

Solar Flagships Program

PRELIMINARY ENVIRONMENTAL ASSESSMENT BROKEN HILL SOLAR PHOTOVOLTAIC POWER PROJECT

- Final
- 18th November, 2010

Prepared for:

AGL Energy Limited



Solar Flagships Program

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Executive Summary

The report provides a Preliminary Environmental Assessment (PEA) to support AGL's Project Application for the Broken Hill Solar Photovoltaic (PV) Power Project. The report identifies key environmental issues associated with the project and supports an application to the Minister for Planning under Section 75J(1) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for project approval. This PEA is intended to assist the Director-General of the Department of Planning (DoP) with the issuing of Environmental Assessment (EA) requirements under Section 75F of the EP&A Act.

The Australian Government has committed funding of \$1.5 billion to the Solar Flagships program. The primary objective of the Solar Flagships program is to provide the foundation for large scale, grid-connected, solar power to play a significant role in Australia's electricity supply and to operate within a competitive electricity market. The Australian Government's aim is to establish up to 1,000 megawatts of solar power generation capacity.

AGL has been shortlisted as one of four solar PV projects for funding under the Solar Flagships program. AGL is developing up to five solar PV projects with a total capacity of up to 200 MW AC at multiple sites across Australia. The Broken Hill Solar PV Power Project has been selected as one of AGL's solar projects in NSW.

The preliminary desktop investigations undertaken for the proposed development indicate that the key environmental issues for the Broken Hill Solar PV Power Project include:

- Surface hydrology;
- Aboriginal heritage;
- Visual amenity;
- Noise; and
- Ecology.

This PEA provides discussion of the key environmental issues to demonstrate the proponent's existing understanding of the issues and the need for further environmental assessment of these key issues. The potential impacts and management of other issues such as soils and geology, groundwater, contamination, European heritage, access and traffic, alienation of resources, air quality, hazard and risk (EMF and bushfire), social and economic impacts, land use and waste management, and the reasons they have not been designated as key issues, are also discussed in the report.

The management of both key issues and other issues would be addressed through a Statement of Commitments and the Conditions of Approval of the project, which will determine the requirements for environmental management.

1. Introduction

1.1. Purpose of this Document

This Preliminary Environmental Assessment (PEA) has been prepared to support AGL Energy Limited's project application for the Commonwealth Solar Flagships Program. The report identifies key environmental issues associated with the project and ultimately supports an application to the Minister for Planning under Section 75J(1) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for project approval.

This report is intended to assist the Director-General of the Department of Planning (DoP) with the issuing of Environmental Assessment (EA) requirements under Section 75F of the EP&A Act.

1.2. Background to the Project

The Solar Flagships program is part of the Australian Government's \$4.5 billion Clean Energy Initiative, announced in the May 2009 Budget. The Government has committed \$1.5 billion to support the construction and demonstration of up to four large-scale solar power plants in Australia, using solar thermal and photovoltaic (PV) technologies. The Government's aim is to establish up to 1000 megawatts (MW) of large-scale solar power generation capacity. Round 1 for the Solar Flagships program will select one solar thermal project and one PV project, with a target of up to 400 MW of combined generation capacity

AGL's Stage 1 submission proposed PV plants ranging from 30 to 50 MW in ACT, NSW, SA, VIC and QLD. This multi-state strategy was designed to leverage the benefits of solar PV as a distributed technology, and to leverage funding support from multiple state and territory sources. This approach offers the Commonwealth the opportunity to ensure that multiple stakeholders in multiple jurisdictions benefit from the Solar Flagships Program, providing jobs and economic growth and industry development across the country. Furthermore, the size of AGL's plants simplifies siting issues, allows easier and cheaper grid connections, and provides resource and time zone diversity.

The Broken Hill Solar PV Power Project has been selected as one of AGL's solar projects in NSW. The plant would be 50 MW in size. The project site and surrounding area is shown on **Figure 1-1**.

Figure 1-1 | Project area and surrounds



LEGEND

- | | |
|---|--|
| Study area | Proposed transmission line |
| Site boundary | Road |
| Local government authority boundary | Railway |
| | Transmission line |
| | Watercourse |
| | Water body |
| | Cadastre |

GDA 1994 | MGA Zone 54
A4 1:70,000



0 2
Kilometres



1.3. The Proponent

AGL Energy (AGL) is the largest private owner, operator and developer of renewable generation in Australia and has invested well over \$2 billion in renewable energy. AGL has major investments in hydro and wind, as well as ongoing developments in key renewable areas including solar, geothermal, biomass, bagasse and landfill gas. AGL also operates retail, merchant energy and upstream gas businesses and has over three million customer accounts.

1.4. Project Objectives

The primary objective of the Solar Flagships program is to provide the foundation for large scale, grid-connected, solar power to play a significant role in Australia's electricity supply and to operate within a competitive electricity market. The Australian Government's aim is to establish up to 1,000 MW of solar power generation capacity.

Other objectives of the Solar Flagships program, and hence the project, are to:

- Develop a solar industry in Australia;
- Encourage regional development;
- Provide research infrastructure;
- Develop Australian intellectual property in solar power generation; and
- Develop and share technical and economic knowledge from the Solar Flagships program.

1.5. Report Structure

A summary of the information contained within each chapter of this report is provided below.

Chapter 1 – provides the purpose of the report and the background of the project.

Chapter 2 – provides the need for the project and alternatives considered.

Chapter 3 – describes the project location, the key elements of the project and construction activities.

Chapter 4 –describes the legislative context and the planning approvals required for the project and consultation activities.

Chapter 5 – presents the preliminary environmental assessment of the key issues and other issues.

Chapter 6 – provides a conclusion to this report

Chapter 7 – references.

2. Project Need

2.1. Project Need

In August 2009, the Australian Government implemented the Renewable Energy Target (RET) Scheme, which is designed to deliver on the Government's commitment to ensure that 20 per cent of Australia's electricity supply will be derived from renewable sources by 2020.

To assist in achieving this 20 per cent target and emphasise the need to invest in clean energy technologies, the Government has committed funding of \$1.5 billion to the Solar Flagships program, which is part of the Clean Earn Energy Initiative (CEI). The Solar Flagships program has been designed to accelerate the delivery of large scale, grid-connected solar power into the National Electricity Market, show the Government's commitment to large scale solar projects and cleaner, greener electricity generation.

As part of the Solar Flagships program, AGL are seeking to construct and operate the Broken Hill Solar PV Power Project.

The main factors in determining the need for the project are to:

- Demonstrate that large scale solar power plants can be constructed and operated within major electricity grids in Australia;
- Optimise the business models for constructing, generating and wholesaling electricity generated from large scale solar power plants;
- Develop the solar power industry in Australia;
- Provide research infrastructure for solar power generation;
- Encourage regional development;
- Build initial infrastructure for further development of solar power;
- Develop Australian intellectual property and know-how in solar power; and
- Develop and share technical and economic knowledge of the operation of large scale solar power plants in a competitive energy market.

