The requirements for temporary facilities will be determined by the construction contractor, however are anticipated to include (but not limited to):

- Site office;
- Temporary toilet facilities;
- Multiple Laydown areas; and
- Temporary car parking (informal).

Lay-down areas will be required for the delivery and management of construction material. The construction contractor will determine the lay-down requirements within the Project area. Other temporary construction facilities will most likely be accommodated within the Project area.

3.3.4. Temporary Construction Camp

A temporary construction workers camp on a suitable part of the Project area will likely be the most efficient/effective way to manage the construction workforce during the construction phase.

The construction workers camp would be designed to accommodate up to an estimated 275 equivalent full-time workers during construction.

Approximately 3ha – 5ha is required for the construction workers camp. An example of a typical construction workers camp layout is attached as Appendix 4.

Adequate arrangements will need to be made for the provision of essential services to the construction workers camp including, the supply of water, the supply of electricity, the disposal and management of sewage/waste water, stormwater drainage and general waste management.

The final design, specification and layout of the temporary construction workers camp, including essential services, within the Project area will be submitted to the relevant authority for approval prior to the commencement of construction.

3.3.5. Utilities

The construction contractor will be responsible for providing power and water required to support construction activities. It is anticipated the first priority will be establishment of a permanent auxiliary power supply, so it can be used to supply power during the construction period. It is anticipated construction water requirements will be trucked in.

3.3.6. Vehicle Movements

Construction/commissioning vehicle movements are linked to the phases explained in Section 1 “Introduction”.

Based on the estimated level of light and heavy vehicle construction/commissioning vehicles, movements on the highways are not expected to greatly alter existing highway traffic movements.

Available traffic data is limited for Lower Bright Rd, Powerline Rd and Junction Rd but based on discussions with some of the local landowners the roads have relatively minor vehicle flows, except during harvest. The estimated level of light and heavy vehicle construction/commissioning vehicles movements on Lower Bright Rd, Powerline Rd and Junction Rd is not expected to greatly alter the existing roads traffic movements and are within the design criteria of the road.

A Traffic Management Plan for the construction phase will be prepared before the commencement of construction in consultation with DPTI and Goyder Regional Council. The Traffic Management Plan will address construction vehicle access arrangements and identify traffic management measures to address traffic safety and access issues inherent with using oversized vehicles and general construction traffic.

3.3.7. Waste Management

Waste products will be generated during construction. Construction waste management procedures will be implemented via a Construction Management Plan (CMP). Suitable management measures typically include:

- Construction waste will be separated into different streams to facilitate recycling with waste removed from the Project area by a licensed contractor as appropriate;
- Liquid waste (including hydrocarbons, paints and solvents) will be stored in sealed drums or containers in a bunded area before removal from the Project area by an EPA licensed contractor for recycling, where possible, or disposal to a licensed facility; and
- Temporary ablution facilities will be serviced by pump-out tanker trucks, used with offsite disposal by a licensed contractor.

3.3.8. Stormwater Management

The Project's construction has the potential to cause erosion, sedimentation, and pollution of water courses running through the Project area. Suitable key principles that could be incorporated into the Project's detailed design to appropriately manage stormwater runoff include:

- Surface water runoff will be discharged to match existing drainage patterns (if any) as much as possible;
- All drainage works will be designed and constructed to prevent scour and erosion. Additional protection measures will be included as required at locations particularly susceptible to scour/erosion; and
- If practicable all drainage works will be formed to provide a consistent fall along drainage lines and to avoid flat spots, where water may be subject to collection adjacent to the Project's infrastructure.

A soil erosion and drainage management plan will be prepared as part of the CMP.

3.4. OPERATIONAL PHASE

The Project's PVS element and BESS element are expected to operate for approximately 30 years. It is expected up to approximately 15 permanent full-time staff will be required to run the Project during operations. Some of the permanent staff will operate out of the site office while others will operate generally across the Project area. Specialist contractors will be on-call to assist with maintenance activities that will include (but not be limited to):

- Solar panel washing;
- General PVS and BESS equipment maintenance;

- Fence and landscape maintenance; and
- Land management.

Equipment updates and replacements will be required from time to time as equipment fails or is rendered obsolete by improvements in technology.

3.4.1. Utilities

Depending on availability and approval the Project area will be connected to electricity and water at Lower Bright Road.

Requirements for disposal of sewerage during operations are considered small as there will be minimal staff on site at any one time. Sewerage management will likely comprise either:

- Installation of a small on-site sewerage treatment system such as a BioCycle; and/or
- Installing holding tanks to be pumped out and disposed of at a suitably licenced facility.

3.4.2. Vehicle Movements

Operational vehicle movements are expected to be minimal, and not have any significant impact on the State or local road network. During the operational phase staff attendance on site will be up to approximately 15 personnel employed on a full-time basis. Additional staff are expected to be employed on part-time and contract basis, for specialist electrical skills, module cleaning and other maintenance requirements associated with the Project. Operational vehicle movements are not expected to significantly impact on other road users and the local road network.

3.4.3. Waste Management

A limited amount of waste products will be generated during Operations. Operational waste management procedures will be implemented via an Operational Environment Management Plan (OEMP). Suitable management measures typically include:

- Operation waste will be separated into different streams to facilitate recycling with waste removed from the site by a licensed contractor as appropriate;
- Liquid waste (including hydrocarbons, paints and solvents) will be stored in sealed drums or containers in a bunded area before removal from the site by an EPA licensed contractor for recycling, where possible, or disposal to a licensed facility; and
- Management of ablution facilities.

3.4.4. Stormwater Management

The predominance of the Project area (greater than an estimated 1,700 hectares of the Project area's 18km²) will continue to be permeable; covered by the PVS solar array; represent the spacing between the arrays; or be undeveloped land. The areas underneath and surrounding the solar modules will be pervious and therefore most of the Project area will be retained substantially in the current infiltration condition. Consequently, the runoff from most of the Project area, is likely to remain at the same pre-development levels and allow infiltration of rainfall.

Runoff from areas such as the administration and control area, laydown and compound area, inverters stations, battery storage structures and switchyard/substation area may increase compared with current levels, but this is not anticipated to be significant because the areas will likely comprise less than 24ha or 2.6% of the Project's development footprint or 1.3% of the Project area.

Drainage will be designed for all Project-disturbed areas to ensure there is no or minimal increase in developed flow intensity/frequency beyond the Project area boundaries. Suitable key principles that could be incorporated into the Project's detailed design to appropriately manage stormwater runoff include:

- Surface water runoff will be discharged to match existing drainage patterns (if any) as much as possible;
- All drainage works will be designed and constructed to prevent scour and erosion. Additional protection measures will be included as required at locations particularly susceptible to scour/erosion; and
- If practicable all drainage works will be formed to provide a consistent fall along drainage lines and to avoid flat spots, where water may be subject to collection adjacent to the Project's infrastructure.

3.5. DECOMMISSIONING PHASE

The Project would likely be decommissioned at the end of its operational lifespan. In consultation with the landowners, all Project related infrastructure would be removed from the Project area, and the land returned for agricultural use.

Prior to the commencement of Project's operation phase a Decommissioning and Rehabilitation Plan (DRP) that outlines end-of-project decommissioning works (describing the extent of reinstatement and restoration activities upon the removal of the renewable energy infrastructure and associated facilities) will be provided to the relevant authority for approval.

The plan will include but is not limited to;

a) identification of structures, including but not limited to all solar panels, the control and facility building and electrical infrastructure, including underground infrastructure to be removed, except where such facilities are to be transferred to or in the control of the local network operator, and how they will be removed;
b) measures to reduce impacts of the development on the environment and surrounding land uses; and
c) details of how the land will be rehabilitated back to its pre-development condition, including slope and soil profile.

The alternate to decommissioning is to extend the life of the Project however currently it is not possible to determine if extending the life of the Project is a viable option.

4. STRATEGIC CONTEXT

4.1. ALIGNMENT WITH NATIONAL POLICY OBJECTIVES

The Project will assist fulfil Australia's commitment to reducing greenhouse gas emissions as a signatory to the Paris Agreement.

The Project will complement and increase the generation of renewable energy within South Australia and the broader National Electricity Market. Australia's Renewable Energy Target (RET) emphasises the need to reduce greenhouse gases, specifically in the electricity generation sector through the encouragement of additional sustainable and renewable sources. The RET targets both large-scale and small-scale renewable generation. The RET envisages that by 2020, renewable sources will provide 20 percent of Australia's electricity supply. The Project supports the achievement of the RET through generation of additional renewable energy.

Federal Government is considering replacing the RET with a number of options that aim to:

- Put downward pressure on household and business power bills and reduce spot price volatility—more investment and therefore more supply of electricity puts downward pressure on prices;
- Encourage the right investment in the right place at the right time—to meet the obligation, retailers will need to secure power from a variety of sources ensuring an ongoing place for coal, gas, wind, solar, batteries and hydro in the Nation's energy mix;
- Improve reliability—increasing investment in new and existing dispatchable supply;
- Reduce emissions at lowest cost—emissions targets can be met using a range of technology, including existing resources; and
- Is not a subsidy or a tax—allows the lowest cost range of technologies to meet overall targets.

The Project's 500MW(AC) PVS element with an integrated; but separately operated 250MW/1,000MWh BESS element supports the aims of the Federal Government.

4.2. ALIGNMENT WITH STATE POLICY OBJECTIVES

The South Australian Government is reviewing a number of the previous Government's long -standing State renewable energy strategic policies. The Project's alignment with current key Government State policy objectives is summarised in Table 4-1.

Table 4-1: State Policy Objectives

Objective/Target	Project Alignment
South Australia's greenhouse gas emissions	
South Australia's *Climate Change and Greenhouse Emissions Reduction Act 2007* provides renewable energy and emissions reduction targets. Under the Act, South Australia has a target to 'reduce by 31 December 2050 greenhouse gas emissions within the State by at least 60% to an amount that is equal to or less than 40% of 1990 levels as part of a national and international response to climate change. The Australian Government Department of the Environment reports South Australia's net greenhouse gas emissions were 26.3 million tonnes of carbon dioxide equivalent in 2015/16.	The Project is a renewable energy development with a maximum output capacity of approximately 500MW(AC) from the PVS and storage capacity of 250MW/1,000MWh from the BESS. The Project will annually displace the equivalent of 815,000 tonnes of greenhouse gas emissions, comparable to planting 116,500 trees or removing 326,500 cars from the road each year of its operational life. The Project contributes to South Australia's emissions reduction targets.
SA/NSW Electricity Interconnector	
In July 2018 ElectraNet published a draft report on the proposed construction of a high capacity interconnector between South Australia and New South Wales. South Australian Minister for Energy and Mining Dan van Holst Pellekaan said the proposed project would "close the loop" on South Australia's connection to the national electricity market (NEM) and bring many opportunities. *"Access to additional electricity if we need it plus the opportunity to export our often over-abundant renewable energy will deliver lower prices and more security for all South Australians".*	The proposed interconnector will run from Robertstown in South Australia's mid-north to Wagga Wagga in New South Wales, via Buronga. This is a route ElectraNet says would provide the highest net market benefits of the various route scenarios studied and a 'no regrets' solution. The Project will feed into the National Electricity Market through 275kV connections to the adjacent ElectraNet's Robertstown Substation. The Project's co-location with the Robertstown Substation supports the feasibility of the proposed SA/NSW interconnector.
South Australia's Virtual Power Plant	
The South Australian government is embarking on the largest expansion of home battery storage in the world and has reconfirmed its support for Tesla's virtual power plant of solar and Powerwall home batteries. Analysis by Frontier Economics shows the new 250MW power plant is expected to lower energy bills for participating households by around 30 per cent. Additionally, all South Australians will benefit, with lower energy prices and increased energy stability.	The Project is a utility scale solar Photovoltaic Energy Generation System (PVS) and Battery Energy Storage System (BESS) with a maximum output capacity of approximately 500MW (AC) from the PVS and storage capacity of 250MW/1,000MWh from the BESS to feed into the National Electricity Market via ElectraNet's Robertstown Substation. The Project supports the Government aim to lower SA energy bills through increasing supply and competition and increase energy stability.

4.3. ALIGNMENT WITH MID NORTH REGION PLAN

The State Government's broad vision for sustainable land use and the built development of the State is outlined in the Planning Strategy. The relevant volume of the Planning Strategy for the Goyder Council Development Plan is the Mid North Region Plan (May 2011).

The Mid North Region Plan provides a link between broad, state wide planning aims and local, council-specific planning needs, and they work in tandem with key state policies, leading to a consistent approach to land use and development across the state.

The Mid North Region Plan includes the following vision, Principle and Policies for renewable and clean energy:

- *In addition, state and local governments continue to investigate ways to organise land use such that it supports renewable and clean energy technologies. These opportunities will give South Australia a competitive advantage in a carbon-constrained economy. Investment in infrastructure will be critical to realise such opportunities. These initiatives will extend the life and reliability of our water and energy supplies and allow the population and the economy to grow without placing unsustainable demands on our natural resources (P8);*
- *Expanding local electricity generation through renewable energy sources, such as wind farms and gas-fired peak demand plants, which will provide greater capacity for economic activity. This will require expansion of the transmission infrastructure to service this growth (P12);*
- *Enhance development of renewable energy (P14);*
- *Energy supply is limited in many parts of the region. Building design and innovative local solutions (for example, solar, wind and co-generation) can make the best use of energy supplies. There are opportunities to further develop wind farms in several locations across the central and southern parts of the region, which would facilitate the achievement of SASP targets related to renewable energy development (P30);*
- *Provide for the development of alternative and innovative energy generation (for example, wind, solar, marine, biomass and geothermal technologies) and water supply facilities, as well as guidance on environmental assessment requirements (P30).*
- *South Australia has the potential to be a 'green' energy hub and to help other states achieve the Federal Government's target of 20 per cent renewable energy by 2020 (P32);*
- *Identify land suitable to accommodate renewable energy development, such as wind farms (P36);*
- *Support the development of wind farms in appropriate locations, including the collocation of wind farms and existing agricultural land (P38); and*
- *increasing renewable and low emission energy generation (for example, wind farms) (P62).*

The Project's 500MW(AC) PVS element with an integrated; but separately operated 250MW/1,000MWh BESS element supports the aims of the Federal Government, State Government and supports the Mid North Region Plan's vision, Principle and Policies for renewable and clean energy.

4.4. ALIGNMENT WITH GOYDER COUNCIL STRATEGY

The alignment of the Project with Goyder Council's Community Plan 2012-2032 relevant strategies is summarised in Table 4-2.

Table 4-2: Goyder Council Community Plan

Strategy/Outcome/Action	Project Alignment
Strategy 3: A Resilient Economy **Key Outcome:** A strong economy that supports jobs growth, opportunities for young people and business development for a diverse community **Our Actions (Five Years)** 12. Develop stronger regional links with other Councils and relevant industries in areas such as tourism, value adding to primary production and renewable energy projects (Council Role: Initiator/Facilitator)	The Project is a renewable energy project with an estimated capital investment of AUD $1.17 billion (estimate). The Project will create jobs and provide opportunities for local/regional contractors/ suppliers during both construction and operation phases. A construction workforce of up to approximately 275 people over the construction period. During the Project's operations, up to approximately 15 full-time staff are expected in addition to a number of part-time and contract staff for specialist electrical skills, module cleaning and other maintenance requirements. The introduction of renewable energy to the area can generate media attention and may, with the integration with other renewable projects in the region, offer opportunities for eco-philosophy tourism as a draw card for tourism.
Strategy 4: Our Environment and Culture is Valued and Protected **Desired Outcome** Responsible, well informed management of our natural and built environment and cultural heritage **Our Actions (Five Years)**	The Project's annual generating capacity is equivalent to reducing 815,000 tonnes of GHG emissions each year for 30 years.

Strategy/Outcome/Action	Project Alignment
Council will lead and encourage community participation in actions that reduce greenhouse gas emissions (Council Role: Leadership)	

The alignment of the Project with the Regional Council of Goyder draft Strategic Directions Report's relevant policy recommendations is summarised in Table 4-3.

Table 4-3: Goyder Draft Strategic Directions

Policy Recommendations	Project Alignment
7.2 Rural Areas **7.2.3. General** 4. Work with State Government Departments to ensure that the Development Plan allows primary industries to diversify into new areas and alter current practices to adapt to climate change. This could include the consideration of new 'environmental' land-uses such as solar farming and carbon sequestration.	The Goyder Council Development Plan (Consolidated – 24 November 2016) (Development Plan) is a statutory policy document which guides the type of development that can occur within a council area. The Development Plan envisages the Project as a renewable energy facility within the zone and constituting a component of the Primary Production Zone's desired character subject to implementation of management techniques.

5. STATUTORY CONTEXT

The following section outlines the key legislation and planning instruments relevant to the proposed development.

5.1. DEVELOPMENT APPROVAL

The development application is submitted pursuant to Section 49 of the *Development Act 1993* (the Act).

The Department of Energy and Mining's endorsement of the Project is provided in Appendix 1.

5.1.1. Public Notification

The proposed development has an estimated cost of AUD $1.17 Billion. Accordingly, public notification pursuant to subsection 49(7(d)) of the Act is required.

5.1.2. Statutory Referrals

In accordance with Section 49 of the Act, and Schedule 8 of the Development Regulations 2008 (the Regulations), statutory referrals are required including:

- Commissioner of Highways; and
- Goyder Regional Council.

5.2. ADDITIONAL APPROVALS

Additional statutory approvals may be required prior to the construction and operation of the Project including:

- Approval for the clearance of native vegetation;
- Authorisation of a planned activity to damage, disturb or interfere with an Aboriginal site or object;
- Network Connection agreement to connect the Project to the adjacent substation in accordance with the National Electricity Rules;
- Electricity Generation Licence for connection to the National Electricity Market in accordance with the requirements of the *Electricity Act 1996*;

- Authorisation to place infrastructure and access tracks across road reserves under the *Local Government Act 1999* and possibly the *Roads (Opening and Closing) Act 1991*; and
- Approval for on-site sewage handling or treatment systems under the South Australian Public Health (Wastewater) Regulations 2013.

5.3. DEVELOPMENT PLAN ASSESSMENT

The Goyder Council Development Plan (Consolidated – 24 November 2016) (Development Plan) is a statutory policy document guiding the type of development that can occur within the council area.

Assessment of the Project against the relevant provisions of the Development Plan provisions is provided in Appendix 5.

The assessment of the Project against the relevant provisions of the Development Plan determined:

- The Project is a type of Renewable Energy Facility contemplated for the Goyder Council area;
- The Project is located on land zoned Primary Industry Zone. The Development Plan expressly seeks the development of Renewable Energy Facilities within the Primary Production Zone;
- The Development Plan acknowledges that given the size of utility scale renewable energy facilities it is difficult to mitigate all impacts;
- Subject to implementation of management techniques set out by the general/Council wide policy regarding renewable energy facilities a level of impacts including visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy;
- The general / Council wide policy comprises general provisions that contain Objectives and Principles of Development Control that establish the development standards or management techniques that apply to renewable energy facilities and provide the yardstick against which the suitability of the Project is measured;
- The key findings of the assessment of the Project against the applicable Development Plan controls include:
    - Primary Production Zone - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Controls for the Project;
    - Renewable Energy Facilities - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Controls for the Project;

- Orderly and Economic Development - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provisions - “Infrastructure”, “Interface between Land Uses”, “Orderly and Sustainable Development” and “Renewable Energy Facilities”;
- Visual Amenity – The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provisions - “Design and Appearance”, “Infrastructure”, “Interface between Land Uses”, “Landscaping, Fences and Walls”, “Renewable Energy Facilities” and “Siting and Visibility”;
- Noise - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provision - “Interface between Land Uses”;
- Health and Amenity - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provisions - “Interface between Land Uses” and “Waste”;
- Flora and Fauna - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provision - “Natural Resources”;
- Traffic and Transport - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provision - “Transportation and Access”;
- Heritage - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provisions - “Heritage Conservation” and “Heritage Places”; and
- Hazards - The Project is sufficiently in compliance with the relevant Objectives and Principles of Development Control of General Provision - “Hazards”.

Conducted on behalf of Robertstown Solar, EPS Energy’s assessment of the Project against the relevant provisions of the Development Plan concludes the Project is sufficiently in compliance with the relevant provisions of the Development Plan to warrant development approval.

6. COMMUNITY AND OTHER STAKEHOLDERS

A Community & Stakeholder Engagement Plan was prepared at the Project Preparation Phase to ensure that the engagement for the Project was undertaken in a comprehensive and constructive manner. The Plan is founded on a Statement of Intent and subsequent Aims and Objectives to promote effective community and other stakeholder engagement. The Plan was used as a tool to assist with the planning and management of engagement activities proposed to be undertaken at various stages of the Project including the Pre-development application engagement stage.

Subsequently, a Community & Stakeholder Engagement Report has been prepared with the purpose of communicating the outcomes of the Pre-development application engagement that has taken place. The full report is provided at Appendix 6 and is summarised in the following sections.

6.1. KEY STAKEHOLDERS

On behalf of Robertstown Solar, EPS Energy conducted an audience analysis during the Project Preparation Phase to identify parties known to be potentially impacted by the Project, and those who may have an interest in the Project, vested or otherwise. The following stakeholders have been identified as key to the Project;

- Landowners of the properties forming the Project area and the adjoining properties;
- Key government and agency members;
- Low Carbon Economy Unit within the Department for Energy and Mining;
- ElectraNet;
- Regional Development Australia;
- Federal Member for Grey;
- State Member for Stuart;
- CEO, Mayor and relevant Development Officers of the Regional Council of Goyder;
- The Ngadjuri Nation Aboriginal Corporation;
- The wider Robertstown community and established community groups; and
- The relevant authorities who manage the registered easements across the Project area i.e. ElectraNet; and SA Power Networks.

Additional stakeholders may be identified as the Project progresses over time. Robertstown Solar will continue to review the above list as stakeholders gain or lose interest in participating in the engagement process over the Project's life.

Further, the initial release of Project information was staged with the purpose of directly informing the local community and ensuring the parties considered likely to have the highest level of impact and/or interest in the Project were notified earliest. Details of the staging are outlined in the attached report at Appendix 6.

6.2. ENGAGEMENT PROGRAMME

The Engagement Programme has five key phases which provide effective consultation from Project preparatory phase through to inception, construction, operation and decommissioning stages. This programme aimed to ensure that all relevant environmental, social and economic issues raised by the community and other stakeholders were considered and addressed within the Planning Report. The Engagement Programme Phases are described in Appendix 6.

6.3. COMMUNITY AND STAKEHOLDER RESPONSE

The response from the Pre-Development Application lodgement community and other stakeholder engagement has been positive and supportive of the Project.

From Robertstown's population of 248 (Census 2016), an estimated 52 guests attended the information sessions over the two days (Tuesday 29 May 2018 & Wednesday 30 May 2018). This included seven (7) of the nine (9) adjacent landowners who attended the dedicated Neighbour Information Session. This also included several representatives from the Regional Council of Goyder and ElectraNet.

Overall, community and other stakeholder enquiries have been general in nature with most seeking to understand more about the Project or expressing an interest in participating in the construction phase. Many of the general community comments were related to the Local Community Fund and the potential benefits to the local economy. The adjacent landowners were supportive of the Project. The enquiries from the adjacent landowners included:

- Potential for their land being part of the Project;
- Management of land under the panels; and
- Visual amenity of the solar array.

The response from the key members of State and Local government and other agencies has also been largely positive and supportive of the Project. Key members of the Regional Council of Goyder expressed their commendation of EPS Energy's early and comprehensive engagement approach.

7. KEY ENVIRONMENTAL ISSUES

At this stage the Project is proposed to be an integrated but separately operated grid connected Photovoltaic Energy Generation System (PVS) of up to approximately 500MW (AC) generation capacity and up to a 250MW capacity Battery Energy Storage System (BESS) with 1,000MWh of storage. The PVS element, the BESS element and associated infrastructure, together are “the Project”.

The following sections summarise the outcomes of investigations undertaken to identify, predict and analyse the potential impacts of the Project on the physical environment as well as social, cultural and health impacts and if necessary identify mitigation measures to reduce the potential impact of the Project.

7.1. VISUAL IMPACT AND LANDSCAPE

A Visual Impact Assessment (VIA) has been completed and is attached as Appendix 7. The VIA assesses the existing landscape within the Project Area, as well as the surrounding area, to determine the potential visual impact of the Project to the landscape and visual receptors during the operation phase.

7.1.1. Existing Environment

The landscape within and surrounding the Project area can be described as predominantly rural, typified by flat to undulating land that is sparsely vegetated or utilised for agricultural purposes.

There are potentially 29 residential receptors within a 2km Visual Catchment of the Project area five (5) of which are owned by Project landowners and potential viewpoint receptors who may view part of the Project area from other areas e.g. from the roads, within a 2km Visual Catchment of the Project area.

7.1.2. Potential Impacts

The VIA found the that the overall visual impact rating to residential and viewpoint receptors is “Low”. Further, that renewable energy facilities were contemplated by the local Development Plan in the rural landscape.

Based on the Visual Impact Assessment the Project's potential to adversely impact the existing and planned visual landscape is low.

7.1.1. Mitigation Measures

The VIA identifies the following mitigation measures for this potentially low impact during the construction and operation phases, where practicable:

- Stakeholder engagement activities will continue be undertaken to understand relevant landowner and community relationships with visual aspects of the Project;
- The development will occur on land previously cleared of vegetation and/or disturbed;
- Utility buildings or structures will be sited together, away from residences and constructed of materials that are muted in colour;
- The use of reflective materials in construction will be limited;
- Any landscaping that is completed as part of the Project will be selected and designed so it is sensitive to the landscape and visual receptors;
- Any signage will be designed and located so it is sensitive to the landscape and visual receptors;
- Fencing will be sited and designed appropriately to blend with the facility as much as possible; and
- Construction equipment and waste will be removed from the site in a timely manner.

7.2. LAND USE

7.2.1. Existing Environment

The Project area and surrounding properties are used for cropping and grazing. Crops change over time according to market prices, changing demand and water availability.

7.2.2. Potential Impact

The medium-term change of land-use is approximately 1,800ha (18km^2). The medium-term change of agricultural land (representing 0.27% of the Regional Council of Goyder area and 0.05% of the Mid North Region of South Australia) is considered very minor relative to the region's agricultural production potential (Based on Australian Bureau of Agricultural and Resource Economics land use data 2011).

The consistent income from the solar lease arrangements will assist each of the Project landowner's agricultural enterprises.

Investigations are being undertaken to assess agricultural co-location opportunities. Sheep grazing or cropping under or between the panels may be feasible during the operation phase.

Internationally examples of co-location in comparable climatic conditions include oilseed, Aloe Vera and Agave plantations in the US, India and Mexico.

On decommissioning the Project, the land will be available for agricultural activities, consequently the Project will not have an adverse impact on the long-term agricultural use of the Project area.

7.2.3. Mitigation Measures

Following the Project's decommissioning the land will be available for agricultural uses.

7.3. BIODIVERSITY

7.3.1. Existing Environment

An assessment of ecological values of the Project area was undertaken to determine the presence of species of conservation significance (i.e. species protected under Commonwealth or State legislation) and to identify any potential impacts on biodiversity.

It is highlighted that only approximately 223ha or 13% of the 18km² Project area contains native vegetation.

The desktop ecological assessment, attached as Appendix 8, and preliminary field flora assessment undertaken in May 2018 determined the dominant landform in the Project area is "*undulating stony plain which has been extensively cleared for agriculture*" (EBS, 2018). As such, the likelihood of suitable habitat for threatened flora species being present was assessed as very low.

The preliminary field flora assessment conducted in May 2018 was performed in accordance with the Scattered Tree Assessment Method and Bushland Assessment Method derived by the Native Vegetation Council. The field fauna assessment included recording of opportunistic fauna sightings, signs of fauna (e.g. scats and burrows) and fauna habitat.

Targeted searches were conducted for the following species:

- Southern Hairy-nosed Wombat (*Lasiorhinus latifrons*);
- Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*); and
- Flinders Ranges Worm-Lizard (*Aprasia pseudopulchella*).

Based on preliminary design drawings a number of scattered native trees and clumps of trees are identified to be removed to assist with the construction of the PVS element and BESS element and the Project's effective operation. The majority of scattered trees were considered high value due to their size, the presence of hollows and proximity to other native vegetation.

The ecological assessment noted that none of the scattered trees were considered to provide suitable habitat for any threatened fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999 and National Parks and Wildlife Act 1972*.

Further, no species listed under *Environment Protection and Biodiversity Conservation Act 1999* and *National Parks and Wildlife Act 1972* were observed during the surveys.

Two vegetation associations *Lomandra effusa* (Scented Iron-grass) Grassland and *Callitris gracilis*/Eucalyptus spp. Very Open Mallee are located within the western portion of CT 5465/354 where components of the PVS element could be positioned. Avoiding these vegetation associations will be considered as part of the final Project design.

Fourteen (14) bird, two (2) mammal and one (1) reptile species were opportunistically observed during the fauna assessment.

No Southern Hairy-nosed Wombats were observed during the preliminary Project area investigations, however EBS considered there to be potential for their presence and habitat to be located in other parts of the Project area, where components of the PVS element could be positioned.

No Pygmy Blue-tongue Lizards were observed during targeted assessment and it was established that there is no suitable habitat for the Pygmy Blue-tongue Lizard in the Project area.

No Flinders Ranges Worm-Lizards were observed during targeted assessment and it was established that it is highly unlikely that the Flinders Ranges Worm-Lizard would be present in the small areas of disturbed and fragmented habitat on the Project area.

7.3.2. Potential Impact

The Project area was selected due to its high-level of disturbance and associated historical vegetation clearance.

A number of individual scattered trees and clumps of trees to assist with the construction of the PVS and BESS elements and the Project's effective operation may need to be removed. The scattered tree species that may need to be removed are:

- *E. socialis* (Beaked Red Mallee);
- *E. porosa* (Mallee Box); and
- *E phenax spp. phenax* (White Mallee).

Any adverse impact on native vegetation or ecosystems that cannot be avoided will be submitted to the Native Vegetation Council for approval as required.

Perimeter fencing is proposed for not only security, but for safety of fauna. Fencing will minimise opportunities for wildlife to interact with the solar infrastructure area and the potential for fauna to be harmed, or damage infrastructure.

Based on the preliminary biodiversity investigations the Project's potential to adversely impact the existing biodiversity environment is low.

7.3.3. Mitigation Measures

The biodiversity investigations along with several other investigations have informed the Project's preliminary layout and design.

A key criterion for selecting the Project area was most of the area used for cropping is cleared of native vegetation to allow efficient cropping practices. An aim of the Project's layout and design is to position as much of the Project's development footprint, as is technically possible, on the cropped land thereby avoiding the need to remove native vegetation.

The Project's development footprint that cannot be located on cropped land has been designed to avoid significant areas of native vegetation.

Where scattered native paddock trees and/or clumps of native paddock trees will adversely impact the construction of the PVS element and/or BESS element and/or the Project's effective operation the native vegetation will need removal.

The Project's preliminary layout and design has endeavored to avoid the unnecessary clearance of native vegetation for the Project's construction and operation. Suitable mitigation measures for this potentially low impact typically include:

- Removal of large areas of vegetation be avoided and minimised, as far as practicable, as part of the final design;
- A targeted wombat survey be completed prior to construction to confirm the presence of Southern Hairy-nosed Wombats and burrows. The targeted survey will inform the appropriate management options if required;
- Hollows, coarse woody debris and litter to be translocated into native vegetation patches, as far as practicable, within the Project area as scattered trees are removed;
- Weed and pathogen hygiene measures will be employed as part of the removal process to ensure that no new weeds or other pathogens are introduced to existing native vegetation; and
- An Application for approval to clear native vegetation under Division 5 of the Native Vegetation Regulations 2017 be submitted to Native Vegetation Council based on the Project's final design.

7.4. SOILS AND SALINITY

7.4.1. Existing Environment

Preliminary geotechnical investigations indicate that the Project area has a rocky/gravelly surface, underlain by a number of geological units. The subsurface conditions can be generally described as silty gravel, silty clay, siltstone, clayey sand, clay, gravel and calcrete.

The South Australian Resource Information Gateway (SARIG 2018) Salinity non-watertable (soil salinity) mapping layer identifies the Project area as having low to moderately low salinity. The SARIG 2018 Salinity watertable induced (soil salinity) mapping layer identifies the Project area as having negligible salinity.

7.4.2. Potential Impact

The potential for the Project to exacerbate soil erosion is considered in Section 7.5, while this section addresses the potential impacts of the Project on soil physical and chemical attributes.

Agricultural soils are commonly detrimentally affected by compaction, acidification, structural decline, loss of organic matter and fertility, and salinity. These can be due to a combination of factors such as removal of native vegetation, cultivation, the type of crop or pasture grown, irrigation and specific farming practices.

The Project area soils are understood not to be adversely impacted by the listed impacts. Nonetheless, it is likely that when compared to native soils in their pre-farming condition, there have been changes due to cultivation.

The Project will involve short-term construction, followed by possibly decades of the land being inactive. The limited or no cropping and consequently limited use of farm machinery on the Project area will be beneficial for the soils. While constructing the Project will require removal of some vegetation and the Project's operations will require water to clean the PVS panels from time to time these activities will not lead to an increase in the Project area's typical groundwater levels and/or the leaching of salts, consequently the Project will not contribute to an increase in salinity levels.

7.4.3. Mitigation Measures

No specific mitigation measures are required because the Project is not expected to adversely impact the existing soil and salinity environments.

7.5. SURFACE WATER AND EROSION

7.5.1. Existing Environment

The Project's area is slightly undulating between 244m above sea level (asl) and 362m asl comprising cleared land historically used for cropping and vegetated land used for grazing. Rainfall on the Project area predominately infiltrates and during high rainfall some of the rain is captured by ephemeral watercourses and drainage lines on the Project area that flow into the areas water system including small dams on the Project area.

The Project is located within the Murray Darling Basin Water Management Area and Rangelands Natural Resource Management District. The Rangelands sub-region lies outside the South Australian agricultural zone, due to the landscape's low and variable rainfall. Mean annual rainfall in the landscape can be greater than 500mm in the north-eastern Mt Lofty Ranges, but typically annual rainfall is less than 250mm. The Project area is not located in the Murray Floodplain or within the River Murray protected area.

The major waterway in the area is the Burra Creek and its associated catchment approximately 15km from the Project area. The Project area is not located in the Burra Creek Catchment area. The second most important waterway in the area is the Spring Hut Creek approximately 5km south of the Project area. An ephemeral watercourse running through the western portion of the Project area feeds into Spring Hut Creek.

Figure 2-3 shows there are ephemeral watercourses and drainage lines on the Project area. As ephemeral watercourses are drainage lines or overland flow paths they do not hold permanent water and only run during high rainfall.

The Project area has minor water erosion caused from the flow of water during high rainfall and minor wind erosion. The potential for water or wind erosion is partly reduced by existing cropping practices and pasture management which is dependent on rainfall frequency.

7.5.2. Potential Impacts

The largest component of the Project's operation is the PVS solar array layout, including the spacing between the arrays, anticipated to occupy approximately 99% of the Project area. The areas underneath and surrounding the solar modules will not be impervious and allow infiltration of rainfall. Earthmoving activities required for the PVS solar array layout are expected to grade areas suitable for the single axis tracking system. These activities will remove vegetation, if existing, exposing soils to erosive forces (e.g. wind and rain).

Construction of the Project will require earthmoving activities (topsoil stripping and contouring) for the internal access roads, parts of the PVS area, hardstands, BESS storage area, laydown and site infrastructure (inverters, demountable buildings, etc.). These activities will remove vegetation, if existing, exposing soils to erosive forces (e.g. wind and rain). The earthmoving activities can result in erosion and sediment release, deterioration of water quality and changes to surface runoff volume and overland flow paths.

Erosion control measures to be adopted during construction will be further detailed and implemented as part of the Environmental Management Plan suite to be prepared as indicated at Section 7.5.3 and Section 9 of this report.

The use and storage of fuels and chemicals for light vehicles, plant and construction equipment may potentially result in surface water or groundwater contamination through spills, leaks or other uncontrolled releases.

Surface water and Ground water pollution control measures to be adopted during construction will be further detailed and implemented as part of the Environmental Management Plan suite to be prepared as indicated at Section 7.5.3 and Section 9 of this report.

Approximately 24ha or approximately 1.1% of the Project area could be occupied by the administration and laydown compound area, substation, invertors, BESS storage area and internal access roads.

These areas could potentially increase the runoff volumes and velocities and consequently erosion and migration of sediment, though given the small size of this part of the development footprint any adverse impact is considered low.

Surface water, erosion and sediment management control measures to be adopted during construction and operation will be further detailed and implemented as part of the Environmental Management Plan suite to be prepared as indicated at Section 7.5.3 and Section 9 of this report.

The Project will include a wastewater treatment system for workforce. Discharge of treated sewage from the ablution block has the potential to decrease groundwater quality (e.g. through increased biological oxygen demands) if the sewage is not adequately treated or if the lining has not been appropriately designed the evapotranspiration bed could seep into the surrounding area.

Wastewater control measures to be adopted during construction and operation will be further detailed and implemented as part of the Environmental Management Plan suite to be prepared as indicated at Section 7.5.3 and Section 9 of this report.

The Project’s potential to adversely impact the existing surface water and erosion environments is low.

7.5.3. Mitigation Measures

Suitable mitigation measures for this potentially low impact typically include:

- During construction, main access tracks will be permanently gravelled where required;
- Rows of PV panels rotate and will be separated from the next row, so providing an infiltration area and sunlight to potential co-located agricultural activities or pasture;
- If practicable the ground under and adjacent the PV panels will be used for co-located agricultural activities and may be sown with a permanent pasture mix;
- If practicable the Project area will include co-located agricultural activities such as pasture managed by controlled grazed (most likely with sheep) to maintain ground cover density and manage the sward length;
- During the construction and operation phases an erosion and sediment control plan for each phase will be developed detailing the control measures to be implemented;
- Sewage treatment and disposal to be conducted in accordance with relevant Australian Standards and local regulations/approval; and

- During the construction and operation phases a storage and handling of chemical and hazardous materials management plan for each phase will be developed detailing the control measures to be implemented.

7.6. FLOODING

7.6.1. Existing Environment

The Project area is not mapped as subject to inundation and is not located in the Murray Floodplain or within the River Murray protected area or within a local Catchment area.

7.6.2. Potential Impacts

The Project will not have a demonstrable impact on local flooding.

7.6.3. Mitigation Measures

No specific mitigation measures are required because the Project is not expected to adversely impact the existing flooding environment.

7.7. GROUNDWATER

7.7.1. Existing Environment

The 1:100,000 Florieton sheet of SARIG 2018 shows the area in which the Project is located to be underlain by several geological units. The following units are expected on the Project area:

- Qha – Undifferentiated Holocene Alluvial/Fluvial Sediments;
- Qp/Ca – Calcrete – Pleistocene;
- Qa – Undifferentiated Quaternary Alluvial/Fluvial Sediments;
- Nds – Saddleworth Formation, Mudstone, Siltstone, Shale, partly carbonaceous – Neoproterozoic;
- Nya – Appila Tillite, Tillite, Quartzite, Siltstone, Massive, Grey – Neoproterozoic; and
- Nms6 – Skillogalee Dolomite, pale dolomite Neoproterozoic.

Preliminary geotechnical investigations in May 2018 of some of the Project area noted;

"*The encountered ground conditions correlate well with the expected regional geology. The Qp/Ca (Calcrete) unit was encountered as either calcrete or calcareous Silty/Sandy CLAY. This is a common occurrence within this unit, as calcrete thickness and strength is highly variable over very short distances.*

Within the Neoproterozoic units, the depth to rock was highly variable. The Holocene alluvial/fluvial sediments were generally encountered as a lower strength unit than their Quaternary counterpart, with either cohesive or granular soils encountered."

The SARIG 2018 groundwater mapping layer indicates the Shallow Standing Water Level at 20m Below Ground Level (BGL). The Shallow Standing Water Level represents the depth to standing water of the shallowest aquifer only. Other aquifers may well give rise to standing water at significantly different depths.

7.7.2. Potential Impacts

Construction works will involve earthworks and limited vegetation clearing for the erection of the PVS solar panels, substation, BESS storage area, buildings, internal access roads and other infrastructure. During operation, the primary land management activities will likely relate to erosion and sediment control.

Potential geology, topography and soil impacts on the environment due to site activities include:

- Increased risk of erosion and sediment mobilisation due to alterations to drainage patterns and stormwater flows during high rainfall events. Erosion risk is higher where Project works encroach on drainage lines;
- Exposure of soil to erosive forces (wind and rain) causing soil erosion and sediment transport that can result in:
    - Deterioration of the receiving environments water quality during ephemeral flows;
    - Sedimentation of vegetated areas resulting in reduced vegetation growth/health; and
    - Reduced air quality (dust impacts) of neighbouring agricultural operations.
- Loss of topsoil integrity from improper removal or storage;
- Entrainment of soils off-site by construction vehicles and machinery leading to sedimentation external to the Project area;
- Physical degradation of soil as a result of the use of heavy construction machinery; and

- Soil contamination as a result of hazardous and other chemicals spills.

Groundwater was not encountered during site investigations. The May 2018 preliminary geotechnical investigation report states "*groundwater was not encountered during the investigation. Based on the information in regional groundwater maps (SARIG 2018) groundwater is not expected within the upper 20 BGL*."

While the Project is not expected to directly interfere with groundwater, activities have the potential to impact groundwater quality through the accidental release of contaminants to the environment. These water affecting activities associated with the Project may include:

- Construction activities (e.g. operation of heavy machinery);
- Waste storage;
- Ablutions;
- Sewerage systems;
- Operation of the substation and inverters;
- Operation of heavy vehicles; and
- Storage of oils, hydraulic fluids, greases, coolants and other maintenance items including minor amounts of cleaning solvents, paints and thinners.

Contaminants, if released, have the potential to reach the water table via infiltration and recharge from the point of release or via stormwater mobilisation and subsequent infiltration.

The Project's potential to adversely impact the existing groundwater environment is low.

7.7.3. Mitigation Measures

Suitable mitigation measures for this potentially low impact typically include:

- Erosion and sediment control devices will be installed where necessary and monitored to assess efficacy of erosion and sediment control measures;
- No unnecessary clearing or earthworks;
- Measures implemented to control flow velocities in such a manner that prevents soil erosion along drainage paths;
- Ensure the use of appropriately designed laydown areas for vehicles and machinery and storage areas for chemicals, oils and fuels;
- Make available spill kit(s) within the operational and maintenance area;
- Ensure all staff to be made aware of spill response procedures and the requirement to report any spills or leaks;
- Ensure regular maintenance and checks of heavy vehicles, machinery and equipment to identify potential leaks; and

- All chemical storage vessels are to be bunded and/or constructed on impermeable surfaces in compliance with relevant Australian Standards.

7.8. CLIMATE

7.8.1. Existing Environment

South Australia's *Climate Change and Greenhouse Emissions Reduction Act 2007* provides emissions reduction targets to be achieved by 2050.

7.8.2. Potential Impacts

The Project will deliver clean and renewable energy to the South Australian people in the face of climate change, assist in meeting renewable energy targets for the State and the nation, displace the annual equivalent of 815,000 tonnes of greenhouse gas emissions, comparable to planting 116,500 trees or removing 326,500 cars from the road and provide clean energy to power an equivalent of 144,000 homes per annum for the Project's life.

The Project will make a significant contribution to achieving the State emission reduction targets.

7.8.3. Mitigation Measures

The Project is a mitigation measure, contributing to lower GHG. Other measurable GHG mitigation measures could include where practicable:

- Efficient PV components and Project design to maximise electricity production;
- Components updated as they become obsolete or superseded by more efficient technologies, as required; and
- Panels will be maintained to maximise solar collection.

7.9. NOISE

7.9.1. Existing Environment

The Project area is located within an agricultural area, which generally has a low levels of existing background noise. Agricultural noise emissions primarily occur when farm machinery is used to prepare the land for cropping, sow crops, harvest crops and move stock.

The Robertstown Substation and associated transmission lines owned and operated by ElectraNet running through the southern part of the Project area emit a crackling or buzzing noise named 'Corona', which is the leakage of electricity into the air (which is a natural insulator). Often hard to hear, damp weather increases its audibility.

7.9.2. Potential Impacts

The Project's noise emissions will be generated primarily during some of the construction phase from construction vehicles and machinery.

The Project's construction noise emissions have the potential to impact sensitive receivers some of the time during the construction phase.

The Project will not be a significant source of noise once operational. As such, no noise impacts to sensitive receivers are anticipated during the operation phase of the Project.

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

7.9.3. Mitigation Measures

Suitable mitigation measures for construction noise typically include compliance with the Environment Protection (Noise) Policy 2007 i.e.:

- Work on-site will occur within the standard work hours of 7.00a.m. and 7.00p.m. Monday to Saturday;
- Particularly noisy activities will be commenced after 9.00am where the noise exceeds industry guidelines;
- Noisy equipment and processes will be located so that their impact on neighbouring properties is minimised whether by maximising the distance to the premises, using structures or elevations to create barriers or otherwise;
- Equipment will be shut down or throttled down whenever it is not in use;
- Equipment will be equipped with feasible noise control (e.g. mufflers, silenced exhausts, acoustic enclosures);
- Equipment will be properly maintained so as to eliminate or reduce noise as far as practicable;
- Equipment shall be handled so as to minimise impact of noise;
- As far as practicable, off-site or alternative processes that eliminate or lessen noise will be utilised; and

- A complaints hotline will be established and advertised for the receipt of feedback on the Project, including any complaints regarding noise.

Subject to approval from the relevant authority, circumstances, such as extreme summer heat, may warrant construction activity to be permitted outside of the hours of 7.00am and 7.00pm Monday to Saturday or on a Sunday or Public Holiday.

7.10. ARCHAEOLOGY

7.10.1. Existing Environment

An archaeological assessment of the Project was completed to determine the presence of Aboriginal and/or European heritage value within the Project area.

The desktop archaeological assessment is attached as Appendix 9. Preliminary field investigations in May 2018 entailed systematic inspection of high-risk areas using pedestrian survey approach. Survey visibility was high as the majority of the Project area is heavily disturbed by cropping and animal grazing.

Aboriginal

As part of the assessment, a search of the National Native Title register was completed. The Search returned one Native Tile claim applicable to the Project area: Ngadjuri Nation #2 (SC2001/002). The contact for this claim is the Ngadjuri Nation Aboriginal Corporation.

A search of the Department of Premier and Cabinet Aboriginal Affairs and Reconciliation, Register of Aboriginal Sites and Objects and the SA Museum Database was completed. The searches returned that no registered or reported sites are located within the current Project area. However, they indicated it is likely that unrecorded Aboriginal sites are located within the undisturbed sections of the Project area.

During the preliminary field investigations survey one Aboriginal site, three isolated artefacts and one culturally sensitive landscape were located.

European

The *Heritage Places Act 1993* makes provision for the identification, recording and conservation of places and objects of non-Aboriginal heritage significance in South Australia. Once registered, State Heritage Places are protected under the *Heritage Places Act 1993* and the *Development Act 1993*.

It is an offence to damage, destroy, excavate or disturb locally and State significant heritage places without consent. There are no State Heritage Places or Local Heritage Places registered in the Project area.

During preliminary field investigations four European sites (G80401R-01, G80401R-02, G80401R-04, G80401R-05) were located. The sites were considered to be significant at a local level.

7.10.2. Potential Impacts

The Project, especially during the construction phase, could result in damaging heritage significant Aboriginal and/or European heritage artefacts within the Project area.

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

7.10.3. Mitigation Measures

The archaeological investigations along with several other investigations have informed the Project's preliminary layout and design.

A key criterion for selecting the Project area was most of the area used for cropping (23% of the Project's area) is cleared of native vegetation to allow efficient cropping practices. An aim of the Project's layout and design is to position as much of the Project's development footprint, as is technically possible, on the cropped land thereby ameliorating the possibility of disturbing Aboriginal and/or European cultural heritage items.

The Project's development footprint that cannot be located on cropped land has been designed to avoid areas that may contain Aboriginal and/or European heritage sites.

Where Aboriginal archaeological value may adversely impact the construction of the PVS element and/or BESS element and/or the Project's effective operation the relevant provisions of the *Aboriginal Heritage Act 1988* will be considered.

Discussions have commenced with the Ngadjuri Nation Aboriginal Corporation regarding the presence of Aboriginal archaeological value within the Project area.

The preliminary cultural heritage works plus further cultural heritage work with the Ngadjuri Nation Aboriginal Corporation will inform the final layout plans.

The Project's preliminary layout and design has endeavored to avoid the disturbance of Aboriginal and/or European heritage sites.

Suitable mitigation measures for this potentially moderate impact typically include:

- Further cultural heritage works with the Ngadjuri Nation Aboriginal Corporation will inform the final detailed Project layout plans;
- Any Aboriginal sites and artefacts will be taken into consideration for the final detailed Project layout plans;
- Compliance with the relevant provisions of the *Aboriginal Heritage Act 1988*;
- The four European Heritage places (G80401R-01, G80401R-02, G80401R-04, G80401R-05) will be avoided;
- European Heritage places (G80401R-01, G80401R-02, G80401R-04, G80401R-05) will be fenced or flagged so that there is a clear, visible boundary for construction personnel during construction;
- Construction personnel will receive a heritage induction prior to work on-site;
- A stop work/site discovery procedure for both Aboriginal and European heritage will be developed prior to the commencement of construction to manage the event of an unexpected find; and
- The Construction Management Plan will include information on recorded heritage items.

7.11. BUSHFIRE

7.11.1. Existing Environment

The Project area is not located within a mapped Bushfire Protection Area (Location SA Map Viewer, 2018).

The Project area contains dry pastures and crop stubble, sparse woody vegetation in areas, and dense stands of woody vegetation in other areas.

Potential ignition that exists in and around the Project area include: stubble burning, littered cigarettes, short circuiting electrical equipment, and lightning strikes.

7.11.2. Potential Impacts

Fires that might spread to the Project area would cause significant damage to wiring, panels and other components. Conversely, fires ignited on Project area could spread to neighbouring land and infrastructure.

To prevent the invasion of stubble or grass fires onto the Project area, the design will incorporate an appropriate Asset Protection Zones (APZ). Ongoing, long-term liaison with adjacent landholders should ensure that the Project area is staffed in the event of neighbouring stubble burns.

The risk of initiating fire from commercial solar panels and inverters is very low due to their high quality and remote sensing/operating systems.

The Project's potential to adversely impact the existing bushfire environment is low.

7.11.3. Mitigation Measures

Suitable mitigation measures for this potentially low impact typically include:

- Installation of only Standard compliant components;
- Ongoing monitoring and review of the solar system performance;
- Installation of thermal overload protection on inverters;
- Controlled grazing or machinery maintenance of pastures under panel arrays; and
- Maintenance of firebreaks.

7.12. TRAFFIC AND TRANSPORT

A Transport Impact Assessment (TIA) has been completed and is attached as Appendix 10. The TIA assesses the potential impact of the Project's construction traffic movements on transport routes and other road users based on an indicative construction scenario.

7.12.1. Existing Environment

Anticipated traffic volumes will be highest during the Project's construction while operational traffic volumes are expected to be minimal.

A Transport Impact Assessment (TIA) attached as Appendix 10 included assessing the potential impact of the Project's construction traffic movements on transport routes and other road users and assessed the potential impact on transport routes and other road users based on the Project being completely operational.

The TIA defined the existing environment as the component delivery route to the Project area. Consequently, the environment includes other road users and the road infrastructure.

While the component delivery route will be finalised as part of the Traffic Management Plan, preliminary analysis indicates the feasible trucking option is that components are shipped to Flinders Port Adelaide and trucked direct to the Project area via National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81), Worlds End Highway, Powerline Road and Lower Bright Road.

The National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81) and Worlds End Highway are under the care and control of the Department of Planning Transport and Infrastructure (DPTI).

Powerline Road, Lower Bright Road, Eagle Hawke Gate Road, and Junction Road are under the care and control of Goyder Council.

The existing DPTI approved restricted access vehicle routes detailed on the DPTI RAVnet website and reproduced as Figure 4.1 and Figure 4.2 in the TIA shows the existing 26m B-Double approved route for the Port Adelaide to Gawler section of the indicative heavy vehicle route and the existing 26m B-Double approved route for the Gawler to the Project area section of the indicative heavy vehicle route.

Powerline Road, Lower Bright Road, Eagle Hawke Gate Road, and Junction Road are not currently gazetted for 26m B-Double (PBS Level 2) access.

7.12.2. Potential Impacts

The majority of construction works are associated with the PVS element. The TIA is based on a construction scenario of approximately 28 months.

Other road users and key stakeholders including the DPTI and Goyder Regional Council are considered the potential sensitive receivers for the purposes of construction traffic.

Operational vehicle movements are expected to be minimal, and not have any significant impact on the local road network. During the operational phase, staff attendance on site will be up to approximately 15 personnel employed on a full time, on site basis. Additional staff are expected to be employed on part-time and contract basis, for specialist electrical skills, module cleaning and other maintenance requirements associated with the Project. Operational vehicle movements are not expected to significantly impact other road users and the local road network.

Anticipated traffic volumes will be highest during the construction phase. The types of vehicles anticipated to be used during the construction phase include buses to transport workers to and from the Project area (if a temporary construction workers camp on the Project area is not used), light vehicles, heavy construction vehicles and oversized vehicles. A summary of the estimated number of construction vehicle traffic two-way movements estimated to take place during the indicative construction phase is presented in Table 7-1.

Table 7-1: Estimated Construction Traffic

Construction Phase	Light Vehicles	Heavy Vehicles	OD Heavy Vehicles	Total
Months 1-2	10	9	N/A	19
Months 3-4	15	11	N/A	26
Months 5-6	23	17	N/A	40
Months 7-8	34	26	N/A	60
Months 9-10	32	20	N/A	52
Months 11-12	27	21	2	50
Months 13-14	30	21	N/A	51
Months 15-16	32	19	N/A	51
Months 17-18	26	20	N/A	46
Months 19-20	27	21	N/A	48
Months 21-22	30	19	N/A	49
Months 23-24	29	18	N/A	47
Months 25-26	22	11	N/A	33
Months 27-28	17	1	N/A	18

It is important to note both the Project phasing and the construction company's construction methodology, based on the Project's final design, may vary these predicted Project traffic volume estimates.

Based on the TIA findings, the traffic generated by the proposed Project area during the construction and operational phases is very low in comparison to existing traffic volumes for the National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81) and Worlds End Highway section of the indicative heavy vehicle route under the care and control of DPTI, and therefore is not expected to compromise the safety or function of this road network.

Powerline Road, Lower Bright Road, Eagle Hawke Gate Road, and Junction Road are under the care and control of the Regional Council of Goyder. While the TIA was unable to source traffic volume data for Powerline Road and Lower Bright Road, the existing traffic volumes are expected to be less than 170 vehicles per day based on data obtained from DPTI that shows Worlds End Highway, within the vicinity of the Project Area, has an annual average daily traffic volume (AADT) of approximately 170 vehicles per day (Location SA – Traffic Volume Estimates, base year 2014). Based on the TIA findings the traffic generated by the proposed Project area during the construction and operational phases is very low and therefore is not expected to compromise the safety or function of the local roads that experience low volumes of traffic.

The other potential impact is the potential deterioration of local road conditions from construction traffic. Although the construction traffic will be for a short time it will possibly contribute to the wear and tear on the approved local road access routes.

The Project's potential to adversely impact the existing State road traffic and transport environment during the construction phase is low. The Project's potential to adversely impact the existing Local road traffic and transport environments during some of the construction phase is low-moderate.

7.12.3. Mitigation Measures

Suitable mitigation measures for the potentially low-moderate impacts will be addressed in the following documents:

- A Traffic Management Plan prepared prior to commencement of construction works in consultation with DPTI and Goyder Regional Council; and
- A dilapidation report or equivalent report, of the road conditions along the nominated local access roads, prepared prior to commencement of construction in consultation with the Goyder Regional Council.

7.13. AIR QUALITY

7.13.1. Existing Environment

There is no known dust deposition or Total Suspended Particles (TSP) data for the site or adjacent areas. It is expected that the local air quality is typical of rural areas, with irregular peaks due to dust storms, regional fires, local stubble burns, cultivation and crop stripping.

7.13.2. Potential Impacts

Installation of the Project will involve trenching, plant and vehicular movements over soil and local unsealed roads and general movement of construction vehicles. This limited activity is not expected to generate more dust than the regular cultivation and crop stripping that currently occurs on the Project area and adjacent paddocks.

The Project is not expected to generate measurable dust during operations, and natural ground cover or sown pasture (if practicable), on what is now a series of cropping paddocks, will reduce the dust generation potential of the Project area.

During operations the Project will contribute towards improving air-quality by reducing Australia's reliance on fossil fuels for electricity generation. The Project equates to the equivalent to the displacement of 815,000 tonnes of greenhouse gas emissions per annum.

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

7.13.3. Mitigation Measures

Suitable mitigation measures for this potentially low impact typically include:

- Dust management measures will be included in the Construction Management Plan;
- During construction, dust raised on site will be monitored and, if dust is creating a nuisance, a water cart will be used to manage problem areas;
- Dust generation from construction traffic will be monitored and dust suppression activities will be undertaken to minimise dust emissions, if required;
- Wind speed and direction will be monitored, and dust generating activities will be adapted to the wind conditions; and
- Properly maintained equipment will be used to minimise emissions.

7.14. ELECTRIC AND MAGNETIC FIELDS, AND RADIO FREQUENCY INTERFERENCE

7.14.1. Existing Environment

A brief discussion of electrical terminology is useful to aid an understanding of electric and magnetic fields (EMF) and the separate question of radio frequency interference (RFI).

EMF are produced by all electrical equipment, from high voltage power lines to hair dryers, with fields increasing with voltage and current respectively. Both fields drop away rapidly with distance from the source, or due to shielding by insulation or earth (in the case of buried installations). For comparative purposes, in unshielded overhead high voltage transmission wiring, both electrical and magnetic fields would drop to approximately zero within 60 metres from the centreline of the transmission line's conductor bundles.

Radio Frequency Interference (RFI) can be generated by a range of electrical apparatus. The Australian Communications and Media Authority (ACMA) is the Australian regulator of radio communications, telecommunications, broadcasting and the internet, responsible for ensuring compliance with the *Radio Communications Act, 1992*. Part of ACMA's role is to regulate the use of equipment that might affect important telecommunications.

There have been reports of household solar installations detrimentally affecting television reception. It appears that this reported interference is not strictly due to RFI affecting reception but are generally due to poor quality domestic inverters inserting RFI into the household wiring system that disturbs the television set power supply, which in turn cause screen distortion.

The Project area and adjacent land incudes utility scale electricity infrastructure comprising a substation and powerlines. The ElectraNet transmission network 275/132kV Robertstown substation is located on Lower Bright Road adjacent to the Project area. Two overhead 275kV transmission lines run north/north west from the substation across the western portion of the Project area within registered easements (refer to Figure 2-3). Two overhead 275kV/132kV transmission lines run south/south east from the substation across adjoining land (refer to Figure 2-3).

An ElectraNet 132kV transmission line running east/west crosses the northern portion of the Project area (refer to Figure 2-3).

7.14.2. Potential Impacts

Substantial EMF's have the potential to interrupt electrical equipment and impact human health.

The Project's various EMF generating components include the PVS panels, the interconnecting buried cables, the direct to alternating current inverters, overhead transmission lines, step up transformers, the BESS and overhead or underground connection to the Robertstown substation.

Essentially EMF increases with voltage and proximity to the apparatus producing, transmitting or consuming electricity. EMF does vary according to specific design and construction parameters such as conductor height, electrical load and phasing, and most importantly, whether the conductors are overhead or buried.

The Project's components that will generate the highest EMF are the Project's substation, BESS and potentially the synchronous condenser(s), together with the possible overhead line connection to the Robertstown substation.

With regards to RFI, solar inverters do emit harmonics but not radio frequency waves and so will not directly affect television transmissions. As discussed previously, poor quality household solar inverters can insert undesirable interference into wiring systems and so indirectly reduce picture quality. Inverters should be tested according to International Electrotechnical Commission (of which Australia is a full member) standards for radio interference, and, depending on the make and model may emit some radiation within acceptable limits. The commercial Inverters being considered for the Project, have been tested to international standards and have proven to not disturb radio signals except in the immediate area around the inverter (approximately <5m).

The Project's potential to adversely impact the existing EMF and RFI environment is low.

7.14.3. Mitigation Measures

Suitable mitigation measures for this potentially low impact typically include:

- Installing electricals to the relevant Australian Standards and guidelines;
- Use of International Electrotechnical Commission compliant commercial inverters;
- Locating the high voltage electrical equipment such as switchyard, substation, BESS and synchronous condensers (if required) appropriately on the Project area; and

- Restriction of access to areas of high voltage electrical equipment such as switchyard, substation, BESS areas and synchronous condensers (if required).

7.15. WATER RESOURCES

7.15.1. Existing Environment

A 2018 report by the World Resources Industry notes the following key points:

- Australia is one of the world's top 20 water-stressed nations;
- Every megawatt hour of electricity generated by coal withdraws around 60,700 litres and consumes about 2,600 litres of water; and
- In the 2017-2018 financial year, Australian's have consumed 147 terrawatt hours of electricity, about 73 per cent of which comes from coal, which equates to around 455 billion litres of water.

7.15.2. Potential Impacts

The Project's general use of water to produce electricity is limited to cleaning the solar panels during the operational phase. Continual improvements in panel cleaning technology is reducing the small amount of water currently required to produce electricity.

The World Resources Industry report notes "*the potential for cheap renewable energy, solar and wind as opposed to fossil fuels, could reduce water consumption country-wide as these technologies use minimal water*".

If the Project produced 1,000GW/hours of electricity per year this would equate to approximately 63 billion litres of water annually not being required for electricity production.

The Project will contribute to reducing the current amount of water required to generate electricity in Australia.

7.15.3. Mitigation Measures

The Project is a mitigation measure, contributing to lower use of water for electricity generation.

7.16. SOCIO-ECONOMIC

A socio-economic impact assessment has been undertaken to consider the likely outcomes of Robertstown Solar. Key findings of this study are provided below. The full analysis and discussion are provided at Appendix 11.

7.16.1. Socio-Economic Benefits

The Project will:

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

To ensure that the employment opportunities, afforded by the Project, are maximised for the local community, an expressions of interest register has been established. This register allows for local people and businesses to express interest in participating with the construction and operations of the Project. The register has been established and maintained since initial community consultation phases.

This register will be passed onto the construction contractor, and where skills and resources can be appropriately matched, local and regional community members and businesses will be considered in participation opportunities.

7.17. GLINT AND GLARE

A Glint and Glare Analysis is attached as Appendix 12. The Glint and Glare Analysis assessed the optical effects on drivers on certain parts of relevant roads, and some houses in adjacent areas of the potential impact from PVS solar panels on a single axis tracking system during the operational phase.

The Glint and Glare Analysis report explains the methodology and modelling undertaken to carry out the assessment of potential Glint and Glare impacts. The methodology's conservative assumptions and estimates gives quantified results. However, the results do not take into consideration a number of factors which mitigate the results and potential risks including:

- The model does not rigorously represent the detailed geometry of the solar panel arrays, for example gaps between panels, detailed variations in height of the array and support structures;
- The tool does not consider any obstacles (e.g. trees, structures or earth, topography, buildings) between the observation points and the solar panel arrays that may obstruct observed glare. The model does not consider mitigation measures such as proposed or existing vegetation buffers;
- The tool does not define directional viewpoints from each observation point. Instead it considers the cumulative impact of the entire solar panel array areas; and
- The tool uses a typical clear-day solar irradiance profile (worst-case for glare). The model profile has a lower irradiance level in the mornings and evenings and a maximum at solar noon. Actual irradiance levels and profile on any given day can be affected by cloud cover and other environmental factors, however is not considered in this model.

7.17.1. Existing Environment

The Project area's dominant landform is an undulating stony plain which has been extensively cleared for agriculture. Some of the Project area is more heavily disturbed than others because of the yearly cropping. There is native vegetation within the Project area including small treed areas, scattered trees and tree clumps throughout the Project area. The Project area has a small number of built structures.

There is no commercial airport in the immediate region (10 km) around the Project area and only a small private aerodrome, Truro Park, approximately 77 km to the South of Robertstown.

A small number of houses are located in the primary production area adjacent to the Project area.

Lower Bright Rd follows the Project’s southern boundary line which is a minor local road. Powerline Rd follows the Project’s northern boundary which is a minor local road. Junction Rd follows the Project’s eastern boundary which is a minor local road. At the south-western end of the Project area is ElectraNet’s Robertstown substation and to the west of the Project area Worlds End Highway passes north- south. Lower Bright Rd, Powerline Rd and Junction Rd are unpaved gravel roads with very limited traffic and Worlds End Highway experiences low traffic volumes. Eagle Hawke Gate Rd crosses the site in north-south direction. This road is however only a very small local traffic road and therefore of minor importance.

7.17.2. Potential Impacts

The PVS solar panels can potentially cause a glint and/or glare impact beyond the Project area. The Glint and Glare Analysis key findings are:

Air Traffic:

The Project area is more than 50 km from any commercial airport. The Australian Civil Aviation Safety Authority (CASA) only requires an assessment for any solar farm within a distance of around 5 nautical miles from an airport and therefore no calculation for potential Glint and Glare issues was performed.

Houses:

The observer locations (OP), described in Table 5 (in the Glint and Glare Report), and shown as white markers in the map, were chosen to represent potential residences that may experience Glint and Glare when looking towards the PVS solar Panels.

The assessment identified six residences as potentially where the residents of the houses may experience low-level glare when looking towards the PVS solar Panels.

Roads:

Worlds End Highway does not experience glare issues.

Sections of Lower Bright Rd, Powerline Rd and Junction Rd experience some low-level glare for a small duration (less than 10 minutes) during the early morning for a few months a year. The roads experience very limited local traffic.

7.17.3. Mitigation Measures

Houses:

The assessment identified six residences as potentially where the residents of the houses may experience low-level glare when looking towards the PVS solar panels.

Based on observations, existing obstacles including existing vegetation, topography, and structures between the residents of houses and the PVS panel arrays ameliorates the low-level glare identified in the Glint and Glare report.

Based on these observations no mitigation measures are required.

Roads:

Worlds End Highway does not experience glare issues.

Sections of Lower Bright Rd, Powerline Rd and Junction Rd experience some low-level glare for a small duration (less than 10 minutes) during the early morning for a few months a year. The roads experience very limited local traffic.

Based on the roads experiencing very limited local traffic and observations of existing obstacles including existing vegetation, topography and structures between the relevant sections of roads and the PVS panel arrays, these factors ameliorate the low-level glare identified in the Glint and Glare report.

Based on these factors no mitigation measures are required.

8. SUMMARY OF MITIGATION MEASURES

8.1. PVS ELEMENT AND ANCILLARY COMPONENTS

Table 8-1 provides a summary of mitigation measures for the PVS element and ancillary components of the Project.

Table 8-1: Summary of Mitigation Measures for the PVS Element of the Project

Issue	Mitigation Measure	Section of Planning Report
Visual Impact and Landscape	• Stakeholder engagement activities will continue to be undertaken to understand relevant landowner and community relationships with visual aspects of the Project; • As far as practicable, the development will occur on land previously cleared of vegetation and disturbed; • Utility buildings or structures will be sited together, away from residences and constructed of materials that are muted in colour; • The use of reflective materials in construction will be limited, as far as practicable; • Any landscaping that is completed as part of the Project will be selected and designed so it is sensitive to the landscape and visual receptors; • Any signage will be designed and located so it is sensitive to the landscape and visual receptors; • Fencing will be sited and designed appropriately to blend with the facility; and • Construction equipment and waste will be removed from the Project area in a timely manner.	7.1
Land Use	• Following the Project's decommissioning the land will be available for current agricultural uses.	7.2
Biodiversity	• Removal of large areas of vegetation will be avoided and minimised, as far as practicable, as part of the final Project design; • A targeted wombat survey will be completed prior to construction to confirm the presence of Southern Hairy-nosed Wombats and burrows. The targeted survey will inform the appropriate management options if required; • Hollows, coarse woody debris and litter to be translocated into native vegetation patches, as far as practicable, within the Project area as scattered trees are removed; • Weed and pathogen hygiene measures will be employed as part of the removal process to ensure	7.3

Issue	Mitigation Measure	Section of Planning Report
	that no new weeds or other pathogens are introduced to existing native vegetation; and • An Application for approval to clear native vegetation under Division 5 of the Native Vegetation Regulations 2017 be submitted to Native Vegetation Council based on the final Project design and the consequently clearing requirements are known.	
Surface Water and Erosion	• During construction main access tracks will be permanently gravelled where required; • Rows of PV panels will rotate and be separated from the next row, so providing an infiltration area and sunlight to potential pasture; • If practicable the ground under and adjacent the PV panels will be sown with a permanent pasture mix, suitable to the region and long - term stock grazing; • If practicable the Project area will be controlled grazed (most likely with sheep) to maintain ground cover density and manage the sward length; • During the construction and operation phases an erosion and sediment control plan for each phase will be developed detailing the control measures to be implemented; • Sewage treatment and disposal to be conducted in accordance with relevant Australian Standards and local regulations/approval; and • During the construction and operation phases a storage and handling of chemical and hazardous materials management plan for each phase will be developed detailing the control measures to be implemented.	7.5
Groundwater	• Erosion and sediment control devices will be installed where necessary and monitored to assess efficacy of erosion and sediment control measures; • No unnecessary clearing or earthworks; • Measures implemented to control flow velocities in such a manner that prevents soil erosion along drainage paths; • Ensure the use of appropriately designed laydown areas for vehicles and machinery and storage areas for chemicals, oils and fuels; • Make available spill kit(s) within the operational and maintenance area; • Ensure all staff to be made aware of spill response procedures and the requirement to report any spills or leaks; • Ensure regular maintenance and checks of heavy vehicles, machinery and equipment to identify potential leaks; and	7.7

Issue	Mitigation Measure	Section of Planning Report
	• All chemical storage vessels are to be bunded and/or constructed on impermeable surfaces in compliance with relevant Australian Standards.	
Climate	• Efficient PV components and Project design to maximise electricity production; • Components updated as they become obsolete or superseded by more efficient technologies, as required; and • Panels will be maintained to maximise solar collection.	7.8
Noise	• Work on-site will occur within the standard work hours of 7.00a.m. and 7.00p.m. Monday to Saturday; • Particularly noisy activities will be commenced after 9.00am if they exceed noise guidelines; • Noisy equipment and processes will be located so that their impact on neighbouring properties is minimised whether by maximising the distance to the premises, using structures or elevations to create barriers or otherwise; • Equipment will be shut down or throttled down whenever it is not in use; • Equipment will be equipped with feasible noise control (e.g. mufflers, silenced exhausts, acoustic enclosures); • Equipment will be properly maintained so as to eliminate or reduce noise as far as practicable; • Equipment shall be handled so as to minimise impact of noise; • As far as practicable, off-site or alternative processes that eliminate or lessen noise will be utilised; • A complaints hotline will be established and advertised for the receipt of feedback on the Project, including any complaints regarding noise nuisance; and • Subject to approval from the relevant authority, circumstances, such as extreme summer heat, may warrant construction activity to be permitted outside of the hours of 7.00am and 7.00pm Monday to Saturday or on a Sunday or Public Holiday.	7.9
Archaeology	• Further cultural heritage works with the Ngadjuri Nation Aboriginal Corporation will inform the final detailed Project layout plans; • Any Aboriginal sites and artefacts will be taken into consideration for the final detailed Project layout plans; • Compliance with the relevant provisions of the *Aboriginal Heritage Act 1988*;	7.10

Issue	Mitigation Measure	Section of Planning Report
	• The four European Heritage places (G80401R-01, G80401R-02, G80401R-04, G80401R-05) will be avoided; • European Heritage places (G80401R-01, G80401R-02, G80401R-04, G80401R-05) will be fenced or flagged so that there is a clear, visible boundary for construction personnel during construction; • Construction personnel will receive a heritage induction prior to work on-site; • A stop work/site discovery procedure for both Aboriginal and European heritage will be developed prior to the commencement of construction to manage the event of an unexpected find; and • The Construction Management Plan will include information on recorded heritage items.	
Bushfire	• Installation of only Standard compliant components; • Ongoing monitoring and review of the solar system performance; • Installation of thermal overload protection on inverters; • Controlled grazing or machinery maintenance of pastures under panel arrays; and • Maintenance of firebreaks.	7.11
Traffic and Transport	• A Traffic Management Plan will be prepared, prior to commencement of construction works in consultation with DPTI and Goyder Regional Council; and • A dilapidation report or equivalent report, of the road conditions along the nominated local access roads will be undertaken prior to the commencement of construction in consultation with the Goyder Regional Council.	7.12
Air Quality	• Dust management measures will be included in the Construction Management Plan; • During construction, dust raised on site will be monitored and, if dust is creating a nuisance, a water cart will be used to manage problem areas; • Dust generation from construction traffic will be monitored and dust suppression activities will be undertaken to minimise dust emissions, if required; • Wind speed and direction will be monitored, and dust generating activities will be adapted to the wind conditions; and • Properly maintained equipment will be used to minimise emissions.	7.13
Electric and Magnetic Fields	• Installing electrical componentry to the relevant Australian Standards and guidelines;	7.14

Issue	Mitigation Measure	Section of Planning Report
	• Use of International Electrotechnical Commission compliant commercial inverters; and • Restriction of access to areas of high voltage electrical equipment such as switchyard, substation, BESS areas and synchronous condensers (if required).	

8.2. BESS ELEMENT

Table 8-2 provides a summary of mitigation measures for the BESS element of the Project.

Table 8-2: Summary of Mitigation Measures for the BESS Element of the Project

Issue	Mitigation Measure	Section of Planning Report
Visual Impact and Landscape	• Stakeholder engagement activities will continue to be undertaken to understand relevant landowner and community relationships with visual aspects of the Project; • Utility buildings or structures will be sited together, away from residences and constructed of materials that are muted in colour; • The use of reflective materials in construction will be limited, as far as practicable; • Any landscaping that is completed as part of the Project will be selected and designed so it is sensitive to the landscape and visual receptors; • Any signage will be designed and located so it is sensitive to the landscape and visual receptors; • Fencing will be sited and designed appropriately to blend with the facility; and • Construction equipment and waste will be removed from the Project area in a timely manner.	7.1
Land Use	• Following the Project's decommissioning the land will be available for current agricultural uses.	7.2
Surface Water and Erosion	• During the construction and operation phases an erosion and sediment control plan for each phase will be developed detailing the control measures to be implemented.	7.5
Groundwater	• Erosion and sediment control devices will be installed where necessary and monitored to assess efficacy of erosion and sediment control measures; • No unnecessary clearing or earthworks; and • Measures implemented to control flow velocities in such a manner that prevents soil erosion along drainage paths.	7.7

Issue	Mitigation Measure	Section of Planning Report
Noise	• Work on-site will occur within the standard work hours of 7.00a.m. and 7.00p.m. Monday to Saturday; • Particularly noisy activities will be commenced after 9.00am if they exceed noise guidelines; • Noisy equipment and processes will be located so that their impact on neighbouring properties is minimised whether by maximising the distance to the premises, using structures or elevations to create barriers or otherwise; • Equipment will be shut down or throttled down whenever it is not in use; • Equipment will be equipped with feasible noise control (e.g. mufflers, silenced exhausts, acoustic enclosures); • Equipment will be properly maintained so as to eliminate or reduce noise as far as practicable; • Equipment shall be handled so as to minimise impact of noise; • As far as practicable, off-site or alternative processes that eliminate or lessen noise will be utilised; • A complaints hotline will be established and advertised for the receipt of feedback on the Project, including any complaints regarding noise nuisance; and • Subject to approval from the relevant authority, circumstances, such as extreme summer heat, may warrant construction activity to be permitted outside of the hours of 7.00am and 7.00pm Monday to Saturday or on a Sunday or Public Holiday.	7.9
Archaeology	• Further cultural heritage works with the Ngadjuri Nation Aboriginal Corporation will inform the final detailed Project layout plans; • Any Aboriginal sites and artefacts will be taken into consideration for the final detailed Project layout plans; • Compliance with the relevant provisions of the *Aboriginal Heritage Act 1988* if required; • Construction personnel will receive a heritage induction prior to work on-site; • A stop work/site discovery procedure for both Aboriginal and European heritage will be developed prior to the commencement of construction to manage the event of an unexpected find; and • The Construction Management Plan will include information on recorded heritage items.	7.10
Bushfire	• Installation of only Standard compliant components; • Ongoing monitoring and review of the Battery system performance; and	7.11

Issue	Mitigation Measure	Section of Planning Report
	• Installation of thermal overload protection on inverters.	
Electric and Magnetic Fields	• Locating the high voltage electrical equipment such as switchyard, substation, BESS and synchronous condensers (if required) appropriately on the Project area; • Installing electrical componentry to the relevant Australian Standards and guidelines; • Use of International Electrotechnical Commission compliant commercial inverters; and • Restriction of access to areas of high voltage electrical equipment such as switchyard, substation, BESS areas.	7.14

9. ENVIRONMENTAL MANAGEMENT AND MONITORING

While the purpose of reviewing the key environmental issues is to consider the potential environmental impacts resulting from the Project, the role of an ongoing environmental management system is to ensure that the identified controls and commitments are maintained throughout the construction and operational phases of the Project. Further, a formal environmental management system will implement and monitor the objectives and measures outlined in the development consent, relevant licenses and legislation. Accordingly, this section outlines an overall environmental management framework to guide the development and management of the Project.

Following a development approval, an Environmental Management Plan (EMP) for the construction and operational phases of the development will be prepared taking into account the following documents:

- This Planning Report;
- Conditions of Approval; and
- Any other approval, licence or permit required, including but not limited to grid connection to the ElectraNet Robertstown Substation.

It is intended to prepare a suite of EMPs including a Construction Management Plan and Operational Management Plan. These EMPs will be drafted and finalised following development approval. Notwithstanding, the EMPs are expected to specify all environmental management activities and measures used to control, prevent or minimise environmental impacts. In addition, the plan will assign responsibility for mitigation measures to specific personnel and allocate quantitative or qualitative criteria to the performance of each measure where applicable. The following matters are likely to be addressed in the suite of EMPs:

- Project description;
- Environmental management structure and responsibilities;
- Approval and licensing requirements;
- Environmental training requirements;
- Emergency contacts and responsible procedures;
- Risk assessment;
- Environmental management measures;
- Environmental management maps, as required;
- Environmental monitoring requirements;
- Environmental auditing, as required;
- Corrective action; and
- Review.

The nature of the Project means that environmental monitoring required by more intrusive project (mines, quarries, roads, etc.) is likely not required.

Following development approval, environmental management will be implemented in accordance with the following environmental objectives:

- Implement a standard of environmental management that reflects proactive planning and recognition of environmental impact;
- Comply with applicable Commonwealth and South Australian legislative requirements;
- Comply with applicable environmental standards and approvals throughout all phases of the Project; and
- Commit to undertake all environmental management practices in accordance with best-practice.

Management procedures may be adjusted in the event of an environmental incident or the receipt of complaints.

10. CONCLUSION

The Project area selection, assessment and design has been a considered and iterative process influenced by a number of factors including legislative and technical requirements, on-ground environmental attributes, financial feasibility, and potential for economic, social and environmental benefits.

Detailed and measured investigations have allowed the Project to achieve its intent of maximising the benefits derived from increased production of renewable energy, while being sustainable for the needs of the present generation without compromising the ability of future generations to meet their future economic, social and environmental needs.

This Planning Report has considered the details of the Project, the strategic and statutory context, and identified key environmental, social and economic issues. Where potential impacts have been identified, mitigation measures have been proposed for incorporation in the Project design and future management plans.

Assessment of the Project against the Development Control Plan has demonstrated its compatibility and appropriateness for the Project land and locality. Specifically, the land selected is predominantly cleared and previously disturbed, and is located in close proximity to existing electricity network infrastructure.

The provision of appropriately designed new generating facilities, such as the Project, is critical for the future of South Australia's energy security. Further, it is considered that the Project will have positive socio-economic and environmental impacts on the local, state and national scales.

The Planning Report concludes the Project:

- Is consistent with the relevant strategic and statutory provisions;
- Will not result in significant environmental impacts;
- Is suitable at the proposed site; and
- Is in the public interest.

Therefore, it is respectively requested the Project be approved subject to final Project documents and plans being approved by relevant Government authorities prior to the commencement of construction and operation.

11. REFERENCES

BV Consulting (2018) *Glint and Glare Analysis – Robertstown Solar, South Australia, November 2018*

CMW Geosciences (2018) *Robertstown Solar Geotechnical Investigation,* ADL2018-0004AD Rev2. 06/07/2018

Department of Planning Transport and Infrastructure (DPTI) (2018) Annual Average Daily Traffic (AADT) estimates and Heavy Vehicle Estimates accessed at https://dpti.sa.gov.au/traffic_volumes

EBS Heritage (2018) *Robertstown Solar Desktop Heritage Assessment*, Version 4, Project Number: G80401, Author Shannon Smith, 25/07/2018.

EBS Heritage (2018) *Robertstown Solar Archaeological Survey Report*, Version 2, Project Number: G80401, Author Shannon Smith, 25/07/2018.

EBS Ecology (2018) *Robertstown Solar Desktop Ecological Assessment*, Version 3, Project Number: G80401, Author Dr M. Louter, 14/05/2018.

EBS Ecology (2018) *Native Vegetation Clearance Proposal Robertstown Solar*, Version 2, Project Number: G80401, Author Dr M. Louter, 25/07/2018.

Engel, Z., Wszołe, T. (1996) *Audible noise of transmission lines caused by the corona effect: Analysis, modelling, prediction*, Applied Acoustics, Volume 47, Issue 2, Pages 149-163, ISSN 0003-682X, https://doi.org/10.1016/0003-682X(95)00041-7, accessed at: http://www.sciencedirect.com/science/article/pii/0003682X95000417)

EPA South Australia (2013) *EPA 424/13 General Environmental Noise Information Sheet*

EPA South Australia (2009) *Wind farms environmental noise guidelines* ISBN 978-1-876562-43-9

Government of South Australia, *Environment Protection (Noise) Policy 2007* accessed at https://www.legislation.sa.gov.au/LZ/C/POL/Environment%20Protection%20(Noise)%20Policy%202007.aspx

South Australian Resource Information Gateway (SARIG) (2018) 1:100,000 Florieton sheet and geoscientific and geospatial data accessed at: http://minerals.statedevelopment.sa.gov.au/online_tools/free_data_delivery_and_publication_downloads/sarig

World Resources Institute (2018) *These 20 Water-Stressed Countries Have the Most Solar and Wind Potential*

APPENDIX 1

Regulatory Endorsement

1.1 Department for Energy and Mining's S49 Endorsement

1.2 Office of Technical Regulator Certificate

1.1 Department for Energy and Mining’s S49 Endorsement

Government of South Australia

Department for Energy and Mining

DEMC18/00022

Mr Steve McCall
Director
Energy Projects Solar (EPS) Pty Ltd
3/153 Pacific Highway
CHARLESTOWN NSW 2290

Email: stevemccall@epsenergy.com.au

Dear Mr McCall

CROWN SPONSORSHIP ROBERTSTOWN SOLAR PROJECT

Thank you for your letter of 7 September 2018 requesting Crown Sponsorship under section 49 of the *Development Act 1993* to assist with Energy Project Solar (EPS) Pty Ltd's Robertstown Solar Project (Project).

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 500MW solar photovoltaic with up to 250MW capacity battery with up to 1000MWh of storage as a development of public infrastructure as required by section 49 of the *Development Act 1993* (the Act).

It is the responsibility of EPS 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 EPS.

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 EPS'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 EPS's Project will lapse.

If you have any questions regarding the preparation of the material to support this section 49 application, please contact Mr Adam Cook on (08) 8429 3496 or via email: adam.cook@sa.gov.au.

Yours sincerely

Paul Heithersay
CHIEF EXECUTIVE
18 / 10 / 2018

1.2 Office of Technical Regulator Certificate

Government of South Australia
Department for Energy and Mining

Ref: 2017/01873.01 D18126014

Energy and Technical Regulation

Office of the Technical Regulator

Level 4, 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

24 September 2018

Steve McCall
EPS Energy
PO Box 195
Charlestown NSW 2290
By email: stevemccall@epsenergy.com.au

Dear Steve,

RE: CERTIFICATE FOR DEVELOPMENT OF THE ROBERTSTOWN SOLAR PROJECT

The development of the Robertstown Solar Project 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:

- An email from yourself 18 June 2018, which included the project application attached '20180618 Robertstown Solar Statement to OTR.pdf';
- Revised project information emailed by John Thompson of John Thompson Inclusive Pty Ltd on 27 June 2018;
- An OTR certificate issued for this project, dated 27 June 2018.
- A revised application emailed by yourself to the OTR on 24 September 2018.

After assessing the information provided, I advise that approval is granted for the proposed project.

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

Yours sincerely

Rob Faunt
TECHNICAL REGULATOR

cc: Jeff Burns – EPS Energy
Simon Duffy – EPS Energy
John Thompson – John Thompson Inclusive

APPENDIX 2

Certificate of Titles

Product	Register Search (CT 5465/354)
Date/Time	14/02/2018 02:23PM
Customer Reference	
Order ID	20180214007933
Cost	$28.25

REAL PROPERTY ACT, 1886
South Australia

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 5465 Folio 354

Parent Title(s)	CT 4273/650				
Creating Dealing(s)	CONVERTED TITLE				
Title Issued	31/10/1997	**Edition**	4	**Edition Issued**	18/06/2009

Estate Type

FEE SIMPLE

Registered Proprietor

STEPHEN GRANT SCHULZ
ROSLYN LOUISE SCHULZ
OF STOCK ROUTE ROAD ROBERTSTOWN SA 5381
AS JOINT TENANTS

Description of Land

SECTION 13
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Easements

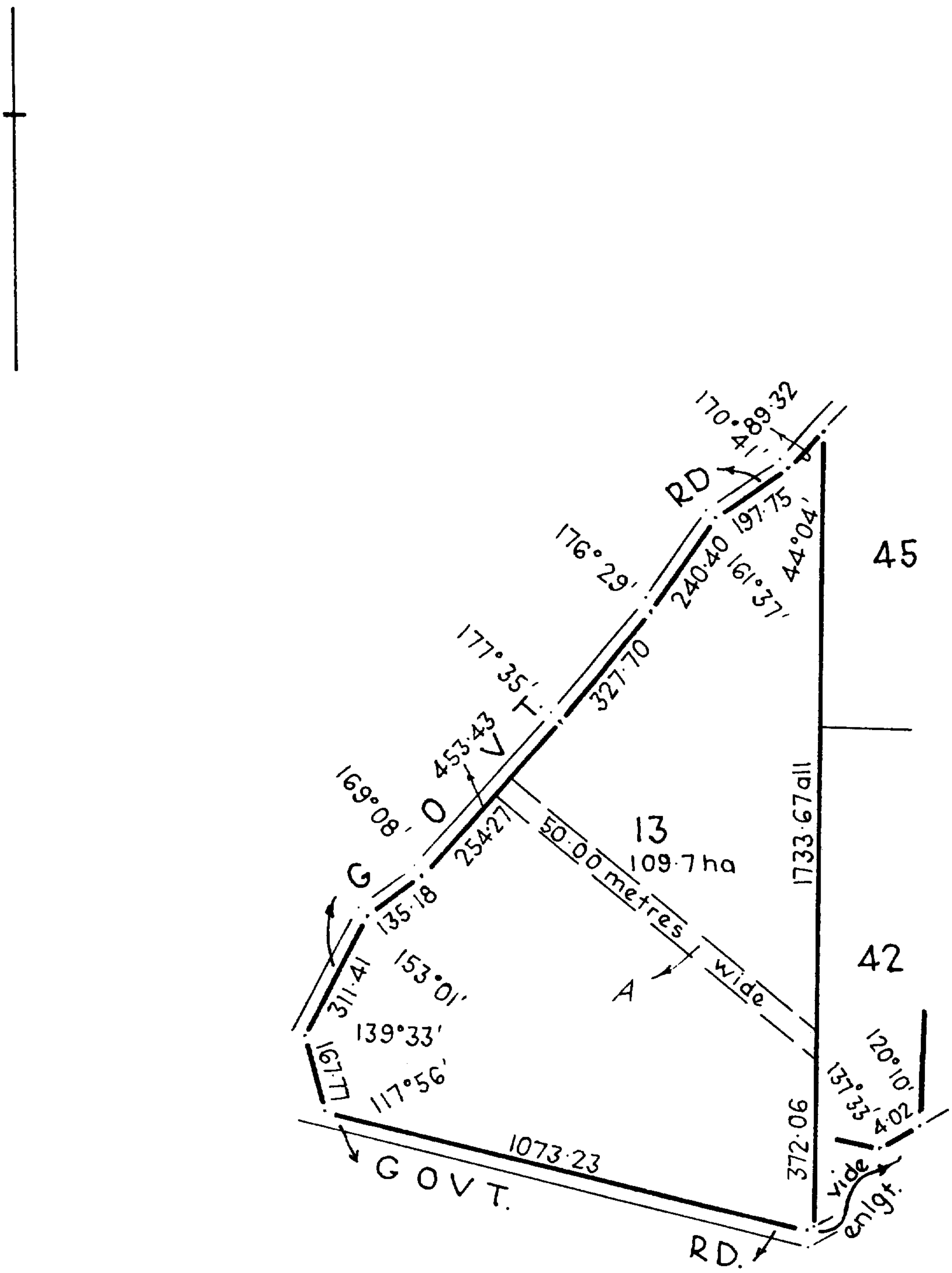
SUBJECT TO EASEMENT(S) OVER THE LAND MARKED A TO THE ETSA CORPORATION (T 5079119)

Schedule of Dealings

Dealing Number	Description
11188584	MORTGAGE TO RABOBANK AUSTRALIA LTD.

Notations

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



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44°04'
45
176°29'
240.40
161°37'
177°35'
327.70
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453.43
V
169°08'
O
254.27
13
109.7 ha
50.00 metres wide
1733.67 all
G
135.18
311.41
153°01'
A
42
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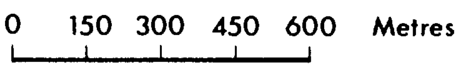
wide enlgt.
G O V T.
RD.



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Product	Register Search (CT 5464/828)
Date/Time	14/02/2018 02:30PM
Customer Reference	11314
Order ID	20180214008120
Cost	$28.25

REAL PROPERTY ACT, 1886
South Australia

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.