2.2. Alternatives Considered

During the development of the Broken Hill Solar PV Power Project, a number of alternative locations, layouts, and size on the site were considered.

Minimising environmental and social impacts and maximising efficiency have been major considerations in the evaluation of alternative options. Alternative options include building a

single 200 MW PV plant at one site rather than smaller PV plants across multiple sites in Australia. Multiple smaller PV plants were selected as the preferred option given that:

- Small PV plants would require a much smaller area of land which would have less impact on flora and fauna than a larger site;
- The local community is likely to be more accepting of a small solar PV plant than a large solar PV plant;
- It would allow for faster project development and construction times (again minimising environmental and social impacts during construction);
- Multiple small plants would provide the opportunity to better manage increasing peak demands during Summer in multiple locations, rather than one location;
- Geographic diversity would reduce weather risk as multiple smaller plants at multiple sites provides a natural hedge against transient cloud cover and weather systems since all sites are unlikely to be impacted simultaneously, whereas a single 200 MW plant can be negatively impacted from unfavourable weather; and
- Job creation, skills transfer, and economic development would occur in multiple locations, rather than one location.

The Broken Hill site was identified as the preferred location for one of the solar PV plant sites, based on the following:

- Availability of an abundant solar resource;
- Access to connect to the electricity grid;
- Availability of appropriate land; and
- Suitability in terms of the interests of other stakeholders and the environment.

Further discussion of the alternatives considered will be included in the environmental assessment for the project.

The consequences of not proceeding would result in the loss of the benefits of the project, including:

- Reduction in greenhouse gas emissions and a move towards cleaner electricity generation;
- Supply of renewable energy which would assist the Australian and NSW Government to reach the Renewable Energy Target of 20 per cent by 2020;
- Provision of additional electricity generation and supply into the Australian grid;
- Provision of social and economic benefits through the provision of direct and indirect employment opportunities.

3. Description of the Project

3.1. Overview

This section of the PEA provides the context of the project location and a general description of the project. A more detailed description of the proposed Broken Hill Solar PV Power Project will be included in the environmental assessment.

3.2. Project Location

The project site is located in far west NSW, approximately 5 km south-west of the Broken Hill township. The location of the project site and immediate surrounds is shown on **Figure 1-1**.

The project is entirely within the unincorporated area which is administered by the NSW Department of Lands, Western Division, and comprises rural land. The project site is located between the Barrier Highway to the north and the Peterborough Broken Hill railway line to the south, wholly within Lot 6806 Plan 823918 (Land and Property Management Authority (CROWN)).

Approximately 180 hectares of land would be required for the 50 MW photovoltaic (PV) plant at Broken Hill. The site comprises a cleared, relatively flat area with numerous unsealed access track scattered throughout. There is currently one residence located in the northern part of the property with several other ‘sheds’ scattered nearby. There are no other residences or sensitive receivers located in proximity to the proposed site.

Along with the PV plant, the proposed development would also include the installation and operation of a double circuit 22 kV overhead line (OHL), approximately 2.7 km long, to connect the plant to the TransGrid Broken Hill substation.

This OHL will be a pole route requiring a 30m wide easement adjacent to the existing easements as shown in **Figure 1-1**.

3.3. Key Elements of the Project

3.3.1. Layout

The project would comprise the installation of a 50 MW PV plant with panel arrays. The project would comprise the following elements:

- PV solar panels and supporting infrastructure,
- DC collection system (including inverters, step up transformers and RMUs)
- 22kV collector system,
- 22kV facility and switchgear,
- 22 kV double circuit transmission line,
- TNSP connection augmentation works (where applicable) and
- PV plant infrastructure including roads, fences and drainage.

3.3.2. Power Generation and Transmission

The solar panels (arrays) would be connected in series to form strings and then the strings connected together in parallel at the inverter input. This allows the regulation of the appropriate DC voltage and current to be provided as a DC power input into the inverter.

There are 630kW inverters at each local collection point which accept the DC power provided by the arrays. The inverters convert this to AC power (3 phase at 315 volts) and then this is transformed into 22kV by the transformer.

The 22kV collector system then brings all of the power together at the interconnection point where the 22kV double circuit then allows the export of this power to the TransGrid substation.

The approximate location of the proposed 22kV OHL is identified in **Figure 1-1**; however, the final alignment of the transmission line may differ from that shown following detailed design. The line will follow an existing 30m wide easement which exits the proposed site in an easterly direction for approximately 1.4km. The proposed line will then turn south, following the existing Silverton OHL easement for 1.3km to the TransGrid substation.

3.4. Workforce and Hours of Operation

3.4.1. Construction

It is anticipated that during the construction period for the Broken Hill Solar PV Power Project, approximately 150 to 200 construction personnel would be required on site.

Construction activities would be undertaken during standard daytime construction hours (7.00am to 6.00pm Monday to Friday and 7.00am to 1.00pm on Saturdays). Any construction outside of these normal working hours would require prior approval from relevant authorities.

3.4.2. Operations

Plant operation would be largely automated and only minimal maintenance activities will be required. Approximately two to three jobs would be created to support ongoing plant operations and maintenance.

3.5. Project Construction Phase

The overall construction works for the Broken Hill Solar PV Power Project is expected to take 12 months. The main construction activities would include:

- Site establishment and preparation for construction (preliminary civil works and drainage),
- Piling of steel posts to provide support for the PV panels,
- Attachment of tilt brackets and rails which hold the PV panels,
- Connection of the PV panel modules to the brackets,
- Installation of the inverters,
- Trenching and wiring of underground cabling (DC and AC),
- Construction of the transmission and connection assets,
- Installation of PV switchgear, transformers and connection to transmission infrastructure
- Commissioning and testing of the plant; and
- Removal of temporary construction facilities and completion of restoration works.

4. Planning Considerations and Consultation

4.1. Environmental Planning and Assessment Act 1979

Development in NSW is subject to the requirements of the Environmental Planning and Assessment Act 1979 (EP&A Act) and its associated regulation. Environmental planning instruments prepared pursuant to the Act set the framework for approvals under the Act.

The State Environmental Planning Policy (Major Development) 2005 identifies individual developments, or categories of developments which require assessment under Part 3A of the EP&A Act. Specifically, clause 24(a) of Schedule 1 applies to projects that involve:

“Development for the purpose of a facility for the generation of electricity or heat or their co-generation (using any energy source, including gas, coal, bio-fuel, distillate and waste and hydro, wave, solar or wind power), being development that:

(a) has a capital investment value of more than \$30 million, or.....”

As the capital investment for the 50 MW photovoltaic plant at Broken Hill is greater than \$30 million, the project meets the criteria for classification as a major development. The Minister for Planning is the relevant approval authority for assessing and determining project applications under Part 3A of the EP&A Act.

4.1.1. Critical Infrastructure Project

The Minister for Planning has declared under Section 75C of the Environmental Planning and Assessment Act 1979 (EP&A Act), by order dated 27 November 2009 published in NSW Government Gazette (No. 184) that the following would be a critical infrastructure project under Section 75C of the EP&A Act:

“Development for the purpose of a facility for the generation of electricity derived from renewable fuel sources (that is, wind energy, solar energy, geothermal energy, hydro energy, wave energy and bio energy), being development that:

(a) is the subject of an application lodged pursuant to section 75E or section 75M of the Environmental Planning and Assessment Act 1979 lodged after the date of this declaration; and

(b) is the subject of an application that proposes a development with a capacity to generate at least 30 megawatts.”

Critical infrastructure projects under Section 75C of the EP&A Act are developments which, for economic, social and/or environmental reasons, are perceived to be essential to the State of NSW.

The declaration has been made to provide increased certainty for industry and the community in the development of new renewable energy projects.

As the proposed development would have a generation capacity greater than 30 MW, the Broken Hill PV plant would be assessed by the Minister for Planning as a critical infrastructure project under Part 3A of the EP&A Act. Whilst there are some differences which apply to the assessment of projects declared to be critical infrastructure projects under Part 3A (such as landowner consent is not required), the environmental assessment process is the same as that which applies to other Part 3A projects.

4.2. Environmental Planning Instruments

Section 75R of the EP&A Act excludes the application of the provisions of environmental planning instruments (other than SEPPs) to approved projects, including approved critical infrastructure projects. A SEPP only applies to critical infrastructure projects to the extent that the provisions of the SEPP expressly provide that they apply to the particular project (EP&A Act Section 75R(2)). There are no SEPPs that expressly relate to the Broken Hill PV plant.

The proposed development would be located in the unincorporated area administered by the NSW Department of Lands, Western Division. As such, local environmental planning instruments are not applicable to works within this area. As the proposed development is subject to Part 3A of the EP&A Act, the Minister for Planning would be the approval authority.

4.3. NSW Environmental Approvals

4.3.1. Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the Department of Environment, Climate Change and Water (DECCW). Under Section 48 of the POEO Act, premise-based scheduled activities (as defined in Schedule 1 of the Act) require an Environment Protection Licence (EPL). Although the works have a capacity to generate more than 30 MW of electrical power, electricity generation from solar power is not considered a scheduled activity, and therefore does not require an EPL under the POEO Act. Nevertheless, any water pollution resulting from the proposed development that is not in accordance with an EPL would constitute a breach of the Act under Section 120. Under Section 148 of the Act, the proponent would be required to notify the DECCW of any pollution incidents that occur as a consequence of the construction or operation of the proposed development.

4.3.2. Roads Act 1993

The *Roads Act 1993* (Roads Act) provides for the classification of roads and for the declaration of the Roads and Traffic Authority (RTA) and other public authorities as roads authorities for both

classified and unclassified roads. It also regulates the carrying out of various activities in, on and over public roads. Approval from the RTA or the local council would be required under Section 138 to erect a structure or to carry out work in, on or over a public road.

4.3.3. Western Lands Act 1901 and Crown Lands Act 1989

The proposed development site is located on Crown land in the Western Division which is managed by the Land and Property Management Authority in accordance with the *Western Lands Act 1901* and the *Crown Lands Act 1989*. The *Western Lands Act 1901* regulates the manner in which land in the Western Division can be used, how roads and rights of way are created and how leases are issued. The proposed site is located on land occupied by a Western lands lease for pastoral purposes. It may be necessary to transfer the lease from the current leaseholder to the proponent, alter the purpose of the lease and/or alter the conditions of the lease, which would require approval from the Land and Property Management Authority and the leaseholder. In addition, the Minister can declare any land within the Western Division to be a development district. Where a development district has been declared, the land can be leased (special purpose lease) for up to 100 years for solar or wind power projects, or another special purpose allowed by proclamation. If this is to occur, as the site is located in a mining lease area under the *Mining Act 1992*, consent from Industry and Investment NSW would also be required.

4.4. Commonwealth Legislation

4.4.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA). Under the EPBC Act, approval is required for actions that are likely to have a significant impact on a matter of national environmental significance (NES) or Commonwealth land. The EPBC Act identifies seven matters of NES:

- World Heritage properties;
- National heritage places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

The EPBC Act also requires assessment and approval for actions that are likely to have a significant impact on the environment of Commonwealth land, even if the subject action is taken outside Commonwealth land. When a person proposes to take an action that they believe may need approval under the EPBC Act, they must refer the proposal to the DEWHA for assessment.

A search of the Commonwealth DEWHA Protected Matters Search Tool indicates that there are no World Heritage or National Heritage areas or items within the study area. The proposed development is located in the same catchment as Lake Pinaroo, listed as a Ramsar Wetlands of international significance, but is 320 km from the wetlands and therefore is not likely to be an issue. The proposed development is not likely to have a significant impact on the environment of Commonwealth land. As the area surrounding the proposed development generally consists of rural land, it is anticipated that the project would have a minimal impact on the local area, and hence would not be a controlled action. Further flora and fauna studies would confirm whether any impacts to any ecological species or communities would occur as a result of the proposed development, during the preparation of the Environmental Assessment.

4.4.2. Native Title Act 1993

The Commonwealth *Native Title Act 1993* provides a legislative framework for the recognition and protection of common law native title rights. Native title is the recognition in Australian law that Indigenous people had a system of law and ownership of their lands before European settlement. Where that traditional connection to land and waters has been maintained and where government acts have not removed it, the law recognises this as native title.

People who hold native title have a right to consult or continue to practise their law and customs over traditional lands and waters while respecting other Australian laws. This could include visiting to protect important places, making decisions about the future use of the land or waters, hunting, gathering and collecting bush medicines. Further, when a native title claimant application is registered by the National Native Title Tribunal, the people seeking native title recognition gain a right to consult or negotiate with anyone who wants to undertake a project on the area claimed.

Native title may exist in areas such as:

- Vacant Crown land;
- Some national parks, forests and public reserves;
- Some types of pastoral lease;
- Some land held for Aboriginal communities; and
- Beaches, oceans, seas, reefs, lakes, rivers, creeks, swamps and other waters that are not privately owned.

A native title search was undertaken in August 2010 for the area potentially impacted upon by the proposed development to determine whether it may be affected by a native title determination, application or indigenous land use agreement (ILUA). The results showed that there is a Native Title Claimant in the project area, being the Barkandji Traditional Owners 8. As a common law right, native title may exist over areas of Crown land or waters, irrespective of whether there are any native title claims or determinations in the area. As Lot 6806 Plan 823918 is currently Crown Land (administered by the Land and Property Management Authority, Native Title rights may potentially exist over the property. As such, further information should be sought regarding Native Title rights that may exist.

4.5. Stakeholder Consultation

The following stakeholders were identified as potentially being impacted by the PV plant development in Broken Hill or possibly having an interest in the project itself. Adequate community consultation would be required with some or all of the following interested parties in **Table 4-1**.