REGISTRAR - GENERAL SOUTH AUSTRALIA

Certificate of Title - Volume 5464 Folio 828

Parent Title(s)	CT 4273/649				
Creating Dealing(s)	CONVERTED TITLE				
Title Issued	30/10/1997	**Edition**	3	**Edition Issued**	11/02/1999

Estate Type

FEE SIMPLE

Registered Proprietor

STEPHEN GRANT SCHULZ
ROSLYN LOUISE SCHULZ
OF C/- POST OFFICE ROBERTSTOWN SA 5381
AS JOINT TENANTS

Description of Land

SECTION 42
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Easements

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED A TO THE ETSA CORPORATION (T 5079119)

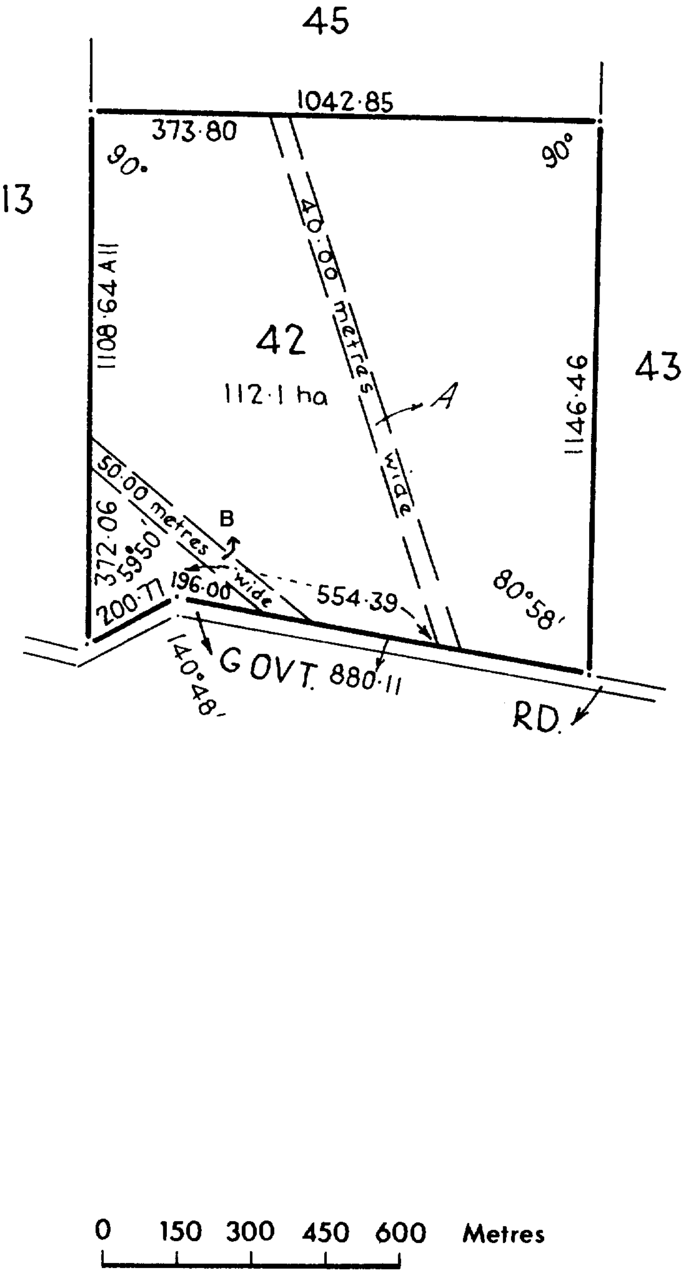
Schedule of Dealings

NIL

Notations

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

Product	Register Search (CT 5464/828)
Date/Time	14/02/2018 02:30PM
Customer Reference	11314
Order ID	20180214008120
Cost	$28.25



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Date/Time	14/02/2018 02:03PM
Customer Reference	
Order ID	20180214007437
Cost	$28.25

REAL PROPERTY ACT, 1886
South Australia

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 5941 Folio 840

Parent Title(s) CL 934/33

Creating Dealing(s) RLG 10228869

Title Issued 06/06/2005 **Edition** 2 **Edition Issued** 27/06/2006

Estate Type

FEE SIMPLE

Registered Proprietor

JASON DALE SEMMLER
OF PO BOX ROBERTSTOWN SA 5351

Description of Land

SECTION 43
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Easements

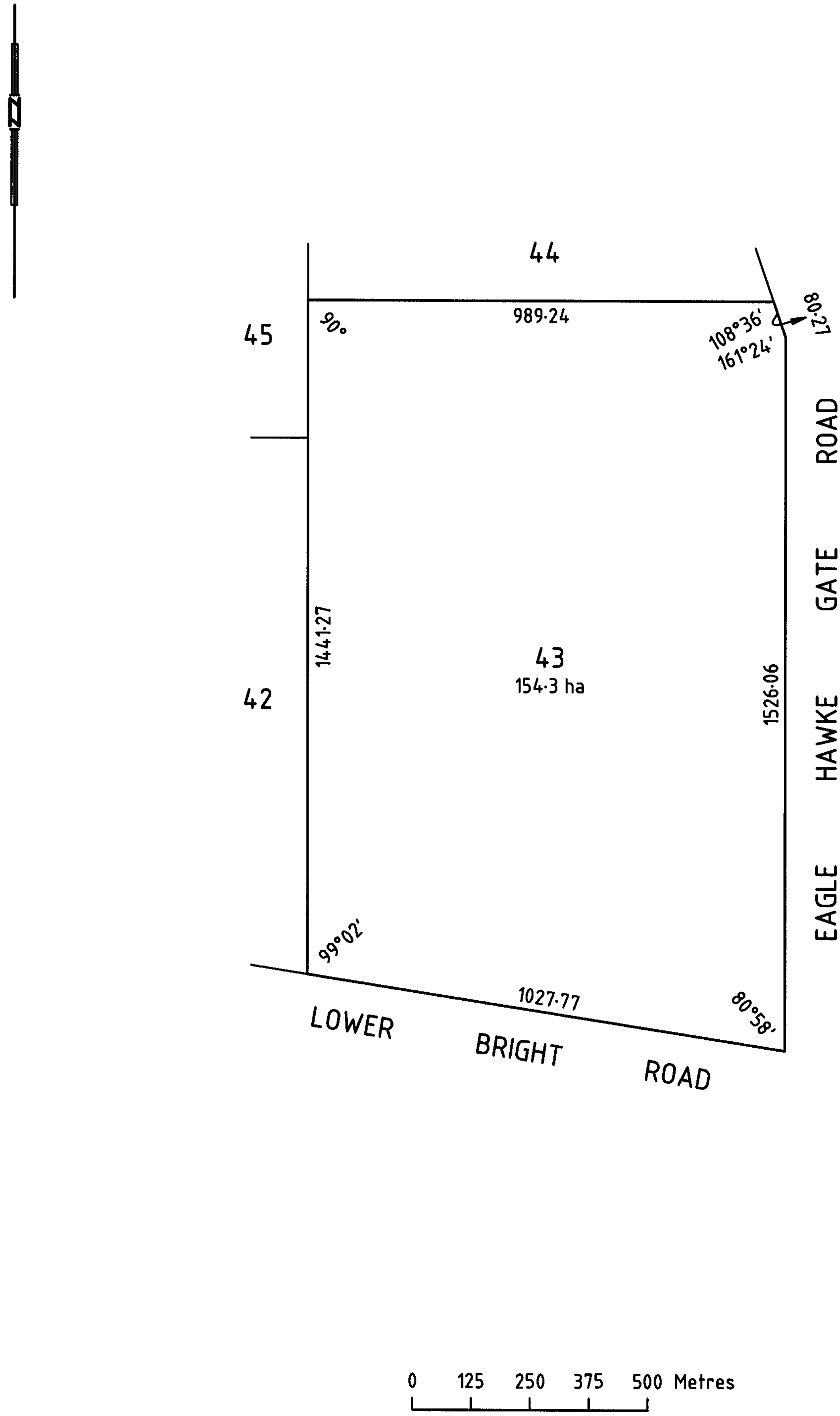
NIL

Schedule of Dealings

NIL

Notations

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


N
44
45
989·24
90°
108°36'
161°24'
80·27
ROAD
GATE
HAWKE
EAGLE
1441·27
43
154·3 ha
42
1526·06
99°02'
1027·77
80°58'
LOWER BRIGHT ROAD
0 125 250 375 500 Metres

REAL PROPERTY ACT, 1886
South Australia

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 5431 Folio 659

Parent Title(s)	CT 4344/242				
Creating Dealing(s)	CONVERTED TITLE				
Title Issued	02/07/1997	**Edition**	2	**Edition Issued**	01/09/1998

Estate Type

FEE SIMPLE

Registered Proprietor

ANDREW CHARLES RUEDIGER
OF ROBERTSTOWN SA 5381

Description of Land

SECTION 232
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Easements

NIL

Schedule of Dealings

Dealing Number	Description
1837364	LEASE COMMENCING ON 13/4/1954 AND EXPIRING ON 12/4/2053 OF A RIGHT OF WAY AND EASEMENT OVER PORTION (SUBJECT TO LEASE 9061500 OF 1 UNDIVIDED 2ND PART)
9061262	VESTING OF LEASE 1837364 IN TRANSMISSION LESSOR CORPORATION
9061394	VESTING OF LEASE 1837364 IN ELECTRANET PTY. LTD. OF 1 UNDIVIDED 2ND PART

Notations

Dealings Affecting Title NIL

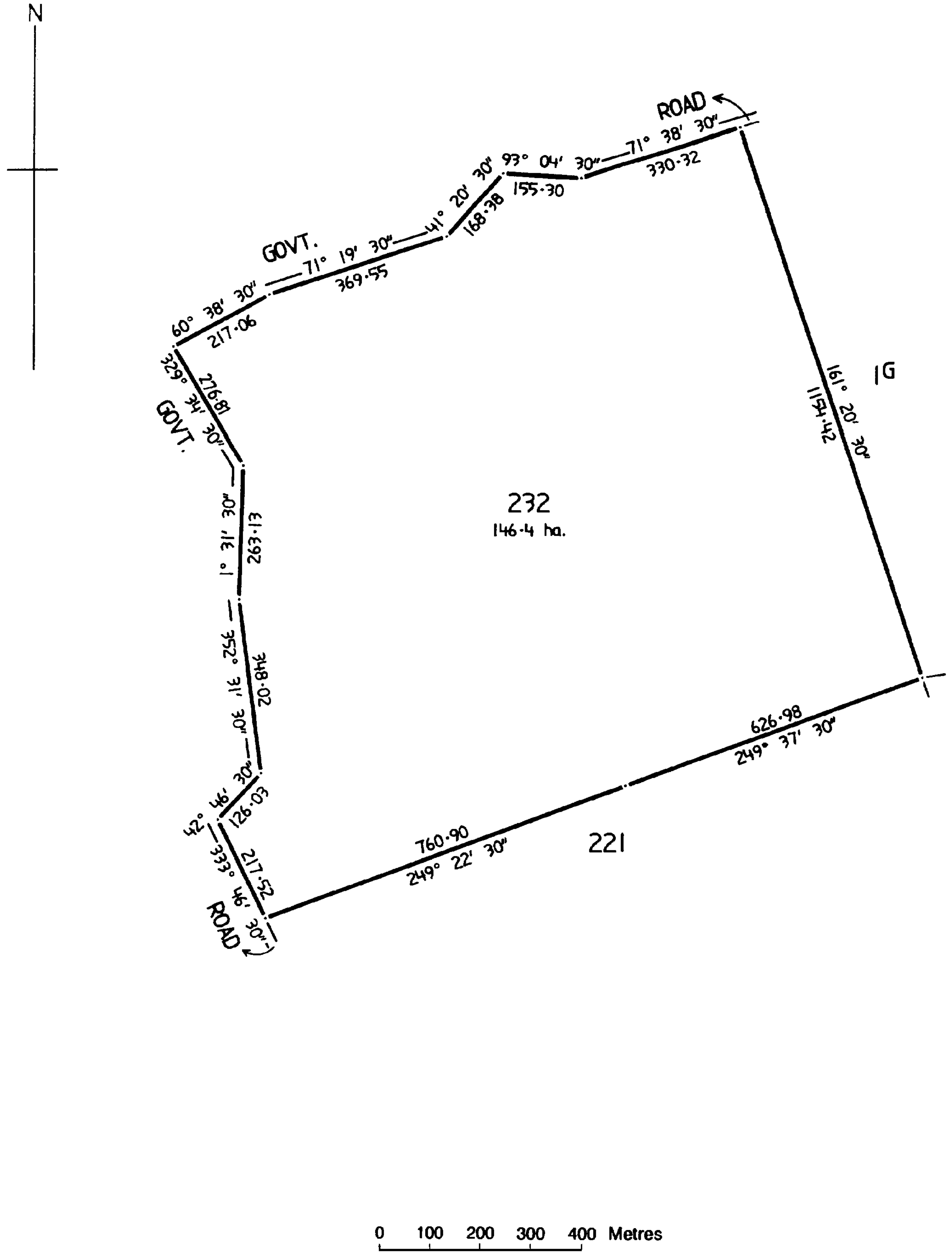
Priority Notices NIL

Notations on Plan NIL

Registrar-General's Notes

TEXTUAL AMENDMENT VIDE 9201027

Administrative Interests NIL


N
ROAD
71° 38' 30"
330·32
93° 04' 30"
155·30
41° 20' 30"
168·38
GOVT.
71° 19' 30"
369·55
60° 38' 30"
217·06
329° 34' 30"
276·81
GOVT.
1° 31' 30"
263·13
352° 31' 30"
348·02
42° 46' 30"
126·03
333° 46' 30"
217·52
ROAD
760·90
249° 22' 30"
626·98
249° 37' 30"
161° 20' 30"
1154·42
1G
232
146·4 ha.
221
0 100 200 300 400 Metres

Product	Register Search (CT 5431/657)
Date/Time	13/02/2018 03:58PM
Customer Reference	
Order ID	20180213011001
Cost	$28.25

REAL PROPERTY ACT, 1886
South Australia

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.

REGISTRAR - GENERAL SOUTH AUSTRALIA

Certificate of Title - Volume 5431 Folio 657

Parent Title(s)	CT 4344/241				
Creating Dealing(s)	CONVERTED TITLE				
Title Issued	02/07/1997	**Edition**	2	**Edition Issued**	01/09/1998

Estate Type

FEE SIMPLE

Registered Proprietor

ANDREW CHARLES RUEDIGER
OF ROBERTSTOWN SA 5381

Description of Land

SECTION 227
HUNDRED OF BRIGHT
IN THE AREA NAMED GERANIUM PLAINS

Easements

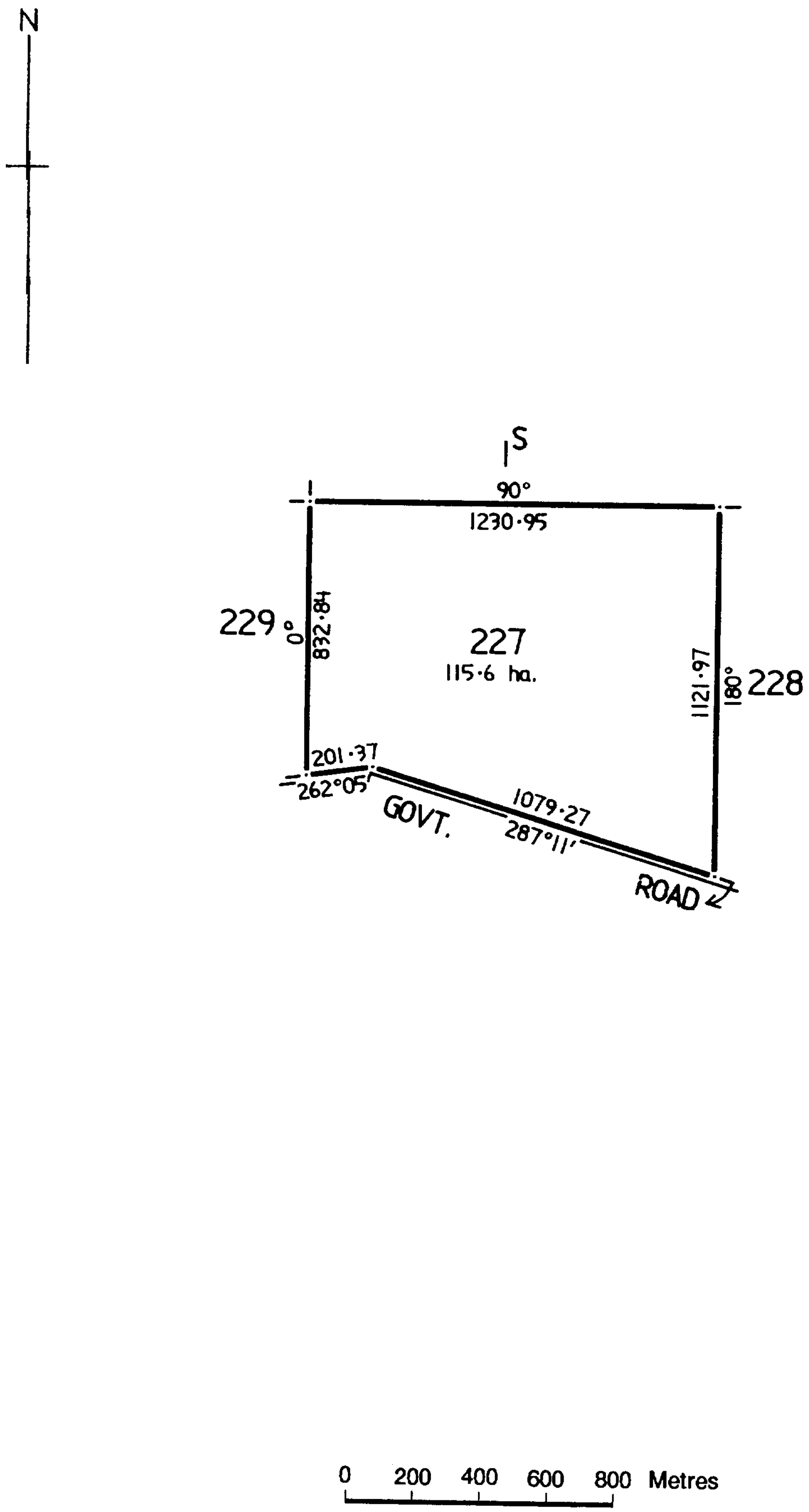
NIL

Schedule of Dealings

NIL

Notations

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


N
S
90°
1230·95
229
0°
832·84
227
115·6 ha.
1121·97
180°
228
201·37
262°05'
GOVT.
1079·27
287°11'
ROAD
0
200
400
600
800
Metres

Product	Register Search (CT 5565/131)
Date/Time	14/02/2018 01:40PM
Customer Reference	
Order ID	20180214007004
Cost	$28.25

REAL PROPERTY ACT, 1886
South Australia

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 5565 Folio 131

Parent Title(s)	CT 1188/84				
Creating Dealing(s)	CONVERTED TITLE				
Title Issued	14/08/1998	**Edition**	2	**Edition Issued**	01/09/1998

Estate Type

FEE SIMPLE

Registered Proprietor

ANDREW CHARLES RUEDIGER
OF ROBERTSTOWN SA 5381

Description of Land

ALLOTMENT 91 FILED PLAN 212965
IN THE AREA NAMED BRIGHT
HUNDRED OF BRIGHT

Easements

NIL

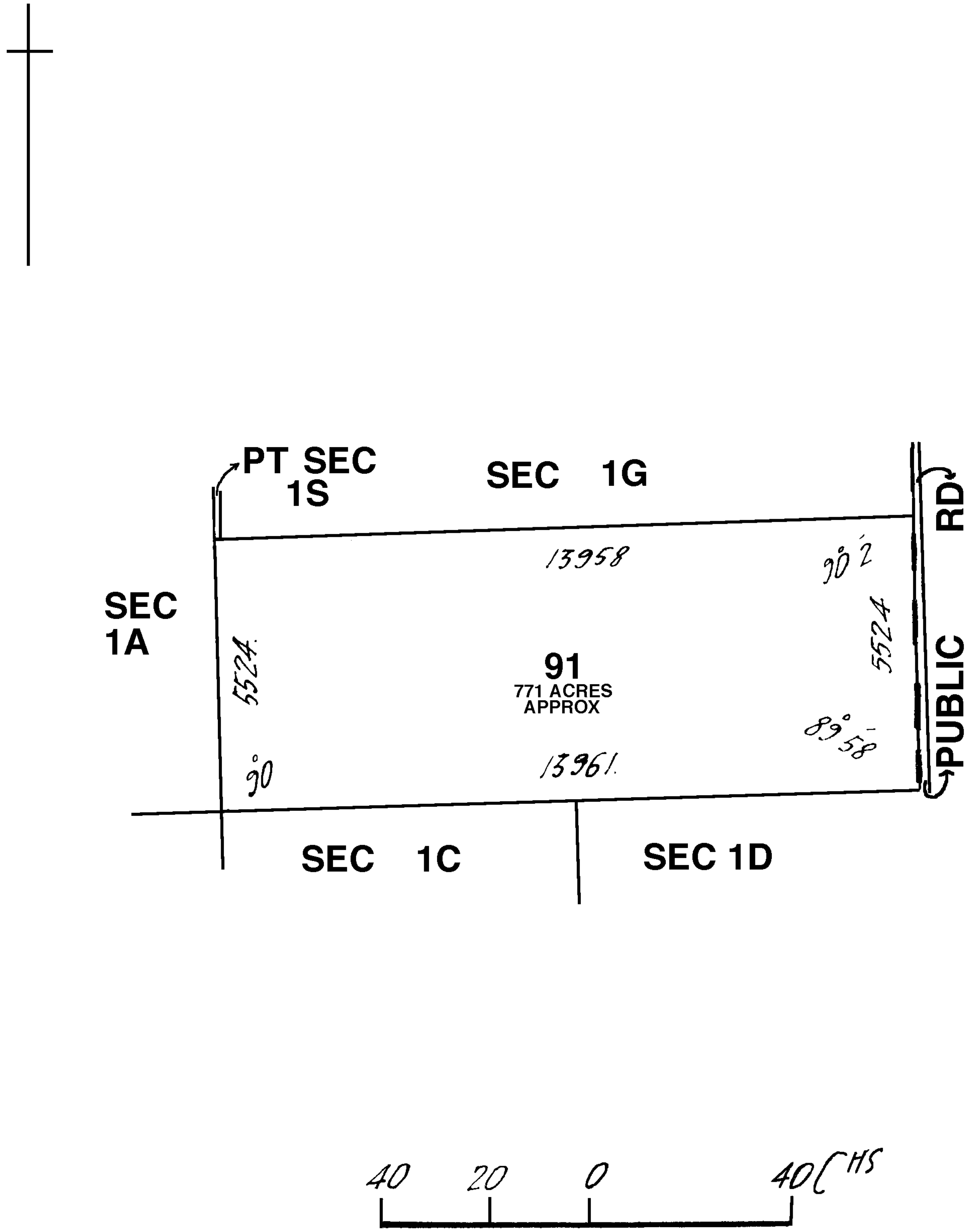
Schedule of Dealings

NIL

Notations

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

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1188/84



FOR METRIC CONVERSION		
1 LINK	=	0·201168 METRES
1 CHAIN	=	100 LINKS
1 ACRE	=	0·404686 HECTARES
1 ROOD	=	1011·7 m²
1 PERCH	=	25·29 m²

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Product	Register Search (CT 5951/34)
Date/Time	31/08/2018 03:23PM
Customer Reference	11314
Order ID	20180831008698
Cost	$28.75

REAL PROPERTY ACT, 1886
South Australia

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.

REGISTRAR - GENERAL SOUTH AUSTRALIA

Certificate of Title - Volume 5951 Folio 34

Parent Title(s) CL 938/7, CL 943/30

Creating Dealing(s) RLG 10312263

Title Issued 11/10/2005 **Edition** 2 **Edition Issued** 02/04/2008

Estate Type

FEE SIMPLE

Registered Proprietor

ANDREW MARK JAESCHKE
MICHELLE KAY JAESCHKE
OF PO BOX 10 HILLTOWN SA 5455
WITH NO SURVIVORSHIP

Description of Land

SECTIONS 44, 45 AND 46
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Easements

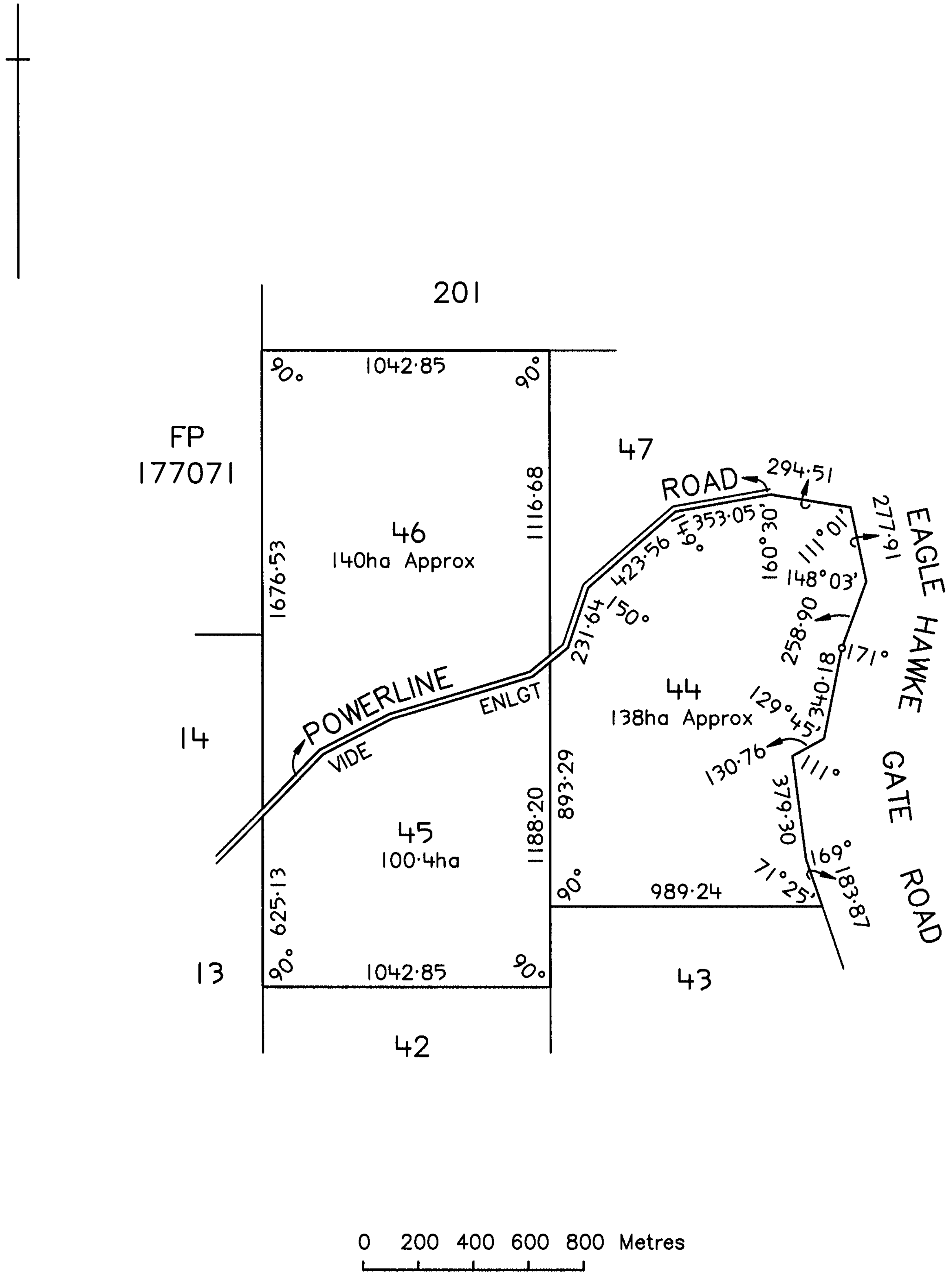
NIL

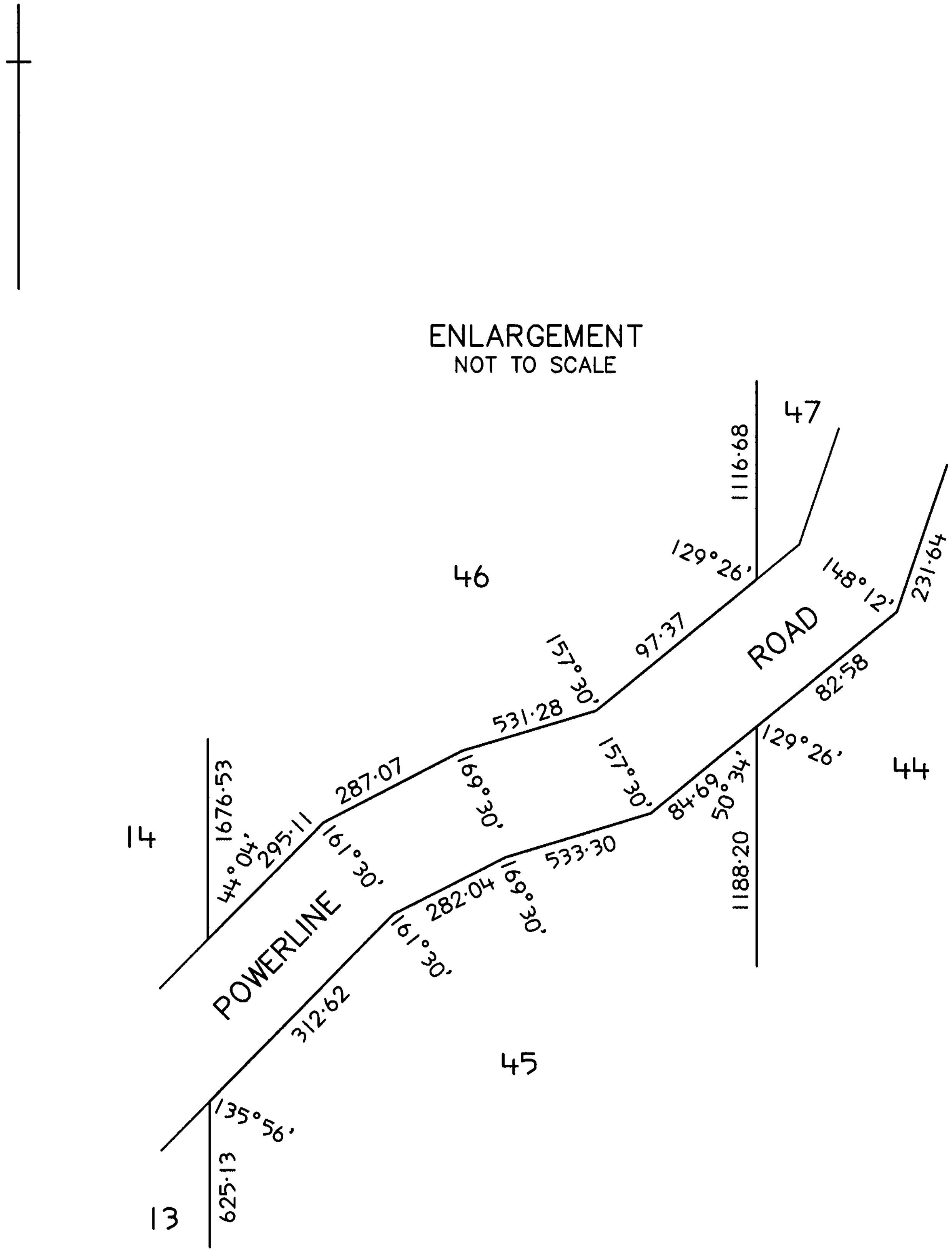
Schedule of Dealings

Dealing Number	Description
1837353	LEASE COMMENCING ON 28/2/1954 AND EXPIRING ON 27/2/2053 OF AN EASEMENT OVER PORTION AS TO THE SHARES SPECIFIED THEREIN (SUBJECT TO LEASE 9061500 OF THE INTEREST OF TRANSMISSION LESSOR CORPORATION)
1868520	LEASE COMMENCING ON 19/3/1954 AND EXPIRING ON 18/3/2053 OF AN EASEMENT OVER PORTION AS TO THE SHARES SPECIFIED THEREIN (SUBJECT TO LEASE 9061500 OF THE INTEREST OF TRANSMISSION LESSOR CORPORATION)
5085253	LEASE COMMENCING ON 21/6/1983 AND EXPIRING ON 20/6/2082 OF AN EASEMENT OVER PORTION AS TO THE SHARES SPECIFIED THEREIN (SUBJECT TO LEASE 9061500 OF THE INTEREST OF TRANSMISSION LESSOR CORPORATION)

Notations

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


201
FP
177071
14
13
42
43
47
46
140ha Approx
45
100·4ha
44
138ha Approx
1042·85
1116·68
1676·53
625·13
1188·20
893·29
989·24
POWERLINE
VIDE
ENLGT
ROAD
294·51
277·91
423·56
353·05
231·64
258·90
340·18
130·76
379·30
183·87
160°30'
111°01'
148°03'
171°
129°45'
111°
169°
71°25'
150°
EAGLE HAWKE GATE ROAD
0 200 400 600 800 Metres


ENLARGEMENT
NOT TO SCALE
47
1116·68
46
129°26'
148°12'
231·64
97·37
ROAD
157°30'
531·28
82·58
129°26'
44
157°30'
287·07
169°30'
84·69
50°34'
1676·53
14
44°04'
295·11
161°30'
533·30
1188·20
282·04
169°30'
POWERLINE
161°30'
312·62
45
135°56'
625·13
13

Certificate of Title

Title Reference	CT 5550/784
Status	CURRENT
Easement	NO
Owner Number	14030446
Address for Notices	POST OFFICE BOX 1045, CLARE, SA 5453
Area	309.8HA (CALCULATED)

Estate Type

Fee Simple

Registered Proprietor

ANDREW MARK JAESCHKE
MICHELLE KAY JAESCHKE
OF PO BOX 10 HILLTOWN SA 5455
WITH NO SURVIVORSHIP

Description of Land

ALLOTMENT 91 FILED PLAN 212508
IN THE AREA NAMED BRIGHT
HUNDRED OF BRIGHT

Last Sale Details

Dealing Reference	Transfer (T) 10919008
Dealing Date	12/03/2008
Sale Price	$0
Sale Type	Change of ownership for no monetary consideration or undisclosed consideration

Constraints

Encumbrances

NIL

Stoppers

NIL

Valuation Numbers

Valuation Number	Status	Property Location Address
9802522004	CURRENT	Lot 91 POWERLINE ROAD, BRIGHT, SA 5381

Notations

Dealings Affecting Title

NIL

Notations on Plan

NIL

Registrar-General's Notes

NIL

Administrative Interests

NIL

S.A. LANDS TITLES OFFICE RE-IDENTIFICATION PLAN

PLAN NUMBER

FP 212508

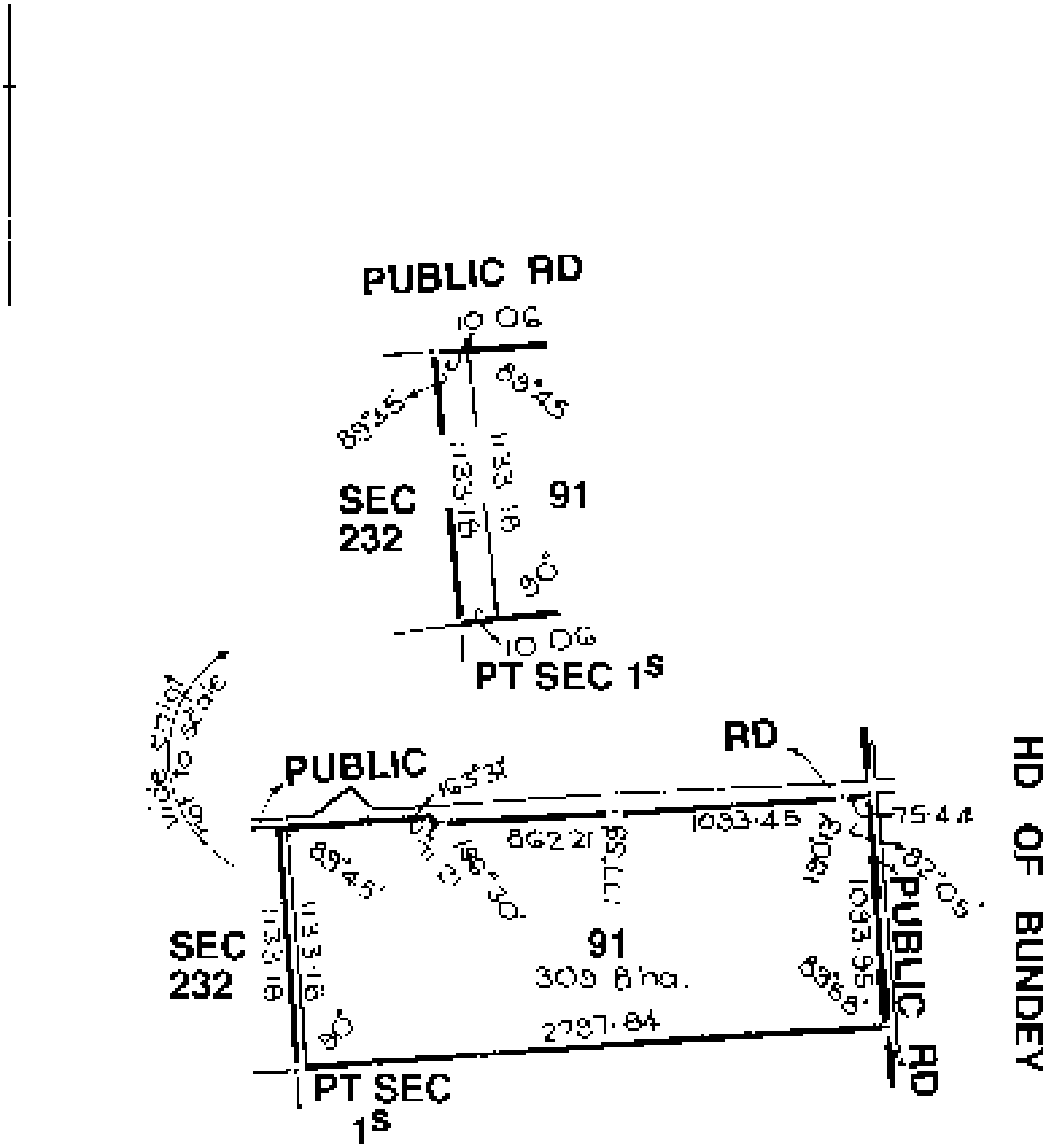
SHEET 1 OF 1

ACCEPTED FOR FILING 11/08/1993

REGISTRAR GENERAL

AREA : BRIGHT
LGA : DISTRICT COUNCIL OF ROBERTSTOWN
HUNDRED : BRIGHT
SECTION : P S 1G

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 4271/298



0 400 800 1200 1600 Metres

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Government of South Australia
Department of Planning, Transport and Infrastructure

Product	Title Details
Date/Time	12/05/2017 10:03AM
Customer Reference	11263
Order ID	20170512002900
Cost	$9.75

Certificate of Title

Title Reference	CT 5561/287
Status	CURRENT
Easement	NO
Owner Number	07748986
Address for Notices	PO BOX 11 ROBERTSTOWN 5381
Area	115.3HA (CALCULATED)

Estate Type

Fee Simple

Registered Proprietor

CLAYTON FRANCIS HEINRICH
CARLENE MICHELLE HEINRICH
OF ROBERTSTOWN SA 5381
AS JOINT TENANTS

Description of Land

SECTION 229
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Last Sale Details

There are no sales details recorded for this property

Constraints

Encumbrances

NIL

Stoppers

NIL

Valuation Numbers

Valuation Number	Status	Property Location Address
9802598113	CURRENT	Lot 221 GOVT ROAD, BRIGHT, SA 5381

Notations

Dealings Affecting Title

NIL

Notations on Plan

NIL

Registrar-General's Notes

NIL

Administrative Interests

NIL

HUNDRED OF BRIGHT

REFERENCE

Field Book No. Pages

Nos of Secs	Areas of Secs	Description	Locality
229	285	Grant Ch.Bk.339 P52	
Roads			
Total			

Checked. Book 338 p 40 ... Area Books. 81 p 500 & 88 p 236
Survey correct. D.R. 211/1933 ... 17.6.37

C. D. to plot 3/6/37 ... for S.G.

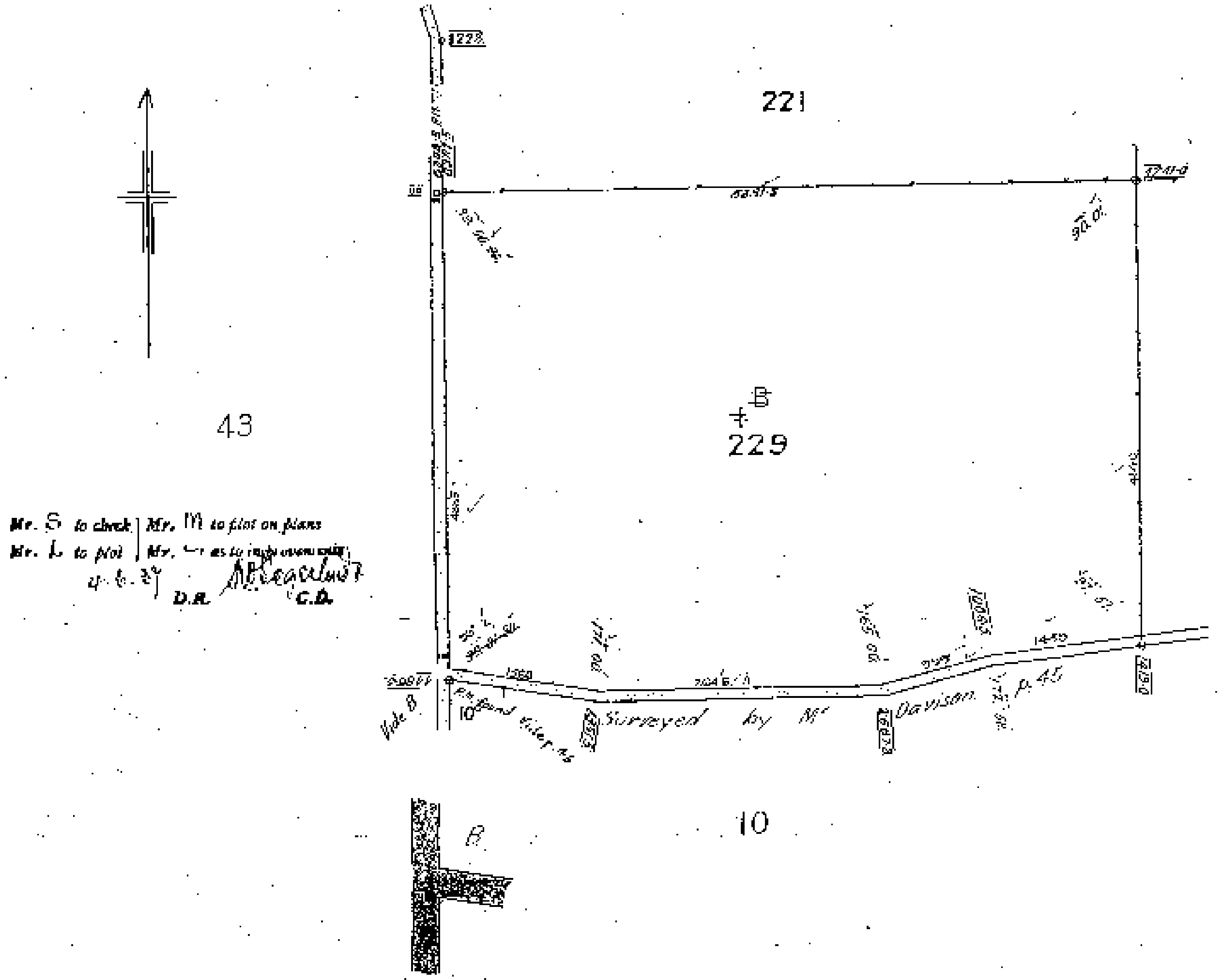
Plotted on Land Office Plans ... 23.6.37.
" " County Plan
" " Original Plans
For Improvements vide Valuation Paper No.

Position of Permanent Marks shewn thus ■
" " Metal Pins " " M.P.
" " Datum Pegs " " D.P.
" " Old Marks " " O.P. or O.L.
" " Observation Stns " " △

I hereby certify that this survey was made by me, that it is properly marked on the ground and that this plan is a true and correct representation of the lines so marked.

1/6/37.
Surveyor

SCALE



D.L. 6837/36
D.R. 211/33

Vide pages 21, 30 & 45

Product	Title Details
Date/Time	12/05/2017 10:14AM
Customer Reference	11263
Order ID	20170512003173
Cost	$9.75

Certificate of Title

Title Reference	CT 5561/89
Status	CURRENT
Easement	NO
Owner Number	07748986
Address for Notices	PO BOX 11 ROBERTSTOWN 5381
Area	139.6HA (CALCULATED)

Estate Type

Fee Simple

Registered Proprietor

CLAYTON FRANCIS HEINRICH
CARLENE MICHELLE HEINRICH
OF ROBERTSTOWN SA 5381
AS JOINT TENANTS

Description of Land

SECTION 221
HUNDRED OF BRIGHT
IN THE AREA NAMED BRIGHT

Last Sale Details

There are no sales details recorded for this property

Constraints

Encumbrances

NIL

Stoppers

NIL

Valuation Numbers

Valuation Number	Status	Property Location Address
9802598113	CURRENT	Lot 221 GOVT ROAD, BRIGHT, SA 5381

Notations

Dealings Affecting Title

NIL

Notations on Plan

NIL

Registrar-General's Notes

NIL

Administrative Interests

NIL

HUNDRED OF BRIGHT

LAND GRANT

52

REFERENCE

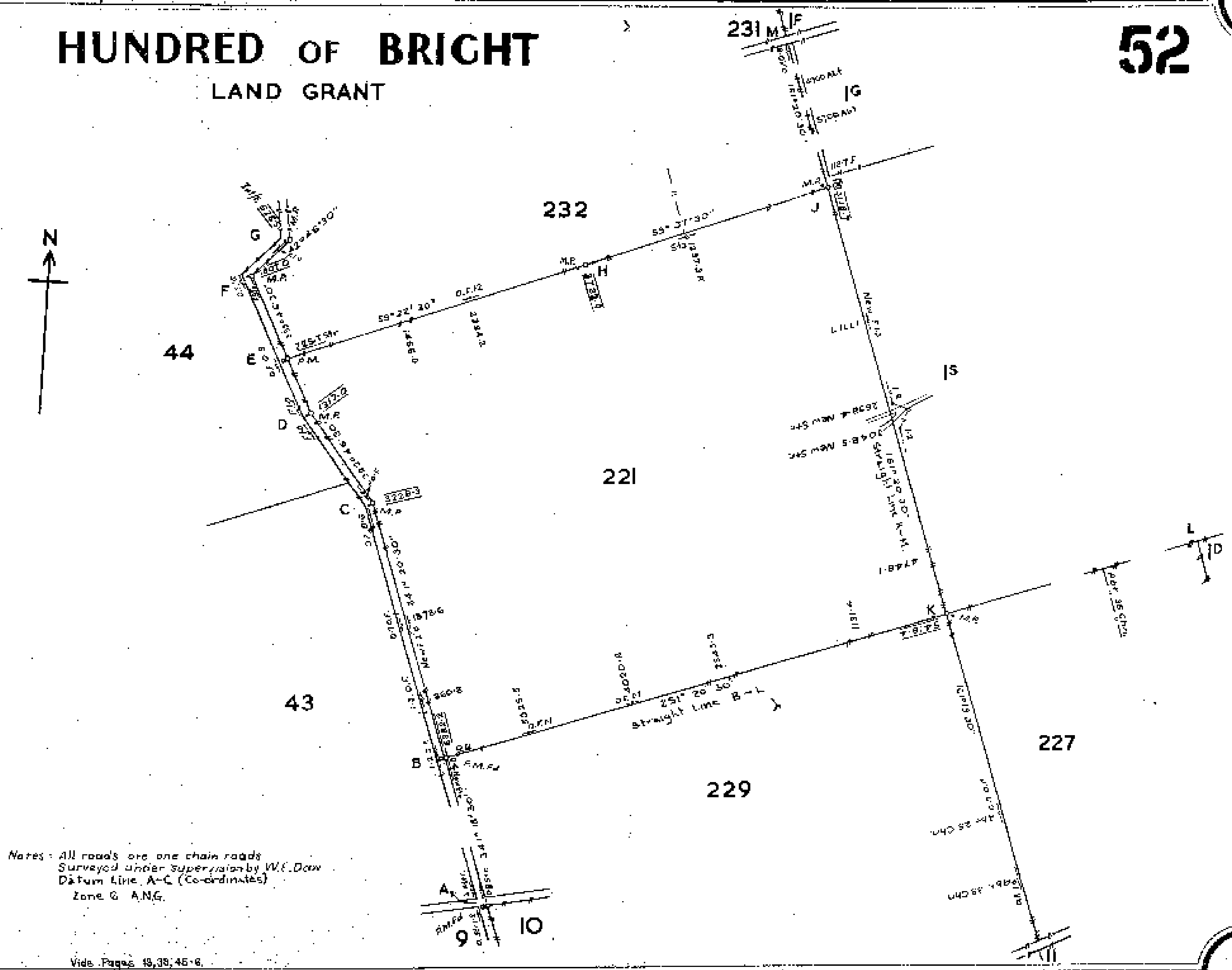
Field Book No. 3339

Pages 11-15

Nos of Secs.	Areas of Secs	Locality
221	345 Acs	5 MILES N.E. FROM ROBERTSTOWN

Schedule of Marks

Corner	Bearing	Mark	Distance
A	80°02'	P.M.Fd	5·0
B	71°20'30"	P.M.Fd	3·0
C	64°05'	M.P.	5·0
D	15°11'	M.P.	4·6
E	45°38'	P.M.	3·1
F	94°40'	M.P.	3·4
G	104°32'	M.P.	7·1
H	68°10'	M.P.	10·2
J	146°52'	M.P.	3·0
K	281°21'	M.P.	5·5



Notes: All roads are one chain roads
Surveyed under supervision by W.E. Daw
Datum Line A–C (Co-ordinates)
Zone 6 A.N.G.

Vide Pages 19, 38, 45-6.

Jackets D.R 357/67, D.L. 1741/67

Checked, Book 465, P. 1

Survey examined W.L. Hughes S.E.

Report D.R. 357/67

Survey accepted [signature] S.G. 19-4-68

Plotted on Land Office Plans

" " Original Plans

Position of Permanent Marks shown thus ◼

" " Metal Pins " " M.P.

" " Datum Pegs " " D.P.

" " Old Marks " " O.P. or O.T.

" " Observation Stns " " △

I, Thomas William Hughes

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 1935–1961.

Dated this sixth day of October 1967.

T. W. Hughes

Licensed Surveyor.

S.D. for Exam.n [signature] for S.G. 25-10-67

SCALE

0 10 20 30 Chns

REAL PROPERTY ACT, 1886
South Australia

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 5689 Folio 928

Parent Title(s) CT 5295/766

Creating Dealing(s) RTC 8696570

Title Issued 07/09/1999 **Edition** 3 **Edition Issued** 17/07/2018

Estate Type

FEE SIMPLE

Registered Proprietor

JOHN ROBERT LIPSCHINSKI
OF ROBERTSTOWN SA 5381

Description of Land

ALLOTMENT 51 DEPOSITED PLAN 51338
IN THE AREA NAMED BRIGHT
HUNDRED OF BRIGHT

Easements

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED A.B AND C TO THE ETSA CORPORATION (T 3030798 T 5085252 AND T 5276850 RESPECTIVELY)

Schedule of Dealings

Dealing Number	Description
9211582	MORTGAGE TO WESTPAC BANKING CORPORATION

Notations

Dealings Affecting Title NIL

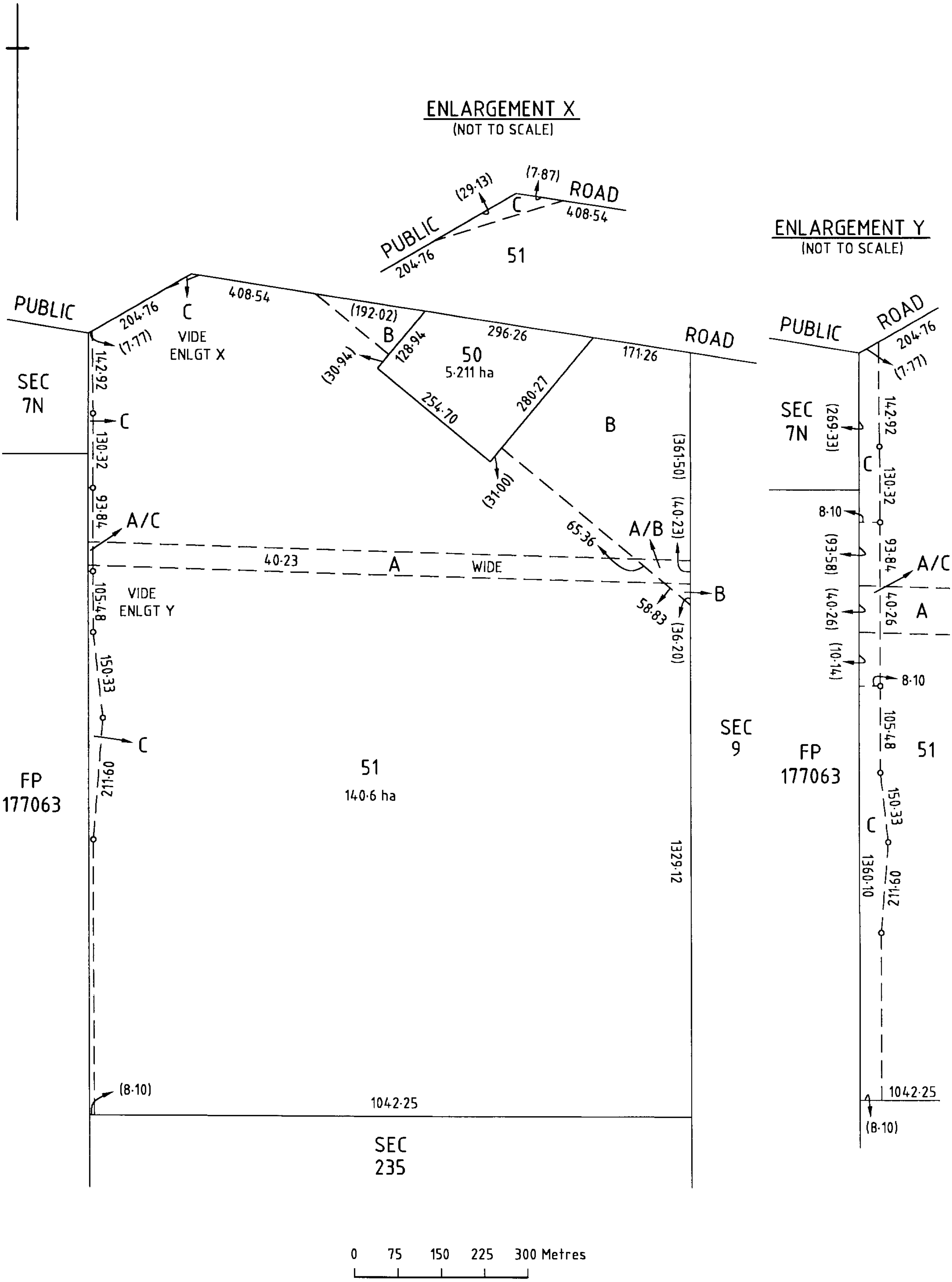
Priority Notices NIL

Notations on Plan NIL

Registrar-General's Notes

APPROVED FX251560

Administrative Interests NIL


ENLARGEMENT X
(NOT TO SCALE)
ENLARGEMENT Y
(NOT TO SCALE)
PUBLIC
ROAD
204·76
(7·71)
408·54
(29·13)
(7·87)
C
51
SEC
7N
142·92
130·32
93·84
A/C
VIDE
ENLGT X
(192·02)
B
(30·94)
128·94
50
5·211 ha
296·26
254·70
280·27
171·26
(31·00)
65·36
A/B
(361·50)
(40·23)
40·23
A
WIDE
58·83
(36·20)
VIDE
ENLGT Y
105·48
150·33
211·60
FP
177063
51
140·6 ha
SEC
9
1329·12
(8·10)
1042·25
SEC
235
(269·33)
8·10
(93·58)
(40·26)
40·26
(10·14)
1360·10
0 75 150 225 300 Metres

Product	Register Search (CT 5689/927)
Date/Time	28/11/2018 04:50PM
Customer Reference	JQQDWZV1Z9KS6
Order ID	20181128011174

REAL PROPERTY ACT, 1886
South Australia

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 5689 Folio 927

Parent Title(s) CT 4213/306, CT 5295/766, CT 5471/432

Creating Dealing(s) RTC 8696570

Title Issued 07/09/1999 **Edition** 3 **Edition Issued** 12/10/2001

Estate Type

FEE SIMPLE

Registered Proprietor

TRANSMISSION LESSOR CORPORATION
OF 200 VICTORIA SQUARE ADELAIDE SA 5000

Description of Land

ALLOTMENT 50 DEPOSITED PLAN 51338
IN THE AREA NAMED BRIGHT
HUNDRED OF BRIGHT

Easements

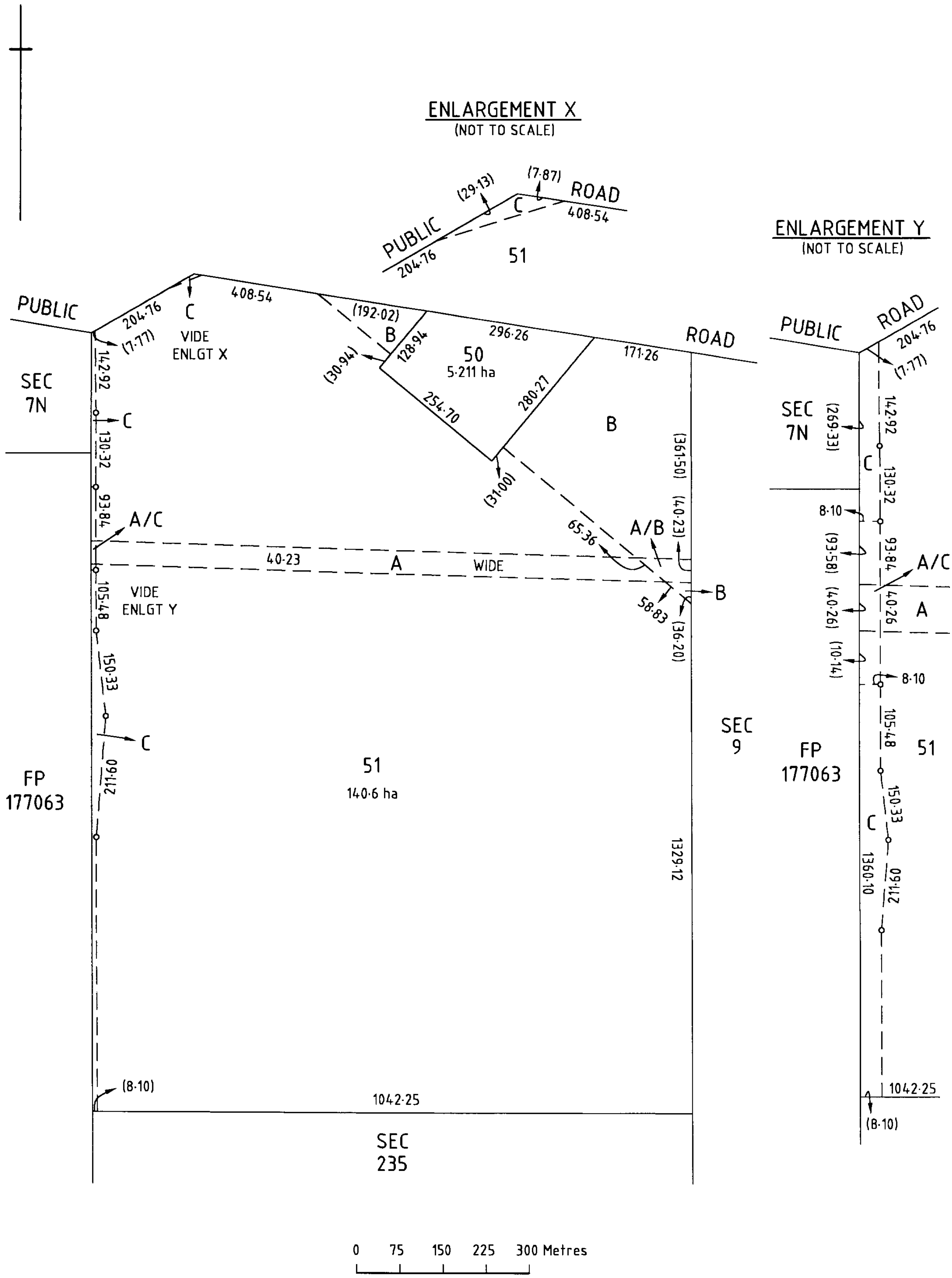
NIL

Schedule of Dealings

Dealing Number	Description
9061500	LEASE TO ELECTRANET PTY. LTD. COMMENCING ON 31/10/2000 AND EXPIRING ON 30/10/2200 PURSUANT TO ELECTRICITY CORPORATIONS (RESTRUCTURING AND DISPOSAL) ACT 1999

Notations

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


ENLARGEMENT X
(NOT TO SCALE)
PUBLIC
204·76
(29·13)
(7·87)
C
ROAD
408·54
51
ENLARGEMENT Y
(NOT TO SCALE)
PUBLIC
204·76
(7·77)
C
VIDE
ENLGT X
408·54
(192·02)
B
128·94
(30·94)
50
5·211 ha
296·26
254·70
280·27
171·26
ROAD
SEC
7N
142·92
C
130·32
93·84
A/C
40·23
A
WIDE
VIDE
ENLGT Y
105·48
150·33
C
211·60
FP
177063
B
(361·50)
(31·00)
65·36
A/B
(40·23)
58·83
B
(36·20)
SEC
9
51
140·6 ha
1329·12
(8·10)
1042·25
SEC
235
PUBLIC
ROAD
204·76
(7·77)
SEC
7N
(269·33)
142·92
C
130·32
8·10
(93·58)
93·84
A/C
(40·26)
40·26
A
(10·14)
8·10
105·48
FP
177063
51
150·33
C
1360·10
211·60
1042·25
(8·10)
0
75
150
225
300 Metres

APPENDIX 3

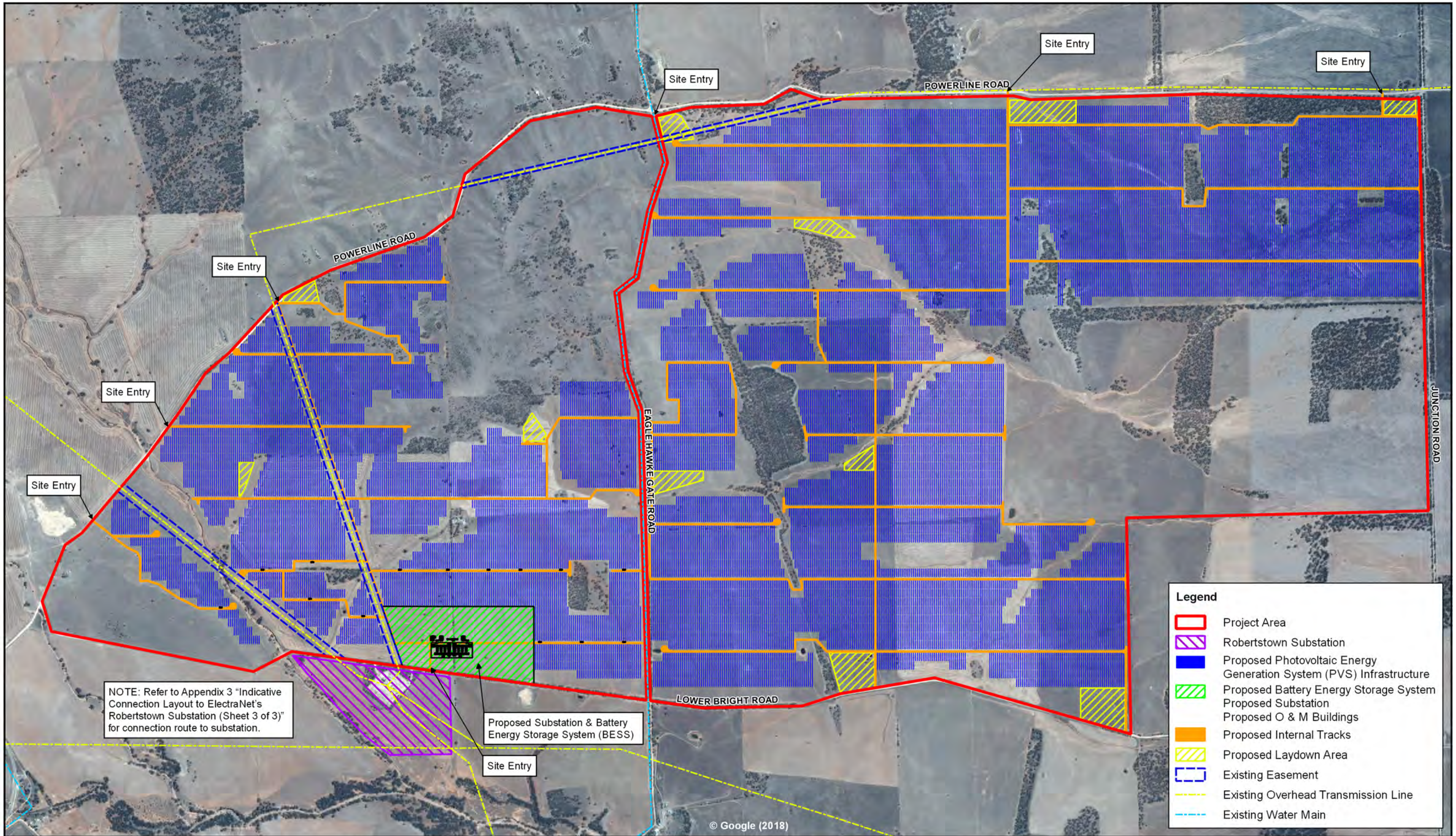
Indicative Layouts

3.1 Indicative PVS Operations Layout

3.2 Indicative BESS Operations Layout, Project Substation Layout and Operations and Maintenance Layout

3.3 Indicative Connection Layout to ElectraNet's Robertstown Substation

3.1 Indicative PVS Operations Layout



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:19,000
Job Ref/Version:	11314/ V03

Accuracy: location and scale of features is indicative only

Map Projection: GDA 1994 MGA Zone 54

Sheet 1 of 3

Indicative PVS Operations Layout

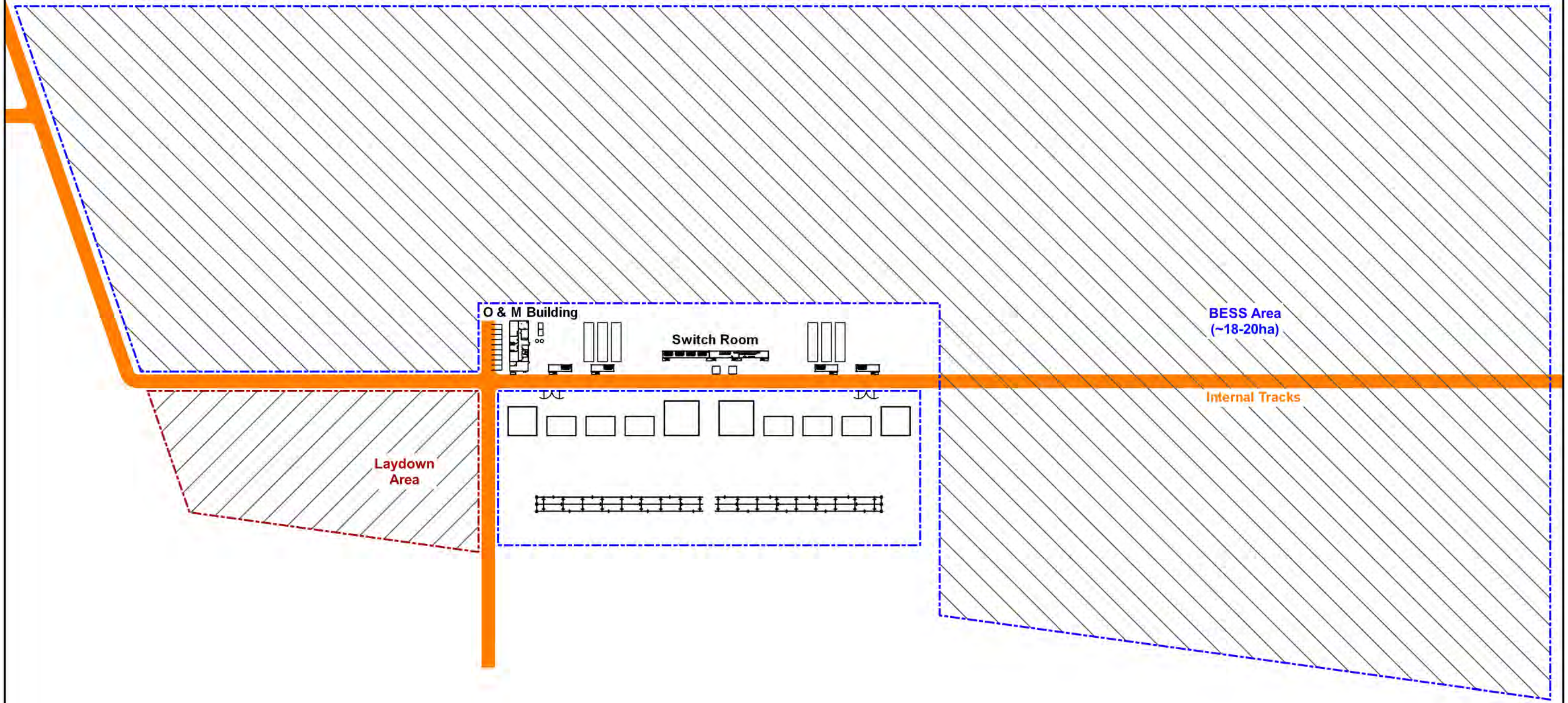
Robertstown Solar | Robertstown SA Australia

23/11/2018

ROBERTSTOWN SOLAR

11314_PR_Preliminary_Layout.qgs

3.2 Indicative BESS Operations Layout, Project Substation Layout and Operations and Maintenance Layout

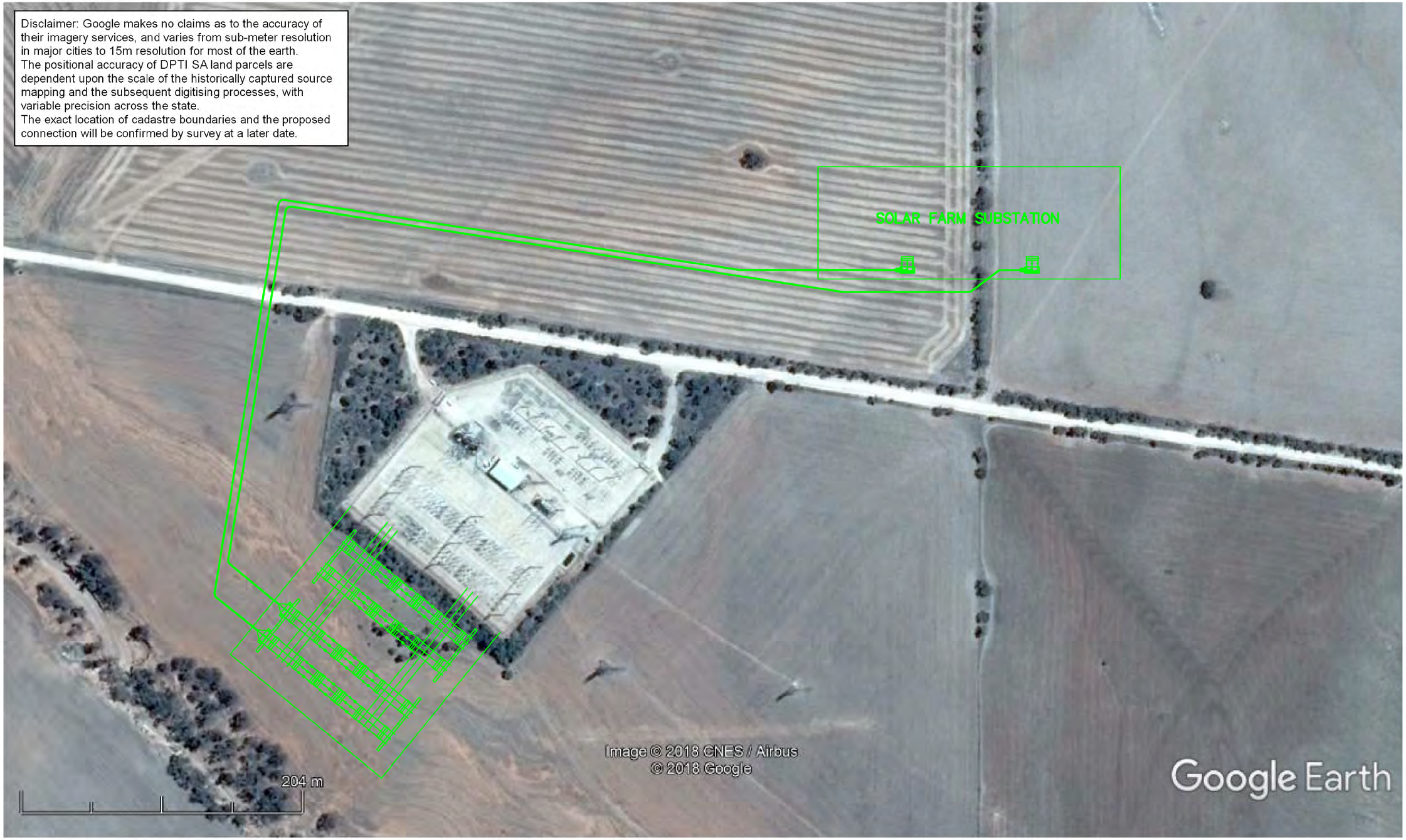


Author:	SW	Sheet 2 of 3	
Reviewer:	SMC/ JB	Indicative BESS Operations Layout, Project Substation Layout and Operations and Maintenance Layout	
A3 Scale:	1:2,000	Robertstown Solar | Robertstown SA Australia	ROBERTSTOWN SOLAR
Job Ref/Version:	11314/ V01	23/11/2018	

0 25 50 75 100 m

11314_PR_Indicative_BESS_Substation_OM.qgs

3.3 Indicative Connection Layout to ElectraNet's Robertstown Substation



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	N/A
Job Ref/Version:	11314/ V02

Sheet 3 of 3

Indicative Connection Layout to ElectraNet's Robertstown Substation (Underground Cable)

Robertstown Solar | Robertstown SA Australia

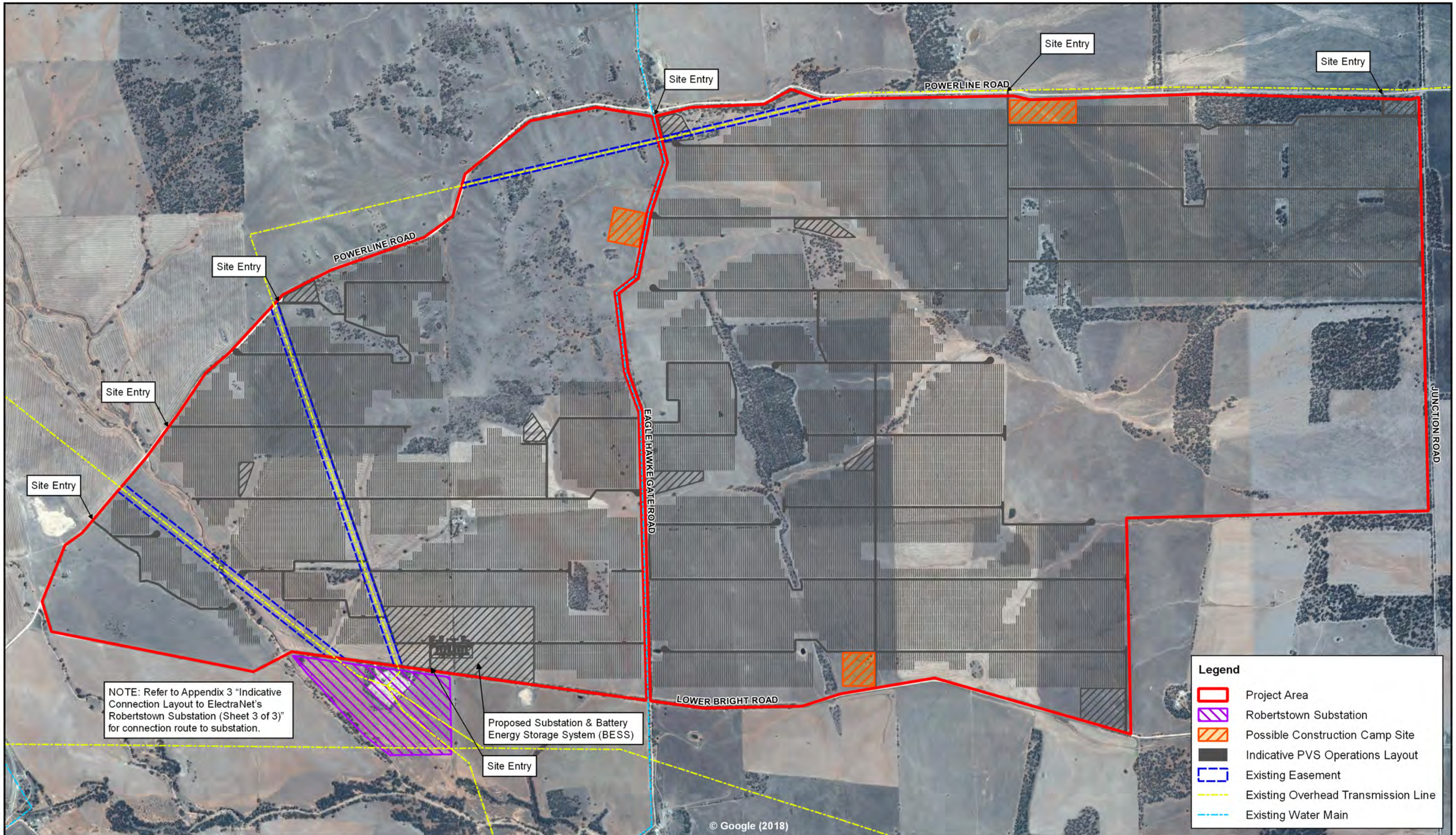
29/11/2018

ROBERTSTOWN SOLAR

11314_PR_Indicative_Connection_Layout.qgs

APPENDIX 4

Typical Construction Camp Layout



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:19,000
Job Ref/Version:	11314/ V01

0 0.25 0.5 0.75 1 km

Accuracy: location and scale of features is indicative only

Map Projection: GDA 1994 MGA Zone 54

Sheet 1 of 3

Possible Locations of Construction Camp

Robertstown Solar | Robertstown SA Australia

23/11/2018

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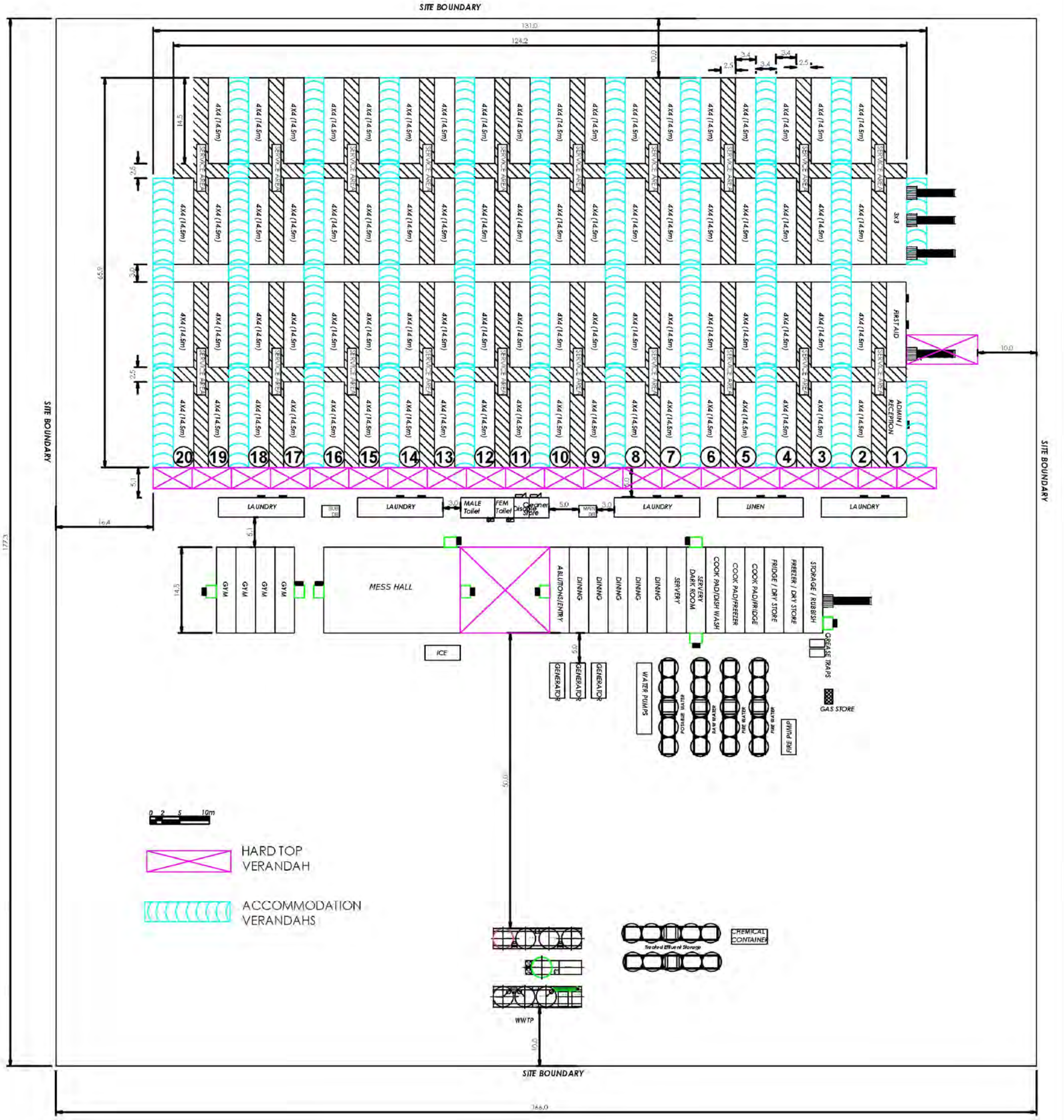
11314_PR_Potential_Construction_Camps.qgs



Note: While the Project has a preference for local accommodation, if insufficient accommodation suitable to meet the requirements of the Project is not available, then a temporary construction workers camp on a suitable part of the Project area.

Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	N/A
Job Ref/Version:	11314/ V01

Sheet 2 of 3

Indicative Construction Camp Layout Plan

Robertstown Solar | Robertstown SA Australia

23/11/2018

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11314_PR_Indicative_Camp_Layout.qgs

Author:	SW	
Reviewer:	SMC/ JB	
A3 Scale:	N/A	
Job Ref/Version:	11314/ V01	

Sheet 3 of 3

Photograph of Typical Construction Camp

Robertstown Solar | Robertstown SA Australia

23/11/2018

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11314_PR_Typical_Camp_Layout.qgs

APPENDIX 5

Development Plan Assessment

DEVELOPMENT PLAN ASSESSMENT

Prepared for Robertstown Solar

EPS ENERGY

Reference No. 11314

November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

QUALITY ASSURANCE AND DECLARATION

Quality Assurance and Version Control Table		
Project:	Robertstown Solar	
Client:	Robertstown Solar 1 Pty Ltd and Robertstown Solar 2 Pty Ltd	
Rev:	**Date:**	**Reference:**
V01	29.11.2018	11314_Robertstown Development Plan Assessment

Checked by:	Marina Budisavljevic	
Approved by:	Steve McCall	
Declaration:	*The opinions and declarations in this document are ascribed to EPS Energy and are made in good faith and trust that such statements are neither false nor misleading.* *In preparing this document, EPS Energy has considered and relied upon information obtained from the public domain, supplemented by discussions between key EPS Energy staff, representatives from governing agencies and independents, including the client and specialist consultants.*	
Applicant:	EPS Energy PO Box 195 Charlestown NSW 2290 (02) 9258 1362	
Prepared By:	Simon Duffy	
Project Land:	CT 5565/131 CT 5431/657 CT 5431/659 CT 5465/354 CT 5464/828 CT 5941/840 CT 5561/287 CT 5561/89 CT 5951/34 CT 5550/784 CT 5689/928 CT 5689/927	A91 FP212965 Section 227 Section 232 Section 13 Section 42 Section 43 Section 229 Section 221 Section 44 & 45 A91 FP212508 A51 DP51338 A50 DP51338

GOYDER COUNCIL DEVELOPMENT PLAN (CONSOLIDATED – 24 NOVEMBER 2016)

Assessment Section		Project Response
Primary Production Zone Provisions		
Objectives (P110)	*1. Economically productive, efficient and environmentally sustainable primary production*	The Robertstown Solar Project (Project) is located within the Primary Production Zone as shown in Zone Map Go/1. The Project will implement a Construction Management Plan for the construction phase and Operation Management Plan for the operation phase approved, by the Minister for Planning or delegate, to manage potential adverse impacts. The Project will not impede the operation of the established agricultural land uses in the area through any nuisance or harmful creating impact.
	3. Protection of primary production from encroachment by incompatible land uses and protection of scenic qualities of rural landscapes.	The Project is envisaged in the Primary Production Zone and therefore is not considered an incompatible land use. The key features of the Project's rural landscape include, cleared land used for cropping and grazing, vegetated land used for grazing and utility scale electricity infrastructure comprising a substation and powerlines. The ElectraNet Robertstown Substation is located on Lower Bright Road adjacent to the Project area. The Planning Report's Figure 2-3 - key physical features of the Project land, show overhead 275kV transmission lines running north/north

Assessment Section		Project Response
		west from the substation across the western portion of the Project area, overhead 275/132kV transmission lines running south/south east from the substation across adjoining land and an overhead 132kV transmission line running east/west across the northern portion of the Project area. Utility scale solar projects are becoming more common place in rural settings and acceptable rurally located infrastructure. The Project is not located in an area of known visual or scenic significance. The Project's rural landscape scenic quality is categorised as low to moderate at most.
	4. Accommodation of wind farms and ancillary development.	Wind farms are a type of a renewable energy facility. The Project is another type of renewable energy facility suitable in the Primary Production Zone. The Project is development that contributes to the desired character of the zone and is a form of development contemplated within the zone.
	5. Development that contributes to the desired character of the zone.	Wind farms and ancillary development are envisaged within the zone and constitute a component of the zone's desired character subject to implementation of management techniques set out by general/ council wide policy regarding renewable energy facilities. The Project is another type of renewable energy facility envisaged within the zone and constitute a component of the zone's desired character subject to implementation of management techniques set

Assessment Section		Project Response
		out by general/ council wide policy regarding renewable energy facilities.
Desired Character (P110)	**Function:** *Wind farms and ancillary development are envisaged within the zone and constitute a component of the zone's desired character.* *Subject to implementation of management techniques set out by general / council wide policy regarding renewable energy facilities, these visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy.*	The Project is a type of renewable energy facility envisaged within the zone and constitute a component of the zone's desired character subject to implementation of management techniques set out by general/ council wide policy regarding renewable energy facilities. The Project will contribute to the benefits derived from increased generation of renewable energy. The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure and the short distance for the grid connection to the Robertstown substation thereby minimising the expanse of overhead power lines.
	Pattern of Development: *Large allotments will be maintained to prevent the reduced viability of primary production and the amalgamation of allotments will increase to maintain commercially viable farm sizes.*	The Project area is approximately 1800ha. The Project leases the land from landowners at a commercial rate. The lease payments will ensure the commercially viability of the land during the life of the Project.
	Public Realm: *The scenic qualities of the public routes and views across the primary production area will remain attractive and generally unobstructed by inappropriate development, including excessive advertising signage. The nature and appearance of road reserves will vary across the primary production area depending on the role the road plays.* *Special tourist drives, particularly to conservation parks, will include vegetation corridors of biodiversity significance. Areas of conservation*	The Project does not include advertising signage and is not located along tourist routes identified in the Development Plan Location Map Go/1. The Project may provide the catalyst to create tourism opportunities for Robertstown.

Assessment Section		Project Response
	and biodiversity significance will be protected from inappropriate new development.	The Project's rural landscape includes utility scale electricity infrastructure visible from public roads i.e. Robertstown Substation and associated transmission lines. Sections of the Project together with existing utility scale electricity infrastructure will be viewed from Powerline Rd, Lower Bright Rd and Junction Rd, local roads with low local traffic volumes. A section of the Project together with existing utility scale electricity infrastructure i.e. transmission lines, will be viewed from Worlds End Highway identified as a Secondary Arterial Road on the Overlay Map Go/1 Transport that accounts for low volumes of local and regional traffic.
	Built Form: *Other structures will be of a form that blends with, and does not detract from, the scenic qualities and function of the primary production area.*	The Project co-locates with existing utility scale electricity infrastructure. The Project's Indicative design drawings attached as Appendix 3 to the Planning Report is designed and sited to minimise impacts and maximise the generation capability. The location of the buildings required during the Project's construction phase and operational phase of approximately 30 years is based on the function and role of the buildings for the Project and so as to not interfere with the performance of the panels. The buildings are similar in size to buildings typically found in a primary production area e.g. intensive animal keeping infrastructure, shearing sheds, machinery sheds and grain facilities such as silos. The buildings are located near Lower Bright Road and adjacent to the Robertstown Substation and associated transmission lines.

Assessment Section		Project Response
	Building Materials/Character: *New buildings appropriately sited, designed and screened by vegetation. New buildings will be constructed using materials and colours that blend with the rural landscape and are traditionally used within the rural environment including corrugated steel, stone and timber.*	The size of the buildings will be similar to buildings and structures typically found in a primary production area and will be constructed using materials and colours that blend with the rural landscape as much as possible. Depending on the final design existing vegetation may sufficiently screen the buildings. If required targeted landscaping for the buildings can be incorporated into the final design drawings.
	Key Design Elements: *When determining whether or not a development proposal is in accordance with the Desired Character, greater weight should be given to the following design elements:* • *Impact on the sustainability and viability of primary production uses;* • *Visual impact on the landscape character;* • *Impact on the freight network.*	The Project's Indicative layout in the preliminary design drawings attached as Appendix 3 to the Planning Report has been designed and sited to minimise impacts and not to impede the operation of the primary production uses in the area through encroachment, over development of the Project area, noise/emissions or any harmful or nuisance -creating impacts. The Project is not located in visually prominent locations such as ridgelines or visible from scenic routes and valuable scenic and environmental areas. The Project's rural landscape scenic quality is classified as low to moderate. The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure and the short distance required for the grid connection (minimising the expanse of overhead power lines). Only a section of the Project will be viewed from a small section of the Worlds End Highway identified as a Secondary Arterial Road on the Overlay Map Go/1 Transport. There is existing utility scale electricity infrastructure i.e. transmission lines in this part of the Project area

Assessment Section		Project Response
		visible from Worlds End Highway. The Project design will not adversely impact the freight network.
Principles of Development Control **(P112)**	**Land Use:** *1. The following forms of development are envisaged in the zone:* • *"wind farm and ancillary development"*	Wind farms are a type of a renewable energy facility. The Project is another type of renewable energy facility that is suitable in the Primary Production Zone. The Project is development envisaged in the zone.
	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.	The Project is not listed as a non-complying.
	4. *Wind farms and ancillary development should be located in areas which provide opportunity for harvesting of wind and efficient generation of electricity and may therefore be sited:* *(a) in visually prominent locations* *(b) closer to roads than envisaged by generic setback policy.*	The Project area has good energy generation potential and provides the opportunity for efficient generation of electricity. The Project area is not in a visually prominent location. The Project's final design may site some of the Project's components including buildings closer to Lower Bright Road and Powerline Road than envisaged by the generic setback policy to maximise the opportunity to harvest the sun for the generation of electricity.
	8. Buildings should primarily be limited to farm buildings, a detached dwelling associated with primary production on the allotment and residential outbuildings that are: *(a) grouped together on the allotment and set back from allotment boundaries to minimise the visual impact of buildings on the landscape as viewed from public roads* *(b) screened from public roads and adjacent land by existing vegetation or landscaped buffers.*	The Project does not include dwellings or residential outbuildings. The Project's indicative layout attached as Appendix 3 to the Planning Report shows the buildings required for a utility scale solar development. For example, one of the buildings is for the Project's administration and control functions for Project. The building will likely be a single storey structure with the overall height of approximately six metres. Car

Assessment Section		Project Response
		parking will be located within the vicinity of the administration building that will accommodate staff, visitors and contractor parking. The final selected battery energy storage system may be stored in open areas (like the Tesla design), shipping container style structures or large sheds, similar to intensive animal keeping sheds used in the Primary Production Zone. The buildings are grouped together and located adjacent to the Robertstown Substation and near existing transmission lines that aligns with the current infrastructure visual amenity when viewed from this part of Lower Bright Road. Depending on the final layout plan the buildings may be totally or partially screened from public roads by exiting vegetation. If required targeted landscaping for the buildings can be incorporated into the final design.
	Form and character: *10. Development should not be undertaken unless it is consistent with the desired character for the zone.* *11. Structures and buildings should generally be set back a minimum of 30 metres from all road boundaries*	The Project is a type of renewable energy facility envisaged within the zone and constitute a component of the zone's desired character. The Project's Indicative layout attached as Appendix 3 to the Planning Report shows the solar arrays may not be setback a minimum of 30m from all road boundaries. The Project has been designed and sited to maximise the energy generation. A set back of approximately 15m from the road boundaries will likely be maintained. The Project's buildings will be approximately 20m from the Lower Bright Road boundary. The location of the Project's buildings to the Lower Bright road boundary is consistent with the location of the Robertstown Substation in relation to Lower Bright Rd. Land Use Control 4 permits the Project to be closer

Assessment Section		Project Response
		to roads than envisaged by generic setback policy. The final Project layout that will be submitted to the relevant authority for approval prior to the commencement of construction will identify the setbacks.
	Land Division: *13. Land division involving boundary realignments should only occur where the number of resulting allotments of less than 100 hectares is not greater than the number that existed prior to the realignment.*	The Project doesn't trigger the Land Division requirements.
General Provisions		
Crime Prevention (P19)	**Objectives:** *1. A safe, secure, crime resistant environment where land uses are integrated and designed to facilitate community surveillance.* **Principles of Development Control:** *1. Development should be designed to maximise surveillance of public spaces through the incorporation of clear lines of sight, appropriate lighting and the use of visible permeable barriers wherever practicable*	A 1.8m – 2.4m (approximately) high wire fence will be installed around the Project area. A security gate will allow access to the Project area. Alarms and cameras are likely to be used to monitor the Project facilities 24 hours a day, 7 days a week. Low spill security lighting will be used in certain locations and approximately 4m will be provide between the perimeter fence and the solar panel blocks.
Design and Appearance (P20)	**Objectives:** *1. Development of a high architectural standard that responds to and reinforces positive aspects of the local environment and built form.*	The Project is defined as 'electricity infrastructure, in accordance with the definition provided in Section 4 of the Electricity Act 1996'. The Project is an electricity generating plant with powerlines, substation/s, equipment for metering, monitoring and controlling electricity and will include items required in the connection and supply of electricity.

Assessment Section		Project Response
	Principles of Development Control: 2. *The design of a building may be of a contemporary nature and exhibit an innovative style provided the overall form is sympathetic to the scale of development in the locality and with the context of its setting with regard to shape, size, materials and colour.* 5. *Where a building is sited on or close to a side boundary, the side boundary wall should be sited and limited in length and height to minimise:* *(a) the visual impact of the building as viewed from adjoining properties* *(b) overshadowing of adjoining properties and allow adequate natural light to neighbouring buildings.* 6. *Building form should not unreasonably restrict existing views available from neighbouring properties and public spaces.* 7. *Transportable buildings and buildings which are elevated on stumps, posts, piers, columns or the like, should have their suspended footings enclosed around the perimeter of the building with brickwork or timber, and the use of verandas, pergolas and other suitable architectural detailing to give the appearance of a permanent structure.* **Building Setbacks from Road Boundaries:** 18. *The setback of buildings from public roads should:*	The Design and Appearance Objective and Principles of Development Control are predominately for urban built form. The principle objective in designing a solar farm is to configure the design that best utilises the space to collect as much of the sun's energy as possible on any given day. This includes the number, size, and angle of the panels. The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure and the short distance required for the grid connection minimising the expanse of possible overhead power lines. The Project's buildings have been sited to minimise any potential visual impacts of the Project's buildings when viewed from an adjoining property. The Project's buildings will not overshadow adjoining properties. The Project's buildings will not unreasonably restrict existing views available from neighbouring properties and public spaces. Any transportable buildings and buildings which are elevated on stumps, posts, piers, columns or the like, will have their suspended footings enclosed around the perimeter of the building with brickwork or timber, and were practicable adopt the use of verandas, pergolas and other suitable architectural detailing to give the appearance of a permanent structure. Primary Production Zone Land Use control 4 permits the Project to be closer to roads than envisaged by generic setback policy.

Assessment Section		Project Response
	(a) be similar to, or compatible with, setbacks of buildings on adjoining land and other buildings in the locality.	
Hazards **(P27)**	**Objectives:** *1. Maintenance of the natural environment and systems by limiting development in areas susceptible to natural hazard risk.* *2. Development located away from areas that are vulnerable to and cannot be adequately and effectively protected from the risk of natural hazards.* *3. Development located to minimise the threat and impact of bushfires on life and property.* *4. Expansion of existing non-rural uses directed away from areas of high bushfire risk.* *6. 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.* *7. Protection of human health and the environment wherever site contamination has been identified or suspected to have occurred.* *9. Minimisation of harm to life, property and the environment through appropriate location of development and appropriate storage, containment and handling of hazardous materials.*	The Project is not in an area susceptible to significant natural hazard risk. A review of overlays from SA Map viewer indicate the only potential hazard is bushfire. The Project area's bushfire risk is mapped General. The Project's final design will apply appropriate standards and management strategies to manage hazards such as bushfire, the Project area's environmental values, potential harm to life, potential harm to property and potential harm to environment. The Project area is not listed on the South Australian Contamination index. Based on the historical and current agricultural activities no areas of significant contamination are expected to be encountered during the Project's construction or operation. Based on the proposed use of the Project area the historical and current agricultural activities do not pose a significant human or environmental health risk.
	Principles of Development Control – Flooding: *4. Development should not be undertaken in areas liable to inundation by tidal, drainage or flood waters unless the development can achieve all of the following….*	A review of overlays in the Development Control Plan and from SA Map viewer indicate the Project area is not subject to inundation. There are a number of ephemeral natural watercourses/drainage lines in the Project area that contain water from time to time. The Project's final design will consider the ephemeral watercourses/drainage lines.

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Assessment Section		Project Response
	5. Development, including earthworks associated with the development, should not do any of the following: *(a) impede the flow of floodwaters through the land or other surrounding land* *(b) occur on land where the risk of flooding is unacceptable having regard to personal and public safety and to property damage* *(c) increase the potential hazard risk to public safety of persons during a flood event* *(d) aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood* *(e) cause any adverse effect on the floodway function* *(f) increase the risk of flooding of other land* *(g) obstruct a watercourse.*	The Project including required earthworks will not impede the flow of floodwaters through the land or other surrounding land, is not on land where the risk of flooding is unacceptable having regard to personal and public safety and to property damage, will not increase the potential hazard risk to public safety of persons during a flood event, will not aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood, will not cause any adverse effect on the floodway function, will not increase the risk of flooding of other land and will not obstruct a pertinent watercourse.
	Principles of Development Control – Bushfire: *6. Buildings and structures should be located away from areas that pose an unacceptable bushfire riskas a result of one or more of the following:* *(a) vegetation cover comprising trees and/or shrubs* *(b) poor access* *(c) rugged terrain* *(d) inability to provide an adequate building protection zone*	The Project area's bushfire risk is mapped General. The majority of the Project area is cleared land with woody vegetation in the other areas. The Project area's dominant landform is an undulating stony plain which has been extensively cleared for agriculture. Some of the Project area is more heavily disturbed with little vegetation because of yearly cropping and the associated use of herbicides. There will be areas of vegetation within the development area. The risk of initiating fire from commercial solar panels and inverters is very low due to their high quality. The Project area does pose a risk of fire due to ground cover.

Assessment Section		Project Response
	(e) inability to provide an adequate supply of water for fire-fighting purposes. *11. 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.*	The Project will employ fire response measures to mitigate the risk and prevalence of bushfires including internal and perimeter roads designed to facilitate safe and effective operational use for fire-fighting.
	Principles of Development Control – Salinity: *13. Development should not increase the potential for, or result in an increase in, soil and water salinity.*	The SARIG 2018 Salinity non-watertable (soil salinity) mapping layer identifies the Project area as having low to moderately low salinity. The SARIG 2018 Salinity watertable induced (soil salinity) mapping layer identifies the Project area as having negligible salinity. The SARIG 2018 groundwater mapping layer indicates the Shallow Standing Water Level at 20m below Ground Level (BGL). The Shallow Standing Water Level represents the depth to standing water of the shallowest aquifer only. Other aquifers may well give rise to standing water at significantly different depths. The Project will involve short-term construction, followed by possibly decades of the land being inactive during operations. The limited or no cropping and consequently limited use of farm machinery on the Project area will be beneficial for the soils. While constructing the Project will require removal of some vegetation and the Project's operations will require water to clean the panels from time to time these activities will not lead to an increase in the Project area's typical groundwater levels and/or the leaching of salts, consequently the Project will not contribute to an increase in salinity levels.

Assessment Section		Project Response
	Principles of Development Control - Acid Sulfate Soils: *16. Development and activities, including excavation and filling of land, that may lead to the disturbance of potential or actual acid sulfate soils should be avoided unless such disturbances are managed in a way that effectively avoids the potential for harm or damage to:* *(c) agricultural or land-based aquaculture activities* *(e) public health*	The Australian Soil Resource Information System (ASRIS 2014) notes the probability of Acid Sulfate soils in the area is extremely low.
	Principles of Development Control - Site Contamination: *18. Development, including land division, should not occur on contaminated land or on potentially contaminated land unless either of the following applies:* *(a) remediation of the site is undertaken to a standard that makes it suitable and safe for the proposed use* *(b) 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.*	The Project area is not listed on the South Australian Contamination index. Preliminary geotechnical investigations in May 2018 of some of the Project area found *"The site and subsurface conditions was visually assessed for contamination during the site investigations. No fill materials were encountered during the site investigation and there was no indication of contaminated soils".* Based on the historical and current agricultural activities no areas of significant contamination are expected to be encountered during the construction or operation of the Project. Based on the proposed use of the Project area the historical and current agricultural activities do not pose a significant human or environmental health risk.
	Principles of Development Control - Containment of Chemical and Hazardous Materials:	Fuels and chemicals are required during the construction and operation phases for light vehicles, plant and equipment.