■ **Table 4-1 Key stakeholders**

Category	Stakeholders
Directly impacted	■ The current lessee of Lot 6806 Plan 823918 ■ Adjoining and nearest neighbours to the site, in particular residents of dwellings close to the proposed site ■ Holders of exploration leases and mining leases which cover the site (Perilya Broken Hill Limited)
Communities	■ Local city (Broken Hill) ■ Broken Hill Local Aboriginal Land Council
Environmental non-government organisations (NGOs) and community based organisations	■ Local and regional groups (Lions club of Broken Hill) ■ Police and community youth clubs ■ Local environmental groups
Government agencies and regulators	■ Department of Lands ■ Department of Environment, Climate Change and Water (DECCW) ■ NSW Office of Water (part of DECCW) ■ Industry and Investment NSW (I&I NSW) (including Department of Primary Industries) ■ NSW Department of Planning ■ NSW Roads and Traffic Authority (RTA) ■ Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) ■ Western Catchment Management Authority and Lower Murray Darling Catchment Management Authority

Category	Stakeholders
Special interest groups	■ Emergency response groups (Rural Fire Service, State Emergency Service) ■ News media groups (ABC Radio, Barrier Daily Truth (local paper), Rural Press paper, HILL FM radio) ■ Business - trade, retail sales and tourism committees

A Community Consultation Plan would be prepared to inform the community and project stakeholders of the project. The Plan may include:

- Preparation of material for distribution informing stakeholders about the project and newspaper advertisements to advertise the project.
- Establishment of a database, including all private stakeholders and potentially affected landholders; and
- Establishment of an information hotline and project email address.

Meetings would be held with stakeholders and concerned landholders as required. The consultation plan would aim to ensure that there is effective, ongoing liaison with the community. Measures to reduce adverse impacts and promote positive impacts would be identified in the environmental assessment and appropriate management plans developed for the proposal. Agency consultation would also be undertaken in accordance with the requirements of the Director-General's requirements.

5. Preliminary Environmental Assessment

5.1. Preliminary Environmental Risk Assessment

A preliminary environmental risk analysis has been conducted to assist in the identification of key environmental matters that would require detailed assessment during the environmental assessment. The preliminary identification of key environmental risks has been undertaken in accordance to the general principles outlined in Australian Standard *AS/NZS 4360:2004 Risk Management* (Standards Australia, 2004) and *HB 203:2006 Environmental Risk Management – principles and process* (Standards Australia, 2006). Risks were identified for both the construction and operation phase of the project and analysed in relation to their possible consequence and likelihood of occurrence. From this analysis, some environmental matters were deemed to be key issues on the basis that they had the potential, without appropriate mitigation measures, to have a significant impact on the environment.

A summary of the key environmental issues is provided in **Section 5.2**. The intent of the discussion is to demonstrate an understanding of the issues and the need for further environmental assessment and mitigation measures for these key issues. The potential impacts and management of other issues such as soils and geology, groundwater, contamination, European heritage, access and traffic, alienation of resources, air quality, hazard and risk, social and economic impacts, land use and waste management and the reasons they have not been designated as key issues, are discussed in **Section 5.3**.

5.2. Assessment of Key Issues

5.2.1. Surface Hydrology

The Broken Hill region is located in the west of the Barwon-Darling Catchment. It covers over 142,000 square kilometres and is a subcatchment of the Murray-Darling Basin. Key rivers which flow within this catchment include the Darling River, Barwon River and associated anabranches. Drinking water is supplied to Broken Hill from Umberumberka Reservoir and Stephens Creek Reservoir. The health of the catchment is considered to be poor due to over-allocation of surface water resources, with over 30 per cent of surface water being extracted for irrigation purposes.

Drainage on the site is characterised by a creek system that is a tributary of the Stirling Vale Creek. The Stirling Vale creek catchment emanates from land immediately west of Broken Hill. The creek system on the site flows from the south eastern boundary at the Railway in a north easterly direction. The egress point is located approximately 400 metres from the north eastern corner, where a farm dam lies within the creek. Major overflows would fill and bypass this dam and continue towards the Stirling Vale Creek, which is flowing in a southerly direction. The catchment

of the creek system on the site is contained within the site boundary. Small catchments at the perimeter flow out of the site to other creeks.

There is limited information available on flooding of the proposed solar PV plant site. It should be considered that there is a potential for flooding, however it is uncertain whether there is a high or low probability of flooding given that there is limited historical information and that the potential for flooding would depend on the design of the proposed solar PV plant. A flood study would be undertaken as part of the detailed Environmental Assessment.

Conclusions and Need for Further Assessment

The proposed development would not result in any direct impacts to water courses. Lake Pinaroo, listed as a Ramsar site, is not likely to be significantly affected by the proposed development, as it is located approximately 320 km north of the site. There is a minor potential for water quality of the nearby waterways such as Stirling Vale Creek and Kellys Creek to be affected during construction via impacts to the ephemeral tributaries which are present in the project site. Any impacts on water quality during construction would be addressed through the implementation of standard erosion and sedimentation control measures. There is unlikely to be any impacts to water quality during operation. There could be potential for flooding at the proposed PV plant site.

A flood study has been undertaken as part of the detailed Environmental Assessment.

5.2.2. Aboriginal Heritage

A search of the Department of Environment, Climate Change and Water (DECCW) Aboriginal Heritage Information Management System (AHIMS) database was undertaken to identify the locations of known Aboriginal heritage sites in the study area. The results of this search indicated that there are 55 previously recorded Indigenous heritage sites within a 5 km radius of the proposed solar PV plant and transmission line. The results of the AHIMS search are presented in **Table 5-1**. In locations where an AHIMS item has been located closer to the transmission line than the PV plant, this has been indicated in **Table 5-1**.

■ **Table 5-1 AHIMS search results within the study area**

Site ID	Site Name	Approximate distance to PV plant
31-1-0019	The Pinnacles	6.7km
31-1-0017	Hungry Hill	6.6 km
31-1-0018	Hungry Hill	6.6 km
23-4-0081	AS1	1.4 km (920 m to transmission line)
23-4-0082	AS3	1.4 km (900 m to transmission line)
23-4-0083	AS4	1.2 km (950 m to transmission line)
23-4-0084	AS5	1.1 km (1.3 km to transmission line)

Site ID	Site Name	Approximate distance to PV plant
23-4-0085	AS6	1.8 km (110 m to transmission line)
23-4-0086	AS7	920 m (1.2 km to transmission line)
23-4-0087	AS8	920 m (1.5km to transmission line)
23-4-0088	AS9	700m (720 m to transmission line)
23-4-0089	AS10	700 m (560 m to transmission line)
23-4-0090	AS12	820 m (540 m to transmission line)
23-4-0091	AS16	560 m (800 m to transmission line)
23-4-0092	AS15	640 m (1k m to transmission line)
23-4-0093	AS14	475 m (680 m to transmission line)
23-4-0111	AS11	1.7 km (540 m to transmission line)
23-4-0112	AS2	1.9 km (700 m to transmission line)
23-4-0107	AS13	1.4 km (620 m to transmission line)
31-1-0065	34.1	4.2 km
31-1-0066	34.2	4.2 km
31-1-0067	34.3	4.3 km
31-1-0068	34.4	4.4 km
31-1-0069	35.1	2.5 km
31-1-0070	36.1	3.6 km
31-1-0071	37.1	4.3 km
31-1-0072	37.2	4.2 km
31-1-0073	37.3	4.2 km
31-1-0074	37.4	4.3 km
31-1-0075	37.5	4.4 km
31-1-0079	39.1	3.2 km
31-1-0080	40.1	3.2 km
31-1-0081	41.1	3.1 km
31-1-0082	42.1	2.8 km
31-1-0083	43.1	2.9 km
31-1-0084	43.2	2.8 km
31-1-0024	1.1	5.6 km
31-1-0025	1.2	5.5 km
31-1-0026	1.3	5.3 km
31-1-0027	2.1	5.2 km
31-1-0028	2.2	5.2 km
31-1-0029	3.1	5.2 km
31-1-0030	4.1	5.3 km
31-1-0031	4.2	5.3 km
31-1-0032	4.3	5.4 km
31-1-0056	20.1	7.8 km
31-1-0057	21.1	7.8 km

Site ID	Site Name	Approximate distance to PV plant
31-1-0058	22.1	7.8 km
31-1-0059	23.1	7.6 km
31-1-0060	24.1	7.3 km
31-1-0061	30.1	2.9 km
31-1-0062	31.1	3 km
31-1-0063	32.1	2.9 km
31-1-0064	33.1	3.1 km
23-4-0615	SU278/L9	1 km

There are no Indigenous heritage sites listed on the Commonwealth Heritage List, Register of the National Estate, State Heritage Register, State Heritage Inventory or within local Council development and environmental plans.

None of the recorded Indigenous heritage items is located within the project boundary. The closest Indigenous heritage items are located approximately 475 metres east of the proposed solar PV plant site. Another site is approximately 540m from the transmission line and would not be affected by the project.

As the site has been previously undisturbed and the AHIMS found numerous Indigenous sites in the study area, there is a potential for undiscovered Indigenous artefacts or places to be encountered during construction.

Conclusions and Need for Further Assessment

The PV plant and transmission line are proposed to be constructed on previously undisturbed land. There is potential that undiscovered Aboriginal artefacts or places would be encountered during the construction phase.

An Aboriginal heritage assessment would be undertaken as part of the environmental assessment. Consultation with representatives of local Aboriginal groups would be also be undertaken as part of the assessment. The significance of any Aboriginal heritage sites that may be potentially affected by the proposal would be determined. If any Aboriginal sites or items are considered to be of high significance, further intensive investigations would be conducted in consultation with relevant Aboriginal groups. Appropriate management measures would be developed prior to construction works, to ensure significant sites and items are salvaged, if necessary.

5.2.3. Visual Amenity

The proposed solar PV plant site would be located within a relatively flat landscape with an elevation of approximately 255 to 285 metres above sea level and located on open rural land,

traversing one land holding. One residential receiver is currently located within the actual footprint of the proposed solar PV plant. This dwelling would be removed as part of the proposal. The next closest receiver outside of the proposed site is located approximately 750 m to the east. As the topography of the site is flat, receivers would not look down upon or up towards the proposed development. The residential dwelling may have a distant view of the solar PV plant and the transmission line.

A 22kV transmission line would also be constructed as part of the development, which would connect the solar PV plant to Broken Hill substation.

The line will follow an existing 30m wide easement which exits the proposed site in an easterly direction for approximately 1.4km. The proposed line will then turn south, following the existing Silverton OHL easement for 1.3km to the TransGrid substation.

It is likely that the transmission line would be visible from the nearby residential properties however the line would be similar in nature to that which is already present and is not expected to adversely affect the visual amenity of the region. There are no significant tourist sites or facilities, scenic lookouts or public recreation areas in the vicinity of the proposed Broken Hill Solar PV Power Project and transmission line. The property is also not located in an area of high scenic value.

Conclusions and Need for Further Assessment

The proposed PV plant and transmission line are likely to be visible from the nearest house (and potentially from other residential dwellings), and therefore it is possible that minor localised visual impacts could occur.

A visual impact assessment would be undertaken as part of the environmental assessment. The assessment would include an analysis of existing photographs, maps and drawings, a survey of sensitive locations, assessment of the visual impact and development of mitigation measures which would minimise the visual impact of the proposed solar PV plant and transmission line.

5.2.4. Noise

The proposed PV plant is located on rural land that has very low ambient (background) noise levels. The main existing background noise sources are from vehicle traffic on Pinnacles Road, train movements on the railway line and intermittent vehicle movements through private properties and on local public and private roads. The study area generally contains few significant noise or vibration sources. There is no available information of existing background noise levels at the site.

There are unlikely to be sensitive receivers given the low population density in the vicinity of the site. The majority of residences are located in the township of Broken Hill approximately 5 km distant. The closest residential dwelling to the proposed PV plant is approximately 750m to the east of the proposed development site. One dwelling is also currently within the footprint of the proposed solar PV plant, but for the purposes of this preliminary assessment it has been assumed that this dwelling would be removed by AGL as part of the development.

Conclusions and Need for Further Assessment

The construction of the proposed PV plant is not anticipated to have a significant noise impact given that the closest residential dwelling is approximately 750 m from the proposed solar PV plant, and approximately 1 km from the transmission line.

Noise would be minimised as far as practicable with the implementation of appropriate management measures. Construction of the transmission line would be of relatively short duration at any one location as it would be undertaken in a progressive/staged manner along the length of the transmission line route.

The operation of the PV plant and transmission line is expected to have minimal or negligible noise impacts.

A construction noise assessment would be undertaken as part of the environmental assessment to assess potential noise impacts. The assessment would be undertaken in accordance with the Interim Construction Noise Guideline (DECCW, 2009) and be of a qualitative nature.

5.2.5. Ecology

From an assessment of the aerial photography, the proposed solar PV plant and transmission line is located in an area that is largely devoid of vegetation, and may be subject to grazing with considerable erosion present across the entire site.

The potential ecological constraints within the study area have been identified based on the following information sources:

- Existing threatened species listings under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Existing records of threatened species sightings in the study area, as recorded in the *Atlas of NSW Wildlife* (DECCW); and
- Department of Environment, Water, Heritage and the Arts (online) Protected Matters Search Tool (nationally threatened species listed on the EPBC Act).

There is limited threatened species data in the immediate locality probably due to a lack of past survey effort rather than a lack of species. Typically, a 10 km radius of the study area is undertaken to ascertain potential threatened flora and fauna species, endangered populations and ecological communities; however, given the lack of data available, a 25 km radius of the study area has been undertaken for this desktop assessment (defined as the study locality).

Endangered ecological communities

One endangered ecological community, *Acacia loderi* Shrublands, may potentially occur within a 25 km radius of the study area (defined as the study locality) (refer to **Table 5-2** and therefore may occur on the project site.