Assessment Section		Project Response
	19. 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.	During the construction and operation phases a storage and handling of chemical and hazardous materials management plan for each phase will be developed detailing the control measures to be implemented.
	Principles of Development Control – Landslip: *21. Development, including associated cut and fill activities, should not lead to an increased danger from land surface instability or to the potential of landslip occurring on the site or on surrounding land.*	The Project area is not susceptible to land slip. The Project's earthworks will not lead to an increased danger from land surface instability or to the potential of landslip occurring on the Project area or on surrounding land.
Heritage Conservation **(P31)**	**Objectives:** *1. The conservation of areas, places and their settings of indigenous and non-indigenous cultural significance.* **Principles of Development Control:** *1. Development should conserve and not adversely impact on the cultural or natural significance of places, areas, artefacts and shipwreck that display any of the following values:* *(a) aesthetic* *(b) anthropological* *(c) archaeological* *(d) architectural* *(e) ecological* *(f) economic*	An archaeological assessment of the Project was completed to determine the presence of Aboriginal and/or European heritage value within the Project area. The desktop heritage assessment is attached as Appendix 9. Preliminary field investigations in May 2018 entailed systematic inspection of high-risk areas using pedestrian survey approach. Survey visibility was high as the majority of the Project area was heavily disturbed by cropping and animal grazing. **Aboriginal** As part of the assessment, a search of the National Native Title register was completed. The Search returned one Native Tile claim applicable to the Project area: Ngadjuri Nation #2 (SC2001/002). The contact for this claim is the Ngadjuri Nation Aboriginal Corporation. A search of the Department of Premier and Cabinet Aboriginal Affairs and Reconciliation, Register of Aboriginal Sites and Objects and the SA Museum Database was completed. The searches returned that no registered or reported sites are located within the current Project area.

Assessment Section		Project Response
	(g) educational *(h) geological* *(i) historic* *(j) palaeontologic* *(k) scientific* *(l) social* *(m) speleological* *(n) spiritual* *(o) technological.*	However, they indicated it is likely that unrecorded Aboriginal sites are located within the undisturbed sections of the Project area. During the preliminary field investigations survey one Aboriginal site, three isolated artefacts and one culturally sensitive landscape were located. **European** The *Heritage Places Act 1993* makes provision for the identification, recording and conservation of places and objects of non-Aboriginal heritage significance in South Australia. Once registered, State Heritage Places are protected under the *Heritage Places Act 1993* and the *Development Act 1993*. It is an offence to damage, destroy, excavate or disturb locally and State significant heritage places without consent. There are no State Heritage Places or Local Heritage Places registered in the Project area. During preliminary field investigations four European sites (G80401R-01, G80401R-02, G80401R-04, G80401R-05) were located. The sites were considered to be significant at a local level. Discussions have commenced with the Ngadjuri Nation Aboriginal Corporation regarding the presence of Aboriginal archaeological value within the Project area. The preliminary cultural heritage survey works plus further discussion and cultural heritage work with the Ngadjuri Nation Aboriginal Corporation will inform preparation of the final Project layout plans.

Assessment Section		Project Response
		All heritage sites currently identified have been excluded in the preliminary design.
Heritage Places (P32)	**Objectives:** *1. The conservation of State and local heritage places.* *2. The continued use, or adaptive re-use of State and local heritage places that supports the conservation of their cultural significance.* *3. Conservation of the setting of State and local heritage places.*	A search of the Department of Premier and Cabinet Aboriginal Affairs and Reconciliation, Register of Aboriginal Sites and Objects and the SA Museum Database was completed. The searches returned that no registered or reported sites are located within the current Project area. However, they indicated it is likely that unrecorded Aboriginal sites are located within the undisturbed sections of the Project area. Preliminary field investigations survey work in May 2018 of some of the Project area identified one Aboriginal site, three isolated artefacts (Complete Flake, Silcrete), one culturally sensitive landscape and four European sites of local significance which will inform the Project's final layout plans.
	Principles of Development Control: *1. A State heritage place spatially located on Overlay Maps Go/1, Go/2, Go/6, Go/7 and Go/11 – Heritage and more specifically identified in Table Go/2 – State Heritage Places, should not be demolished, destroyed or removed, in total or in part, unless …….”* *2. Development located within the Burra State Heritage Area indicated on Overlay Maps Go/6 and Go/7 – Heritage should be consistent with the Design Guidelines for the Burra State Heritage Area set out in Table Go/1 - Design Guidelines for the Burra State Heritage Area.*	The Project area is not shown on Development Plan's heritage overlay maps including the Burra Heritage Area overlay map.

Assessment Section		Project Response
	3. Development of a State heritage place should retain those elements contributing to its heritage value, which may include (but not be limited to)……….	
Infrastructure **(P38)**	**Objectives:** *1. Infrastructure provided in an economical and environmentally sensitive manner.* *4. The visual impact of infrastructure facilities minimised.* *5. The efficient and cost-effective use of existing infrastructure.*	The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure i.e. Robertstown Substation and associated transmission lines and the short distance required for the grid connection, minimising the expanse of connection resulting in efficient and cost-effective use of existing infrastructure. The Project is a type of renewable energy facility the Development Plan contemplates the presence of in the Council area and in the Primary Production Zone. The Development Plan acknowledges it is difficult to mitigate visual impacts of large-scale renewable energy facilities. The Project has been designed to minimise the visual impact of the infrastructure while maximising the generation of renewable energy from this Project. The Project is not located in an area of known visual or scenic significance. The Project's rural landscape scenic quality is categorised as low.
	Principles of Development Control: *1. Development should not occur without the provision of adequate utilities and services including:* *(a) electricity supply* *(b) water supply*	The Project's design will incorporate the provision of adequate utilities and services. The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure i.e. Robertstown substation and associated transmission lines and the short distance

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	(c) drainage and stormwater systems *(d) waste disposal* *(e) effluent disposal systems* *(f) formed all-weather public roads* *(g) telecommunications services* *(h) social infrastructure, community services and facilities* *(i) gas services.* 8. *Electricity infrastructure should be sited and designed to minimise its visual and environmental impacts* 10. *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.*	required for the grid connection, minimising the expanse of connection. The Project is a type of renewable energy facility the Development Plan contemplates the presence of in the Council area and in the Primary Production Zone. The Development Plan acknowledges it is difficult to mitigate visual and environmental impacts of large-scale renewable energy facilities. The Project has been designed to minimise the visual and environmental impacts of the infrastructure while maximising the generation of renewable energy from this Project. A key criterion for selecting the Project area is the land is currently used for agricultural land uses, including cropping, that reduces and minimises the amount of native vegetation that may need to be cleared or disturbed for the Project. The Project has been designed to minimise the interference or disturbance to existing native vegetation and biodiversity. The Development Plan recognises that a large renewable energy facility cannot be constructed in the Primary Production Zone without some disturbance to wildlife and vegetation.
Interface between land uses (P40)	**Objectives:** 1. *Development located and designed to prevent adverse impact and conflict between land uses.* 2. *Protect community health and amenity and support the operation of all desired land uses.*	The key neighbouring land uses are agricultural land uses, utility scale electricity infrastructure comprising a substation and powerlines and roads. The Project's design and co-location with existing utility scale electricity infrastructure i.e. Robertstown Substation and associated transmission lines prevents adverse impact and conflict between land uses, prevents

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		adverse impact to community health and amenity and will not unreasonable impede all desired land uses in this area. The Project is a type of renewable energy facility the Development Plan contemplates the presence of in the Council area and in the Primary Production Zone.
	Principles of Development Control: *1. Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:* *(a) the emission of effluent, odour, smoke, fumes, dust or other airborne pollutants* *(b) noise* *(c) vibration* *(d) electrical interference* *(e) light spill* *(f) glare* *(g) hours of operation* *(h) traffic impacts.* *2. Development should be designed and sited to minimise negative impact on existing and potential future land uses considered appropriate in the locality.*	The Project is a type of renewable energy facility the Development Plan contemplates the presence of in the Council area and in the Primary Production Zone. The Development Plan acknowledges it is difficult to mitigate visual and environmental impacts of large-scale renewable energy facilities. The Project has been designed to minimise the visual and environmental impacts of the infrastructure while maximising the generation of renewable energy from this Project. The Planning Report concludes the Project will not detrimentally affect the amenity of the locality or cause unreasonable interference through the environmental issues listed in Development Control 1. The Project has been designed and sited to minimise negative impact on existing and potential future land uses considered appropriate in the locality. The Development Plan acknowledges it is difficult to mitigate the potential negative impacts of large-scale renewable energy facilities. The Project will develop an environmental framework through implementing a Construction Environmental Management Plan (CEMP) for the construction phase and Operational Environmental Management Plan (OEMP) for the operation phase which will be finalised prior to the commencement of construction and operation.

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		The environmental framework establishes objectives and targets to manage the environmental aspects of the Project. The Project's CEMP and OEMP will address compliance with regulatory requirements, environmental protection policies and relevant guidelines and codes of practice. The specific regulatory requirements for each environmental aspect will be identified in the CEMP and / or OEMP and incorporated, where appropriate, in the performance indicators utilised for monitoring environmental compliance. Both the CEMP and OEMP will be implemented throughout the relevant phase of the Project, to ensure that potential environmental impacts are minimised.
	Principles of Development Control – Noise: *6. Development should be designed, constructed and sited to minimise negative impacts of noise and to avoid unreasonable interference.* *7. Development should be consistent with the relevant provisions each of the following documents:* *(a) AS 2107 Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors* *(b) AS 3671 Acoustics - Road Traffic Noise Intrusion, Building Siting and Construction* *(c) the current Environment Protection (Noise) Policy*	The Project will be designed and sited to minimise negative impacts of noise and to avoid unreasonable interference. The Project will be constructed and operated to be consistent with: (a) AS 2107 Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors (b) AS 3671 Acoustics - Road Traffic Noise Intrusion, Building Siting and Construction (c) the current Environment Protection (Noise) Policy The Project's CEMP and OEMP will address compliance with regulatory noise requirements.
	Principles of Development Control – Rural Interface:	The Project does not include urban development such as residential development.

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	10. Existing primary production uses and mineral extraction should not be prejudiced by the inappropriate encroachment of sensitive uses such as urban development.	
Land Division **(P42)**	**Objectives:** *2. Land division that creates allotments appropriate for the intended use.* *4. Land division restricted in rural areas to ensure the efficient use of rural land for primary production and avoidance of uneconomic infrastructure provision.*	The Project will not trigger the land division provisions.
Landscaping, Fences and Walls **(P46)**	**Objectives:** *1. The amenity of land and development enhanced with appropriate planting and other landscaping works, using locally indigenous plant species where possible.* *2. Functional fences and walls that enhance the attractiveness of development.*	Given the scale and extent of the proposed development and the low level of visual impact, providing landscaping which is adequate to screen the entire Project area is not considered practical. If required targeted landscaping may be established to support erosion control and for visual amenity adjacent to car parking areas and control room/site office, battery energy storage areas and the Project's substation. Security fencing will be installed around the perimeter of the solar plant. Signage will be clearly displayed identifying hazards present within the solar plant.
	Principles of Development Control: 1. Development should incorporate open space and landscaping in order to ……..	Given the scale and extent of the proposed development and the low level of visual impact, providing landscaping which is adequate to screen the entire Project area is not considered practical. Targeted landscaping may be established to support erosion control and for

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		visual amenity adjacent to car parking areas and control room/site office, battery energy storage areas and the Project's substation.
Mineral Extraction **(P48)**	**Objectives:** 1. Protection of mineral deposits against intrusion by inappropriate forms of development.	The SARIG 2018 Mineral tenements production layer does not indicate current mining activities within the Project area of 1800ha. The SARIG 2018 Mineral tenements production layer does show the 1800ha Project area is within an exploration licence area i.e: Tenement Label: EL 6201 Licencees: Ausmex Mining Pty Ltd (100%) Operators: Ausmex Mining Pty Ltd Commodities sought: Cobalt, Gold, Copper Tenement start date: 20/07/2018 Tenement Expiry date: 19/07/2020 Area: 818 square kilometres (81,800ha)
	Principles of Development Control: *1. Known reserves of economically-viable mineral deposits should be kept free of development that may inhibit their future exploitation.* *2. Development in proximity to mining operations should not be allowed where it may be exposed to adverse impacts resulting from mining activities.*	The Project is not on land with known reserves of economically-viable mineral deposits and the Project is not in close proximity to existing mining operations. The Project is within the exploration licence area described above.
	Objectives:	The Project is a type of renewable energy facility the Development Plan contemplates the presence of in the Council area and in the Primary

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Natural Resources (P50)	*1. Retention, protection and restoration of the natural resources and environment.* *2. Protection of the quality and quantity of South Australia's surface waters, including inland and underground waters.* *3. The ecologically sustainable use of natural resources including soil and water resources (including underground water, surface water and watercourses as defined in the current Environment Protection (Water Quality) Policy).* *5. Development consistent with the principles of water sensitive design.* *6. Development sited and designed to:……..* *8. Native flora, fauna and ecosystems protected, retained, conserved and restored.* *10. Minimal disturbance and modification of the natural landform.* *12. Protection of areas prone to erosion or other land degradation processes from inappropriate development.*	Production Zone. The Development Plan acknowledges it is difficult to mitigate environmental impacts of large-scale renewable energy facilities. The Project has been designed to minimise environmental impacts of the infrastructure while maximising the generation of renewable energy from this Project. An objective of the Project is to apply appropriate standards and management strategies to minimise impacts to the areas natural resources and environment while maximising the generation capability of the Project. The Project's final design aims to retain, protect and restore the natural resources and environment where possible including protecting the natural resources via the adoption of a CEMP and OEMP that will address compliance with regulatory requirements, environmental protection policies and relevant guidelines and codes of practice. The specific regulatory requirements for each environmental aspect will be identified in the CEMP and OEMP and incorporated, where appropriate, in the performance indicators utilised for monitoring environmental compliance.
	Principles of Development Control – Water Sensitive Design: *5. Development should be designed to maximise conservation, minimise consumption and encourage re-use of water resources.* *6. Development should not take place if it results in unsustainable use of surface or underground water resources.*	Australia is one of the world's top 20 water-stressed nations. A report by the World Resources Industry notes the following key points: • It identified Australia as one country vulnerable to water stress where the potential for cheap renewable energy, solar and wind as opposed to fossil fuels, could reduce water

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	7. Development should be sited and designed to:…….. *8. Water discharged from a development site should: ….* *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.* *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.* *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* *13. Development should include stormwater management systems to minimise the discharge of sediment, suspended solids, organic matter, nutrients, bacteria, litter and other contaminants to the stormwater system.* *16. Stormwater management systems should preserve natural drainage systems, including the associated environmental flows.* *17. Stormwater management systems should:……*	consumption country-wide as these technologies use minimal water. • Every megawatt hour of electricity generated by coal withdraws around 60,700 litres and consumes about 2600 litres of water. • In the 2017-2018 financial year, Australian's have consumed 147 terrawatt hours of electricity, about 73 per cent of which comes from coal, which equates to around 455 billion litres of water. The Project will contribute to reducing the amount of water required to generate electricity. Most of the Project area will be covered by solar array and spacing between the arrays. The areas underneath and surrounding the solar modules will not be impervious and therefore most of the Project area will be retained substantially in the current condition. Consequently, the runoff from most of the Project area, is likely to remain at the same post development levels and allow infiltration of rainfall. During the construction and operation phases a small area of the Project area will be occupied by administration buildings, laydown and compound area, inverters stations, battery area and switchyard/substation area that may increase runoff from this small area compared with current levels. The Project will include a minor wastewater treatment system. Discharge of treated sewage from the ablution block has the potential to decrease groundwater quality (e.g. through increased biological oxygen demands) if the sewage is not adequately treated or if the lining

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		has not been appropriately designed the evapotranspiration bed could seep into the surrounding area. During the construction phase and operational phase, fuels oils and herbicides will be stored in the on-site compound area. Contaminants (e.g. hydrocarbons) from spills and leaks may potentially enter groundwater or drainage lines and impact on the environmental value of the receiving environment. The Project's CEMP and OEMP will include specific management measures or plans for a number of aspects including erosion and stormwater management, waste management, storage and handling of hazardous substances. The management strategies are designed in part to address the relevant principles of development controls for water sensitive design. The SARIG 2018 Salinity non-watertable (soil salinity) mapping layer identifies the Project area as having low to moderately low salinity. The SARIG 2018 Salinity watertable induced (soil salinity) mapping layer identifies the Project area as having negligible salinity. While constructing the Project will require removal of some vegetation and the Project's operations will require water to clean the panels from time to time these activities will not lead to an increase in the Project area's typical groundwater levels and/or the leaching of salts, consequently the Project will not contribute to an increase in salinity levels. The Project area is not mapped as subject to inundation and is not located in the Murray Floodplain or within the River Murray protected

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		area or within a local Catchment area. Figure 2-3 shows there are ephemeral watercourses and drainage lines on the Project area. The ephemeral watercourses and drainage lines do not hold permanent water and only run during high rainfall. The Project's final design will consider the Project area's watercourses and drainage lines.
	Principles of Development Control - Water Catchment Areas: *20. Development should ensure watercourses and their beds, banks, wetlands and floodplains are not damaged or modified and are retained in their natural state, except where modification is required for essential access or maintenance purposes.* *28. Development should comply with the current Environment Protection (Water Quality) Policy.* *29. Development within the Water Management Area designated on Concept Plan Map Go/2 - Development Constraints - Water Management Areas should not adversely affect the quality or quantity of the water resource.*	The Project area is within the Murray Darling Basin Water Management Area designated on the Concept Plan Map Go/2 – Development Constraints – Water Management Areas. The Project area is not located in the Murray Floodplain or within the River Murray protected area. The Project will not adversely affect the quality or quantity of the Murray Darling Basin.
	Principles of Development Control – Biodiversity and Native Vegetation: *30. Development should retain existing areas of native vegetation and where possible contribute to revegetation using locally indigenous plant species.* *32. Native vegetation should be conserved and its conservation value and function not compromised by development if the native vegetation does any of the following:………*	A key criterion for selecting the Project area is the land is currently used for agricultural land uses, including cropping, that reduces and minimises the amount of native vegetation that may need to be cleared or disturbed for the Project. The Project has been designed to minimise the interference or disturbance to existing native vegetation and biodiversity. The Development Plan recognises that a large renewable energy facility cannot be constructed in the Primary Production Zone without some disturbance to wildlife and vegetation.

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	33. Native vegetation should not be cleared if such clearing is likely to lead to, cause or exacerbate any of the following:…. *34. Development that proposes the clearance of native vegetation should address or consider the implications that removing the native vegetation will have on the following:…* *35. 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.*	An objective of the Project is to minimise impacts to the areas Biodiversity and native vegetation while maximising the generation capability of the Project. An assessment of ecological values on the Project area was undertaken to determine the presence of species of conservation significance (i.e. species protected under Commonwealth or State legislation) and to identify any potential impacts on biodiversity. The desktop ecological assessment is attached as Appendix 8 and preliminary field flora assessment in May 2018 of part of the Project area determined the dominant landform in the Project area is "*undulating stony plain which has been extensively cleared for agriculture*" (EBS, 2018). As such, the likelihood of suitable habitat for threatened flora species being present is assessed as very low. The preliminary field flora assessment in May 2018 of part of the Project area was performed in accordance with the Scattered Tree Assessment Method and Bushland Assessment Method derived by the Native Vegetation Council. The field fauna assessment included recording of opportunistic fauna sightings, signs of fauna (e.g. scats and burrows) and fauna habitat. Targeted searches were conducted for the following species: • Southern Hairy-nosed Wombat (*Lasiorhinus latifrons*); • Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*); and. • Flinders Ranges Worm-Lizard (*Aprasia pseudopulchella*). Based on preliminary design drawings a number of scattered native trees and clumps of trees are identified to be removed to assist with

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		the construction and the Project's effective operation. The majority of scattered trees were considered high value due to their size, the presence of hollows and proximity to other native vegetation. The ecological assessment noted that none of the scattered trees were considered to provide suitable habitat for any threatened fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999 and National Parks and Wildlife Act 1972*. Further, no species listed under *Environment Protection and Biodiversity Conservation Act 1999* and *National Parks and Wildlife Act 1972* were observed during the surveys. The removal of a number of scattered native trees or small clumps of trees will not lead to, cause or exacerbate, erosion or sediment within water catchments, decreased soil stability, soil or land slip, deterioration in the quality of water in a watercourse or surface water runoff, a local or regional salinity problem or the occurrence or intensity of local or regional flooding. The removal of native vegetation will require approval from the Native Vegetation Council.
	Principles of Development Control – Soil Conservation: *40. Development should not have an adverse impact on the natural, physical, chemical or biological quality and characteristics of soil resources.* *41. Development should be designed and sited to prevent erosion.*	The Project will involve short-term construction, followed by possibly decades of the land being inactive. The limited or no cropping and consequently limited use of farm machinery on the Project area will be beneficial for the soils.

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	42. Development should take place in a manner that will minimise alteration to the existing landform. *43. 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.*	As previously discussed, erosion and sediment control measures will be implemented during the construction and operation phases to prevent erosion and loss of soil from the Project area.
Orderly and Sustainable Development **(P60)**	**Objectives:** *1. Orderly and economical development that creates a safe, convenient and pleasant environment in which to live.* *2. Development occurring in an orderly sequence and in a compact form to enable the efficient provision of public services and facilities.* *3. Development that does not jeopardise the continuance of adjoining authorised land uses.* *4. Development that does not prejudice the achievement of the provisions of the Development Plan.*	The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure and the short distance required for the grid connection. The Project aligns with the Development Plan's Renewable Energy Facilities objective. The Project supports the existing electricity infrastructure and will not impede the operation of the established agricultural land uses in the area through any nuisance or harmful creating impact.
	Principles of Development Control: *1. Development should not prejudice the development of a zone for its intended purpose.* *2. Land outside of townships and settlements should primarily be used for primary production and conservation purposes.*	The Robertstown Solar Project (Project) is located within the Primary Production Zone as shown in Zone Map Go/1. The Project is a type of renewable energy facility envisaged within the zone and constitute a component of the zone's desired character subject to implementation of management techniques set out by general / council wide policy regarding renewable energy facilities. The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure and the short

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	6. Development should be located and staged to achieve the economical provision of public services and infrastructure, and to maximise the use of existing services and infrastructure. *7. Where development is expected to impact upon the existing infrastructure network (including the transport network), development should demonstrate how the undue effect will be addressed.*	distance required for the grid connection (minimising the expanse of overhead power lines). The Project's construction traffic will impact the existing local transport network. A Traffic Management Plan will be developed with the DPTI, Safety and Services (Traffic Operations) and Regional Council of Goyder to minimise the impact during the construction phase.
Renewable Energy Facilities (P64)	**Objectives:** *1. Development of renewable energy facilities that benefit the environment, the community and the state.* *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.* *3. Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.*	The Project will complement and increase the generation of renewable energy within South Australia and the broader National Electricity Market, reduce greenhouse gases and decrease the use of water in the production of electricity. The Project area is an appropriate location because of the co-location with existing utility scale electricity infrastructure and the short distance required for the grid connection (minimising the expanse of overhead power lines). An objective of the Project is to minimise impacts on the natural environment and other land uses in the area while maximising the generation capability of the Project.
	Principles of Development Control: *1. Renewable energy facilities, including wind farms and ancillary development, should be:* *(a) located in areas that maximise efficient generation and supply of electricity; and*	The identification of the Project area is the result of an extensive solar site identification assessment of possible locations across Australia. The following factors/criteria were used to select the Project area: • Proximity to the Robertstown substation; • Access to the Robertstown substation and capacity of the substation to accept new generation;

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	(b) 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.	• Agreements with landowners to host the Project; • Marginal loss factors and future forecasts; • Details on interstate connectors and relevant known transmission constraints; • Consideration of known projects proximate to the Project's area and potential for impact on capacity and connection; • Irradiation levels; • Environmental analysis of topography and environmental constraints; • Topography of the Project area providing suitable conditions for the construction and operation of a solar farm; • Site visits and initial field investigations; • Located close to the towns of Robertstown & Burra, but equally sufficient distance between the Project area and populated areas; • Suitable infrastructure surrounding the Project area e.g. road access for construction and operation of a solar Farm; and • Most of the Project area is disturbed through continuous agricultural land uses reducing the likelihood that the Project's development footprint will contain significant areas of native vegetation, Aboriginal cultural heritage items, or other environmental constraints.

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		The Project area is not near water or air transport operations or Port operations, airfields or designated landing strips.
	Principles of Development Control - Wind Farms and Ancillary Development: 2. *The visual impacts of wind farms and ancillary development (such as substations, maintenance sheds, access roads and wind monitoring masts) should be managed through:* *(a) wind turbine generators being:* *(i) setback at least 1000 metres from non-associated (nonstakeholder) dwellings and tourist accommodation* *(ii) setback at least 2000 metres from defined and zoned township, settlement or urban areas (including deferred urban areas)* *(iii) regularly spaced* *(iv) uniform in colour, size and shape and blade rotation direction* *(v) mounted on tubular towers (as opposed to lattice towers)* *(b) provision of vegetated buffers around substations, maintenance sheds and other ancillary structures.* 3. *Wind farms and ancillary development should avoid or minimise the following impacts on nearby property owners / occupiers, road users and wildlife:*	The Project is appropriately setback from non-associated (non-stakeholder) dwellings and tourist accommodation and areas defined and zoned township, settlement or urban areas (including deferred urban areas) Most of the Project area will be covered by solar panels mounted on single axis tracking modules and spacing. Depending on the type of single axis tracking modules the height of the bottom of the solar modules could be approximately 1.2m above ground level while the height of modules could be approximately 4m above ground level. The panels will be installed in parallel rows with the spacing being between approximately 4m to 10m depending on the type of single axis tracking module selected. The solar panels and single axis tracking modules will be uniform in colour, size, and shape. The solar arrays will be aligned north/south and track east/west. Viewing the solar arrays from Lower Bright Road and Powerline Road will be similar in geometric layout as to viewing rows of grape vines aligned north/south on the Project area. The buildings required for operations will be similar in size to buildings and structures typically found in a primary production area and will be constructed using materials and colours that blend with the rural landscape as much as possible. The buildings are grouped together and located adjacent to the Robertstown Substation and near existing transmission lines that aligns

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	(a) shadowing, flickering, reflection or glint *(b) excessive noise* *(c) interference with television and radio signals and geographic positioning systems* *(d) interference with low altitude aircraft movements associated with agriculture* *(e) modification of vegetation, soils and habitats striking of birds and bats.* 4. *Wind turbine generators should be setback from dwellings, tourist accommodation and frequently visited public places (such as viewing platforms) a distance that will ensure that failure does not present an unacceptable risk to safety.*	with the current infrastructure visual amenity when viewed from this part of Lower Bright Road. Depending on the final design existing vegetation may sufficiently screen the buildings. If required targeted landscaping for the buildings can be incorporated into the final design drawings. The Project's solar panels can potentially cause a glint and/or glare impact beyond the Project area. A Glint and Glare 2018 Assessment is attached as Appendix 12. The key findings are: • The assessment identified six potential residences where the residents of the houses may experience low-level glare when looking towards the PVS solar panels. Based on observations, existing obstacles (including existing vegetation, topography, and structures) between these six houses and the PVS panel arrays ameliorate low-level glare identified in the Glint and Glare report. • The assessment concluded Worlds End Highway does not experience glare issues. Sections of Lower Bright Rd, Powerline Rd and Junction Rd experience some Green Glare or low-level glare for a small duration (less than 10 minutes) during the early morning for a few months a year. Based on the roads experiencing very limited local traffic and observations of existing obstacles (including existing vegetation, topography and structures between the relevant sections of roads and the PVS panel arrays) the low-level glare identified in the Glint and Glare report are considered negligible.

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		The Project's construction phase will generate noise emissions. Noise emissions occur during site preparation, the installation of the Project's infrastructure including the panel system and from the construction vehicles and machinery. Adopting standard environmental management controls, shutting down equipment when not in use and use of noise reduction devices will minimise the construction noise impacts at sensitive receivers which are expected to be negligible. Operating the Project will generate nominal noise emissions. Consequently, noise impacts to sensitive receivers are not anticipated during the Project's operation phase. The Project will not interfere with television and radio signals and geographic positioning systems or with low altitude aircraft movements associated with agriculture. The Project is not located near dwellings, tourist accommodation and frequently visited public places (such as viewing platforms) and is sited not to be an unacceptable risk to the public.
Short-term Workers Accommodation **(P72)**	**Objectives:** 1. *A range of appropriately located accommodation types supplied to meet the housing needs of seasonal and short-term workers.*	A temporary construction workers camp on a suitable part of the Project area will likely be the most efficient/effective way to manage the construction workforce during the construction phase.
	Principles of Development Control: 1. *Accommodation intended to be occupied on a temporary basis by persons engaged in employment relating to the production or processing of primary produce including minerals should be located*	A temporary construction workers camp on a suitable part of the Project area will likely be the most efficient/effective way to manage the construction workforce during the construction phase.

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	within existing townships or within primary production areas, where it directly supports and is ancillary to legitimate primary production activities or related industries. 2. *Buildings used for short-term workers accommodation should:* *(a) be designed and constructed to enhance their appearance* *(b) provide for the addition of a carport, verandas or pergolas as an integral part of the building* *(c) where located outside of townships, not jeopardise the continuation of primary production on adjoining land or elsewhere in the zone* *(d) be supplied with service infrastructure such as power, water, and effluent disposal sufficient to satisfy the living requirements of workers.* 3. *Short-term workers accommodation should not be adapted or used for permanent occupancy.* 4. *A common amenities building should be provided for temporary forms of short-term accommodation such as caravan and camping sites.*	The construction workers camp would be designed to accommodate up to an estimated 275 equivalent full-time workers during construction. Approximately 3ha – 5ha is required for the construction workers camp. An example of a typical construction workers camp layout is attached to the Planning Report as Appendix 4. Adequate arrangements will need to be made for the provision of essential services to the construction workers camp including, the supply of water, the supply of electricity, the disposal and management of sewage/waste water, stormwater drainage and general waste management. The final design, specification and layout of the temporary construction workers camp, including essential services, within the Project area will be submitted to the relevant authority for approval prior to the commencement of construction.
Siting and Visibility (P73)	**Objective:** 1. *Protection of scenically attractive areas, particularly natural, rural and coastal landscapes.*	The Project area is not an identified and listed scenically attractive area.

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	Principles of Development Control: *1. Development should be sited and designed to minimise its visual impact on:* *(a) the natural, rural or heritage character of the area* *(b) areas of high visual or scenic value, particularly rural areas* *(c) views from public reserves, tourist routes and walking trails.* *2. Buildings should be sited in unobtrusive locations and, in particular, should:* *(a) be grouped together* *(b) where possible be sited in such a way as to be screened by existing vegetation when viewed from public roads.*	The Project is a type of renewable energy facility the Development Plan contemplates the presence of in the Council area and in the Primary Production Zone. The Development Plan acknowledges it is difficult to mitigate visual impacts of large-scale renewable energy facilities. The Project has been designed to minimise the visual impacts of the infrastructure while maximising the generation of renewable energy from this Project. The Project is not located in an area of known visual or scenic significance. The Project's rural landscape scenic quality is categorised as low to moderate at most and it is not visible to a significant portion of the region's public. The buildings required for construction and operation phases are grouped together and located adjacent to the Robertstown Substation and near existing transmission lines that aligns with the current infrastructure visual amenity when viewed from this part of Lower Bright Road. The Project area's and surrounding topography will limit direct line of sight to the whole Project. Existing vegetation will provide partial screening when viewed from various sections of the public roads.
	3. Buildings outside of urban areas and in undulating landscapes should be sited in unobtrusive locations and in particular should be: *(a) sited below the ridgeline* *(b) sited within valleys or behind spurs*	The Project is located on undulating terrain with scattered vegetation which will assist with limiting and interrupting views of the whole Project from public roads.

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	(c) sited in such a way as to not be visible against the skyline when viewed from public roads *(d) set well back from public roads, particularly when the allotment is on the high side of the road.* *4. Buildings and structures should be designed to minimise their visual impact in the landscape…..*	The Project will be set back from public roads. The buildings required for operations are similar in size to buildings typically found in a primary production area e.g. intensive animal keeping infrastructure, shearing sheds, machinery sheds and grain facilities such as silos.
	5. The nature of external surface materials of buildings should not detract from the visual character and amenity of the landscape.	The buildings will be constructed using materials and colours that blend with the rural landscape as much as possible.
	6. The number of buildings and structures on land outside of urban areas should be limited to that necessary for the efficient management of the land.	Only the required number of structures to efficiently manage the solar farm will be located on the Project's land. No residential buildings are part of the development.
	7. Driveways and access tracks should be designed and constructed to blend sympathetically with the landscape and to minimise interference with natural vegetation and landforms, and be surfaced with dark materials.	Access tracks required for the Project will be designed and constructed to blend sympathetically with the landscape and to minimise interference with natural vegetation and landforms where possible.
	8. Development should be screened through the establishment of landscaping using locally indigenous plant species: *(a) around buildings and earthworks to provide a visual screen as well as shade in summer, and protection from prevailing winds* *(b) along allotment boundaries to provide permanent screening of buildings and structures when viewed from adjoining properties and public roads*	Given the scale and extent of the proposed development and the low level of visual impact, providing landscaping which is adequate to screen the entire Project area is not considered practical. Targeted landscaping may be established to support erosion control and for visual amenity adjacent to car parking areas and control room/site office, battery energy storage areas and the Project's substation.

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	(c) along the verges of new roads and access tracks to provide screening and minimise erosion.	
Sloping Land **(P75)**	**Objectives:** *1. Development on sloping land designed to minimise environmental and visual impacts and protect soil stability and water quality*	The Project's final layout will be designed to minimise environmental and visual impacts and protect soil stability and water quality.
	Principles of Development Control: *1. Development and associated driveways and access tracks should be sited and designed to integrate with the natural topography of the land and minimise the need for earthworks.* *7. The excavation and/or filling of land outside townships and urban areas should:* *(a) be kept to a minimum and be limited to a maximum depth or height no greater than 1.5 metres so as to preserve the natural form of the land and the native vegetation* *(b) only be undertaken in order to reduce the visual impact of buildings, including structures, or in order to construct water storage facilities for use on the allotment* *(c) only be undertaken if the resultant slope can be stabilised to prevent erosion* *(d) result in stable scree slopes which are covered with top soil and landscaped so as to preserve and enhance the natural character or assist in the re-establishment of the natural character of the area.*	The Project's indicative layout attached as Appendix 3 to the Planning Report is designed and sited to minimise impacts and maximise the generation capability. The Project is on undulating terrain which will influence the type of Solar array technology and the extent of earthworks. The civil design will be carried out based on the philosophy of the minimal amount of ground disturbance required for the selected solar array technology. The Project will implement a CEMP for the construction phase to manage potential adverse impacts. The CEMP will include specific management measures or plans a number of aspects including erosion and stormwater management.

Assessment Section		Project Response
Transportation and Access **(P83)**	**Objectives:** *2. Development that:* *(a) provides safe and efficient movement for all motorised and non-motorised transport modes* *(b) ensures access for vehicles including emergency services, public infrastructure maintenance and commercial vehicles* *(c) provides off street parking* *(d) is appropriately located so that it supports and makes best use of existing transport facilities and networks.* 5. *Safe and convenient freight movement throughout the State.*	The Projects' movement will be primarily motorised that will utilise the existing State and local transport facilities and networks to safely convey material and personnel to and from the Project area during the life of the Project.
	Principles of Development Control - Movement Systems: *2. Development should be integrated with existing transport networks, particularly major rail and road corridors as shown on Overlay Maps Go/1, Go/2, Go/3, Go/4, Go/6, Go/7, Go/8, Go/9, Go/10 and Go/11 - Transport, and designed to minimise its potential impact on the functional performance of the transport networks.* *6. Development generating high levels of traffic, such as schools, shopping centres and areas, entertainment and sporting facilities, should incorporate passenger pick-up and set down areas. The design of such areas should ensure interference to existing traffic is minimised and give priority to pedestrians, cyclists and public and community transport users.*	While the component delivery route will be finalised as part of the Traffic Management Plan preliminary analysis indicates the feasible trucking option is components are shipped to Flinders Port Adelaide and trucked direct to the Project area via National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81), Worlds End Highway, Powerline Road and Lower Bright Road. Anticipated traffic volumes will be highest during the Project's construction while operational traffic volumes are expected to be minimal. A Transport Impact Assessment (TIA) attached to the Planning Report as Appendix 10 assessed the potential impact of the Project's construction traffic movements on transport routes and other road users and assessed the potential impact of the Project's operational

Assessment Section		Project Response
	13. Development should make sufficient provision on site for the loading, unloading and turning of all traffic likely to be generated.	traffic movements on transport routes and other road users based on the Project being completely operational. The assessment reaches several conclusions including the traffic generated by the Project during the construction and operational phases is very low in comparison to existing traffic volumes on the State controlled roads and therefore is not expected to compromise the safety or function of the surrounding State road network and the traffic generated by the proposed Project area during the construction and operational phases is not expected to compromise the safety or function of the local roads that experience low volumes of traffic. A Traffic Management Plan will be developed with the DPTI, Safety and Services (Traffic Operations) and Regional Council of Goyder to minimise the impact. Section 7.12 of the Planning Report contains further detail on the Project's traffic and transport.
	Principles of Development Control – Access: *21. Development should have direct access from an all weather public road.* *22. Development should be provided with safe and convenient access which:……..* *24. The number of vehicle access points onto arterial roads shown on Overlay Maps Go/1, Go/2, Go/3, Go/4, Go/6, Go/7, Go/8, Go/9, Go/10 and Go/11 - Transport should be minimised,*	The Project will not require vehicle access points onto arterial roads shown on the Development Plan overlay maps. The Project area will be accessed from Lower Bright Road and Powerline Road. Both local roads are all weather graded public roads. Data is limited for Powerline Rd and Lower Bright Rd but it is reasonable to assume that they have relatively minor vehicle flows, except during harvest. During the construction phase access will likely be via existing access points and additional access points to allow for the efficient transport

Assessment Section		Project Response
	26. Development with access from arterial roads or roads as shown on Overlay Maps Go/1, Go/2, Go/3, Go/4, Go/6, Go/7, Go/8, Go/9, Go/10 and Go/11 - Transport should be sited to avoid the need for vehicles to reverse on to the road. *27. Driveways, access tracks and parking areas should be designed and constructed to:* *(a) follow the natural contours of the land* *(b) minimise excavation and/or fill* *(c) minimise the potential for erosion from run-off* *(d) avoid the removal of existing vegetation* *(e) be consistent with Australian Standard AS 2890 Parking facilities.*	of components onto and around the Project area. During the operation phase the use of certain access points will likely be reduced. The internal access roads will be sufficient to allow for safe on-site vehicle manoeuvring including large vehicle deliveries. Driveways, access tracks and parking areas will be designed and constructed to minimise excavation and/or fill, minimise the potential for erosion from run-off, minimise the removal of existing vegetation and be consistent with relevant standards where practicable. An indicative internal access road layout is provided at Appendix 3 to the Planning Report.
	Principles of Development Control - Vehicle Parking: 29. *Development should provide off-street vehicle parking and specifically marked disabled car parking places to meet anticipated demand.*	The Project will provide parking on-site in accordance with relevant standards.
Waste **(P87)**	**Objectives:** *1. 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.*	An objective of the Project is to avoid the production of waste, minimise the production of waste, reuse waste, recycle waste for reuse, treat waste and disposes of waste in an environmentally-sound manner when required. Waste management procedures will be implemented for the construction phase and operation phase with the intention of

Assessment Section		Project Response
	2. 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.	preventing undesired impacts on the environment including, soil, plant and animal biodiversity, human health and the amenity of the locality.
	Principals of Development Control: *1. Development should be sited and designed to prevent or minimise the generation of waste (including wastewater) by applying the following waste management hierarchy in the order of priority as shown below:* *(a) avoiding the production of waste* *(b) minimising waste production* *(c) reusing waste* *(d) recycling waste* *(e) recovering part of the waste for re-use* *(f) treating waste to reduce the potentially degrading impacts* *(g) disposing of waste in an environmentally sound manner.*	The Project is not expected to generate a significant amount of waste during the construction or operation phases. Construction waste management procedures will be implemented via a CEMP. Operational waste management procedures will be implemented via an OEMP. Any waste to be disposed of will be disposed in accordance with relevant standards.
	Principals of Development Control – Wastewater: *3. The disposal of wastewater to land should only occur where methods of wastewater reduction and reuse are unable to remove the need for its disposal, and where its application to the land is environmentally sustainable.* *4. Wastewater storage lagoons…*	During the construction phase and operation phase wastewater will likely be captured and removed from the Project area using a licensed wastewater contractor. A sewerage treatment plant will likely be designed and constructed to accommodate the estimated construction and operational staff and contractors. The exact method for dealing with wastewater will be determined during the Project's final design.

Assessment Section		Project Response
		Construction wastewater management procedures will be implemented via a CEMP. Operational wastewater management procedures will be implemented via an OEMP. The Project does not involve a wastewater storage lagoon.
	Principals of Development Control - Waste Treatment Systems: *12. Development that produces any effluent should be connected to an approved waste treatment system which may include sewage, community wastewater management systems, or on-site wastewater treatment and disposal methods.* *13. The methods for, and siting of, effluent and waste storage, treatment and disposal systems should minimise the potential for environmental harm and adverse impacts on:* *(a) the quality of surface and groundwater resources* *(b) public health* *(c) the amenity of a locality* *(d) sensitive land uses.* *14. Waste treatment should only occur where the capacity of the treatment facility is sufficient to accommodate likely maximum daily demands including a contingency for unexpected high flows and breakdowns.*	During the construction phase and operation phase wastewater will likely be captured and removed from the Project area using a licensed wastewater contractor. A sewerage treatment plant will likely be designed and constructed to accommodate the estimated construction and operational staff and contractors. The exact method for dealing with wastewater will be determined during the Project's final design. The wastewater treatment and disposal will be conducted in accordance with relevant standards. The exact method of for dealing with wastewater will be determined during the Project's final design. The methods for, and siting of, effluent and waste storage, treatment and disposal systems will minimise the potential for environmental harm and adverse impacts on the quality of surface and groundwater resources, public health, the amenity of a locality and sensitive land uses.

Assessment Section		Project Response
	15. Any domestic waste treatment system or effluent drainage field should be located within the allotment of the development that it will service. *16. A dedicated on-site effluent disposal area should not include any areas to be used for, or could be reasonably foreseen to be used for, private outdoor open space, driveways, car parking or outbuildings.*	

APPENDIX 6

Community and Stakeholder Engagement Report

November 18

ROBERTSTOWN SOLAR

COMMUNITY & STAKEHOLDER ENGAGEMENT REPORT

Prepared for Robertstown Solar

EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

QUALITY ASSURANCE AND DECLARATION

Quality Assurance and Version Control Table		
Project:	Robertstown Solar	
Client:	Robertstown Solar 1 Pty Ltd and Robertstown Solar 2 Pty Ltd	
Rev:	**Date:**	**Reference:**
V01	29.11.2018	Robertstown Community and Stakeholder Engagement Report
Checked by:	L. Bryson	
Approved by:	S. McCall/ J. Burns	
Declaration:	*The opinions and declarations in this document are ascribed to EPS Energy and are made in good faith and trust that such statements are neither false nor misleading.* *In preparing this document, EPS Energy has considered and relied upon information obtained from the public domain, supplemented by discussions between key EPS Energy staff, representatives from governing agencies and independents, including the client and specialist consultants.*	
Applicant:	EPS Energy PO Box 195 Charlestown NSW 2290 (02) 9258 1362	
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Reviewed By:	S. McCall	
Project Land:	CT 5565/131 CT 5431/657 CT 5431/659 CT 5465/354 CT 5464/828 CT 5941/840 CT 5561/287 CT 5561/89 CT 5951/34 CT 5550/784 CT 5689/928 CT 5689/927	A91 FP212965 Section 227 Section 232 Section 13 Section 42 Section 43 Section 229 Section 221 Section 44 & 45 A91 FP212508 A51 DP51338 A50 DP51338

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1. INTRODUCTION

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

This Community and Stakeholder Engagement Report has been prepared by EPS Energy on behalf of Robertstown Solar 1 Pty Ltd ACN: 621 450 940 the special purpose vehicle for the (PVS) and Robertstown Solar 2 Pty Ltd ACN: 621 451 161 the special purpose vehicle for the (BESS).

EPS Energy has previously prepared a Community & Stakeholder Engagement Plan including the proposed tools and activities to assist with the engagement process. The purpose of this report is to summarise the outcomes of the engagement that has taken place.

The objectives of this report are to:

- Summarise the outcomes of the engagement undertaken to date;
- Analyse the comments, views and concerns raised by the community and other stakeholders;
- Demonstrate how the engagement process has informed the proposed Project; and
- Outline the ongoing communication tools to be implemented for the life of the Project.

1.1. PROJECT SUMMARY

Robertstown Solar (the Project) is a proposed 500 MW (AC) utility scale solar photovoltaic and 1,000 MWh battery storage plant to integrate into the National Electricity Market through a 275kV connection to ElectraNet's Robertstown Substation in South Australia. The Project is to be developed on approximately 1,800 hectares of cleared land in the districts of Bright and Geranium Plains located approximately five (5) kilometres north east of Robertstown and 125 kilometres north of Adelaide. The Project is within the Local Government Area of the Regional Council of Goyder.

A Local Community Fund is proposed as a financial contribution for the life of the Project. The Community Fund is intended for the local community who are hosting the Project to assist with funding environmental, social and economic development opportunities.

One of the key purposes of the engagement process was to allow for the community and other stakeholders to input their values, concerns and feedback on various aspects of the Project to assist EPS Energy in managing the final Project design. Detailed discussions with the Regional Council of Goyder, ElectraNet and other agencies will also continue to influence final decisions regarding the Project design. A description of each element of the proposal is provided as part of the Planning Report package supporting the Development Application.

2. ENGAGEMENT STRATEGY

The Community & Stakeholder Engagement Plan (the Plan) was prepared at the Project Preparation Phase to ensure that the engagement was undertaken in a comprehensive and constructive manner for the proposed Project.

The Plan was used as a tool to assist with the planning and management of engagement activities proposed to be undertaken at various stages of the Project. The Plan is founded on a Statement of Intent and subsequent Aims and Objectives to promote effective engagement with community and other stakeholders. The Statement of Intent, Aims and Objectives are included below.

Section 3 of this report summarises the outcomes of the engagement activities undertaken in accordance with the Plan, making reference to the Aims and Objectives outlined below, where applicable.

Statement of Intent

EPS Energy intends to involve the community and other stakeholders at each phase of the Project to ensure local values and concerns are identified and inform the decisions and activities of the Robertstown Solar project.

Aim 1

Obtain and maintain a Social Licence to Operate with the identified community and other stakeholders.

Objectives:

- Undertake an audience analysis to identify the key community groups and other stakeholders who may be impacted/interested in the Project;
- Undertake early discussions with relevant landowners, Council, Departments and other agencies to determine Project support and feasibility;
- Engage with the community and other stakeholders early and throughout the Project's life;
- Review the key community groups and other stakeholders who may gain or lose interest in participating in the engagement process;
- Disclose any potential impacts that may occur during the construction, operation, and decommissioning of the Project;
- Obtain an understanding of specific community and other stakeholder values and concerns regarding the Project; and
- Demonstrate how input from the community and other stakeholders influences the Project.

Aim 2
Enable and collaborate with the community and other stakeholders to provide feedback and input to the Project.

Objectives:

- Raise awareness of the proposal with adjacent landowners, local community and Council, key Government agencies and other key stakeholders;
- Provide relevant information to educate the community and other stakeholders on solar development and the development approval process generally so that they can participate in a meaningful way;
- Actively seek local information and input from the community and other stakeholders on local matters of importance that are relevant to the Project;
- Use a variety of engagement tools and activities to reach the broadest sample of the community and other stakeholders; and
- Collaborate with the community and other stakeholders to develop acceptable solutions to raised issues and/or concerns, wherever practicable.

Aim 3
Establish and maintain an open, honest and genuine relationship with the community and other stakeholders.

Objectives:

- Be genuinely available to meet and talk to community members and interested individuals or groups;
- Provide opportunities to interact with the community and other stakeholders;
- Respond to questions and concerns raised by the community and other stakeholders in a respectful, clear, and honest manner;
- Provide updates on the status of the Project; and
- Prioritise the achievement of mutually agreed outcomes, wherever practicable.

2.1. PRELIMINARY AUDIENCE ANALYSIS

The preliminary audience analysis was conducted during the Project Preparation Phase. This analysis included the identification of parties known to be potentially impacted by the Project, and those who may have an interest in the Project, vested or otherwise.

EPS Energy contacted the Regional Council of Goyder on 24 April 2018 to request a comprehensive list of all community groups and other stakeholders whom Council regularly engage with for developments in the area. This was to ensure the preliminary audience analysis was inclusive of all potential stakeholders.

The following stakeholders have been identified as key to the Project.

- Landowners and occupiers of the:
    - Properties forming the proposed Project Area; and
    - Adjacent properties;
- Key government and agency members:
    - Low Carbon Economy Unit within the Department for Energy and Mining;
    - ElectraNet;
    - Regional Development Australia;
    - Federal Member for Grey;
    - State Member for Stuart; and
    - CEO, Mayor and relevant Development Officers of the Regional Council of Goyder;
- The Ngadjuri Nation Aboriginal Corporation;
- The wider Robertstown community and established groups including:
    - Robertstown and District Community Management Inc.;
    - Robertstown Peace Hall Management Committee;
    - Robertstown War Memorial Community Centre;
    - Robertstown Hotel & Community Social Hub; and
    - Robertstown Primary School & Preschool.
- The relevant authorities who manage the registered easements across the Project Area:
    - ElectraNet; and
    - SA Power Networks.

Additional stakeholders may be identified as the Project progresses over time. EPS Energy will continue to review the above list as stakeholders gain or lose interest in participating in the engagement process over the Project's life.

2.2. STAGED RELEASE OF INFORMATION

As outlined in the Plan, EPS Energy staged the initial release of Project information with the purpose of directly informing the local community and ensuring the parties considered to have the highest level of impact and/or interest in the Project were notified earliest. This direct communication was an effort to begin building trust and a genuine relationship with the local community and key stakeholders.

EPS Energy recognised the potential risks associated with staging the release of information and simultaneously contacting the adjacent residents and key stakeholders due to the rapidity of sharing information via digital social media. Where relevant risk management measures were implemented, they are specified in the subsections below.

2.2.1. Confidential Release of Information

In order to conduct preliminary site selection and feasibility studies, EPS Energy discussed certain Project information with the landowners of the proposed Project Area prior to public release of any information.

For the same purposes, EPS Energy discussed Project information with members of ElectraNet and the Low Carbon Unit of the Department for Energy and Mining (then Department for Premier and Cabinet) prior to public release of any information.

EPS Energy also released certain Project information to subconsultants in order to complete preliminary studies on the proposed Project Area.

Where applicable, EPS Energy expressed the information shared was Commercial in Confidence and Confidentiality Deeds would be executed where necessary.

2.2.2. Initial Public Release

EPS Energy conducted a “cold-calling” process to correspond directly with the landowners and occupiers of adjacent properties with the purpose of introducing the Project, personally inviting them to a dedicated Neighbour Information Session and to seek their preference for receiving impending Project information materials.

A total of nine (9) adjacent landowners were identified whose properties adjoin the Project Area. All adjoining landowners were contacted on 8 or 9 May 2018 at various times of the day.

One of the identified telephone numbers was disconnected. EPS Energy express-posted an invitation to the Neighbour Information Session and an Information Brochure to this landowner on 11 May 2018 in an attempt to ensure they received the information directly from EPS Energy.

Concurrent to this, EPS Energy placed calls on 10 May 2018 to key members of the above-mentioned Government and agencies to introduce the Project and request preliminary meetings. The meetings were held via teleconference on 24 May 2018.

2.2.3. Secondary Public Release

Once communication had been established with these parties, EPS Energy directly notified the community groups and other stakeholders stated in Section 2.1 via email and post on 14 May 2018.

This secondary stage also included publishing the Project website, an unaddressed mailbox drop of the invitation to the Community Information Sessions (Appendix 3) to 150 residences in the locality and releasing an announcement to the media on 21 May 2018 (Appendix 6).

3. ENGAGEMENT PROGRAM

As outlined in the Plan, EPS Energy developed a proposed Engagement Program, including the relevant timeframes and actions for each phase of the Project. The Engagement Program is divided into five distinct phases, providing a logical sequence for engagement activities.

Below is a summary of the outcomes achieved at each phase and the intended outcomes for phases that have not yet ensued.

3.1. PHASE 1: PREPARATORY PHASE

The purpose of the engagement conducted during the Preparatory Phase was predominantly to discuss/meet with the potential Project landowners to discuss hosting the Project.

The Preparatory Phase included the following engagement:

- Discussions and meetings with the Project landowners to discuss hosting the Project and executing Agreements, where relevant;
- Discussions and meetings with the Low Carbon Economy Unit within the Department for Energy and Mining (then Department for Premier and Cabinet) to discuss the process of applying for Crown Sponsorship; and
- Discussions and meetings with ElectraNet to discuss and execute a Preliminary Works Agreement and Works Orders to determine connection options to the Robertstown Substation.

3.2. PHASE 2: PRE-LODGEMENT COMMUNITY & STAKEHOLDER ENGAGEMENT

The purpose of the engagement conducted during this phase was predominantly to introduce the Project to the community and other stakeholders prior to lodging a Development Application. This is to ensure that the comments, concerns and values of these parties are considered in project decision making.

Phase 2 engagement included the following:

- Correspondence with specialists as stated in Section 2.2 regarding site suitability and feasibility;
- Correspondence with the adjacent landowners to the Project to introduce EPS Energy and the Project, this entailed:
  - Telephoning the landowners directly and seeking their preference of receiving the impending Project information materials; and
  - Emailing and express-posting an invitation to the dedicated Neighbour Information Session and a Project Information Brochure;
- Correspondence and meeting with members of State and Local Government to further discuss the Project and expectations regarding ongoing engagement;
- Correspondence with the identified local community groups by emailing and express-posting an invitation to the Community Information Session;

- Unaddressed mailbox-drop to 150 residences in the locality;
- Newspaper advertisement in local paper advising of the proposal and the particulars of the Community Information Sessions;
- Press release to local media;
- Activation of the Project website;
- Correspondence with the Project landowners to keep informed of upcoming community and other stakeholder engagement and the resulting outcomes;
- Community Information Sessions and Neighbour Information Session held at the Robertstown Peace Institute on 29-30 May 2018;
- Collating expressions of interest from the local and regional industry workforce seeking to participate in the construction phase;
- Sending a courtesy letter to key Local and State Government members to advise of the outcomes of the Information Sessions;
- Preparation of a Post-On-ground Consultation Summary Report to ensure the comments, concerns, values and feedback from the community and other stakeholders has been captured and considered; and
- Ongoing response to enquiries from the community and other stakeholders.

3.3. PHASE 3: DEVELOPMENT APPLICATION

The key objectives for this phase in relation to community and other stakeholder engagement is to provide updates on the status of the Project as key milestones are executed.

Phase 3 engagement included the following:

- Continued liaison with individual community and other stakeholder members who have expressed a high interest in the Project;
- Continued liaison with the Project landowners to keep informed of upcoming Project milestones;
- Publishing updates to the Project website, in particular the Frequently Asked Questions in response to regular enquiries and comments;
- Correspondence with the Office for the Technical Regulator to obtain the Certificate for Development to append the Crown Sponsorship application;
- Correspondence with the Low Carbon Economy Unit of the Department of Energy and Mining to lodge the Crown Sponsorship application; and
- Sending a courtesy update to key members of the Regional Council of Goyder and State Government upon lodgement of the Crown Sponsorship application.

Phase 3 engagement will also include continued correspondence with Project landowners, adjoining landowners, and community and other stakeholders regarding the following matters:

- Lodgement of the Development Application with the State Commission Assessment Panel;
- Issuing responses to any potential submissions to the Development Application;
- Providing updates if/when approval is granted for the Development Application; and
- And any other matters resulting from the Conditions of Consent.

3.4. PHASE 4: CONSTRUCTION

The key purpose of engagement during Phase 4 is to ensure the community and other stakeholders are aware of the construction activities and any temporary disruptions.

Phase 4 engagement will likely include the following:

- Public notification and updates of construction information including timelines and contact information to be available on the Project website, via local media and on signage at the entrance to the site;
- Correspondence and potential meetings with adjacent landowners with the aim of minimising impacts during this phase; and
- The appointment of a dedicated "complaints line" for the public to report nuisance or negligence of construction terms.

3.5. PHASE 5: OPERATION AND DECOMMISSION

The key objective of engagement during this phase is to maintain ongoing and open channels of communication with the community and other stakeholders to ensure any potential concerns are appropriately managed.

With the end of the operational life of the Project, the Project will likely be decommissioned. An appropriate Community and Stakeholder Engagement plan or strategy should be developed approximately 12-18 months prior to decommissioning.

Phase 5 engagement will likely include the following:

- Public notification and updates of operation and/or decommissioning information and contact information to be available on the Project website and a sign at the entrance to the site;
- The establishment of a Local Community Fund and any correspondence relating to the management and governance of the Fund;
- Correspondence and potential meetings with adjacent landowners with the aim of minimising impacts during operation and decommissioning;
- The appointment of a dedicated Community Liaison Officer with contact details (phone, email and mailing address) to be the priority point of contact for the community and other stakeholders. Their role should entail:
    - Developing and maintaining relationships with the key community and other stakeholders; and
    - Establishing and maintaining a complaints/comments register.

4. ENGAGEMENT TOOLKIT

The following Engagement Toolkit outlines the means by which EPS Energy engaged the community and other stakeholders to meet the Aims and Objectives stated in Section 2.

4.1. ENGAGEMENT ACTIVITIES

The engagement activities outlined below have been selected in accordance with industry practice. The activities are designed to be engaging, informative and promote deliberative discussions that aims to inform Project decision making.

4.1.1. Information Sessions

EPS Energy held four information sessions over two days; one of which was a dedicated Neighbour Information Session, while the remainder were general Community Information Sessions. The purpose of the information sessions was to promote a two-way exchange of information, where the community and other stakeholders could raise any concerns and provide local knowledge, while EPS Energy provided further information about the Project both verbally and via visual and documented communication materials.

Details of the communication materials used are outlined in Section 4.2 below.

The information sessions were held at the Robertstown Peace Institute, 32 Commercial Street, Robertstown, South Australia 5381. The session times were as follows:

- Community Information Sessions:
  - Tuesday, 29 May 2018, between 11:00am – 1:00pm and 5:00pm – 7:00pm;
  - Wednesday, 30 May 2018, between 10:30am – 12:30pm.
- Neighbour Information Session:
  - Tuesday, 29 May 2018, between 2:00pm – 4:00pm.

As detailed in the Community and Stakeholder Engagement Plan, the information sessions were intended to be delivered in a casual setting where attendees could engage at their own pace. A total of five EPS Energy representatives were present at the information sessions. The communication materials were arranged in an open display that enabled attendees to walk through at their own pace, or with an EPS Energy representative. A table of refreshments was also available.

This was positively received by attendees who preferred this delivery over a seminar style.

An estimated 52 guests attended the information sessions over the two days. This included seven (7) of the nine (9) adjacent landowners who attended the dedicated Neighbour Information Session. This also included a number of representatives from the Regional Council of Goyder and ElectraNet.

4.2. COMMUNICATION MATERIALS

The intention of the communication materials outlined below were to facilitate the exchange of information between EPS Energy and the community and other stakeholders in an engaging manner.

It is noted that the communication materials described below represents information about the Project that was accurate at the time of the initial community engagement.

During the May 2018 Information Session, EPS Energy expressed that the Project was in an early stage and that details relating to the capacity and technology would be influenced by the results of investigations and studies that were being conducted concurrent to the initial community engagement.

4.2.1. Website

During the Project Preparation Phase, EPS Energy created a Project specific website to provide information in an engaging manner. The website has been used to publish Project updates and facilitate the exchange of information via a downloadable Information Brochure and responses to frequently asked questions, while the Contact Page includes an electronic feedback form.

The Project website is located at www.robertstownsolar.com.au

4.2.2. Preliminary Information Package

During the Preparation Phase EPS Energy prepared the Information Brochure (Appendix 1) outlining the key features of the Project including its proposed location, summary of the technical functions of the Project, current status, key social and environmental benefits, a map of the Project and contact information.

EPS Energy also prepared an invitation to the designated Neighbour Information Session (Appendix 2) for the adjoining landowners and a separate invitation to the broader Community Information Sessions (Appendix 3). Both invitations include a brief summary of the proposal, the session dates and times, venue address, photograph of the venue and contact information. The reverse side of the invitations include a summary of the Project information brochure.

Copies of the Information Brochure were made available at the Information Sessions and were distributed along with the invitation to the Neighbour Information Session to adjoining landowners during the Initial Public Release between 8-9 May 2018.

The invitations to the Community Information Sessions were delivered to the Community Groups outlined in Section 2.1 and a further 150 unaddressed mailboxes in the locality on 21 May 2018.

4.2.3. Feedback Form

EPS Energy prepared the Feedback Form (Appendix 4) including a short questionnaire to gain valuable information about the community and other stakeholders attending the Information Sessions including, their age group, the distance they reside from the Project, and how long they have resided in the area. The questionnaire aimed to gain information about the community and other stakeholders' opinion of renewable energy generally and whether they consider there to be any positive or negative impacts from the Project.

The Feedback Form will also be a useful tool to inform future engagement with the community and other stakeholders, specific to their values and concerns.

Analysis of the Feedback Form demonstrated a largely positive opinion of the Project and renewable energy generally, with no concerns recorded. The positive comments included:

- Potential for local employment during construction;
- Possibility of attracting tourists; and
- Support for local businesses and community groups.

4.2.4. Attendance Register

EPS Energy prepared an attendance register (Appendix 5) for the Information Sessions. This enabled EPS Energy to collect key information about attendees including, their name, contact details and if they wish to receive Project updates via email.

A total of 19 attendees signed the Register providing further positive feedback.

4.2.5. Media Release

EPS Energy advertised the Community Information Sessions in The Leader. An example of the advertisement is shown in Figure 4-1 below. Following the Community Information Sessions, EPS Energy placed an advertisement in local publication, the Robbie Round Up. This advertisement provided a link to the project website for further information about the project. A press release was issued to both of the above-mentioned local media outlets on 21 May 2018 (Appendix 6).

Figure 4-1 Project Advertisement, pg. 2 of the Leader, Wednesday 23 May 2018

4.2.6. Correspondence Register

EPS Energy developed a correspondence register to record known key stakeholder contact information and details of any correspondence that has occurred. The register is a 'live' document and updated according to all communication proceedings. The register is intended for internal-use only.

4.2.7. Visual Communication

A number of types of visual communication such as maps, images, information boards and a video were used to assist in the exchange of information in an engaging way and demonstrate examples of similar projects.

Mapping

The following maps were created by EPS Energy to visually communicate the Project's location:

- Robertstown Solar - Locality Plan; and
- Robertstown Solar – Site Plan.

Information Boards

A number of information boards were prepared providing the following information:

- Summary of EPS Energy;
- Summary of the technical aspects of solar technology;
- The development approval process and the Project's status;
- Example images of solar panels from both the front and behind the panels;
- Example images of solar panel cleaning technology; and
- Images of the visibility and scale of an existing solar farm.

As described above, these information boards were arranged in an open display that enabled attendees to walk through at their own pace or with an EPS Energy representative. The following Plates depict examples of the layout:

Plate 1: EPS Energy representative with attendees of the Community Information Session, 29 May 2018

Video

EPS Energy compiled videos from solar technology suppliers demonstrating examples of the types of technology that may be used for the Project. The video provided an overview of the process involved in planning, designing, constructing and maintaining similar projects as well as an example of an operating project.

The video was set to play on a continuous loop positioned at the end of the displays and near the refreshments table. Many attendees watched the video while helping themselves to the refreshments and filled out the Feedback Form or conversed further with EPS Energy representatives.

Plate 2: Video with available seating and refreshments at Community Information Session, 29 May 2018

5. COMMUNITY AND STAKEHOLDER RESPONSE

The initial response from the community and other stakeholders has been largely positive and supportive of the Project. The response has remained overall positive and supportive at the time of this report.

5.1. GOVERNMENT AND OTHER AGENCIES

The response from the key members of the State Government and other agencies has been largely positive and supportive of the Project. Key members of the Regional Council of Goyder expressed their commendation of EPS Energy's early and comprehensive engagement approach.

5.2. GENERAL COMMUNITY

Most attendees of the Community Information Sessions were generally interested in learning more about the Project and looking for additional details around some of the information in the Information Brochure. Conversations with the attendees also identified anecdotal information about Robertstown, including potential risks that may be useful to inform various aspects of the Project (e.g. the occurrence of a minor earthquake).

The key themes that have arisen from correspondence with the general community to date include:

- Expressions of interest to participate in the Construction Phase by providing services and/or equipment;
- Positive notions regarding economic development during Construction Phase; and
- Positive notions regarding the Local Community Fund.

5.3. ADJACENT LANDOWNERS

As previously stated, a total of seven (7) of the nine (9) adjacent landowners attended the Information Sessions. Only one (1) expressed concerns with the Project, including:

- Disruptions to stock movement on local roads due to increased traffic; and
- The disproportionate benefits of the Project for the developer and local community.

Overall, the remaining adjacent landowners were complaisant and/or supportive of the Project. Many of the adjoining properties are primarily used for agricultural purposes (grazing) with the landowners residing on different properties. Other enquiries and interests from the adjacent landowners included:

- Their land being part of the Project;
- Management of land under the panels; and
- Visual amenity of the solar array.

5.4. NGADJURI NATION ABORIGINAL CORPORATION

On 21 May 2018 EPS Energy sent the Ngadjuri Nation information about the Project and an invitation to the Community Information Sessions. Although representatives from the Ngadjuri Nation were unable to attend the Information Sessions correspondence has occurred via telephone, email and post.

EPS Energy is continuing to correspond with Ngadjuri Nation representatives to gain an understanding of their expectations of involvement in the Project post lodging a Development Application.

The Ngadjuri Nation has thus far expressed that they are pleased with EPS Energy corresponding with them prior to lodging a Development Application.

EPS Energy understand that the Ngadjuri Nation have experience in engaging in Heritage aspects of similar large-scale solar projects.

5.5. EASEMENT AUTHORITIES

On 21 May 2018 EPS Energy sent a letter with information about the Project and an invitation to the Community Information Sessions to representatives of ElectraNet and SA Power Networks.

A representative of ElectraNet attended the Community Information Session on 30 May 2018.

Ongoing correspondence with these authorities will be necessary during the design of the Project to ensure no encroachment on their registered interest on the land and for connection into the Robertstown substation.

5.6. ONGOING COMMUNICATION MEASURES

Notwithstanding the current positive response toward the Project, EPS Energy intend to maintain an open dialogue with the community and other stakeholders. These measures are described in Sections 3.3, 3.4 and 3.5 of this report.

6. CONCLUSION

EPS Energy consider early and ongoing engagement with the community and other stakeholders that are involved, impacted or interested in Robertstown Solar Project an essential component of the Project's development process and overall success.

The main purpose of the engagement process thus far has been to involve the community and other stakeholders and identify local values and concerns, to inform the decisions and activities of the Project. The tools and activities outlined in the Community & Stakeholder Engagement Plan seek to create numerous opportunities to foster a genuine relationship between EPS Energy and these parties.

The outcomes of the engagement undertaken thus far indicate there is an interest from the local community of Robertstown. It is considered that the comprehensive Engagement Program developed at the Preparatory Phase has facilitated a process of genuine and effective community and other stakeholder engagement. Recognising the ongoing engagement measures to be maintained during the construction and operational phases, it is not anticipated that any adverse impacts upon the community or other stakeholders will arise with respect to the proposal.

APPENDIX 1

Information Brochure

November 18

ROBERTSTOWN SOLAR

ROBERTSTOWN SOLAR

PROJECT INFORMATION

Robertstown Solar is a proposed 300 MW (AC) utility scale solar photovoltaic and battery storage plant to integrate into the National Electricity Market through a 275kV connection to ElectraNet's Robertstown Substation in South Australia.

LOCATION

Robertstown Solar is to be developed on approximately 680 hectares of cleared land in the suburbs of Bright and Geranium Plains, South Australia. The site is situated approximately 5 kilometres north-east of Robertstown and 115 kilometres north-east of Adelaide. The project is within the Local Government Area of the Regional Council of Goyder.

PROJECT

HOW ROBERTSTOWN SOLAR WORKS

Robertstown Solar is a large-scale utility power plant that creates energy from the sunlight via photovoltaic (PV) cells most likely to be mounted on sun tracking systems.

Tracking solar panel systems follow the sun's movement throughout the day for maximum collection. At the end of the day the panels track back to the east ready for the next operation.

The DC electricity that is created by sun through the cells is fed through cables to a series of invertors where the electricity is converted to AC and increased in voltage. The invertors are connected through underground cables to a switching yard and by overhead transmission lines to the Robertstown Substation for connection to the South Australian electrical grid.

Battery storage is proposed as part of Robertstown Solar and will provide additional power system security for South Australia's grid.

During the operational phase, regular inspections, panel cleaning, componentry servicing and site maintenance are required. Additional infrastructure includes internal access tracks, offices, workshop sheds, fence lines and drainage.

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

Figure 1 – Robertstown Solar Project Area (Source: Google Earth Pro, 2018).

Robertstown Solar
www.robertstownsolar.com.au

Contact us:
E: enquiries@robertstownsolar.com.au
P: 0484 595 129

Key Project Statistics

ROBERTSTOWN SOLAR

PROJECT STATUS

12 MONTHS	9 MONTHS	6-18 MONTHS	30 YEARS
Site selection	Feasibility	Project approval	Construction, operation and decommission

SOCIAL AND ENVIRONMENTAL BENEFITS

Robertstown Solar local community social contribution includes:

- Local Community Fund
- 150-200 construction jobs with a large component from the regional workforce

Robertstown Solar 300 MW generating capacity is equivalent to:

- Powering 86,400 homes each year
- 195,900 cars off the road each year
- Reducing 489,000 tonnes of GHG emissions each year
- Planting 70,000 trees each year

CONTACT INFORMATION

Phone:	**0484 595 129**
E-mail:	enquiries@robertstownsolar.com.au
Website:	www.robertstownsolar.com.au

APPENDIX 2

Invitation to Neighbour Information Session

ROBERTSTOWN SOLAR

ROBERTSTOWN SOLAR

invite you to join us for our

Neighbour Information Session

Robertstown Solar is a new large-scale solar and battery storage facility proposed near Robertstown, South Australia. Robertstown Solar is a 300 MW (AC) utility scale solar photovoltaic plant with battery storage to feed into the National Electricity Market through a 275kV connection to ElectraNet's Robertstown Substation. Robertstown Solar is to be developed on approximately 680 hectares of existing cleared land in the suburbs of Bright and Geranium Plains, South Australia.

Robertstown Solar is committed to a genuine and early community and stakeholder engagement process. As part of this process, Robertstown Solar is seeking to inform neighbouring property owners about the project. We look forward to discussing the project with you.

SESSION DATES & TIMES

Tuesday 29th May 2018
2.00pm — 4.00pm

LOCATION

Robertstown Peace Institute
32 Commercial Street
Robertstown
South Australia 5381

ENQUIRIES

Phone: **0484 595 129**
E-mail: **enquiries@robertstownsolar.com.au**
Website: **www.robertstownsolar.com.au**

Please note that if you cannot attend this session we will be holding information sessions for the wider community, which you are welcome to attend. These will be held on Tuesday 29th of May between 11.00am – 1.00pm and 5.00pm – 7.00pm and Wednesday 30th of May between 10.30am – 12.30pm.

ROBERTSTOWN SOLAR

Robertstown Solar local community social contribution includes:

Local Community Fund

150-200 construction jobs with a large component from the regional workforce

Robertstown Solar 300 MW generating capacity is equivalent to:

Powering 86,400 homes each year

Reducing 489,000 tonnes of GHG emissions each year

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Planting 70,000 trees each year

For more visit:
www.robertstownsolar.com.au

Contact us:
E: enquiries@robertstownsolar.com.au
P: 0484 595 129

APPENDIX 3

Invitation to Community Information Sessions

November 18

ROBERTSTOWN
SOLAR

ROBERTSTOWN SOLAR

invite you to join us for our

Community Information Session

Robertstown Solar is a new large scale solar and battery storage facility proposed near Robertstown, South Australia. Robertstown Solar is a 300 MW (AC) utility scale solar photovoltaic plant with battery storage to feed into the National Electricity Market through a 275kV connection to ElectraNet's Robertstown Substation. Robertstown Solar is to be developed on approximately 680 hectares of existing cleared land in the suburbs of Bright and Geranium Plains, South Australia.

Robertstown Solar is committed to a genuine and early community and stakeholder engagement process. As part of this process, Robertstown Solar is seeking a cooperative approach with the local community, key stakeholders and the Council to inform the project and to identify opportunities for local engagement and employment during construction and operation. We look forward to discussing the project with you.

SESSION DATES AND TIMES

Tuesday 29th May 2018
at 11.00am – 1.00pm and
5.00pm – 7.00pm
and **Wednesday 30th May 2018**
at 10.30am – 12.30pm

LOCATION

Robertstown Peace Institute
32 Commercial Street
Robertstown
South Australia 5381

ENQUIRIES

Phone:	**0484 595 129**
E-mail:	**enquiries@robertstownsolar.com.au**
Website:	**www.robertstownsolar.com.au**

Please note that if you cannot attend, project information is available on the Robertstown Solar website.

ROBERTSTOWN SOLAR

Robertstown Solar local community social contribution includes:

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P: 0484 595 129

APPENDIX 4

Feedback Form

ROBERTSTOWN SOLAR | FEEDBACK FORM

We value your honest feedback and opinions to ensure our project appropriately addresses local values and concerns. This feedback will be used to inform future engagement with the community as well as the Project so we can prioritise mutually beneficial outcomes.

QUESTIONNAIRE

Of the options listed below, which best describes where you live in relation to the Robertstown Solar project?

- ☐ Less than 1 km
- ☐ Between 1 km and 5 km
- ☐ Greater than 5 km

Which age group are you included in?

- ☐ 18—34
- ☐ 35—54
- ☐ 55+

Approximately, how long have you lived in the area?

- ☐ Less than 5 years
- ☐ 5 to 10 years
- ☐ 10 years+

What is your opinion of renewable energy, generally?

- ☐ Positive
- ☐ Neutral
- ☐ Negative

Do you consider there to be any positive impacts from the Robertstown Solar project?

Do you consider there to be any negative impacts from the Robertstown Solar project?

Other comments:

CONTACT US

P: 0484 595 129

E: enquiries@robertstownsolar.com.au

ROBERTSTOWN SOLAR

APPENDIX 5

Attendance Register

ROBERTSTOWN SOLAR

Full Name	Contact Number	Email Address	Postcode	Feedback/ Comments
		☐ Please tick if you **would like** updates via email*		

*Alternatively, you can check www.robertstownsolar.com.au for updates relating to the Project.

APPENDIX 6

Media Release

November 18

ROBERTSTOWN SOLAR

ROBERTSTOWN SOLAR

21/05/2018

Media Release: Robertstown Solar

Robertstown Solar is a new large-scale solar and battery storage facility proposed near Robertstown, South Australia. Robertstown Solar is a 300 MW (AC) utility scale solar photovoltaic plant with battery storage to feed into the National Electricity Market through a 275kV connection to ElectraNet's Robertstown Substation.

Robertstown Solar is to be developed on approximately 680 hectares of existing cleared land in the suburbs of Bright and Geranium Plains, South Australia.

South Australian energy consumers will benefit from Robertstown Solar's proposed large scale renewable energy project through reduced energy costs and a reduction in emissions. The project will offer employment opportunities, diversify the region's energy mix and create potential education and tourism opportunities. The project will also directly contribute to the local community through a community fund.

Robertstown Solar is committed to a genuine and early community and stakeholder engagement process. As part of this process, Robertstown Solar is seeking a cooperative approach with the local community, key stakeholders and the Council, and also seeks to identify opportunities for local employment during construction and operation.

Robertstown Solar will be hosting Community Information Sessions over two days at the Robertstown Peace Institute, 32 Commercial Street, Robertstown, South Australia 5381. The session times are:

- Tuesday 29th May 2018: 11.00am – 1.00pm and 5.00pm – 7.00pm; and
- Wednesday 30th May 2018: 10.30am – 12.30pm.

For more information please see the Robertstown Solar website at www.robertstownsolar.com.au

APPENDIX 7

Visual Impact Assessment

November 18

ROBERTSTOWN SOLAR

VISUAL IMPACT ASSESSMENT

Prepared for Robertstown Solar

EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

QUALITY ASSURANCE AND DECLARATION

Quality Assurance and Version Control Table		
Project:	Robertstown Solar	
Client:	Robertstown Solar 1 Pty Ltd and Robertstown Solar 2 Pty Ltd	
Rev:	**Date:**	**Reference:**
V01	29.11.2018	11314_Robertstown Solar – Visual Impact Assessment
Checked by:	Leonie Bryson	
Approved by:	Steve McCall/ Jeff Burns	
Declaration:	*The opinions and declarations in this document are ascribed to EPS Energy and are made in good faith and trust that such statements are neither false nor misleading.* *In preparing this document, EPS Energy has considered and relied upon information obtained from the public domain, supplemented by discussions between key EPS Energy staff, representatives from governing agencies and independents, including the client and specialist consultants.*	
Applicant:	EPS Energy PO Box 195 Charlestown NSW 2290 (02) 9258 1362	
Prepared By:	Marina Budisavljevic	
Reviewed By:	Steve McCall	
Project land:	CT 5565/131 CT 5431/657 CT 5431/659 CT 5465/354 CT 5464/828 CT 5941/840 CT 5561/287 CT 5561/89 CT 5951/34 CT 5550/784 CT 5689/928 CT 5689/927	A91 FP212965 Section 227 Section 232 Section 13 Section 42 Section 43 Section 229 Section 221 Section 44 & 45 A91 FP212508 A51 DP51338 A50 DP51338

CONTENTS

TABLE OF FIGURES

LIST OF TABLES

ROBERTSTOWN SOLAR

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1. INTRODUCTION

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

The Project land currently supports grazing and cropping agricultural activities, consistent with the surrounding land use. Various forms of existing infrastructure are present within the area including SA Power Networks (SAPN) and ElectraNet's Robertstown Substation, and numerous high voltage transmission lines both crossing and surrounding the Project area.

The Project land is zoned Primary Production under the Regional Council of Goyder Development Plan 2016*.* The Development Plan provisions contemplates that Renewable Energy Projects such as Robertstown Solar will be established in the Goyder Council area on land within the Primary Production Zone subject to implementation of management techniques set out in the Development Plan.

This VIA has been prepared to support a Development Application for the Project. The intent of this VIA is to provide an assessment of the existing landscape within the Project area, as well as the surrounding area, to determine the potential visual impact of the Project to the landscape and visual receptors during construction and operational phases. EPS Energy understands that the assessment of visual impact is subjective, and the individual consideration of visual and landscape effects and the significance of these effects may differ between receptors depending on personal values attached to the landscape.

1.1. OBJECTIVES

The objectives of this VIA are to:

- Identify and analyse the landscape character within and around the surrounding Project area;
- Identify and assess potential visual receptors and viewpoints from which the Project may have a visual effect, within the Visual Catchment;
- Assess the visual significance of the viewpoints and the sensitivity of the potential visual receptors;
- Assess the suitability of the Project within its location; and
- Recommend mitigation measures where appropriate.

1.2. KEY TERMS

Key terms used throughout this VIA are defined in Table 1-1 below:

Table 1-1: Key Terms

Term	Definition
Background	Defined by exceeding the extent of the Visual Catchment and/or features and elements in the horizon.
Effect	The landscape or visual outcome of a proposed change. It may be the combined result of sensitivity together with the magnitude of the change.
Foreground	Within 100m of the Visual Catchment where details are easily discernible and/or occupy a large proportion of the field of view.
Impact	The effect of a proposal, which can be adverse or beneficial, when measured against an existing condition.
Landscape Values	The relative value that is attached to different landscapes by present or future generations. Landscape values may include biodiversity, geo-diversity, historic, and aesthetic values, as well as more personal values such as a person’s associations, memories, knowledge or experiences of that landscape.
Landscape Character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Effect	A change to landscape values as a result of development, which can be either positive or negative.
Landscape Receptors	Defined aspects of the landscape resource that have the potential to be affected by a proposal.
Midground	Within the 1-2km Visual Catchment, where details are less distinguishable, but the features occupy a moderate proportion of the field of view.
Perception	Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Surrounding Area	Those areas outside the Project area that have been identified as relevant for investigation of landscape values and potential effects.

Term	Definition
View	Any sight, prospect or field of vision as seen from a place, and may be wide or narrow, partial or full, pleasant or unattractive, distinctive or nondescript, and may include background, midground and/or foreground elements or features.
Visual Amenity	The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.
Visual Catchment	Areas visible from a combination of locations within a defined setting (may be modelled or field-validated).
Visual Effect	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visual Significance	Used in this instance to describe the weighting that is given to the relative importance of identified landscape values. The landscape values of an area likely to be significant are those that help understand the past, enrich the present, and which will be of value to future generations.
Zone of Theoretical Visibility (ZTV)	A map, usually digitally produced, showing areas of land within which, a development is theoretically visible. The ZTV does not account for any vegetation or built environment. Therefore, the actual view of the project is likely to be less than indicated on the ZTV plan.

(Landscape Institute and IEMA, 2013; Australian Institution of Landscape Architects, 2018; Roads and Maritime Services, 2013)

2. METHODOLOGY

The Project's potential visual impact on the landscape and visual receptors is derived from changes in the landscape, its character and how this is experienced. Effects may arise at different scales (local, regional and national) and have different levels of significance (high, moderate and low) depending on the sensitivity of the visual receptors and the magnitude of change. Changes to the landscape are more than visual and include a range of physical and perceptual factors. Determining the overall visual impact therefore requires a combination of qualitative and quantitative assessment measures and acknowledgement of limitations.

2.1. ASSESSMENT FRAMEWORK & CRITERIA

Specific guidelines for assessing the visual impact of utility-scale solar projects in South Australia are unavailable. This is a recognised limitation to this VIA. To mitigate this, the methodology used throughout this VIA is based on a number of existing national and international landscape and VIA guidelines. These resources are consistently used for VIAs across Australia, in place of available specific guidelines, and are generally considered industry standard and appropriate. The key resources this methodology is based on includes:

- *Guidelines for Landscape and Visual Impact Assessment* (Landscape Institute and Institute of Environmental Management & Assessment (IEMA), 2013);
- *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects (AILA), 2018);
- *Environmental Impact Assessment Practice Note: Guidelines for Landscape Character and Visual Impact Assessment* (Roads and Maritime Services (RMS), 2013); and
- *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design* (Department for Planning and Infrastructure, 2007).

Further to the above-mentioned resources, the 'Objectives' and 'Principles of Development Control' related to the visual impact of proposed developments from the Regional Council of Goyder Development Plan 2016 are also considered as part of this methodology.

The methodology, and therefore the subsequent Sections of this VIA, follows the process outlined in Figure 2-1 below.

Report Section	VIA Process
Section 3	**1.** Describe and assess the existing landscape character: • Landform/topography, vegetation, water form, land use, texture and colour; • Condition (physical state); • Settlement pattern (farms, towns, cities); • Rarity/ significance/ sensitivity; and • Desired character.
Section 4	**2.** Describe the proposed development: • Project area particulars; • Siting (within the landscape context); • Technical summary; • Layout; and • Key visual components during the Project's life.
Section 5	**3.** Identify and assess potential effects on landscape and visual receptors: • Change to elements, features or character; • Magnitude of effects (size and scale, exposure, geographical extent, duration and reversibility); • Sensitivity of receptors; • Significance of effects; and • Cumulative visual effects.
Section 6	**4.** Identify measures to mitigate adverse effects: • Primary measures (integrated into the Project design); • Standard construction and operational management practices; and
Section 7	**5.** Identify and categorise residual impacts i.e. with mitigation measures incorporated into the proposed conditions (if required).

Feedback and refine design (if required)

Figure 2-1: Visual Impact Assessment Process and Report Structure

2.1.1. Landscape Character Assessment Criteria

Landscape character is determined by the way the physical, natural and cultural components within a landscape interact, which together create a distinctive area, or character (Landscape Institute & IEMA, 2013). Although some of these components are relatively objective and are able to be assessed against a standardised set of criteria, landscape character is also defined by aesthetic, perceptual and experiential aspects (landscape values), which are subjective, and based on personal associations and opinions which vary between individuals.

This is a recognised limitation affecting many components of this VIA. To mitigate the subjectivity concerning perceptions and values, this VIA utilises commonly accepted landscape characteristics for various landscape characters that are generally preferred and valued. These will underpin the landscape character assessment criteria outlined in Table 2-1 as well as other assessments throughout this VIA.

It is noted that preferences and values will also differ depending on the context of the landscape (i.e. urban, rural, natural) (Landscape Institute and IEMA, 2013; Department for Planning and Infrastructure, 2007). To ensure the criteria is appropriate to the local context in which the Project is proposed to be located, the general planning designation (i.e. land zoning) has been used as the indicator to the general landscape type.

Pursuant to the Regional Council of Goyder Development Plan 2016*,* the Project area is zoned 'Primary Production' and therefore key elements of the 'Desired Character' for the Primary Production Zone have been included in the landscape character assessment criteria (Table 2-1). Additionally, Table 2-1 includes the most and least preferred (generally) landscape characteristics indicated by the literature specifically regarding rural landscapes.

Notably, renewable energy is envisioned for this zone in the Development Plan, in the form of Wind farms and ancillary developments such as substations, maintenance sheds, access roads and connecting power-lines. The Plan details that these facilities will need to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence, components may need to be:

- Located in visually prominent locations such as ridgelines;
- Visible from scenic routes and valuable scenic and environmental areas; and
- Located closer to roads than envisaged by generic setback policy.

The Desired Character section for the Primary Production Zone also sets out that, subject to the implementation of management techniques by council wide policy regarding renewable energy facilities, visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy.

Nonetheless, this VIA provides a comprehensive assessment of the potential landscape and visual effects in accordance with the process outlined in Figure 2-1above. Accordingly, once the existing landscape character has been identified, this will be reviewed alongside the description of the Project to identify the potential landscape and visual receptors and effects. The method for identifying and assessing these are outlined in Section 2.1.2.

Table 2-1: Landscape Character Assessment Criteria

Landscape Characteristic	Higher preference/value	Lower preference/value
Landform/ topography	• Topographic variety and ruggedness • Significant landscape features (trees, tree stands, historic relics, windmills)	• Uniform or flat with little to no vertical relief • Absence of landscape features • Eroded areas • Unmanaged roads and access tracks
Landcover/ vegetation	• Areas or sites frequently prone to ephemeral features (presence of fauna, distinctive crop rotations, water conditions and climatic conditions) • Distinctive remnant vegetation located along streamsides, roadsides and in paddocks	• Areas of soil salinity/salt scalds or dead, dying or diseased vegetation • Areas of extensive weed infestation • Recently harvested areas (stumps, debris, abandoned off-cuts)
Water form	• Presence of water bodies (dams, lakes, inundated areas)	• Absence of or eutrophied water bodies
Land use	• Gradual transition zones between agricultural land and natural landscape • Historic features and land use patterns that strengthen local rural character (historic farm machinery, old shearing sheds, windmills and historic buildings) • Well maintained buildings and/or structures that support the rural character (including building materials/finishes)	• Tips, dumps and landfill areas • Land use areas that contrast significantly from local rural landscape characteristics (plantations, mines, housing, utility towers, roads and fencing) • Abandoned structures (including farm structures) in a state of disrepair or destruction
Texture and colour	• Diverse colour and contrast or species diversity of cropping • Agricultural patterns, colours and textures that complement natural features	• Lack of diversity in colour and texture • Difficult to distinguish details in the midground • No discernible focal points on the horizon
Settlement pattern	• Scattered settlement pattern and individual structures (silos, windmills, water tanks, historic buildings, bridges, hay bales and dams) • Large allotments	• Concentrated settlements with uncharacteristic structures (industrial structures; modern housing) • Subdivided allotments
Rarity	• Presence of rare elements or features in the landscape or presence of a rare landscape character type	• Common elements or features within the region

(Landscape Institute & IEMA, 2013, Department for Planning and Infrastructure, 2007; AILA, 2018; RMS, 2013; Government of South Australia, 2016 (Regional Council of Goyder Development Plan 2016)).

2.1.2. Landscape and Visual Effects Assessment Criteria

The overall visual impact of a proposed development is determined by combining the separate assessments of landscape and visual effects as perceived by receptors. Landscape effects are changes within or to the landscape as a result of interactions between a proposed development and elements within the landscape or the landscape character itself (landscape receptors), while visual effects are the changes of views or visual amenity of the landscape as perceived by people (visual receptors) (Landscape Institute & IEMA, 2013).

As discussed in Section 2.1.1, the significance of landscape and visual effects are also perceived differently by individuals based on personal preferences and values associated to the landscape and views. As with landscape character, these values and the perceived significance of changes can be difficult to quantify and is a recognised limitation of this VIA. In accordance with the landscape character assessment, the landscape and visual effects assessment will also utilise the preferred and valued landscape characteristics identified in the literature (Table 2-1) when assessing value-based criteria. The remaining criteria used in the landscape and visual effects assessment are outlined in Table 2-2 along with specifications of the category scale (high, moderate, and low) used for measuring each criterion.

It is recognised that relationships can exist between criteria (i.e. the size and scale, distance and visibility of the effect all influence the susceptibility of the receptor) and must be considered concurrently when determining the most appropriate category scale for the effect being assessed. Similarly, some of the specifications of category scales for landscape and visual effects can overlap (i.e. the defined measurable distance in metres or kilometres between an effect and the receptor), while others are specific to either landscape or visual effects (i.e. a change to a view does not consequentially change the overall landscape character). These distinctions are clearly defined in Table 2-2 to ensure transparency in the assessment, as far as practicable. Any necessary explanation of influences between criteria will be discussed in Section 5.

Although the criteria for assessing landscape and visual effects can differ, the process is inherently the same; using the predetermined landscape character alongside the description of a proposed development to identify potential receptors and effects. Subsequently, assessing each effect against the established criteria to determine the ***sensitivity*** of the receptor and the ***magnitude*** of the effect. This is an iterative process that is undertaken for each effect and is depicted in Figure 2-2 below. Finally, the sensitivity of the receptors and the magnitude of the effects are successively combined to determine the overall ***significance*** of the effect, depicted in Table 2-3.

Although considerable efforts have been made to avoid subjectivity within this assessment process, it is important to note that a level of professional judgement must still be utilised (Landscape Institute & IEMA, 2013). For example, a receptor may collectively score a “Moderate” level of sensitivity and a “Moderate” level for the magnitude of the effect, which according to Table 2-3 should result in an overall “Moderate” significance of the effect. However, if the constructed Project is not visible or does not change the view from the receptor, logical reasoning should indicate a “Low” or negligible significance of the effect as there is no change to the landscape in this instance. Where this professional judgement has been employed it is clearly disclosed during the associated assessment.

Table 2-2: Category Scale to Assess Landscape and Visual Effect Criteria (Landscape Institute & IEMA, 2013)

Criteria	High	Moderate	Low
Sensitivity of Receptors			
Susceptibility			
Landscape effect	The degree to which the landscape may accommodate the Project would potentially result in a number of perceived uncharacteristic and significant changes.	The degree to which the landscape may accommodate the Project would potentially result in the introduction of prominent elements but may be accommodated to some degree.	The degree to which the landscape may accommodate the Project would not significantly alter existing landscape character.
Visual effect	Residents at home in high proximity and visibility to the Project; visitors to heritage assets or other areas where the views are an important factor to the experience (i.e. lookouts).	People engaged in activities whose attention is likely to be focused on the landscape and on particular views (i.e. scouts/camping groups); people at their place of work whose attention is not focused on their surroundings and where the setting is not important to the quality of working life.	Pedestrians and motorists that would typically have less vested interest and emotional connection to the landscape i.e. view the Project infrequently, intermittently and/or over a short timeframe.
***Value* *(also refer to Table 2-1)**			
Landscape effect	The effect may compromise the specific basis for the value attached to the landscape, for example if the landscape character is valued on an international, national or local scale (i.e. World Heritage Sites, National Parks).	The effect does not compromise the specific basis for the value attached to the landscape.	The existing landscape characteristics are not considered to be generally preferred or valued and therefore the effect does not negatively affect the value attached to the landscape.
Visual effect	The view appears in guidebooks or on tourist maps, there is a provision of facilities for visitor's enjoyment of the view (i.e. parking places, sign boards and interpretive material); or the local planning designations restrict the introduction of effects that compromise the value of a particular view.	The effect does not compromise the specific basis for the value attached to the particular view.	The view is not considered to be generally preferred or valued and therefore the effect does not negatively affect the value attached to the view.

Criteria	High	Moderate	Low
Magnitude of Effects			
Size and scale			
Landscape effect	Key characteristics of the landscape character may be adversely impacted by the Project and may result in major alterations to perceived characteristics of the landscape character.	Some characteristics of the landscape character may be altered by the Project, although the landscape has the capability to absorb these changes without compromising the overall landscape character.	The characteristics of the landscape character are generally robust (evidenced by the existence of artificial elements) and would be minimally affected by the Project.
Visual effect	Large proportion of the view occupied by the Project; high degree of contrast or integration of new features/ changes in terms of form, scale and mass, height, colour and texture.	Some change to the view due to loss of existing features and addition of new features in the view without significant change in its composition.	No obvious change to the view due to loss of existing features or addition of new features.
Frequency of use			
Landscape effect	Frequently visited or populated areas often used for appreciating the view of the landscape for prolonged periods of time (e.g. residences, lookouts, townships).	Less visited areas with intermittent visitation (e.g. major/secondary roads) with partial visibility from the receptor (i.e. unobstructed features of the Project from a vehicle while passing within the Visual Catchment of the Project).	Infrequent visitation; brief glimpses of the Project not in the direct line of sight. (e.g. secondary/local roads, screened visibility).
Visual effect	As above.	As above.	As above.
Distance/ Geographical extent			
Landscape effect	The Project is a very prominent element in the view from the receptor (i.e. in the foreground) in the receptor's direct line of sight.	The Project is a noticeable element in the view from the receptor (i.e. in the midground or within the 1-2km Visual Catchment) but not in the direct line of sight.	The Project is difficult to distinguish from the receptor (i.e. in the background or beyond the 2km Visual Catchment) not in the direct line of sight.
Visual effect	As above.	As above.	As above.

Criteria	High	Moderate	Low
Duration			
Landscape effect	The effect is a permanent feature or lasting over a generation (excess of 30 years).	The effect is a temporary but lasting a significant period of time (i.e. 5 to 30 years).	The effect is temporary lasting a short period of time (i.e. less than 5 years).
Visual effect	As above.	As above.	As above.
Reversibility			
Landscape effect	The effect has irreversible changes to the landscape character or view.	The effect is reversible but may result in some lasting changes to the Landscape character or view.	The effect is reversible, and the landscape or view can be returned to the state prior to introduction of the effect.
Visual effect	As above.	As above.	As above.