■ **Table 5-2 Endangered ecological communities in the study locality**

Endangered ecological community	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk of impact
<i>Acacia loderi</i> Shrublands	-	Endangered	Species or species habitat may occur within study locality	Moderate - small tracts of remnant vegetation present in central section of proposed site could include this EEC and provide habitat for threatened flora and fauna.

The proposed development site appears to be located within cleared land. There are a small number of habitat trees within the proposed site. There is a moderate risk of impact on the remnant *Acacia loderi* Shrublands endangered ecological community by the proposed construction of the Broken Hill Solar PV Power Project.

Threatened flora species

Five threatened flora species have been previously recorded or have been identified as potentially occurring within 25 km of the study area (defined as the study locality), including one species listed as vulnerable under the EPBC Act (refer to **Table 5-3**).

■ **Table 5-3 Threatened flora species in the study locality**

Scientific Name	Common Name	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk of impact
<i>Acacia carneorum</i>	Needle Wattle	Vulnerable	Vulnerable	Species or species habitat likely to occur within study locality	Low - habitat does not appear to be present. No vegetation communities which this species may use for habitat are visible within the proposed site.

Scientific Name	Common Name	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk of impact
<i>Acacia notabilis</i>	Mallee Golden Wattle	-	Endangered	Species or species habitat may occur within the study locality	Low - habitat does not appear to be present. No vegetation communities which this species may use for habitat are visible within the proposed site.
<i>Acacia rivalis</i>	Creek Wattle	-	Endangered	Species or species habitat may occur within the study locality	Low - habitat does not appear to be present. No vegetation communities which this species may use for habitat are visible within the proposed site.
<i>Atriplex acutiloba</i>		-	Endangered	Species or species habitat may occur within the study locality	Low - habitat does not appear to be present. No vegetation communities which this species may use for habitat are visible within the proposed site.
<i>Swainsona murrayana</i>	Slender Darling Pea	-	Vulnerable	Species or species habitat may occur within the study locality	Low - habitat does not appear to be present. No vegetation communities which this species may use for habitat are visible within the proposed site.

As the site appears to be located within cleared land and no vegetation communities were identified on-site from the desktop assessment, there is a low risk of impact on these threatened flora species.

Threatened fauna species

Thirty five threatened or migratory fauna species have been previously recorded or have been identified as potentially occurring within 25 km of the study area (study locality), including either species listed as vulnerable under the EPBC Act (refer to **Table 5-4**).

■ **Table 5-4 Threatened and migratory fauna species in the study locality**

Scientific Name	Common Name	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk Impact
Birds					
<i>Ardeotis australis</i>	Australian Bustard	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Burhinus grallarius</i>	Bush Stone-curlew	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.

Scientific Name	Common Name	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk Impact
<i>Calamanthus campestris</i>	Rufous Fieldwren	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Certhionyx variegatus</i>	Pied Honeyeater	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Climacteris picumnus</i>	Brown Treecreeper	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Epthianura albifrons</i>	White-fronted Chat	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Hieraaetus morphnoides</i>	Little Eagle	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Melanodryas cucullata</i>	Hooded Robin	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Neophema splendida</i>	Scarlet-chested Parrot	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Oxyura australis</i>	Blue-billed Duck	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Pezoporus occidentalis</i>	Night Parrot	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Pyrrholaemus brunneus</i>	Redthroat	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Rostratula australia</i>	Australian Painted Snipe	Vulnerable	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Circus assimilis</i>	Spotted Harrier	-	Vulnerable	Species or species habitat likely to occur within study locality	Low - habitat does not appear to be present.

Scientific Name	Common Name	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk Impact
<i>Hieraaetus morphnoides</i>	Little Eagle	-	Vulnerable	Species or species habitat likely to occur within study locality	Low - habitat does not appear to be present.
<i>Cacatua leadbeateri</i>	Major Mitchell's Cockatoo	-	Vulnerable	Species or species habitat likely to occur within study locality	Low - habitat does not appear to be present.
<i>Hirundapus caudacutus</i>	White-throated Needletail	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Merops ornatus</i>	Rainbow Bee-eater	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Ardea alba</i>	Great Egret, White Egret	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Ardea ibis</i>	Cattle Egret	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Rostrallata benghalensis s. lat.</i>	Painted Snipe	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
Mammals					
<i>Antechinomys laniger</i>	Kultarr	-	Endangered	Species or species habitat may occur within study locality	Low - habitat is not likely to occur due to grazing within the locality
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart		Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.

Scientific Name	Common Name	EPBC Act status	TSC Act status	Likelihood of occurrence	Risk Impact
<i>Leporillus conditor</i>	Greater Stick-nest Rat	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Notomys longicaudatus</i>	Long-tailed Hopping-mouse	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Chalinolobus picatus</i>	Little Pied Bat	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Nyctophilus timoriensis</i> (South-eastern form)	Greater Long-eared Bat, South-eastern Long-eared Bat	Vulnerable	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
Ray-finned fish					
<i>Maccullochella peelii pealii</i>	Murray Cod	Vulnerable	-	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
Reptiles					
<i>Ctenophorus decresii</i>	Tawny Crevice-dragon	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Pseudonaja modesta</i>	Ringed Brown Snake	-	Endangered	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Lerista xanthura</i>	Yellow-tailed Plain Slider	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.
<i>Tiliqua occipitalis</i>	Western Blue-tongued Lizard	-	Vulnerable	Species or species habitat may occur within study locality	Low - habitat does not appear to be present.

The proposed site is devoid of significant vegetation communities which would provide habitat for a large number of the threatened fauna species and therefore there is a low risk of impact on these threatened fauna species.

Conclusions and Need for Further Assessment

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Overall, although a number of endangered ecological communities and threatened flora and fauna species of national and state conservation significance have been recorded in the wider study locality or listed as possibly occurring within the area, many of these species or species habitats have a low risk of occurring within the proposed project site. However, there is a moderate risk of affecting the *Acacia loderis* Shrublands endangered ecological community as there are small tracts of remnant vegetation on the proposed site which could potentially contain this endangered ecological community and provide habitat for threatened flora and fauna.

A flora and fauna assessment (including a field investigation) would be undertaken during the preparation for the environmental assessment to assess potential impacts of the project on threatened species, populations or communities.

5.3. Other Environmental Issues

There are a range of potential environmental issues associated with the Broken Hill Solar PV Power Project that are not considered to be key issues. These issues are considered secondary issues given the characteristics of the project and the availability of appropriate safeguards for mitigation. These issues are outlined in **Table 5-5**.

It is proposed that these issues will be addressed in sufficient detail to assess the level of their impacts (if any). It is anticipated that any impacts identified would be able to be managed through appropriate mitigation measures and management plans.

■ **Table 5-5 Other Environmental Issues**

EXISTING ENVIRONMENT	POTENTIAL IMPACTS	MANAGEMENT AND MITIGATION MEASURES
Soils and Geology		
Soils within the study area are thin and weathered. They are likely to derive from weathered metamorphics, while silty clays are contributed by ephemeral streams within the study area. From interpretation of aerial imagery, there is low potential for gilgai soil to occur within the study area.	Construction activities such as excavation have the potential to cause soil erosion and sedimentation.	The adverse impacts on soils are expected be minimal and would be managed with the implementation of erosion and sedimentation control measures. A detailed geotechnical study would be undertaken as part of the environmental assessment.
Groundwater		
Broken Hill is located within the Adelaide Fold Belt groundwater management unit (GMU) (Geoscience Australia, 2008). The Adelaide Fold Belt GMU covers an area of over 12,000 square kilometres and has a sustainable yield of over 59,000 megalitres per year. The predominant source of groundwater within an area 0-150 km around Broken Hill is the Fractured Rock Groundwater Province. This province is characterised by variable, but often low yield and supplies water for various uses including small-scale stock and domestic bores. Groundwater quality within the study area is generally considered to be poor, with values of total dissolved solids and salinity too high for human consumption (Geoscience Australia, 2008). Broken Hill is located in the Western Water Management Area. The water sharing plan for the Western Water Management Area commenced on 1 July 2008, but only applies to areas within the Great Artesian Basin.	It is unlikely that groundwater would be encountered given the minor excavation and earthwork requirements for the proposed PV plant and pole placements for the transmission lines Contamination of groundwater would also be unlikely given that chemicals and fuels would be appropriately stored, and spills procedures would be implemented. Effects on groundwater are not considered to be a fatal flaw and can be adequately managed.	Groundwater impacts are expected to be minimal. Appropriate chemical and fuel handling as part of the Construction Environmental Management Plan (CEMP) would mitigate any potential contamination of groundwater.

Contamination		
A search of the Department of Environment, Climate Change and Water (DECCW) contaminated site register found no records in the database for the unincorporated area. There were five contaminated site records for the Broken Hill LGA, none of which are located adjacent to, or in close proximity to the proposed PV plant. The site is not located on the contaminated site register.	Given that there are no contaminated site records on, or adjacent to the proposed development and that the site appears to be undeveloped, it is unlikely that significant contamination exists on the proposed PV plant site.	There is not anticipated to be any impacts to contaminated land. If contaminated soils are encountered during the implementation of the proposed works, all work in that area would cease and the Environmental Manager would be contacted to determine the appropriate course of action.
European Heritage		
A search of relevant historical heritage registers was undertaken to identify the locations of non-Aboriginal heritage items and places in the study area. The following heritage registers were searched: ■ Register of the National Estate; ■ Commonwealth Heritage List; and ■ State Heritage Register and the State Heritage Inventory. The results of the heritage register searches indicated that there were no recorded cultural heritage items listed on Register of the National Estate, Commonwealth Heritage List or State Heritage Register or Inventory located within a 5 km radius of the proposed PV plant.	There is no recorded European heritage items located on or adjacent to the project site and none would be affected by the proposed PV plant and transmission line. It is unlikely that any European heritage items would be affected by the construction and operation of the proposed development at Broken Hill.	If a potential European heritage site is uncovered during construction, works in that area would cease until the find could be assessed by an appropriately qualified archaeologist, and the NSW Heritage Branch would be consulted.
Access and Traffic		
The main road in the study area is the Barrier Highway. The Barrier Highway is the main road which joins Broken Hill and Peterborough in South Australia. The Highway forms part of the inland route from Sydney to Adelaide – National Route 32. Although a relatively remote road, the Highway does carry significant volumes of traffic. There are a number of unsealed, unnamed access roads which provide access to the proposed site including one which traverses the northern border of	Access to the proposed PV plant site during the construction and operation phases is likely to be obtained via the unnamed roads adjacent to the property on the north of the site or the railway line. This is a single carriageway road. A railroad crossing would be provided across the rail line if required. The construction and operation of the proposed Broken Hill Solar PV Project is not anticipated to have a significant impact on traffic flows, given that there would be a small increase in traffic volumes	Consultation would be undertaken before construction with the appropriate roads authority regarding the works that may affect roads or traffic. A Traffic Management Plan would be developed as part of the CEMP.

the site, one which traverses the southern border of the site adjacent to the rail line and another unsealed access road provides access to the dwelling present on the property. Each of these tracks appears to carry very minor volumes of traffic.	from vehicles. The 22kV transmission line may also cross some roads which has the potential to disrupt traffic. This aspect of the works would require consent with the RTA or the local council under Section 138 of the <i>Roads Act 1993</i>.	
Alienation of Resources		
The proposed site is located on land occupied by a Western lands lease for pastoral purposes, issued under the <i>Western Lands Act 1901</i>. For interpretation of the aerial photography, it appears that the site is undeveloped. Information was obtained from Industry and Investment NSW (Department of Primary Industries branch) to determine current exploration titles and applications for minerals, coal and petroleum. There are currently four Exploration Licences (EL6689, EL6132, EL2921 and 6774) and one Consolidated Mining Lease (CML13) over the proposed PV plant site. The Mining Act 1992 allows for an exploration licence to be issued for the exploration of minerals and also a consolidated mining lease which comprises a consolidation of previously existing mining leases or mining purposes.	There is a potential for any planned exploration to be affected during the construction of the proposed PV plant. It is currently unknown whether there are plans to explore the region, or extract minerals in the short-term. It would be possible that future mineral exploration and extraction schedules could be managed around the planned timeframe for construction. During operation, there is a potential that the operation of the proposed PV plant could affect future exploration and extraction planned for the site, as it may obstruct the exploration and extraction of minerals in close proximity to the PV plant infrastructure. Potential impacts to any planned exploration or extraction are determined to be low given that: ■ The proposed site intersects a very small proportion of the total land covered by EL2921 (approx 6ha or 0.1% of the total EL area) ; ■ The proposed site intersects a very small proportion of the total land covered by EL6132 (approx 24ha or 0.2 % of the total EL area) ■ The proposed site intersects a very small proportion of the total land covered by EL6774 (approx 1 ha or 0.02% of the total EL area) ; ■ The proposed site intersects a very small proportion of the total land covered by EL6774 (approx 142 ha or 1.5% of the total EL area) ; ■ The proposed site intersects a very small proportion of the total land covered by CML 13 (approx 1 ha or 0.1% of the total CML area)	Consultation would be undertaken with the current exploration licence holders and consolidated mining lease holders, Perilya Broken Hill Limited, regarding the project.