Table 2-3: Matrix of Significance of Effects (Landscape Institute & IEMA, 2002)

		Magnitude of Effects		
		High	**Moderate**	**Low**
Sensitivity of Receptors	**High**	High Significance	High-Moderate Significance	Moderate Significance
	Moderate	High-Moderate Significance	Moderate Significance	Moderate-Low Significance
	Low	Moderate Significance	Moderate-Low Significance	Low Significance

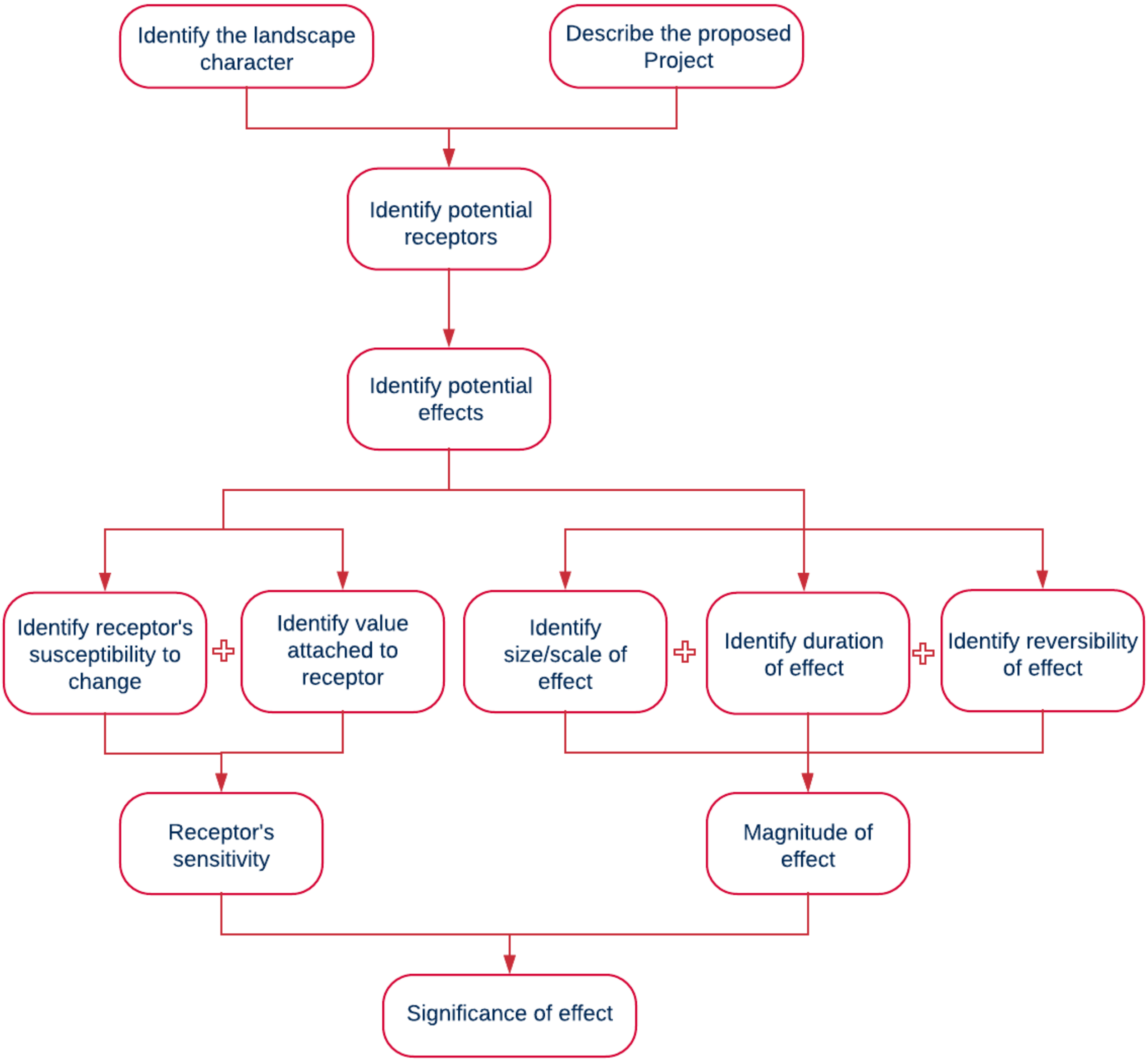

Figure 2-2: Processing for Assessing Landscape and Visual Effects (Landscape Institute & IEMA, 2013)

2.2. SCOPE OF VIA

In defining the scope of this VIA, a one (1) km and two (2) km varied distance buffer of the Project area was created using Geographical Information System (GIS) technology. These buffers are referred to as Visual Catchments throughout this VIA and are used to define the extent of the assessments on both the landscape character and the landscape and visual receptors/effects.

2.3. DATA COLLECTION

The following specific data has been collected and relied upon for this VIA:

- Photographs and associated data provided/sourced by EPS Energy;
- Preliminary concept plans of the Project;
- Survey data including contours of the existing site;
- Topographic maps and aerial photographs;
- Computer-generated (GIS) areas of theoretical visibility; and
- Other investigations undertaken for the Project, including a glint and glare assessment, and heritage and environmental studies.

In preparing this VIA, key EPS Energy personnel attended the Project land on five (5) separate occasions to photograph and record the existing landscape, liaise with relevant landowners, and collect other data pertinent to the VIA. Data collected on the following dates has been included in this VIA:

- 6-7 June 2017;
- 18 December 2017;
- 12 March 2018;
- 29-30 May 2018; and
- 26 July 2018.

2.4. RENEWABLE ENERGY AND LANDSCAPE CHARACTER

Landscapes are an important consideration because of the value that individuals, communities and public bodies attach to them. Landscapes are a shared resource which are as important in their own right as they are as a public good. Certain landscapes also provide economic benefits, either directly such as through agriculture or indirectly through health and wellbeing improvements.

Landscapes are not static but continue to evolve and change with communities. Landscape changes are driven by changing requirements for development to meet the needs of a growing population and economy. This includes new forms of energy generation, such as renewable energy.

Emerging modern perspectives are placing increasing emphasis on the importance of sustainable development. Sustainable development is development which is able to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. A key component of sustainable development is that this type of development balances economic, social and environmental matters. Sustainable developments do not rely upon depleting limited or finite resources. Renewable energy is an example of a type of sustainable development, compared with traditional energy-generation methods. In considering our shift towards more sustainable developments, authorities must balance big-picture policy considerations against small-scale local impacts, including visual impacts.

2.4.1. Australian Context

As a signatory to the Paris Agreement, Australia has international obligations in response to climate change to reduce greenhouse gas emissions. Australia's goal is to reduce emissions by 26-28 per cent below 2005 levels by 2030. In order to meet this goal, Australia has set a Renewable Energy Target aiming towards a doubling to more than 23 per cent of Australia's electricity to be from renewable sources by 2020. This target sees energy production move away from the development of traditional fossil fuels, to low carbon technologies. Whilst traditional fossil fuel energy sources tended to be large and centralised, renewable energy technologies are available at different scales with different distribution models. Renewable energy developments can produce energy close to the point of use, with different ownership models that depend upon the scale of the development.

The transition to renewable energies will have a profound shift on our landscapes, places, communities and economies. Renewable energies offer an opportunity to consider how these new technologies will best fit into our existing environment. A potential challenge for new renewable energy developments is the competition for land use with existing land uses. A balance needs to be struck against the production of both food and energy. Treasured landscapes, unique biodiversity and valuable heritage assets need to be respected and preserved. Site selection for renewable energy developments presents a unique challenge to minimise impacts on existing environments, with the opportunity to create positive change in communities with untapped potential.

Appropriate site selection is vital to the success or failure of any renewable energy project, including solar farms. Availability of solar resources, land use for both the site and the surrounding area, environmental constraints of the site, community attitudes towards the development and the ability to provide unconstrained energy into the electrical grid are all important considerations for any solar energy project. Examples of existing renewable energy infrastructure throughout Australia is shown in Figure 2-3.

Figure 2-3: Existing Renewable Infrastructure in Australia

2.4.2. South Australian Context

Investment in solar energy projects has been rapidly increasing in recent years throughout South Australia. South Australia is currently on track to have three quarters of its electricity generated from renewable sources by 2025. SA Department for Energy and Mining is committed to facilitating investment into renewable energy and energy storage projects to meet the state's future energy needs as well as Australia's Paris climate emission agreements. South Australia is a world leader in renewable energy production, with the state currently undergoing a renewable energy boom. South Australia is home to the world's largest Lithium-Ion Battery now operating in Jamestown and is the leading producer of wind power in Australia.

The impact of this rapid uptake of renewable energy projects results in an ever-changing landscape to accommodate this infrastructure. Despite the fast-paced changing landscape, adequate consideration of appropriate bulk and scale within the existing landscape is an important consideration for renewable energy developers. Examples of existing renewable energy infrastructure in South Australia is shown in Figure 2-4.

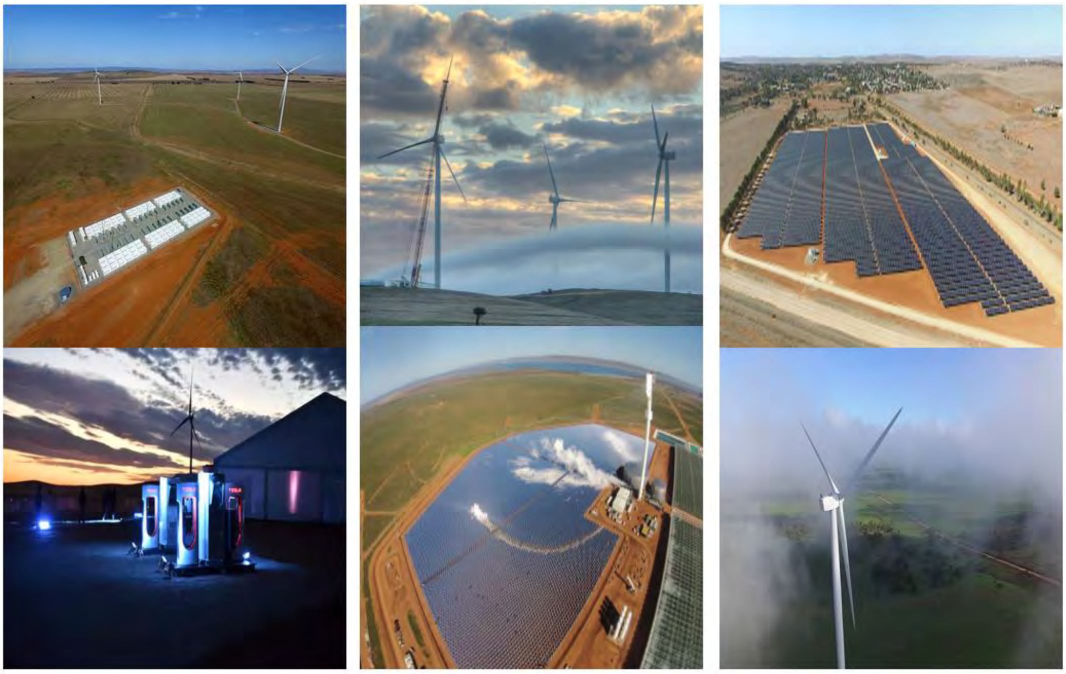

Figure 2-4: Existing Renewable Infrastructure in South Australia

2.4.3. Local Character

Local Character is what makes a neighbourhood distinct. Local Character contributes to the identity of an area, and is created by the landscape, both private and public places as well as natural and human elements. In considering the appropriateness of locating a proposed development, attention is needed to be paid to the distinctive character of the area. An important component of this is how the community sees the insertion of specific development types, such as renewable energy developments, into their existing landscape.

The Regional Council of Goyder Development Plan 2016 is the on-ground development assessment document which sets out the rules about what can be done on any piece of land in the Regional Council of Goyder and the detailed criteria against which development applications will be assessed.

This Development Plan outlines the Desired Character for the Primary Production Zone. Renewable energy is envisioned for this zone in the form of wind farms and ancillary developments such as substations, maintenance sheds, access roads and connecting power-lines. The Development Plan details that these facilities will need to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence, components may need to be:

- Located in visually prominent locations such as ridgelines;
- Visible from scenic routes and valuable scenic and environmental areas; and
- Located closer to roads than envisaged by generic setback policy.

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The Development Plan acknowledges that it is difficult to mitigate the visual impacts of wind farms to the degree expected of other types of development due to the large scale of these facilities (in terms of both height and spread of components). Appropriate wind farm locations include sites with the opportunity for harvesting of wind and efficient generation of electricity and therefore these types of developments can be in visually prominent locations. The Desired Character section for Primary Production Zone sets out that, subject to the implementation of management techniques by Council wide policy regarding renewable energy facilities, visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy.

The Regional Council of Goyder Development Plan 2016 was consolidated on 24 November 2016. This was at a time when wind projects were the only renewable energy projects in the region, prior to the renewable energy boom which saw large-scale solar developments rapidly become economically viable. Since then, Goyder Council has adapted and recently included proposed solar projects in the Goyder Master Plan 2018-2033. It can be extrapolated from their Development Plan that it is the intention of Goyder Council to not only permit large-scale solar projects in the Primary Production Zone but that, in addition, the visual impacts of such a development are to be accepted where an increase in renewable energy is generated.

One of the key design elements in determining whether or not a development proposal is in accordance with the Desired Character of a landscape, is considering the visual impact on the character of a landscape. The visual impact on the character of rural landscapes is considered in the section below.

2.4.4. Visual Impact on Rural Landscapes

Rural environments have historically been the preferred location for large electrical infrastructure. Electrical infrastructure, including substations and transmission lines are already prevalent in rural landscapes across Australia. Examples of electrical infrastructure in rural Australian landscapes are shown in Figure 2-5.

Figure 2-5: Existing Electrical Infrastructure in Australia

Rural landscapes are the preferred landscape type for the development of new electrical infrastructure, including renewable energy developments for a number of reasons including:

- **Proximity to Electrical Infrastructure** - Rural land use is typically the land use surrounding existing electrical infrastructure. Proximity to substations and 275kV transmission lines are key requirements for utility-scale solar projects;
- **Large Land Areas** - Rural land offers large areas which can satisfy the requirements for economically viable renewable energy projects. An area of about two hectares is required in order to generate 1MW of utility-scale solar, with projects typically requiring between 200-2,000 hectares of land;
- **Large Allotments and Land Tenure** - Rural landholdings typically have large allotments and land tenure, which ease project inception, as far less allotments are required than in urban environments;
- **Regional Economic Benefits** - New infrastructure in a regional area, including rural landscapes has the positive flow on effect of stimulating local business;
- **Income Diversification** - Co-benefits can be produced where agricultural land is used for renewable energy production, as rural landowners can diversify their income. Energy production offers an excellent alternative source of revenue where land is of variable productivity potential. Rural landowners can generate a passive income from renewable energy developments, which can be supplemented in some cases with co-location of agricultural activities; and

- **Fewer Receptors** - Rural landscapes typically have minimum receptors nearby, compared with urban environments. Rural areas are less built-up, meaning that the number of individuals to be exposed to a change in the visual landscape is far less than in an urban environment.

2.4.5. Character of the Project Area

The location of the Project is within a highly rural setting. The Project area and the surrounding land is currently used for agricultural purposes. However electrical infrastructure already forms part of the character of the Project area.

The Project area has existing surrounding electrical infrastructure. Robertstown Substation is located to the south of the Project area, on the opposite side of Lower Bright Road. Transmission lines (both 132kV and 275kV) as well as their associated easements transect and surround the Project area. The existing electrical infrastructure in and around the Project area is shown in Figure 2-6. The visual impact of the existing electrical infrastructure is important contextually for considering both the existing character of the Project area, and how the Project is likely to impact upon the visual landscape of the local area.

Figure 2-6: Existing Electrical Infrastructure in and Around the Project Area

2.4.6. Visual Interpretation of Utility-Scale Solar

Utility scale solar projects share similar visual characteristics to existing rural landscapes. This is important in understanding how solar projects are visually interpreted in their contexts. The following section examines the comparison between the proposed indicative technology of the Project to examples of agricultural uses and rural infrastructure.

The technology currently proposed for the Project is a single axis tracking system with an approximate 10m separation between rows, with ancillary infrastructure such as battery storage sheds. The modules will generally be aligned on the tracking system in a north/south row and rotate in position from east to west.

Further site layout assessments and detailed engineering will define the preferred configuration of panels to ensure:

- Maximum exposure to sun;
- Efficient layout of solar panels across the Project area;
- Efficient connection to the substation;
- Ease of construction;
- Efficient access for maintenance and long-term operation; and
- Technology advances can be incorporated.

Generally, however, the configuration will demonstrate lineal geometric repetition consistent with typical large-scale solar farms.

As shown below in Figure 2-7, Figure 2-8 and Figure 2-9 a project of this scale provides uniformity within rural landscapes, not dissimilar to the lineal patterns of vineyard or orchard rows, or the geometric form of monocultural fields.

Figure 2-7: Lineal Repetition of Vineyards and Solar Farm Panels

Figure 2-8: Comparison of Monoculture to the Geometric Landscape of Solar Farms

Figure 2-9: Viewpoints Articulating the Repetition and Lineal Sight Lines

The design of the Project's ancillary infrastructure including battery storage, are also reflective of existing rural landscapes. Solar infrastructure can be compared to the form of metal clad shedding and storage typically found in rural settings (See Figure 2-10 below).

Figure 2-10: Comparison of Typical Battery Infrastructure to Farming Structures

Utility-scale battery storage structures are typically constructed according to two design methodologies; modular systems and building-based systems. A number of technologies are being assessed to provide the optimum solution for the project and integration in the South Australian transmission electricity network. Although the BESS footprint and storage structure is subject to the final technology decision, it could cover up to approximately 20ha of the 1,800ha Project land.

At this stage the storage of the BESS could include a combination of solid structures representative either of typical agricultural style storage buildings e.g. intensive animal keeping sheds used in the Primary Production Zone (See Figure 2-11 and Figure 2-12 below) or Tesla style battery units (See Figure 2-10 above) or 40-foot shipping containers. The specific height of storage structures within the battery storage area is yet to be determined.

Figure 2-11: Typical Sheds Used at a Chicken Farm

Figure 2-12: Chicken Farm at Robertstown, SA

3. LANDSCAPE CHARACTER

The scope of this assessment of landscape character includes the identification of Landscape Character Zones and description of the general landscape characteristics of the Project land and surrounding area within the 2km Visual Catchment.

3.1. PROJECT LOCATION

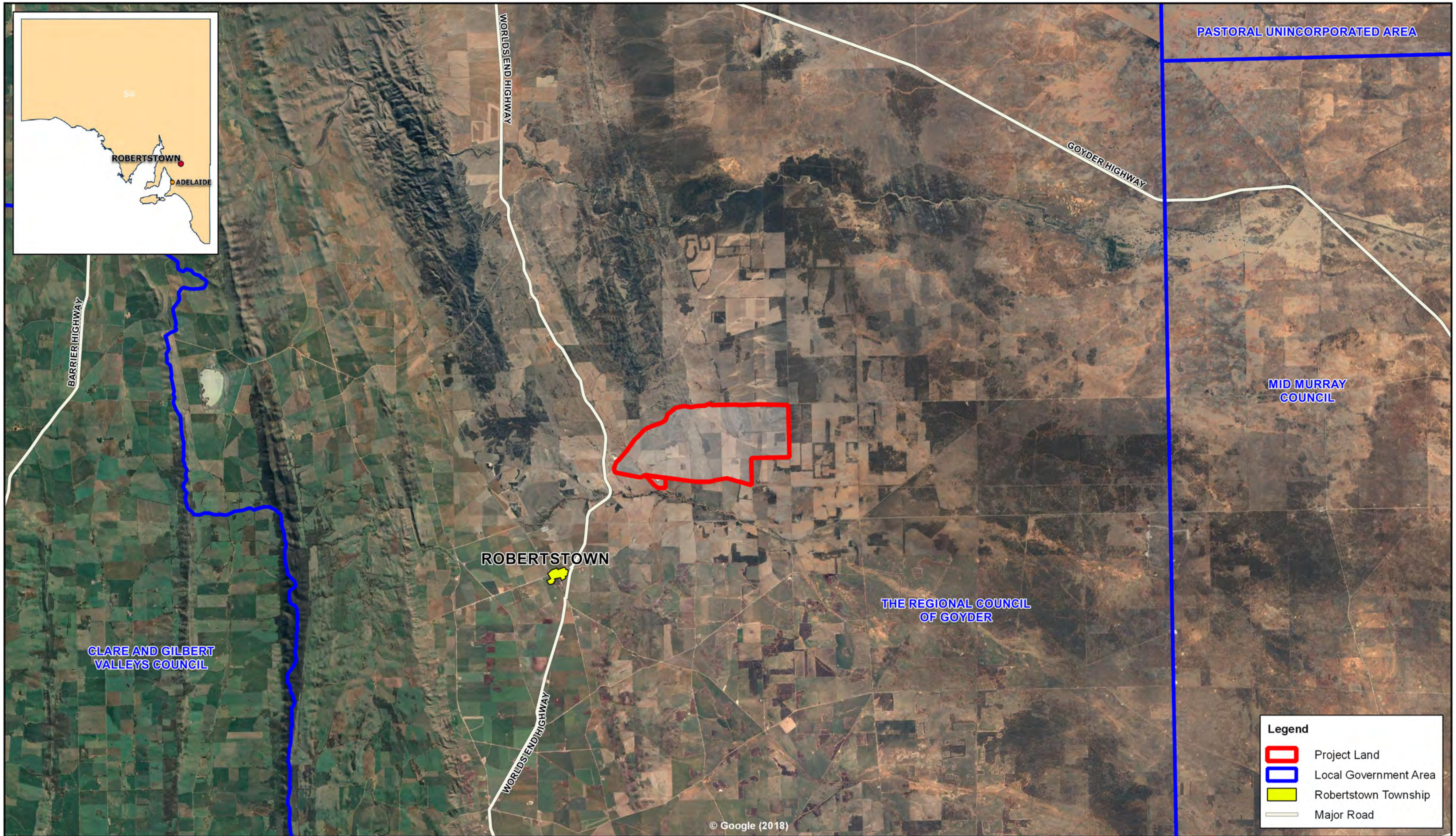
The Project land is approximately 1,800 ha and is shown on the location plan in Figure 3-1.

The Project land is located in the districts of Bright and Geranium Plains, approximately five (5) km north east of Robertstown and 125 km north of Adelaide. The Project land is within the Local Government Area of the Regional Council of Goyder.

The Project land incorporates the Project area on which the PVS, BESS, Project's substation, Operations and Maintenance buildings and associated infrastructure will be built and operated.

The following features characterise the Project area and are described further in Section 3.2.

- Adjacent to the existing Robertstown Substation;
- Bound by Powerline Road (north and west), Lower Bright Road (south), Junction Road (east) with Eagle Hawke Gate Road running north-south through the centre of the Project area, all of which are unsealed and predominately used for local traffic movement;
- 132kV and 275kV transmission lines and associated easements crossing and surrounding the Project area;
- Rudimentary wire fencing;
- Mostly cleared, slightly undulating land that has been heavily used for grazing and cropping; and
- Disused and/or decrepit residential buildings, most of which are essentially debris.



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:150,000
Job Ref/Version:	11314/ V08

0 2.5 5 7.5 10 km

Map Projection: GDA 1994 MGA Zone 54

Figure 3-1

Robertstown Solar Location

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_VIA_Locality Map.qgs

3.2. LANDSCAPE DESCRIPTION

There are no distinct Landscape Character Zones within the 2km Visual Catchment. The predominant landscape character is almost exclusively rural, details of which are described below.

As described in Section 2, once the existing landscape character has been identified, this will be reviewed alongside the description of the Project to identify the potential landscape and visual receptors and effects.

3.2.1. Landform/topography

The Project area and surrounding landscape is characterised as mostly flat to undulating land (Plate 1 and Plate 2). The land is approximately 330m above sea level with an undulating gradient.

The surrounding landscape within the 2km Visual Catchment, and also extending beyond by approximately 15km, is dominated by agricultural uses and is within the "Primary Production" zone category pursuant to the Regional Council of Goyder Development Plan 2016.

There is some evidence of eroded areas within the landscape (Plate 3).

There are little to no natural landscape features aside from vegetation (discussed in Section 3.2.2) evident within the 2km Visual Catchment, however a number of artificial features are dominant and discussed in Section 3.2.4.

Plate 1: Flat Terrain with Low Contrast Within Project Area

Plate 2: Undulating Terrain Within Project Area

Plate 3: Evidence of Erosion Within Project Area

3.2.2. Landcover/vegetation

The Project area and surrounding landscape consists of mostly cleared land due to historic cropping and grazing activities. There is native vegetation within the Project area including small treed areas, scattered trees and tree clumps throughout (Plate 4 and Plate 5).

There is sparse-low density vegetation along Powerline Road (north and west), Lower Bright Road (south) and medium density vegetation along Junction Road (east) and Eagle Hawke Gate Road (running north-south in the centre of the Project area).

Plate 4: Scattered Vegetation on Rocky Outcrop

Plate 5: Clump of Vegetation Along Fence Line

3.2.3. Water Form

A small number of ephemeral water courses exist within the Project area (Plate 6), however there is no presence of inundated areas.

Plate 6: Dry Creek Within Project Area

3.2.4. Land Use

The Project area is mostly free from development and is primarily used for grazing and cropping agricultural activities. There are a small number of abandoned and decrepit residential buildings, most of which are essentially debris (Plate 7 and Plate 8). The dominant land use in the surrounding area is consistent with that of the Project area.

The Robertstown Substation is located adjacent to the Project area, on the southern side of Lower Bright Road, which is only partially visible from Worlds End Highway and several surrounding roads and properties. Although the associated transmission lines and towers form part of the landscape and influence the overall naturalness of the area (Plate 9). Further, two large watermains are located near the Project area and extend throughout the surrounding landscape.

Plate 7: Rubble Remains of Old Residential Building Within Project Area

Plate 8: Decrepit Residential Building Within Project Area (image from drone survey)

Plate 9: 275kV Transmission Lines and Towers Within Project Area

3.2.5. Texture and Colour

There is little diversity or contrast in colour tones and texture due to levels and patterns of rainfall (Plate 10). The Bluff Ranges is a distinct feature in the background, and the only discernible focal point on the horizon.

Plate 10: Bluff Ranges in the Background, Watermain in the Foreground

3.2.6. Settlement Pattern

The settlement pattern is spread across large rural allotments with scattered rural buildings. As stated, many of these buildings are abandoned and, in most cases, have been reduced to rubble.

3.2.7. Rarity

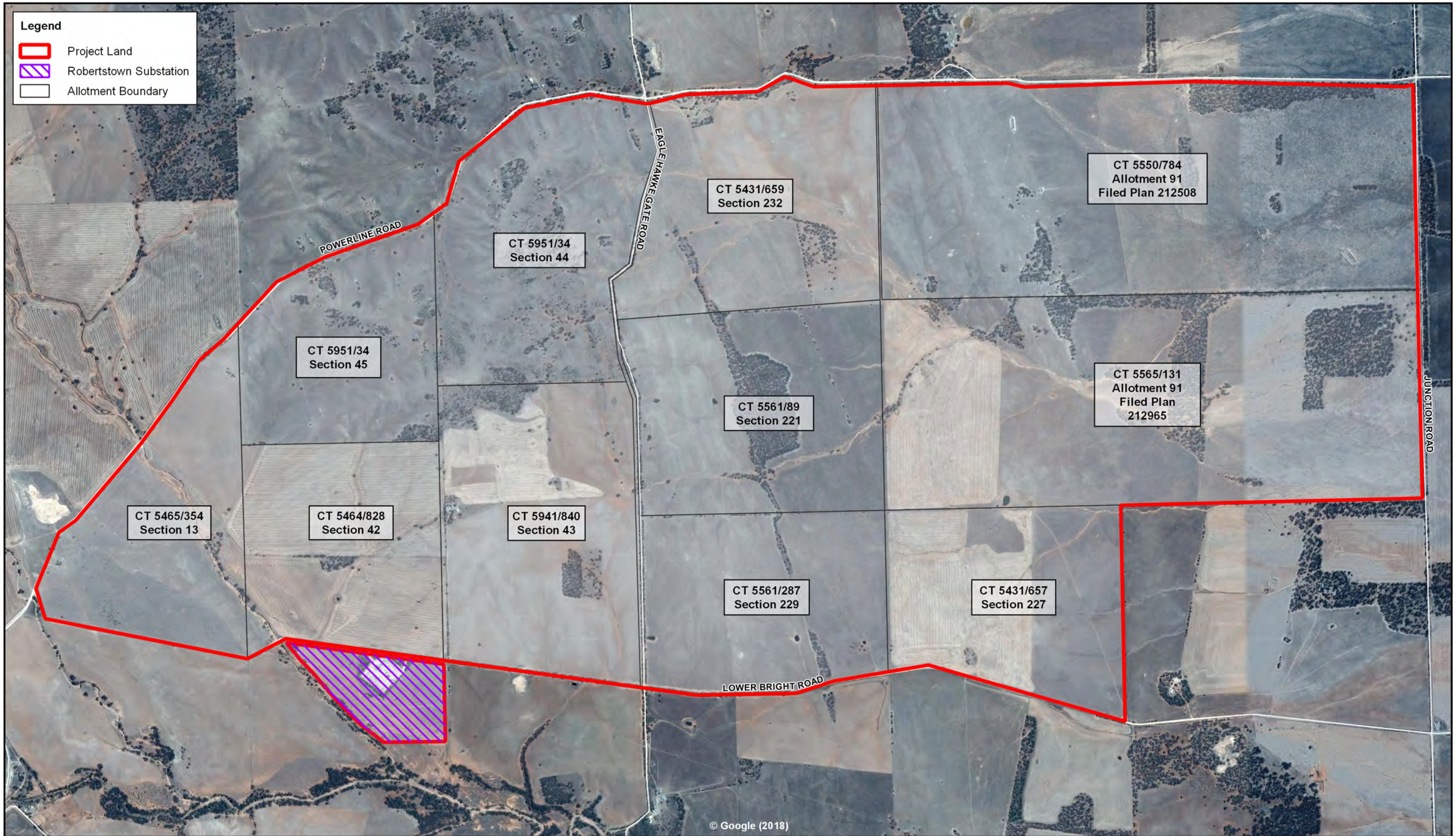
The Project area and the surrounding landscape do not contain any local, regional, national or internationally significant landscapes or elements.

The existing landscape elements within the Project area and surrounding landscape are common within the region and other rural landscapes.

4. ROBERTSTOWN SOLAR PROJECT

4.1. PROJECT LAND PARTICULARS

The Project land and title particulars are detailed in Figure 4-1 below.



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Reviewer:	SMC/ JB
A3 Scale:	1:19,000
Job Ref/Version:	11314/ V03

0 0.25 0.5 0.75 1 km

Map Projection: GDA 1994 MGA Zone 54

Figure 4-1

Project Land Title Particulars

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_VIA_Project_Land_Particulars.qgs

4.2. TECHNICAL DESCRIPTION

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

The Project will comprise of a series of mounted PV modules set out in arrays using a single axis tracking system. The arrays will be connected to inverters and voltage step-up transformers. The Project will be connected to the adjacent Robertstown Substation via dedicated 275kV double circuit overhead or underground transmission line.

The Project components includes but is not limited to:

- A PVS of approximately 500MW (AC) generation capacity and associated infrastructure;
- A 250MW capacity BESS with 1,000MWh of storage and associated infrastructure;
- Permanent operations components of the PVS element include (but are not limited to) the series of mounted photovoltaic modules set out in arrays, inverter/ transformer stations, interconnector substations, switching station, all overhead transmission and underground cabling and operational, maintenance and control buildings;
- Permanent operations components of the BESS element including (but not limited to) the BESS area, sheds and all overhead transmission and underground cabling;
- Any synchronous condensers if included in the Project; and
- Permanent operations ancillary components of the Project including (but not limited to) all internal roads, car parking areas, fencing, and access points to the road network, and any other relevant matter.

4.3. LAYOUT AND KEY VISUAL COMPONENTS

The indicative layout and indicative key visual components of the Project considered in this assessment include:

- Solar modules – mounted on single axis tracking racks;
    - Approximately 1,700,000 solar panels installed in rows orientated north;
    - Solar panels of approximately 2 x 1.2m mounted on steel frames approximately 3-4 metres above the ground;
    - Panels are specifically designed to absorb light and should not produce any significant reflectivity or glare;
- Inverter stations (~3m high);
- Transformers;
- Switching substation;
- One or more synchronous condensers (subject to requirement); and

- Utility scale battery facility (either 3-4m high containerised system or possible rural shed up to ~8 or 9m high).

Typical examples of the proposed mounted solar panels are shown in Figure 4-2 below. Panels can tilt on the one axis. There are wide distances between the rows of panels which provides for greater access during construction and operation and eliminates overshadowing from adjacent panels. Panels are attached to the racking in different formations, which can range from four panels to one panel and be orientated either landscape or portrait.

Figure 4-2: Examples of Typical Single-axis Tracking Solar Modules

Groups of solar panels are connected to an inverter, typically via underground cabling and the inverters are linked together to collect the total energy being produced. Step-up transformers, that increase the voltage, are housed in the inverter containers. An example of a typical utility-scale inverter is shown in Figure 4-3 below.

Figure 4-3: Example of a Typical Utility-scale Inverter

Examples of utility-scale battery technology configurations are shown in Figure 4-4. A battery facility is scalable to the space, power and energy requirements of the site. It can be configured in various arrangements, offering a high amount of modularity. Alternate battery technology such as flow batteries may be used which may either be laid out in container similar to shipping containers or located in multiple rural style sheds (up to 8-9m in height) over a larger footprint area than lithium ion type batteries.

Figure 4-4: Examples of Utility Scale Battery Technology Options

Connection infrastructure includes:

- Associated underground cables connecting groups of solar panels to inverter stations and underground and/or overhead transmission lines from inverter stations to the Project's switching substation; and
- A switching substation comprising typical electrical infrastructure to that which is found within the existing Robertstown Substation, depicted in Plate 11 below.
  The switching substation will contain any synchronous condenser if required and will be fenced for safety and security purposes.

Plate 11: Robertstown Substation

Administration and controls area including:

- Control room and site office with amenities (typical demountable style building);
- Maintenance and spare parts building;
- Other buildings;
- Car parking sufficient for employees and contractors during operation;
- Laydown/compound area and battery storage area; and
- Internal access roads.

Ancillary infrastructure includes:

- Drainage works, including stormwater management systems;
- Areas not to be developed e.g. native vegetation areas, heritage areas;
- Security fencing and CCTV will be installed;
- Low-level night time lighting; and
- Lightning protection.

Examples of indicative development components are shown below for a typical Office and Maintenance (O&M) buildings (Figure 4-5), a typical Switch Room (Figure 4-6), a typical Staff Room (Figure 4-7), how these buildings typically appear alongside each other (Figure 4-8), and security fencing (Figure 4-9).

Figure 4-5: Example of a Typical Office and Maintenance Building

Figure 4-6: Example of a Typical Switch Room

Figure 4-7: Example of a Typical Staff Room

Figure 4-8: Example of a Typical Switch Room Alongside an O&M Building

Figure 4-9: Indicative View of Security Fencing Surrounding a Solar Farm

4.3.1. Construction and Decommissioning

The Project has three phases; construction, operation and decommission phases. Each phase is anticipated to have a varying degree of visual impact and duration. Each phase involves various activities, machinery, equipment and structures detailed below.

The key construction works required for the construction phase include (but are not limited to):

- Construction of internal access tracks and laydown areas;
- Installation of site office, maintenance sheds and other buildings;
- Site preparation earthworks for installation of panel supports;
- Installation of panel supports;
- Solar panel erection;
- Installation of the battery system/technology and battery storage structures;
- Substation installation and electrical connection between solar panels and central inverters, substation and battery storage;
- Provision of other utility services (electricity, communications, etc.) as required;
- Overhead or underground electrical connections to the Bungama Substation;
- Installation of the remaining system components (including synchronous condensers if included);
- Landscaping (if required), fencing and signage; and
- Commissioning.

The operational period will run for approximately 30 years and includes:

- Solar panel washing;
- General PVS and BESS equipment maintenance;
- Fence and landscape maintenance; and
- Land management.

During the decommissioning phase Project related infrastructure would be removed from the Project area, and the land restituted for its original use.

5. ASSESSMENT OF POTENTIAL RECEPTORS AND EFFECTS

The following assessment of potential effects is based primarily on the Photovoltaic (PV) array component of the Project and does not include an assessment of the ancillary structures (described in Section 4.3). This is primarily due to the horizontal spread of the PV array spanning a large area of the landscape, subsequently posing a higher potential for visual change to the landscape. Whereas the ancillary structures are not uncommon structures in the landscape (as described in Section 4.3) and are also proposed to be located immediately adjacent to the existing Robertstown Substation along Lower Bright Road. These structures are therefore not anticipated to pose a visual change requiring detailed assessment.

5.1. POTENTIAL LANDSCAPE RECEPTORS

Landscape receptors can include the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the landscape character itself (Landscape Institute & IEMA, 2013). As such, the landscape characteristics described in Section 3.2 are considered landscape receptors, as well as the identified rural landscape character.

As indicated in Section 2.1.2, this assessment will be guided by the most and least preferred characteristics identified in the literature (Table 2-1) and considered against the specifications of the assessment criteria detailed in Table 2-2. The category scales (high, moderate, low) are referred to with either H, M, L in the assessment of potential landscape effects in Table 5-1 below.

Table 5-1: Assessment of Landscape Effects

Landscape Receptor	Sensitivity of Receptor		Magnitude of effect					Description	Significance of Effect
	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility		
Landform/ topography	M	L	L	L	M	M	L	Although the Project will impact the landform, there will be no major impact on the topography of the land.	Moderate-Low
Landcover/ vegetation	L	L	L	L	L	L	L	Limited vegetation clearance will be undertaken as part of this Project.	Low
Water form	L	L	L	L	L	L	L	No water forms evident within the Project area or the surrounding landscape.	Low
Land use	M	L	M	L	M	M	L	Although the addition of the Project would be a noticeable change to the existing land use, the co-location of the existing Robertstown Substation and the Project area render the proposed use of the site appropriate.	Moderate-Low
Texture and colour	M	L	M	L	M	M	L	The introduction of PV solar panels will introduce a new scale of colour and texture to the Project area; however, these textures and colours are common place in the landscape from machinery sheds, silos, storage sheds, etc.	Moderate-Low

Landscape Receptor	Sensitivity of Receptor		Magnitude of effect					Description	Significance of Effect
	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility		
Settlement pattern	M	L	M	L	M	M	L	The addition of the Project would be a noticeable change to the existing settlement pattern.	Moderate-Low
Rarity	L	L	L	L	L	L	L	No existing rare or unique elements were identified within the Project area or the surrounding landscape. Changes are negligible in this regard.	Low
Rural landscape character	L	L	L	L	L	M	L	Renewable energy developments are a type of desired character for the Primary Production Zone. Further, developments of this nature are not considered a significant change in rural landscapes, generally. Changes are negligible in this regard.	Low

5.2. VIEWSHED ANALYSIS

Viewshed analysis is a GIS tool used to identify the theoretical visibility of the Project within a defined study area. As stated, the results of the analysis are theoretical only and recognising the limitations of its use can assist with understanding the results of the analysis.

It is important to note that the Project in its entirety cannot be viewed from one single viewpoint.

The viewshed analysis completed for this VIA (Figure 5-1) is based on digital elevation model (DEM) information derived from Geoscience Australia. This data has a resolution of approximately 30 metres, where 90% of tested elevations were within 6m of reference heights, and in flatter areas height errors are less than 3 metres (Gallant, et. al., 2011).

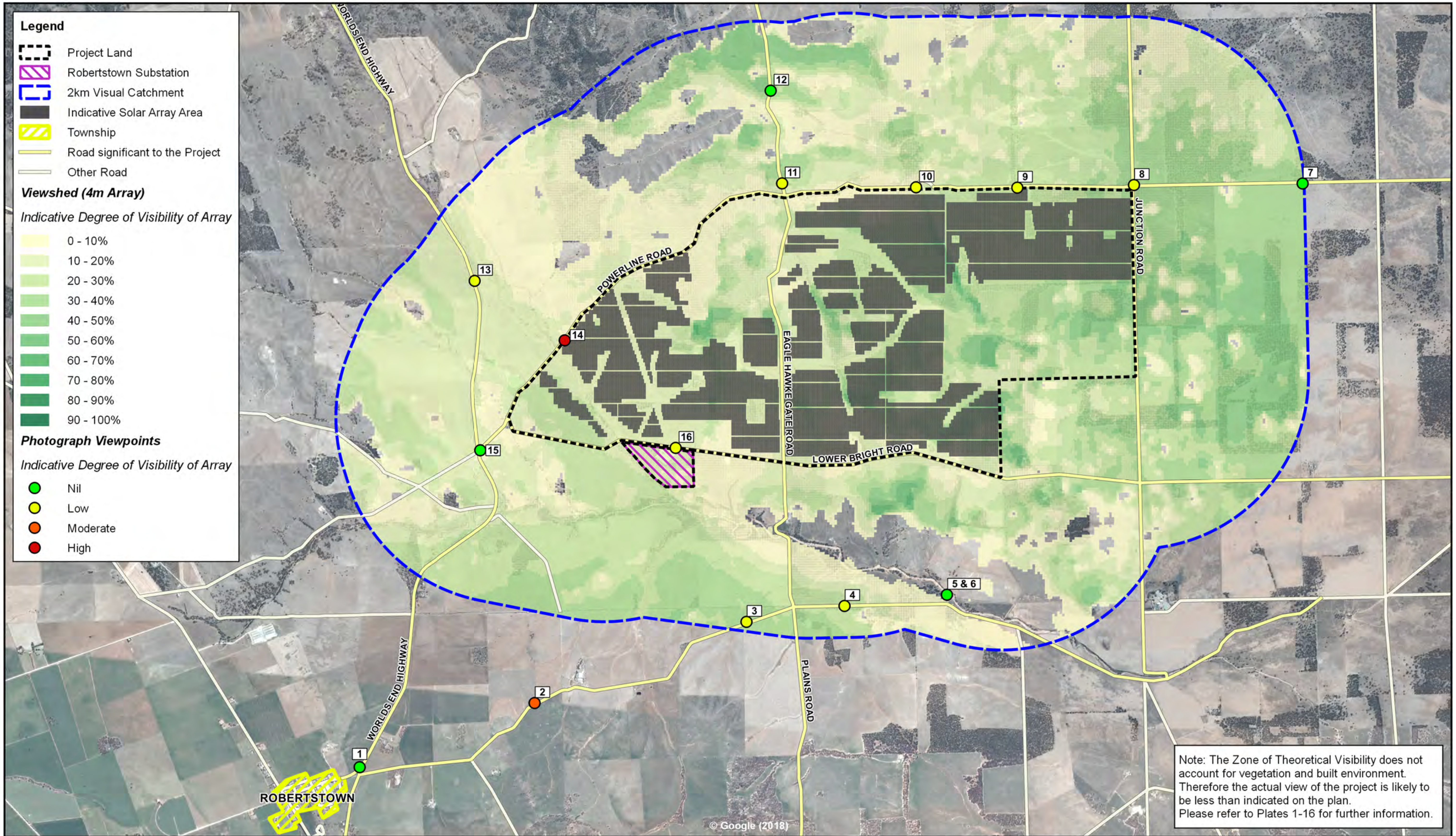
Although smoothing has been applied, and after vegetation removal random noise is still present. The noise typically alters elevations by 2 to 3 metres, but in some cases by as much as 10 metres (Gallant, et. al., 2011). Considering the Project area and surrounding area is mostly flat and sparsely vegetated the accuracy is considered to be manageable over a larger area.

It is not common practice to include other land use or topographical data when processing the viewshed, therefore the results do not account for features or "obstructions" (i.e. buildings/structures, vegetation, and ridgelines) that have potential screening abilities. Accordingly, false-positives are a common occurrence. The earth curvature can also have an influence on screening potential, however given the size and scale of the Project in relation to the earth curvature this is not considered necessary to include in the viewshed.

Lastly, the heights of the viewer/receptors and the Project are also integral to the analysis. In this instance, the receptor height is set at 1.6 metres, which is considered an average persons' height, and the Project height is set at 4 metres, which is an indicative dimension of the maximum height of the PVS likely to be used for the Project.

It is also important to consider that a significant amount of the land that is indicated to have a degree of visibility of the Project is not exposed to many receptors. Using the viewshed analysis, a total of 17 viewpoints scattered throughout the surrounding landscape were selected. These viewpoints underwent assessment during numerous site visits to "ground-truth" the degree of visibility and effects of the Project. This revealed a significant amount of false-positives within the viewshed output and confirmed the limitations of this type of analysis and that the results are theoretical only.

An assessment of the visual effects from 16 of these viewpoints are also depicted in Figure 5-1 (Inspiration Point is not depicted within the figure) and all 17 are discussed in the following Section, 5.3.



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:42,000
Job Ref/Version:	11314/ V05

Figure 5-1 **Zones of Theoretical Visibility (4m Array)**

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23/11/2018

11314_VIA_Viewshed_Analysis.qgs

5.3. POTENTIAL VISUAL RECEPTORS

Visual receptors are defined as individuals and/or defined groups of people who are affected by changes to views or visual amenity of the landscape as a result of the Project (Landscape Institute & IEMA, 2013). It follows that the key visual receptors to consider in this assessment are the potential "residential receptors" and the "viewpoint receptors". These have been assessed separately in Table 5-2 and Table 5-3 respectively.

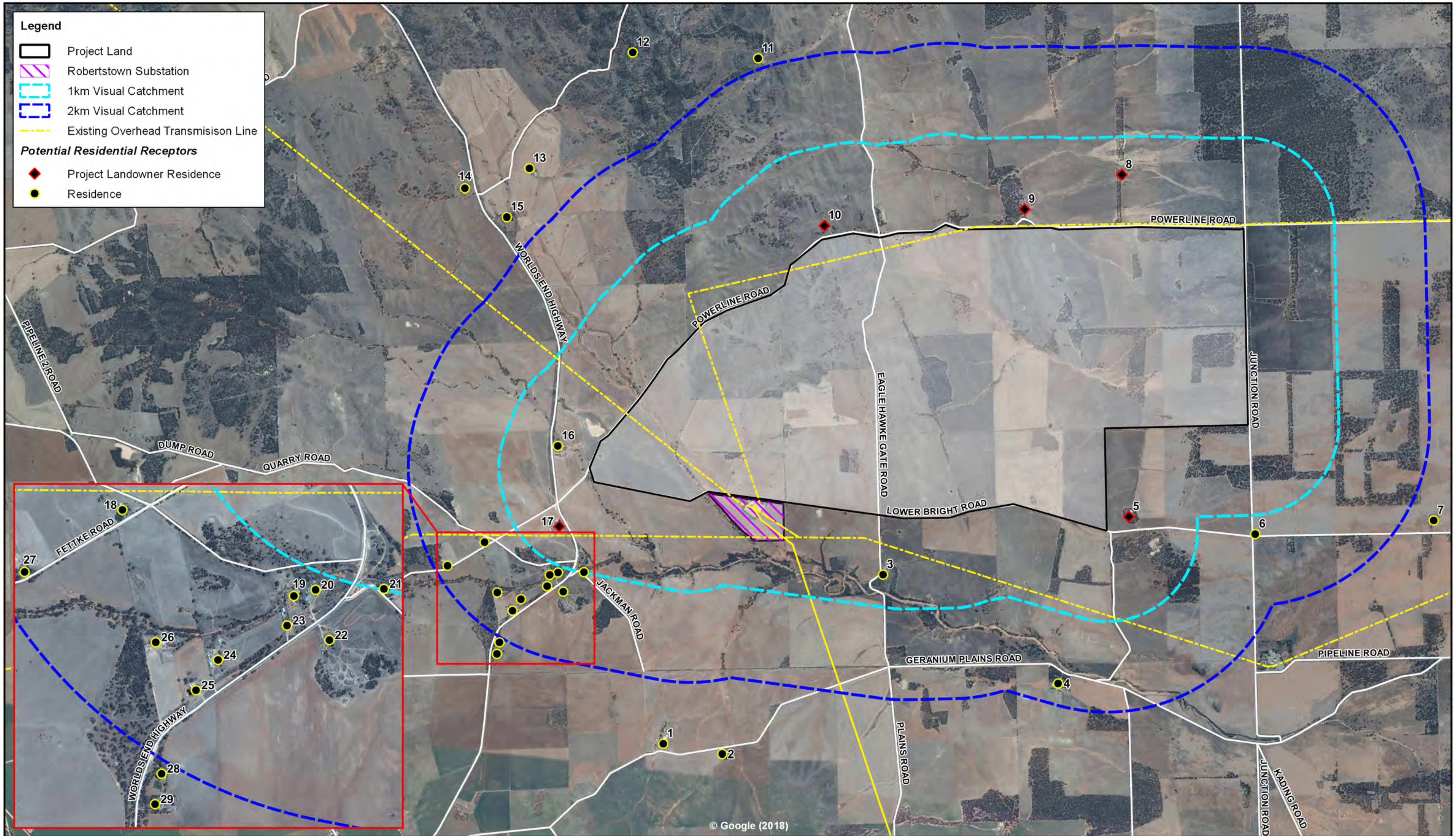
The potential *residential* receptors identified within a 1 and 2km Visual Catchment of the Project area are shown in Figure 5-2. This figure numerically identifies 29 potential residential receptors, five (5) of which are owned by Project landowners. The Project landowners are exempt from this VIA as EPS Energy will liaise with them directly on any potential visual mitigation measures. These receptors are therefore depicted as shaded cells in Table 5-2.

It is noted that at the time of this assessment some residential receptors were unable to be distinguished between residences or structures such as sheds. Also, some residential receptors were unable to be distinguished as occupied or unoccupied residences. During on-ground public consultation it was evident that a number of residences were unoccupied due to local population decline. EPS Energy has taken a conservative approach to these matters and has treated each receptor as if it were an occupied residence. It is also noted that although Receptors 1, 2, 7 and 11-15 are outliers of the Visual Catchment, they have been included in this assessment to ensure consistency and inclusivity as Receptors 1, 2 and 13-15 have visibility of the Project from their location and Receptors 7, 11 and 12 are less than 500 metres outside the 2km Visual Catchment.

The potential *viewpoint* receptors are those identified in the viewshed analysis in Section 5.2. Again, it is important to note that the Project in its entirety cannot be viewed from one single viewpoint. The potential degree of visibility of the Project from each visual receptor has been depicted in both Figure 5-3 and Figure 5-4. Further to this, Figure 5-4 also demonstrates the degree of visibility of the Project along the roads from the Robertstown township toward the Project area and all roads within the extent of the 2km Visual Catchment. Where the Project is expected to be visible, it is indicated in Plates 11-27 as blue shading.

The assessment of visual effects on both the potential residential receptors and potential viewpoint receptors is undertaken in accordance with the assessment criteria outlined in Table 2-2. As with the assessment of landscape effects, the category scales (high, moderate, low) are referred to with either H, M, L in the assessment tables of visual effects.

It is noted that in both the assessment of visual effects on both the residential receptors and viewpoint receptors the 'duration' and 'reversibility' for all receptors score "Moderate" and "Low" respectively. This is due to the nature of the Project as a utility-scale solar development, which is a temporary feature lasting up to 30 years, is non-invasive to install, and the associated infrastructure can be removed upon decommissioning and the landscape and associated views restored to the condition and use prior to the introduction of the Project. Similarly, the 'value' for all viewpoint receptors is assigned "Low" in accordance with the value results from the assessment of rural landscape character (Table 5-1).



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:40,000
Job Ref/Version:	11314/ V05

Figure 5-2 Potential Residential Receptors

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

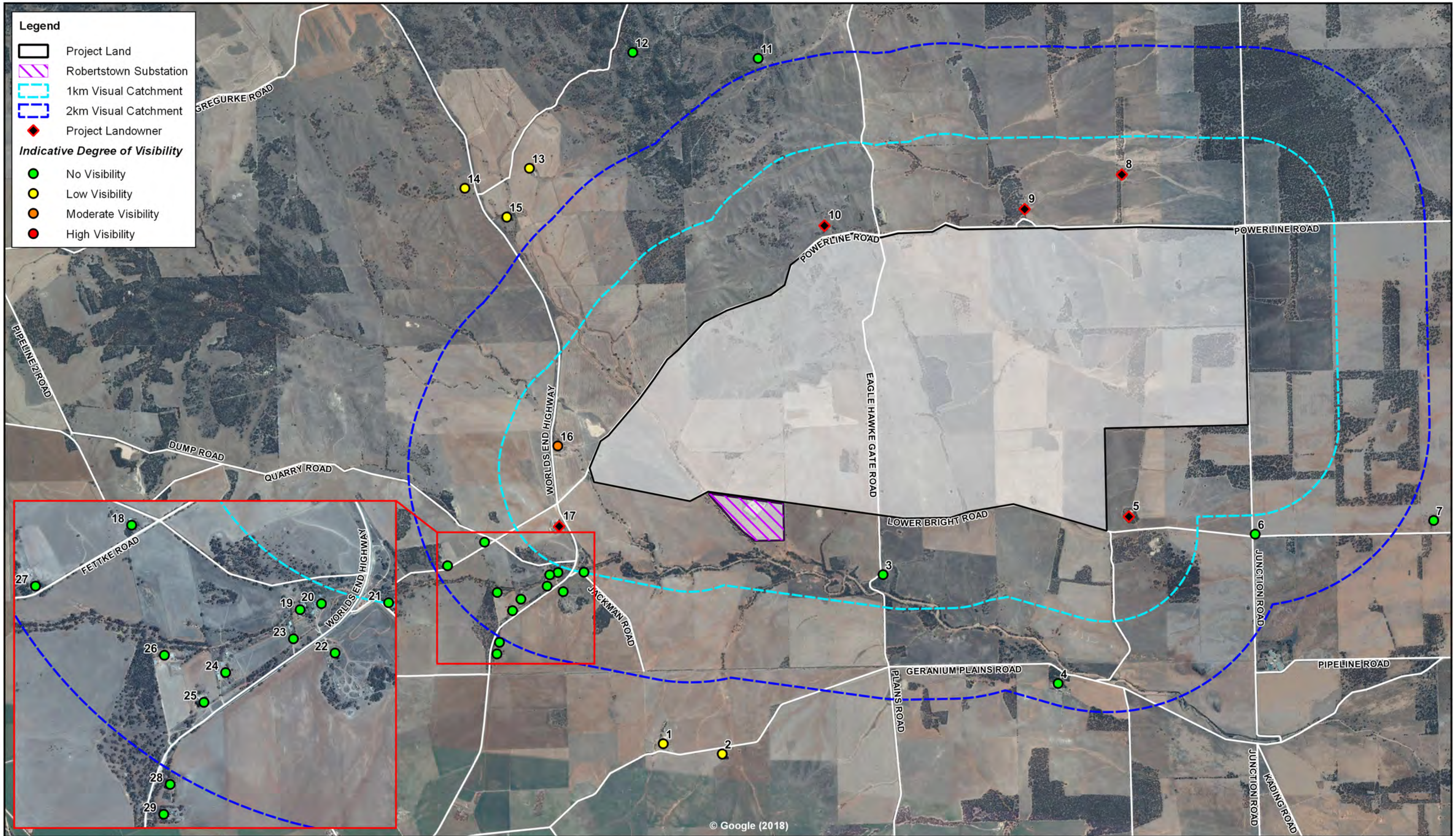
11314_VIA_Potential Residential Receptors.qgs

Table 5-2: Assessment of Visual Effects on Potential Residential Receptors

	Sensitivity of Receptor		Magnitude of effect						
Receptor Identifier	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility	Description	Significance of Effect
1	H	M	L	L	L	M	L	These receptors have prominent views of Robertstown Substation and the expanse of transmission lines and towers covering the landscape. Although the Project may result in a noticeable change to the landscape, these receptors will be looking up the rows of panels, which will not appear to be substantially different in scale and character to the layout of a vineyard as demonstrated in Section 2.4.	Moderate-Low
2	H	M	L	L	L	M	L	As above.	Moderate-Low
3	H	M	L	L	M	M	L	The Project is not visible from this receptor due to the existing topography and vegetation. The Project will not result in any change to views of the landscape from this receptor.	Low
4	H	M	L	L	L	M	L	As above.	Low
5									

Receptor Identifier	Sensitivity of Receptor		Magnitude of effect					Description	Significance of Effect
	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility		
6	H	M	L	L	M	M	L	The Project is not visible from this receptor due to the existing topography and vegetation. The Project will not result in any change to the landscape from this receptor.	Low
7	H	M	L	L	L	M	L	The Project is not visible from this receptor due to the existing topography and vegetation. The Project will not result in any change to the landscape from this receptor.	Low
8-10									
11	H	M	L	L	L	M	L	The Project is not visible from this receptor due to the existing topography and vegetation. The Project will not result in any change to the landscape from this receptor.	Low
12	H	M	L	L	L	M	L	As above.	Low
13	H	M	L	L	L	M	L	A small section of the Project may be visible, however, due to the significant distance from the Project area the Project will not result in a prominent change to the overall landscape from this receptor.	Moderate-Low

	Sensitivity of Receptor		Magnitude of effect						
Receptor Identifier	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility	Description	Significance of Effect
14	H	M	L	L	L	M	L	As above.	Moderate-Low
15	H	M	L	L	L	M	L	As above.	Moderate-Low
16	H	M	M	M	M	M	L	This receptor is adjacent to Worlds End Highway and has views of Robertstown Substation and the expanse of transmission lines and towers covering the landscape. Due to the existing topography only a small portion of the Project will be visible. Notwithstanding, this is likely to result in a noticeable change to the landscape given the proximity of this receptor.	Moderate
17									
18-29	H	M	L	L	M	M	L	The Project is not visible from these receptors. The Project will not create a noticeable change to the landscape or surrounding view locations from these receptors.	Low



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:40,000
Job Ref/Version:	11314/ V10

0 0.5 1 1.5 2 km

Map Projection: GDA 1994 MGA Zone 54

Figure 5-3 **Indicative Visibility from Potential Residential Receptors**

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21/11/2018

ROBERTSTOWN SOLAR

11314_VIA_Indicative Visibility_Potential Residential Receptors.qgs

Table 5-3: Assessment of Visual Effects on Potential Viewpoint Receptors

Viewpoint Identifier	Sensitivity of Receptor		Magnitude of effect					Description	Significance of Effect
	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility		
1	L	L	L	L	L	M	L	The Project area is greater than 5km from this viewpoint. The Project area is not visible from this viewpoint due to topography and distance. The Project will not result in any change to the landscape from this viewpoint. Refer to Plate 12	Low
2	L	L	M	L	M	M	L	The Project area is approximately 3km from this viewpoint. The existing watermain, substation and transmission lines are moderately prominent elements in the midground. Geranium Plains Road is an unsealed local road with infrequent visitation. The southern area of the western portion of the Project area is likely to be visible from this viewpoint. Given the moderate distance and that the views of the Project from this viewpoint would be looking up the rows, which is a similar view when observing a crop from the same perspective, the visual impact is considered low. Refer to Plate 13.	Low
3	L	L	M	L	M	M	L	The Project area is approximately 2km from this viewpoint. The existing watermain, substation and transmission lines are moderately prominent elements in the foreground and	Low

Viewpoint Identifier	Sensitivity of Receptor		Magnitude of effect					Description	Significance of Effect
	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility		
								midground. Geranium Plains Road is an unsealed local road with infrequent visitation. Given the moderate distance and that the views of the Project from this viewpoint would be looking directly up the rows, which is a similar view when observing a crop from the same perspective, the visual impact is considered low. Refer to Plate 14.	
4	L	L	L	L	M	M	L	The Project area is approximately 2km from this viewpoint. The existing watermain, substation and transmission lines, house and sheds are moderately prominent elements in the landscape. Geranium Plains Road is an unsealed local road with infrequent visitation. A small portion of the Project area is likely to be visible from this viewpoint. Given the moderate distance and that the views of the Project from this viewpoint would be looking directly up the rows, which is a similar view when observing a crop from the same perspective, the visual impact is considered low. Refer to Plate 15.	Low

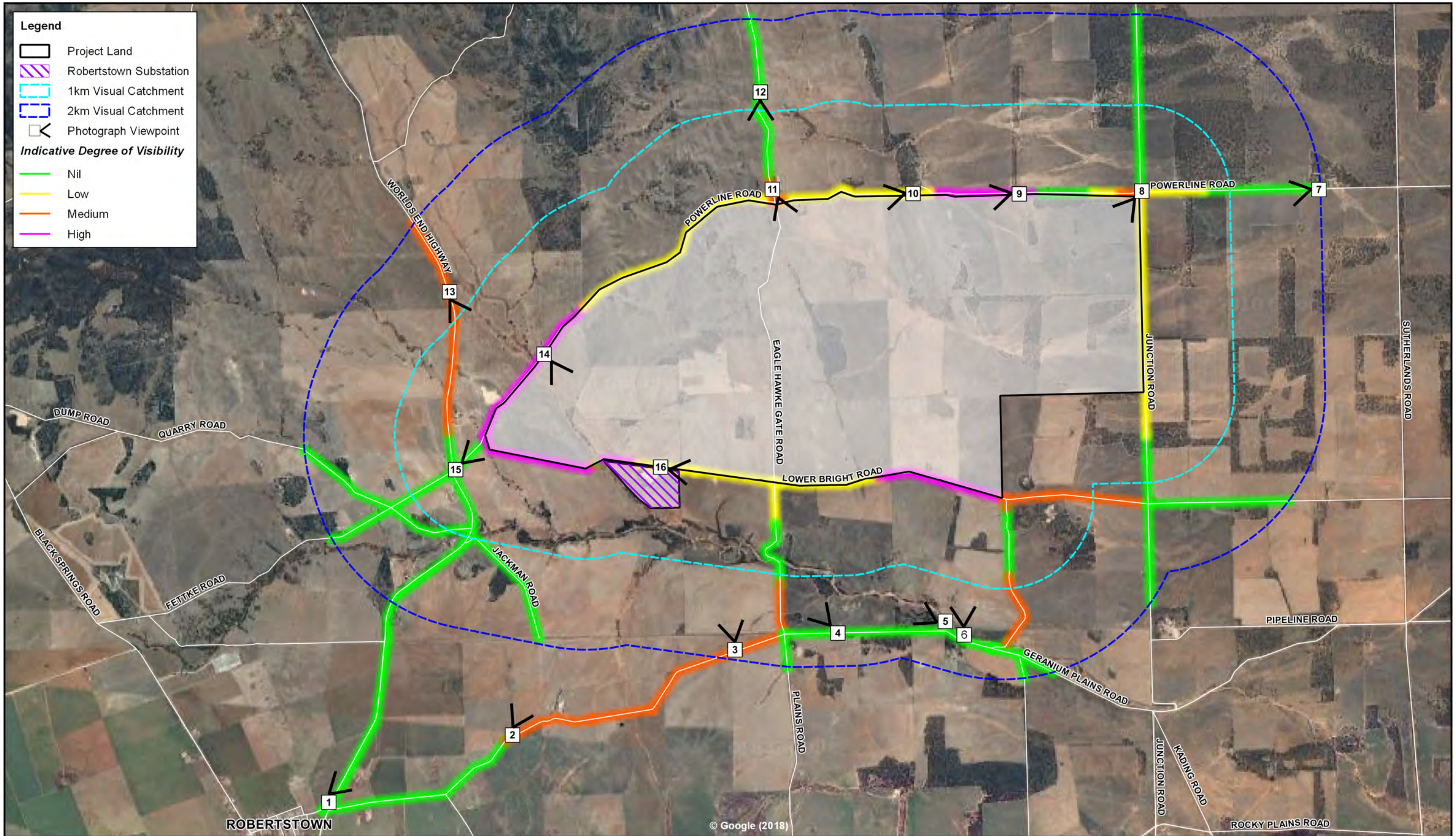
	Sensitivity of Receptor		Magnitude of effect						
Viewpoint Identifier	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility	Description	Significance of Effect
5	L	L	L	L	M	M	L	The Project area is approximately 1.5km from this viewpoint. The Project area is not visible from this viewpoint due to topography. The Project will not result in any change to the landscape from this viewpoint. Refer to Plate 16.	Low
6	L	L	L	L	M	M	L	As above. Refer to Plate 17.	Low
7	L	L	L	L	M	M	L	The Project area is approximately 2km from this viewpoint. The Project area is not visible from this viewpoint due to topography. The Project will not result in any change to the landscape from this viewpoint. Refer to Plate 17.	Low
8	L	L	M	M	H	M	L	The Project area is <50m from this viewpoint. The constructed Project will result in a change to the landscape from this viewpoint. Both Junction Road and Powerline Road are unsealed local roads with infrequent visitation. Only a small portion of the Project area may be visible from this viewpoint but from a close distance. The Project is likely to result in a	Moderate

	Sensitivity of Receptor		Magnitude of effect						
Viewpoint Identifier	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility	Description	Significance of Effect
								noticeable change to the landscape but not compromise the overall view. Refer to Plate 18.	
9	L	L	L	L	H	M	L	The Project area is approximately 1.2km from this viewpoint. The Project area is not visible from this viewpoint due to topography. The Project will not result in any change to the landscape from this viewpoint. Refer to Plate 19.	Low
10	L	L	L	L	H	M	L	The Project area is approximately 300m from this viewpoint. A small portion of the north-eastern corner of CT 5431/659 may be visible from this viewpoint. Powerline Road is an unsealed local road with infrequent visitation. Only a small portion of the Project may be visible from this viewpoint. The Project is unlikely to result in a prominent change to the landscape from this viewpoint. Refer to Plate 20.	Low
11	L	L	L	L	H	M	L	The Project area is <50m from this viewpoint. A small portion of the north-western corner of CT 5431/659 may be visible from this viewpoint. Eagle Hawke Gate Road and Powerline Road are unsealed local roads with infrequent visitation. The Project is	Low

Viewpoint Identifier	Sensitivity of Receptor: Susceptibility	Sensitivity of Receptor: Value	Magnitude of effect: Size and scale	Magnitude of effect: Frequency of use	Magnitude of effect: Distance/ Geographical extent	Magnitude of effect: Duration	Magnitude of effect: Reversibility	Description	Significance of Effect
								unlikely to result in a noticeable change to the landscape. Refer to Plate 22.	
12	L	L	L	L	M	M	L	The Project area is >1km from this viewpoint. The Project area is not visible form this viewpoint due to topography. The Project will not result in any change to the landscape from this viewpoint. Refer to Plate 23.	Low
13	L	L	L	L	M	M	L	The Project area is >1km from this viewpoint. The existing substation and transmission lines are prominent elements in the view. Although Worlds End Highway is a major road, its visitation/usage is considered moderate at most. A small part of the Project area is visible from this viewpoint, but the visibility is considered negligible. The Project is not likely to result in a prominent change to the landscape and may be difficult to distinguish from existing elements from this viewpoint Refer to Plate 24.	Low

	Sensitivity of Receptor		Magnitude of effect						
Viewpoint Identifier	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility	Description	Significance of Effect
14	L	L	H	H	H	M	L	The Project area is <50m from this viewpoint. The existing substation and transmission lines are prominent elements in the landscape. Further the site has historical cropping activities. Powerline Road is an unsealed local road with infrequent visitation. The Project will likely be highly visible form this viewpoint due to distance. The Project will likely result in a prominent change to the landscape and extensive portions of the western portion of the Project will form the feature of the landscape from this viewpoint. Refer to Plate 25.	Moderate-High
15	L	L	L	L	H	M	L	The Project area is approximately 500m from this viewpoint. The Project area is not visible from this viewpoint due to topography. The Project will not result in any change to the landscape from this viewpoint. Refer to Plate 26.	Low
16	L	L	L	L	H	M	L	The Project area is <50m this viewpoint. Robertstown Substation is adjacent to this viewpoint. The bulk and scale of the substation would absorb a significant amount of the Project given the Project's low-profile. Lower Bright Road is an unsealed local road with infrequent visitation. The existing vegetation	Low

	Sensitivity of Receptor		Magnitude of effect						
Viewpoint Identifier	Susceptibility	Value	Size and scale	Frequency of use	Distance/ Geographical extent	Duration	Reversibility	Description	Significance of Effect
								provides a high level of screening along Lower Bright Road. Given the proximity of the existing substation, the Project is unlikely to result in a prominent change to the landscape from this viewpoint. Refer ton Plate 27.	
17	H	L	L	L	L	M	L	The Project area is >10km from this viewpoint. This viewpoint is a local lookout (Inspiration Point) and has prominent views of the rural landscape. Although Inspiration Point is considered a lookout, visitation is considered low to moderate at most. The Project area is difficult to distinguish from this viewpoint due to distance and it would appear as a relatively small element in the background. The Project is unlikely to result in a noticeable change to the landscape or surrounding views as it is difficult to distinguish from this viewpoint. Refer to Plate 28.	Low



Author:	SW
Reviewer:	SMC/ JB
A3 Scale:	1:40,000
Job Ref/Version:	11314/ V07

0 0.5 1 1.5 2 km

Map Projection: GDA 1994 MGA Zone 54

Figure 5-4 Indicative Visibility from Viewpoints within Landscape

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11314_VIA_Indicative Visibility_Potential Viewpoint Receptors.qgs

Plate 12: Viewpoint 1 – Worlds End Highway (northbound, north-east)

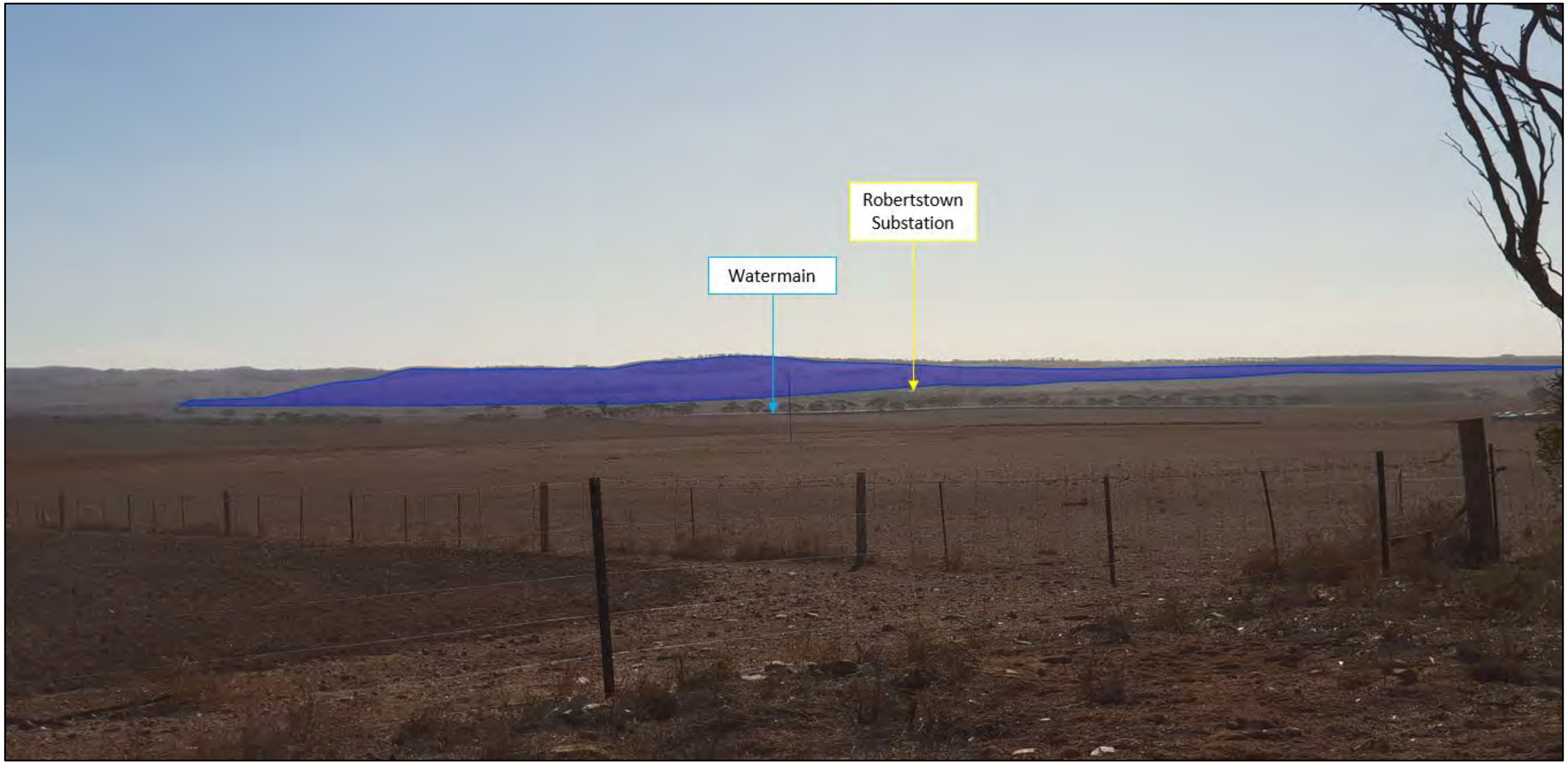


Plate 13: Viewpoint 2 - Geranium Plains Road (north - north-east)

Plate 14: Viewpoint 3 – Geranium Plains Road (north)

Plate 15: Viewpoint 4 - Geranium Plains Road (north-west)

Plate 16: Viewpoint 5 - Geranium Plains Road (north-west)

Plate 17: Viewpoint 6 - Geranium Plains Road (north-east)

Plate 18: Viewpoint 7 - Powerline Road (west)

Plate 19: Viewpoint 8 - Corner of Powerline Road and Junction Road (south-west)

Plate 20: Viewpoint 9 - Powerline Road (west)

Plate 21: Viewpoint 10 - Powerline Road (west)

Plate 22: Viewpoint 11 - Intersection of Eagle Hawke Gate Road and Powerline Road (south - south-west)

Plate 23: Viewpoint 12 - Eagle Hawke Gate Road (south)

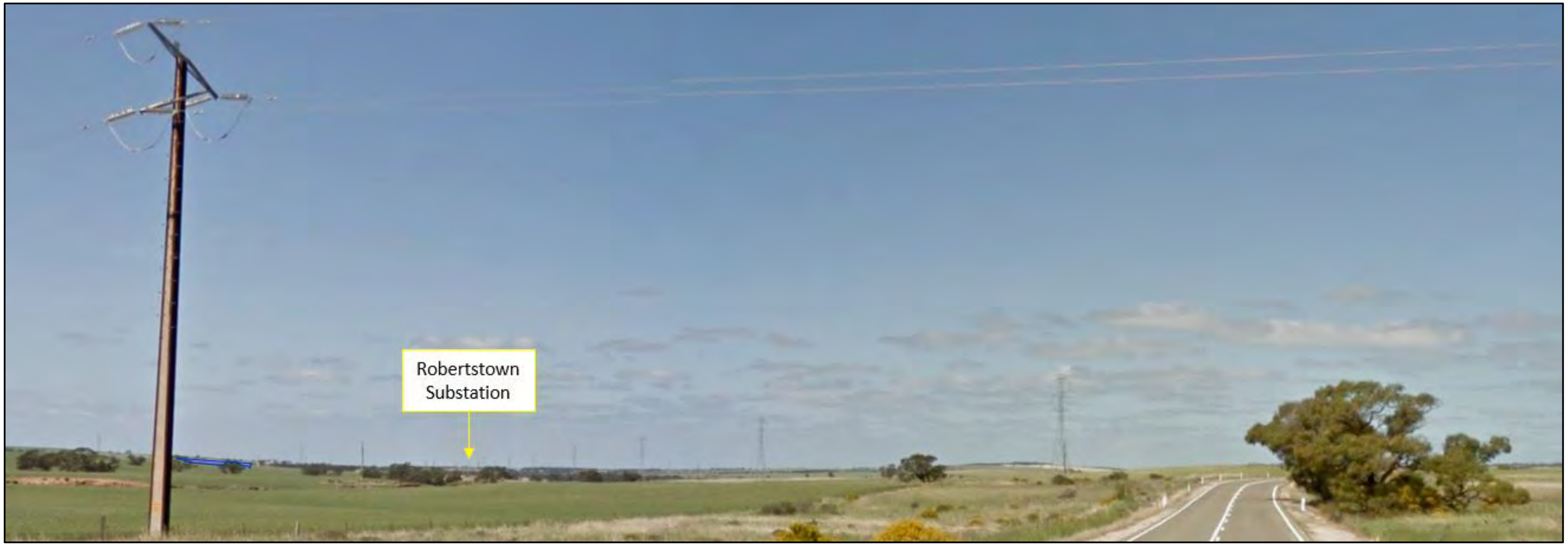


Plate 24: Viewpoint 13 - Worlds End Highway (southbound, south-east)

Plate 25: Viewpoint 14 - Powerline Road (south-east)

Plate 26: Viewpoint 15- Intersection of Worlds End Highway and Powerline Road (north-east)

Plate 27: Viewpoint 16 - Lower Bright Road (east)

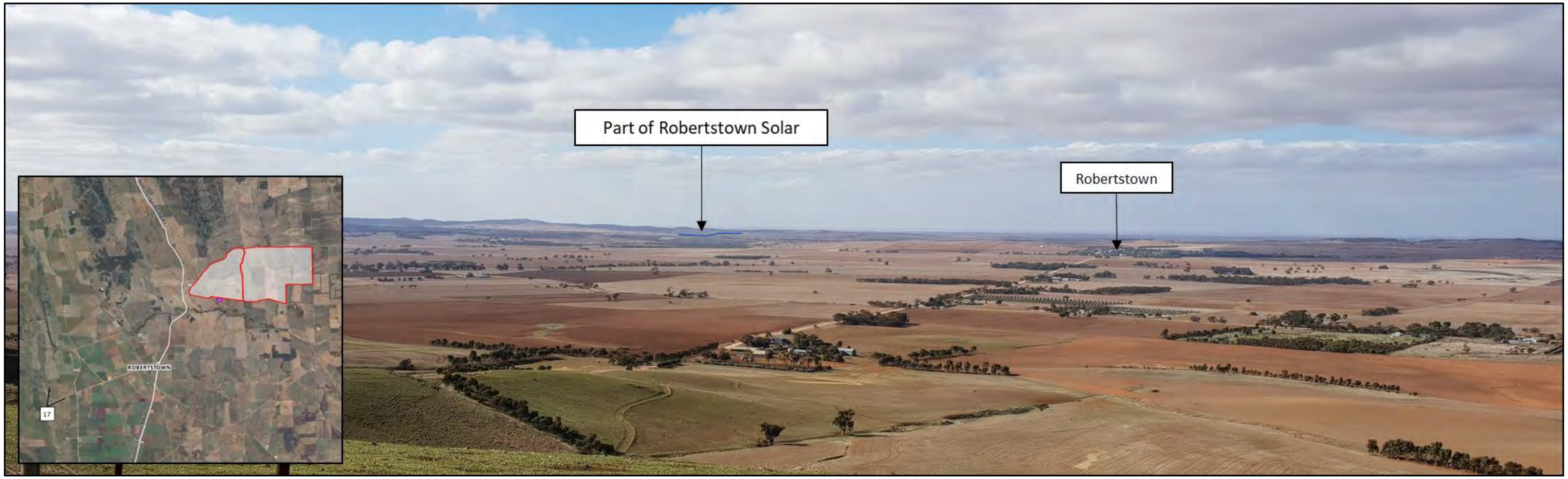


Plate 28: Viewpoint 17 - Inspiration Point (north-east)

5.3.1. Summary of Potential Visual Receptors

As stated in Section 5.3, a total of 29 potential residential receptors were identified within a 2km Visual Catchment of the Project area, five (5) of which are owned by Project landowners. The Project landowners are exempt from this VIA as Robertstown Solar will liaise with them directly on any potential visual mitigation measures. Therefore, a total of 24 potential residential receptors were assessed against the criteria outlined in Section 2.1.2 and the assessment results detailed in Table 5-2 above.

A summary of the significance of effects for the 24 potential **residential** receptors is as follows:

- 18 of the 24 potential residential receptors scored “Low”;
- 5 of the 24 potential residential receptors scored “Moderate-Low”; and
- 1 of the 24 potential residential receptors scored “Moderate”.

No potential residential receptors scored “Moderate-High” or “High”.

These scores indicate that overall 75% of potential residential receptors may have a “Low” significance of effect.

A total of 17 potential viewpoint receptors were identified in the viewshed analysis in Section 5.2. Again, it is important to note that the Project in its entirety cannot be viewed from one single viewpoint. The potential viewpoint receptors were assessed against the criteria outlined in Section 2.1.2 and the assessment results detailed in Table 5-3 above.

A summary of the significance of effects for the 17 potential **viewpoint** receptors is as follows:

- 15 of the 17 potential viewpoint receptors scored “Low”;
- 1 of the 17 potential viewpoint receptors scored “Moderate”; and
- 1 of the 17 potential viewpoint receptors scored “Moderate-High”.

No potential residential receptors scored “High”.

These scores indicate that overall 88% of potential viewpoint receptors may have a “Low” significance of effect.

As such, mitigation measures are considered suitable and are detailed in Section 6.

5.4. CUMULATIVE LANDSCAPE AND VISUAL EFFECTS

Cumulative landscape and visual effects are the combined visual changes (both positive and negative) caused by a proposed development in conjunction with other similar developments. It is also important to consider both the existing and evolving contextual landscape in the region.

As stated, landscapes are not static, but continue to evolve and change, driven by factors such as government policy, the needs of a growing population, economy and climate change. This includes new forms of energy generation, such as renewable energy.

Rural landscapes have historically been the preferred location for large electrical infrastructure. Electrical infrastructure, including substations and transmission lines are already prevalent in rural landscapes, which is an important factor when considering cumulative landscape and visual effects of a proposed development. In the context of the Project, this is supported by the Regional Council of Goyder Development Plan 2016 which lists renewable energy as an envisioned land use for the Primary Production Zone. Accordingly, numerous renewable energy projects either in action, approved or proposed are evident within the region where the Project is proposed.

This Section considers the potential cumulative landscape and visual effects that may result from interactions between the Project and both existing and proposed similar developments within 50km of the Project (Table 5-4). The 50km radius is considered an appropriate scope for this assessment as visibility beyond this distance is impractical. This study area is demonstrated in Figure 5-5, along with the location of other renewable energy projects within the study area.

Table 5-4: Renewable Energy Projects in action, approved and proposed within 50km of the Project

Status	Developer/ Owner	Renewable	Project	Capacity	Expected Cost
Operational	AGL Energy	Wind	Hallett 2 Wind Farm	71.4 MW	N/A
Under Construction/ Approved	Lyon Group	Solar PV/ Battery	Riverland Solar Farm	330 MW/ 400 MWh battery storage	~$1 B
Under Construction/ Approved	Solar River Project Pty	Solar PV/ Battery	The Solar River Project	200 MW/ 120 MWh battery storage	~$454 M
Under Construction/ Approved	EnergyAustralia	Wind	Stony Gap Wind Farm	105 MW	Unknown
Proposed	FRV	Solar PV/ Battery	Chaff Mill Solar Farm	100 MW/ 50 MW battery	~$260 M

Status	Developer/ Owner	Renewable	Project	Capacity	Expected Cost
Proposed	RES Australia	Wind/ Battery	Twin Creek Wind Farm	185 MW/ 215 MW battery storage	~$209 M
Proposed	Robertstown Solar 1 Pty	Solar PV/ Battery	Robertstown Solar	500 MW/ 250 MW/ 1,000 MWh battery storage	~$1.17 B

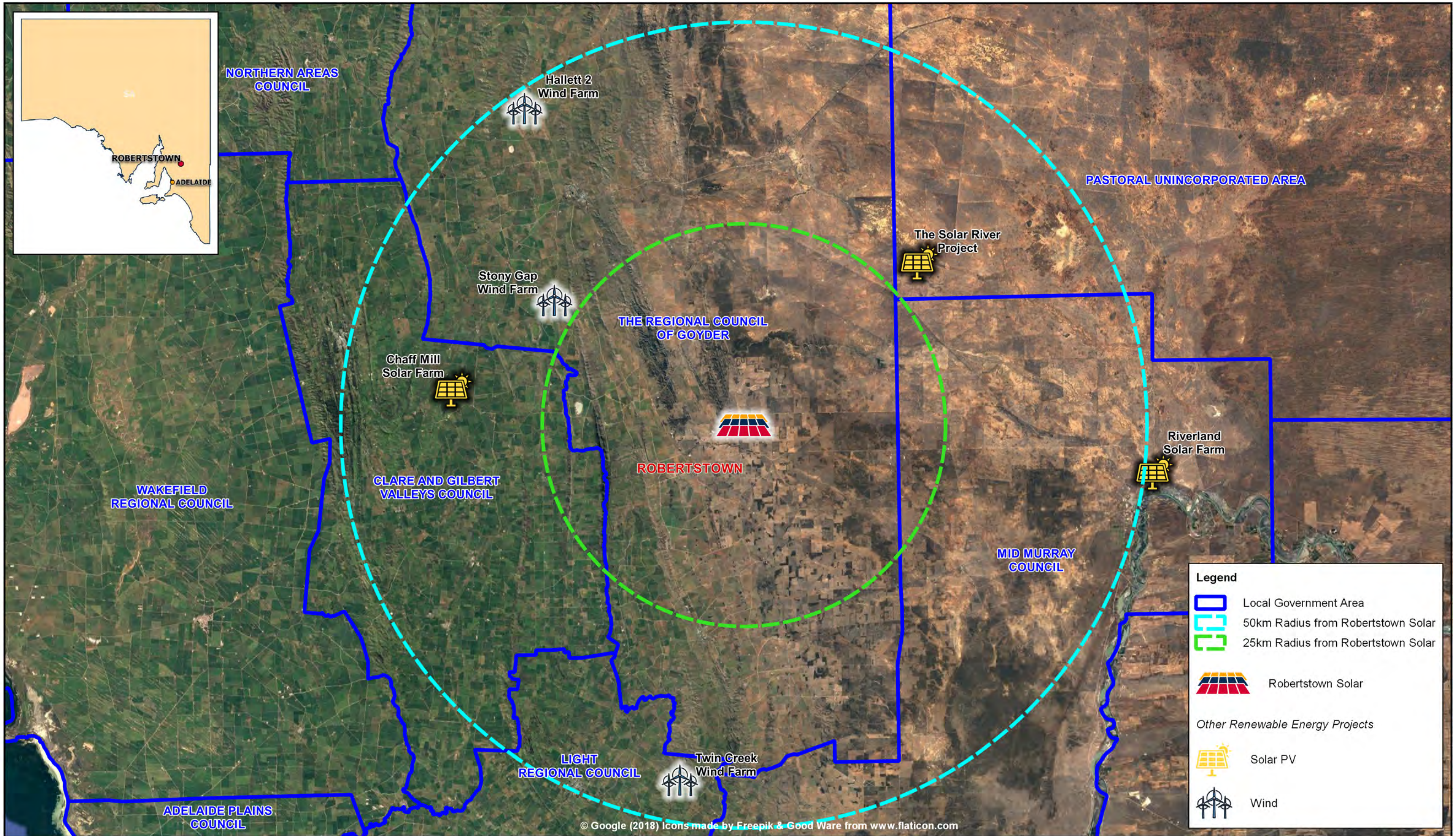
(Source: AltEnergy, 2018)

As demonstrated in Figure 5-5, the nearest other renewable energy development to the Project is in excess of 25km away. It is therefore reasonable to conclude that there will be no cumulative visual effects as these other projects cannot be viewed together from a single viewpoint and can be considered stand-alone visual elements within the landscape.

In the Regional Council of Goyder Development Plan 2016 renewable energy development is listed as a land use under the Desired Character for the Primary Production Zone, therefore it is also reasonable to conclude that the Project will not result in any negative cumulative landscape effects.

The renewable energy projects that are in operation, are approved, or that are proposed within 50km of the Project area support State and Local Government policy to have renewable energy projects. Renewable Energy Projects, such as Robertstown Solar, once constructed and operating in South Australia, are located within rural Council areas and on land with a particular zone including land zoned Primary Production Zone.

As such, mitigation measures are considered suitable and are detailed in Section 6.



Author:	MB
Reviewer:	SMC/ JB
A3 Scale:	1:450,000
Job Ref/Version:	11314/ V04

0 5 10 15 20 25 km

Map Projection: GDA 1994 MGA Zone 54

Figure 5-5

Renewable Energy Projects within 50km of Robertstown Solar

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_VIA_Potential Cumulative Landscape and Visual Effects.qgs

6. MITIGATION MEASURES

The assessments outlined in the above sections conclude that the overall visual impact rating to residential and viewpoint receptors is "Low".

Accordingly, the following mitigation measures are proposed to be implemented during the construction and operation phases, where practicable:

- Stakeholder engagement activities will continue to be undertaken to understand relevant landowner and community relationships with visual aspects of the project;
- The development will occur on land previously cleared of vegetation and/or disturbed;
- Utility buildings or structures will be sited together, away from residences and constructed of materials that are muted in colour;
- The use of reflective materials in construction will be limited;
- Any landscaping that is completed as part of the Project will be selected and designed so it is sensitive to the landscape and visual receptors;
- Any signage will be designed and located so it is sensitive to the landscape and visual receptors;
- Fencing will be sited and designed appropriately to blend with the facility as much as possible; and
- Construction equipment and waste will be removed from the site in a timely manner.

Specific details relating to the above-mentioned mitigation matters will be considered as part of the construction and operation management plans.

7. RESIDUAL VISUAL IMPACTS

Residual visual impacts are the adverse effects remaining after all of the practical methods of mitigation have been implemented. The final stage of this VIA will assess the significance of the residual visual impacts of the Project.

As stated throughout this VIA, the Regional Council of Goyder Development Plan 2016 details the Council's position on visual impacts from renewable energy facilities. The Development Plan anticipates and encourages the introduction of renewable energy infrastructure as new components of the landscape in the Primary Production Zone, accepting that it is difficult to mitigate the visual impacts and any potential visual impact needs to be considered alongside other relevant Development Plan provisions including the aim for an increase in renewable energy electricity generation.

The assessments outlined in earlier sections of this VIA conclude that the overall visual impact rating to the potential residential receptors and viewpoint receptors is considered "Low". The inclusion of the mitigation measures outlined in the section above will further lower the residual visual effects on both potential residential receptors and viewpoint receptors.

Considering the above, the residual visual impacts are therefore considered to be acceptable.

8. CONCLUSION

This VIA is intended to provide an assessment of the existing landscape character within the context of the Project's proposed location to determine the potential landscape and visual effects of the Project during both construction and operational phases. It has been noted that the assessment of visual impact is subjective, and the individual consideration of qualitative factors such as scenic quality may differ between receptors as it is influenced by individual values, preferences and affiliations with the landscape and particular views.

The existing landscape and scenic quality of the Project area and surrounding area indicates that the site is appropriate for the Project for the following reasons:

- The bulk and scale of the Project is consistent with the existing electricity infrastructure;
- The uniform and linear layout of the Project is not considered out of character with the existing rural landscape; and
- The Project cannot be viewed in its entirety from one single viewpoint, even from Inspiration Point lookout.

The assessment has concluded:

- The landscape within and surrounding the Project area can be described as predominantly rural, typified by flat to undulating land that is sparsely vegetated or utilised for agricultural purposes;
- Renewable energy and ancillary development is a type of development that is envisaged within the Primary Production Zone in Regional Council of Goyder area;
- Utility scale solar projects are becoming more common place in rural setting and are considered acceptable rurally located infrastructure;
- The significance of visual effects on potential residential receptors is categorised as "Low"; and
- The significance of visual effects on potential viewpoint receptors is categorised as "Low".

Combined, these assessments form the basis to evaluate the magnitude and significance of the visual impact on the landscape and locality resulting from the Project, which is "Low" overall.

While the Regional Council of Goyder Development Plan 2016 anticipates and encourages the introduction of renewable energy infrastructure as new components of the landscape in the Primary Production Zone and accepts that it is difficult to mitigate the visual impacts of large scale renewable energy infrastructure the mitigation measures detailed in Section 6 are proposed to lower the impacts of the potential landscape and visual effects as far as practicable. The residual impacts are therefore considered to be acceptable.

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APPENDIX 8

Desktop Ecological Assessment

DESKTOP ECOLOGICAL ASSESSMENT

Prepared for Robertstown Solar

Prepared by EBS Ecology

EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

ebs ecology

Robertstown Solar

Desktop Ecological Assessment

Robertstown Solar Desktop Ecological Assessment

13 September 2018

Version 3

Prepared by EBS Ecology for Robertstown Solar 1 Pty Ltd

Document Control					
Revision No.	Date issued	Authors	Reviewed by	Date Reviewed	Revision type
1	30/04/2018	M. Laws, G. Oerman	Dr M. Louter	27/04/2018	Draft
2	14/05/2018	M. Laws, G. Oerman	Dr M. Louter	11/05/2018	Final
3	13/09/2018	M. Laws, G. Oerman	Dr M. Louter	-	Updated Project area

Distribution of Copies			
Revision No.	Date issued	Media	Issued to
1	30/04/2018	Electronic	Kate Tierney, EPS Energy
2	14/05/2018	Electronic	Kate Tierney, EPS Energy
3	13/09/2018	Electronic	Kate Tierney, EPS Energy

EBS Ecology Project Number: G80903 (previously G80401)

CITATION: EBS Ecology (2018) Robertstown Solar Desktop Ecological Assessment. Report to Robertstown Solar 1 Pty Ltd. EBS Ecology, Adelaide.

Cover photograph: *Lomandra effusa* (Scented Iron-grass) Grassland in the southwest corner of the Project area (Lot H200300 S13).

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GLOSSARY AND ABBREVIATION OF TERMS

ALA	Atlas of Living Australia
BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia (maintained by DEW)
DEW	Department of Environment and Water (formerly Department of Environment, Water and Natural Resources (DEWNR))
DotEE	Department of the Environment and Energy
EBS	EBS Ecology
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
FRWL	Flinders Ranges Worm-lizard
IBRA	Interim Biogeographical Regionalisation of Australia
NPW Act	*National Parks and Wildlife Act 1972*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
PBTL	Pygmy Bluetonge Lizard
PMST	Protected Matters Search Tool (under the EPBC Act, maintained by DotEE)
Project	The proposed development of a solar farm at Robertstown
Project area	The land where Robertstown Solar is proposed to be constructed
RS	Robertstown Solar
SEB	Significant Environmental Benefit
spp.	Species (plural)
ssp.	Subspecies
STAM	Scattered Tree Assessment Method
TEC	Threatened Ecological Community

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1 INTRODUCTION

EBS Ecology (EBS) was contracted by EPS Energy to conduct an ecological desktop assessment for the proposed development of the Robertstown Solar (RS), South Australia. This report summarizes the findings of the ecological desktop assessment.

Any proposed clearance of native vegetation in South Australia (unless exempt under the *Native Vegetation Regulations 2017*) is to be assessed against the *Native Vegetation Act 1991* (NV Act) Principles of Clearance, and requires approval from the Native Vegetation Council (NVC). To ensure that EPS Energy is able to minimise environmental impacts and achieve legislative compliance requirements for the proposed works, a vegetation survey and fauna assessment is required to inform planning and development for the RSP. Initial investigations are necessary to determine if the proposed site is suitable for development and if the RSP requires an application for clearance approvals, prepared by a NVC Accredited Consultant. Therefore, an ecological desktop assessment was conducted prior to the field survey.

The ecological desktop assessment involved searching Commonwealth and State databases to identify threatened flora and fauna species potentially occurring in the proposed RSP development site, as well as relevant matters of national environmental significance and other matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *National Parks and Wildlife Act 1972* (NPW Act).

The ecological field survey methods were also confirmed during the desktop assessment, based on aerial imagery and vegetation mapping.

1.1 Objectives

The specific objectives of the ecological desktop assessment were to:

- Identify and highlight areas of concern within the nominated Project area, where any threatened flora and fauna species and/or threatened ecological communities (TECs) listed under Commonwealth and State legislation occur or have been historically recorded in the vicinity of the Project area; and areas determined as potential habitat for threatened flora and fauna;
- Determine the likelihood of occurrence of any threatened species, identified in database searches, within the Project area;
- Determine if the proposed works will likely impact any Commonwealth and State listed species to inform decisions on vegetation clearance approval;
- Identify any 'show-stoppers' areas/trees that must be avoided from a vegetation or fauna perspective where the impacts of the proposed RS development to the vegetation/habitat would be considered to be particularly adverse or significant; and
- Identify any introduced flora and fauna species, including plant diseases, which potentially occur or have been historically recorded in the vicinity of the Project area and may require control during the Project. The report will provide recommendations to control the spread of any relevant plant or animal pests, that may have been identified during the survey.

1.2 Project area

The Project area is located near Robertstown, South Australia, which is approximately 120 km NNE of Adelaide. The proposed Project area is located to the north and northeast of an existing substation, and consists of approximately 1756 ha across three parcels with multiple land owners (Table 1). The proposed Project area for RS is provided in Figure 1.

The ecological desktop assessment was extended to the near surroundings of the proposed RS (the Project area) with a 5 km buffer zone.

Table 1. Land parcel details for the proposed Robertstown Solar.

Lot Number	Address	Area of Interest (ha)
CT 5465/354	Lot 13 Government Road, Bright SA 5381	110
CT 5464/828	Lot 13 Government Road, Bright SA 5381	112
CT 5941/840	235 Lower Bright Road, Bright SA 5381	154
CT 5431/657	Lot 227 Government Road, Geranium Plains SA 5381	116
CT 5565/131	Lot 91 Government Road, Bright SA 5381	312
CT 5431/659	Lot 232 Government Road, Bright SA 5381	146
CT 5550/784	Lot 91 Powerline Road, Bright SA 5381	310
CT 5561/287	Lot 221 Government Road, Bright SA 5381	115
CT 5561/89	Lot 221 Government Road, Bright SA 5381	140
CT 5951/34	Lot 44 Powerline Road, Bright SA 5381	141
CT 5951/34	Lot 45 Powerline Road, Bright SA 5381	100
Total		**1756**

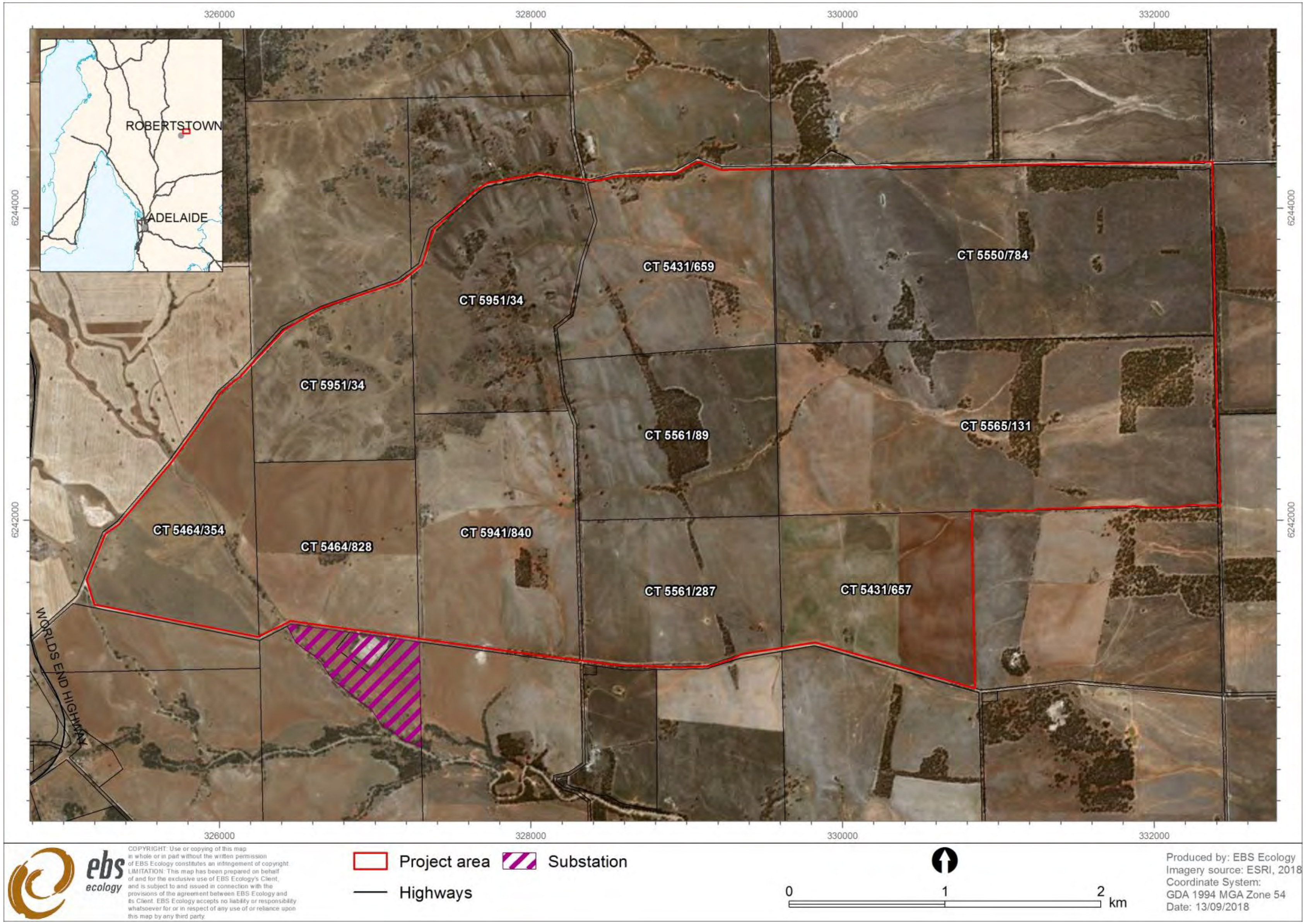


Figure 1. Location and design layout of the proposed Robertstown Solar Farm, South Australia.

2 COMPLIANCE AND LEGISLATIVE SUMMARY

2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1991* (EPBC Act) and the *Environment Protection and Biodiversity Conservation Regulations 2000* provide a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the Act as 'matters of national environmental significance'. The nine matters of national environmental significance protected under the Act are:

1. World Heritage properties
2. National Heritage places
3. Wetlands of international importance (listed under the RAMSAR Convention)
4. Listed threatened species and ecological communities
5. Migratory species protected under international agreements
6. Commonwealth marine areas
7. The Great Barrier Reef Marine Park
8. Nuclear actions (including uranium mines
9. A water resource, in relation to coal seam gas development and large coal mining development

Matters 4 and 5 are relevant to the RS Project.

Any action that has, will have, or is likely to have a significant impact on matters of national environmental significance requires referral under the EPBC Act. Substantial penalties apply for undertaking an action that has, will have or is likely to have significant impact on a matter of national environmental significance without approval.

The EPBC Act Significant Impact Guidelines provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance. In terms of nationally threatened species, the guidelines define an action as likely to have a significant impact if there is a real chance or possibility that it will:

- Lead to a long term decrease in the population
- Reduce the area of occupancy of the species
- Fragment an existing population
- Adversely affect critical habitat
- Disrupt breeding cycles
- Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- Result in the establishment of invasive species that are harmful to the species
- Introduce disease that may cause the species to decline
- Interfere with the recovery of the species.

2.2 Native Vegetation Act 1991

Native vegetation within the Project area is protected under the *Native Vegetation Act 1991* (NV Act) and *Native Vegetation Regulations 2017*. Any proposed clearance of native vegetation in South Australia (unless exempt under the *Native Vegetation Regulations 2017*) is to be assessed against the NV Act Principles of Clearance, and requires approval from the Native Vegetation Council (NVC). A net environmental benefit is generally conditional on an approval being granted.

Native vegetation refers to any naturally occurring local plant species that are indigenous to South Australia, from small ground covers and native grasses to large trees and water plants.

“Clearance", in relation to native vegetation, means:

- The killing or destruction of native vegetation
- The removal of native vegetation
- The severing of branches, limbs, stems or trunks of native vegetation
- The burning of native vegetation
- Any other substantial damage to native vegetation, and includes the draining or flooding of land, or any other act or activity, that causes the killing or destruction of native vegetation, the severing of branches, limbs, stems or trunks of native vegetation or any other substantial damage to native vegetation

Approval must be obtained before performing any activity that could cause substantial damage to native plants. This also applies to dead trees that may provide habitat for animals. These activities include but are not limited to:

- The cutting down, destruction or removal of whole plants
- The removal of branches, limbs, stems or trunks (including brush cutting and woodcutting)
- Burning
- Poisoning
- Slashing of understorey
- Drainage and reclamation of wetlands
- Grazing by animals (in some circumstances).

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

- It contains a high level of diversity of plant species
- It is an important wildlife habitat
- It includes rare, vulnerable or endangered plant species
- The vegetation comprises a plant community that is rare, vulnerable or endangered
- It is a remnant of vegetation in an area which has been extensively cleared
- It is growing in, or association with, a wetland environment
- It contributes to the amenity of the area

- The clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding
- The clearance of vegetation is likely to cause deterioration in the quality of surface or underground water
- After clearance, the land is to be used for a purpose which is unsustainable

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

All approved vegetation clearance must also be conditional on achieving a SEB to offset the clearance. The requirement for a SEB also applies to several of the exemptions. Potential SEB offsets include:

- The establishment and management of a set-aside area to encourage the natural regeneration of native vegetation
- The protection and management of an established area of native vegetation
- Entering into a Heritage Agreement on land where native vegetation is already established to further preserve or enhance the area in perpetuity
- A payment to the Native Vegetation Fund

An assessment against the Native Vegetation Clearance Principles is not required as the clearance associated with the project complies with the following regulation:

Part 3—Permitted clearance of native vegetation

Division 5—Risk assessment

16—Clearance for other activities

(1) Clearance of native vegetation for the purposes of activities of a kind specified in Schedule 1 Part 6 is permitted only if it is undertaken in accordance with—

(a) the written approval of the Council; or

(b) a standard operating procedure determined or approved by the Council for the purposes of this provision.

(2) Authorisation to clear native vegetation under subregulation (1) is subject to—

(a) a condition—

(i) that the clearance of native vegetation is to be undertaken in accordance with a management plan, approved by the Council for implementation, that results in a significant environmental benefit; or

(ii) that the person undertaking the operations is to make a payment into the Fund of an amount considered by the Council to be sufficient to achieve a significant environmental benefit in the manner contemplated by section 21(6) or (6a) of the Act,

as determined by the Council; and

(b) such other conditions as the Council thinks fit.

(3) Clearance of native vegetation for the purposes of activities of a kind specified in Schedule 1 Part 6 is permitted only if any conditions that apply to the approval are complied with.

The requirements of the proponent to undertake clearance for other activities include:

- Application to the NVC in accordance with a NCV approved Standard Operating Procedure;
- Provision of sufficient information for the NVC to assess the level of risk to biodiversity;
- Development of a SEB Management Plan to be approved by the NVC; and
- Provision of a SEB in accordance with the Management Plan or payment into the Native Vegetation Fund.

2.3 National Parks and Wildlife Act 1972

Native plants and animals in South Australia are protected under the *National Parks and Wildlife Act 1972* (NPW Act). It is an offence to take a native plant or protected animal without approval. Threatened plant and animal species are listed in Schedules 7 (endangered species), 8 (vulnerable species) and 9 (rare species) of the Act. Persons must not:

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

Conservation rated flora and fauna species listed on Schedules 7, 8, or 9 of the NPW Act are known to or may occur within the Project area. Persons must comply with the conditions imposed upon permits and approvals.

2.4 Natural Resources Management Act 2004

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

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

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

2.5 Planning, Development and Infrastructure Act 2016

The *Planning, Development and Infrastructure Act 2016* (PDI Act) provides for matters that are relevant to the use, development and management of land and buildings, including the provision of a planning system to regulate development within the State, rules with respect to the design, construction and use of buildings, and other initiatives to facilitate the development of infrastructure, facilities and environments that will benefit the community. The PDI Act repeals the *Development Act 1993* and will gradually come into operation over a five year period.

The State Planning Strategy establishes the broad vision for sustainable land use and the built development of South Australia. The Planning Strategy informs and guides local council development plans. No development can be undertaken without an appropriate Development Approval being obtained from the relevant authority after an application and assessment process.

The PDI Act and the *Development Regulations 2008* provide for the protection of ‘regulated’ and ‘significant’ trees; however, the Project falls outside the PDI Act boundaries.

3 BACKGROUND INFORMATION

3.1 Project details

EPS Energy provides relevant expertise for the planning and development of solar and wind projects in Australia. EPS Energy is currently investigating whether the proposed Project area at Robertstown is suitable for the development of a solar farm and if an application for vegetation clearance approvals is required to undertake the proposed works.

3.2 IBRA

The Interim Biogeographical Regionalisation of Australia (IBRA) identifies geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. The bioregions are further refined into subregions and environmental associations (DEWNR 2011). The Project area is located within the Flinders Lofty Block (to the west) and Murray Darling Depression (to the east) IBRA Bioregions, the Broughton (to the west) and Murray Mallee (to the east) IBRA Subregions and the Burra Hill (to the west) and Sutherlands (to the east) IBRA Environmental Associations.

Native vegetation remnancy figures for IBRA subregions are useful for setting regional landscape targets. Approximately 10% (106,330 ha) of the Broughton IBRA Subregion is mapped as remnant vegetation, of which less than 3% (3,064 ha) is formally conserved within National Parks and Wildlife reserves, and private Heritage Agreements under the NV Act. While approximately 21% (444,401 ha) of the Murray Mallee IBRA Subregion is mapped as remnant native vegetation, of which 17% (76,180 ha) is formally conserved. A full summary is provided below in Table 2 and Table 3.

Table 2. IBRA Bioregion, Subregion, and Environmental Association summary for the western half of the Project area (DEWNR 2011).

Flinders Lofty Block IBRA bioregion	
Temperate to arid Proterozoic ranges, alluvial fans and plains, and some outcropping volcanics, with the semi-arid to arid north supporting native cypress, black oak (belah) and mallee open woodlands, *Eremophila* and *Acacia* shrublands, and bluebush/saltbush chenopod shrublands on shallow, well-drained loams and moderately-deep, well-drained red duplex soils. The increase in rainfall to the south corresponds with an increase in low open woodlands of *Eucalyptus obliqua* and *E. baxteri* on deep lateritic soils, and *E. fasciculosa* and *E. cosmophylla* on shallower or sandy soils.	
Broughton IBRA subregion	
This subregion is characterised by a series of wide undulating intramontane basins with red duplex soils, separated by low but distinct northerly trending strike ridges. In the north the region leads into the Southern Flinders Ranges with no sharply defined landform boundary but a land use boundary marking the northern extremity of wheat cultivation. Due to widespread clearing for farming the only significant remnant of native vegetation is found in the Mt Remarkable area, where an open forest dominated by *Eucalyptus cladocalyx* or by *E. goniocalyx* and *E. leucoxylon* on reddish dense loams remains. Degraded remnants of *E. leucoxylon* and *E. odorata* woodlands can still be found on stony crests and steep slopes.	
Remnant vegetation	Approximately 10% (106,330 ha) of the subregion is mapped as remnant native vegetation, of which 3% (3,064 ha) is formally conserved.
Landform	Hills and valleys; alternating subparallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland.

Geology	Dissected lateritized surface in south.
Soil	Hard setting loams with red clayey subsoils, highly calcareous loamy earths, hard setting loams with mottled yellow clayey subsoil, coherent sandy soils, cracking clays.
Vegetation	Assumed native vegetation cover.
Conservation significance	55 species of threatened fauna, 113 species of threatened flora. 0 wetlands of national significance.
Burra Hill IBRA environmental association	
Remnant vegetation	Approximately 45% (32,624 ha) of the association is mapped as remnant native vegetation, of which 5% (1,786 ha) is formally conserved.
Landform	Steep strike ridge on metasediments with dissected footslopes.
Geology	Metasediments and alluvium.
Soil	Reddish powdery calcareous loams, hard pedal red duplex soils and reddish calcareous earths.
Vegetation	Woodland of SA Blue Gum and Peppermint Box and woodland of SA Blue Gum.
Conservation significance	20 species of threatened fauna, 54 species of threatened flora. 0 wetlands of national significance.

Table 3. IBRA Bioregion, Subregion, and Environmental Association summary for the eastern half of the Project area (DEWNR 2011).

Murray Darling Depression IBRA bioregion	
An extensive gently undulating sand and clay plain of Tertiary and Quaternary age frequently overlain by Aeolian dunes. Vegetation consists of semi-arid woodlands of Black Oak / Belah, Bullock Bush/ Rosewood and *Acacia spp.*, mallee shrublands and heathlands and savanna woodlands.	
Murray Mallee IBRA subregion	
Extensive calcreted plains overlain by a series of sand dunes The calcreted ridges which form the undulating plain have a distinct west-north-westerly trend. The soils are shallow reddish sands on the plains and deep yellowish sands on the dunes. Fans bordering the Mt Lofty Ranges with low isolated hills rising above them have red duplex soils and calcareous earths subject to sheet erosion. Mallee is the dominant vegetation of the subregion. Its species composition reflects the diminishing coastal influence towards the north, especially in the understorey: broombush gives way here to saltbush and bluebush (*Atriplex* and *Maireana spp*.) and hummock grass (*Triodia irritans*). Blue Gum (*E. leucoxylon*) and Peppermint Box (*E. odorata*) are characteristic species in the west of the region. Although tracts of mallee still occur, most of the original vegetation has been cleared for agriculture.	
Remnant vegetation	Approximately 21% (444,401 ha) of the subregion is mapped as remnant native vegetation, of which 17% (76,180 ha) is formally conserved.
Landform	Very gently undulating, to flat Aeolian sand covered depositional plain of the central-southern Murray Basin.
Geology	East-west linear dunes, regularly spaced with cusp-like crests which are consistently steeper on the southern side. Up to four buried paleosols within the dune. Dunes composed of pale to dark reddish-brown calcareous sand with some clay fraction.
Soil	Brown calcareous earths and highly calcareous brown loamy earths, hard setting loamy soils with red clayey subsoils, cracking clays.
Vegetation	Mallee heath and shrublands.
Conservation significance	101 species of threatened fauna, 136 species of threatened flora. 9 wetlands of national significance.

Sutherlands IBRA environmental association	
Remnant vegetation	Approximately 47% (32,682 ha) of the association is mapped as remnant native vegetation, of which 0% (159 ha) is formally conserved.
Landform	Undulating plain comprising easterly sloping fans and pediments, dissected by streams rising in the Mt Lofty Ranges.
Geology	Colluvium, siltstone, sandstone and alluvium.
Soil	Red calcareous earths and brown siliceous sands.
Vegetation	Open scrub of beaked red mallee and low open woodland of false sandalwood and black oak.
Conservation significance	18 species of threatened fauna, 5 species of threatened flora. 0 wetlands of national significance.

3.3 Administrative boundaries

The Project area is located in the in the South Australian Murray-Darling NRM Region and Rangelands NRM District. The Project area is also located within the County of Burra and the Bright Hundred.

3.4 Climate

The nearest long-term climate data was sourced from the Eudunda weather station, located 20.5 km south of the Project area. Rainfall and temperature data are indicative of a Mediterranean climate, with hot dry summers and cool wet winters. Annual average rainfall is 448.6 mm. The majority of the rainfall occurs during winter with the highest falls in August (average 55.7 mm) and June (average 51.9 mm). The mean minimum temperature ranges from 5°C (July) to 14.3°C (February) and the mean maximum temperature ranges from 13.1°C (July) to 29.3°C (January) (Figure 2).

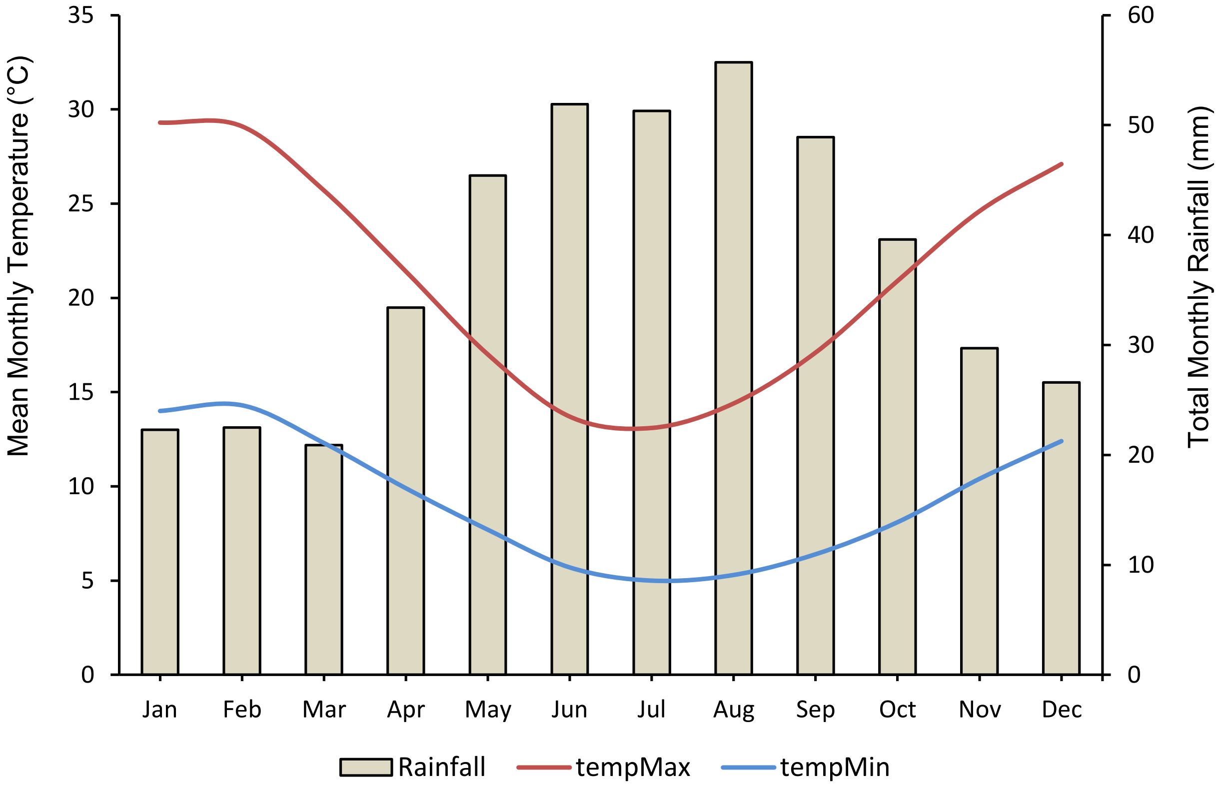


Figure 2. Mean total monthly rainfall and mean maximum and minimum temperatures recorded at Eudunda (station no. 24511), located 20.5 km south of the Project area (BOM 2018).

4 METHODS

The ecological desktop assessment was conducted to assess the potential for any threatened species (both Commonwealth and State listed) to occur within the Project area.

4.1 Protected Matters Search Tool (PMST) – EPBC Act

A Protected Matters Search Tool (PMST) report was generated on 05 September 2018 to identify matters of national environmental significance under the EPBC Act (DotEE 2018). The PMST is maintained by the Department of the Environment and Energy (DotEE) and was used to identify flora and fauna species or ecological communities of national environmental significance that may occur or have suitable habitat within the Project area. A buffer of 5 km was applied for this search.

4.2 Biological Database of South Australia (BDBSA) – NPW Act

Threatened species listed under South Australia's NPW Act were assessed using the Biological Database of South Australia (BDBSA), which is maintained by the South Australian Department of Environment, and Water (DEW). The BDBSA is comprised of an integrated collection of corporate databases which meet DEW standards for data quality, integrity and maintenance. In addition to the DEW biological data, the BDBSA also includes data from partner organisations. This data is included under agreement with the partner organisation for ease of distribution, but they remain owners of the data and should be contacted directly for further information. The dataset was obtained on 18 April 2018 (*Recordset number DEWNRBDBSA180418-1*) and used to identify threatened species that have been recorded within the 5 km buffer of the Project area (DEW 2018). Records of threatened and migratory species listed under the EPBC Act were also identified.

4.3 Assessment of the likelihood of occurrence

An assessment of the likelihood of each threatened flora and fauna species occurring within the 5 km buffer of the Project area was undertaken. A likelihood of occurrence rating (Highly Likely/Known, Likely, Possible, Unlikely, Impossible) was assigned to each threatened species identified in the desktop database searches. The ratings take the following criteria into consideration:

- Date of the most recent record (taking into consideration the date of the last surveys conducted in the area) (ALA 2018; DEW 2018);
- Proximity of the records (i.e. distance to the Project area);
- Landscape, vegetation remnancy and vegetation type of the record location (taking into consideration the landscape, vegetation 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, and local population trends.

A summary of the likelihood criteria is shown below in Table 4.

Table 4. Criteria for the likelihood of occurrence of threatened species within the Project area.

Likelihood	Criteria
Highly Likely/Known	• Records in the last 10 years, the species does not have highly specific needs, and the 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.
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.
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 is known to occur in the area, and species of similar habitat needs have no records either.
Impossible	• Species cannot occur in Project area (e.g. it is impossible for a marine mammal to occur in a terrestrial Project area).

4.4 Additional searches

Additional searches included:

- Atlas of Living Australia (ALA) online resource, which provides records (including locations) for threatened flora and fauna; and
- NatureMaps to collect further SA Biological Survey flora site information (site descriptions), up-to-date and cross-referenced aerial photography, and spatial datasets, such as floristic mapping and protected area maps.

4.5 Survey design and site identification

All the above described information has been used to determine and document:

- Native vegetation cover within the Project area;
- Flora and fauna species (including species of national, state or local conservation significance) known or likely to occur within the Project area (5 km buffer) of the proposed Robertstown Solar;
- Potential ecological constraints for the proposed Robertstown Solar; and
- EBS viewed the vegetation and terrain within the Project area using NatureMaps and Google Earth to determine the appropriate method and estimate the time for the planned field assessment.

4.6 Limitations

The content of the desktop study was derived from existing datasets and references from a range of sources. EBS has not attempted to verify the accuracy of any such information.

Flora and fauna records were sourced from the PMST and BDBSA and were limited to a 5 km buffer around the proposed RS Project area. 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 significant species occur that are not reflected by database records. Although much of the BDBSA data has been through a variety of validation processes, the lists may contain errors and should therefore be used with caution. DEW give no warranty that the data is accurate or fit for any particular purpose of the user or any person to whom the user discloses the information.

The reliability of the BDBSA data ranges from 100 m to over 100 km. Fauna species, in particular birds, also have the ability to traverse distances in excess of 20 km. It is also acknowledged that the presence of species may not be adequately represented by database records. Hence the PMST and BDBSA results may not highlight all potential threatened flora and fauna species that may occur within a 5 km buffer of the Project area.

It is difficult to comment on the likelihood of occurrence of threatened species without observing the condition of vegetation in the Project area. A precautionary approach was therefore adopted during the desktop assessment, with reference to existing PMST and BDBSA records and native vegetation cover.

The findings and conclusions expressed by EBS are based solely upon information in existence at the time of the assessment. The combination of database records and background research have provided a solid foundation for determining the flora and fauna that are likely or are known to occur within the Project area.

5 RESULTS

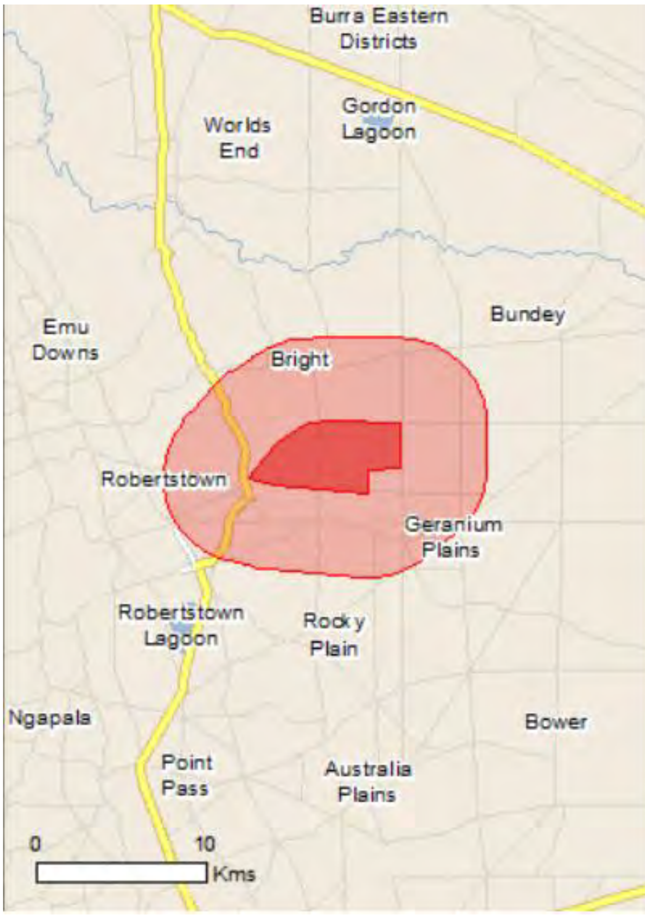
5.1 Matters of national and state environmental significance

The EPBC Act Protected Matters Search identified 21 threatened species, 11 migratory species, and 3 nationally threatened ecological communities, protected under the EPBC Act that may be relevant to the RS Project area. The results of the EPBC Act PMST report are summarised in Table 5 (DotEE 2018).

Note that listed marine species (e.g. marine birds, turtles, sea-lions, fish, whales, and other cetaceans) are included in Table 5. However, these matters are not impacted by or relevant to the project, given that the Project area and potential impacts are confined to the terrestrial environment. Therefore, these species are not further discussed.

Any action that has, will have or is likely to have a significant impact on matters of national environmental significance requires referral under the EPBC Act. The relevant matters of national environmental significance, other matters protected under the EPBC Act, and threatened species listed under the NPW Act are discussed in more detail below.

Table 5. Summary of the results of the EPBC Act Protected Matters Search Tool report (DotEE 2018).



Project Area (5 km buffer)	Matters of national environmental significance under the EPBC Act	Identified within the search area
	World heritage properties	None
	National heritage properties	None
	Wetlands of international importance	1
	Great Barrier Reef marine park	None
	Commonwealth marine area	None
	Threatened ecological communities	3
	Threatened species	21
	Migratory species	11
	Commonwealth land	None
	Commonwealth heritage places	None
	Listed marine species	17
	Whales and other cetaceans	None
	Critical habitats	None
	Commonwealth reserves terrestrial	None
	Commonwealth reserves marine	None
	State and Territory reserves	2
	Regional forest agreements	None
	Invasive species	32
	Nationally important wetlands	None
	Key ecological features (marine)	None

5.1.1 *Wetlands of international importance*

The Coorong, and lakes Alexandrina and Albert wetland are a wetland of international importance. However, it is located approximately 100-150 km upstream from the Project area. Therefore this wetland is not relevant to the project and not further discussed.

5.1.2 *Threatened ecological communities*

The EPBC Act PMST report identified three Nationally Threatened Ecological Communities (TECs) in the Project area (Table 6). All of these TECs were considered unlikely to occur in the Project area. The rationale for the likelihood of occurrence for each TEC identified is provided in Table 6.

Table 6. Threatened ecological communities potentially occurring within the Project area.

Threatened Ecological Community	Conservation status[1]		Likelihood of occurrence in Project area	Reasoning
	Aus	SA		
Buloke Woodlands of the Riverine and Murray-Darling Depression Bioregions	EN		Unlikely	The Project area does not fall within the distribution of Buloke Woodlands of the Riverine and Murray-Darling Depression Bioregions, which extends from the Wimmera region of VIC to the far south-east of SA.
Iron-grass Natural Temperate Grassland of South Australia	CE		Unlikely	The Project area falls within the distribution of Iron-grass Natural Temperate Grassland of South Australia and broad vegetation mapping shows *Lomandra ssp.* grassland within the local area, which is the dominant genus of grasses within the TEC. However, since the majority of the Project area has been entirely cleared of remnant vegetation and subsequently cropped, and remaining patches will be avoided, it is unlikely that this TEC occurs within the Project area.
Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia	CE		Unlikely	The Project area falls within the distribution of Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia and the dominant tree species; *E. odorata*, has been recorded within the local Robertstown area. However, since the majority of the Project area has been entirely cleared of remnant vegetation and subsequently cropped, and remaining patches will be avoided, it is unlikely that this TEC occurs within the Project area.

[1]<u>**Conservation status**</u>
Aus.: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare

5.1.3 *Nationally threatened flora*

The EPBC Act PMST report identified nine threatened flora species listed under the EPBC Act within 5 km of the Project area. Six of the nine species identified were determined to potentially occur within the Project area. A summary of these species and comment regarding their likelihood of occurrence within the Project area is provided in Table 7.

5.1.4 *State threatened flora*

The BDBSA search identified two threatened flora species listed under the NPW Act (excluding those also listed under the EPBC Act) within 5 km of the Project area (Table 7 and Figure 3). One of the two species identified; *Phebalium glandulossum ssp. macrocalyx* (Glandular Phebalium), was considered to potentially occur within the Project area. A summary of these species and comment regarding their likelihood of occurrence within the Project area is provided in Table 7.

All flora species identified in the BDBSA search within 5 km of the Project area are shown in Appendix 1.

Table 7. Threatened flora species potentially occurring within 5 km of the Project area identified in the PMST (DotEE 2018) and BDBSA (DEW 2018) database searches.

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
Acacia glandulicarpa	Hairy-pod Wattle	VU	E	1		Possible	The core population of *Acacia glandulicarpa* (Hairy-pod Wattle) occurs in the western VIC/SA border area. The other SA sub-population located in the in the Booborowie-Burra Gorge-Hanson-Farrell Flat area (Carter 2011). It grows in alkaline soil on rocky hills in open scrub (at Burra), or in eucalypt open forest (Orchard and Wilson 2001). *A. glandulicarpa* was recorded ca. 20 km WNW of the Project area in 2001. The species was observed within mixed native and exotic grassland. Therefore, given the broad suitability of habitat within the Project area and regions records of the species, it is considered possible that *A. glandulicarpa* could occur within the Project area.
Acacia menzelii	Menzel's Wattle	VU	V	1		Unlikely	*Acacia menzelii* (Menzel's Wattle) is endemic to SA. The species is confined to localised areas around Monarto and Murray Bridge, Mt Lofty Ranges and Flinders Ranges (around Brachina) (Whibley and Symon). The northern Flinders Ranges populations are considered relicts (Davies 1995). It occurs as scattered shrubs; either on roadsides, or in low open shrubby woodland on more rocky sites and found in open *Eucalyptus* scrub (Orchard and Wilson 2001) where associated species include *E. socialis* (Beaked-red Mallee), *E. incrassata* (Ridge-fruited Mallee), *Callitris gracillis* (Southern Cypress Pine) and *E. odorata* (Peppermint Box) (Whibley and Symon 1992) on calcareous loamy earths. There are no records of the species from Harrogate to Burra, and therefore, it is considered unlikely to occur within the Project area.
Acacia spilleriana	Spiller's Wattle	EN	E	1, 2	1992	Possible	*Acacia spilleriana* (Spiller's Wattle) is endemic to SA. The species has severely fragmented populations occurring in the northern Mt Lofty Ranges and in the ranges around Burra and Auburn. Most populations are on road verges, except for larger populations that occur in the Burra Gorge/Hallelujah Hills area. Grows on rocky hills, commonly along watercourses and roadsides. Associated with species such as *A. calamifolia* (Wallowa) and communities dominated by *Eucalyptus gracilis* (Yorrell), *E. socialis* (Beaked Red Mallee) and *E. brachycalyx* (Gilja) open scrub with a shrubby understorey and *E. camaldulensis* (River Red Gum) woodland. *A. spilleriana* was recorded 5 km ENE of Robertstown in 1988, and therefore, has historically occurred either within or adjacent to the Project area. As such, it is possible that the species may occur, especially given the presence of suitable habitats in eucalypt woodland and mallee.
Caladenia tensa	Greencomb Spider-	EN		1		Possible	*Caladenia tensa* (Greencomb Spider-orchid) is found within western

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
	orchid, Rigid Spider-orchid						VIC, southeast SA and central west NSW. Emerges in winter and flowers in Sep-Oct. Occurs in woodlands dominated by *Callitris* spp. (Cypress Pine) and *Eucalyptus leucoxylon* (Blue Gum) or *Melaleuca uncinata* (Broombush Mallee). Grows in Tertiary and Quaternary Aeolian sandy loams in the Murray-Darling Depression bioregion. *C. tensa* is considered to potentially occur within the Project area due to the widespread distribution of the species and the presence of broadly suitable habitat in eucalypt forest and woodland.
Caladenia xantholeuca	White Rabbits, Flinders Ranges White Caladenia	EN	E	1		Unlikely	*Caladenia xantholeuca* (White Rabbits) is endemic to SA. The species is distributed in three sub-populations in the southern Flinders Ranges; two of which occur in the Mt Remarkable National Park and another in Telowie Gorge Conservation Park. The species occurs in *Callitris glaucophylla* Woodland often on south facing slopes in heavily shaded areas, where it grows on mossy rock ledges and red-brown loam soils. As the Project area is ca. 200 km south of the known distribution of *C. xantholeuca*, the species is considered unlikely to occur.
Codonocarpus pyramidalis	Slender Bell-fruit, Camel Poision	VU	E	1		Possible	*Codonocarpus pyramidalis* (Slender Bell-fruit) occurs as scattered individuals across areas of the Flinders Ranges, northern Mt Lofty Ranges and the eastern regions of SA such as within the Murray-Darling Basin, Eyre Peninsula, Yorke Peninsula and Adelaide. Grows along the crests of hills and ridges, slopes and along creeks, where the soil is either a loamy sand or sandy clay loam, and where the pH is between 8.5–9. Throughout its range it is never common and only scattered trees are to be found. *C. pyramidalis* was recorded ca. 8 km N of Robertstown in 2013 by DEW. This observation is particularly important as it is the southern-most record for the species. Given the proximity of this record to the Project area, the species is considered to potentially occur.
Dodonaea subglandulifera	Peep Hill Hop-bush	EN	E	1, 2	2007	Possible	*Dodonaea subglandulifera* (Peep Hill Hop-bush) occurs in isolated localities in semi-arid areas of south-east SA. Populations primarily occur on low hills on loamy soils associated with rocky (limestone, slate, shale) outcrops. The species has also been recorded from plains country in sandy soils over limestone. A subpopulation of *D. subglandulifera* occurs ca. 5 km NE of Robertstown, and therefore, given the proximity to the Project area, the species is considered to potentially occur.
Myoporum parvifolium	Creeping Boobialla		R	2	2008	Unlikely	*Myoporum parvifolium* (Creeping Boobialla) is a creeping shrub that is widespread within coastal environments and along the River Murray in South Australia. The species grows upon coastal cliffs, sand and brackish mudflats. It is not expected that these substrates will occur

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
							within the Project area, and therefore, the species has been considered to be unlikely to occur.
Olearia pannosa subsp. pannosa	Silver Daisy-bush, Silver-leaved Daisy, Velvet Daisy-bush	VU	V	1, 2	2003	Possible	*Olearia pannosa ssp. pannosa* (Silver Daisy-bush) is endemic to SA, where it is scattered throughout agricultural areas. Collections have been made in the EP, YP, FR, Southern MLR, Northern MLR, Murray Basin and SE botanical districts and a single collection from KI. Is generally found in sandy, flat areas and in hilly, rocky areas in woodland or mallee communities dominated by a wide range of *Eucalyptus*, *Melaleuca* and *Callitris* spp. *O. pannosa ssp. pannosa* has been recorded on several occasions ca. 6 km N of Robertstown. Therefore, given the proximity of these records and the broad suitability of habitat within the Project area, the species is considered to potentially occur.
Phebalium glandulossum ssp. macrocalyx	Glandular Phelabium		E	2	2008	Possible	*Phebalium glandulossum ssp. macrocalyx* (Glandular Phelabium) is a large perennial shrub that occurs on the Yorke Peninsula and in the Mid North region of South Australia. The species occurs inhabits mallee associations and therefore has been significantly impacted by vegetation clearance for agriculture. A subpopulation of *P. glandulossum ssp. macrocalyx* has been recorded ca. 7 km NE of Robertstown. Therefore, given the proximity of these records and presence of Mallee associations within the Project area, the species is considered to potentially occur.
Swainsona pyrophila	Yellow Swainson-pea	VU	R	1		Unlikely	*Swainsona pyrophila* (Yellow Swainson-pea) is distributed within SA, NSW and VIC. The species can be found in Mallee vegetation communities on a variety of soil types including well-drained sands, sandy loams and heavier clay loams. It is usually found after fire growing in association with *Eucalyptus incrassata* (Ridge-fruited Mallee), *E. socialis* (Beaked Red Mallee), *E. brachycalyx* (Gilja), *E. gracilis* (Yorrell), and *E. oleosa* (Red Mallee) mid mallee woodland over *Melaleuca uncinata* (Broombush) tall shrubland. *S. pyrophila* is considered unlikely to occur within the Project area due to the absence of regional records.

[1]**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.

[2]**Source**

1: EPBC Act Protected Matters Search Tool (PMST) report (DotEE 2018) – 5 km buffer applied to Project area.

2: Biological Database of South Australia (BDBSA) data extract (DEW 2018) – 5 km buffer applied to Project area.

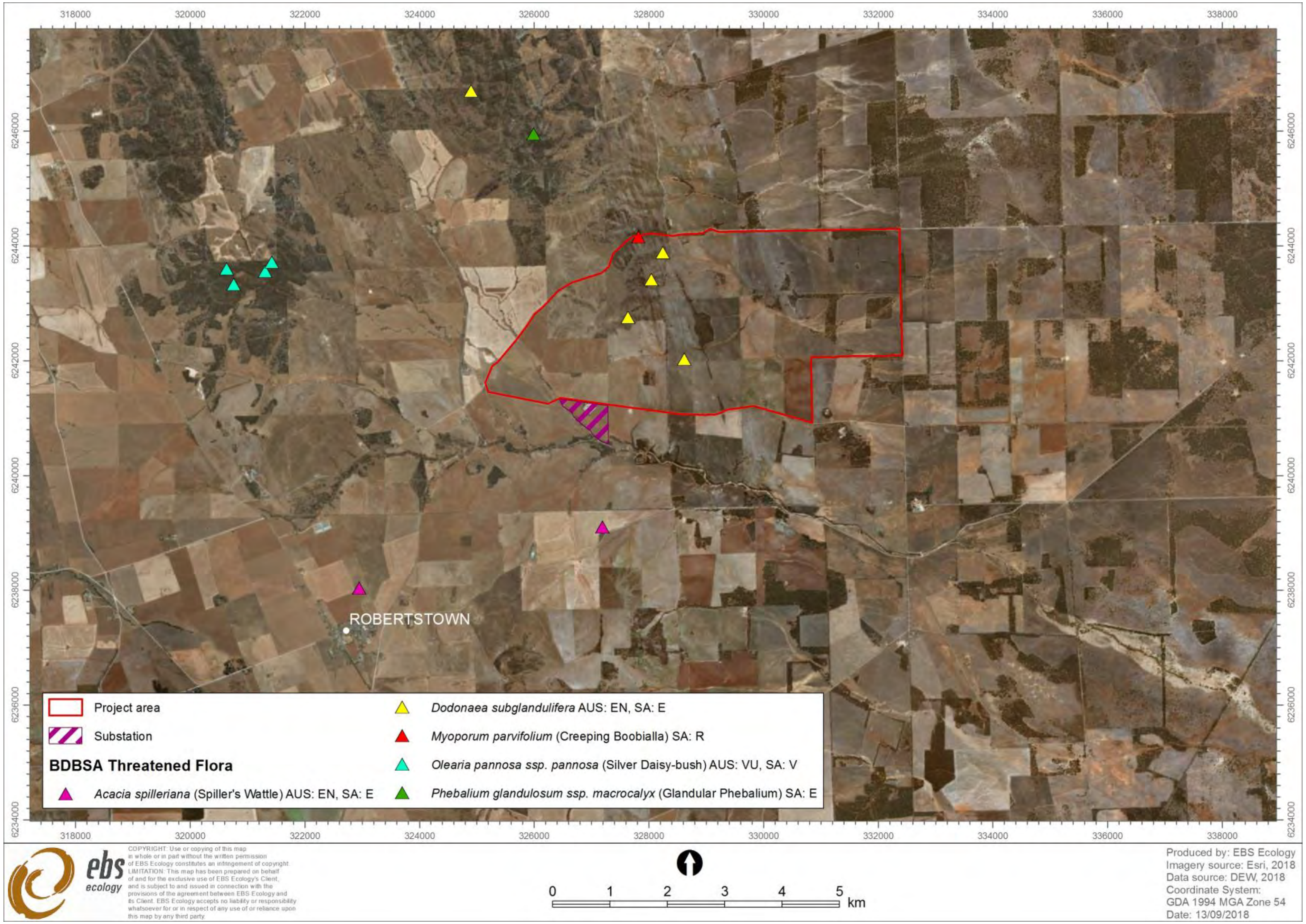


Figure 3. BDBSA records of threatened flora species recorded within 5 km of the Project area (DEW 2018).

5.1.5 Nationally threatened fauna

The EPBC Act PMST report identified 12 nationally listed fauna species within the 5 km buffer of the Project area. Of these 12 species, two were considered to potentially occur within the Project area. These were the Pygmy Bluetongue Lizard (*Tiliqua adelaidensis*) and Flinders Range Worm-lizard (*Aprasia pseudopulchella*). A summary of the threatened species identified and comments regarding their likelihood of occurrence within the Project area is provided in Table 8.

5.1.6 Migratory fauna

The EPBC Act PMST report and BDBSA search identified 12 migratory fauna species listed under the EPBC Act within 5 km of the Project area. Of these 12 species, the Fork-tailed Swift (*Apus pacificus*) was determined to potentially occur within the Project area. A summary of the migratory species identified and comments regarding their likelihood of occurrence within the Project area is provided in Table 8.

5.1.7 State threatened fauna

The BDBSA search identified four fauna species listed under the NPW Act (excluding those also listed under the EPBC Act) within 5 km of the Project area (Table 8 and Figure 4). Three of the four species were considered to have potential to occur within the Project area. None of the remaining state listed fauna species are expected to occur as they are either waterbirds or are reliant upon habitats which are absent from the Project area. A summary of these species and comment regarding their likelihood of occurrence within the Project area is provided in Table 8.

All fauna species identified in the BDBSA search within 5 km of the Project area are shown in Appendix 2.

Table 8. Threatened fauna species potentially occurring within the Project area, identified in the PMST (DotEE 2018) and BDBSA (DEW 2018) database searches.

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
AVES	**Birds**						
Actitis hypoleuca	Common Sandpiper	Mi	R	1		Unlikely	The Common Sandpiper (*Actitis hypoleuca*) is a shorebird species that inhabits coastal environments and inland waterbodies, including bays, inlets, tidal mudflats, saltmarshes and wetlands. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Apus pacificus	Fork-tailed Swift, Pacific Swift	Mi		1		Possible	The Fork-tailed Swift (*Apus pacificus*) is an aerial passerine that spends their non-breeding season in Australia from October to April. The distribution of the Fork-tailed Swift covers the entire continent; however, the species is more common within coastal and subcoastal regions. While in Australia, the species is almost exclusively aerial and flies over habitats which range from treeless plains to rainforests to cities. Given the suite of habitats which the Fork-tailed Swift can use, it is considered possible that the species could occur aerially over the Project area.
Calidris acuminata	Sharp-tailed Sandpiper	Mi		1, 2	1963	Unlikely	The Sharp-tailed Sandpiper (*Calidris acuminata*) is a shorebird species that inhabits coastal environments and inland waterbodies, including bays, inlets, tidal mudflats, saltmarshes and wetlands. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Calidris ferruginea	Curlew Sandpiper	CE, Mi		1		Unlikely	The Curlew Sandpiper (*Calidris ferruginea*) is a shorebird species that inhabits coastal environments and inland waterbodies, including bays, inlets, tidal mudflats, saltmarshes and wetlands. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Calidris melanotos	Pectoral Sandpiper	Mi	R	1		Unlikely	The Pectoral Sandpiper (*Calidris melanotos*) is a shorebird species that inhabits coastal environments and inland waterbodies, including bays, inlets, tidal mudflats, saltmarshes and wetlands. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Calidris ruficollis	Red-necked Stint	Mi		2	1963	Unlikely	The Red-necked Stint (*Calidris ruficollis*) is a shorebird species that inhabits coastal environments and inland waterbodies, including bays, inlets, tidal mudflats, saltmarshes and wetlands. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Corcorax melanorhamphos	White-winged Chough		R	2	2015	Likely	The White-winged Chough (*Corcorax melanorhamphos*) is a medium sized (43-47 cm), primarily ground-dwelling passerine that occurs within drier forest and woodlands of southern and eastern Australia. In South Australia, the species predominantly is found within mallee,

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
							while it also inhabits gardens and parks of small towns. White-winged Choughs are an edge specialist, meaning they preferentially use the edges of remnant vegetation patches. As such, the species survives well within a fragmented environment. The White-winged Chough is likely to occur within the Project area due to recent records (2015) of the species within 5 km and the occurrence of small patches of mallee, which constitute the species preferred habitat.
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Mi	R	1		Unlikely	The Latham's Snipe (*Gallinago hardwickii*) is a shorebird species that occurs within temperate and tropical eastern Australia. Within its range, the species inhabits well vegetated wetlands and saltmarsh. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Grantiella picta	Painted Honeyeater	VU	V	1		Unlikely	The Painted Honeyeater (*Grantiella picta*) is a nectarivorous passerine that inhabits eucalypt, acacia and casuarina dominated woodlands and forests over eastern and inland Australia. In South Australia, the species is very rare and recorded only within the Murray mallee region in the state's west. As such, the distribution of the Painted Honeyeater does not overlap with the Project area, and therefore the species is considered unlikely to occur.
Leipoa ocellata	Malleefowl	VU	V	1		Unlikely	Malleefowl (*Leipoa ocellata*) is a large (55-61 cm), ground-dwelling bird that is distributed throughout the mallee regions of southern Australia. The species has not historically been recorded within the mid-north region, and given the low remnancy of mallee woodland matched with the small size of remnants, it is unlikely that the species would occur within the Project area.
Melanodryas cucullata cucullata	Hooded Robin		R	2	2003	Possible	The Hooded Robin (*Melanodryas cucullata cucullata*) is a small passerine that inhabits drier woodlands throughout Australia. The species can inhabit a range of woodlands that are dominated by eucalypts, casuarinas, cypress pines and acacias. Habitat structure is important to the species, with individuals typically using open areas adjacent to low lateral branches, which are used to sight and pounce upon invertebrates on the ground. The species is considered to possible occur as suitable habitat types are present within the Project area; however, they may be of unsuitable size for Hooded Robins to be resident. Rather, individuals may only use the Project area for movement through the landscape.
Motacilla cinereal	Grey Wagtail	Mi		1		Unlikely	The Grey Wagtail (*Motacilla cinereal*) is a vagrant to Australia, and is exceedingly rare within South Australia, where the species has only been recorded on three occasions. In Australia, the species inhabits areas of running water, sewage ponds, ploughed fields and airfields. The species is considered unlikely to occur in the Project area due to its rarity and the absence of suitable habitat.

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
Motacilla flava	Yellow Wagtail	Mi		1		Unlikely	The Yellow Wagtail (*Motacilla flava*) is a regular coastal migrant to north-western Australia; however, has occurred on rare occasions in coastal southern Australia. This species inhabits areas of short grass and bare ground around wetlands environments. Therefore, the species is considered unlikely to occur in the Project area due to its rarity and the absence of suitable habitat.
Myiagra cyanoleuca	Satin Flycatcher	Mi	E	1		Unlikely	The Satin Flycatcher (*Myiagra cyanoleuca*) occurs along the temperate and tropical eastern coastline of Australia. Within its range, the species primarily inhabits heavily vegetated gullies in forests and tall woodlands; however, during migration, the species may also be found within coastal forests, woodlands and mangroves. The species is a vagrant to SA, and primarily occurs in the far south-east of the state. The species is considered unlikely to occur in the Project area due to its rarity and the absence of suitable habitat.
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	CE, Mi	V	1		Unlikely	The Eastern Curlew (*Numenius madagascariensis*) is a shorebird species that inhabits coastal and subcoastal environments, such as intertidal mudflats, mangroves, saltmarshes and estuaries. Due to the inland location of the Project area and absence of these habitats, the species is considered unlikely to occur.
Pandion haliaetus	Osprey	Mi	E	1		Unlikely	The Osprey (*Pandion haliaetus*) is marine species of raptor that inhabits coastal environments and major river systems. Due to the inland location of the Project area and absence of a major river system, the species is considered unlikely to occur.
Pedionomus torquatus	Plains-wanderer	CE	E	1		Unlikely	The Plains-wanderer (*Pedionomus torquatus*) is a small, ground-dwelling bird. The species stronghold is in the NSW Riverina; however, it also patchily occurs in inland NSW and QLD, southern NT, south-eastern SA and northern VIC. Within its range, the species inhabits spare, treeless and lightly grazed grasslands and herbfields with bare ground. Low shrublands and cropping land may also be used. Historically, the Plains-wanderer occurred within the region of the Project area; however, has not been recorded since 1931. Given the widespread native vegetation clearance since the last record, the habitat within Project area is now likely unsuitable for the species. As such, it is considered unlikely that the Plains-wanderer would occur within the Project area.
Pezoporus occidentalis	Night Parrot	EN	E			Unlikely	The Night Parrot (*Pezoporus occidentalis*) is a species of nocturnal, ground-dwelling parrot. The species inhabits spinifex grassland, chenopod shrubland, and samphire shrublands adjacent to salt lakes. The species is considered to be extinct regionally, and therefore, would not occur within the Project area.
Rostratula australis	Australian Painted	EN	V	1		Unlikely	The Latham's Snipe (*Gallinago hardwickii*) is a shorebird species that

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
	Snipe						primarily occurs within temperate and tropical eastern Australia. Within its range, the species inhabits well vegetated wetlands and marshy areas. Due to the absence of wetlands from the Project area, the species is considered unlikely to occur.
Turnix varius	Painted Buttonquail		R	2	2015	Possible	The Painted Buttonquail (*Turnix varius*) is a small ground-dwelling bird that inhabits forest and woodlands of eastern Australia and south-west Western Australia. The species prefers a closed over-storey and deep leaf litter in the understorey; however, they may also inhabit scrublands, mallee and heathland. The most recent record of a Painted Buttonquail within 5 km of the Project area occurred in 2015 within a large remnant of mallee. Given this record and the presence of Mallee within the Project area, it is considered possible that the species could occur. However, as the Mallee remnants within the Project area are small, it may be unlikely that individuals would be resident; rather they may only use them for movement through the landscape.
ACTINOPTERYGII	**Ray-finned Fishes**						
Galaxis rostratus	Flathead Galaxias, Beaked Minnow, Flat-head Galaxias, Flat-head Jollytail, Flat-headed Minnow	CE		1		Impossible	There are no river channels or wetlands within the Project area, and therefore the Flathead Galaxias (*Galaxis rostratus*) will not occur within the Project area.
AMPHIBIA	**Amphibians**						
Litoria raniformis	Growling Grass Frog, Southern Bell Frog	VU	V	1		Unlikely	There are no wetlands within the Project area, and therefore, the Growling Grass Frog (*Litoria raniformis*) is unlikely to occur within the Project area.
MAMMALIA	**Mammals**						
Nyctophilus corbeni	Corben's Long-eared Bat, South-eastern Long-eared Bat	VU	V	1		Unlikely	The Corben's Long-eared Bat (*Nyctophilus corbeni*) is distributed within the Murray Darling Basin; however, only occurs in the far east of South Australia. The species inhabits box / ironbark / cypress pine woodlands, Buloke woodlands, Brigalow woodland, Belah woodland, smooth-barked apple woodland, river red gum forest, black box woodland and mallee (Lumsden et al. 2008). As the distribution of the Corben's Long-eared Bat (*Nyctophilus corbeni*) in South Australia falls outside the Project area, it is considered unlikely that the species would occur.
REPTILIA	**Reptiles**						
Aprasia pseudopulchella	Flinders Ranges Worm-lizard	VU		1		Possible	The Flinders Ranges Worm-lizard (*Aprasia pseudopulchella*) (FRWL) is a skink that is distributed from the central Mount Lofty Ranges in the

Scientific name	Common name	Conservation status[1]		Source[2]	Last BDBSA record (year)	Likelihood of occurrence in Project area	Likelihood Rationale
		Aus	SA				
							south to the Flinders Ranges in the north. Within its range, the species inhabits open woodland, native tussock grassland, riparian habitats and rocky isolates. As the FRWL is a burrowing species it requires a stony or woody cover on soils. Due to the subterranean nature of the species, it can only be detected by targeted surveys. The FRWL is considered to potentially occur within the Project area due to the potential presence of suitable habitat and the proximity of the closest record, which occurred 14 km NW of Robertstown in 2003 (ALA 2018).
Tiliqua adelaidensis	Pygmy Bluetongue Lizard, Adelaide Blue-tongue Lizard	EN	E	1		Possible	The Pygmy Bluetongue Lizard (*Tiliqua adelaidensis*) (PBTL) is a skink that inhabits the holes of burrowing spiders within areas of unploughed native and exotic grassland. The Project area falls within the distribution gap of two PBTL populations; one at Kapunda in the south and one at Burra in the north. Therefore it is possible that the species may occur within the Project area. As the species resides within holes, a targeted search is required to detect the PBTL due to their cryptic nature. Unploughed areas of grassland appear to exist on hill slopes within the Project area, and therefore, suitable habitat may be present.
Morelia spilota	Carpet Python		R	2	1950	Unlikely	The Carpet Python (*Morelia spilota*) is a snake that typically grows to 2 m but the largest known individuals can reach 4 m in length. The two closest populations of Carpet Pythons near the Project area occur along the River Murray and within the Flinders Ranges. Within these areas, the species occurs within areas of sclerophyll woodland and forest, primarily *Eucalyptus camaldulensis* (River Red Gum) forest. Cliffs and logs are important habitat features for Carpet Pythons which use them for shelter during the day before becoming active during the night. The Carpet Python is considered unlikely to occur within the Project area due to the absence of sclerophyll woodland and forest.

[1]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. Mi.: Migratory.

[2]Source

1: EPBC Act Protected Matters Search Tool (PMST) report (DotEE 2018) – 5 km buffer applied to Project area.

2: Biological Database of South Australia (BDBSA) data extract (DEW 2018) – 5 km buffer applied to Project area.

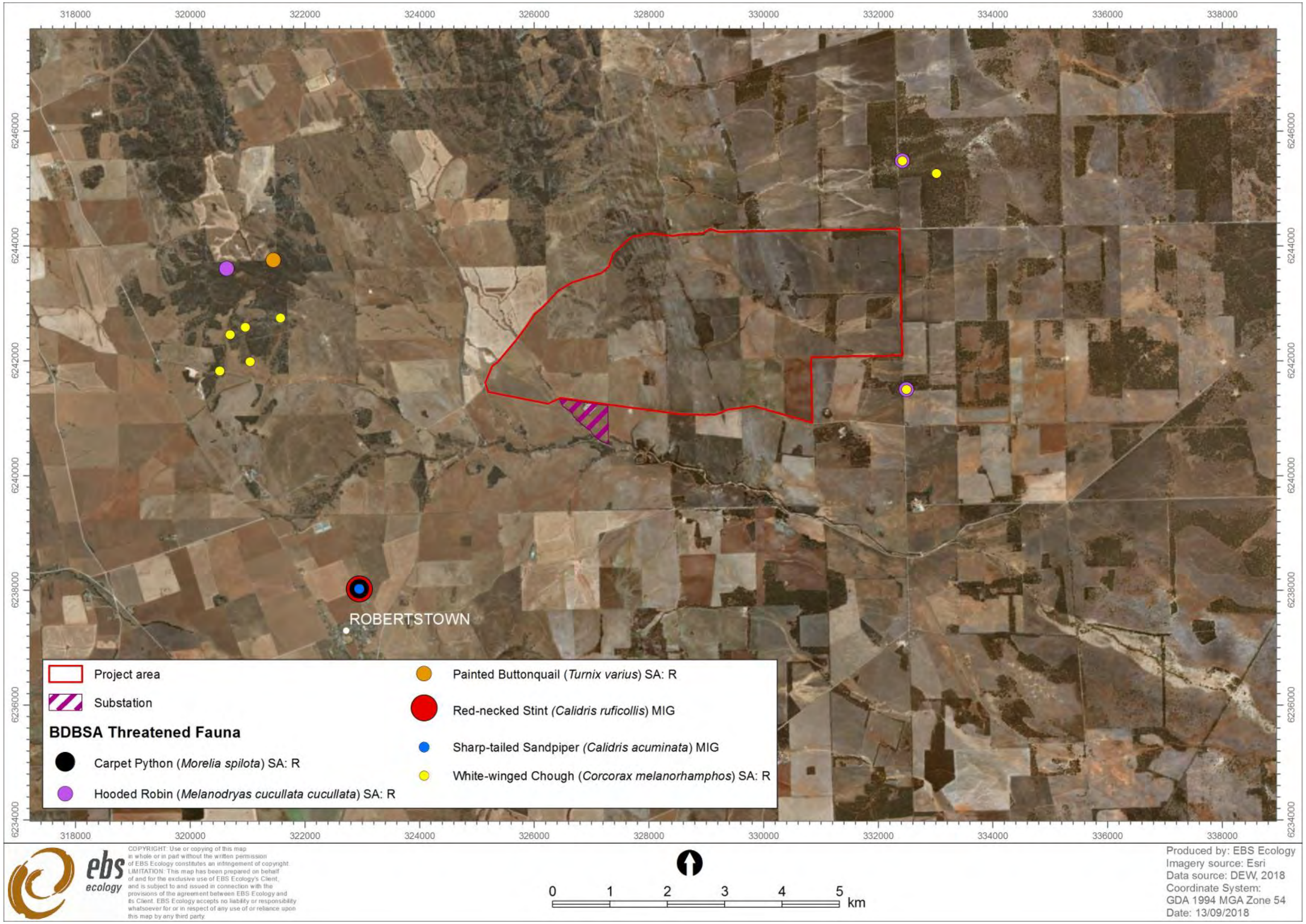


Figure 4. Threatened fauna species BDBSA records within 5 km of the Project area (DEW 2018).

5.1.8 Invasive species

A total of 17 invasive fauna were identified by the PMST as potentially occurring within the Project area, consisting of eight bird and nine mammal species. Seven of these invasive fauna species were determined to likely occur within the Project area (Table 9).

A total of 15 invasive flora species were identified by the PMST as potentially occurring within the Project area, of which two were determined to likely occur within the Project area (Table 9).

Table 9. Invasive flora and fauna species potentially occurring within 5 km of the Project area identified in the PMST database search (DotEE 2018).

Scientific name	Common name	Status[1]	Likelihood of occurrence within Project area
AVES	**Birds**		
Alauda arvensis	Skylark		Likely
Anas platyrhynchos	Mallard		Possible (Dams)
Carduelis carduelis	European Goldfinch		Possible
Columba livia	Domestic Pigeon		Possible
Passer domesticus	House Sparrow		Likely
Streptopelia chinensis	Spotted Turtle-dove		Possible
Sturnus vulgaris	Common Starling		Likely
Turdus merula	Common Blackbird		Possible
MAMMALIA	**Mammals**		
Boa taurus	Domestic Cattle		Unlikely
Canis lupus familiaris	Domestic Dog		Unlikely
Capra hircus	Goat		Unlikely
Felis catus	Cat		Likely
Lepus capensis	Brown Hare		Unlikely
Mus musculus	House Mouse		Likely
Oryctolagus cuniculus	European Rabbit		Likely
Rattus rattus	Black Rat		Possible
Vulpes vulpes	European Red Fox		Likely
PLANTAE	**Plants**		
Asparagus asparagoides	Bridal Creeper	WoNS, D	Unlikely
Austrocylindropuntia spp.	Prickly Pears	WoNS, D	Possible
Carrichtera annua	Ward's Weed	WoNS, E	Likely
Cenchrus ciliaris	Buffel-grass	WoNS, D	Unlikely
Chrysanthemoides monilifera	Bitou Bush, Boneseed	WoNS, D	Unlikely
Chrysanthemoides monilifera ssp. monilifera	Boneseed	WoNS, D	Unlikely
Cylindropuntia spp.	Prickly Pears	WoNS, D	Possible
Genista sp. X Genista monspessulana	Broom	WoNS, D	Unlikely
Lycium ferocissimum	African Boxthorn	WoNS, D	Likely
Olea europaea	Olive	WoNS, D	Unlikely
Opuntia spp.	Prickly Pears	WoNS, D	Possible
Pinus radiata	Radiata Pine	WoNS, E	Unlikely
Rubus fruticosus aggregate	European Blackberry	WoNS, D	Unlikely
Salix spp.	Willows	WoNS, D, E	Unlikely

Scientific name	Common name	Status[1]	Likelihood of occurrence within Project area
Ulex europaeus	Gorse, Furze	WoNS, D	Unlikely

[1]Status
WoNS: Weed of National Significance (*Environment Protection and Biodiversity Conservation Act 1999*). D: Declared (*Natural Resources Management Act 2004*). E: Environmental weed (Department of Planning, Transport and Infrastructure).

5.2 Survey design and site identification

5.2.1 Vegetation assessment

An assessment of aerial imagery and the preliminary layout of the Project area (Figure 1) showed that small patches of native vegetation within the Project area will be avoided. There are however numerous scattered trees/shrubs located within the proposed RS construction footprint. Therefore, a vegetation survey will be conducted by accredited consultants in accordance with the Scattered Tree Assessment Method (STAM), which was devised by the NVC in 2017 (NVC 2017). The STAM is suitable for assessing scattered trees in the following instances:

- Individual scattered trees (i.e. canopy does not overlap). Spatial distribution of trees may vary from approach what would be considered their pre-European distribution through to single isolated trees in the middle of a paddock; or
- Dead trees (when a dead tree is considered native vegetation); or
- Clumps of trees (contiguous overlapping canopies) if the clump is small (~<0.1 ha); and
- For both scattered trees and clumps:
  - The ground layer comprising wholly or largely of introduced species;
  - Some scattered colonising native species may be present, but represents <5% of the ground cover; and
  - The area around the trees consists of introduced pasture or crops.

Scattered trees are scored using a Point Scoring System (PSS), which facilitates the consistent and quantifiable assessment of the relative biodiversity value of a tree. This process assists in determining if clearance is at variance with the principles of clearance in Schedule 1 of the NV Act, particularly Principle 1(b) – Wildlife habitat. The PSS is also used in the calculation of the Significant Environmental Benefit (SEB) requirements.

During the assessment the following metrics of the PSS will be recorded:

- General information – date of inspection, inspectors, number of trees, name of applicant etc.;
- Photo;
- GPS point;
- Species – to subspecies level;

- Height (m);
- Diameter of trunk (cm) – recorded at 1.5 m above the ground;
- Health – % canopy dieback; and
- Hollows – number and size (Small = <5 cm, Medium = 5-15 cm, Large >15 cm).

5.2.2 Fauna survey

Any opportunistic fauna sightings will be recorded as the Project area is traversed during the vegetation assessment. All fauna species observed, signs of fauna (i.e. scats, burrows, nests and skeletons) and potential habitat for fauna (e.g. hollows) will be recorded.

Wombats

A targeted fauna assessment will be conducted in the western section of the Project area to record and map the presence/absence of Southern Hairy-nosed Wombat (*Lasiorhinus latifrons*) burrows. Observations of this species on site will also be recorded during this assessment.

Pygmy Bluetongue Lizard

The Pygmy Blue-tongue Lizard (PBTL) (*Tiliqua adelaidensis*) is listed as nationally endangered under the EPBC Act and state endangered under the NPW Act. Any action that has, will have, or is likely to have a significant impact on this species requires referral under the EPBC Act.

The species resides within the holes of burrowing spiders within areas of unploughed native and exotic grass. Even highly degraded grasslands (dominated by exotic species) are potential habitat, providing that the area is unploughed and the soil structure remains intact (J. Schofield *pers. comm*. 2008).

Given that the Project area falls between the current distributions of two PBTL populations (Kapunda in the south and Burra in the north), it is possible that the species may occur.

Therefore, EBS will conduct visual surveys within the Project area to determine whether habitat suitable for the presence of PBTLs occurs. If suitable habitat is identified, a targeted PBTL field survey will need to be planned and undertaken.

During a targeted PBTL survey all spider burrows suitable for PBTL inhabitance within suitable habitat will be marked with a GPS and survey tags. All holes will be subsequently examined using an optic fibre ‘Burrowscope’ to determine whether PBTLs are present. For each hole, the presence or absence of PBTLs, spiders and other fauna will be recorded.

Flinders Ranges Worm-lizard

The Flinders Ranges Worm-lizard (FRWL) (*Aprasia pseudopulchella*) is listed as nationally vulnerable under the EPBC Act. Any action that has, will have, or is likely to have a significant impact on this species requires referral under the EPBC Act.

This species may occur within the Project area due to the potential presence of suitable habitat (particularly where flat surface rocks are present) and given the proximity of the Project area to a known Flinders Ranges Worm-lizard record/population approximately 14 km NE of Robertstown.

Given the potential presence of this threatened species, EBS will conduct visual surveys over the Project area to determine whether habitat suitable for the presence of the FRWL occurs. If suitable habitat exists, a targeted FRWL field survey will need to be planned and undertaken. This survey can be undertaken in concurrence with the PBTL survey. During a targeted FRWL survey rocks and logs will be flipped in areas where flat surface rocks are present to determine whether FRWLs are present.

6 DISCUSSION

6.1.1 Potential threatening processes

Potential impacts were assessed in relation to vegetation and fauna within the Project area and considered through elements of the project from pre-construction through to establishment of the proposed RS in South Australia.

Based on existing knowledge of potential receptors, the preliminary risks are summarised below:

- Invasion and spread of weeds and pest fauna species/pets;
- Loss of habitat and feeding opportunities via clearance/damage to nesting sites/dens for common fauna species;
- Loss of feeding and roosting habitat for nationally listed fauna species;
- Loss of feeding opportunities for threatened fauna that may visit the site on an irregular basis;
- Displacement due to habitat loss;
- Reduction in terrestrial fauna movement along existing corridors;
- Mortality via collision with vehicles associated with the RS operations; and
- Disturbance effects (e.g. impact on breeding activities, habitat suitability, flight pathways).

6.1.2 Protected areas

All three of the TECs identified in the EPBC Act PMST report were considered unlikely to occur in the Project area.

The Project area does not fall within the distribution of Buloke Woodlands of the Riverine and Murray-Darling Depression Bioregions, which extends from the Wimmera region of VIC to the far south-east of SA.

The Project area falls within the distribution of Iron-grass Natural Temperate Grassland of South Australia and Peppermint Box (*Eucalyptus odorata*) Grassy Woodland. However, the majority of the Project area has been entirely cleared of remnant vegetation and subsequently cropped, and remaining vegetation patches will be avoided. Therefore, it is unlikely that these TECs occur within the Project area.

6.1.3 Flora

None of the national and state threatened flora species identified in the EPBC Act PMST report and BDBSA search were considered likely to occur within Project area. Six of the nine species identified in the EPBC Act PMST report were determined to potentially occur within the Project area. While one of the two species identified in the BDBSA search (excluding those also listed under the EPBC Act); *Phebalium glandulossum ssp. macrocalyx* (Glandular Phebalium), was considered to potentially occur within the Project area.

Given that, besides scattered trees, the majority of the Project area has been entirely cleared of remnant vegetation and subsequently cropped, and remaining vegetation patches will be avoided, the six threatened flora matters of national environment significance could be reduced to none. However, ground-truthing is required to ensure these species do not occur in the Project area.

6.1.4 Fauna

Four threatened fauna species were identified in the EPBC Act PMST report and BDBSA search. If the Project footprint is restricted to areas previously cleared of native vegetation then the number of threatened fauna matters of national significance that could potentially be impacted by the Project could be reduced to three:

1. The threatened Pygmy Bluetongue Lizard;
2. Flinders Ranges Worm-lizard; and the
3. Migratory Fork-tailed Swift.

The PBTL and FRWL are the only two federally threatened fauna species that could be resident within the Project area; while the migratory Fork-tailed Swift is expected to very rarely occur within the Project area. As such, field surveys should aim to determine the impact of the Project on the PBTL and FRWL through targeted surveys. Information gathered on the impact on these threatened species from the field survey will be assessed against the Significant Impact Guidelines to determine whether an EPBC Referral is required for the Project.

Scattered trees can be of high value in terms of habitat and movement pathways for protected species. Within the Project area this includes the state rare White-winged Chough (*Corcorax melanorhamphos*), which was determined likely to occur. Therefore, field surveys should aim to determine the significance of the scattered trees as habitat (roosting, feeding, nesting, movement etc.) for this species.

6.1.5 Conclusion

A field component will verify the presence of any threatened flora and fauna records as well as determine the potential for habitat for threatened flora and fauna. Ground-truthing within the Project area is required to determine the presence of Threatened Ecological Communities and to assess if vegetation associations qualify as TECs. Targeted flora surveys are recommended to ground-truth the findings of the desktop study and to confirm the presence of threatened flora species within the RS Project area.

Field data, combined with database records and background research, is part the way to providing an adequately detailed assessment of the flora and fauna that occurs, and is likely to occur, within the RS Project area in South Australia.

All native vegetation within the Project area is covered by the *Native Vegetation Act 1991* and any proposed clearance will need to be assessed against native vegetation principles and regulations. A clearance application to the Native Vegetation Council may be required.

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8 APPENDICES

Appendix 1. Flora species recorded in the BDBSA within 5 km of the Project area (DEW 2018).

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Acacia acinacea	Wreath Wattle			1992
	Acacia calamifolia	Wallowa			2008
	Acacia calamifolia (NC)	Wallowa			1992
	Acacia hakeoides	Hakea Wattle			2005
	Acacia ligulata	Umbrella Bush			1954
	Acacia nyssophylla	Spine Bush			2008
	Acacia oswaldii	Umbrella Wattle			1977
	Acacia pycnantha	Golden Wattle			2005
	Acacia spilleriana	Spiller's Wattle	EN	E	1992
	Acrotriche patula	Prickly Ground-berry			2003
	Actinobole uliginosum	Flannel Cudweed			1992
*	*Agave americana var. (NC)*	Century Plant			1980
	Allocasuarina verticillata	Drooping Sheoak			2005
*	*Amsinckia calycina*	Hairy Fiddle-neck			2003
	Amyema miquelii	Box Mistletoe			1967
*	*Asphodelus fistulosus*	Onion Weed			2008
	Atriplex acutibractea ssp. acutibractea	Pointed Saltbush			2010
	Atriplex eardleyae	Eardley's Saltbush			1980
	Atriplex pumilio	Mat Saltbush			2010
	Atriplex sp.	Saltbush			1994
	Atriplex stipitata	Bitter Saltbush			2010
	Atriplex suberecta	Lagoon Saltbush			1987
	Atriplex vesicaria	Bladder Saltbush			1994
	Atriplex vesicaria ssp. (NC)	Bladder Saltbush			2008
	Austrodanthonia sp. (NC)				2008
	Austrostipa acrociliata	Graceful Spear-grass			1994
	Austrostipa drummondii	Cottony Spear-grass			2010
	Austrostipa eremophila	Rusty Spear-grass			1991
	Austrostipa exilis	Heath Spear-grass			2003
	Austrostipa nitida	Balcarra Spear-grass			2010
	Austrostipa scabra ssp.	Rough Spear-grass			1994
	Austrostipa sp.	Spear-grass			2008
*	*Avellinia michelii*	Avellinia			2003
*	*Avena barbata*	Bearded Oat			2008
*	*Avena sp.*	Oat			2005
	Beyeria lechenaultii	Pale Turpentine Bush			2005
	Brachyscome lineariloba	Hard-head Daisy			1991
*	*Brassica tournefortii*	Wild Turnip			1991
*	*Bromus rubens*	Red Brome			2003
	Bromus sp.	Brome			2008
	Bursaria spinosa ssp. spinosa	Sweet Bursaria			2005
	Caladenia capillata	Wispy Spider-orchid			1981

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Calandrinia eremaea	Dryland Purslane			2003
	Callitris glaucophylla	White Cypress-pine			1966
	Callitris gracilis	Southern Cypress Pine			1992
	Calotis hispidula	Hairy Burr-daisy			1991
*	*Carduus tenuiflorus*	Slender Thistle			1991
*	*Carrichtera annua*	Ward's Weed			2010
*	*Carthamus lanatus*	Saffron Thistle			1967
	Cassytha melantha	Coarse Dodder-laurel			2003
*	*Catapodium rigidum*	Rigid Fescue			2003
*	*Centaurea calcitrapa*	Star Thistle			2008
*	*Cerastium glomeratum*	Common Mouse-ear Chickweed			2003
	Chenopodium curvispicatum	Cottony Goosefoot			1994
	Chenopodium desertorum ssp.	Desert Goosefoot			1992
	Chenopodium desertorum ssp. microphyllum	Small-leaf Goosefoot			2003
	Clematis decipiens	Old Man's Beard			1971
	Convolvulus erubescens (NC)	Australian Bindweed			1991
	Correa glabra (NC)	Rock Correa			1992
	Crassula colligata ssp. lamprosperma				2003
	Crassula colorata var.	Dense Crassula			1991
	Crassula sieberiana ssp. tetramera (NC)	Australian Stonecrop			1992
	Cratystylis conocephala	Bluebush Daisy			2008
	Dianella revoluta var. revoluta	Black-anther Flax-lily			2003
	Dissocarpus paradoxus	Ball Bindyi			2008
*	*Dittrichia graveolens*	Stinkweed			2005
	Dodonaea baueri	Crinkled Hop-bush			2003
	Dodonaea bursariifolia	Small Hop-bush			1992
	Dodonaea lobulata	Lobed-leaf Hop-bush			1966
	Dodonaea subglandulifera		EN	E	2007
*	*Echium plantagineum*	Salvation Jane			2008
	Einadia nutans ssp.	Climbing Saltbush			1991
	Enchylaena tomentosa var.	Ruby Saltbush			1994
	Enchylaena tomentosa var. tomentosa	Ruby Saltbush			2010
	Eremophila alternifolia	Narrow-leaf Emubush			1992
	Eremophila longifolia	Weeping Emubush			1988
	Eremophila scoparia	Broom Emubush			2008
	Eriochiton sclerolaenoides	Woolly-fruit Bluebush			1991
	Eucalyptus brachycalyx	Gilja			2008
	Eucalyptus gracilis	Yorrell			2010
	Eucalyptus leptophylla (NC)	Narrow-leaf Red Mallee			1992
	Eucalyptus odorata (NC)	Peppermint Box			2008
	Eucalyptus oleosa (NC)	Red Mallee			2003
	Eucalyptus oleosa ssp.				2010
	Eucalyptus porosa	Mallee Box			2008

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Eucalyptus socialis (NC)	Beaked Red Mallee			2003
	Eucalyptus socialis ssp.	Beaked Red Mallee			2008
	Eucalyptus sp.				2008
*	*Euonymus japonicus*				1993
*	*Euphorbia maculata*	Eyebane			2010
	Exocarpos aphyllus	Leafless Cherry			1977
	Gahnia lanigera	Black Grass Saw-sedge			1992
	Galium leptogonium	Reflexed Bedstraw			1971
*	*Galium murale*	Small Bedstraw			2003
	Glischrocaryon flavescens	Yellow Pennants			2007
	Glycine rubiginosa	Twining Glycine			1991
	Goodenia pusilliflora	Small-flower Goodenia			1991
	Hakea rostrata	Beaked Hakea			2008
	Helichrysum leucopsideum	Satin Everlasting			2003
?	*Heliotropium europaeum*	Common Heliotrope			2005
*	*Hordeum glaucum*	Blue Barley-grass			2010
*	*Hypochaeris glabra*	Smooth Cat's Ear			1991
	Isoetopsis graminifolia	Grass Cushion			1991
	Isolepis cernua	Nodding Club-rush			1977
	Juncus kraussii	Sea Rush			1977
*	*Lamium amplexicaule var. amplexicaule*	Deadnettle			1917
	Lasiopetalum baueri	Slender Velvet-bush			1992
	Lichen sp.				1991
*	*Limonium sinuatum*	Notch-leaf Sea-lavender			1993
*	*Lolium rigidum*	Wimmera Ryegrass			2003
	Lomandra effusa	Scented Mat-rush			2005
	Lycium australe	Australian Boxthorn			1991
*	*Lycium ferocissimum*	African Boxthorn			2011
	Maireana aphylla	Cotton-bush			2008
	Maireana brevifolia	Short-leaf Bluebush			2008
	Maireana erioclada	Rosy Bluebush			1994
	Maireana lobiflora	Lobed Bluebush			1991
	Maireana pentatropis	Erect Mallee Bluebush			2010
	Maireana pyramidata	Black Bluebush			2010
	Maireana radiata	Radiate Bluebush			2010
	Maireana sedifolia	Bluebush			2010
	Maireana sp.	Bluebush/Fissure-plant			1991
	Maireana trichoptera	Hairy-fruit Bluebush			1991
	Maireana turbinata	Top-fruit Bluebush			2010
*	*Marrubium vulgare*	Horehound			2008
*	*Medicago minima var. minima*	Little Medic			1991
*	*Medicago truncatula*	Barrel Medic			1991
	Melaleuca lanceolata	Dryland Tea-tree			2003
*	*Mesembryanthemum crystallinum*	Common Iceplant			1994
*	*Mesembryanthemum nodiflorum*	Slender Iceplant			1994

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Millotia muelleri	Common Bow-flower			1971
*	*Minuartia mediterranea*	Slender Sandwort			2003
	Moss sp.				1991
	Myoporum montanum	Native Myrtle			1977
	Myoporum parvifolium	Creeping Boobialla		R	2008
	Myoporum platycarpum ssp.	False Sandalwood			2008
	Myoporum platycarpum ssp. perbellum	Mallee Sandalwood			1953
	Nitraria billardierei	Nitre-bush			2008
	Olearia brachyphylla	Short-leaf Daisy-bush			1992
	Olearia minor	Heath Daisy-bush			2003
	Olearia muelleri	Mueller's Daisy-bush			1992
	Olearia pannosa ssp. pannosa	Silver Daisy-bush	VU	V	2003
	Olearia pimeleoides	Pimelea Daisy-bush			1992
	Omphalolappula concava	Burr Stickseed			1991
*	*Onopordum acaulon*	Horse Thistle			2005
	Oxalis perennans (NC)	Native Sorrel			1991
	Oxalis sp.	Sorrel			1991
	Parietaria debilis	Smooth-nettle			2003
*	*Peganum harmala*	African Rue			2010
	Phebalium glandulosum ssp. macrocalyx	Glandular Phebalium		E	2008
	Phyllanthus saxosus	Rock Spurge			1992
	Pimelea microcephala ssp. microcephala	Shrubby Riceflower			1992
	Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower			1977
	Pimelea stricta	Erect Riceflower			1992
*	*Piptatherum miliaceum*	Rice Millet			2008
	Pittosporum angustifolium	Native Apricot			1992
	Podolepis tepperi	Delicate Copper-wire Daisy			1971
	Pomaderris paniculosa ssp. paniculosa	Mallee Pomaderris			1977
	Prostanthera striatiflora	Striated Mintbush			2007
*	*Psilocaulon granulicaule*	Match-head Plant			1992
	Ptilotus spathulatus	Pussy-tails			1992
	Ranunculus hamatosetosus	Hill Buttercup			2003
	Ranunculus sessiliflorus var. sessiliflorus	Annual Buttercup			1971
*	*Reichardia tingitana*	False Sowthistle			1989
	Rhagodia candolleana ssp.	Sea-berry Saltbush			1994
	Rhagodia parabolica	Mealy Saltbush			2008
	Rhagodia preissii ssp. preissii	Mallee Saltbush			2010
	Rhagodia spinescens	Spiny Saltbush			1991
	Rhagodia ulicina	Intricate Saltbush			1991
	Rhodanthe pygmaea	Pigmy Daisy			1991
	Roepera apiculata	Pointed Twinleaf			1994
*	*Roepera aurantiaca*	Shrubby Twinleaf			2008

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Roepera aurantiaca ssp. aurantiaca	Shrubby Twinleaf			2010
	Roepera glauca	Pale Twinleaf			1991
	Roepera ovata	Dwarf Twinleaf			2010
*	*Rostraria cristata*	Annual Cat's-tail			2003
	Rytidosperma racemosum var. racemosum	Slender Wallaby-grass			2005
	Rytidosperma setaceum	Small-flower Wallaby-grass			2005
	Salsola australis	Buckbush			2008
*	*Salvia verbenaca var.*	Wild Sage			2005
	Santalum acuminatum	Quandong			2005
	Santalum murrayanum	Bitter Quandong			1992
*	*Scabiosa atropurpurea*	Pincushion			2008
*	*Schismus barbatus*	Arabian Grass			2010
	Sclerolaena diacantha	Grey Bindyi			2010
	Sclerolaena obliquicuspis	Oblique-spined Bindyi			2008
	Sclerolaena patenticuspis	Spear-fruit Bindyi			2010
	Sclerolaena uniflora	Small-spine Bindyi			1968
	Senecio anethifolius ssp. anethifolius	Feathery Groundsel			1966
	Senecio glossanthus	Annual Groundsel			2003
	Senecio glossanthus (NC)	Annual Groundsel			2003
	Senecio pinnatifolius (NC)	Variable Groundsel			1992
	Senna artemisioides ssp. filifolia	Fine-leaf Desert Senna			2008
	Senna artemisioides ssp. X coriacea	Broad-leaf Desert Senna			2008
	Sida petrophila	Rock Sida			1991
	Sida sp.	Sida			2008
	Sida spodochroma				1981
*	*Silene apetala*	Sand Catchfly			1992
*	*Silene nocturna*	Mediterranean Catchfly			2003
*	*Sisymbrium erysimoides*	Smooth Mustard			1994
*	*Sisymbrium irio*	London Mustard			2010
*	*Sisymbrium sp.*	Wild Mustard			1991
	Solanum esuriale	Quena			1972
*	*Sonchus oleraceus*	Common Sow-thistle			2003
*	*Sonchus oleraceus (NC)*	Common Sow-thistle			2005
*	*Spergularia diandra*	Lesser Sand-spurrey			2010
*	*Stellaria media*	Chickweed			2003
	Stenopetalum lineare	Narrow Thread-petal			2003
	Stenopetalum lineare (NC)	Narrow Thread-petal			2003
	Tecticornia pergranulata ssp. pergranulata	Black-seed Samphire			1993
	Tetragonia eremaea	Desert Spinach			1994
	Teucrium albicaule	Scurfy Germander			1987
	Teucrium racemosum	Grey Germander			1987
	Trymalium wayi	Grey Trymalium			1992

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
*	*Veronica hederifolia*	Ivy-leaf Speedwell			1987
	Vittadinia gracilis	Woolly New Holland Daisy			1992
	Vittadinia sp.	New Holland Daisy			2008
*	*Vulpia muralis*	Wall Fescue			1991
*	*Vulpia myuros f. myuros*	Rat's-tail Fescue			1991
	Wahlenbergia gracilenta	Annual Bluebell			1991
	Wahlenbergia luteola	Yellow-wash Bluebell			1991
	Westringia rigida	Stiff Westringia			2003
	Wurmbea dioica ssp. dioica (NC)	Early Star-lily			1991
	Zygophyllum aurantiacum (NC)	Shrubby Twinleaf			1994
	Zygophyllum aurantiacum ssp. aurantiacum (NC)	Shrubby Twinleaf			1991
	Zygophyllum sp.	Twinleaf			1991

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. *: Introduced.

Appendix 2. Fauna species recorded in the BDBSA within 5 km of the Project area (DEW 2018).

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater			2015
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill			2015
	Acanthiza nana	Yellow Thornbill			2015
	Acanthiza sp.	thornbills			2003
	Acanthiza uropygialis	Chestnut-rumped Thornbill			2015
	Aegotheles cristatus	Australian Owlet-nightjar			1992
	Anas gracilis	Grey Teal			1987
	Anas superciliosa	Pacific Black Duck			1987
	Anas superciliosa x platyrhynchos	Pacific Black Duck x Mallard hybrid			1987
	Anthochaera carunculata	Red Wattlebird			2015
	Anthus australis	Australian Pipit			2010
	Aphelocephala leucopsis	Southern Whiteface			2010
	Aquila audax	Wedge-tailed Eagle			2012
	Ardea pacifica	White-necked Heron			2010
	Artamus personatus	Masked Woodswallow			1992
	Artamus superciliosus	White-browed Woodswallow			1992
	Austronomus australis	White-striped Free-tailed Bat			2003
	Barnardius zonarius	Australian Ringneck			2015
*	*Bos taurus*	Cattle (European Cattle)			2010
	Calidris acuminata	Sharp-tailed Sandpiper			1963
	Calidris ruficollis	Red-necked Stint			1963
*	*Capra hircus*	Goat (Feral Goat)			1992
	Chalinolobus gouldii	Gould's Wattled Bat			2003
	Chalinolobus morio	Chocolate Wattled Bat			2003
	Chenonetta jubata	Maned Duck			1987
	Christinus marmoratus	Marbled Gecko			2003

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Climacteris picumnus	Brown Treecreeper			2010
	Colluricincla harmonica	Grey Shrikethrush			2015
	Coracina novaehollandiae	Black-faced Cuckooshrike			2010
	Corcorax melanorhamphos	White-winged Chough		R	2015
	Corvus coronoides	Australian Raven			2010
	Corvus mellori	Little Raven			2015
	Cracticus torquatus	Grey Butcherbird			2015
	Cryptoblepharus cf plagiocephalus (NC)	Desert Wall skink			1992
	Cryptoblepharus pannosus	Speckled Wall Skink			1992
	Ctenophorus decresii	Tawny Dragon			1983
	Daphoenositta chrysoptera	Varied Sittella			2003
	Diplodactylus vittatus complex (NC)	Stone Geckos			1992
	Dromaius novaehollandiae	Emu			1992
	Elanus axillaris	Black-shouldered Kite			1992
	Eolophus roseicapilla	Galah			2015
	Epthianura albifrons	White-fronted Chat			2010
	Epthianura aurifrons	Orange Chat			1983
	Eurostopodus argus	Spotted Nightjar			1992
	Falco berigora	Brown Falcon			2015
	Falco cenchroides	Nankeen Kestrel			2012
	Falco subniger	Black Falcon			1992
	Gavicalis virescens	Singing Honeyeater			2015
	Gehyra lazelli	Southern Rock Dtella			1983
	Grallina cyanoleuca	Magpielark			1992
	Gymnorhina tibicen	Australian Magpie			2015
	Hemiergis decresiensis	Three-toed Earless Skink			2003
	Hieraaetus morphnoides	Little Eagle			2010
	Lalage tricolor	White-winged Triller			2010
	Lerista dorsalis	Southern Four-toed Slider			2003
	Lerista sp.				2003
	Macropus fuliginosus	Western Grey Kangaroo			2003
	Macropus robustus	Euro			2003
	Macropus rufus	Red Kangaroo			2003
	Macropus sp.				2010
	Malacorhynchus membranaceus	Pink-eared Duck			1963
	Malurus lamberti	Variegated Fairywren			2015
	Malurus leucopterus	White-winged Fairywren			2010
	Manorina flavigula	Yellow-throated Miner			2012
	Megalurus cruralis	Brown Songlark			2010
	Melanodryas cucullata cucullata	Hooded Robin (SE, MM, MLR, AP, YP, MN)		R	2003
	Melithreptus brevirostris	Brown-headed Honeyeater			2015
	Melopsittacus undulatus	Budgerigar			1992
	Menetia greyii	Dwarf Skink			1992
	Merops ornatus	Rainbow Bee-eater			2010

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Microeca fascinans	Jacky Winter			2015
	Morelia spilota	Carpet Python		R	1950
	Morethia obscura	Mallee Snake-eye			2003
	Mormopterus sp.				2003
*	*Mus musculus*	House Mouse			1992
	Nesoptilotis leucotis leucotis	White-eared Honeyeater (SE, MM, KI, FR, YP)			2015
	Nyctophilus geoffroyi	Lesser Long-eared Bat			2003
	Ocyphaps lophotes	Crested Pigeon			2010
*	*Oryctolagus cuniculus*	Rabbit (European Rabbit)			2010
*	*Ovis aries*	Sheep (Feral Sheep)			2010
	Parasuta nigriceps	Mitchell's Short-tailed Snake			1983
	Parasuta spectabilis	Mallee Black-headed Snake			1994
	Pardalotus punctatus	Spotted Pardalote			2015
	Pardalotus striatus	Striated Pardalote			2015
	Parvipsitta porphyrocephala	Purple-crowned Lorikeet			2001
*	*Passer domesticus*	House Sparrow			2010
	Petrochelidon nigricans	Tree Martin			1992
	Phaps chalcoptera	Common Bronzewing			2015
	Phylidonyris novaehollandiae	New Holland Honeyeater			2001
	Platycercus elegans	Crimson Rosella			2001
	Podargus strigoides	Tawny Frogmouth			1913
	Pogona sp.				2010
	Pogona vitticeps	Central Bearded Dragon			1992
	Pomatostomus ruficeps	Chestnut-crowned Babbler			1999
	Pomatostomus superciliosus	White-browed Babbler			2015
	Psephotellus varius	Mulga Parrot			1992
	Psephotus haematonotus haematonotus	Red-rumped Parrot (eastern SA except NE)			1992
	Ptilotula ornata	Yellow-plumed Honeyeater			2015
	Ptilotula penicillata	White-plumed Honeyeater			2001
	Purnella albifrons	White-fronted Honeyeater			1999
	Pyrrholaemus brunneus	Redthroat			2010
	Rhipidura albiscapa	Grey Fantail			2015
	Rhipidura leucophrys	Willie Wagtail			2015
	Smicrornis brevirostris	Weebill			2015
	Sminthopsis murina	Common Dunnart			1992
*	*Spilopelia chinensis*	Spotted Dove			1983
	Strepera versicolor	Grey Currawong			2015
	Struthidea cinerea	Apostlebird			2015
*	*Sturnus vulgaris*	Common Starling			2010
	Tachyglossus aculeatus	Short-beaked Echidna			2010
	Taeniopygia guttata	Zebra Finch			1913
	Tiliqua rugosa	Sleepy Lizard			2010
	Todiramphus pyrrhopygius	Red-backed Kingfisher			1999
	Turnix varius	Painted Buttonquail		R	2015

*	Scientific name	Common name	Conservation status		Last sighting (year)
			Aus	SA	
	Vespadelus sp.				2003
	Zosterops lateralis	Silvereye			2015

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. *: Introduced.

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APPENDIX 9

Desktop Heritage Assessment

DESKTOP HERITAGE ASSESSMENT

Prepared for Robertstown Solar

Prepared by EBS Heritage

EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

Robertstown Solar

Desktop Heritage Assessment

Robertstown Solar: Desktop Heritage Assessment

5 October 2018

Version 2

Prepared by EBS Heritage for Robertstown Solar 1 Pty Ltd

Document Control					
Revision No.	Date issued	Authors	Reviewed by	Date Reviewed	Revision type
1	25/09/2018	Shannon Smith	Dr Marina Louter	25/09/2018	Draft
2	05/10/2018	Shannon Smith	Lucy Sinclair	05/10/2018	Final

Distribution of Copies			
Revision No.	Date issued	Media	Issued to
1	26/09/2018	Electronic	Kate Tierney, EPS Energy
2	05/10/2018	Electronic	Kate Tierney, EPS Energy

Project Number: G80903

CITATION: EBS Heritage (2018) Robertstown Solar: Desktop Heritage Assessment. Report to Robertstown Solar 1 Pty Ltd. EBS Heritage, Adelaide.

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GLOSSARY AND ABBREVIATION OF TERMS

AHA	*Aboriginal Heritage Act* 1988
CHMP	Cultural Heritage Management Plan
DAC	Development Assessment Commission
DEW	Department of Environment and Water (formerly Department of Environment, Water and Natural Resources (DEWNR))
DotEE	Department of the Environment and Energy
DPTI	Department of Planning Transport and Infrastructure
DPC-AAR	Department of the Premier and Cabinet – Aboriginal Affairs and Reconciliation
DSD-AAR	Department of State Development – Aboriginal Affairs and Reconciliation
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
GC	Goyder Council
KM	Kilometres
NTA	*Native Title Act 1993*
Project	The proposed development of the solar farm at Robertstown
Project area	The land where the solar farm at Robertstown is proposed to be constructed
RS	Robertstown Solar
SA	South Australia / South Australian
SAM	The South Australian Museum

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1 INTRODUCTION

EBS Heritage has been engaged by EPS Energy to undertake a heritage desktop and risk assessment of the proposed Robertstown Solar (RS). EBS understands that these initial investigations are necessary to determine if the proposed site is suitable for development.

This report summarises the available previous heritage work carried out for the Project area, and heritage management recommendations in light of the desktop risk assessment and the relevant heritage protection legislation.

1.1 Project area

The Project area is located near Robertstown, South Australia (SA), which is approximately 120 km NNE of Adelaide. The proposed Project area is located to the north and northeast of an existing substation, and consists of approximately 1756 ha across multiple parcels with multiple land owners (Table 1). The proposed Project area for RS is provided in Figure 1 and Figure 2.

Robertstown Solar lies within the SA Murray-Darling Basin NRM region and the Goyder LGA. The proposed Project area of Robertstown Solar in SA is provided in Figure 1.

Table 1: Land parcel details for the proposed Robertstown Solar.

Lot Number	Address	Approx. Area of Interest (Ha)
CT 5465/354	Lot 13 Government Road, Bright SA 5381	110
CT 5464/828	Lot 13 Government Road, Bright SA 5381	112
CT 5941/840	235 Lower Bright Road, Bright SA 5381	154
CT 5431/657	Lot 227 Government Road, Geranium Plains SA 5381	116
CT 5565/131	Lot 91 Government Road, Bright SA 5381	312
CT 5431/659	Lot 232 Government Road, Bright SA 5381	146
CT 5550/784	Lot 91 Powerline Road, Bright SA 5381	310
CT 5561/287	Lot 221 Government Road, Bright SA 5381	115
CT 5561/89	Lot 221 Government Road, Bright SA 5381	140
CT 5951/34	Lot 44 Powerline Road, Bright SA 5381	141
CT 5951/34	Lot 45 Powerline Road, Bright SA 5381	100
Total		**1756**

1.2 Cultural Heritage Desktop Assessment Objectives

- Conduct background research including a review of heritage register searches and the SA Heritage Database as well as background research of primary and secondary sources and previous heritage reports for the Project area;
- Review archival aerial photographs where available to determine levels of historical disturbance in Project area;

- Identify State and Commonwealth legislative requirements pertinent to heritage in the current Project area;
- Determine the likelihood or risk of cultural heritage sites being present as well as the potential impacts for any known heritage within the Project area in accordance with the SA *Aboriginal Heritage Act 1988*; and
- Prepare risk management recommendations for future works and provide recommendations in relation to any potential impacts the proposed activities could have on locations of heritage significance, in light of clients' responsibilities under the SA *Aboriginal Heritage Act 1988*.

Figure 1: Location of the Project area.