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	Therefore, only a small proportion of the land would be unavailable for exploration or mining.	
Air Quality		
The State of the Environment (SoE) supplementary report (2009) for the Broken Hill LGA notes that one of the main air quality problems in the LGA is dust (in particular, lead containing dust). This includes mobilised dust from vacant land, uncovered loads, mine leases, building demolition and land clearing and existing commercial and industrial activities. Dust may be a factor on the proposed PV plant site as large areas of land on, and adjacent to the site, may become exposed during dry weather conditions which would result in dust. There are no heavy polluting industries in the area.	The construction of the proposed PV plant and transmission line is not anticipated to have a significant impact on air quality. There is the potential for dust during excavation and earthworks are considered to be minimal given that the closest residential dwelling to the proposed PV plant is 1.2 km distant, and the closest residential dwelling to the transmission line is 580 metres. Construction would be carried out in a staged/progressive manner along the length of the transmission line route and would thus only affect localised areas at any one time. The operation of the proposed PV plant would involve distribution of electricity generated by solar and would not generate any emissions. Annual maintenance activities would result in some localised, intermittent vehicle emissions and potentially some generation of dust from vehicles travelling across the access tracks. The impacts on local and regional air quality are expected to be negligible.	A CEMP would be prepared to manage air quality impacts during excavation and construction of the project.
Hazard and Risk - EMF		
A 22kV transmission line traverses the proposed solar PV plant site. This is the existing line in which the proposed line will follow to the Broken Hill substation. A 220kV transmission line is located approximately 1km to the south east of the site and south of the railway line.	Considering that no dwellings or other facilities are intended to be built and occupied within the proposed 2 - 22kV transmission line easement and that the nearest potentially occupied building is located approximately 580 metres from the proposed centreline, the EMF that would be generated by the proposed transmission line would be well below the guideline for public exposure and would not be expected to have an adverse impact on human health.	The EMF levels of the proposed transmission line would be calculated as part of the detailed Environmental Assessment.
Hazard and Risk – Bushfire		
In terms of bushfire hazard and risk, the Broken Hill region is generally characterised by hot, persistently	The proposed PV plant is unlikely to be affected by bushfire, or pose a significant bushfire risk due to the	The proposed development would not result in an increased risk of bushfire for

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dry desert climate. There has been no recorded bushfire or wildfire activity in the area since 2007. Given that the proposed site is sparsely covered with low-lying shrubs and there is no bushland located adjacent to, or in the surrounding area, the proposed site is not considered to be in a bushfire prone area.	lack of existing vegetation on and surrounding the site.	the site.
Social and Economic impacts		
The proposed site is located within the unincorporated area of NSW (not part of any local government area). According to the 2006 Census there were only approximately 1,100 people over the 93,300 square kilometre area in the unincorporated area. The Far West Region of NSW is the most sparsely populated in the state accounting for 18.4 per cent of the land mass, but only 0.4 per cent of the population. The nearest township to the proposed PV plant is Broken Hill located approximately 4.5 km distant. The proposed PV plant is located in the suburb of Broken Hill which has a population of 19,551 people (ABS, 2006). The main industry of employment is metal ore mining with 8.3 per cent. The unemployment rate for the suburb of Broken Hill is 8.9 per cent which is higher in comparison to the overall Australian unemployment rate of 5.2 per cent. The Broken Hill region has traditionally been reliant on local resources and agricultural sectors. The mining industry continues to play a central role in the Far West Region's economy with large-scale mining operations such as silver, lead and zinc. The mining sector accounts for 20 per cent of the region's Gross Regional Product, 10 per cent of its employment and 70 per cent of its exports (Department of State and Regional Development, 2008). Tourism continues to grow and is becoming increasingly important to the region's economy.	The construction of the PV plant at Broken Hill is likely to generate approximately 150 to 200 construction jobs. Accommodation would be required for construction personnel during the construction period (approximate duration of 12 months). It is possible that construction workers would relocate their families to Broken Hill during the construction period, and this may place pressures on services such as accommodation, schools and health services. Additional accommodation would be required for construction personnel during the construction period (approximate duration of 12 months). Due to the potential for accommodation shortage and pressures on community services, contingency measures such as temporary accommodation camps may be required.	A detailed social and economic assessment would be undertaken as part of the environmental assessment.
Land Use		
The proposed development is located entirely within the unincorporated area of NSW (not part of any local	The change in land use from pastoral uses to power generation is not considered to be significant.	Overall, the adverse impacts on land use are expected to be minimal.

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government area). The closest township to the proposed PV plant is Broken Hill located 4.5 km distant. Land use in the wider Far West Region includes mining and agriculture (mainly dry land grazing). Approximately 95 per cent of native vegetation in the region remains unmodified except for grazing. The railway line is located immediately to the north of the site. The Broken Hill airport is located approximately 6.5 km to the east of the site. There are a number of mines (including abandoned mines) located in the wider surrounding area. There are no State forests or conservation areas in the vicinity of the proposed PV plant. The area for the proposed PV plant site is located on rural land over one property, Crown land, which is currently administered by the NSW Department of Lands, Western Division. There is currently a Western lands lease on the site for pastoral purposes. The 2 - 22 kV transmission line connecting the PV plant to the Broken Hill substation would traverse four land holdings (Crown land and freehold land) and pass within approximately 580 metres of sensitive receivers. The transmission line would be predominantly located over rural land.	Construction of the transmission line would result in temporary loss of access to land along the transmission line easement during the construction period. Construction impacts are not considered to be significant. An easement of 10 metres would need to be obtained for the 2 -22kV transmission line where it traverses private land holdings which would allow secure access to the transmission lines for their ongoing operation, maintenance and upgrade. Activities associated with on-going maintenance would be minor and non-intrusive and would not generate significant noise or involve any disruptions to land use. Consent from the Minister for the Department of Lands and the leaseholder would be required regarding the development of the PV plant and transmission line over Crown land. If a special purpose lease is given for the proposed development, as the site is located in a mining lease area under the Mining Act 1992, consent from Industry and Investment NSW would also be required.	The management of existing and proposed land use of the project area is not considered to be a key environmental issue. Further investigation into the process of development of Crown land in the Western Division will be examined in detail in the Environmental Assessment.
Waste Management		
The project would generate a number of waste streams and utilise a variety of materials during the construction phase.	During construction, excavated material and green waste would be generated as waste. No operational waste would be associated with this project.	A Waste Management Plan (WMP) would be developed and incorporated in to the CEMP. This would incorporate the principles to avoid, re-use and recycle to minimise wastes.

6. Conclusion

This PEA has described the proposed Broken Hill Solar PV Power Project and established the strategic context of the project. The project meets the criteria for classification as a major development under the Major Development SEPP and will therefore be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Potential environmental impacts associated with the project have been categorised as key issues or other issues. Based on the findings of this PEA an indicative scope for the environmental assessment has been developed, focusing on the key issues. The other issues can be readily addressed through appropriate mitigation and management measures and do not require detailed assessment. Following consideration of this PEA and consultation with other agencies, the Department of Planning will provide the Director-General's requirements for the environmental assessment.

The environmental assessment will be prepared in accordance with the Director-General's requirements under the provisions of Part 3A of the EP&A Act. A Statement of Commitments will be developed for inclusion in the environmental assessment and will address the management of key issues and other issues.

7. References

ABS, 2006. 'Broken Hill (A) (State Suburb), viewed 2 August 2010, <http://www.censusdata.abs.gov.au/>. Australian Bureau of Statistics (ABS).

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