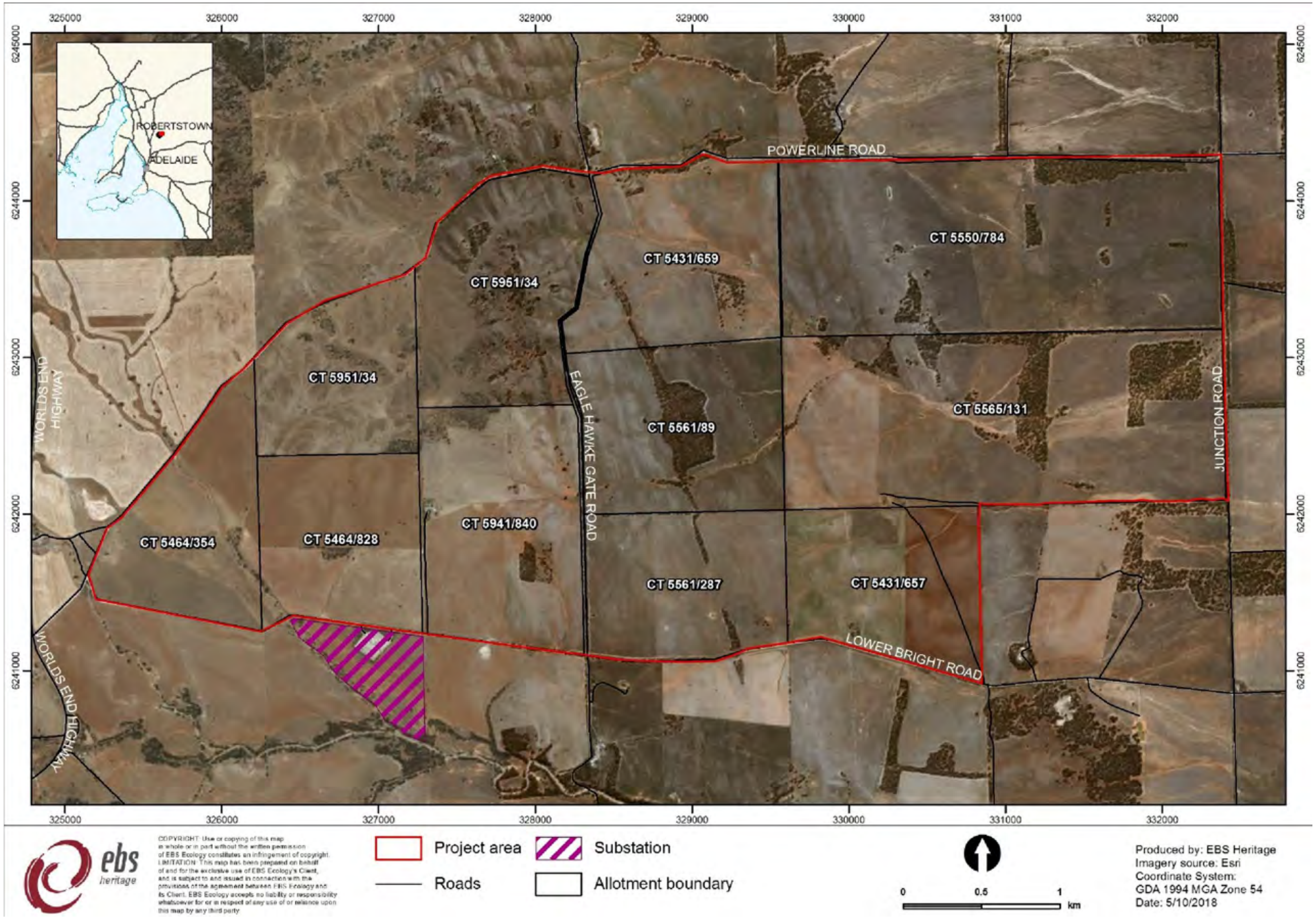

Figure 2: Detailed location of Project area.

2 COMPLIANCE AND LEGISLATIVE SUMMARY

2.1 Commonwealth Legislation

2.1.1 Environmental Protection & Biodiversity Conservation Act 1999

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Protection and Biodiversity Conservation Regulations 2000* protect 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 culture 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. None of these sites are located within the Project area.

2.1.2 Aboriginal & 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 South Australian Aboriginal Heritage Act 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 for any cultural heritage site that may be in the Project area.

2.1.3 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 which is defined as the rights and interests that are possessed under the traditional laws and customs of Aboriginal people in lands and waters.

The NTA recognises the existence of Indigenous land ownership tradition where connections to country have been maintained and where acts of government have not extinguished this connection.

The following list is indicative of the type of land that might be subject to native title:

- Vacant Crown Land
- State forests
- National Parks
- Public Reserves
- Beaches and foreshores
- Land held by the government agencies
- Land held in trust for Aboriginal communities
- Any other public or Crown lands including oceans and inland waterways
- Pastoral leases

Under the amended NT Act, native title is extinguished by the following:

- Private freehold land,
- Valid grants of private freehold land or waters,
- Residential or commercial leases,
- Exclusive possession of leases,
- Mining dissection leases,
- Community purpose leases,
- Public works

2.2 SA State Legislation – Aboriginal Heritage

2.2.1 Native Title (SA) Act 1994

The act establishes a Register that must keep a register of native title and claims to native title in land in the State. The register is to determine whether the claim is to be registered. It is a requirement of this Act that when a developer is carrying out certain activities or development in areas where native title exists or may exist, the developer will need to consider the possible impacts of their actions on native title rights and interests. A search of National Native Title register is presented in Table 2 and Figure 3.

Table 2: Native Title Claims

Name	Tribunal No.	Status
Ngadjuri Nation #2	SC2001/002	Accepted for registration

Contact information for the group was identified by DPC-AAR:

Ngadjuri Nation Aboriginal Corporation

Chairperson: Quenten Agius

Address: 46 Maitland Road, Point Pearce, SA, 5573

Mobile: 0429367121

Email: Traditionalowners@adjahdura.com.au

2.2.2 Aboriginal Heritage Act 1988 (SA)

The South Australian *Aboriginal Heritage Act 1988* (AHA) is administered by the South Australian Department of Premier and Cabinet, Aboriginal Affairs and Reconciliation (DPC-AAR). This legislation outlines that any Aboriginal site, object or remains whether previously recorded or not, are covered by the AHA. The Act provides the following definition of an Aboriginal site in Section 3.

"Aboriginal Site" means an area of land;

a) That is of significance according to Aboriginal tradition; and / or

b) That is of significance according to Aboriginal archaeology, anthropology or history.

The AHA states that it is an offence under Section 23 (s.23) of the AHA to 'damage, disturb or interfere' with an Aboriginal site, object or remains unless written authorisation is obtained from the Minister for Aboriginal Affairs and Reconciliation. Penalties for an offence under s.23 are up to $10,000 or six months' imprisonment for an individual or $50,000 in the case of a corporate body. An owner or occupier of private land, or an employee or agent of such an owner or occupier, who discovers on the land an Aboriginal site or Aboriginal object must as soon as practicable report the discovery to the Minister. Penalties for an offence under s.20 are up to $50,000 for a body corporate and $10,000 or 6 months imprisonment for an individual.

It is also an offence under s.35 of the Act to divulge information relating to an Aboriginal site, object, remains or Aboriginal tradition without authorisation from the relevant Aboriginal group or groups. Penalties for an offence under this section are up to $10,000 or six months imprisonment.

The *Aboriginal Heritage Act 1988* is the most relevant piece of legislation for this particular project.

2.3 SA State Legislation – European Heritage

2.3.1 Heritage Places Act 1993

The Heritage Places Act 1993 makes provision for the identification, recording and conservation of places and objects of non-Aboriginal heritage significance in SA. A State Heritage Place is entered in the SA Heritage Register or contained within an area established as a State Heritage Area. Once registered, State Heritage Places are protected under the Heritage Places Act 1993 and the Development Act 1993.

The Heritage Places Act 1993 is governed by the Department of Environment and Water (DEW) and the South Australian Heritage Council. No Heritage Places related to the current Project area.

Under sections 26, 27 and 28 of this act it is an offence to carry out the following actions without a permit from the Council:

- Excavate or disturb a State Heritage Place designated as a place of archaeological significance; or remove archaeological artefacts from such a place.
- Excavate or disturb any land (not designated as a place of archaeological significance) for the purpose of searching for or recovering archaeological artefacts of heritage significance; or excavate or disturb any land (not designated as a place of archaeological significance) knowing or having reasonable cause to suspect that the excavation or disturbance will or is likely to result in an archaeological artefact of heritage significance being discovered, exposed, moved, damaged or destroyed.
- Damage, destroy or dispose of an archaeological artefact removed from a State Heritage Place designated as a place of archaeological significance (whether removed before or after the entry of that place in the Register) and to damage, destroy or dispose of an object entered in the Register (either as a provisional or confirmed entry).

Penalties for any offences under section 26, 27 and 28 of the Heritage Places Act 1933 are up to $75,000.

Under section 36 of the Heritage Places Act, a person who intentionally or recklessly damages a heritage place or engages in conduct knowing that it will or might destroy or reduce the significance to a State Heritage Place can be fined a maximum penalty of $120,000.

There is no penalty if damage results from an action authorised by an approval or authorisation under the *Development Act 1993*.

2.3.2 Planning, Development and Infrastructure Act 2016

The *Planning, Development and Infrastructure Act 2016* (PDI Act) provides for matters that are relevant to the use, development and management of land and buildings, including the provision of a planning system to regulate development within the State, rules with respect to the design, construction and use of buildings, and other initiatives to facilitate the development of infrastructure, facilities and environments that will benefit the community. The PDI Act repeals the *Development Act 1993* and will gradually come into operation over a five year period.

The PDI Act deals with planning and development measures in the State and specifically deals with any proposed activity which may materially affect a heritage place of either State or local significance. The PDI Act enables local councils to include places of local heritage value into a Planning and Design Code (To replace development plans). The Planning and Design Code will be a central feature of SA's new planning system, becoming the state's single planning rulebook for assessing all development applications. It will transform complex, inconsistent planning rules found within the 72 Development Plans into a single, easy-to-access set of rules that can be applied consistently across the State.

Approval must be obtained if a site or place on the State Heritage Register is to be affected. Places of local heritage value are listed in an inventory attached to the State Heritage Register.

Where construction is likely to take place in the vicinity of heritage listed places, and direct disturbance is possible, the client should seek advice from construction, vibration and sound engineers on mitigation measures that may be required, such as buffer zones to protect the integrity of the building or structure. Where disturbance is likely the client may also need a more detailed assessment of sub-surface deposits associated with historical buildings, such as an archaeological assessment.

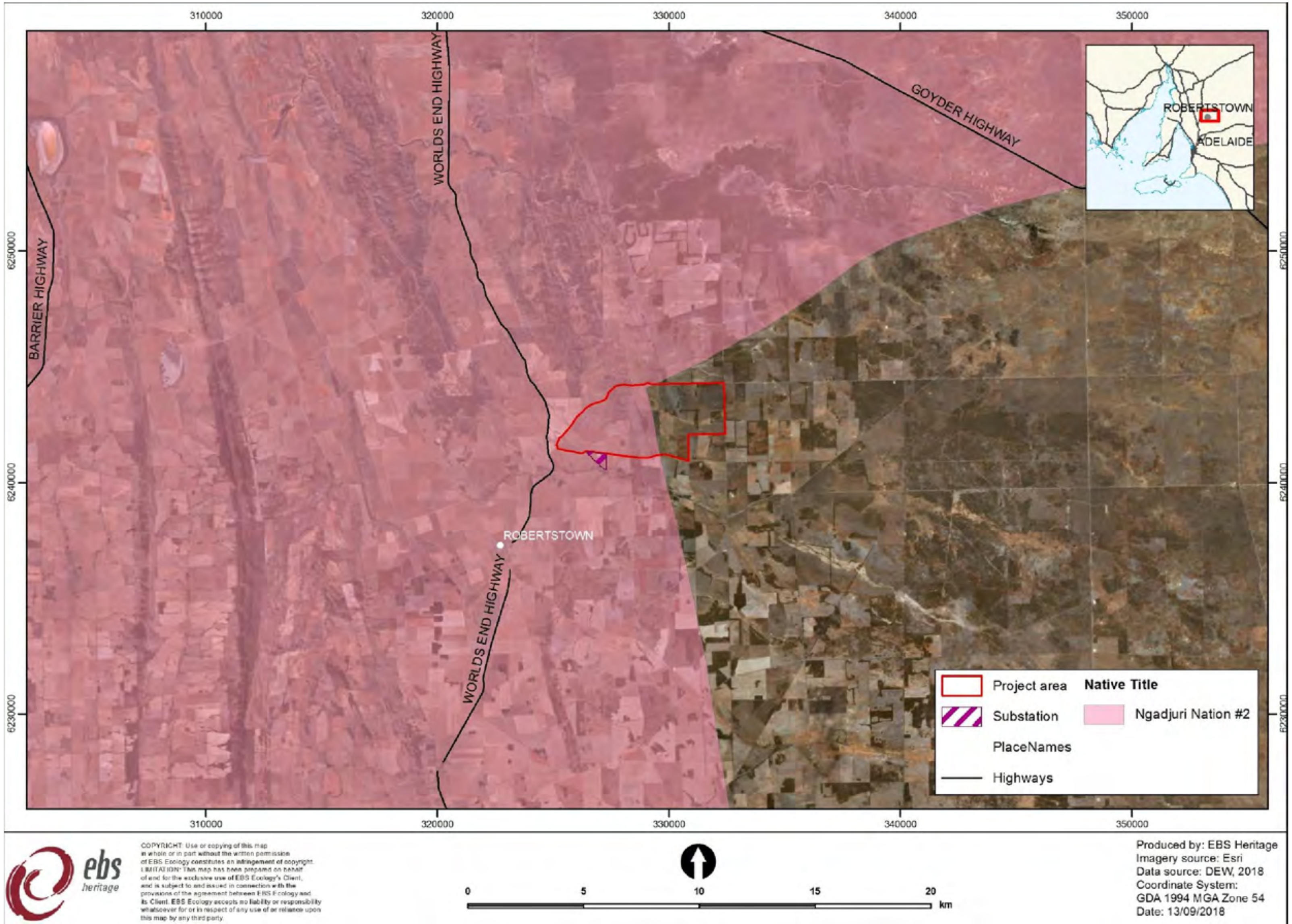

Figure 3: Native Title within the Project area.

3 BACKGROUND INFORMATION

In order to understand the archaeological context of an area it is important to have a good understanding of local environmental landscape features. Past and present environmental factors have an impact on the type, presence and location of cultural material.

3.1 The Murray Basin

The Project area is located within the Murray Basin. The Murray Basin is made up of 22 water catchments which are grouped into the northern Darling basin and the southern Murray basin. Australia's four longest rivers are located within the basin. The basin itself stretches from Queensland, into NSW in the north down to the River Murrays mouth in SA (MDBA 2016). The Murray Valley has arisen from the change in sea level during the last glacial maximum. At 18,000 BP the sea levels were approximately 100 metres below the current levels. During the end of the Pleistocene the perennial lakes throughout the Murray Basin began to dry out on a more regular basis. Lunettes also formed around the eastern banks of these exposed lake edges, formed by strong westerly winds. As the sea level continued to rise, reaching the current level around 7,000 BP, the climate has improved. There was increased rainfall in the area, creating flooding events throughout the basin (Wood & Westell 2008).

3.2 Bioregion

3.2.1 The Murray Darling Depression

The Murray Darling Depression bioregion is located in the south-eastern portion of SA, and extends into both New South Wales and Victoria. Within SA the bioregion makes up to 19 % and includes the River Murray. The climate is semi-arid and has a mean annual rainfall of between 200- 550 mm (NRM 2013). The bioregion lies in the Murray Basin on Tertiary and Quaternary sediment deposited from a shallow sea, lakes and rivers. The landscape is characterised by dune fields, sandplains and undulating plains of brown calcareous soils. Some dunes have consistent east-west linear patterns, others are parabolic. The southern part of South Australia contains the Mediterranean biome. The climate of the Mediterranean biome is cool to warm; tending to winter rains. The biome is characterised by undulating plains and foothills, low ranges, steep rocky gorges and creek lines. The highly fragmented vegetation includes chenopod shrub lands, native grassland, sedge lands, samphire shrub lands, native grassland, open Mallee, eucalypt woodlands and sand dune fields. Its watercourses and rivers range from ephemeral to permanent (NRM, no date).

3.2.2 Climate

The nearest long-term climate data was sourced from the Eudunda weather station, located 20.5 km south of the Project area. Rainfall and temperature data are indicative of a Mediterranean climate, with hot dry summers and cool wet winters. Annual average rainfall is 448.6 mm. The majority of the rainfall occurs during winter with the highest falls in August (average 55.7 mm) and June (average 51.9 mm). The mean minimum temperature ranges from 5°C (July) to 14.3°C (February) and the mean maximum temperature ranges from 13.1°C (July) to 29.3°C (January) (Figure 4).

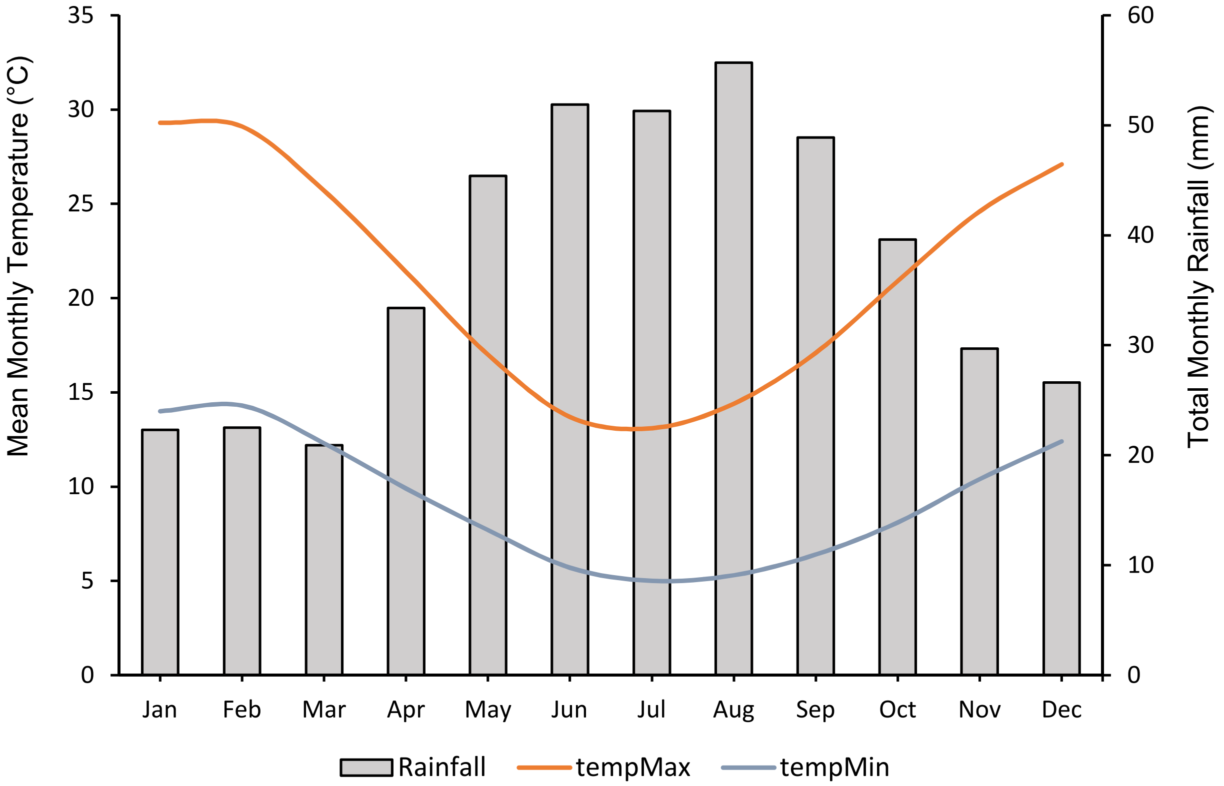

Figure 4. Mean total monthly rainfall and mean maximum and minimum temperatures recorded at Eudunda (station no. 24511), located 20.5 km south of the Project area (BOM 2018).

3.3 Soil Landscape Information

The Project area is predominantly located within soils that are formed on basement rock. There are areas, mostly associated with the Spring Hut Creek that have deep calcareous soil (Figure 5). This is important because certain soil landscapes have a higher risk of containing and preserving cultural material, including those deep soils assorted with creek lines.

3.4 Hydrology

When looking at an area it is important to take into consideration the natural water sources in the region and how these would have affected the occupation of the area by past peoples.

The most major waterway in the area is the Burra Creek and its associated catchment, which is just north of the current Project area. The Burra Creek is a large stream in the Mount Lofty Ranges. It rises north of Burra and flows south until it reaches the River Murray. The flow generally disappears underground in the lower reaches. It is a permanently flowing moderately freshwater creek throughout autumn and spring. The second most important waterway is the Spring Hut Creek. The current Project area is located north of this creek and it goes through the Project area in the western portion. There are also a number of drainage lines throughout the Project area that link up with the Spring Hut Creek (Figure 6 and Figure 7).

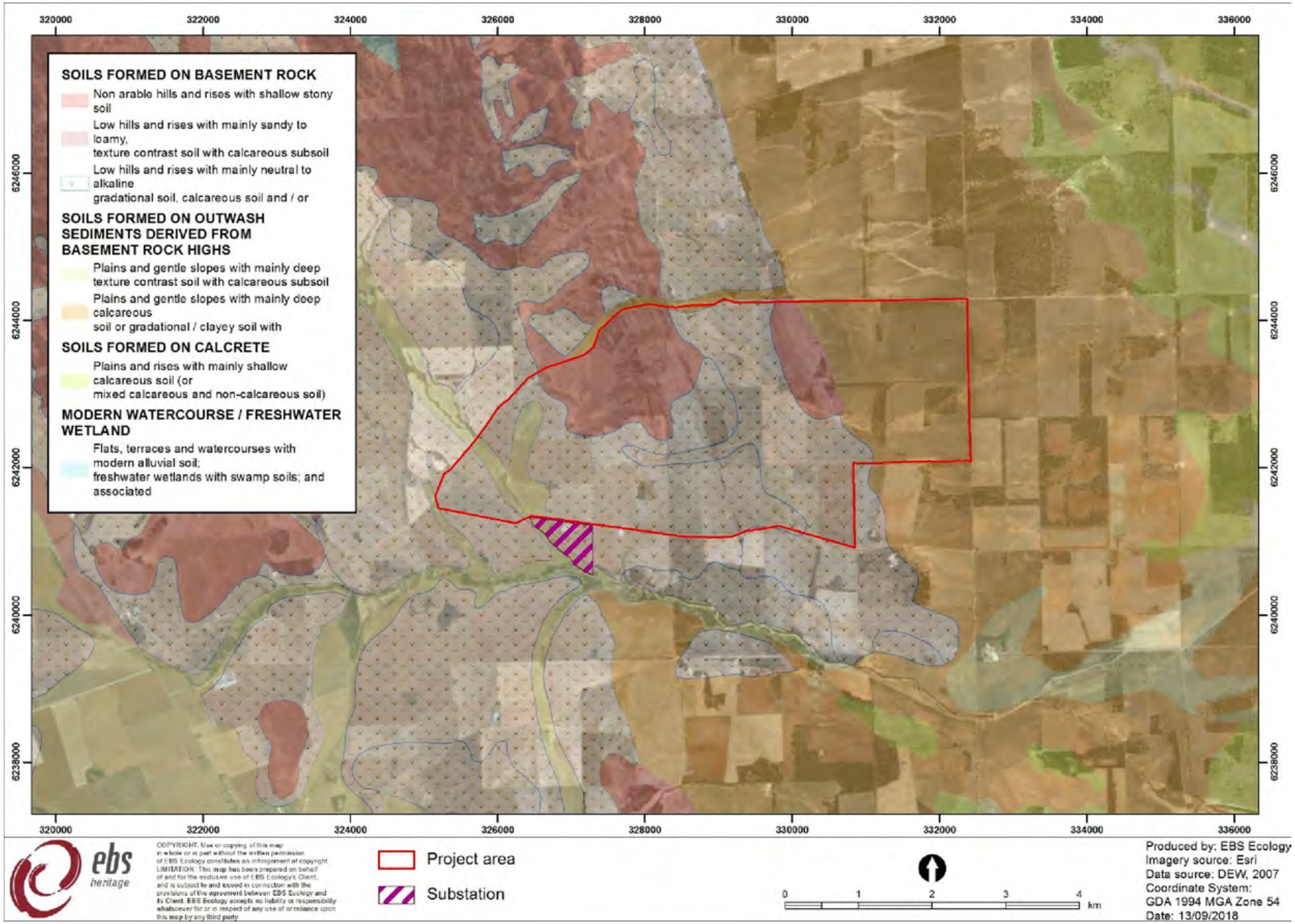

Figure 5: Soil landscape in the Project area.

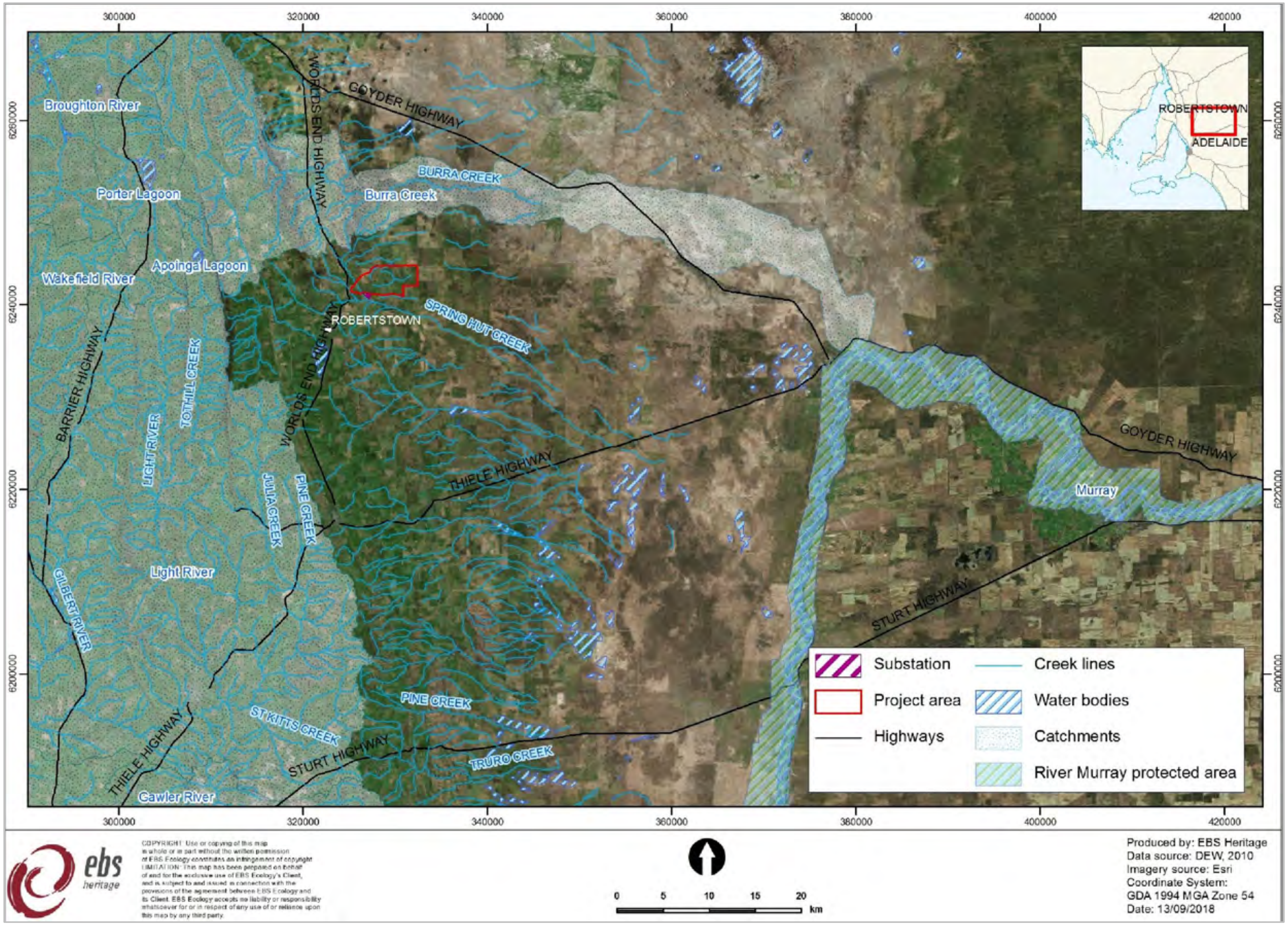

Figure 6: Hydrology in the local area.

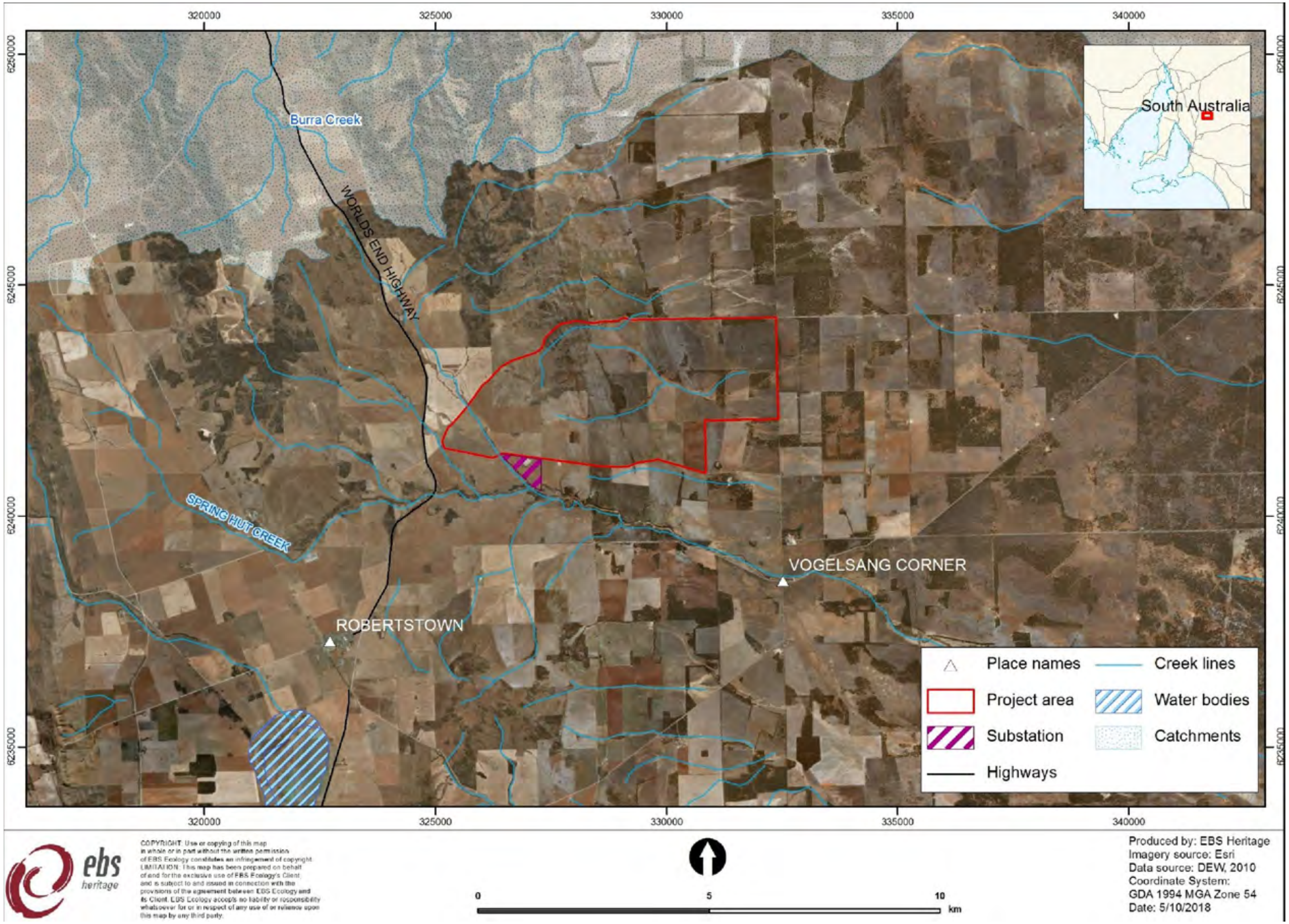

Figure 7: Hydrology in the Project area.

4 DESKTOP ASSESSMENT METHODS

The heritage desktop assessment was conducted to assess the risk of encountering any Aboriginal sites within the Project area. This was achieved by undertaking the following:

4.1 DPC-AAR Register Search

EBS completed a search of the Central Archive and Register of Aboriginal Sites and Objects maintained by DPC-AAR. This search identified any previously recorded sites (as defined under Part 1, Section 3 of the *Aboriginal Heritage Act 1988* (AHA)). Not only does the DPC-AAR search provide a list of sites within the Project area, it also provides an indicator of the types of sites found in the region.

4.2 Archival Research

EBS undertook searches to find any available information regarding early land use and European heritage items within the Project area. Searches were conducted of the:

- the Australian Heritage Database (World Heritage list, National Heritage list, Commonwealth heritage list, the register of the National Estate and places under consideration);
- the SA Heritage Places Database (State, Territory and Commonwealth heritage places);
- the South Australian Museum Database (SAM);
- the Australian Heritage Photographic Library; and
- Local council development plans.

EBS also conducted research at the SA archives for archival information such as images, newspaper clippings, journal entries and other primary sources that may contain information on the early uses of the area and early interactions between Aboriginal people and European colonialists. The results from this research can be seen in Section 7.

4.3 Previous Work / Consultancy Reports

EBS undertook a review of any available heritage reports / works previously carried out in the area and general region, where available and applicable. Section 6 of this report summarise those relevant projects.

4.4 Cultural Heritage Risk Assessment

EBS undertook a risk assessment of the Project areas to assess the likelihood of the project impacting environmental landforms most commonly associated with cultural heritage sites. Coupled with the desktop research, EBS prepared a detailed maps showing areas of high, moderate and low risk for encountering cultural heritage sites. Section 8 presents this information.

4.5 Limitations

The search results of the Department of Premier and Cabinet – Aboriginal Affairs and Reconciliation (DPC-AAR) (Formally the Department of State Development – Aboriginal Affairs and Reconciliation (DSD-AAR)) central archive search results are provided only as a guide and is not an extensive list of all heritage items within an area.

5 BACKGROUND RESEARCH

5.1 Aboriginal Occupation

5.1.1 Ngadjuri

The Ngadjuri territory was identified by Tindale to stretch from south of Angaston and Gawler to north of Port Pirie and Orroroo. The area then stretched eastward to the Mount Lofty Ranges and westward to Crystal Brook. The Ngadjuri were known to the neighbouring people the Kaurna as the Wirra meju, which mean the gum tree men. They were also known as Manu and Manuri by the Nukunu people, which means the back and inland people (Tindale 1937; Wood 2007).

Norman Tindale describes the Ngadjuri as:

> ***Location****: From Angaston to Freeling north to Clare, Crystal brook, Gladstone, Carrieton, and north of Waukaringa to Koonamore; east to Mannahill; in Orroroo, Peterborough, Burra, and Robertstown districts; inhabitants of the gum forest areas. In the period just before the arrival of white people, they were making movements towards the Murray River near Morgan in aggressive attempts to impose the rite of circumcision on the river people. Miranda was a leading male until his death in 1849. The Mimbra horde remained living in the northern bushlands until 1905, the last “wild” group in South Australia. In their last years these people lived near Quorn, at Riverton, and on Willochra Creek. The term Aluri also spelled variously as Hilleri, Yilrea, Eeleeree, etc., is a general term used for several tribes here and on the west coast of South Australia.*
>
> ***Coordinates****: 139°0’E x 33°5’S*
>
> ***Area:*** *11,500 sq. M. (29,900 sq. km).*
> ***Alternatives:*** *Ngadluri, Ngaluri, Aluria, Alury, Eeleeree, Hilleri, Yirrea, Wiramaju ([wira] = gum tree [meju] = men, lit. Gum forest men), Wirrameyu, Wirramayo, Wirramaya, Wiramaya, Wirra, Weera, Eura (general term for several tribes), Manuri (Nganguruku tribe term, means “big goanna people”) Manuri (Nukunu term claimed to mean inland people), Manu, Monnoo, Manuley, Youngye, (name on the language), Boanawari (term meaning “bat people”, and linked with circumcision; applied by non circumcising eastern tribes who feared their proselytising urges), Doora, Burra or Abercrombie Tribe (two names for one horde of this tribe), Mimbara (name of the northernmost horde).*
>
> ***References:*** *Angas, 1847; Noble in Taplin, 1879; LeBrun in Curr, 1886; Valentine in Curr, 1886; East, 1889; Matthews, 1900 (Gr. 5626, 6448), Hossfeld, 1926; Gray, 1930; Elkin, 1931; Tindale, 1937, 1940, 1952, and 1964 MSS, Berndt and Vogelsang, 1941; Tindale and Lindsey, 1963; Bernt 1965; R.D.J. Weathersbee, 1971 MS.*
>
> Tindale 1974:214

Barney Waria, was an Ngadjuri man born in 1873 in Orroroo. He came to Adelaide in the 1930’s and 1940’s and became a great informant on the Ngadjuri culture and language. During his visits he talked to Norman Tindale, Ronald Berndt and Charles Mountford. Tindale (1937) recorded two stories. The first tells the story of an older lady and her two dogs traveling across the Ngadjuri country. Although no specific locations were noted, the blood of one of the dogs is meant to form the large ochre deposit at Parachilna Gorge, which is outside of the Project area north of the Flinders Ranges. The second story is related to an Aboriginal campsite near Orroroo and tells the story of the Eagle and the Crow. This story is also shared by neighbouring Aboriginal group the Adnyamathanha and the Nukunu (Walshe & Bonell 2003). Horton (1994) also states that a dreaming track that travels through the country near the southern end of the great trading and exchange route, which ends at the Gulf of Carpentaria.

Waria also provide information on the spirit beings that inhabited the Ngadjuri country include the Mirlki giant that's left a large footprint near Mt. Bryan. The people living in this area apparently fled north from the giant to a cave southeast of Orroroo and walked underground to Carrieton (Warrior et al. 2005; Wood 2007). Another Ngadjuri man named Jim Mooney later gave Berndt the story of Yuru and Wudlu, which talks about how the country and the rocks around Yunta and the Panaramittee Station came to be (Berndt 1987, Wood 2007).

The Ngadjuri would join the Karna and Narungga from the Yorke Peninsula at Port Wakefield to jointly exploit the local fishing resources. The Ngadjuri would have had a diverse diet of kangaroo, emus, bandicoots, wild turkeys, possums, lizards, snakes, ducks and other plant foods. Twine was obtained by cooking rushes and was used to form fishing nets. Certain leaves have also been noted that were placed in freshwater holes when targeting certain fish (Brown 1897; Berndt 1940; Warrior *et al* 2005; Wood 2007).

As previously stated, specific Ngadjuri ethno-history is limited in available publications, partly due to European interaction. Nobbs details a generalised argument for the lack of material as:

> *"Berndt's informant, Barney Waria gave the following information: 'On the north too, the Ngadjuri interacted closely with people belonging to territories called by Tindale (1940) Jadliaura and Wailpi. As far as the Ngadjuri were concerned the territories and people of these two groups were Adnyamathanha...Barney said that, with the reduction of Ngadjuri numbers after European settlement of the region, those remaining either scattered across the country, living in the main townships or joined the Adnyamathanha"*

Tindale further articulates the absence of published material for the Ngadjuri:

> "*It is probable that less has been written about this tribe than any other in South Australia...The territory of the Ngadjuri people extended from Angaston and Gawler in the south to Port Pirie and Orroroo in the north. Westward they ranged to Crystal Brook, but they scarcely touched the coast at Spencer Gulf except when on visits to the [Nar:aŋga] people of Yorke Peninsula. In the south their boundaries marches with those of the ['Kaurna] between Hamley Bridge and Gawler. Their eastern boundary was the eastern scarp of the Mount Lofty ranges. Their northern neighbours were the ['Nukunu], who lived on the highlands and coast near Mount Remarkable. To the north east was ['Maraura] country. In accordance with the general practice that each neighbouring people has its own term for a tribe, we find that several names have been applied to the members of the Ngadjuri tribe by surrounding peoples"* (Tindale 1937:149).

The dispersal of Ngadjuri people has resulted in specific cultural research being limited, due to the geographical distance from place and the possibility of the establishment of what Morris (1994) calls cultural distance; being the deliberate attempt of one group to withhold knowledge from another group in a relative position of privilege. Considering the aforementioned possibilities, some cultural information is available for reproduction.

Tindale, after revising earlier entries of the '*Wira*' tribe and accrediting them to the '*Ngadjuri*', narrates the following account of Ngadjuri behaviour observed by former Kapunda resident Mrs. A. Moyle:

> *"Mrs. A. Moyle, who arrived in South Australia as a child in 1847 relates the following incident regarding the Wirra Natives. A woman was stolen from the Burraburra natives by a Kapunda man, one of a party who often made their camp at Allandale. The Burra natives therefore came down to Kapunda in force. A group of fully armed men from both camps stood and watched a set combat between the two principals. At first songs were sung and there was much shouting. The two men, both old then came out of the crowd each armed with a spear, spear thrower and shield. The Burra man first pierced the Kapunda man through the left arm; his opponent thereupon retaliated with a blow that pierced him through the heart. His body was placed on a bier and was carried back to the Burra, accompanied by a group of wailing mourners. In 1850 the natives in the district around Kapunda were still wild. They camped near the local dam (as it is now)"* (Tindale 1932 in Tindale 1936)

The incorporation of perceived events, changes to the environment and unexpected occurrences have been included in other Ngadjuri traditions. The introduction of the bullock to the traditional lands of the Ngadjuri, and the impact of the bullock on the environment is explained by the following:

> *"WipaRu was a well known Ancestral Being who was originally in human form. He came from Tea Tree (on Lake Frome) to Reaphook Hill where he camped. He then went to a waterhole where he drank and he went off to a small hill (5km south of Reaphook Hill) that was streaked with red, yellow and white colours. It was here that WipaRu Man painted himself with ochre and turned himself into a WipaRu snake. In that form he continued to Coffin Spring, where he bored a hole in the limestone cliff. It is said to be a perfectly round depression that always contained water. WipaRu had come along a saltwater creek and the waterhole was a raised mound. He became a monster snake and lived in the mound of the freshwater spring. He lived there until disturbed by a bullock drinking in the waterhole. When WipaRu tried to swallow the bullock he choked to death."* (Berndt 1987:19 in Nobbs 2000:29).

The bullock impacted greatly on the water sources on the region, as well as on the ochre deposits. The incorporation of changes to the environment demonstrates a dynamic culture and through tracing changes, such as the aforementioned, continuity in belief systems is maintained through adaptation.

5.1.2 European contact and historical research for the Ngadjuri

Specific ethno-historical data on the region is limited. Two early accounts of European expeditions into the area are from Eyre in 1839 and Sturt in 1844. The Eyre (1845) expedition passed the region to the west and Sturt (1849) (Sturt and Waterhouse 1984). Both expeditions failed in their purpose seeking the centre of the continent. Journal accounts of both explorers display little contact with Aboriginal people, even though the area supported large numbers of Aboriginal people. Eyre writes:

> *"In going up the watercourse I again found a native fire, where the natives had been encamped within a mile of us during the night, without our being aware of it..."* (Eyre 1845:93).

Early accounts of European interaction relate to pastoral activities. Hayward, a pastoralist who occupied a station near Pekina used information supplied by Aborigines living at Pekina to search for new range-land and water sources. Another early pastoralist, Stephen King, established a property at Outalpa Well in 1855 and within ten years most of the Olary uplands had been occupied (Hobbs 2016).

Isaac Palmer Hall, Manager of the Boolcoomata Station (1859 – 1866), and J.P. Buttfield, Sub – Protector of Aborigines in the far north (1960s) provide the only documents mentioning Aborigines in the region during this period. The nature of work and low populations of Europeans available for labour required Hall to employ persons from the local Aboriginal community for station work. An 1865 Hall letter indicates a significant population of Aboriginal people.

> *"We have been without blacks for some time but now that they have all swarmed in they mustered over 150 the other day miserable and thin they looked. They had been right away from the white fellows and living on seeds and vegetables"* (Hall 1865).

The Aboriginal reluctance to spend any time near European settlements, as seen above, can be partly attributed to the history of violent clashes between the two groups. Hall also notes the changes in Aboriginal life:

> "*The Blacks are becoming more and more dependent upon white men every year and now come in at regular seasons to look for work for the sake of blankets, flour, tobacco etc. – they are generally decreasing in number too – the deaths of this tribe are treble the births."* (Hall 1863, Hobbs 2016)

5.2 European Settlement History

The history of European settlement within SA, or Adelaide, had its beginning in 1836 when Colonel William Light (the inaugural surveyor-general for the colony of South Australia) undertook a survey of the Adelaide plains to identify a suitable location for the future capital city. Before Adelaide was first surveyed, Captain Mathew Flinders, sailed his ship the *Investigator* into the head of Spencers Gulf on the 21 February 1802. This was one of his many stops made during his discovery and circumnavigation of Australia. The gulf was named by Flinders in honour of the First Lord of Admiralty, George John the Second Earl Spencer (Flannery 2000).

When the Province of South Australia was established in 1834 by an Act of British Parliament, provisions were made for local government when the colony's population passed 50,000. That figure was reached in 1849, but the first attempt of establishing local government outside of Adelaide was made in the form of District Boards of Roads, based on the surveyed Hundreds. By the 1850s the South Australian government had established a standard hierarchy of Counties, Hundreds, rural sections and town allotments. By 1860 no land could be sold unless located within a proclaimed County and Hundred (Susan 2012).

South Australia was settled during a time when humanitarian principles were being spread in England. Due to this it was thought that Aboriginal people, particularly in SA, would be treated more humanely. In the first annual report in 1836 made by SA Colonisation Commissioners it was remarked that the subject of Aboriginal rights can *"…be regarded as of first importance in the formation of the new settlement of South Australia".* They stated that

> *"…colonisation of South Australia will be an advert of mercy to the native tribes… [In Australia] they are now exposed to every species of outrage and treated like cattle of the fields; they will in future be placed under the protection of British laws, and invested with the rights of British subjects".*

The Commissioners also made plans to occupy land only by agreement with the Aboriginal inhabitants; with it also being proposed that one-fifth of every 80 acres section of the land be *'… resumed as a reserve for the use of the Aborigines, and the remaining four parts, or 64 acres, to remains with the proprietor as his freehold.'* Small pockets of land were also suggested to be designated within settled areas as refuges for Aboriginal people. However, these proposals conflicted with the SA Colonisation Act of 1834, which was to regulate land sales in SA. Governor Hindmarsh and Commissioner Fisher ignored the 1836 suggestions by the Colonisation Commissioners. Not until the passing in 1842 of the Waste Lands Act that the Governor could start to put aside land for the benefit of the Aboriginal people. By 1860 over forty reserves has been declared. After 1860 it was argued that the Aborigines were not properly using the land put aside for them and it was subsequently resumed and then leased or sold to European settlers.

By 1915, only two kinds of land remained for Aboriginal use in settled areas. First, very small pockets of land unwanted by Europeans and second, relatively substantial areas, often land considered to be poor or unsuitable for European use, were owned or leased by missionary societies. This land was leased to mission societies for the 'benefit of Aborigines' rather than being granted directly to them (ALA 1986).

Below is a table highlighting the general chorology of the current Project area (Table 3)

Table 3 General Chorology of the local area (Austral Archaeology 2000, Walshe and Bonnell 2003, Wood 2009a).

Date Range	Event
1842	European explorer Burr and Tolmer come through the area.
	John Hallett is believed to have been the first to bring sheep into the district. He made a selection of land in the Hallett district, named Willogoleeche.
1840s.	John Bristow established Bundaleer Station. This run extended from the Broughton River in the south to Mount Lock in the north and comprised an area of 799 square kilometres.
1845	John Hallet and his brother Alfred, had acquired 160 square miles of pastureland and 20 years later they held an extensive area of land in the district, including the sheep stations of Winninie and Mutooroo.
1850s	Most of the suitable grazing land was taken up.
1865	Joseph Gilbert took over Willogoleeche and Mount Bryan stations
1869	Strangways Act was passed through parliament. Here were vast changes to what became known as the North Agricultural Areas. During the following years the whole of the area was resumed by the Government and surveyed into farms with an average size of 130 hectares. The large sheep runs in the region were subsequently broken up and made available to small farmers. Many of the smaller farmers used their newly acquired land for wheat growing. By 1875, 400,000 hectares of land were under wheat.

Date Range	Event
1870	Hallett was surveyed.
1875	The first railway line from Port Pirie through Crystal Brook Gap to Peterborough. The line was extended to Gladstone in 1876, Caltowie in 1878 and Jamestown in July 1877. A line was built from Burra to Hallett in 1878.
25 July 1878	Corporation of Jamestown was proclaimed. The town was named after the then Governor of South Australia, Sir James Fergusson.
1881	Jamestown had a population of 995.
1880s	The wheat farmers of Jamestown and district formed the Farmers Co-operative Union. It heralded the start of a number of well-known brands including Farmers Union, Southern Farmers, Safcol and Fine Foods.

Through examining the contextual history of the Project area a number of historical themes relating to the occupational history have been identified. Historical sites located within the Project area, if discovered, would relate to the national, SA and local historical themes presented within Table 4.

Table 4: Australian, SA and Local Historical themes relevant to the Project area.

Australian Theme	State Theme	Local Theme	Examples
Peopling Australia	Aboriginal Cultures and interactions with other cultures	Activities associated with maintaining, developing, experiencing and remembering Aboriginal cultural identities and practises, past and present; with demonstrating distinctive ways of life; and with interactions demonstrating race relations.	Place name, camp site, midden, fish trap, trade route, massacre site, missions and institutions, pastoral workers camp, timber mill settlement, removed children's home, town reserve, protest site, places relating to self-determination, keeping place, resistance & protest sites, places of segregation, places of indentured labour and places of reconciliation.
Developing local, regional and national economies	Agriculture	Activities relating to the cultivation and rearing of plant and animal species, usually for commercial purposes, can include aquaculture.	Hay barn, wheat harvester, silo, dairy, rural landscape, plantation, farmstead, shelterbelt, silage pit, fencing, plough markings, shed, irrigation ditch and Aboriginal seasonal picking camp.
	Commerce	Activities relating to buying, selling and exchanging goods and services.	Trade routes, Aboriginal trading places, Aboriginal ration/blanket distribution points and Aboriginal tourism ventures
	Communication	Activities relating to the creation and conveyance of information.	Telegraph equipment, network of telegraph poles, track and airstrip.
	Events	Activities and processes that mark the consequences of natural and cultural occurrences.	Monument, flood marks, memorial, blazed tree, obelisk, camp site, place of pilgrimage, places of protest, demonstration, congregation and celebration.

Australian Theme	State Theme	Local Theme	Examples
	Exploration	Activities associated with making places previously unknown to a cultural group known to them.	Explorers route, marked tree, camp site, mountain pass, water source, Aboriginal trade route and landing site.
	Pastoralism	Activities associated with the breeding, raising, processing and distribution of livestock for human use.	Pastoral station, shearing shed, slaughter yard, homestead, pastoral landscape, common, fencing, grassland, well, water trough, freezer boat shipwreck and wool store.
	Transport	Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements.	Highway, lane, stock route, footpath, radar station, toll gate, horse yard and coach stop.
Building settlements, towns and cities	Land tenure	Activities and processes for identifying forms of ownership and occupancy of land and water, both Aboriginal and non-Aboriginal.	Fence, survey mark, subdivision pattern, boundary hedge, stone wall, shelterbelt, cliff, river, seawall, rock engravings, shelters & habitation sites, cairn, survey mark, trig station and colonial/state border markers.
	Utilities	Activities associated with the provision of services, especially on a communal basis.	Water pipeline, sewage tunnel, gas retort, powerhouse, garbage dump, windmill, radio tower, bridge, culvert, weir, well, cess pit, reservoir, dam, places demonstrating absence of utilities at Aboriginal fringe camps.
Working	Labour	Activities associated with work practises and organised and unorganised labour.	Shearing shed.
Developing Australia's cultural life	Persons	Activities of, and associations with, identifiable individuals, families and communal groups.	A monument to an individual, a family home, a dynastic estate, private chapel, a birthplace, a place of residence, a gendered site, statue, commemorative place name and place dedicated to memory of a person.

6 PREVIOUS HERITAGE WORK

6.1 Accessible

A number of cultural heritage studies have been undertaken for various development projects in the area. However, information relating to some of these reports is limited due to the fact that a letter from the relevant Indigenous organisations is required to get more detailed access to the database of reports held by DPC - AAR. Some details of these studies are provided in Table 5.

Table 5: Archaeological studies undertaken in the local area.

Year	Author	Description
1925	Biddle, J.P.	Research on engraving sites that is located five miles due east of Burra, at Deep Creek. The engraving site consisted of a huge platform with a series of pecking's. Campbell (1925) also recorded this site and noted a number of various animal tracks, circular and ovate motifs.
1983	Gara, T.	Gara conducted an archaeological survey of a 275kV transmission line from Port Augusta to Eudunda. During this assessment a total of five Aboriginal archaeological sites were located. The sites consisted of stone artefact scatters and a scar tree.
1990	Dowling, P.	This report summarises that work done by Woolmer (n.d.) that included undertaking surveys in locations throughout the Upper Murray. A total 13 sites were recorded in the Lake Bonney area. Although great descriptions were not given about the sites they included artefacts scatters, shell middens and area of extensive occupation including 'well used area, 'major living areas' and 'hundreds of graves'.
1995	Crow, H. & P. Clark	Crow and Clark undertook a heritage assessment of Burra Creek Gorge (Worlds end), which is situated 20 km north of Robertstown. During the assessment a total of 15 Aboriginal sites were located. Seven were artefact scatters, one was an isolated artefact and the other seven were scarred trees. All scar trees were found on red river gums and all were located in creek banks.
1995	Stockton, J.	Stockton undertook a survey of the road between Morgon and Burra. During the assessment a total of five stone artefact scatters were located. Three of these sites are located just south of the current Project area. Four were in line with the road alignment and would be destroyed. The fifth was next to an eroding gully. The main stone material noted was quartz, which is available from fossil river gravels. These occur throughout the plains. The sites were located on hill slopes or ridgetops, all well drained locations.
2001	Wood, V.	Wood undertook a heritage survey of the proposed location of communication infrastructure for the emergency services network at Bumbunga Hill, near Clare. The survey was the result of a previous study undertaken by Rhondda Harris, on behalf of the Native Title Unit. No Aboriginal archaeological sites were found during the survey by Harris, but it was suggested that Bumbunga Hill was a possible anthropological sites. Wood suggested further work be undertaken into the significance of the area.
2003	Walsh, K & J. Bowell	Walsh and Bowell were engaged by Wind Prospect Pty Ltd to undertake an archaeological and anthropological desktop assessment of known Aboriginal and non-

Year	Author	Description
		Aboriginal archaeological sites and heritage places for the proposed Willogoleche Wind Farm located near Hallet. The recommendations from the assessment included that a ground survey be undertaken across the development area due to the high likelihood of finding stone cairns, culturally modified trees, quarries and a lower possibility of finding stone tool scatters, campsites, engravings, painting sites and burials.
2007	Fitzpatrick, P.	Fitzpatrick was engaged by the Department of Water, Land and Biodiversity Conservation to undertake a heritage survey as a result of the proposed closure of nine wetlands as part of the South Australian Emergency Drought Responses on the River Murray. The nine wetlands included Murbko South Lagoon, Ross Lagoon, Jaeschke Lagoon, Lake Bonney, Yatco Lagoon, Gurra Lake, Nelwart Swamp, Horseshoe Swamp and Nelwood Swamp. Cultural material in the form of artefact scatters and scar trees were noted at Murbko South Lagoon, Ross Lagoon, Lake Bonney and Gurra Lake. The resulting report indicated that there are no Indigenous Heritage constraints at five of the closure sites (Jaeschke Lagoon, Yatco Lagoon, Nelwart Swamp and Horseshoe Swamp), that there are minor constraints that could be managed at two of the closure sites (Jaeschke Lagoon and Nelwood Swamp) and that there were significant constraints at one closure site that would require institution of a monitoring program (Gurra Lake) and one site (Lake Bonney) that would require a management plan.
2007	Wood, V.	Wood was engaged to undertaken an Indigenous cultural heritage survey of the proposed Willogoleche Hill Wind Farm, near Hallet. No archaeological or anthropological sites were identified during the survey. It was recommended that monitoring occurring of any ground disturbance.
2009	Lower, K.	Lower Master's thesis focused on landscape archaeology and Indigenous nation building in *Ngadjuri* Country. Lowers work included comparing site types recorded in the area by previous studies to those recorded by Smith's work at Plumbago (1980). When comparing this data is was evident that there were a greater occurrence of rock art, particularly engravings outside of Smith's survey area. Lower suggested this was probably indicative of selective recording practices, rather than a reflecting of genuine site distribution. This research showed that landscape archaeology can play a vital role in the re-acquisition of cultural knowledge, assertion and authentication of identity (Figure 8).
2009a	Wood, V.	Wood undertook a heritage desktop assessment of the proposed transmission line connection the Bluff Wind Farm to the southern end of the North Brown Hill Wind Farm in Jamestown. The development was considered to have a low impact and was unlikely to impinge into location that have elevated archaeological sensitivity.
2009b	Wood, V.	Wood undertook a heritage survey of the North Brown Hill Range Wind Farm. During the assessment a total of three Aboriginal archaeological sites were noted including stone artefact scatters and a stone cairn.

Year	Author	Description
2009c	Wood, V.	Wood undertook a field cultural heritage assessment of the Willogoleche Wind Farm Project area. No Indigenous sites of significance to archaeology, anthropology, history or tradition were identified during the study.
2010	Wood, V.	Wood was engaged by International Power Pty Ltd to undertake a desktop study for the proposed amendments to the Willogoleche Hill Wind Farm previously investigated. The report summarised previous work done in the area and concluded that were was still a risk of encountering Aboriginal sites and objects in the area.
2016	Hobbs, J.	ACHM was commissioned by Aurecon Australia Pty Ltd to undertake a desktop assessment of the proposed Hornsdale Wind Farm, near Jamestown in SA. The desktop analysis found that there was a moderate likelihood of the proposed project area containing undiscovered Aboriginal sites. A recommendation to undertake a cultural heritage survey be undertaken to ensure that no European or Indigenous heritage places were damaged. They also made recommendations to engage with both the Ngadjuri and Nukunu traditional owners.
2017	EBS Heritage	EBS Heritage undertook a heritage desktop and risk assessment of the Barrier Highway intersection of Copperhouse Road. The assessment concluded that there were no registered Aboriginal sites in the area and that there was a moderate risk in one section due to the presence of an ephemeral creek line.
2017	EBS Heritage	EBS Heritage undertook a gap analysis desktop and field inspection for the Barn Hill Wind Farm, near Redhill. The survey identified eight previously recorded Aboriginal sites in the Project area. New locations were surveyed but no new sites were identified. All the sites were stone artefact scatters.

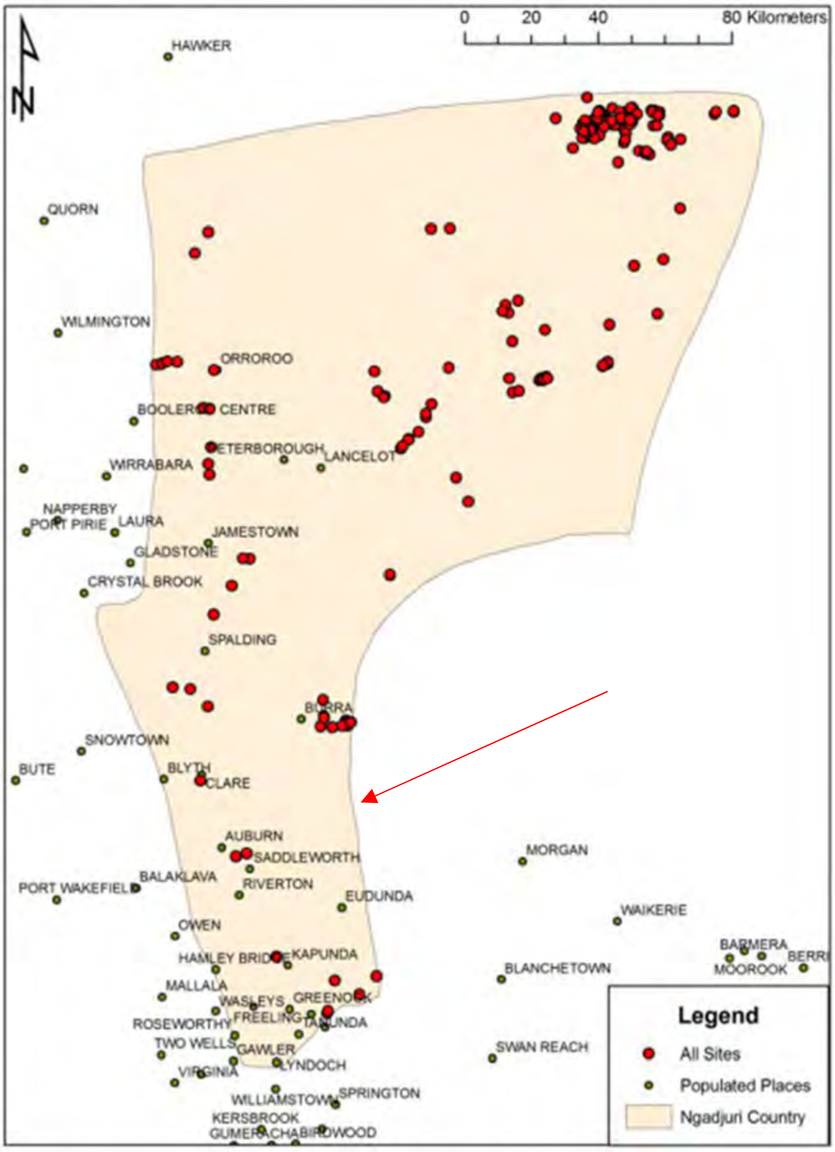

Figure 8: Map showing the location of all known sites in 2009 in Ngadjuri land (red arrow indicating the location of the current Project area (Lower 2009).

6.2 Not Accessible

A number of other cultural heritage surveys are known to have been undertaken for wind farms in the region (it is likely there are others as well but without access to the DPC-AAR database this remains unknown at this stage):

• Brown Hill Range Wind Farm – Anderson 2004

• Mt Bryan Wind Farm – ACHM 2004, Anderson 2008

• Hallett Hill Wind Farm – Anderson 2005, Wood 2005, 2007a

• North Brown Hill Wind Farm – Anderson 2008,

7 HERITAGE REGISTER SEARCH

7.1 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 facilitates the identification of known sites within a project development area. The Central Archive is not an exhaustive list of heritage sites in a specific area, it contains only sites that have been reported and/or registered.

Two separate requests were carried out for a search of the DPC-AAR records for information on previously recorded Aboriginal sites, with the following results:

1. 18 April 2018. No registered or reported sites were located within the Project Area at this time; however, registered sites are present to the west, northwest and northeast, well outside the Project Area (Figure 9).
2. 21 September 2018. No registered or reported sites were located within the Project Area at this time (Appendix 11.1). No figure was attached to the more recent search results from DPC-AAR.

In addition, EBS Heritage undertook a DPC-AAR search of the wider area to gather information about previously recorded Aboriginal sites types within the broader area. This information would then be used to generate the predictive statements and risk assessment for the current Project area. The search results were received on the 26 April 2018 and indicated that there are 16 registered and reported Aboriginal sites in the wider area (Table 4 and Figure 9). The most dominate site types are archaeological sites, scarred trees and stone arrangements.

Due to the restriction of data imposed by DPC-AAR, the precise spatial data for these sites was not obtained. DPC-AAR advises that all Aboriginal sites recorded are protected under the AHA and pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site or damage any Aboriginal object (registered or not) without Authority from the Minister for Aboriginal Affairs and Reconciliation. If construction is to occur within the boundaries of these Aboriginal sites a Section 23 permit would be required.

Table 6: DPC-AAR Registered Sites in close proximity to the Project area.

Site Number	Site Status	Site Type
6630 4580	Reported	Arrangement
6730 4473	Reported	Archaeological
6730 4476	Reported	Archaeological
6730 5851	Reported	Archaeological
6730 5852	Reported	Archaeological
6730 5853	Reported	Archaeological
6730 5854	Reported	Archaeological
6730 5855	Reported	Archaeological
6730 5856	Reported	Archaeological
6730 5857	Reported	Archaeological
6730 5858	Reported	Scarred Tree

Site Number	Site Status	Site Type
6730 5859	Reported	Scarred Tree
6730 5860	Reported	Scarred Tree
6730 5861	Reported	Scarred Tree
6730 5862	Reported	Scarred Tree
6730 5863	Reported	Scarred Tree

7.2 SA Museums Database

The SA Museum Database (SAM) contains information regarding culturally sensitive finds such as human remains and items recorded prior to the establishment of the DPC-AAR Register. Where available, the database contains information on how the item(s) came into the collection, the location in which it was found and the date it was acquired.

EBS Heritage conducted a search of the SAM Database for references to Burra, Robertstown, and Eudunda. A total of 527 entries were found that made reference to the Burra region. Out of this 134 are related to human remains, however a number are noted to be from the Booborowie Govt. Experimental Farm.

As the SAM database does not always specify exactly where cultural material items and human remains were found and its contents are often the result of specifically targeted expeditions and accidental finds, the database is best viewed as an indicative tool. The results indicate that a significant level of cultural activity has occurred in the vicinity. Of note are the entries regarding human remains. This information, combined with the other research indicates that it is likely that unrecorded Aboriginal sites are located within undisturbed sections of the Project area.

7.3 European Heritage

The South Australian (SA) Heritage Places Database is maintained by the South Australian Government Department of Planning and Local Government. This database holds information relating to places on the SA Heritage Register, Local Heritage Places from SA Development Plans and Contributory Items from SA Development Plans.

7.3.1 Commonwealth Heritage Places

The National Heritage List records places with outstanding natural, Indigenous or historic heritage value to the nation of Australia. Places on the National Heritage List and their heritage value are recorded on the list and are protected by the *EPBC Act* 1999. In order to be listed on the National Heritage, the item must meet one or more of nine criteria. These criteria are as follows;

(a) the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history

(b) the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history

(c) the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history

(d) the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:

    (i) a class of Australia's natural or cultural places; or

    (ii) a class of Australia's natural or cultural environments;

(e) the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group

(f) the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period

(g) the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

(h) the place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history

(i) the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

No listings were found for places of Commonwealth level historical significance within the Project area. However, the Australian Cornish Mining site – Burra heritage place is located only 33 km to the north east of the current Project area (DotEE 2018) (Figure 10).

7.3.2 State Heritage Places

The South Australian Heritage Register is a list of places of heritage value in the state of SA. The list is on the Department of Environment and Water SA Heritage Register. In order to be listed as a State Heritage Place it must satisfy one or more of the criteria listed in Section 16 of the *Heritage Places Act* 1993. These places are also identified and protected by the *Development Act* 1993 and the *Planning, Development and Infrastructure Act* 2016. The State Heritage Place criterion are as follows;

- Demonstrates important aspects of the evolution or pattern of the state's history;
- Has rare, uncommon or endangered qualities that are of cultural significance;
- May yield information that will contribute to an understanding of the state's history, including its natural history;
- Is an outstanding representative of a particular class of places of cultural significance;
- Demonstrates a high degree of creative, aesthetic or technical accomplishment or is an outstanding representative of particular construction techniques or design characteristics;
- Has a strong cultural or spiritual association for the community or group within it; and

- Has a special association with the life or work of a person or organisation or an event of historical importance.

No listings were found for places of State level historical significance within the Project area (DEW 2018, DPTI 2017, GC 2016). There are a number of places of historical significance within a 1 km distance from the Project area (Figure 10). Although these places are not within the area subject to development, they play a role in the general history of the area.

7.3.3 Local Heritage Places

A Local Heritage Place is a place of heritage value due to its history, architectural and design qualities, built form character and integrity. These places are listed in the Development Plan and may be considered to have local heritage value if they meet one or more of the listed criteria in the *Development Act 1993* section 23(4). The criteria are as follows:

- Displays historical, economic or social themes that are of importance to the local area;
- Represents customs or ways of life that are characteristic of the local area;
- Has played an important part in the lives of local residents;
- Displays aesthetic merit, design characteristics or construction techniques of significance to the local area;
- Is associated with a notable local personality or event;
- Is a notable landmark in the area; and
- Is a tree of special historical or social significance or importance within the local area.

No listings were found for places of local level historical significance within the Project area (Austral Archaeology 2000, DEW 2018, DPTI 2017, GC 2016).

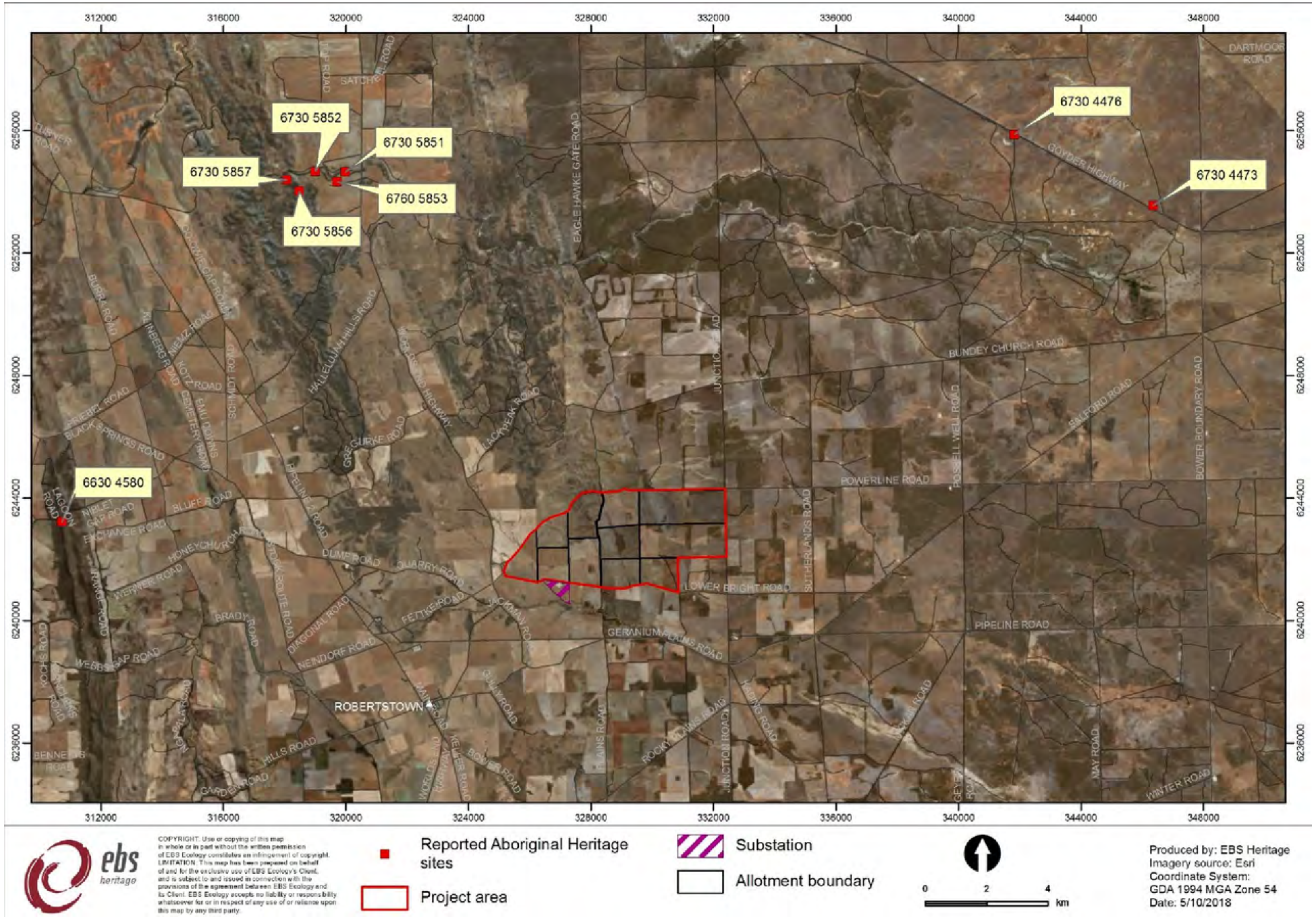

Figure 9: DPC-AAR Registered Aboriginal Heritage sites within the local area.

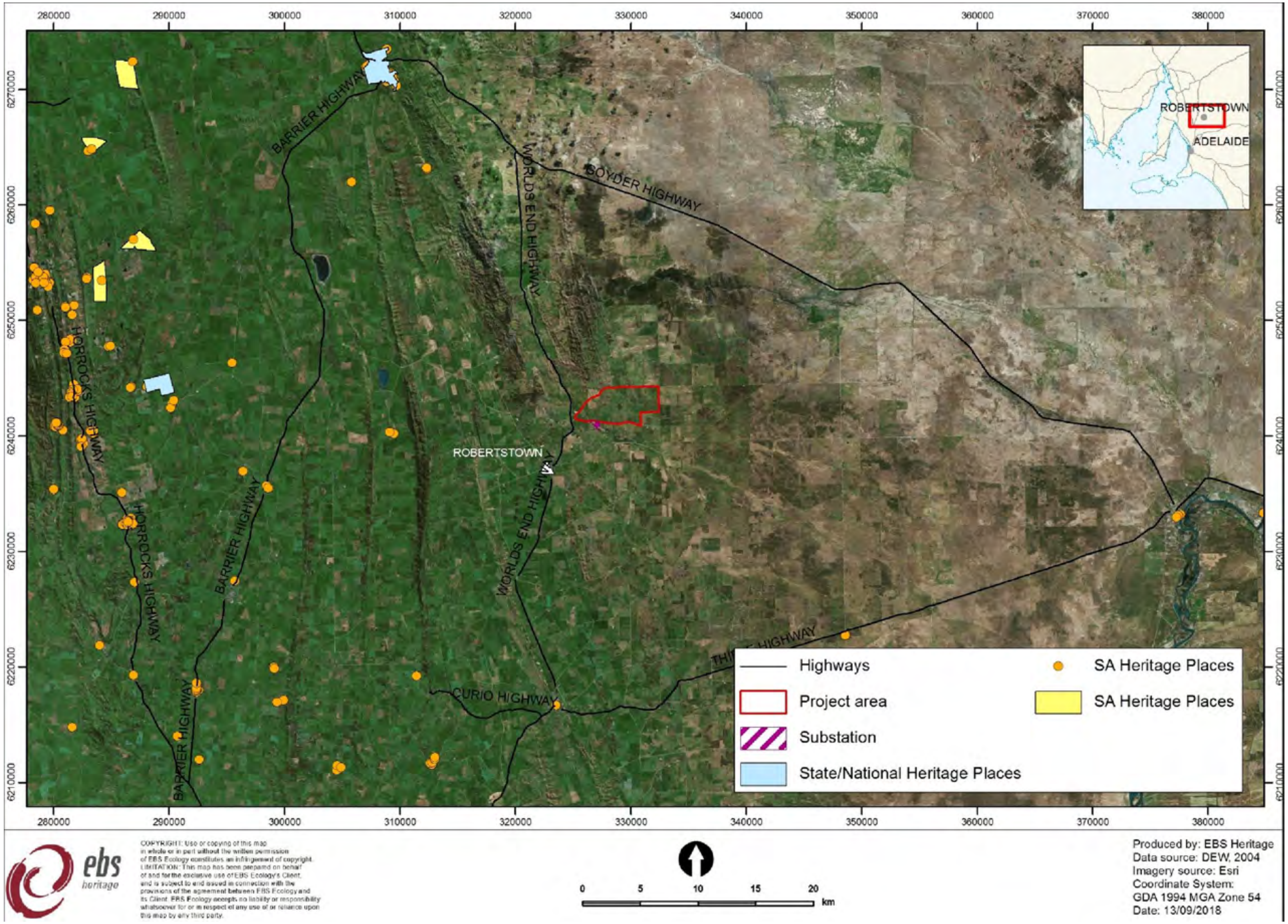

Figure 10: European Heritage within the local area.

8 PREDICTIVE STATEMENTS AND RISK ASSESSMENT

8.1 Predictive Statements

The archaeological predictive statements and risk assessment has been formulated based on the results of the locations and type of Aboriginal sites that have been recorded with the regional area and information about previous archaeological work. From the predictive statements it is evident that there is a higher chance of encountering stone artefact scatters / isolated artefacts, scarred trees, stone arrangements and potential archaeological deposits within the Project area. These site types are common in the environmental zones in close proximity to the River Murray. The results are presented in Table 7 below.

Table 7: Table with predictive statements and risk assessments for the Project area.

Site Type	Site Description	Associated Landform / Environment	Statement
Artefact Scatters / Isolated Artefacts	Debris which results from flaking stone and will include unmodified flakes, cores and flaked pieces. Actual stone tools such as deliberately formed artefacts (such as scrapers, backed blades or adzes) or pieces which possess evidence of use are generally present in low frequencies.	Stone artefacts are located either on the ground surface and/or in subsurface contexts. Within alluvial plains this site type is normally located to high terraces and sand bodies on the floodplain adjacent to drainage features.	Due to the widespread and common nature of this site type there is a high change of finding this site type in the Project area, especially considering the areas close location to the River Murray and a large ephemeral creek line in the south.
Scarred Trees	This site type consists of trees that have been modified through the removal of bark sections to construct canoes, shields and dishes. Typically river red gums or river box are targeted. Sculpted trees are when the tree has been carved for ceremonial purposes.	These site types can occur anywhere that trees of sufficient age are present, however, in an Aboriginal land use context would most likely have been situated on flat or low gradient landform units in areas suitable for either habitation and/or ceremonial purposes.	There are large sections of what appears to be remanent mature vegetation in sections of the Project area. There is subsequently a high risk of encountering this site type. This site type was also the second highest recorded in the area from the DPC-AAR search.
Potential Archaeological Deposit (PAD)	These are areas that have a potential to contain an archaeological deposit. They can be found in association with other cultural material or without.	They can be located in many different environmental locations including within rock shelters, along creek lines, sand dunes and anywhere a deposit can assimilate.	The soil profile around the creek line would assimilate subsurface deposits. There is a high chance of locating this site type in that portion of the Project area.
Engravings	Creation of geometric shapes, patterns or symbols into rock surface. There are many	This site type is located on bedrock outcrops of varying sizes and formations.	At this stage of the assessment there appears to be few rock outcrops, suggesting a low risk of

Site Type	Site Description	Associated Landform / Environment	Statement
	different styles including pecked, grooved etc.		locating this site type within the Project area. However, if there were rock outcrops then this site type could be located.
Quarries	They consist of sources of stone that is used to manufacture stone artefacts. There are also quarries of ochre. Quarries are procurement sites and normally have an associated artefact scatter and areas of reduction or knapping areas.	Located in areas where there are large bedrock outcrops that are available for quarrying.	At this stage of the assessment there appears to be few rock outcrops, suggesting a low risk of locating this site type within the Project area. However, if there were rock outcrops then this site type could be located.
Burials	This site type can include an isolated bone fragment to a complete individuals or group of burials. Burials include flexed, extended and cremated inhumations with common comprising extended inhumations with an east-west attitude. Bundle burials are restricted to the late Holocene.	Burials in this area tend to be associated with ridges and lunettes and other sand bodies, such as source boarding dunes, perched dunes, and point bar deposits, spits and sandy river or creek banks.	Spring Hut Creek runs through a portion of the Project area. There is a moderate to low chance of location this site type in this environmental zone.
Middens	This site type typically comprise of shell remains and other faunal materials. In the region middens will be dominated by freshwater mussels, but are also likely to contain animal bones, stone artefacts, ash, charcoal and other remnants of hearths such as heat retainer stones.	These site types are located in associated with waterways. They are present on floodplain and riverbanks. Older middens are found along prior streams and within lunette sediments.	There are a number of prior streams or ephemeral water channels that run though the Project area towards the Murray River. There is a low to moderate chance of locating this site type.
Rock Art / Paintings	Rock art is found across the continent as paintings, drawings, and pecked or abraded imagery and mechanically produced motifs such as stencils.	Art in the Australian semi-arid zone is associated with rock shelters and other stone feature, in open contexts as pecked or abraded art.	At this stage of the assessment there appears to be few rock outcrops, suggesting a low risk of locating this site type within the Project area. However, if there were rock outcrops then this site type could be located.

Site Type	Site Description	Associated Landform / Environment	Statement
Stone Arrangements	Stone arrangements are formed by placing rocks in a variety of different patterns and shapes. These can include standing stones, cairns, bora rings and fish traps. Bora Rings are Aboriginal ceremonial places.	Anywhere that suitable rock is located. Fish traps are normally located in association with waterways.	A number of stone cairns have been noted in the local area. The DPC-AAR search also noted one in close proximity to the Project area. If there are suitable rocks in the Project area there is a moderate chance of locating this site type.
Engravings	Creation of geometric shapes, patterns or symbols into rock surface. There are many different styles including pecked, grooved etc.	This site type is located on bedrock outcrops of varying sizes and formations.	There is a low chance of finding this site type in the Project area. However, if there are suitable rocks within the Project area there is some chance of locating this site type.
Mythological Sites / Aboriginal Ceremony and Dreaming	Places of significance to Aboriginal people connected to ceremonial activates or dreaming stories.	They can be present in wide variety of environmental landforms.	There is a moderate chance of finding this site type.
Soaks / Water Holes / Water sources	Locations that are a source of water. Some examples include rock holes that collect rain water (known as gnamma" holes and natural springs).	These can be located anywhere there is natural water and rock formations.	There are no recorded soaks in the area and there appears not to be the right bedrock present in the Project area. There is a low chance of locating this site type.
Historic Sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people after first contact. Examples include missions, massacre sites, post-contact camping sites.	Not dictated by any landform or environmental factors. More common in areas that had a higher influence by Europeans after contact.	Although there are none recorded in the area this part of SA has a long European history with intensive occupation after settlement. There is also accounts of Aboriginal people working in farms and stations. There would be a low to moderate chance of finding this site type.
Rock Shelters	Habituation locations that are formed naturally and may contain rick art, stone artefacts or midden deposits.	These sites will occur within rock overhands, shelters and caves where suitable bedrock is present.	There does not appear to be the required large rock formations to create this site type. There is a low chance of finding it within this Project area.

8.2 Risk Assessment

There are generally three levels of heritage risk assigned; low, moderate and high risk.

High Risk: identifies landforms where traditionally, cultural heritage sites have been found and where there is a high risk of proposed works encountering heritage sites. This risk has been assessed on the understanding that these areas have not experienced high levels of disturbance or geotechnical data indicates that the disturbance has not significantly impacted sub-surface soils. Areas traditionally considered to be of ‘high’ risk include the margins of undisturbed waterways, sand dunes and remnant trees.

Moderate Risk: identifies landforms where traditionally opportunistic use cultural heritage sites have been found and where there is a moderate risk of proposed works encountering unidentified heritage sites. Areas traditionally considered to be of ‘moderate’ risk are areas which may have once been classified as ‘high’ risk but appear to have been impacted by modern disturbance.

Low Risk: are areas where there is a very low to no chance of encountering cultural heritage sites and where there is low likelihood of proposed work impacting heritage sites. Areas assessed as having a ‘low’ risk are areas where there has been considerable modern impact and/or where geotechnical data indicates soils have been heavily impacted by modern activities and there is therefore a lower risk of cultural heritage sites to remain undisturbed.

Based on a review of the previous heritage work and the landforms present in the current Project area, EBS has assessed that there is a ***high*** to ***moderate*** risk of works impacting archaeological sites. Areas with what appears to be remnant mature native vegetation and areas around major creek lines have been assessed as high risk. The remainder of the Project area has been assessed as having a moderate risk because there are a number of drainage lines that adjoin a large ephemeral creek to the south. Although there has been surface disturbance, there could still be a risk of intact subsurface deposits in certain section of the Project area. This would depend on the soil profiles. There is a ***low*** risk of works encountering archaeological sites and items in areas of extensive subsurface disturbances. This would mainly be under any large scale modern infrastructure (Figure 11).

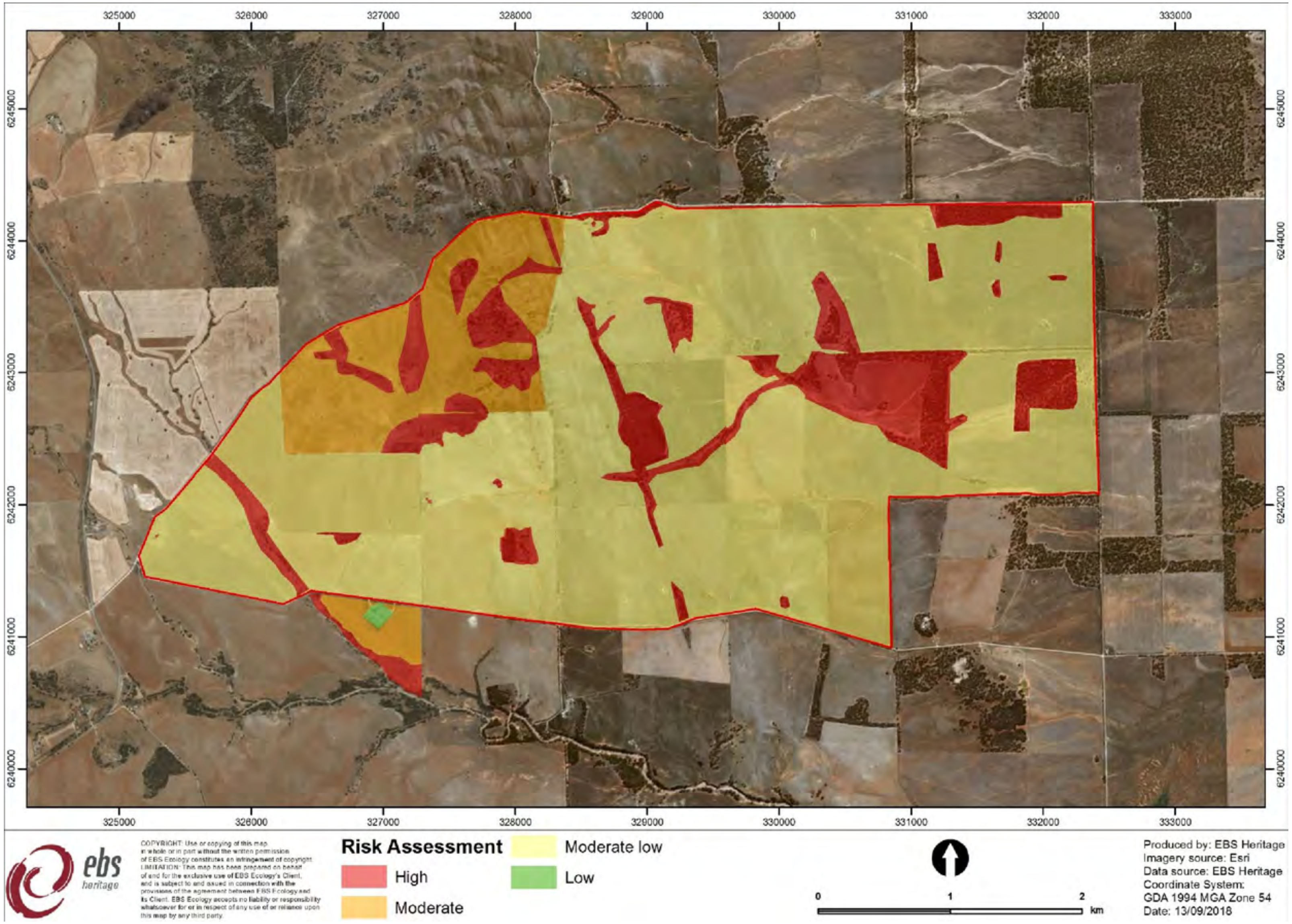

Figure 11: Heritage Risk Assessment.

9 SUMMARY AND RECOMMENDATIONS

EBS Heritage has carried out a desktop risk assessment based on the information available. As a result of this assessment, EBS Heritage recommend the following:

- The client should undertake community consultation with the recognised Aboriginal Traditional Owners for the region before the construction phase of the project;
- A site avoidance survey is undertaken for the proposed infrastructure footprint. If any heritage sites are located, the client has the capacity to modify their proposed construction footprint to avoid any sites. If the client is able to avoid all sites, there is no requirement to apply for a Section 23 permit (Ministerial consent to damage, disturb or interfere with Aboriginal Heritage Sites under the South Australian *Aboriginal Heritage Act 1988*);
- Should the future heritage survey identify any previously unreported Aboriginal sites within the Project area that cannot be avoided, then Section 23 approval will be required to damage, disturb or interfere with those sites;
- After the site avoidance survey, a Cultural Heritage Management Plan (CHMP) should be developed to provide long term management of Aboriginal sites within the Project area that can be avoided and will not be subject to Section 23 approval. This CHMP should include a site discovery procedure (refer Appendix 1);
- EBS recommends that construction personnel receive a heritage induction prior to works as a minimum requirement to manage heritage risk;
- EBS recommends that the client have a stop work/site discovery procedure in place in the event of an unexpected find. EBS has included a site discovery procedure in the appendix of this report for the client's convenience; and
- The client may wish to engage the services of an archaeologist "on-call" to assist in the identification of any unexpected finds.

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Note: Referencing style based on the Australian Archaeological Association style guide

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11 APPENDIX

11.1 DPC-AAR Register Search

Government of South Australia
Department of the Premier and Cabinet

Aboriginal Affairs & Reconciliation
GPO Box 320
Adelaide SA 5001
DX 452
Tel 08 8226 8900
Fax 08 8226 8999

Physical ID: AHRCA18D0111
File No. 2018/000011

26 April 2018

Shannon Smith
EBS Heritage
3/119 Hayward Avenue
TORRENSVILLE SA 5031

Dear Shannon

Thank you for your correspondence (email) dated 18 April 2018, regarding G80401 Project area 1, search 2, overview of the Robertson area, and to be used as part of a desktop risk assessment and cultural heritage survey. The search was based on the shapefile provided.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by the Department of the Premier and Cabinet, Aboriginal Affairs and Reconciliation (DPC-AAR), has entries for Aboriginal sites within the project area.

These entries for Aboriginal sites are described in the attached site table. The enclosed map identifies the approximate site location. It should be noted however that the site indicator does not reflect the actual area of the site; as this will vary from site to site, depending on the site information contained in the Central Archive.

The applicant is advised that sites or objects may exist in the proposed development area, even though the Register does not identify them. All Aboriginal sites and objects are protected under the *Aboriginal Heritage Act 1988* (the Act), whether they are listed in the central archive or not. Land within 200 metres of a watercourse (for example the River Murray and its overflow areas) in particular, may contain Aboriginal sites and objects.

Pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site, object or remains (registered or not) without the authority of the Minister for Aboriginal Affairs and Reconciliation (the Minister). If the planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Minister under Section 23 of the Act. Section 20 of the Act requires that any Aboriginal sites, objects or remains, discovered on the land, need to be reported to the Minister. Penalties apply for failure to comply with the Act.

It should be noted that this Aboriginal heritage advice has not addressed any relevant obligations pursuant to the Native Title Act 1993.

Please be aware in this area there are various Aboriginal groups/organisations/traditional owners that may have an interest, these may include:

NGADJURI NATION ABORIGINAL CORPORATION

Chairperson:	Quenten Agius
Address:	46 Maitland Road POINT PEARCE SA 5573
Mobile:	0429 367 121
Email:	Traditionalowners@adjahdura.com.au

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8226 8900 or send to our generic email address dsdaarheritagesites1@sa.gov.au

Yours sincerely

Perry Langeberg
SENIOR INFORMATION OFFICER (HERITAGE)
ABORIGINAL AFFAIRS & RECONCILIATION

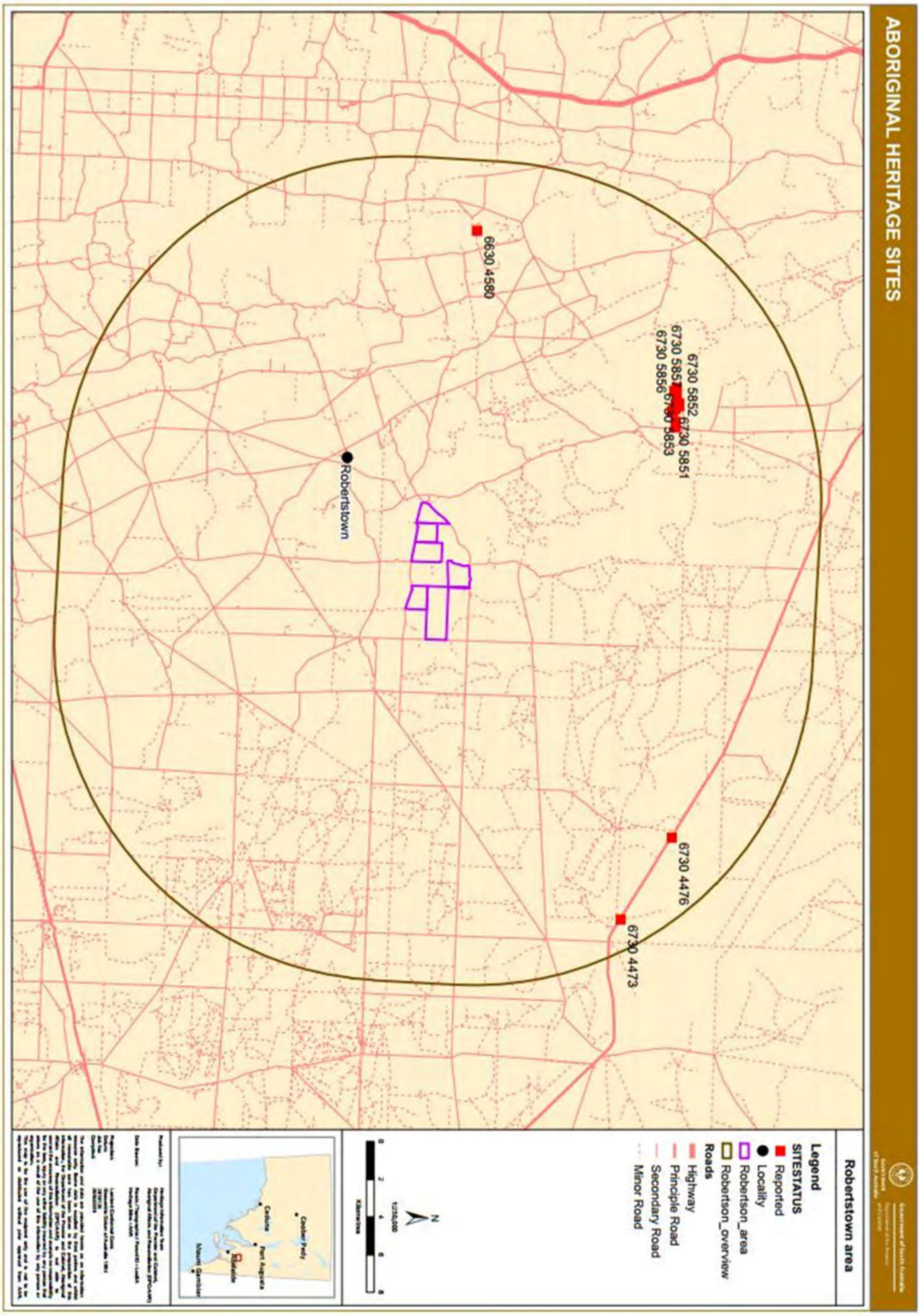

Figure 12. Initial search result map provided by DPC-AAR, prior to an update of the Project Area boundary

AARV2018/000974
File No. AAR2018/000011
HIT0389

Government of South Australia
Department of the Premier and Cabinet

Aboriginal Affairs & Reconciliation
GPO Box 320
Adelaide SA 5001
DX 452
Tel 08 8226 8900
Fax 08 8226 8999

21 September 2018

Shannon Smith
Senior Cultural Heritage Consultant
EBS Heritage
125 Hayward Avenue
TORRENSVILLE SA 5031

Dear Shannon

Thank you for your correspondence (email) dated 4 September 2018, regarding the search area near Robertstown. The search was based on the shapefiles provided.

I advise that the central archive, which includes the Register of Aboriginal Sites and Objects (the Register), administered by the Department of the Premier and Cabinet, Aboriginal Affairs and Reconciliation (DPC-AAR), has no entries for Aboriginal sites within the project area.

The applicant is advised that sites or objects may exist in the proposed development area, even though the Register does not identify them. All Aboriginal sites and objects are protected under the *Aboriginal Heritage Act 1988* (the Act), whether they are listed in the central archive or not. Land within 200 metres of a watercourse (for example the River Murray and its overflow areas) in particular, may contain Aboriginal sites and objects.

Pursuant to the Act, it is an offence to damage, disturb or interfere with any Aboriginal site, object or remains (registered or not) without the authority of the Minister for Aboriginal Affairs and Reconciliation (the Minister). If the planned activity is likely to damage, disturb or interfere with a site, object or remains, authorisation of the activity must be first obtained from the Minister under Section 23 of the Act. Section 20 of the Act requires that any Aboriginal sites, objects or remains, discovered on the land, need to be reported to the Minister. Penalties apply for failure to comply with the Act.

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Please be aware in this area there are various Aboriginal groups/organisations/traditional owners that may have an interest, these may include:

NGADJURI NATION ABORIGINAL CORPORATION

Chairperson:	Quenten Agius
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Mobile:	0429 367 121
Email:	Traditionalowners@adjahdura.com.au

If you require further information, please contact the Aboriginal Heritage Team on telephone (08) 8226 8900 or send to our generic email address dpc-aar.heritagesites1@sa.gov.au

Yours sincerely

Perry Langeberg
SENIOR INFORMATION OFFICER (HERITAGE)
ABORIGINAL AFFAIRS & RECONCILIATION

11.2 Site Discovery Procedure

Discovery of Aboriginal Heritage Procedure

Have you found a site, object or skeletal remains that may be Aboriginal Heritage?

- See example pictures on next page.

STOP

All works in Vicinity of Site

- **Do not disturb/remove/touch or displace 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*)
- ***Leave objects in place*** –Supervisor to take photos and send to archaeologists for verification.

PROTECT

Restrict access. Site supervisor to take note of:

- Location in relation to site works (pref GPS).
- Identify any immediate threats to heritage e.g. construction activities, vandalism, water level.
- Name and contact details of the person who made the discovery.
- Do not proceed with any works (or move ot touch objects) until advice has been sought from site archaeologists

NOTIFY

Site Supervisor to immediately notify:

- Client Representative
- Archaeologists
- Local Police or 131 444. If suspected human remains have been discovered.

MANAGE

Manage the incident with appropriate guidance from:

- Local Police (where skeletal remains have been discovered).
- Aboriginal Affairs and Reconciliation .
- The local Aboriginal community.
- An Archaeologist /Cultural Heritage Advisor

RESUME

- The Site Manager will advise contractors when work can resume.
- This decision will be made in consultation with the archaeologists
- There may be conditions that need to be followed to allow work to resume.

3/119 Hayward Avenue
Torrensville, SA 5031
www.ebsheritage.com.au
t. 08 7127 5607
f. 08 8352 1222

APPENDIX 10

Transport Impact Assessment

TRANSPORT IMPACT ASSESSMENT

Prepared for Robertstown Solar

Prepared by GTA Consultants

EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

Robertstown Solar Project

Robertstown, SA

Transport Impact Assessment

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

on 27/11/18

Reference: S159810

Issue #: A

GTAconsultants

Robertstown Solar Project

Robertstown, SA
Transport Impact Assessment

Client: Energy Projects Solar (EPS) Pty Ltd on behalf of Robertstown Solar 1 Pty Ltd

on 27/11/18

Reference: S159810

Issue #: A

Quality Record

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

GTAconsultants

Melbourne | Sydney | Brisbane
Canberra | Adelaide | Perth

CONTENTS

1. INTRODUCTION

01

1.1. Background

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

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

1.2. Purpose of this Report

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

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

1.3. References

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

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

2. EXISTING CONDITIONS

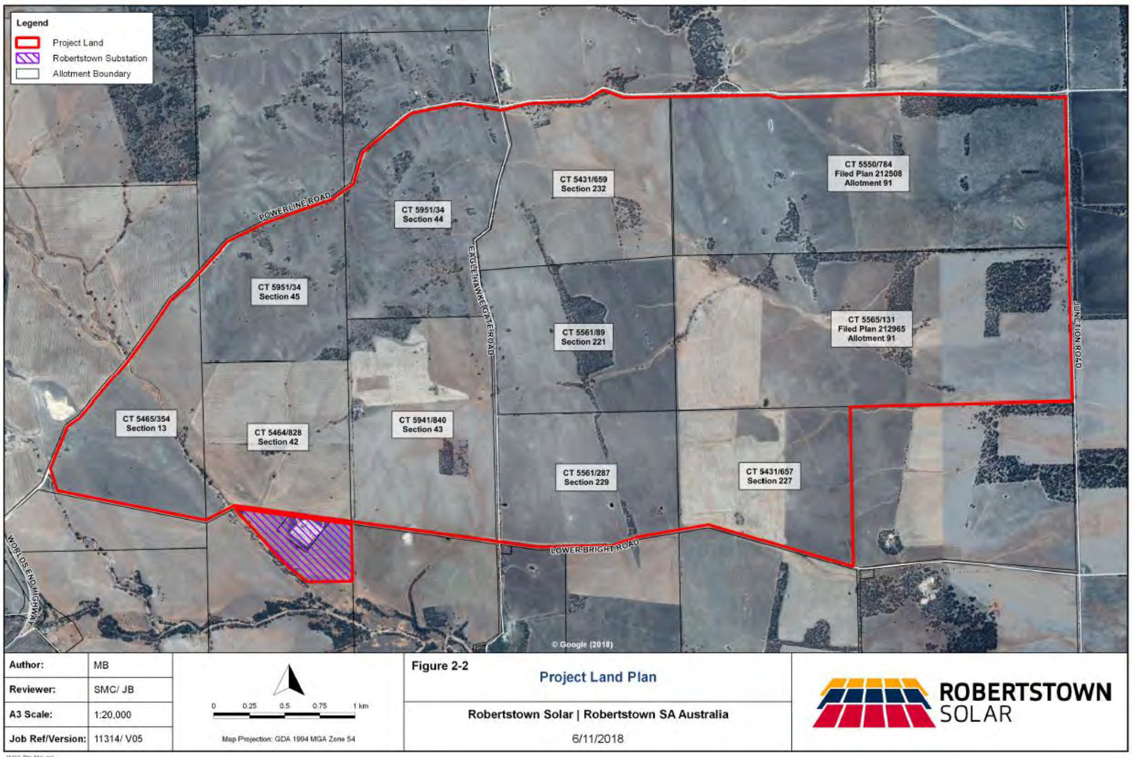
02

2.1. Project Area

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

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

Figure 2.1: Project Land and its Environs



2.2. Road Network

2.2.1. Adjoining Roads

Worlds End Highway

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

Local Roads

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

1 LocationSA – Traffic Volume Estimates, base year 2014.

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

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

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

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

2.2.2. Surrounding Intersections

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

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

2.2.3. Sight Distance

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

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

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

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

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

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

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

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

3. DEVELOPMENT PROPOSAL

03

3.1. Proposed Development

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

Construction of the development is proposed in stages.

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

3.2. Vehicle Access

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

4. TRAFFIC IMPACT ASSESSMENT

04

4.1. Proposed Heavy Vehicle Route to Project Area

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

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

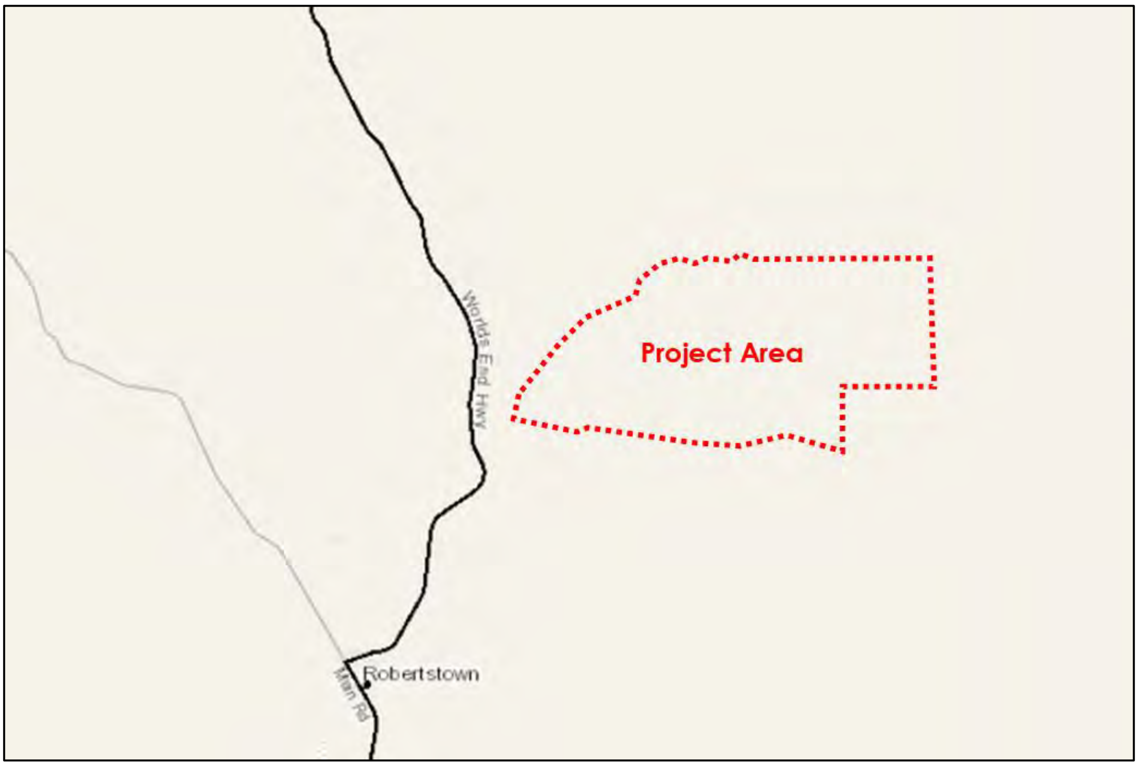
- From Port Adelaide via National Highway A9 (Port River Expressway, Salisbury Highway) and National Highway A1, National Highway M20, Thiele Highway (B81), Worlds End Highway, Powerline Road and Lower Bright Road.

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

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

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

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



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

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

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

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

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

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

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

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

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

4.2. Traffic Generation

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

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

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

4.3. Construction Phase Traffic Generation – Scenario 1

4.3.1. Design Rates

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

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

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

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

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

Table 4.2: Traffic Generation Estimates

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

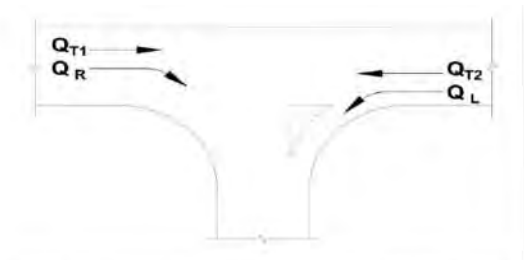
Construction Phase	Light Vehicles per day	Heavy Vehicles per day	OD Heavy Vehicles	Total movements per day
Months 17-18	26	20		46
Months 19-20	27	21		48
Months 21-22	30	19		49
Months 23-24	29	18		47
Months 25-26	22	11		33
Months 27-28	17	1		18

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

4.3.2. Intersection Treatment Warrant Assessment

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

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



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

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

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

Turning movements into the Project Area

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

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

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

Figure 4.9: Turning movements in a peak hour

Warrants for turn treatments

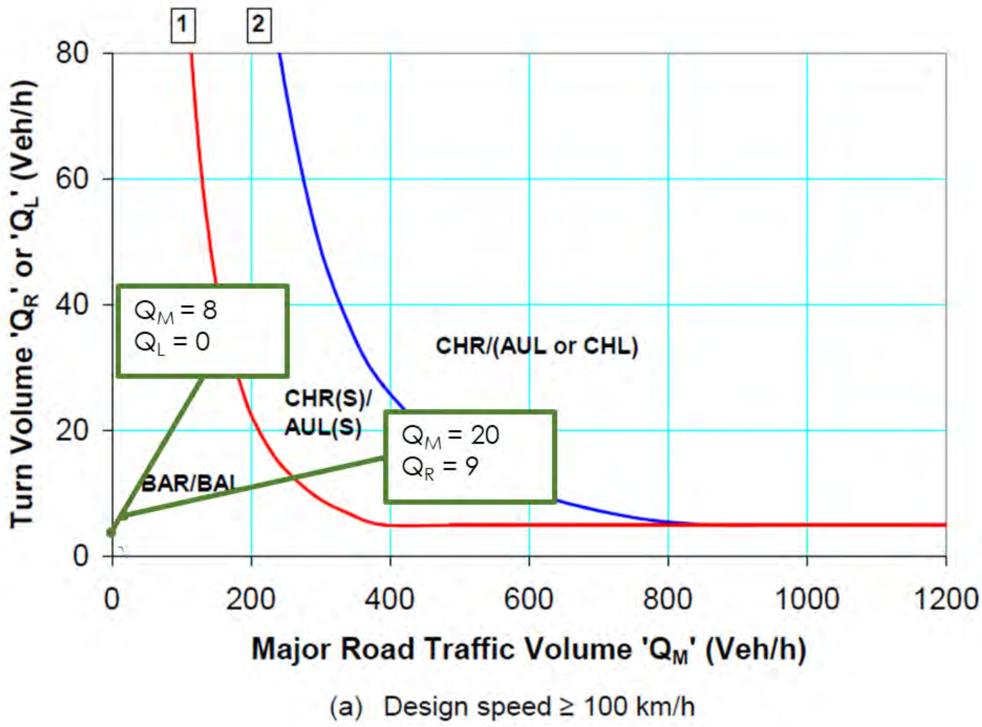
Based on the traffic volume and distribution assumptions, Table 4.3 presents the left and right turn volume calculations with respect to the major road traffic volumes.

Table 4.3: Traffic Volume Parameters

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

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

Figure 4.10: Warrant for intersection treatment



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

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

4.4. Construction Phase Traffic Generation – Scenario 2

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

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

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

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

4.5. Operational Phase Traffic Generation

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

4.6. Summary

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

5. CONCLUSION

05

5.1. Conclusion

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

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

APPENDIX 11

Socio Economic Impact Assessment

November 18

ROBERTSTOWN SOLAR

SOCIO-ECONOMIC IMPACT ASSESSMENT

Prepared for Robertstown Solar

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

QUALITY ASSURANCE AND DECLARATION

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

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

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

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

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

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

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

CONTENTS

TABLE OF FIGURES

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1. INTRODUCTION

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

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

1.1. LIMITATIONS AND ASSUMPTIONS

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

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

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

2. ROBERTSTOWN SOLAR PROJECT

2.1. PROJECT DESCRIPTION

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

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

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

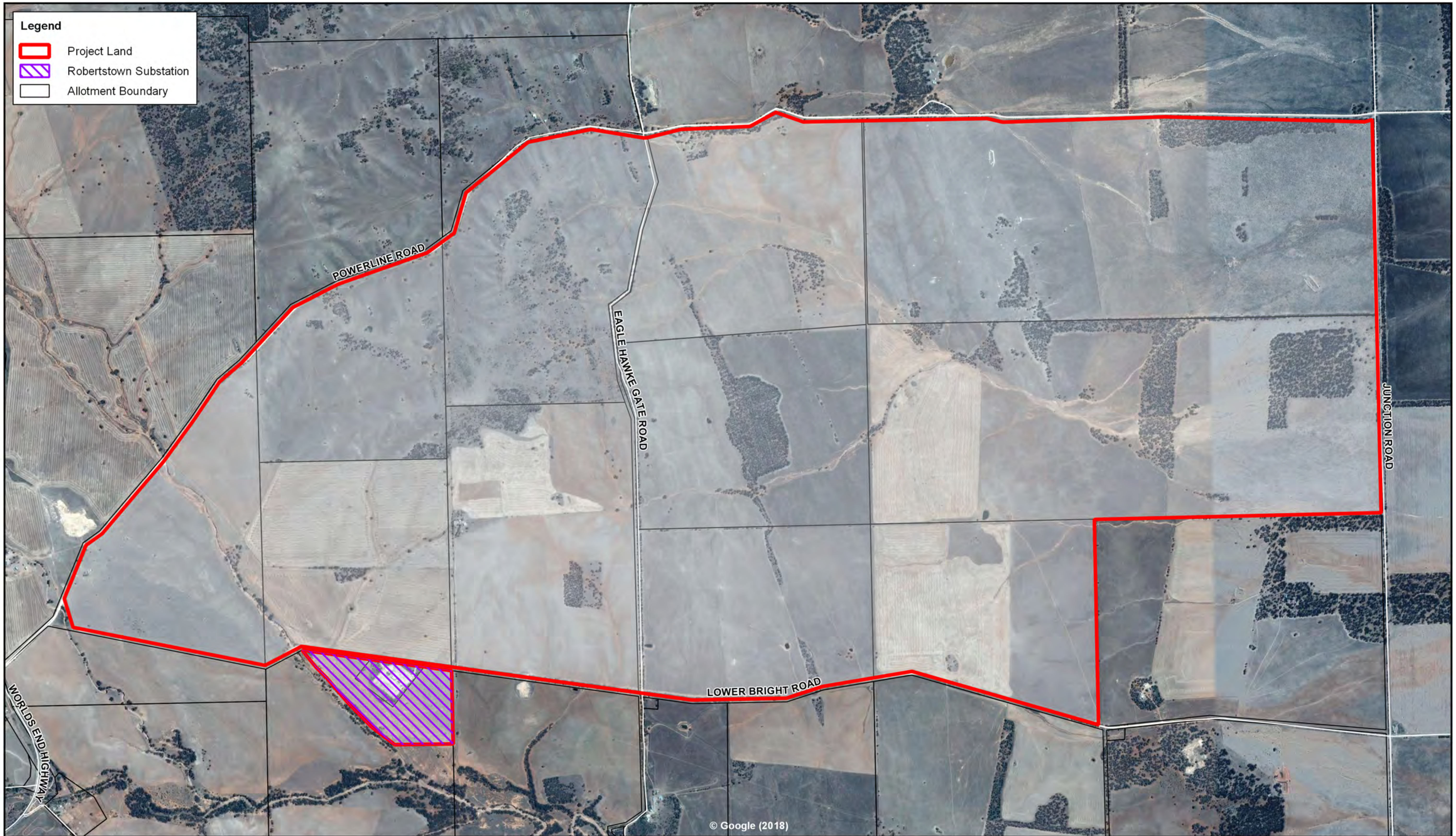
2.2. PROJECT AREA CONTEXT

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

2.3. STUDY AREA

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

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



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

0 0.25 0.5 0.75 1 km

Map Projection: GDA 1994 MGA Zone 54

Figure 2-1

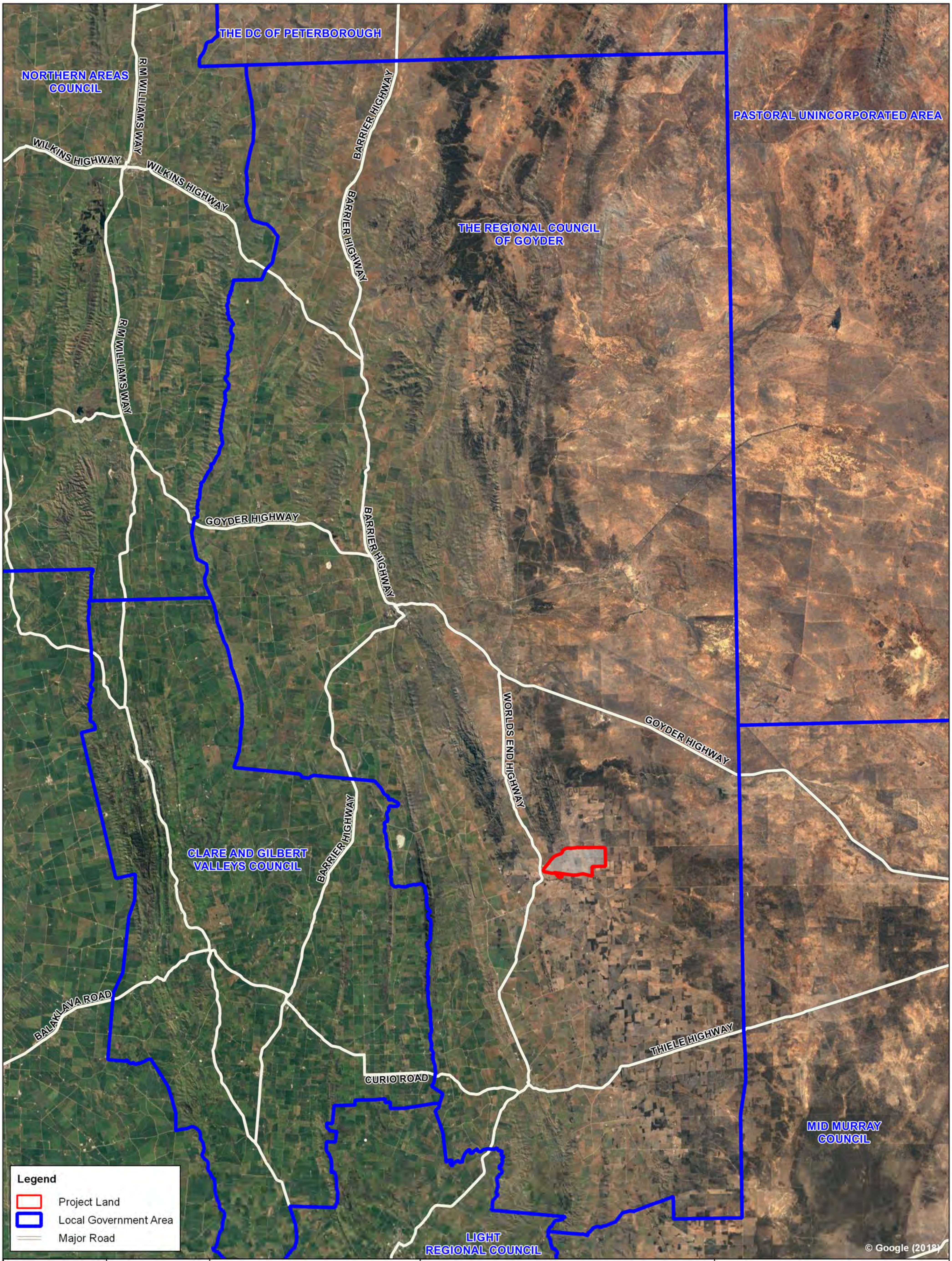
Project Land

Robertstown Solar | Robertstown SA Australia

21/11/2018

ROBERTSTOWN SOLAR

11314_SEIA_Project Land.qgs



Author:	MB		Figure 2-2 **Study Area**
Reviewer:	SMC/ JB		
A3 Scale:	1:400,000	0 5 10 15 20 km	Robertstown Solar | Robertstown SA Australia
Job Ref/Version:	11314/ V07	Map Projection: GDA 1994 MGA Zone 54	21/11/2018

ROBERTSTOWN SOLAR

11314_SEIA_Goyder LGA.qgs

3. REGIONAL PROFILE

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

3.1. POPULATION AND GROWTH PROJECTIONS

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

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

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

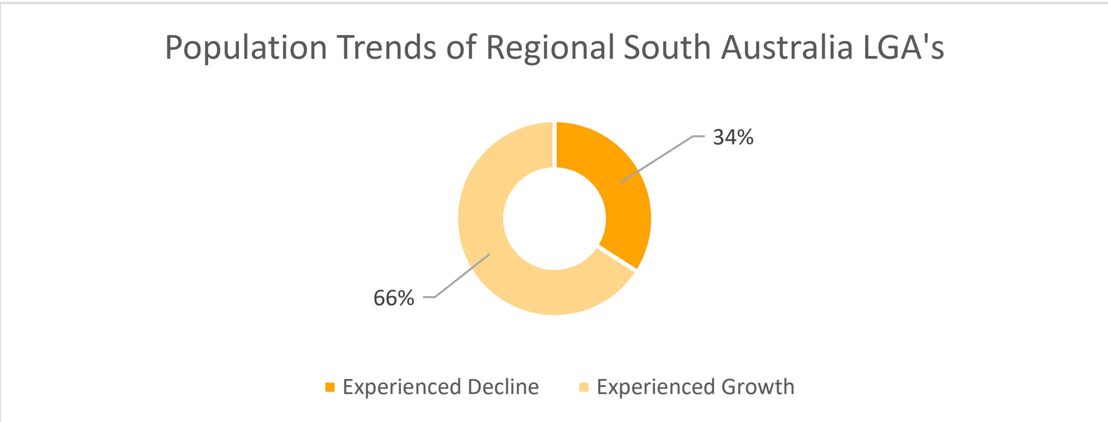


Figure 3-1: Population Trends of Regional South Australia LGA's (2011-16)

3.2. REGIONAL EMPLOYMENT CONDITIONS

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

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

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

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

Figure 3-2: Development Context Photos

4. SOLAR DEVELOPMENT CONTEXT

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

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

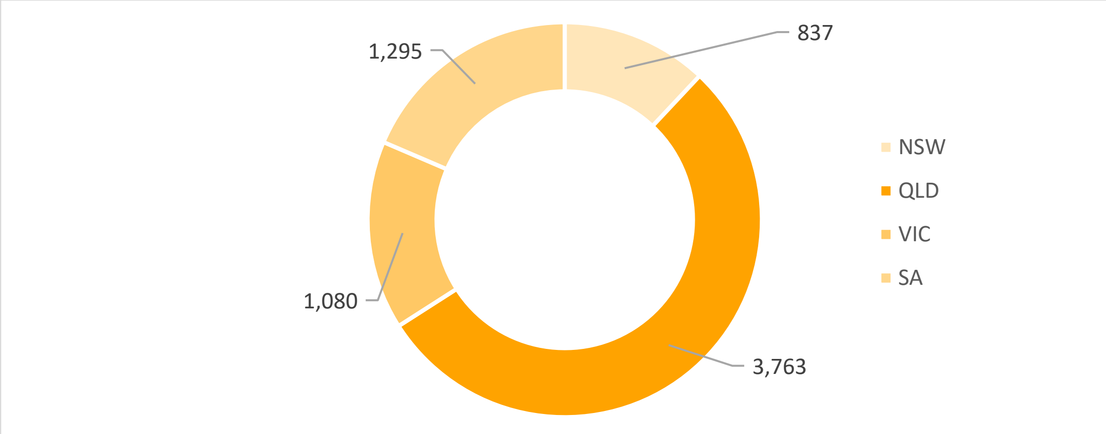


Figure 4-1: AEMO Estimate: Proposed Solar Development Pipeline Nationally (MW)

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

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

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

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

4.1. SOCIAL LICENSE

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

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

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

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

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

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

5. STUDY METHODOLOGY

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

5.1. SOCIAL IMPACT ASSESSMENT DATA

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

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

5.2. ECONOMIC IMPACT ASSESSMENT DATA

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

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

5.3. ASSESSMENT METHODOLOGY

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

6. SOCIAL CONTEXT

6.1. SOCIO-DEMOGRAPHIC PROFILE OF THE PROJECT AREA

6.1.1. Persons

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

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

6.1.2. Age

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

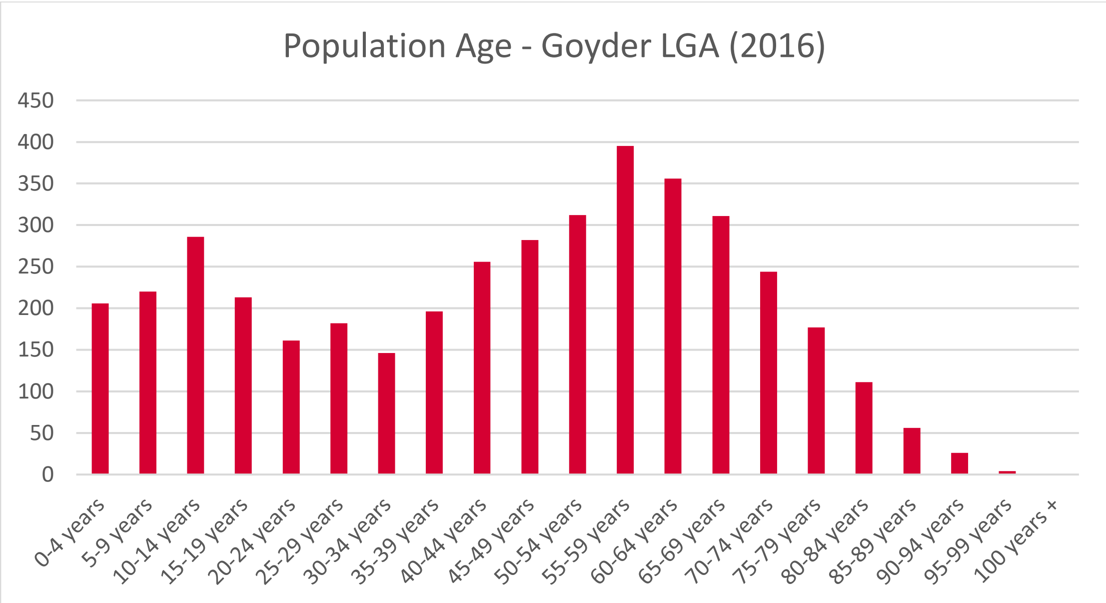


Figure 6-1: Population by Age (ABS 2016)

6.1.3. Household Types

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

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

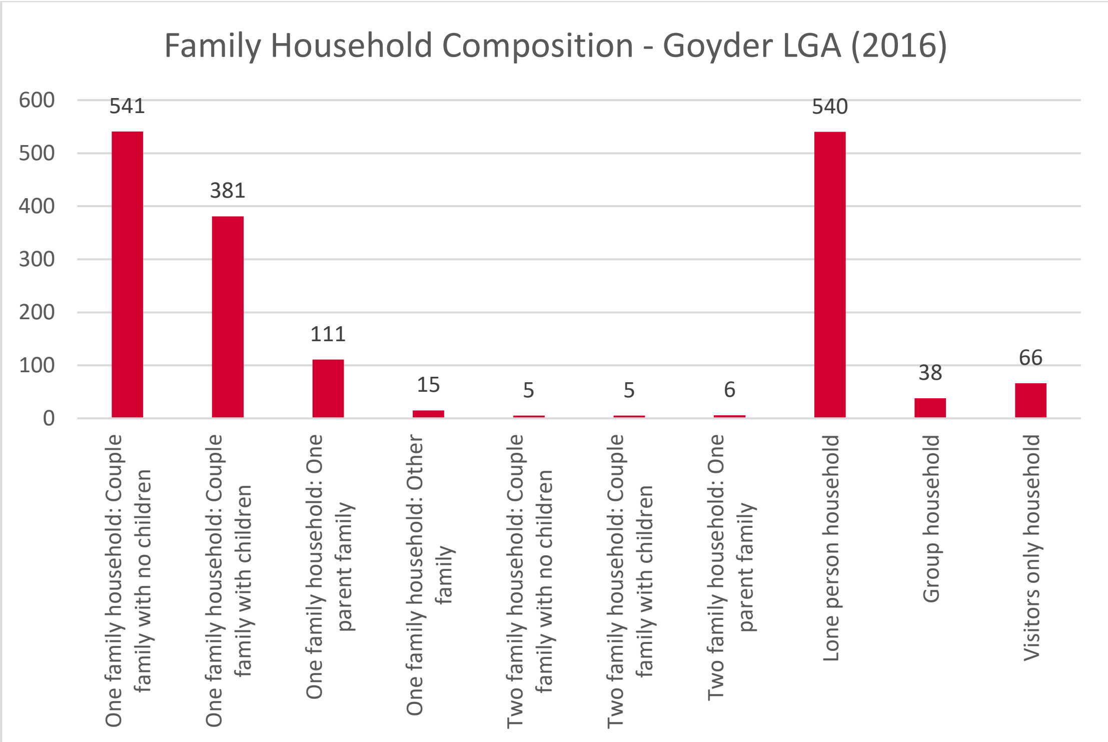


Figure 6-2: Household Composition (ABS 2016)

6.1.4. Tenure

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

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

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

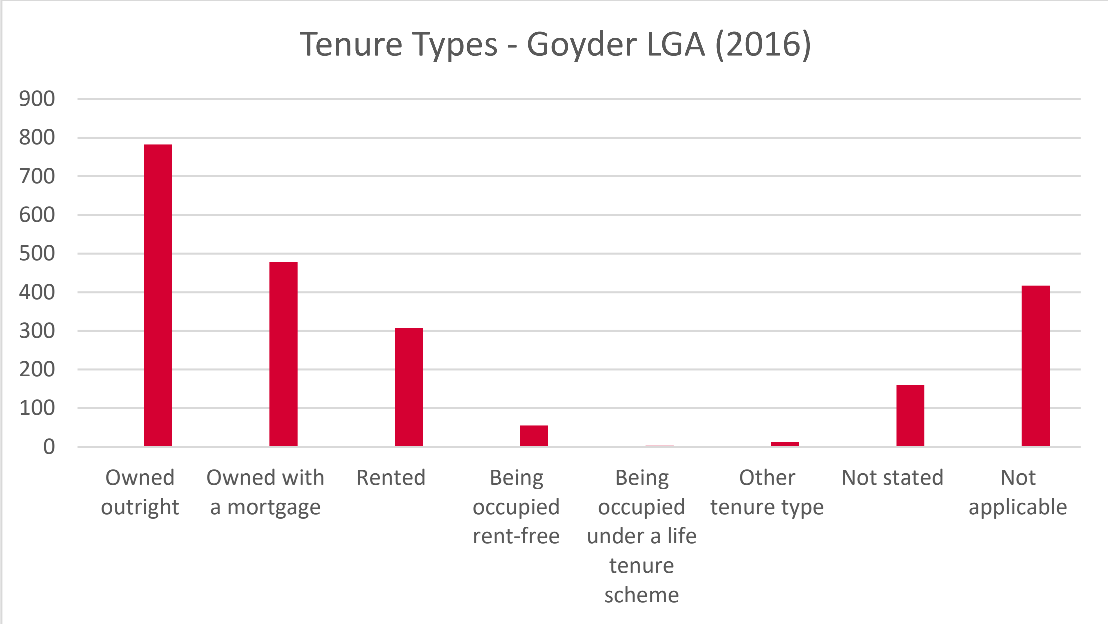


Figure 6-3: Tenure Type (ABS 2016)

6.1.5. Education

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

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

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

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

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

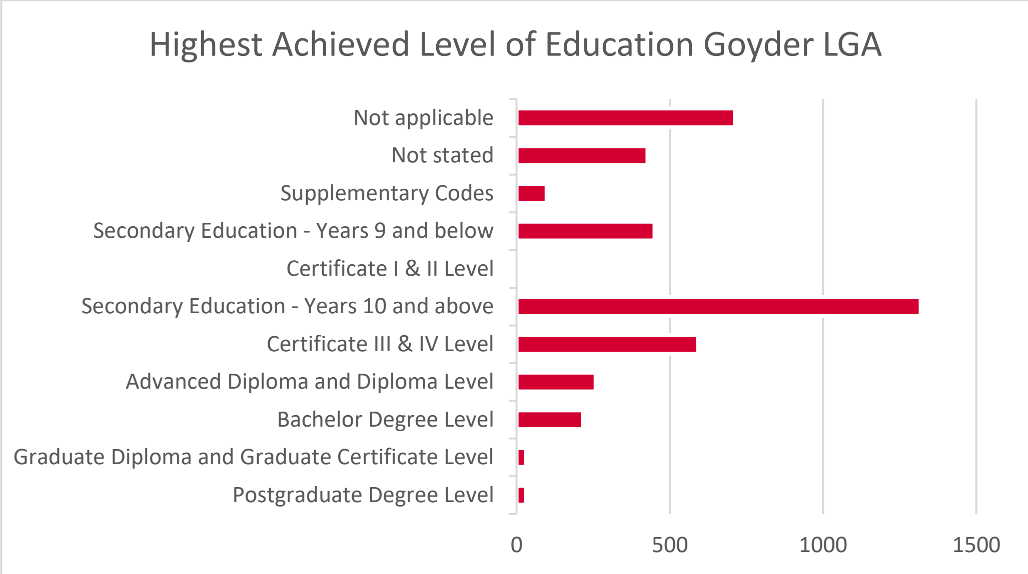


Figure 6-4: Highest Achieved Level of Education (ABS 2016)

6.1.6. Social Analysis Summary

To summarise, the data outlined above suggests that:

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

7. ECONOMIC CONTEXT

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

7.1. ECONOMIC PROFILE OF GOYDER LOCAL GOVERNMENT AREA

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

7.1.1. Gross Regional Profit

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

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

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

7.1.2. Household Income

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

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

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

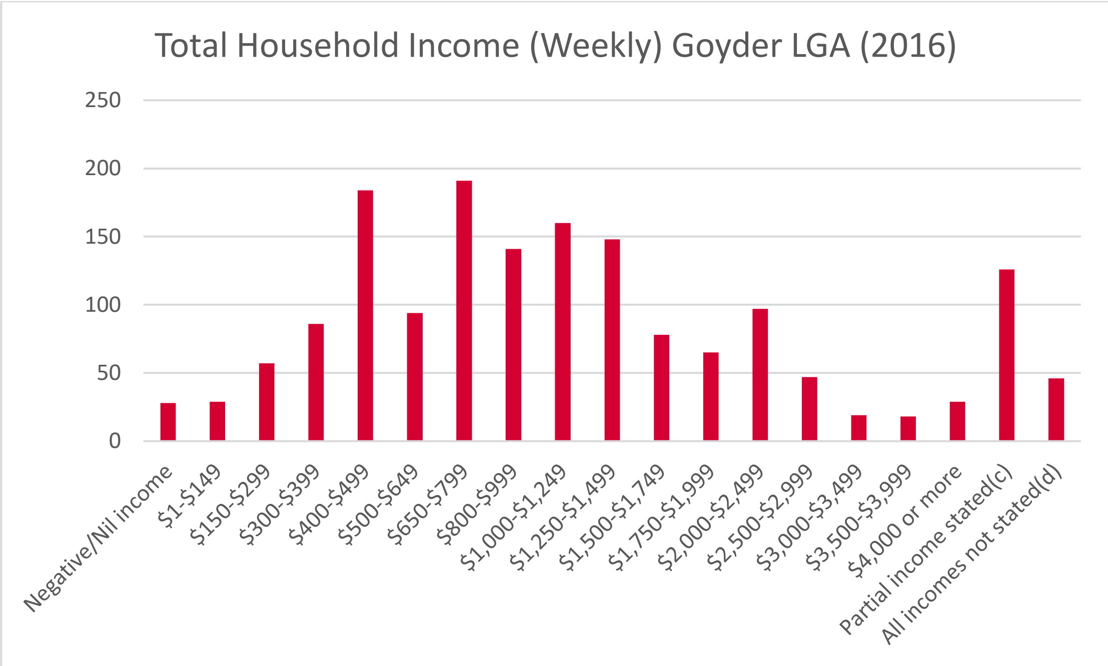


Figure 7-1: Total Household Weekly Income (ABS 2016)

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

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

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

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

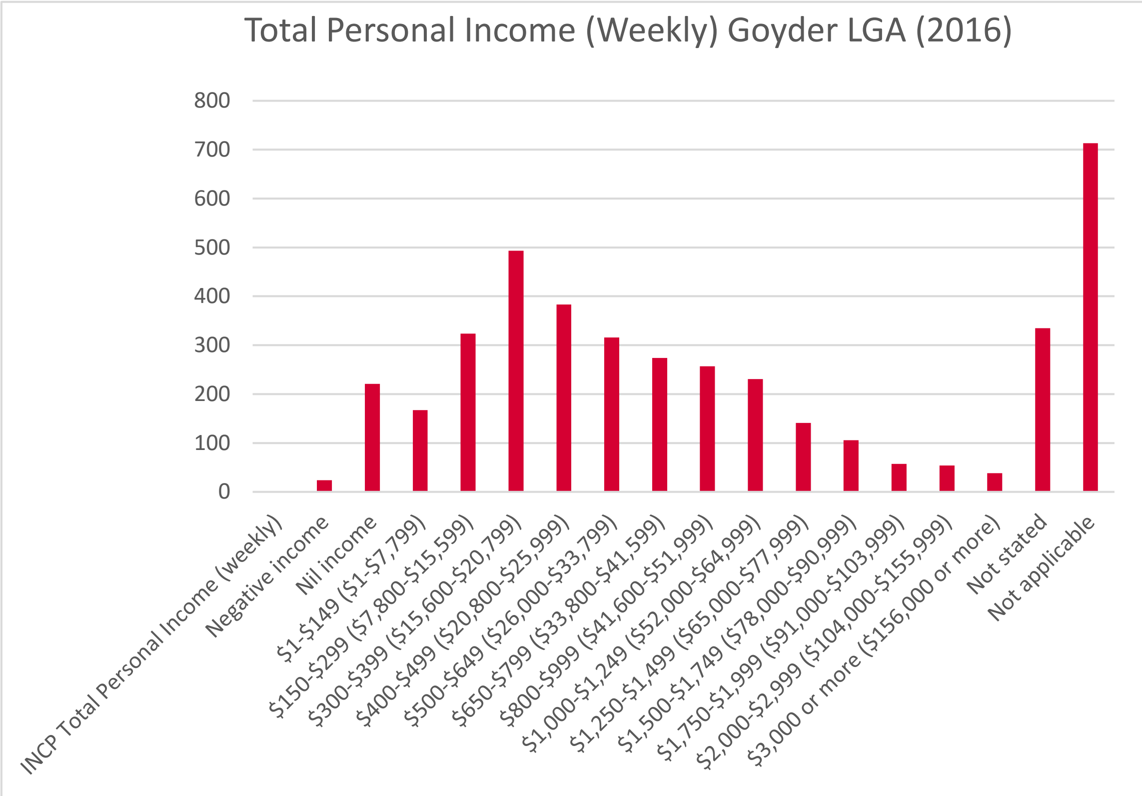


Figure 7-2: Individual Weekly Income (ABS 2016)

7.1.3. Labour Force

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

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

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

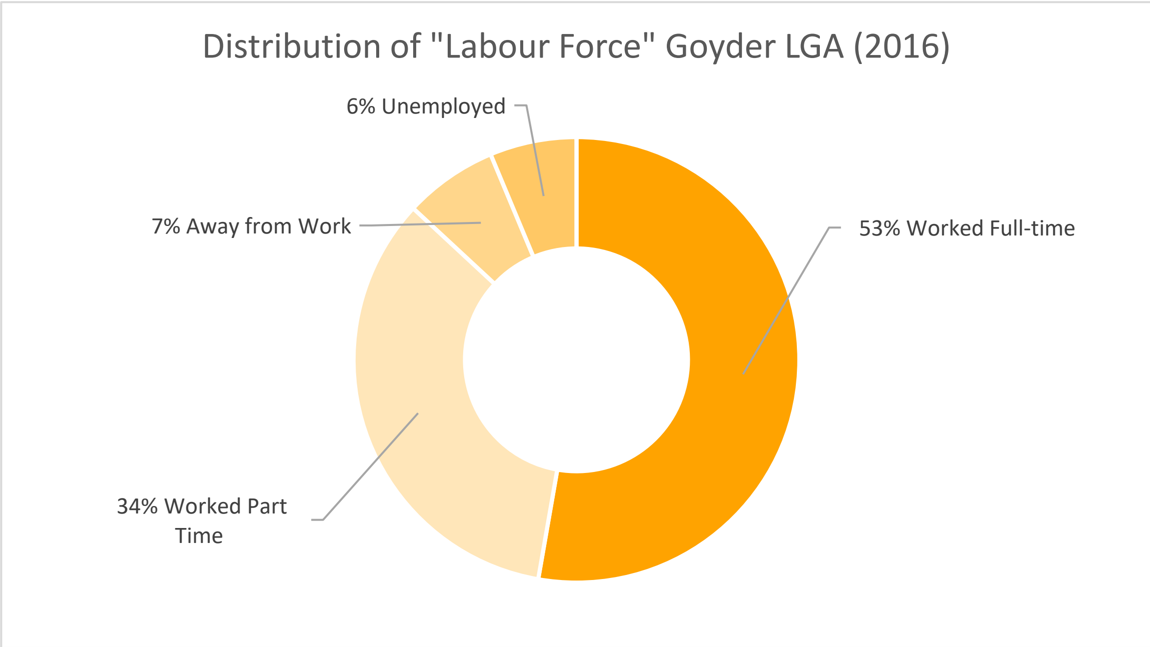


Figure 7-3: Distribution of Labour Force (ABS 2016)

7.1.4. Industry of Employment

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

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

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

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

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

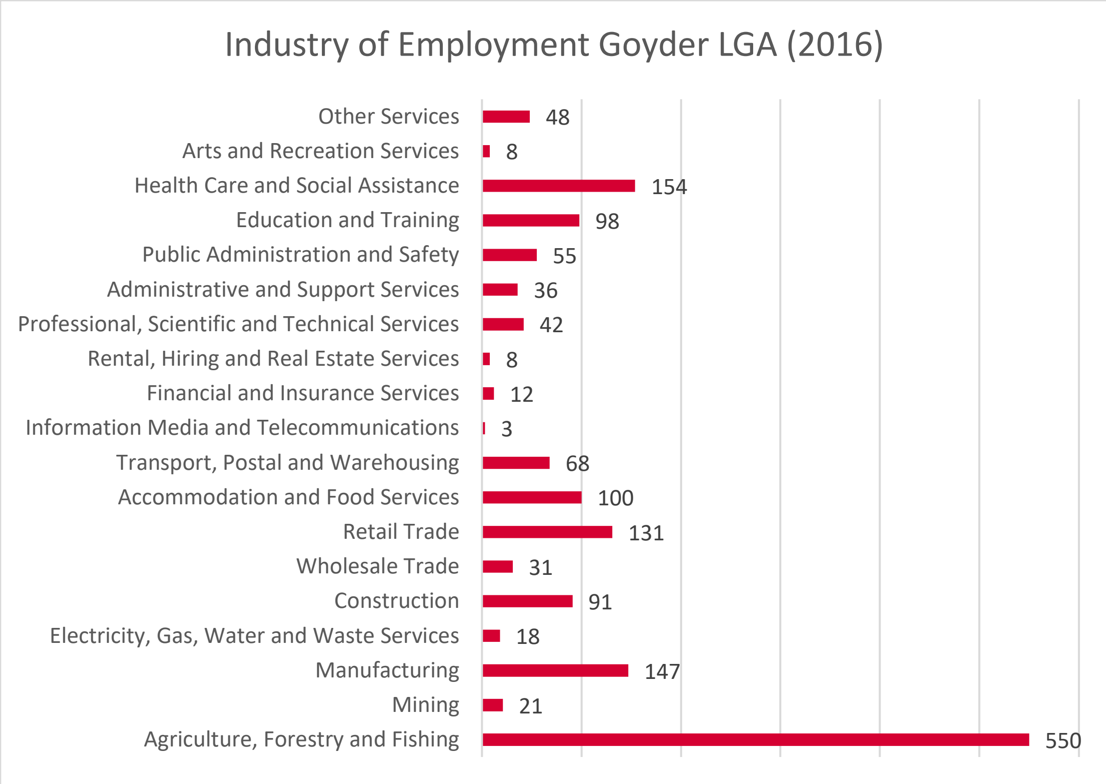


Figure 7-4: Industry of Employment (ABS 2016)

7.1.5. Occupation

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

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

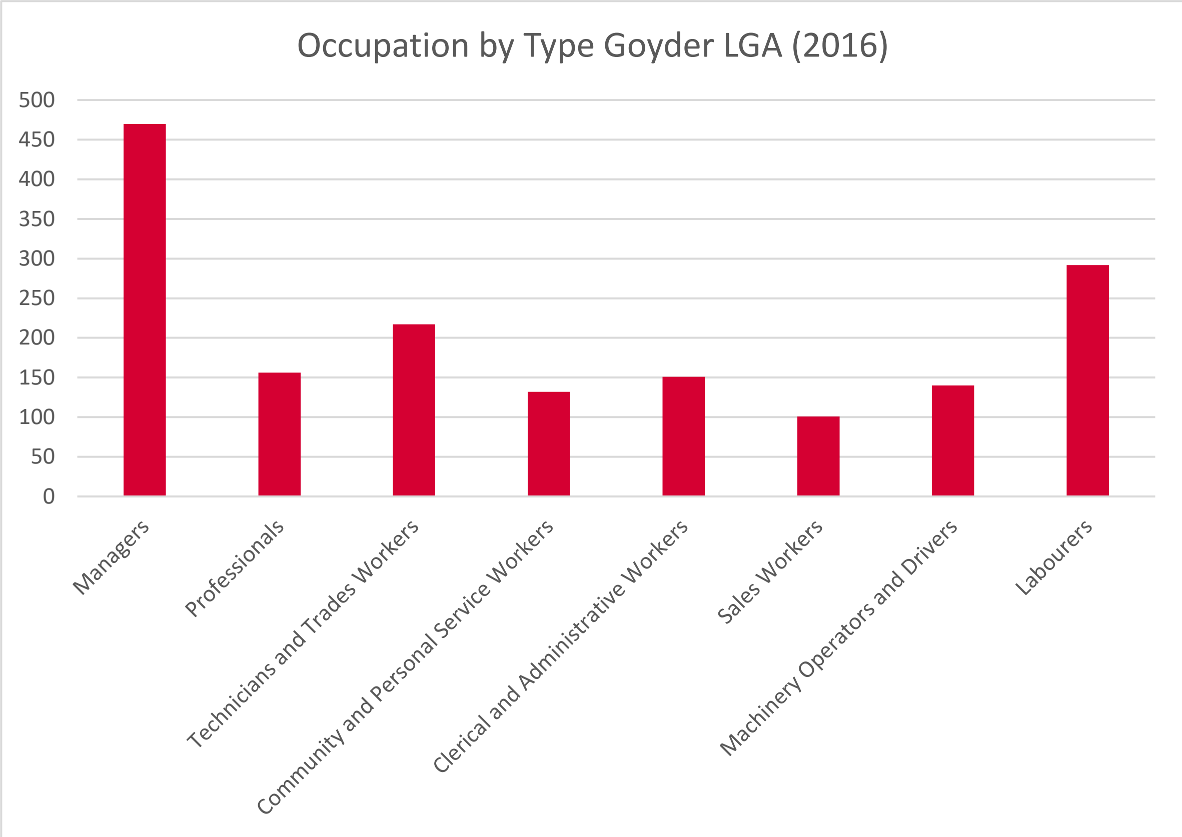


Figure 7-5: Occupation Type (ABS 2016)

7.1.6. Economic Analysis Summary

To summarise, the data provided above indicates that:

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

8. SOCIO-ECONOMIC IMPACT ASSESSMENT

8.1. LARGE SCALE SOLAR OPPORTUNITIES

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

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

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

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

8.2. DIRECT DOMESTIC BENEFIT

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

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

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

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

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

- Finance.

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

Table 8-1: Estimated Total Domestic Spend

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

8.3. EMPLOYMENT OPPORTUNITIES

8.3.1. Development Phase Employment Benefits (Direct and Indirect)

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

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

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

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

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

Table 8-2: Construction Phase Employment

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

8.3.2. Operational Phase Employment Benefits

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

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

Table 8-3: Operational Phase Employment

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

8.4. LOCAL EXPENDITURE

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

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

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

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

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

8.5. DIRECT COMMUNITY FUND

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

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

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

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

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

9. RENEWABLE ENERGY AND CARBON EMISSIONS

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

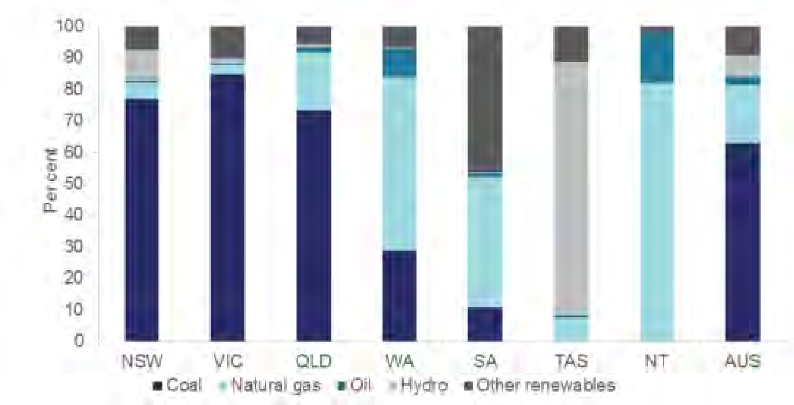


Figure 9-1: Australian Electricity Fuel Generation Mix for 2016
Source: Department of the Environment and Energy (2017)

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

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

9.1. ROBERTSTOWN SOLAR RENEWABLE ENERGY GENERATION

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

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

10. STRATEGIC CONSIDERATIONS

10.1. SOCIAL AND ENVIRONMENTAL ISSUES

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

10.1.1. Positive Impacts

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

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

The Project will create employment opportunities for the study area.

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

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

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

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

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

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

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

10.1.2. Perceived Negative Impacts

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

Perceived visual impacts including general amenity and glint/glare.

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

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

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

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

Perceived impact on agricultural land.

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

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

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

Impacts arising from construction phase including dust and noise.

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

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

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

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

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

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

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

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

11. CONCLUSION

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

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

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

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

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

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APPENDIX 12

Glint & Glare Assessment

November 18

ROBERTSTOWN SOLAR

GLINT AND GLARE ANALYSIS

Prepared for Robertstown Solar

Prepared by BV Consulting

EPS ENERGY

Reference No. 11314 November 18

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

Glint & Glare Analysis

Robertstown Solar
South Australia

Analysis of optical effects of solar plant panels onto air planes, houses and cars

Prepared by **BV** Consulting

Client	Robertstown Solar 1 Pty Ltd
Status	FINAL
Date	25 November 2018
Version	3.1
Classification	CONFIDENTIAL
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2 EXECUTIVE SUMMARY

The following report describes the results of a Glint & Glare calculation performed for Robertstown Solar in South Australia.

Robertstown Solar is a Photovoltaic Energy Generation System (PVS) and Battery Energy Storage System (BESS) located approximately 6 km north-east of the town of Robertstown, South Australia and approximately 110 km north-east of Adelaide, directly north of Electranet's Robertstown substation and east of the Worlds End Highway. The PVS will comprise of solar panels and associated equipment designed as single axis horizontal tracking arrangement tracking the movement of the sun from east to west. The project area is split into two major blocks, called Eastern Block and Western Block in this Report.

The report has been prepared by BV Consulting upon request by the Client to assess the potential glint and glare impact of Robertstown Solar. The report has been calculated using two separate blocks of 617 ha (Western Block) and 1,109 ha (Eastern Block) as shown in Figure 11.

The Glint & Glare Analysis ("GGA") determines the effect on drivers on roads (Routes "RO"), houses (Observation Points "OP") as well as airplanes approaching nearby airports (Flight Paths "FP").

The Glint and glare analysis categorises glint and glare into three major categories:

Hazard Level	Description
GREEN	Low potential for after image[1]
YELLOW	Potential for after image
RED	Potential for permanent retinal damage

Table 1: Hazard levels SGHAT

The Glint and glare analysis has provided the following overall results which are described in detail in this report.

Drivers on Roads (RO)	Houses (OP)
GREEN	GREEN

Table 2: GGA Summary – Glare Results

There is no commercial airport in the immediate region (10 km) around the project area and only a small private aerodrome, Truro Park, is located approximately 77 km to the South of Robertstown (see Figure 1).

As no commercial airport is in the immediate region of the project area no assessment was required to be performed for impact on air traffic. The concentric rings in the figure below show the distance in km from the Robertstown Solar project area.

[1] After image = lingering image of the glare in the field of view

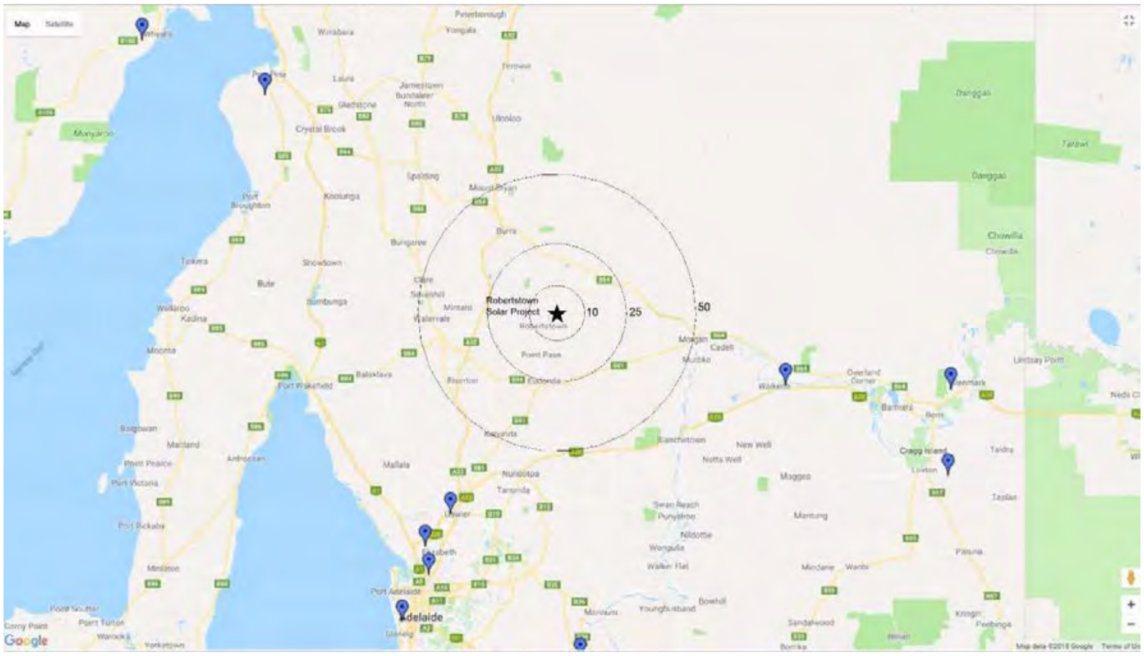


Figure 1: Map of Airports in South Australia[2]

At the southern project area boundary Lower Bright Rd. follows the boundary line which is a minor local road only. Powerline Road, also a local access road, follows the Northern Site boundary. At the south-western end of the project area Electranet's Robertstown substation is located and to the west of the project area Worlds End Highway passes North-South. Junction Rd. forms the eastern boundary of the project area.

Lower Bright Rd., Junction Rd. and Powerline Rd. are unpaved gravel roads with very limited traffic and even Worlds End Highway only experiences relatively low traffic volumes. Eagle Hawke Gate Road crosses the site in North-South Direction. This road is however only a very small 4WD local traffic road and therefore of minor importance.

The calculation has shown that only some very limited impact on drivers and residents during the morning/evening hours of the day can be expected. Glint & glare for drivers and residents can be easily mitigated by scattered hedges, scrubs or small trees alongside the site boundaries in the road reserves or around the residential properties to prevent direct view onto the panels and interrupt any prolonged view onto the solar plant.

The worst case scenario calculation does not factor in trees or other obstacles between the viewer and the PVS solar panels, does not factor in directional views and only assumes views of the whole of the PVS solar panels. It does not consider the actual geometry of the solar modules but assumes a continuous reflective surface within the project area.

Based on this worst case calculation only GREEN GLARE was detected for Robertstown Solar and therefore no screening plantations are considered necessary. When factoring in existing vegetation this will most likely further ameliorate any potential glare.

[2] Source: https://tools.wmflabs.org/wp-world/googlmaps-proxy.php?page=https:%2F%2Ftools.wmflabs.org%2Fkmlexport%3Farticle%3DList_of_airports_in_South_Australia&output=classic

3 GLINT & GLARE FROM SOLAR PANELS

Glare describes the difficulty seeing in the presence of bright light such as direct or reflected sunlight or artificial light such as car headlamps at night. Glare is caused by a significant ratio of luminance between the task (that which is being looked at) and the glare source. Factors such as the angle between the task and the glare source and eye adaptation have significant impacts on the experience of Glare.

Glint is defined as a tiny quick flash of light that can cause discomfort to the viewer. Solar Panels are designed to absorb as much light as possible for power generation and therefore reflectivity of solar panels is minimised. Nevertheless the glass front and potential metal frames may cause some reflection of sunlight. However, compared to other objects such as sheds, ponds, railway tracks, windows, cars etc. solar panels reflect less light than even grass, crops, forest and water.

3.1 Reflectivity of Photovoltaic Panels

Photovoltaic panels (PV Panels) are commonly made of polysilicon covered with treated high transmission low iron glass allowing high absorption of light for power generation. Therefore standard solar PV modules[3] are considered to produce less glare and reflectance than standard window glass. Photovoltaic panels also reflect significantly less light than other common surfaces as shown below[4].

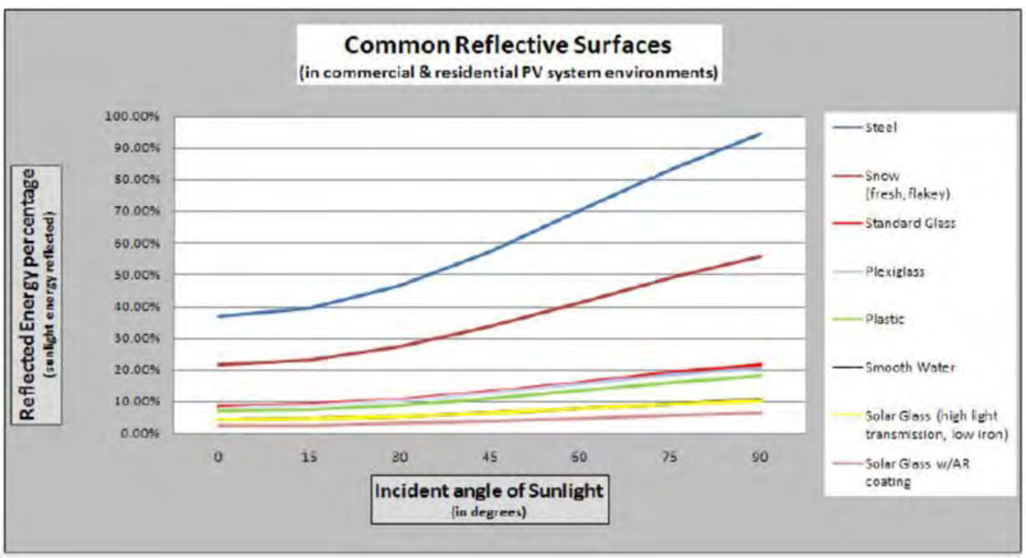


Figure 2: Reflected Energy in % of sunlight

[3] Module consists of a number of panels and a frame holding them
[4] Source: Sunpower Corporation Tech Note T09014, September 2009

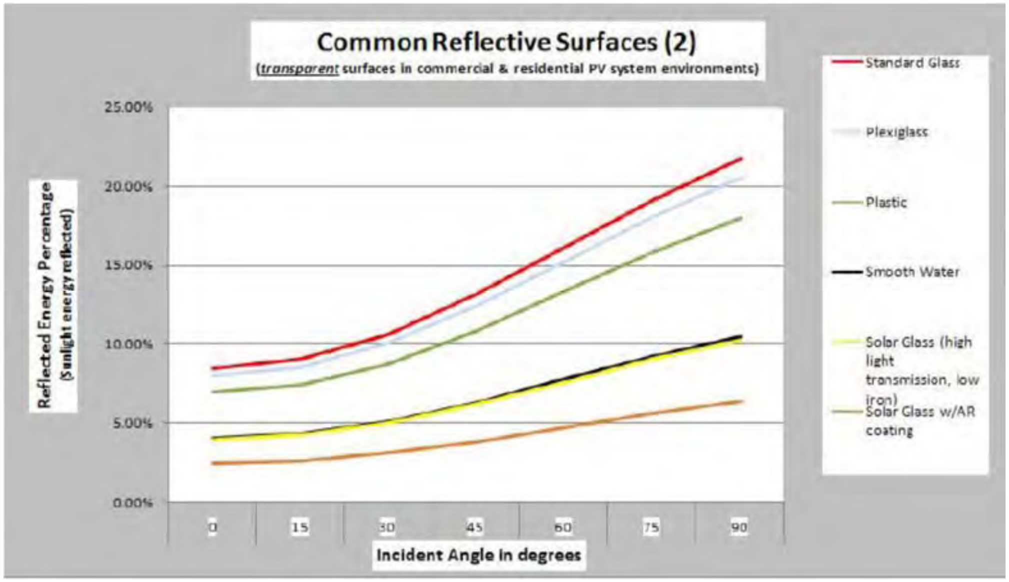


Figure 3: Reflected Energy in % of sunlight (Detail)

It can therefore be concluded that the maximum reflectance of a solar PV Panel can be considered as 11% (assuming uncoated glass). This is significantly below the maximum reflectance of a standard steel surface with 94.4%. Modern solar PV Panels use coated glass to further reduce reflection. Therefore impact will be significantly less.

Compared to typical surfaces frequently occurring in rural areas this reflectivity (albedo = reflection coefficient) is considered very low and thus of no significant concern.

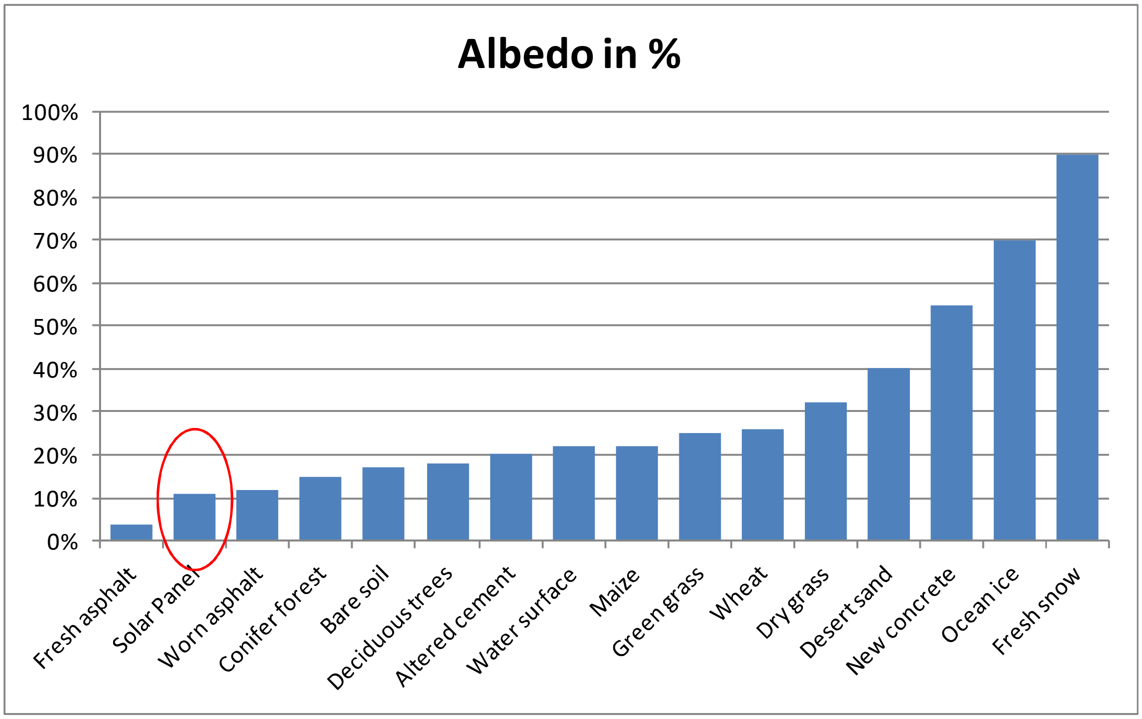


Figure 4: Sample albedos for various surfaces[5]

In a typical agricultural environment roof constructions are commonly made of corrugated steel. Whilst the corrugation itself reduces the glare potential of the surface such roofs still will reflect substantially higher amounts of light than solar PV panels considering the significant difference in reflectivity as shown in Figure 2 to Figure 4 above.

3.2 Glint

Glint results of the direct reflection of sunlight from a reflective surface when the sun reflects of the surface of the PV panels at the same angle as a person is viewing the PV panel surface. Considering the low reflectivity of solar PV panels and the requirement for direct reflection glint is not considered to be an issue for the project area.

[5] Source: Wikipedia, www.apesimulator.org

3.3 Glare

Sunlight reflection from the solar PV Panels will also be in a diffuse pattern potentially resulting in glare or difficulty seeing in the presence of a very bright light[6]. Glare may, depending on its intensity, result in slight irritation of view and temporary after images to permanent damage of the retina in case of prolonged intensive glare. A number of factors determine intensity and extent of glint and glare such as:

- distance between panels and viewpoint;
- horizontal tilt angle of panels;
- time of day and season;
- cloud cover;
- Screening vegetation.

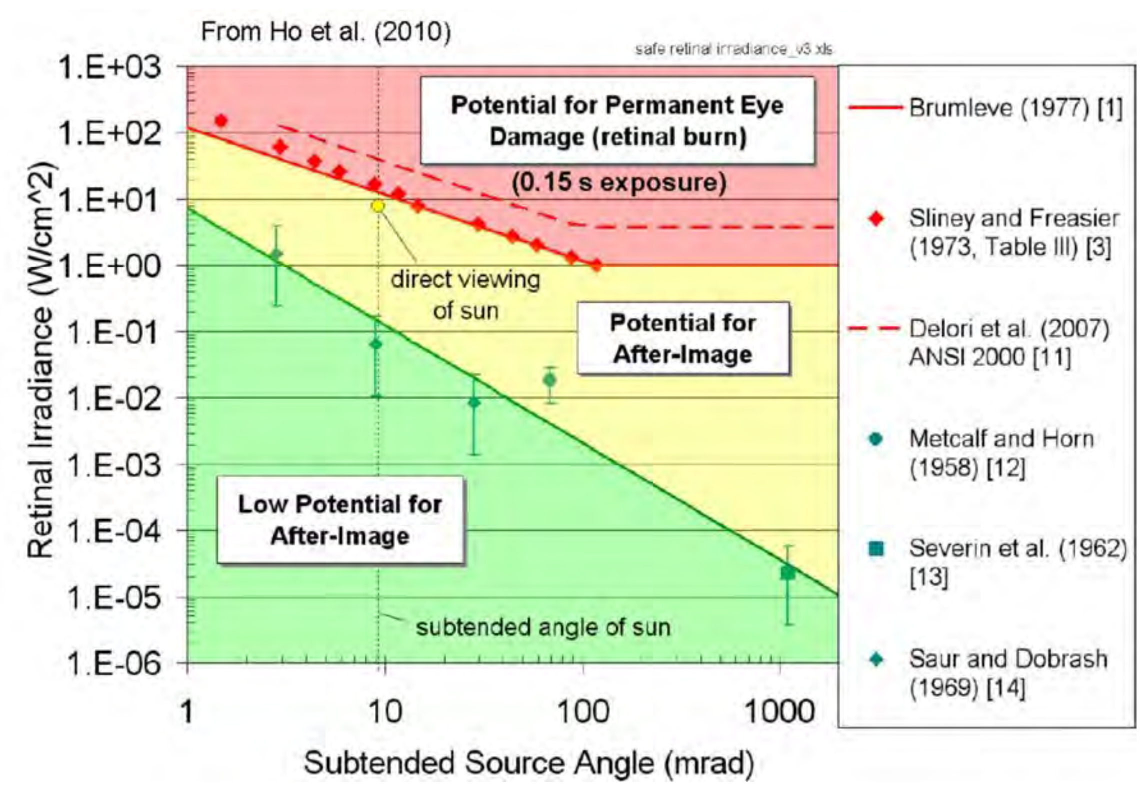


Figure 5: Hazard Plot for visual impact of glare[7]

Figure 5 shows the calculated hazard zones for various sunlight source angles and sunlight intensities as developed through studies commissioned by the US Department of Energy. This plot allows categorizing the glare hazard based on the calculated energy and angle of the projected image caused by the solar PV plant. In the “low potential for after image zone” it is considered that glare within that range does not cause significant air traffic safety hazards.

[6] Source: Wikipedia
[7] Source: Sandia National Laboratories, US Department of Energy, subtended arc is a reflection of the image size experienced

4 METHODOLOGY

The Solar Glare Hazard Analysis Tool (SGHAT V3.0), developed by Sandia Laboratories and licensed by Forge Solar[8] has been used to calculate Glint & Glare impact for this study. This tool is considered industry standard and is also the software required by the US Federal Aviation Administration and recognised by the Australian Civil Aviation Safety Authority (CASA).

Once glare can be found the tool calculates the retinal irradiance and subtended angle of the glare source to predict ocular hazards from temporary after images to permanent eye damage. Results are grouped into three categories:

Hazard Level	Description
GREEN	Low potential for after image[9]
YELLOW	Moderate potential for after image
RED	Potential for permanent retinal damage

Table 3: Hazard levels SGHAT

The model has some limitations resulting in the model describing a worst case scenario:

- Clear day solar irradiation is used;
- No trees of other obstacles between viewer and plant are considered;
- No directional views, always views of the whole solar plant;
- The model does not consider the actual geometry of the solar modules but assumes a continuous reflective surface within the site boundaries.

4.1 Modelling

A number of observation points alongside the project area have been defined, described as "OP" in the detailed results section of this report. These observation points are set at 1.5 m above ground level representing the typical position of a person on a property.

Roads have been defined as Routes ("RO") simulating the viewshed of a driver with a view angle of 50° representing a driver looking at the road ahead.

4.2 Modelling limitations

Several limitations exist due when simulating large arrays. Although this may limit the accuracy of the result the overall outcome is considered conservative and therefore represents a worst case scenario.

- 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.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially

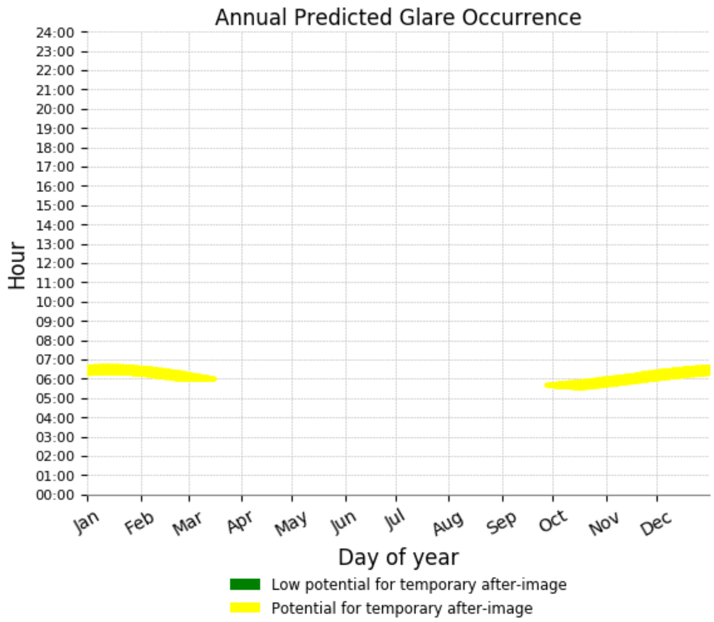
[8] www.forgesolar.com
[9] After image = lingering image of the glare in the field of view

impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)

- Hazard zone boundaries shown in the glare hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.

4.3 Model outputs

For each observation point a glare occurrence plot and glare hazard plot were developed. These plots are described below.



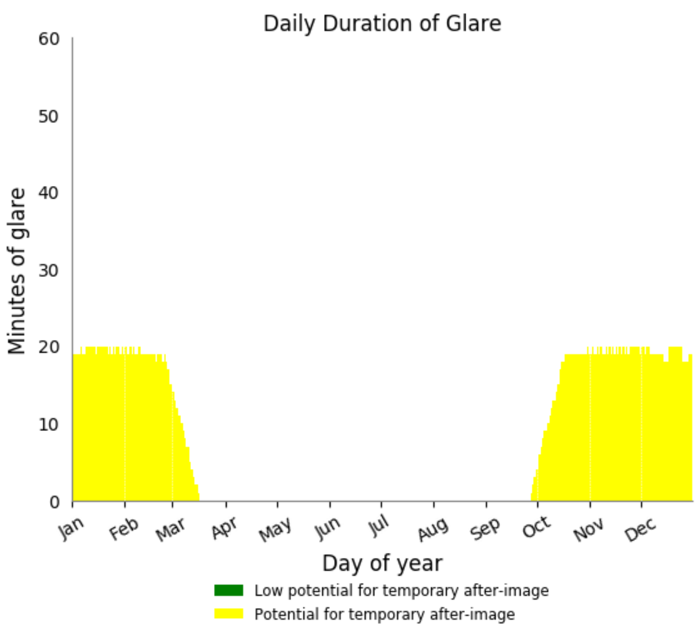


Figure 6: Glare Occurrence Plot (EXAMPLE)

Glare occurrence plots are a graphical depiction showing the expected glare hazard at any time throughout the day and for what duration.

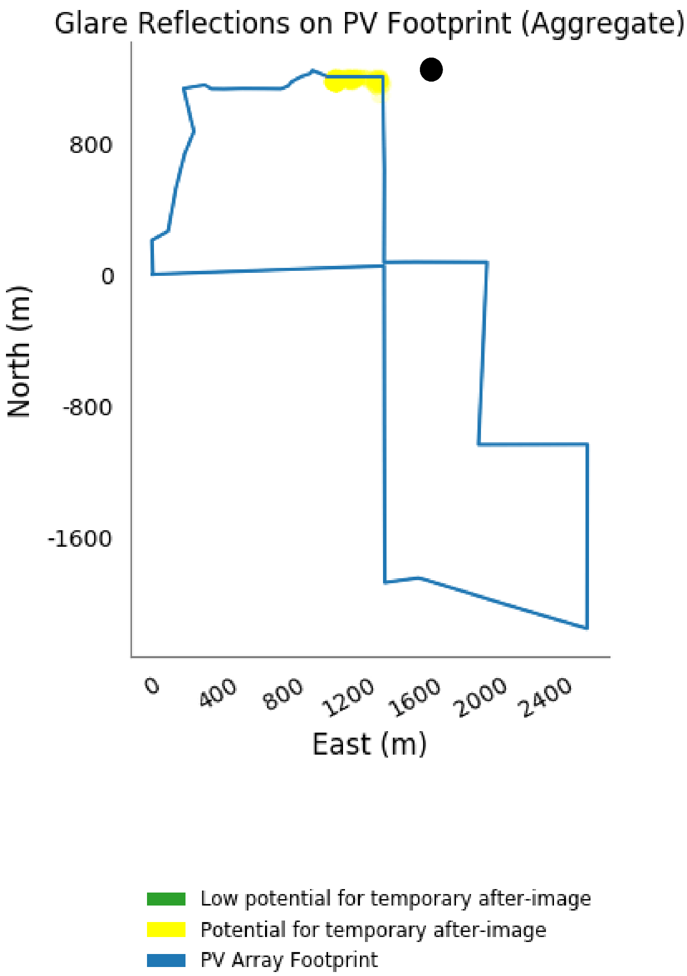


Figure 7: Glare reflection locations (black dot represents viewer location)

The Glare reflection location plot shows the parts of the PVS solar panels generating glare for the viewer at a specific observation point.

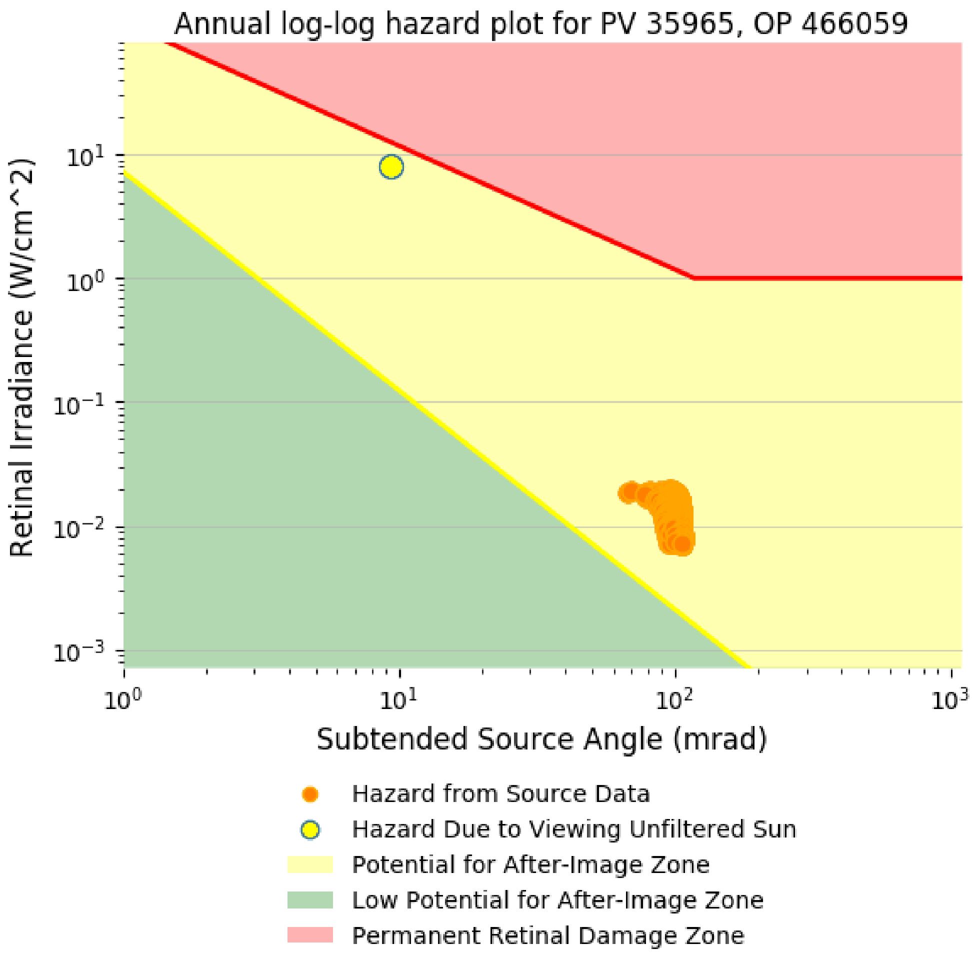


Figure 8: Glare hazard plot

The glare hazard plot shows the expected glare as compared to the hazard when viewing the unfiltered sun. It plots the intensity of light hitting the eye (retinal irradiance) as a function of size & distance (subtended source angle) to the glare source.

For Routes a special plot has been developed showing the glare vectors for a driver. For clarity these vectors are placed at the PV centroid. The actual glare spot locations may vary.

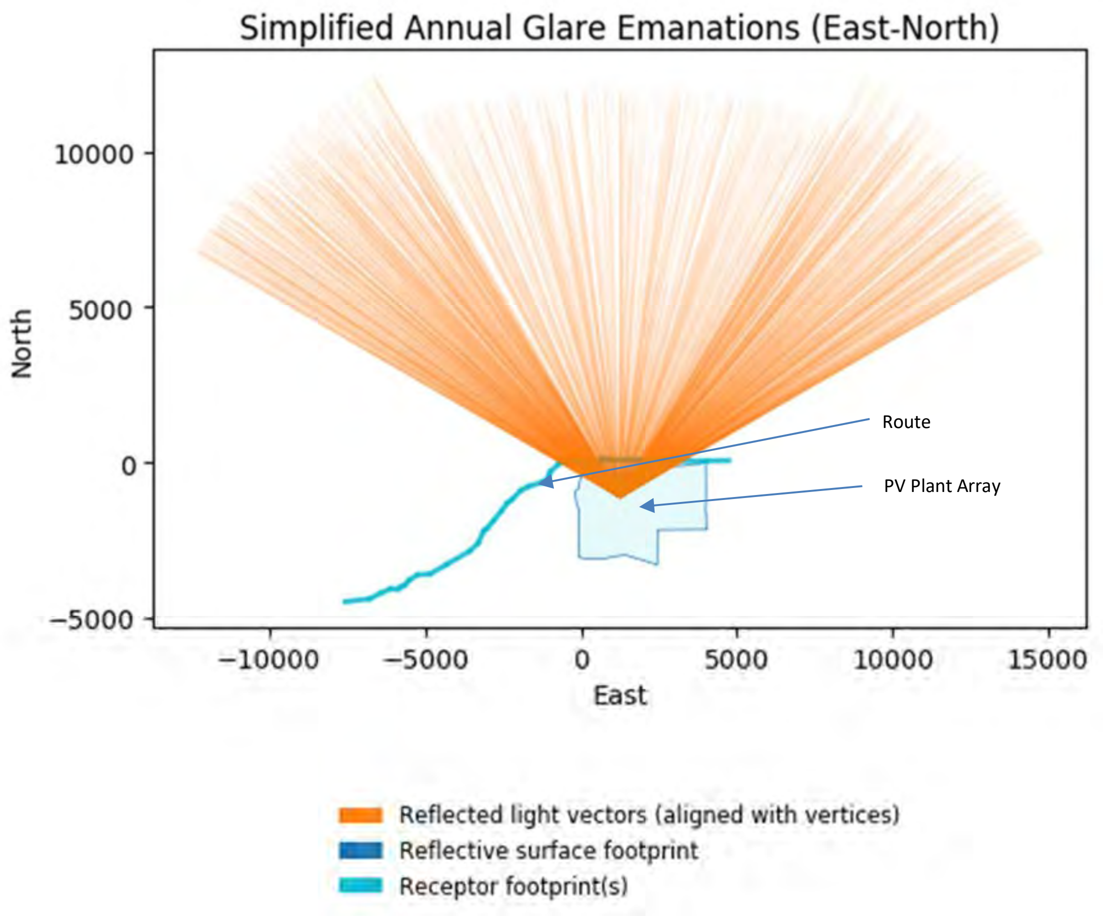


Figure 9: Route glare plot

4.4 Modelling Inputs

Robertstown Solar is located around 6 km north-east of the town of Robertstown in South Australia. The project area centre coordinates are approximately 33° 56.526’ S, 139° 8.514’ E with a typical ground elevation of 336 m above sea level. The SGHAT model uses Google Maps to determine site boundaries, elevation and Observation Points and Routes for the calculation and then simulates the sun path during the day and year for the chosen location or route. A number of inputs is required to compute the solar calculation. The input data shown in Table 4 has been used for all calculations.

Input	Unit	Value	Comment
Time zone	h UTC	9	SA time zone[10]
Peak DNI	kW/m²	1,000	Typical peak irradiance based on generic data
Solar panel surface material	-	Smooth glass with Anti Reflective Coating	Industry practice
Time interval	min	1	
Single axis tracking			
Tilt of tracking axis	deg	90	Horizontal tracking axis
Orientation of tracking axis	deg	0	North
Offset angle of panel	deg	0	Angle between tracking axis and panel
Tracking range	deg	-60 ... 0 ... +60	Range of tracking system
Height of panel above ground	m	3	Centre of tracking axis above ground

Table 4: Modelling Inputs

The average height of the panels above ground was estimated to be 3 m based on client input and a design assumption for solar plants using tables with 2 rows of modules per module table.

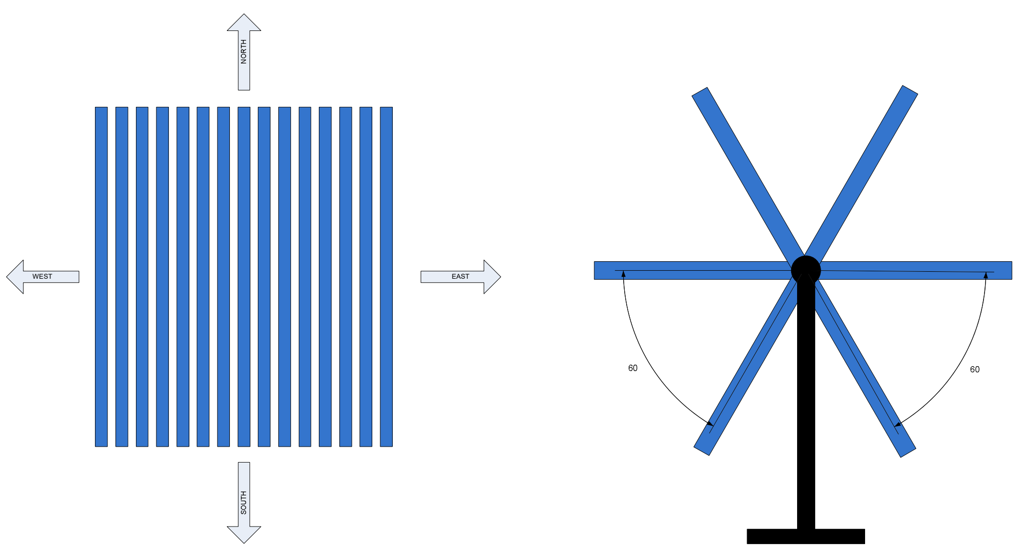


Figure 10: Depiction of input parameters (Panel Orientation and tracking system)

[10] Partial time zones are not possible, only full hours

4.5 Observation Point locations

The observer locations (OP) are described in Table 5 and shown as yellow markers in Figure 12. The points were chosen to represent houses in the area. Glare was calculated for typical viewing heights of 1.5 m.

Route locations (RO) are shown as blue lines in Figure 11. Routes were chosen to represent potential areas where drivers can be confronted with glint and glare when driving on the road. Glare was calculated for a typical viewing height of 1.5 m.

5 RESULTS

5.1 Project Area

Robertstown Solar is located approximately 6 km north-east of the town of Robertstown in South Australia. For calculation purposes the project area has been split into two blocks, in the following called “Western Block” and “Eastern Block”. The entire project area occupies an area of approx. 1,800 ha. Elevation of the site is approx. 330 m above mean sea level.

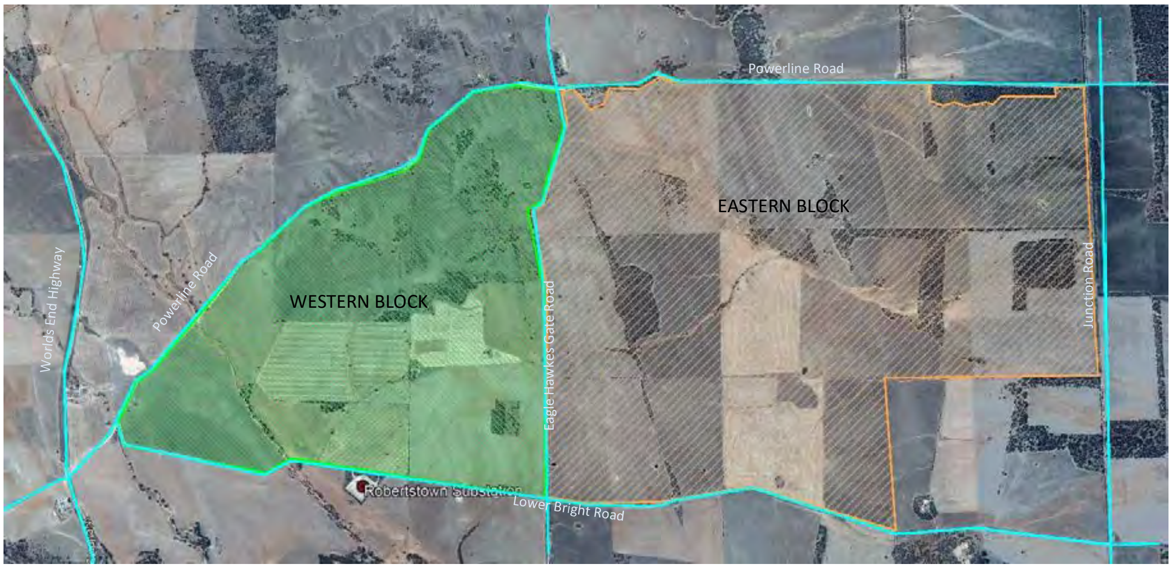


Figure 11: Robertstown Solar Project Area (Road sections marked as blue lines)

Figure 12: Observation Points

Observation Point	Latitude (deg)	Longitude (deg)	Elevation (m)	Height above ground (m)
OP 1	-33.949198	139.104055	338.93	1.5
OP 2	-33.957677	139.103663	328.26	1.5
OP 3	-33.961797	139.106892	316.41	1.5
OP 4	-33.961833	139.102934	319.68	1.5
OP 5	-33.962229	139.103255	319.1	1.5
OP 6	-33.963688	139.104355	321.71	1.5
OP 7	-33.963145	139.102553	321.42	1.5
OP 8	-33.962496	139.102327	320.24	1.5
OP 9	-33.964391	139.099291	324.25	1.5
OP 10	-33.965485	139.098240	326.66	1.5
OP 11	-33.963973	139.096051	327.55	1.5
OP 12	-33.969783	139.096448	332.18	1.5
OP 13	-33.968662	139.096689	331.11	1.5
OP 14	-33.960654	139.084163	339.67	1.5
OP 15	-33.960725	139.090730	332.66	1.5
OP 16	-33.958767	139.094935	334.6	1.5
OP 17	-33.926279	139.098461	362.41	1.5
OP 18	-33.921364	139.101358	376.44	1.5
OP 19	-33.923554	139.093311	371.48	1.5
OP 20	-33.928140	139.137006	327.63	1.5
OP 21	-33.926546	139.160245	288.79	1.5
OP 22	-33.957191	139.171854	273.3	1.5
OP 23	-33.959258	139.186949	243.48	1.5
OP 24	-33.958032	139.208541	222.89	1.5
OP 25	-33.961863	139.143154	301.11	1.5
OP 26	-33.955656	139.127393	308.49	1.5
OP 27	-33.973964	139.163228	272.88	1.5

Table 5: Observation Points

The following roads were assessed as Routes (RO)

Worlds End Highway		Powerline Road	
Junction Road		Eagle Hawkes Gate Road	
Lower Bright Road			

Table 6: Routes

5.2 Calculation Results

The PVS solar panels will operate as single axis tracking system. Only this operation has therefore been assessed.

Observation Point	Green Glare (min)	Yellow Glare (min)	Red Glare (min)	Summary
OP: OP 1	915	-	-	GREEN GLARE
OP: OP 2	-	-	-	NO GLARE
OP: OP 3	-	-	-	NO GLARE
OP: OP 4	-	-	-	NO GLARE
OP: OP 5	-	-	-	NO GLARE
OP: OP 6	-	-	-	NO GLARE
OP: OP 7	-	-	-	NO GLARE
OP: OP 8	-	-	-	NO GLARE
OP: OP 9	-	-	-	NO GLARE
OP: OP 10	-	-	-	NO GLARE
OP: OP 11	-	-	-	NO GLARE
OP: OP 12	-	-	-	NO GLARE
OP: OP 13	-	-	-	NO GLARE
OP: OP 14	-	-	-	NO GLARE
OP: OP 15	-	-	-	NO GLARE
OP: OP 16	-	-	-	NO GLARE
OP: OP 17	2,373	-	-	GREEN GLARE
OP: OP 18	720	-	-	GREEN GLARE
OP: OP 19	1,098	-	-	GREEN GLARE
OP: OP 20	10,413	-	-	GREEN GLARE
OP: OP 21	3,742	-	-	GREEN GLARE
OP: OP 22	311	-	-	GREEN GLARE
OP: OP 23	-	-	-	NO GLARE
OP: OP 24	-	-	-	NO GLARE
OP: OP 25	-	-	-	NO GLARE
OP: OP 26	-	-	-	NO GLARE
OP: OP 27	-	-	-	NO GLARE
RO: Worlds End Highway	-	-	-	NO GLARE
RO: Powerline Road	243	-	-	GREEN GLARE
RO: Eagle Hawkes Gate Road	-	-	-	NO GLARE
RO: Junction Road	616	-	-	GREEN GLARE
RO: Lower Bright Road	238	-	-	GREEN GLARE

Table 7: Results

No YELLOW GLARE or RED GLARE has been calculated and therefore no issues with glare are expected. Only some observation points and minor roads experience limited GREEN GLARE. When factoring in existing vegetation it is likely that most if not all glare will be sufficiently screened. Therefore any GREEN GLARE calculated is considered acceptable.

Consequently no mitigation measures will be required for Robertstown Solar.

5.3 Air Traffic

The Australian Civil Aviation Safety Authority (CASA) provides guidelines to planning authorities in relation to referring solar projects for assessment to ensure there is no likelihood of any Glare and Glint issues for pilots on approach to or on departure from an airport or as impact on traffic controllers.

Robertstown Solar is more than 50 km from any commercial airport. It is therefore considered unlikely that any Glint or Glare issues will be created for pilots on approach to or departure.

CASA only requires an assessment for any solar farm within a distance of around 5 nautical miles from an airport and therefore no calculation for potential glint and glare issues with respect to air traffic was performed.

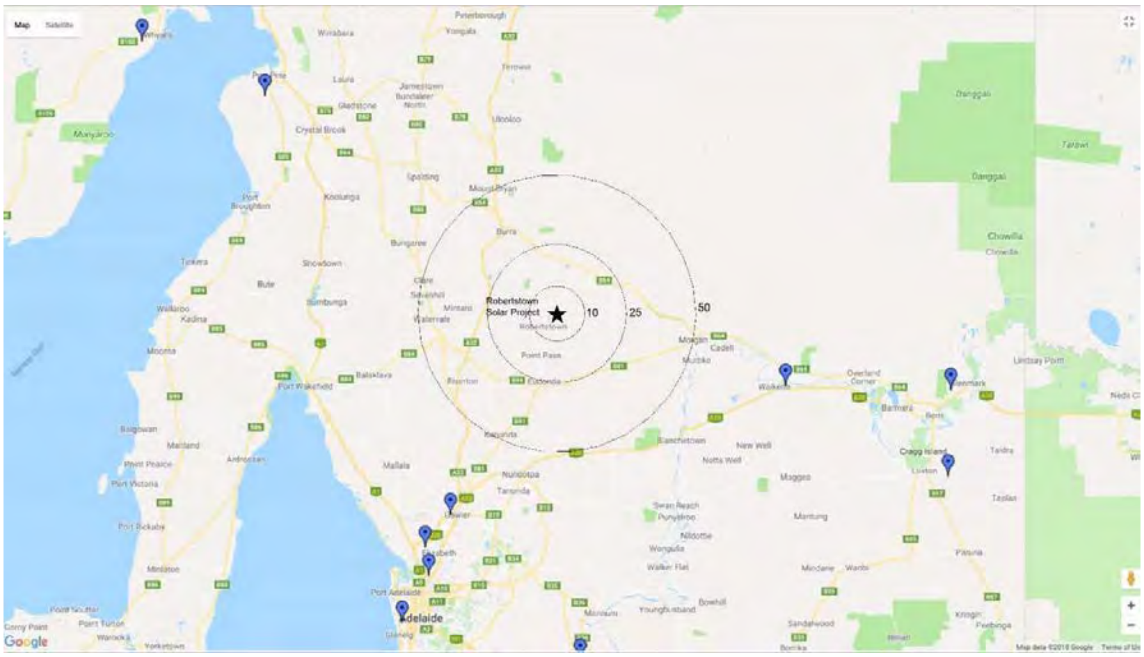


Figure 13: Map of Airports in South Australia[11]

[11] Airports marked as purple flags
Source: https://tools.wmflabs.org/wp-world/googlmaps-proxy.php?page=https:%2F%2Ftools.wmflabs.org%2Fkmlexport%3Farticle%3DList_of_airports_in_South_Australia&output=classic,

6 CONCLUSIONS

With single axis tracking systems only GREEN GLARE can be expected. When existing vegetation is factored in then all GREEN GLARE will be substantially ameliorated.

Therefore no mitigation measures are considered to be required when using horizontal axis tracking systems.

7 OBSERVATION POINTS

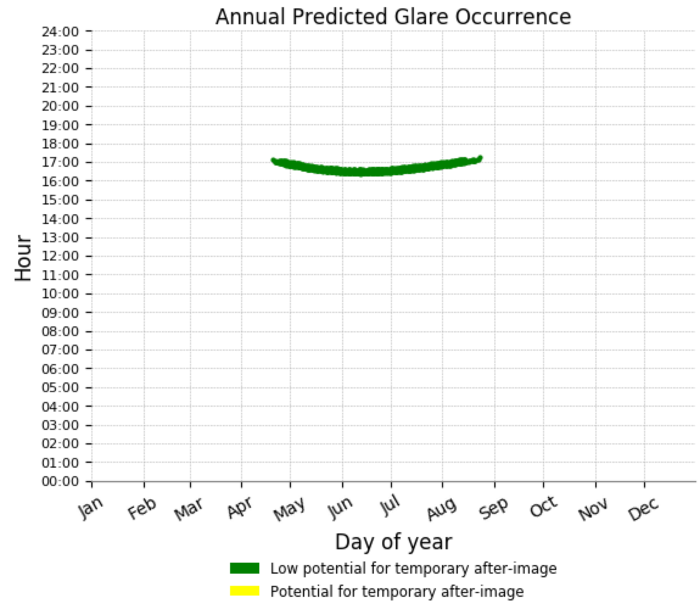
In the following section observation points and routes with calculated glare impact are shown.

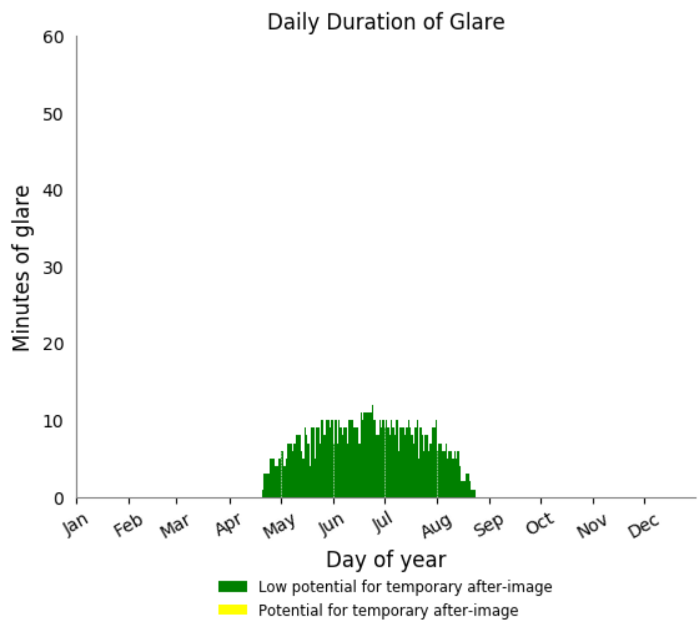
7.1 OP01 – Worlds End Highway

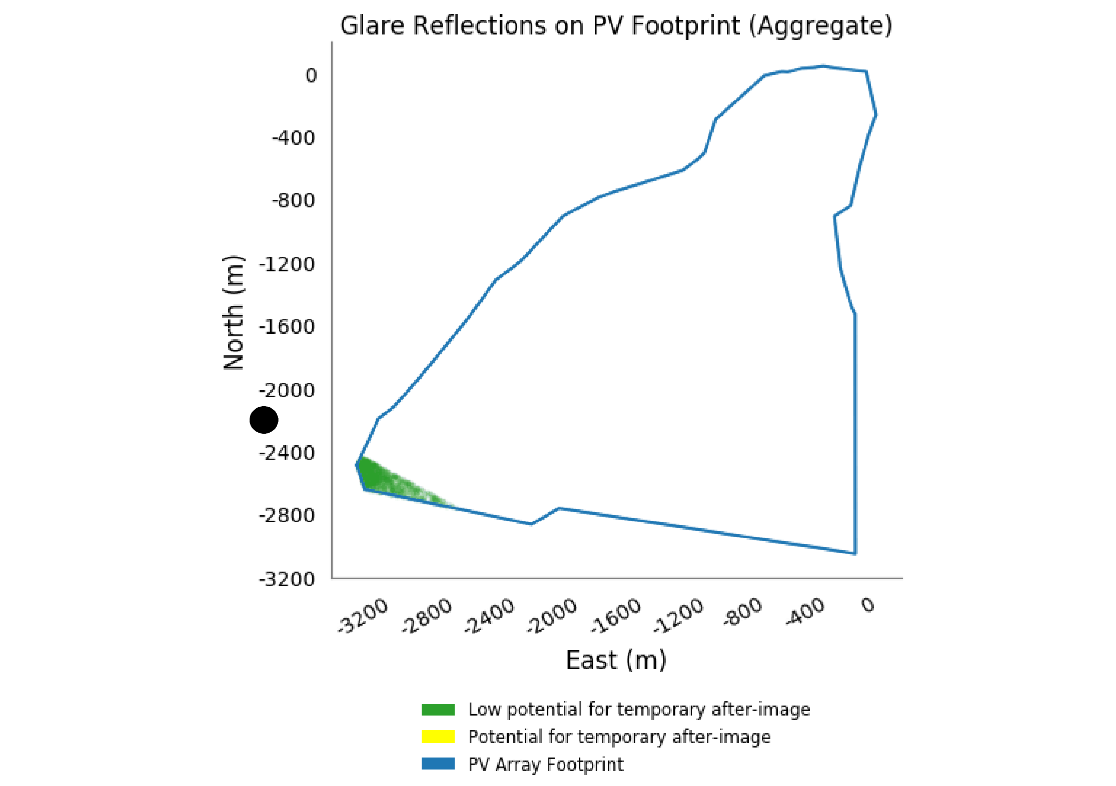
House OP01 experiences approximately 15 hours per year of glare for a maximum of 10 min per day in the late afternoon hours. The house is surrounded by trees so glare is not considered to impact residents.

Figure 14: OP01 - Worlds End Highway House[12]

[12] Photo taken from Google Earth™ Street View


Annual Predicted Glare Occurrence
Hour
24:00
23:00
22:00
21:00
20:00
19:00
18:00
17:00
16:00
15:00
14:00
13:00
12:00
11:00
10:00
09:00
08:00
07:00
06:00
05:00
04:00
03:00
02:00
01:00
00:00
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image



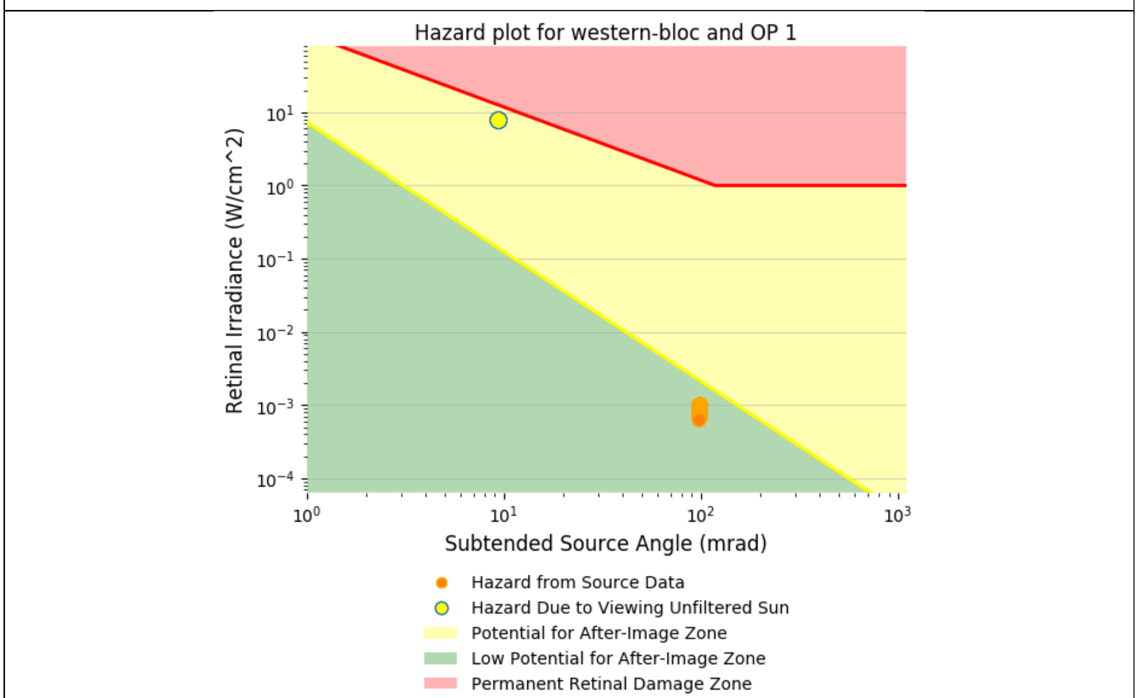
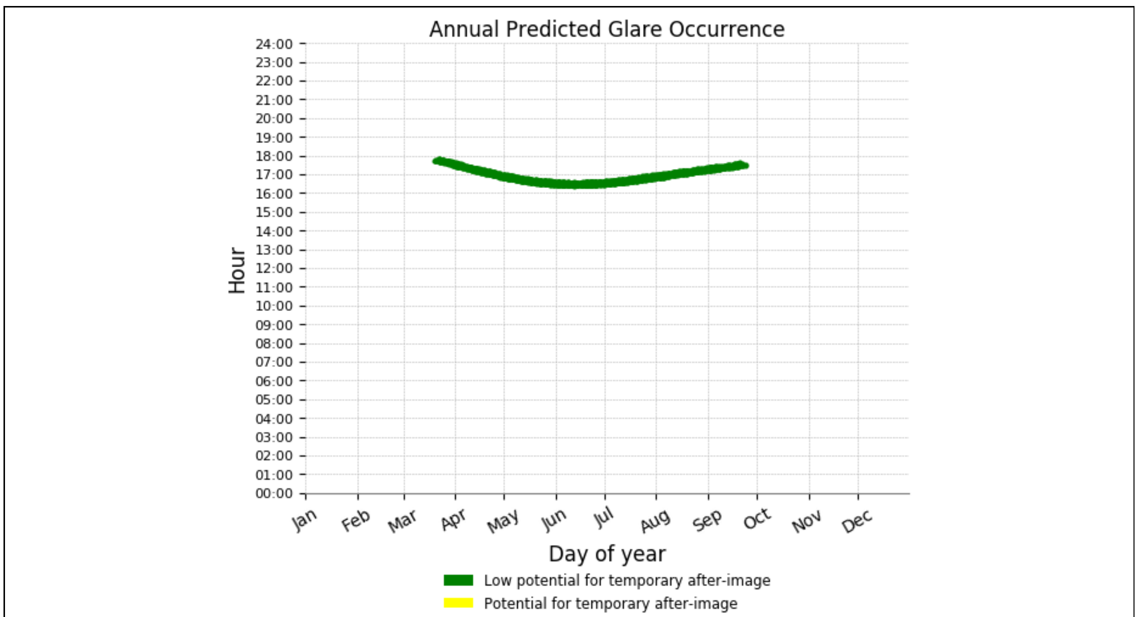


Table 8: SGHAT Results OP01

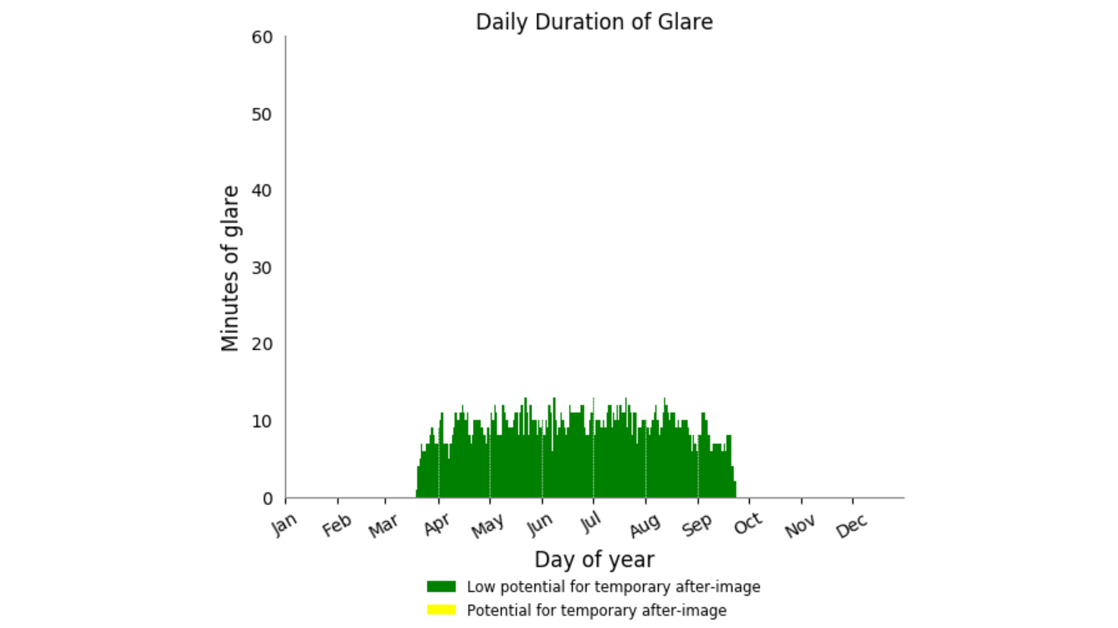
7.2 OP17 – Worlds End Highway

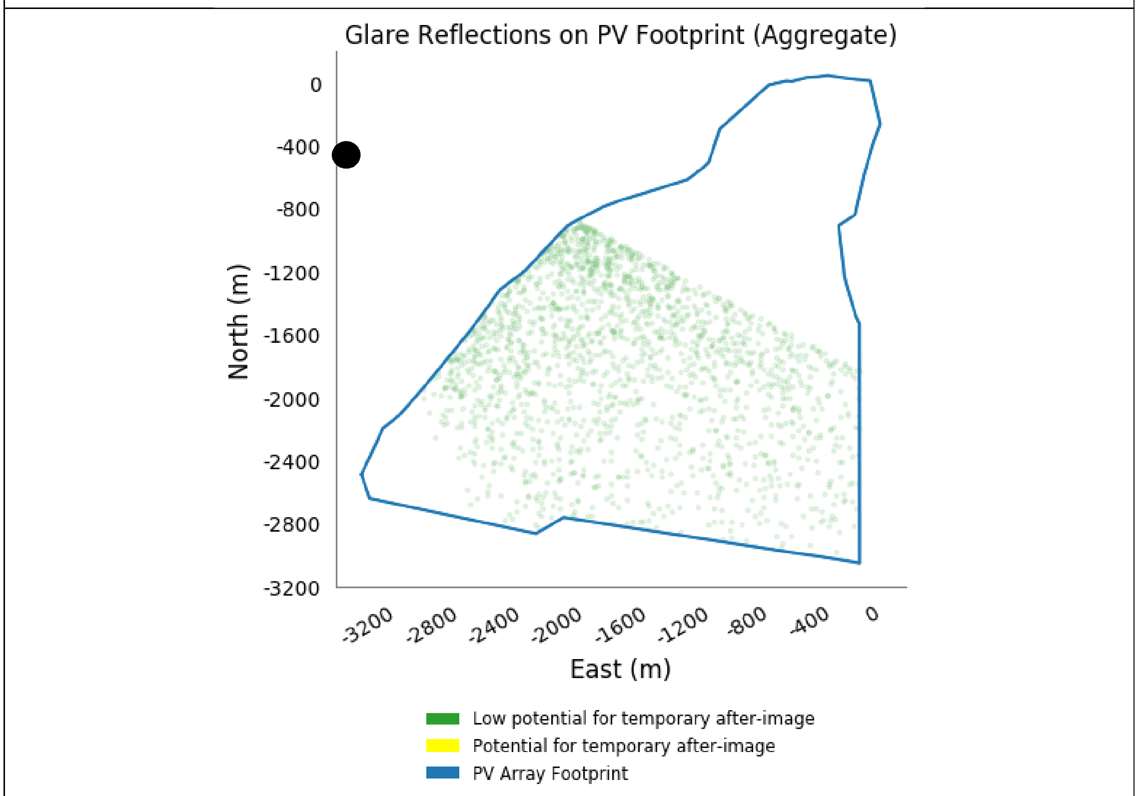
House OP17 experiences approximately 40 hours per year of glare for a maximum of 10 min per day in the late afternoon hours. The house is surrounded by trees so glare is not considered to impact residents.

Figure 15: OP17 - Worlds End Highway House[13]



[13] Photo taken from Google Earth™ Street View


Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Glare Reflections on PV Footprint (Aggregate)
North (m)
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
-3200
-2800
-2400
-2000
-1600
-1200
-800
-400
0
East (m)
Low potential for temporary after-image
Potential for temporary after-image
PV Array Footprint

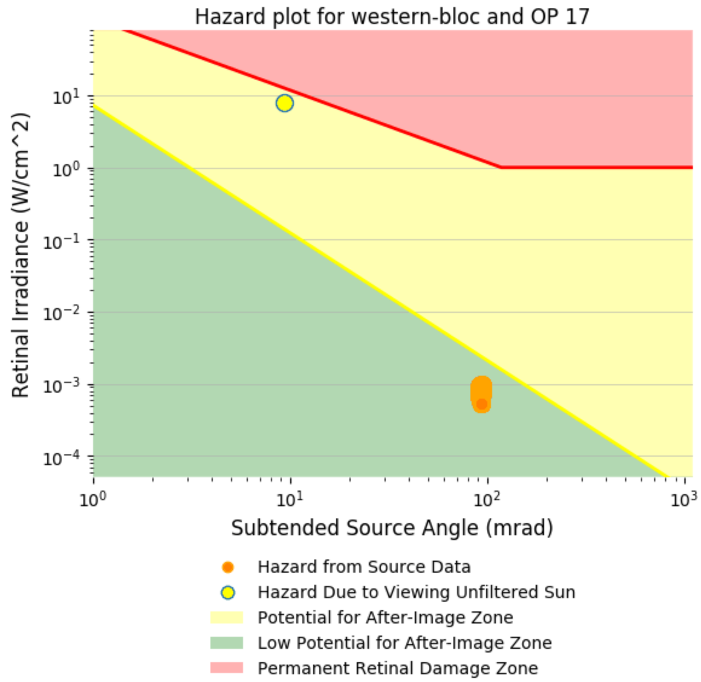
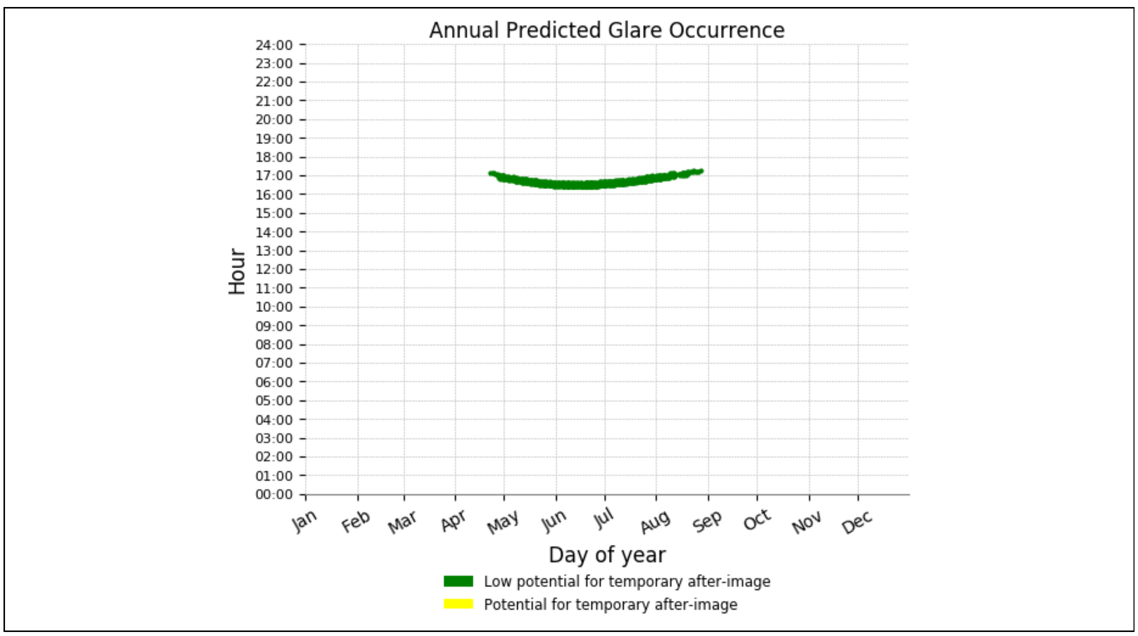


Table 9: SGHAT Results OP17 (only western block shown)

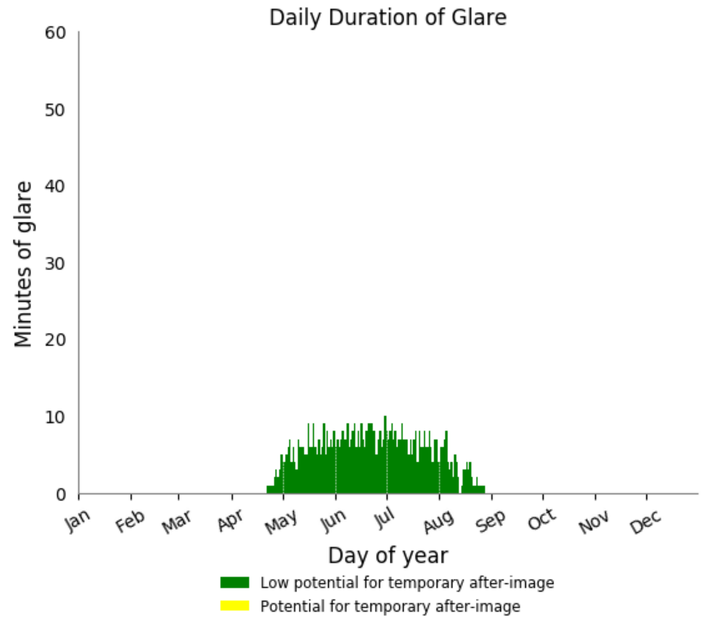
7.3 OP18 – Worlds End Highway

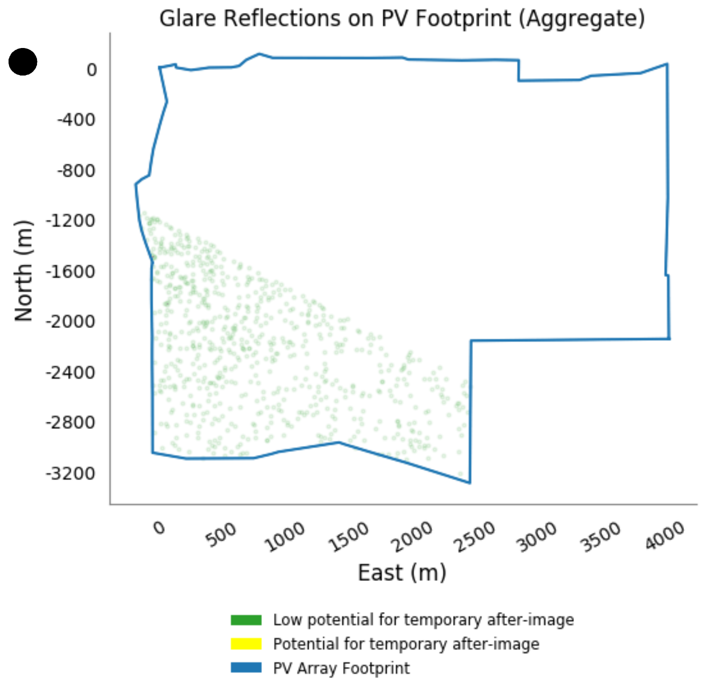
House OP18 experiences approximately 720 min per year of glare for a maximum of 10 min per day in the late afternoon hours. The house is surrounded by trees towards the PVS solar panels so glare is not considered to impact residents.

Figure 16: OP18 - Worlds End Highway House[14]



[14] Photo taken from Google Earth™ Street View


Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Glare Reflections on PV Footprint (Aggregate)
North (m)
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
0
500
1000
1500
2000
2500
3000
3500
4000
East (m)
Low potential for temporary after-image
Potential for temporary after-image
PV Array Footprint

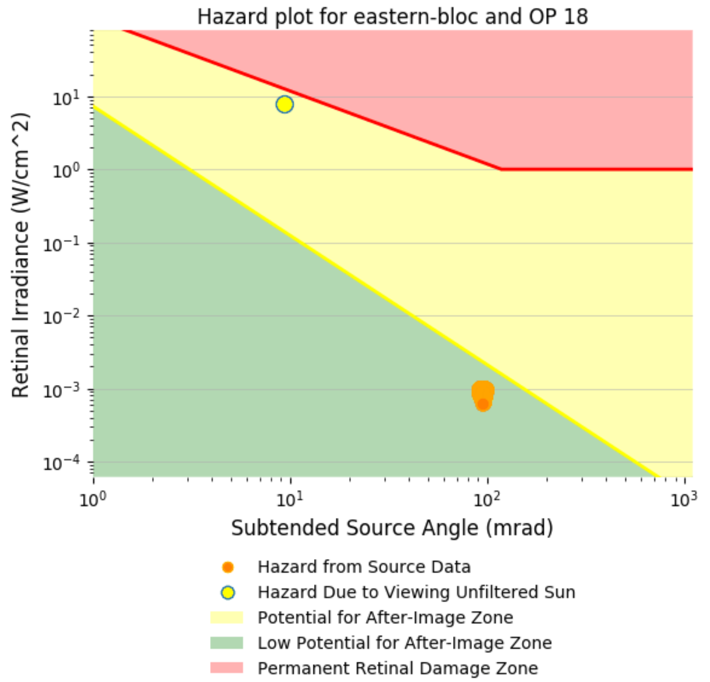
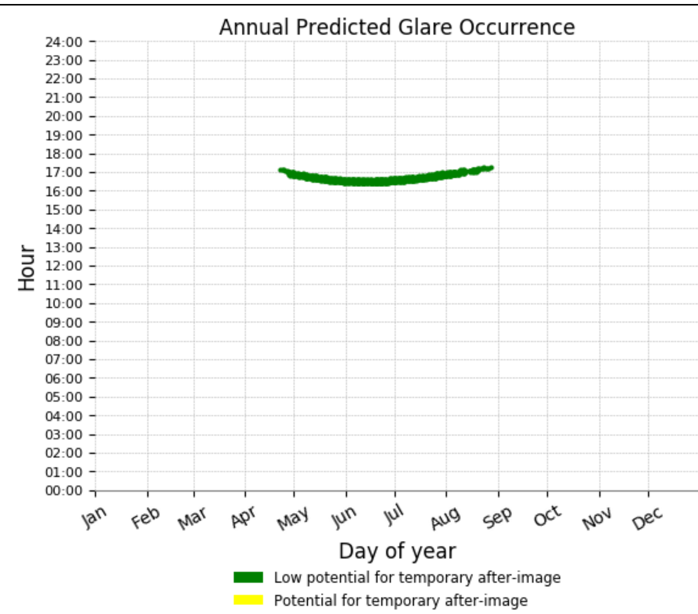


Table 10: SGHAT Results OP18 (only eastern block shown)

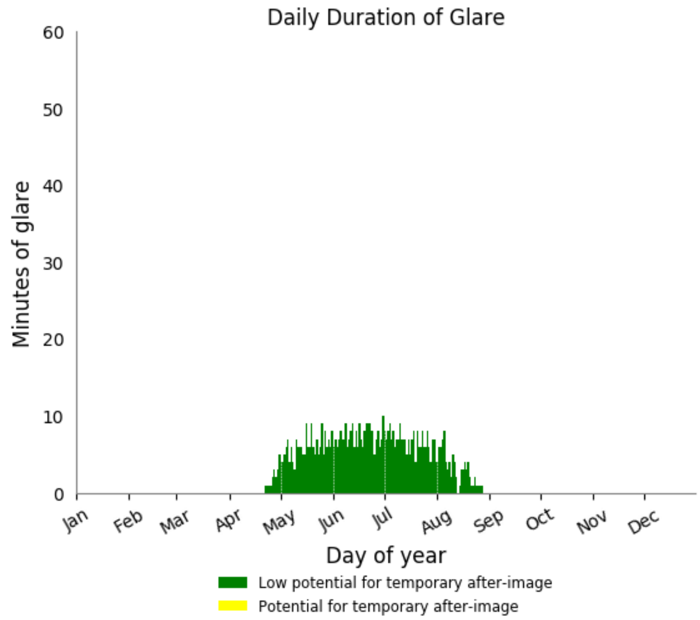
7.4 OP19 – Worlds End Highway

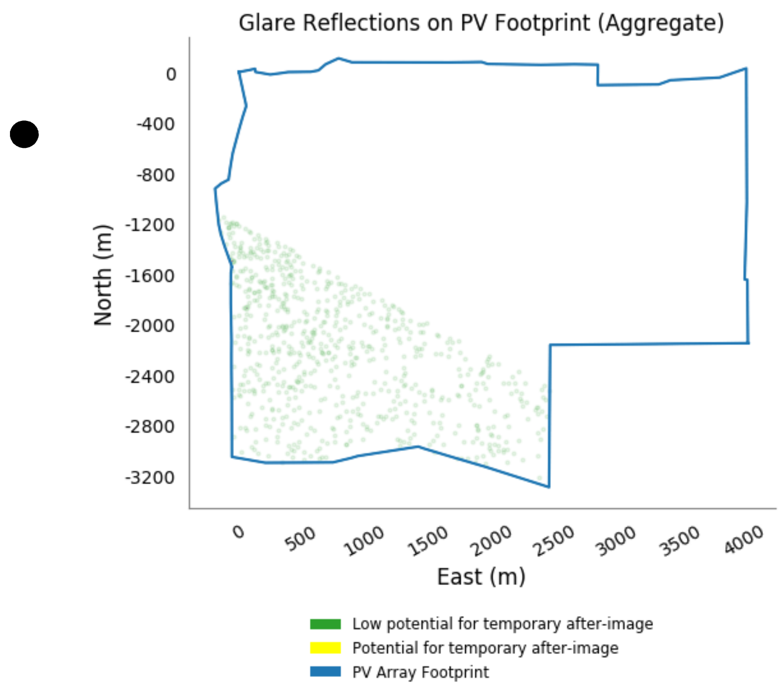
House OP19 experiences approximately 720 min per year of glare for a maximum of 10 min per day in the late afternoon hours. The house is surrounded by trees towards the PVS solar panels so glare is not considered to impact residents.

Figure 17: OP19 - Worlds End Highway House[15]



15 Photo taken from Google Earth™ Street View


Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Glare Reflections on PV Footprint (Aggregate)
North (m)
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
0
500
1000
1500
2000
2500
3000
3500
4000
East (m)
Low potential for temporary after-image
Potential for temporary after-image
PV Array Footprint

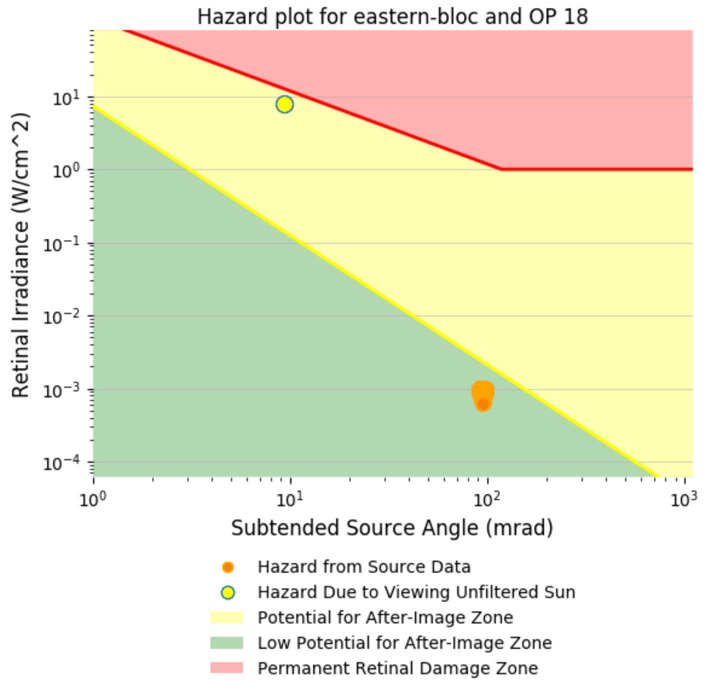
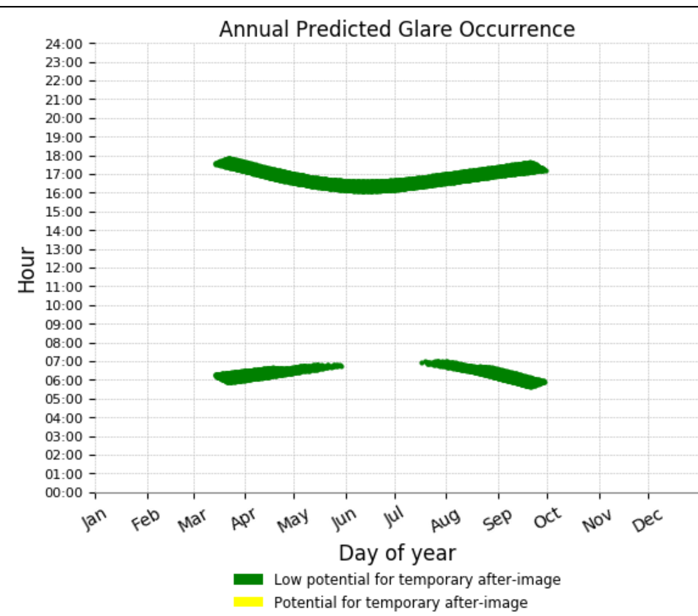


Table 11: SGHAT Results OP19 (only eastern block shown)

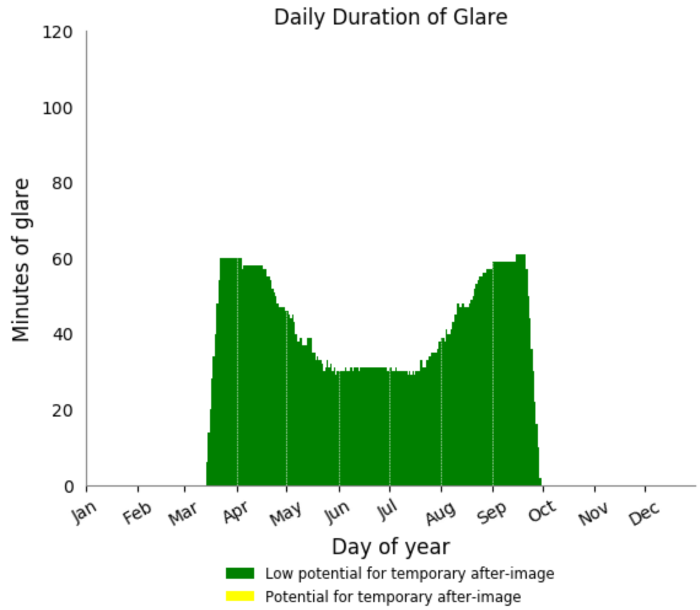
7.5 OP20 – Powerline Road

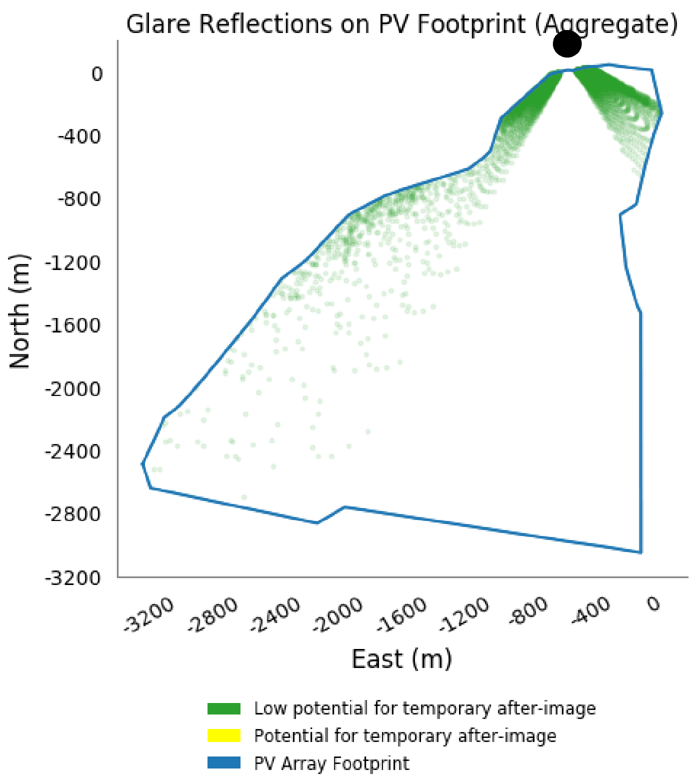
House OP20 experiences approximately 174 h per year of glare for a maximum of 60 min per day in the early morning and late afternoon hours. The house is surrounded by trees towards the PVS solar panels so glare is not considered to impact residents.

Figure 18: OP20 – Powerline Road House[16]



[16] Photo taken from Google Earth™


Daily Duration of Glare
Minutes of glare
120
100
80
60
40
20
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Glare Reflections on PV Footprint (Aggregate)
North (m)
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
-3200
-2800
-2400
-2000
-1600
-1200
-800
-400
0
East (m)
Low potential for temporary after-image
Potential for temporary after-image
PV Array Footprint

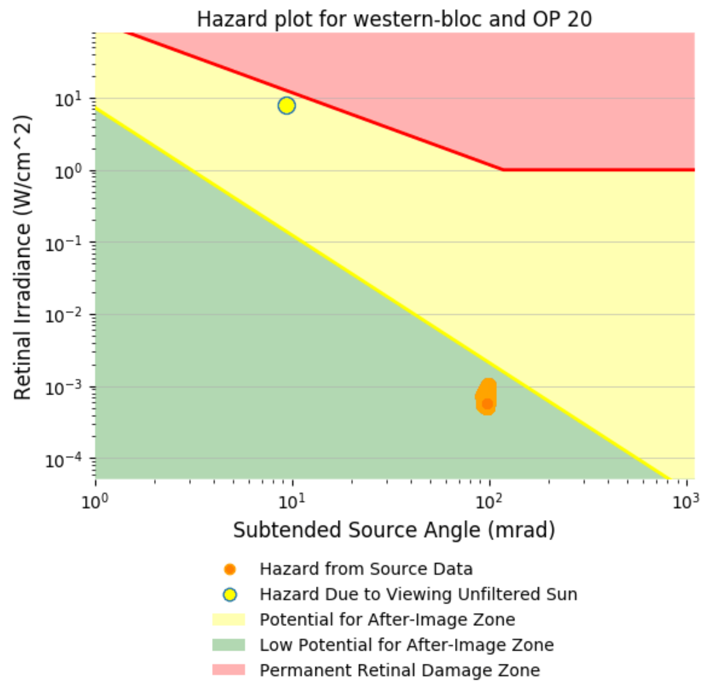
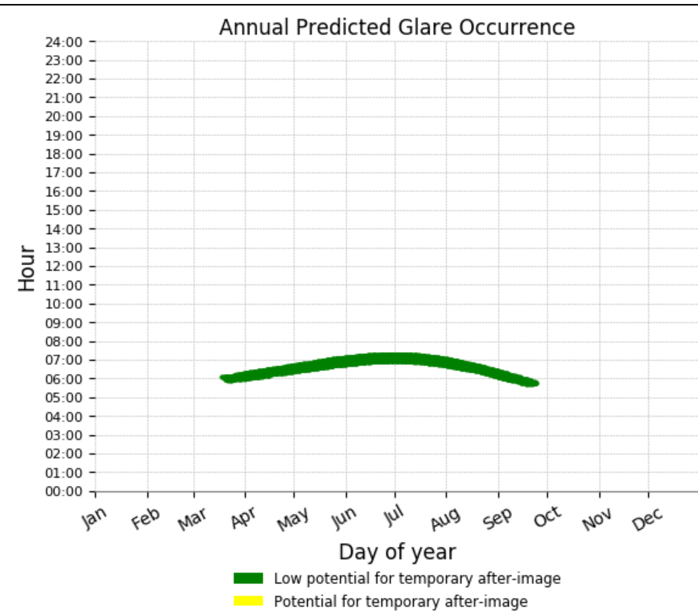


Table 12: SGHAT Results OP20 (only western block shown)

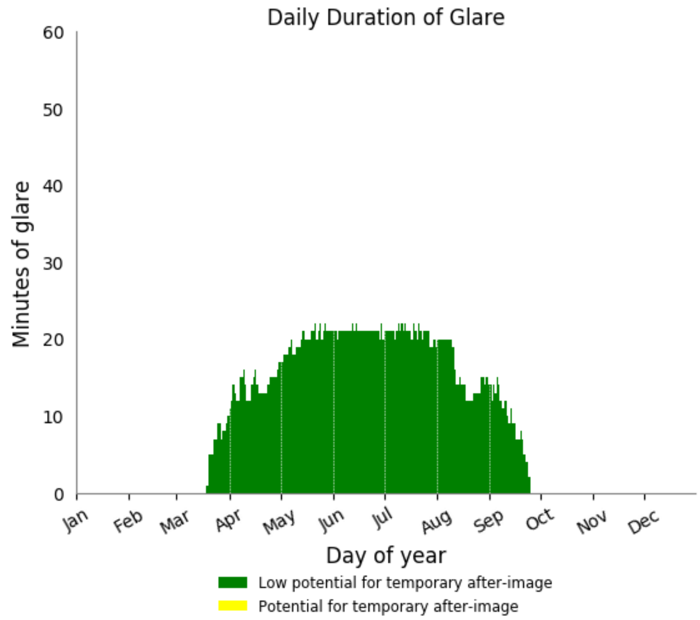
7.6 OP21 – Powerline Road

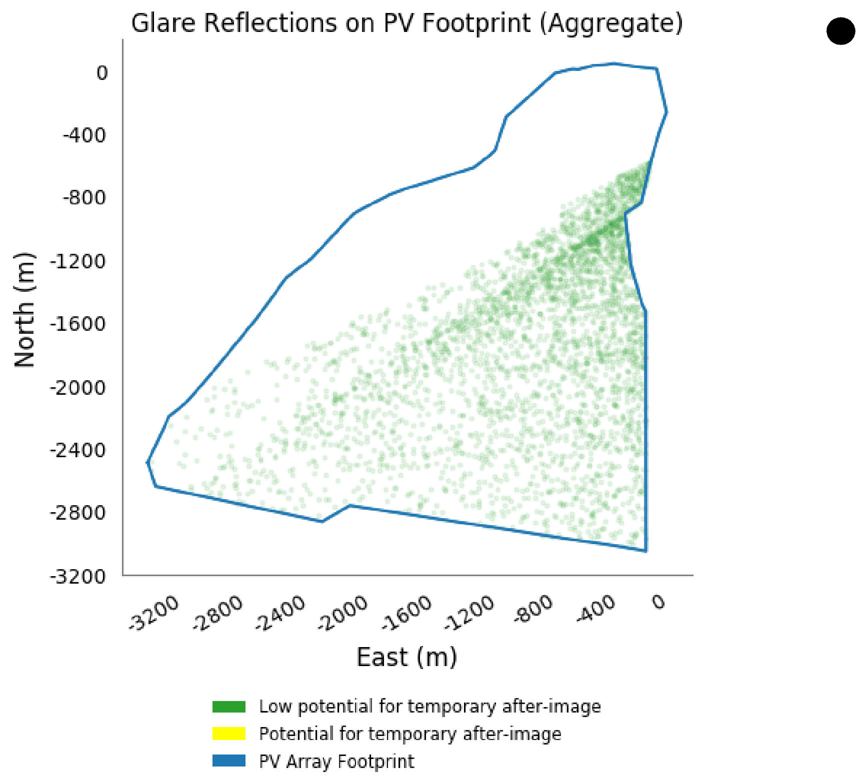
House OP21 experiences approximately 62 h per year of glare for a maximum of 20 min per day in the early morning and late afternoon hours. Glare is also received from panels very distant from the house and therefore may not be considered as intensive as from close by panels. The house is surrounded by trees towards the PVS solar panels so glare is considered significantly ameliorated.

Figure 19: OP21 – Powerline Road House[17]



[17] Photo taken from Google Earth™ Street View


Daily Duration of Glare
Minutes of glare
0
10
20
30
40
50
60
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Glare Reflections on PV Footprint (Aggregate)
North (m)
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
-3200
-2800
-2400
-2000
-1600
-1200
-800
-400
0
East (m)
Low potential for temporary after-image
Potential for temporary after-image
PV Array Footprint

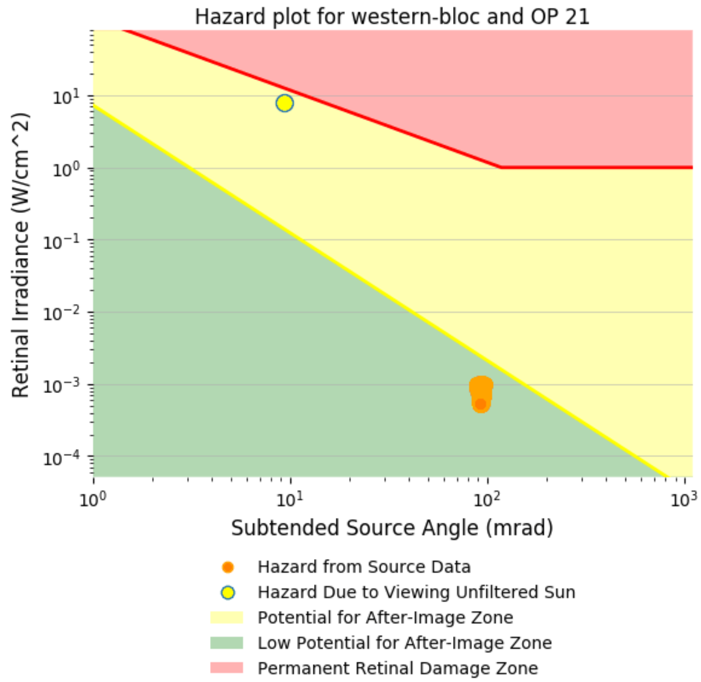
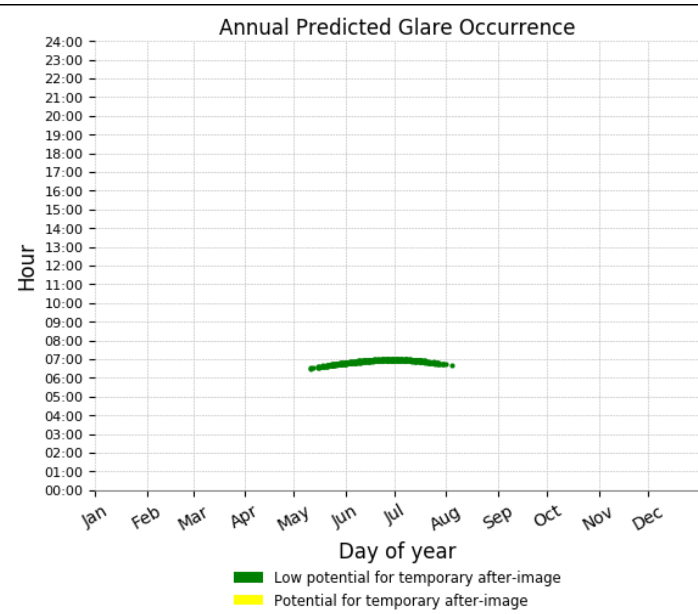


Table 13: SGHAT Results OP21 (only western block shown)

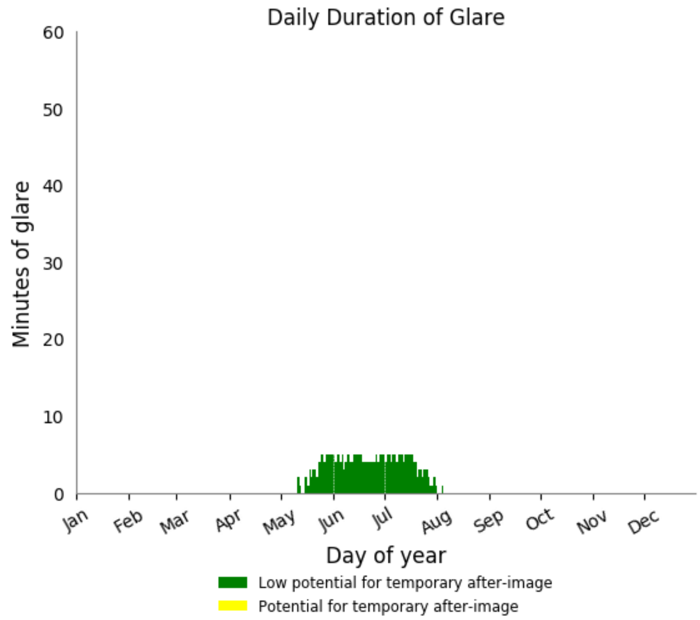
7.7 OP22 – Lower Bright Road

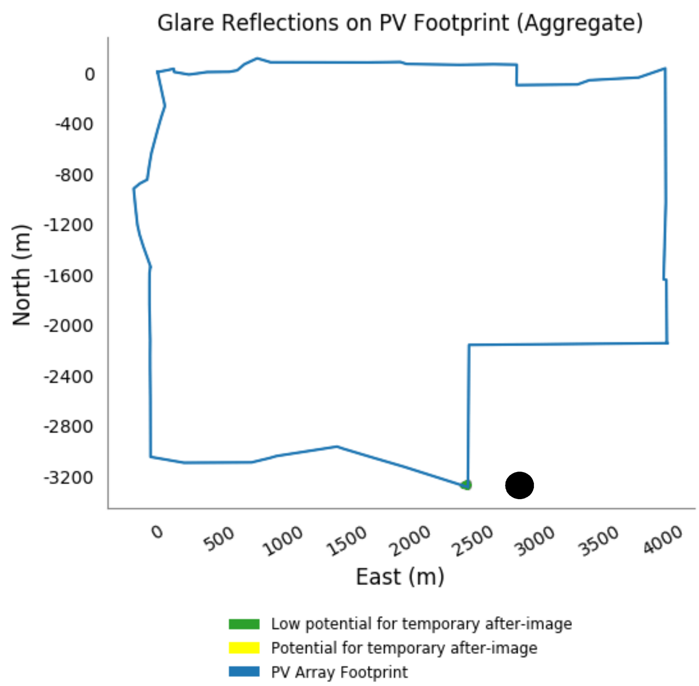
House OP22 experiences approximately 311 min per year of glare for a maximum of 5 min per day in the early morning and late afternoon hours. The house is surrounded by trees towards the PVS solar panels so glare is not considered to impact residents.

Figure 20: OP22 – Lower Bright Road House[18]



[18] Photo taken from Google Earth™


Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Glare Reflections on PV Footprint (Aggregate)
North (m)
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
0
500
1000
1500
2000
2500
3000
3500
4000
East (m)
Low potential for temporary after-image
Potential for temporary after-image
PV Array Footprint

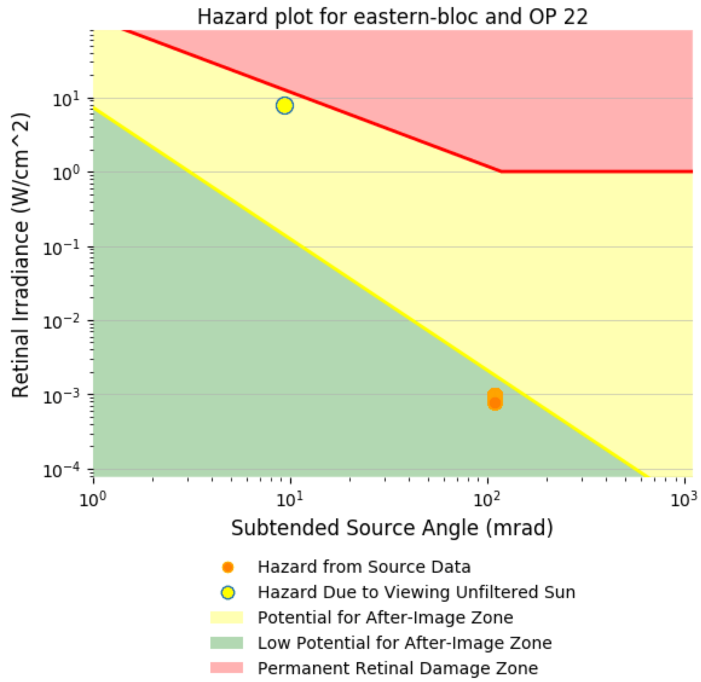
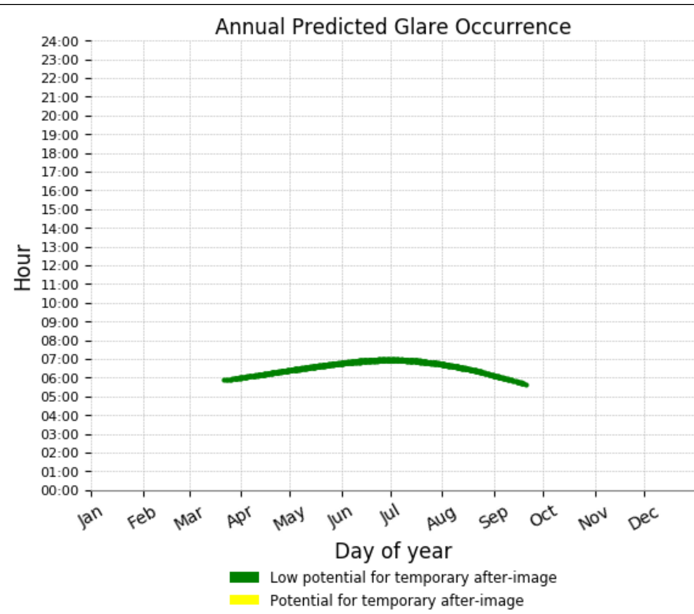


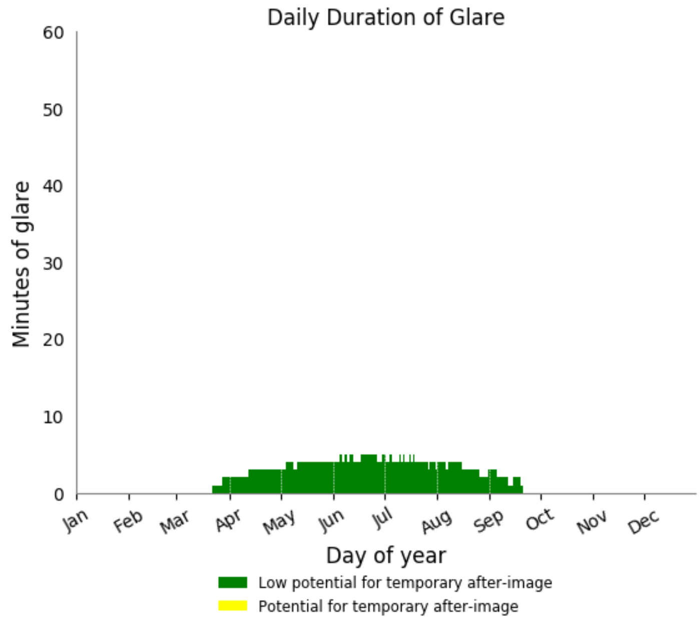
Table 14: SGHAT Results OP22 (only eastern block shown)

7.8 RO – Junction Road

Junction Road experiences approximately 10 h per year of glare for a maximum of 5 min per day in the early morning hours. This is not considered to be a concern when existing vegetation is factored in combined with the very low traffic volume.

Figure 21: Junction Road




Daily Duration of Glare
Minutes of glare
0
10
20
30
40
50
60
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image

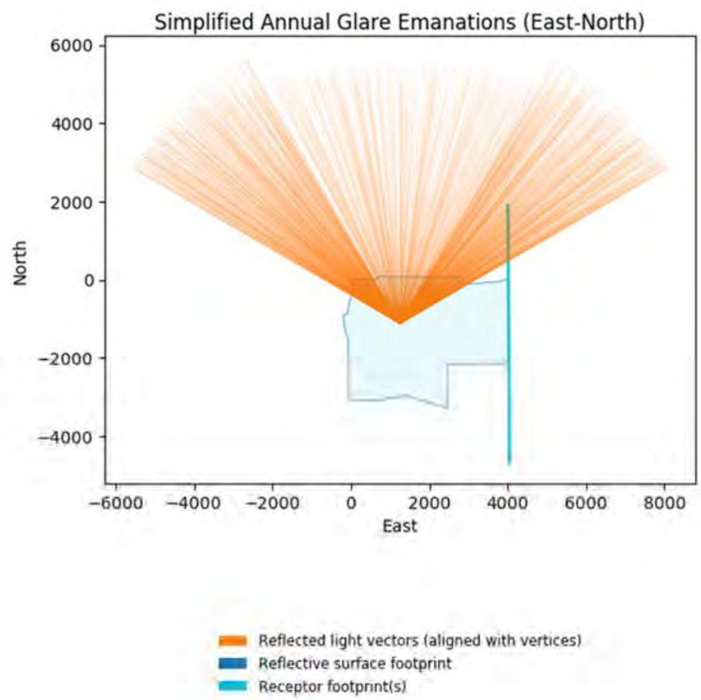
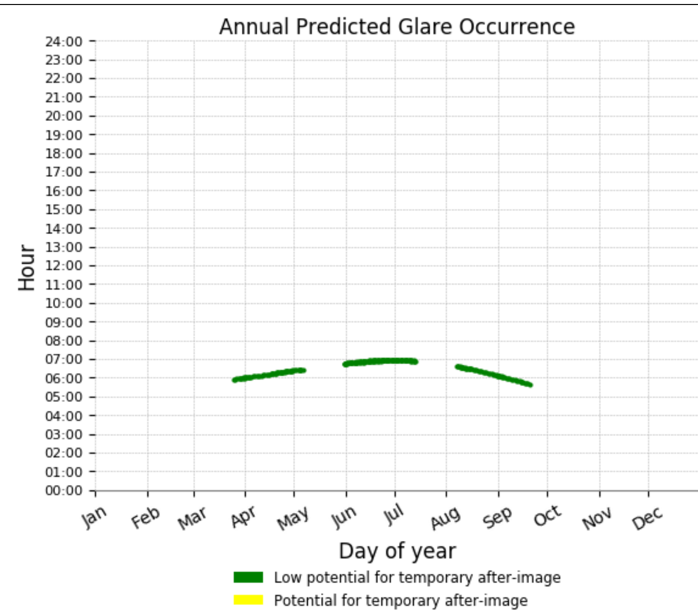

Simplified Annual Glare Emanations (East-North)
North
6000
4000
2000
0
−2000
−4000
−6000
−4000
−2000
0
2000
4000
6000
8000
East
Reflected light vectors (aligned with vertices)
Reflective surface footprint
Receptor footprint(s)

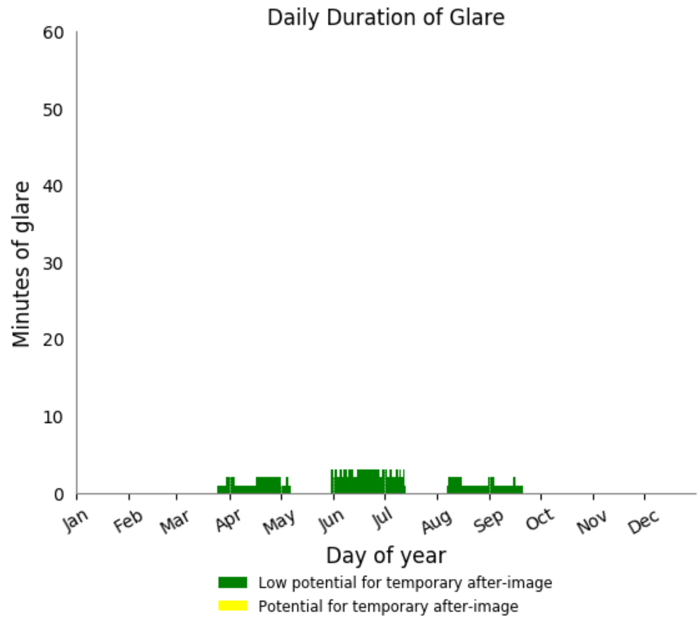
Table 15: SGHAT Results Junction Road (only eastern block shown)

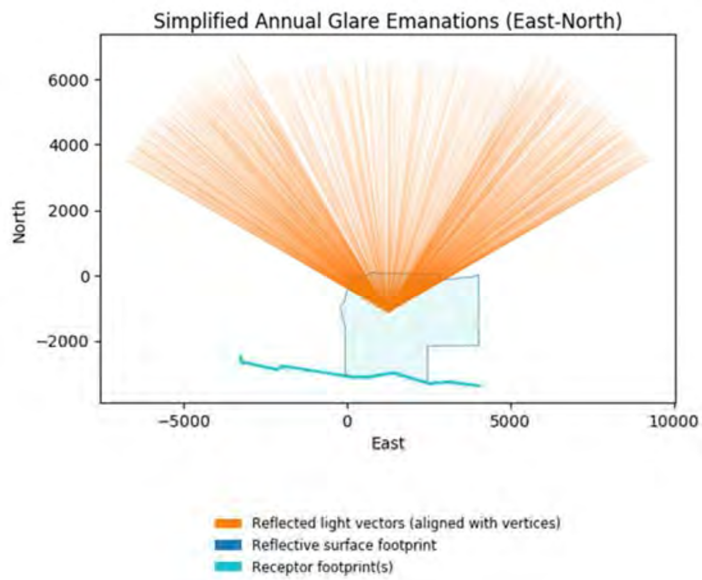
7.9 RO – Lower Bright Road

Lower Bright Road experiences approximately 6 h per year of glare for a maximum of 5 min per day in the early morning hours. This is not considered to be a concern when existing vegetation is factored in combined with the very low traffic volume.

Figure 22: Lower Bright Road




Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Simplified Annual Glare Emanations (East-North)
6000
4000
2000
0
−2000
North
−5000
0
5000
10000
East
Reflected light vectors (aligned with vertices)
Reflective surface footprint
Receptor footprint(s)

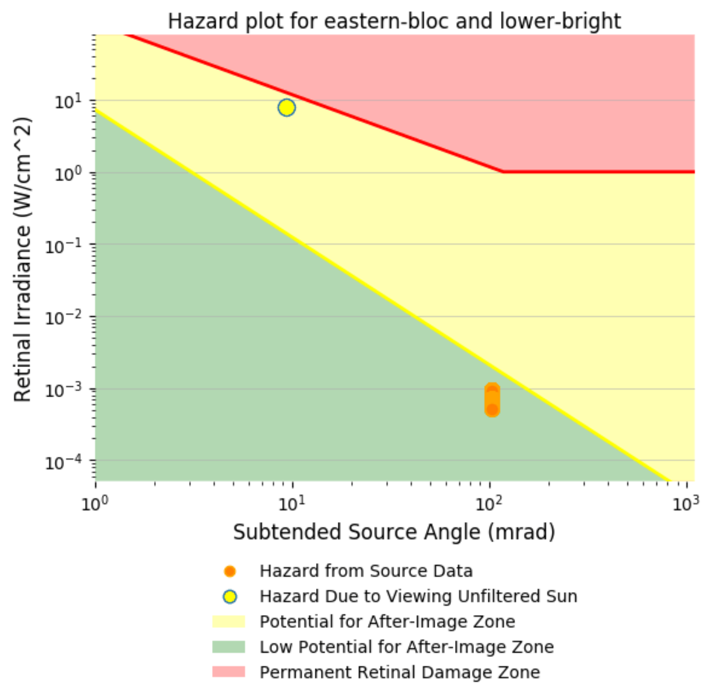
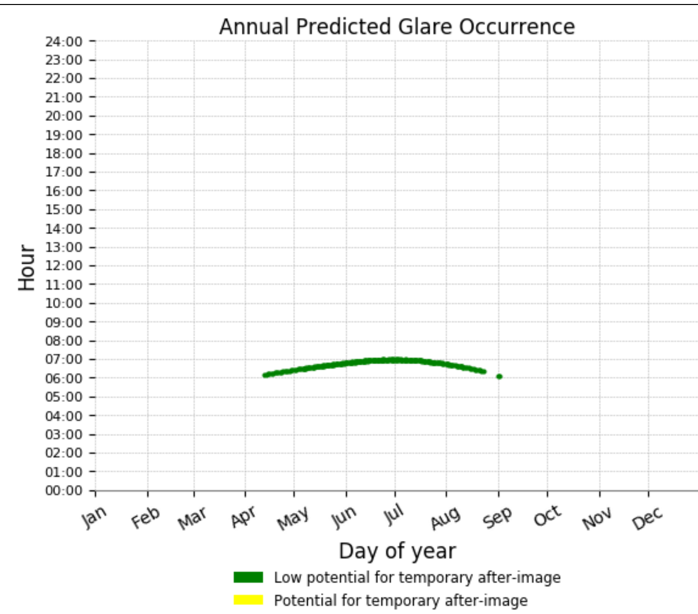


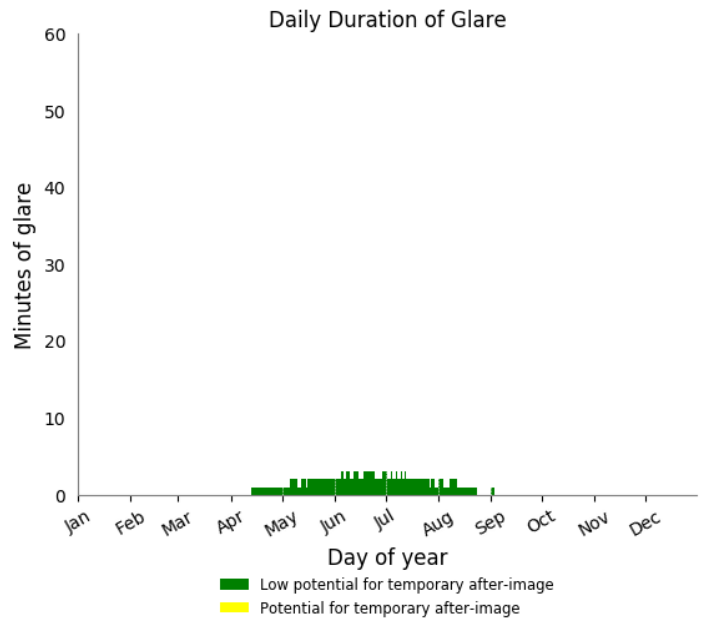
Table 16: SGHAT Results Lower Bright Road (only eastern block shown)

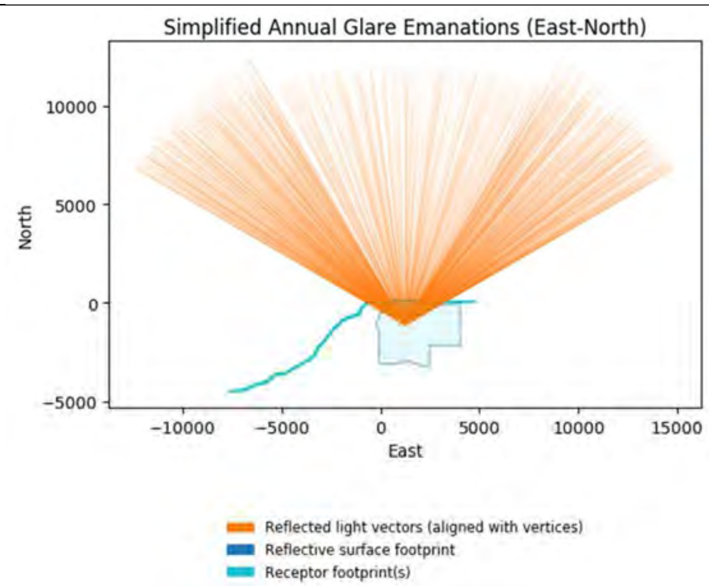
7.10 RO – Powerline Road

Powerline Road experiences approximately 6 h per year of glare for a maximum of 5 min per day in the early morning hours. This is not considered to be a concern when existing vegetation is factored in combined with the very low traffic volume.

Figure 23: Powerline Road




Daily Duration of Glare
Minutes of glare
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year
Low potential for temporary after-image
Potential for temporary after-image


Simplified Annual Glare Emanations (East-North)
North
10000
5000
0
−5000
−10000
−5000
0
5000
10000
15000
East
Reflected light vectors (aligned with vertices)
Reflective surface footprint
Receptor footprint(s)

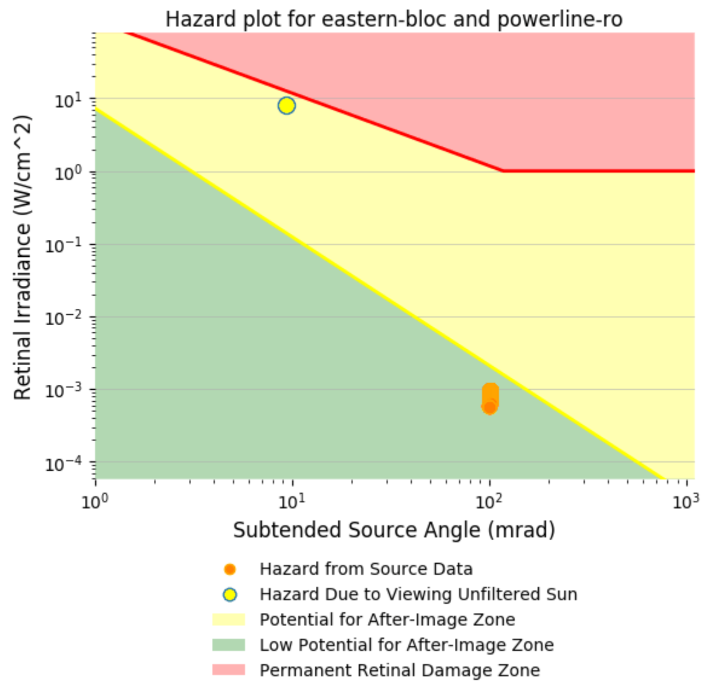
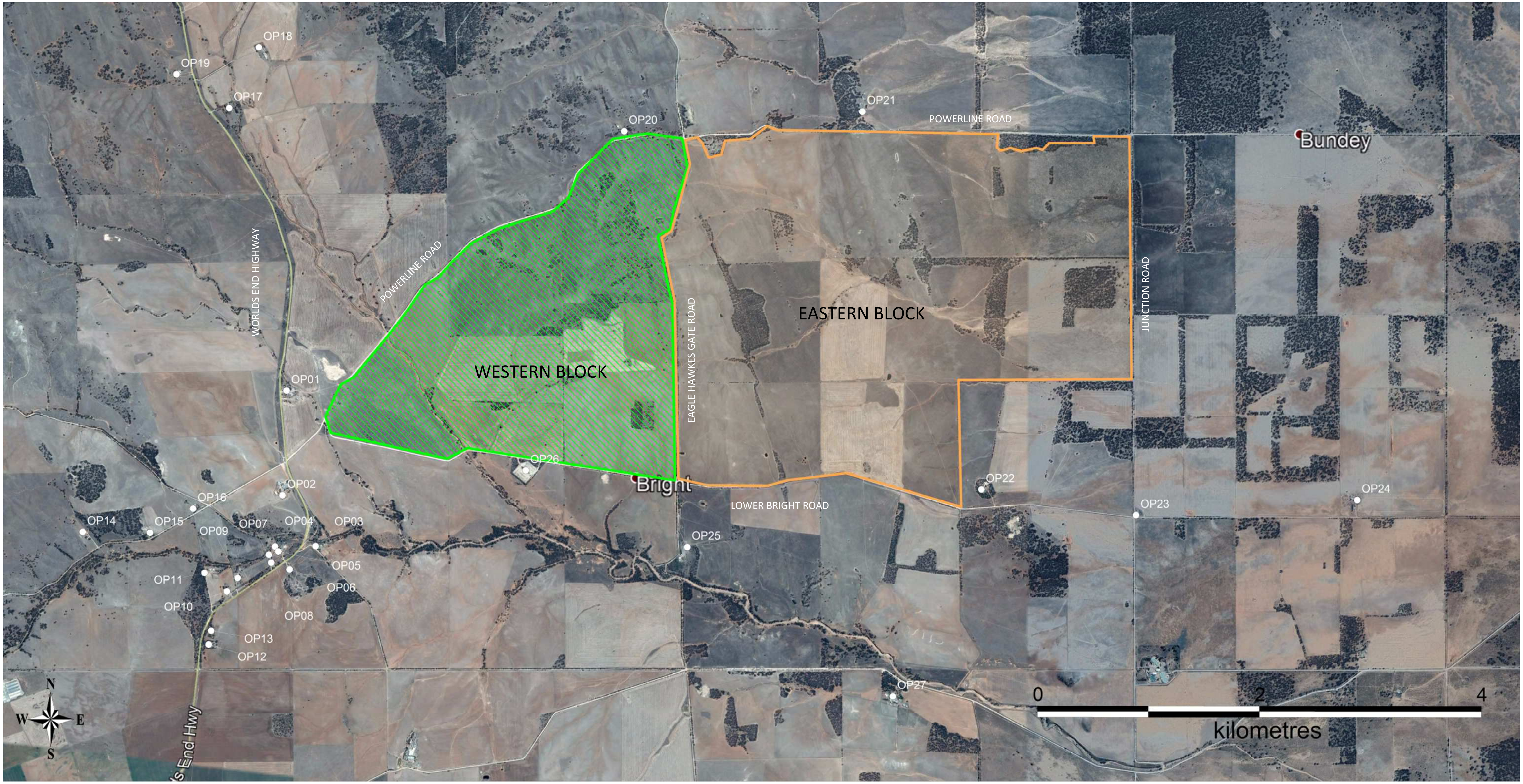


Table 17: SGHAT Results Powerline Road (only eastern block shown)



Houses Legend

Point

Blocks Legend

Region

Region

BV

CONSULTING

BV CONSULTING

NORA-PLATIEL-STR. 4, 34253 LOHFELDEN
GERMANY

PV Plant Overview

ROBERTSTOWN SOLAR

SIZE	Author	DWG NO	REV
A3	B. Voll	RPV-LAYOUT-BV20181111	0

SCALE	n/a	25-11-2018	SHEET	1 OF 1

ROBERTSTOWN SOLAR

www.robertstownsolar.com.au

3783 - Assessing - 422/V005/18 - Sharon Wyatt

DETERMINE ADDITIONAL REFERR... | EXTEND A REFERRAL | RECALL A REFERRAL

Summary | Attachments | Contacts | Invoices | Categorisation Details | Referral History | Public Notification Response | Decisions | Application Time Usage | Event History | Related Actions

REFERRAL STATUS

GENERATE EMAIL TO APPLICANT

	Referral Body	Response Type	Distribution Date	Due Date	Response Date	Status	Fee Waived Comment
☐	Regional Council of Goyder	Regard (2 months)	20/12/2018	20/02/2019	07/02/2019	Response Received	
☐	Native Vegetation Council	Crown Regard (6 weeks)	20/12/2018	12/02/2019	12/02/2019	Late Response	
☐	Essential Services Commission	Non-Mandatory (4 weeks)	20/12/2018	29/01/2019		Recalled	
☐	Commissioner of Highways	Non-Mandatory (4 weeks)	20/12/2018	29/01/2019		Recalled	
☐	DEW (Planning Applications)	Non-Mandatory (4 weeks)	20/12/2018	29/01/2019	29/01/2019	Expired	
☐	Commissioner of Highways	Non-Mandatory (4 weeks)	07/02/2019	07/03/2019		Recalled	

6 items

RESPONSE DETAILS - NATIVE VEGETATION COUNCIL

Chosen Standard Planning Conditions

None Selected

Other Authored Planning Conditions

Chosen Standard Advisory Notes

None Selected

Other Authored Advisory Notes

While the project area is located on largely developed agricultural land, some remnant native vegetation remains on site. The proposed layout of the solar project on the whole appears to avoid areas of remnant native vegetation, including Iron-grass (Lomandra spp.) Tussock Grassland located in the southwest of the project area. It is acknowledged that the development footprint aims to avoid the clearance of native vegetation. However the development will impact some native vegetation. Any clearance of native vegetation will require approval from the Native Vegetation Council under the Native Vegetation Act 1991 or relevant Regulation, in this instance Regulation 12(34) – Infrastructure.

Additional Comments

STATE COMMISSION ASSESSMENT PANEL
A COMMITTEE OF THE STATE PLANNING COMMISSION

State Commission Assessment Panel

Level 5
50 Flinders Street
Adelaide SA 5000

GPO Box 1815
Adelaide SA 5001

Reference: *422/V005/18*
Contact Officer: *Simon Neldner*
Telephone: *08 7109 7058*
Email: *simon.neldner@sa.gov.au*

2 January 2019

Dear Sir/Madam,

Application Number: 422/V005/18
Proposed Development: Robertstown Solar Farm and ancillary infrastructure
Subject Land: Powerline Road, Lower Bright Road, Robertstown

SECTION 49 - REFERRAL

The State Commission Assessment Panel (SCAP) has recently received a copy of the proposed development described above, pursuant to Section 49 of the *Development Act 1993*. A copy of the application is attached (Section 49(4a)).

Councils attention is particularly drawn to the time allowed for reports under Section 49 (5) and (6).

49 (5) A council may report to the SCAP on any matters contained in a notice under subsection (4a).

(6) Where a notice is given to a council under subsection (4a), and a report from the council is not received by the SCAP within two months of the date of the notice, it will be conclusively presumed that the council does not intend to report on the matter.

When replying please attach a copy of this letter with your details below.

Yours faithfully,

For **STATE COMMISSION ASSESSMENT PANEL**

I advise that this Council has **the attached/no report** to make on the proposed development described below.

Reporting Officer

7/2/2019
Date

DA 422/V005/18 – Robertstown Solar

Development Plan Provisions

Primary Production Zone:

Desired Character
Function
The region will support a more sustainable approach to primary production with rural production forming the core focus of the region. Sustainable land management practices will see long-term improvement in the quality of the environment and the economic activity of this region. Incompatible development will be restricted to support the ongoing function of primary production, with the division of land restricted to maintain large allotments and the construction of new dwellings and other structures limited to only being developed where they are associated with, and essential to, primary production activities. The townships of Eudunda (Bunker Site), Robertstown and Hallett contain necessary infrastructure for the storage, handling and transportation of agricultural and other commodities, which are an integral part of the rural economy, and should be protected from encroachment by incompatible activities. Alternative rural uses and value-adding enterprises that attract employment and economic development to the district will be developed in conjunction with the bulk handling activities in the Zone, but located sensitively to protect good quality land and to take advantage of existing infrastructure networks. Land of conservation and biodiversity significance will be protected from incompatible primary production activities and will be enhanced with tourism facilities to add to the diversity of the region's employment and economy.

Wind farms and ancillary development such as substations, maintenance sheds, access roads and connecting power-lines (including to the National Electricity Grid) are envisaged within the zone and constitute a component of the zone's desired character. These facilities will need to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence, components (particularly turbines) may need to be:

- located in visually prominent locations such as ridgelines;
- visible from scenic routes and valuable scenic and environmental areas; and
- located closer to roads than envisaged by generic setback policy.

This, coupled with the large scale of these facilities (in terms of both height and spread of components), renders it difficult to mitigate the visual impacts of wind farms to the degree expected of other types of development. Subject to implementation of management techniques set out by general / council wide policy regarding renewable energy facilities, these visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy.

OBJ 1 Economically productive, efficient and environmentally sustainable primary production.

OBJ 3 Protection of primary production from encroachment by incompatible land uses and protection of scenic qualities of rural landscapes.

OBJ 4 Accommodation of wind farms and ancillary development.

OBJ 5 Development that contributes to the desired character of the zone.

PDC 1 The following forms of development are envisaged in the zone:

- tourist accommodation, including through the diversification of existing farming activities and conversion of farm buildings
- farming
- intensive animal keeping (especially within Enterprise Policy Area 2)
- wind farm and ancillary development
- wind monitoring mast and ancillary development.

PDC 4 Wind farms and ancillary development should be located in areas which provide opportunity for harvesting of wind and efficient generation of electricity and may therefore be sited:

(a) in visually prominent locations

(b) closer to roads than envisaged by generic setback policy.

PDC 10 Development should not be undertaken unless it is consistent with the desired character for the zone.

PDC 11 Structures and buildings should generally be set back a minimum of 30 metres from all road boundaries.

General Provisions:

Crime Prevention:

OBJ 1 A safe, secure, crime resistant environment where land uses are integrated and designed to facilitate community surveillance.

Design and Appearance:

PDC 2 The design of a building may be of a contemporary nature and exhibit an innovative style provided the overall form is sympathetic to the scale of development in the locality and with the context of its setting with regard to shape, size, materials and colour.

PDC 6 Building form should not unreasonably restrict existing views available from neighbouring properties and public spaces.

PDC 18 The setback of buildings from public roads should:
(a) be similar to, or compatible with, setbacks of buildings on adjoining land and other buildings in the locality
(b) contribute positively to the streetscape character of the locality
(c) not result in or contribute to a detrimental impact upon the function, appearance or character of the locality.

Hazards:

OBJ 1 Maintenance of the natural environment and systems by limiting development in areas susceptible to natural hazard risk.

OBJ 2 Development located away from areas that are vulnerable to, and cannot be adequately and effectively protected from the risk of natural hazards.

OBJ 3 Development located to minimise the threat and impact of bushfires on life and property.

OBJ 4 Expansion of existing non-rural uses directed away from areas of high bushfire risk.

PDC 4 Development should not be undertaken in areas liable to inundation by tidal, drainage or flood waters unless the development can achieve all of the following:
(a) it is developed with a public stormwater system capable of catering for a 1 in 100 year average return interval flood event
(b) buildings are designed and constructed to prevent the entry of floodwaters in a 1 in 100 year average return interval flood event.

PDC 5 Development, including earthworks associated with development, should not do any of the following:
(a) impede the flow of floodwaters through the land or other surrounding land
(b) occur on land where the risk of flooding is unacceptable having regard to personal and public safety and to property damage
(c) increase the potential hazard risk to public safety of persons during a flood event
(d) aggravate the potential for erosion or siltation or lead to the destruction of vegetation during a flood
(e) cause any adverse effect on the floodway function
(f) increase the risk of flooding of other land
(g) obstruct a watercourse.

PDC 6 Buildings and structures should be located away from areas that pose an unacceptable bushfire risk as a result of one or more of the following:
(a) vegetation cover comprising trees and/or shrubs
(b) poor access
(c) rugged terrain
(d) inability to provide an adequate building protection zone
(e) inability to provide an adequate supply of water for fire-fighting purposes

PDC 11 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.

PDC 13 Development should not increase the potential for, or result in an increase in, soil and water salinity.

Heritage Conservation:

OBJ 1 The conservation of areas, places and their settings of indigenous and non-indigenous cultural significance.

PDC 1 Development should conserve and not adversely impact on the cultural or natural significance of places, areas, artefacts and shipwrecks that display any of the following values:
(a) aesthetic
(b) anthropological
(c) archaeological
(d) architectural
(e) ecological
(f) economic
(g) educational
(h) geological
(i) historic
(j) palaeontologic
(k) scientific
(l) social
(m) speleological
(n) spiritual
(o) technological.

Infrastructure:

OBJ 1 Infrastructure provided in an economical and environmentally sensitive manner.

OBJ 4 The visual impact of infrastructure facilities minimised.

OBJ 5 The efficient and cost-effective use of existing infrastructure.

PDC 10 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.

Interface Between Land Uses:

OBJ 1 Development located and designed to prevent adverse impact and conflict between land uses.

PDC 1 Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:
(a) the emission of effluent, odour, smoke, fumes, dust or other airborne pollutants
(b) noise
(c) vibration
(d) electrical interference
(e) light spill
(f) glare

(g) hours of operation
(h) traffic impacts.

PDC 2 Development should be designed and sited to minimise negative impact on existing and potential future land uses considered appropriate in the locality.

PDC 6 Development should be designed, constructed and sited to minimise negative impacts of noise and to avoid unreasonable interference.

PDC 10 Existing primary production uses and mineral extraction should not be prejudiced by the inappropriate encroachment of sensitive uses such as urban development.

Landscaping, Fences and Walls:

OBJ 2 Functional fences and walls that enhance the attractiveness of development

Natural Resources:

OBJ 1 Retention, protection and restoration of the natural resources and environment.

OBJ 2 Protection of the quality and quantity of South Australia's surface waters, including inland and underground waters.

OBJ 5 Development consistent with the principles of water sensitive design.

OBJ 8 Native flora, fauna and ecosystems protected, retained, conserved and restored.

OBJ 10 Minimal disturbance and modification of the natural landform

OBJ 12 Protection of areas prone to erosion or other land degradation processes from inappropriate development.

PDC 7 Development should be sited and designed to:
(a) capture and re-use stormwater, where practical
(b) minimise surface water runoff
(c) prevent soil erosion and water pollution
(d) protect and enhance natural water flows
(e) protect water quality by providing adequate separation distances from watercourses and other water bodies
(f) not contribute to an increase in salinity levels
(g) avoid the water logging of soil or the release of toxic elements
(h) maintain natural hydrological systems and not adversely affect:
(i) the quantity and quality of groundwater
(ii) the depth and directional flow of groundwater
(iii) the quality and function of natural springs.

PDC 13 Development should include stormwater management systems to minimise the discharge of sediment, suspended solids, organic matter, nutrients, bacteria, litter and other contaminants to the stormwater system.

PDC 16 Stormwater management systems should preserve natural drainage systems, including the associated environmental flows.

PDC 17 Stormwater management systems should:
(a) maximise the potential for stormwater harvesting and re-use, either on-site or as close as practicable to the source
(b) utilise, but not be limited to, one or more of the following harvesting methods:
(i) the collection of roof water in tanks
(ii) the discharge to open space, landscaping or garden areas, including strips adjacent to car parks
(iii) the incorporation of detention and retention facilities
(iv) aquifer recharge.

PDC 20 Development should ensure watercourses and their beds, banks, wetlands and floodplains are not damaged or modified and are retained in their natural state, except where modification is required for essential access or maintenance purposes.

PDC 30 Development should retain existing areas of native vegetation and where possible contribute to revegetation using locally indigenous plant species

PDC 32 Native vegetation should be conserved and its conservation value and function not compromised by development if the native vegetation does any of the following:

(a) provides an important habitat for wildlife or shade and shelter for livestock
(b) has a high plant species diversity or includes rare, vulnerable or endangered plant species or plant associations and communities
(c) provides an important seed bank for locally indigenous vegetation
(d) has high amenity value and/or significantly contributes to the landscape quality of an area, including the screening of buildings and unsightly views
(e) has high value as a remnant of vegetation associations characteristic of a district or region prior to extensive clearance for agriculture
(f) is growing in, or is characteristically associated with a wetland environment.

PDC 33 Native vegetation should not be cleared if such clearing is likely to lead to, cause or exacerbate any of the following:

(a) erosion or sediment within water catchments
(b) decreased soil stability
(c) soil or land slip
(d) deterioration in the quality of water in a watercourse or surface water runoff
(e) a local or regional salinity problem
(f) the occurrence or intensity of local or regional flooding.

PDC 34 Development that proposes the clearance of native vegetation should address or consider the implications that removing the native vegetation will have on the following:

(a) provision for linkages and wildlife corridors between significant areas of native vegetation
(b) erosion along watercourses and the filtering of suspended solids and nutrients from runoff
(c) the amenity of the locality
(d) bushfire safety
(e) the net loss of native vegetation and other biodiversity.

PDC 35 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.

PDC 40 Development should not have an adverse impact on the natural, physical, chemical or biological quality and characteristics of soil resources.

PDC 41 Development should be designed and sited to prevent erosion

Orderly and Sustainable Development:

OBJ 2 Development occurring in an orderly sequence and in a compact form to enable the efficient provision of public services and facilities.

OBJ 3 Development that does not jeopardise the continuance of adjoining authorised land uses.

OBJ 4 Development that does not prejudice the achievement of the provisions of the Development Plan.

PDC 1 Development should not prejudice the development of a zone for its intended purpose

PDC 2 Land outside of townships and settlements should primarily be used for primary production and conservation purposes.

PDC 6 Development should be located and staged to achieve the economical provision of public services and infrastructure, and to maximise the use of existing services and infrastructure.

Renewable Energy Facilities:

OBJ 1 Development of renewable energy facilities that benefit the environment, the community and the state.

OBJ 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.

OBJ 3 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.

PDC 1 Renewable energy facilities, including wind farms and ancillary development, should be:

(a) located in areas that maximize efficient generation and supply of electricity; and

(b) 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.

PDC 2 The visual impacts of wind farms and ancillary development (such as substations, maintenance sheds, access roads and wind monitoring masts) should be managed through:

(a) wind turbine generators being:

(i) setback at least 1000 metres from non-associated (nonstakeholder) dwellings and tourist accommodation

(ii) setback at least 2000 metres from defined and zoned township, settlement or urban areas (including deferred urban areas)

(iii) regularly spaced

(iv) uniform in colour, size and shape and blade rotation direction

(v) mounted on tubular towers (as opposed to lattice towers)

(b) provision of vegetated buffers around substations, maintenance sheds and other ancillary structures

PDC 3 Wind farms and ancillary development should avoid or minimise the following impacts on nearby property owners / occupiers, road users and wildlife:

(a) shadowing, flickering, reflection or glint

(b) excessive noise

(c) interference with television and radio signals and geographic positioning systems

(d) interference with low altitude aircraft movements associated with agriculture

(e) modification of vegetation, soils and habitats striking of birds and bats

Short-term Workers Accommodation:

OBJ 1 A range of appropriately located accommodation types supplied to meet the housing needs of seasonal and short-term workers.

PDC 1 Accommodation intended to be occupied on a temporary basis by persons engaged in employment relating to the production or processing of primary produce including minerals should be located within existing townships or within primary production areas, where it directly supports and is ancillary to legitimate primary production activities or related industries.

PDC 2 Buildings used for short-term workers accommodation should:

(a) be designed and constructed to enhance their appearance

(b) provide for the addition of a carport, verandas or pergolas as an integral part of the building

(c) where located outside of townships, not jeopardise the continuation of primary production on adjoining land or elsewhere in the zone

(d) be supplied with service infrastructure such as power, water, and effluent disposal sufficient to satisfy the living requirements of workers.

PDC 3 Short-term workers accommodation should not be adapted or used for permanent occupancy.

PDC 4 A common amenities building should be provided for temporary forms of short-term accommodation such as caravan and camping sites.

Siting and Visibility:

PDC 1 Development should be sited and designed to minimise its visual impact on:
(a) the natural, rural or heritage character of the area
(b) areas of high visual or scenic value, particularly rural areas
(c) views from public reserves, tourist routes and walking trails.

PDC 2 Buildings should be sited in unobtrusive locations and, in particular, should:
(a) be grouped together
(b) where possible be sited in such a way as to be screened by existing vegetation when viewed from public roads.

PDC 3 Buildings outside of urban areas and in undulating landscapes should be sited in unobtrusive locations and in particular should be:
(a) sited below the ridgeline
(b) sited within valleys or behind spurs
(c) sited in such a way as to not be visible against the skyline when viewed from public roads
(d) set well back from public roads, particularly when the allotment is on the high side of the road.

PDC 4 Buildings and structures should be designed to minimise their visual impact in the landscape, in particular:
(a) the profile of buildings should be low and the rooflines should complement the natural form of the land
(b) the mass of buildings should be minimised by variations in wall and roof lines and by floor plans which complement the contours of the land
(c) large eaves, verandas and pergolas should be incorporated into designs so as to create shadowed areas that reduce the bulky appearance of buildings.

PDC 5 The nature of external surface materials of buildings should not detract from the visual character and amenity of the landscape.

PDC 6 The number of buildings and structures on land outside of urban areas should be limited to that necessary for the efficient management of the land.

PDC 7 Driveways and access tracks should be designed and constructed to blend sympathetically with the landscape and to minimise interference with natural vegetation and landforms, and be surfaced with dark materials.

PDC 8 Development should be screened through the establishment of landscaping using locally indigenous plant species:
(a) around buildings and earthworks to provide a visual screen as well as shade in summer, and protection from prevailing winds
(b) along allotment boundaries to provide permanent screening of buildings and structures when viewed from adjoining properties and public roads
(c) along the verges of new roads and access tracks to provide screening and minimise erosion.

Transport and Access:

OBJ 2 Development that:
(a) provides safe and efficient movement for all motorised and non-motorised transport modes
(b) ensures access for vehicles including emergency services, public infrastructure maintenance and commercial vehicles
(c) provides off street parking
(d) is appropriately located so that it supports and makes best use of existing transport facilities and networks.

PDC 2 Development should be integrated with existing transport networks, particularly major rail and road corridors as shown on Overlay Maps Go/1, Go/2, Go/3, Go/4, Go/6, Go/7, Go/8, Go/9, Go/10 and Go/11 - Transport, and designed to minimise its potential impact on the functional performance of the transport networks.

PDC 6 Development generating high levels of traffic, such as schools, shopping centres and areas, entertainment and sporting facilities, should incorporate passenger pick-up and set down areas. The design of such areas should ensure interference to existing traffic is minimised and give priority to pedestrians, cyclists and public and community transport users.

PDC 13 Development should make sufficient provision on site for the loading, unloading and turning of all traffic likely to be generated.

PDC 21 Development should have direct access from an all weather public road.

PDC 22 Development should be provided with safe and convenient access which:

(a) avoids unreasonable interference with the flow of traffic on adjoining roads

(b) accommodates the type and volume of traffic likely to be generated by the development or land use and minimises induced traffic through over-provision

(c) is sited and designed to minimise any adverse impacts on the occupants of and visitors to neighbouring properties.

PDC 24 The number of vehicle access points onto arterial roads shown on Overlay Maps Go/1, Go/2, Go/3, Go/4, Go/6, Go/7, Go/8, Go/9, Go/10 and Go/11 - Transport should be minimised, and where possible access points should be:

(a) limited to local roads

(b) shared between developments.

Waste:

OBJ 1 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.

OBJ 2 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.

PDC 1 Development should be sited and designed to prevent or minimise the generation of waste (including wastewater) by applying the following waste management hierarchy in the order of priority as shown below:

(a) avoiding the production of waste

(b) minimising waste production

(c) reusing waste

(d) recycling waste

(e) recovering part of the waste for re-use

(f) treating waste to reduce the potentially degrading impacts

(g) disposing of waste in an environmentally sound manner.

PDC 3 Development should avoid or minimise as far as practical, the discharge or deposit of waste (including wastewater) onto land or into any waters (including processes such as seepage, infiltration or carriage by wind, rain, sea spray, stormwater or by the rising of the water table).

PDC 4 Untreated waste should not be discharged to the environment, and in particular to any water body

PDC 12 Development that produces any effluent should be connected to an approved waste treatment system which may include sewage, community wastewater management systems, or on-site wastewater treatment and disposal methods.

PDC 13 The methods for, and siting of, effluent and waste storage, treatment and disposal systems should minimise the potential for environmental harm and adverse impacts on:

(a) the quality of surface and groundwater resources

(b) public health

(c) the amenity of a locality

(d) sensitive land uses.

PDC 14 Waste treatment should only occur where the capacity of the treatment facility is sufficient to accommodate likely maximum daily demands including a contingency for unexpected high flows and breakdowns.