



GUNNING SOLAR FARM

**PRELIMINARY ENVIRONMENTAL ASESSEMENT TO OBTAIN
SECRETARY'S ENVIRONMENTAL ASESSEMENT REQUIREMENTS FOR
STATE SIGNIFICANT DEVELOPMENT**

PROJECT REFERENCE: PEA-16-149 DATE: 5 JUNE 2017

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1. INTRODUCTION

Photon Energy is proposing to construct and operate a 316MW solar farm using photovoltaic technology at a site in Lade Vale, about 12 km south-west of Gunning in NSW. The proposed site is made up of several lots which vary in size from 80 ha to 200 ha and is bisected by a 330KV TransGrid powerline. The solar farm would connect into this powerline. The site has been cleared and disturbed for agricultural activity and is currently used for sheep grazing.

As the capital value of the solar farm would exceed \$30 million, the State and Regional Development SEPP determines that the project is State Significant Development (SSD) and consequently the proponent must prepare an Environmental Impact Statement (EIS) and the relevant planning authority is the Department of Planning and Environment (DPE). Photon Energy is seeking the Secretary's Environmental Assessment Requirements (SEARs) to enable the preparation of the EIS. This Preliminary Environmental Assessment provides supporting documentation including:

- Information on the site;
- Description of the solar farm and its construction and operation;
- Statutory context;
- Identification of key environmental issues; and
- Preliminary impact assessment for construction and operations.

2. SOLAR FARM SITE

2.1. LOCATION

The proposed site for the solar farm site is located in the Upper Lachlan Shire Council Local Government Area, approximately 12 km south west of Gunning NSW. The site (known as “the proposed site”) is located across ten lots (Lot 37, 48, 69, 84, 149, 162, 170, DP754130 - Lot 3, 4, DP1142197 - Lot 1, DP809910) in Lade Vale and is directly adjacent to Lade Vale Road (refer to Figure 2.1 below).

A TransGrid power transmission line crosses the northern section of the proposed solar farm.

The proposed site was selected due to:

- its proximity to the TransGrid power line and to major cities (Canberra, Sydney);
- its rural environment and there is no substantial housing development in close proximity to the site;
- ease of access to /from the Hume Highway;
- existing land use as its been cleared and disturbed by agricultural activities;
- existing adjacent land use including a fertiliser plant; and
- the topography of the site is relatively flat and requires minimal earthworks.

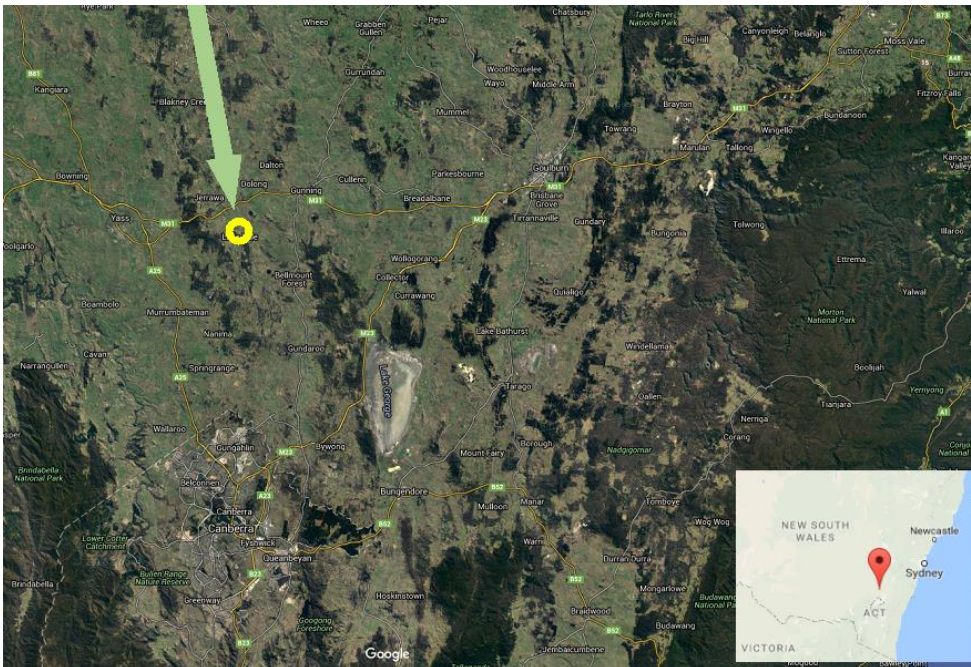


Figure 2.1 Site Location

2.2. SITE DESCRIPTION

The proposed site is accessible via Lade Vale Road to the north and Iron Mines Road to the west. An unsealed road reserve known as Elms Road runs through the centre of the proposed site.

The proposed site is irregularly shaped and has been determined by the suitability and the availability of land. The proposed site is approximately 500 hectares of cleared and relatively flat land. The proposed site and surrounding properties have experienced broad scale clearing and disturbance in the past for

agriculture and is currently used for sheep grazing.

Other features of the site include:

- A large dam – about 10 ha in surface area in the north west corner of the site;
- About 10 small dams < 0.5 ha in surface area;
- An unnamed ephemeral creek which bisects the site. There are wetland areas along the creek;
- Other minor drainage lines;
- A small section (<10%) of a 4.5 ha remnant bushland area;
- Scattered paddock trees;
- Screening, ornamental or wind break plantings of non-native tree species;
- TransGrid 330kV powerline which crosses the site from east to west;
- Elms Road – an unsealed local road which bisects the centre of the site from north to south;
- Houses, sheds and other infrastructure required for agricultural activity.

Refer to Figure 2.2 for details on the proposed site and surrounding neighbours.

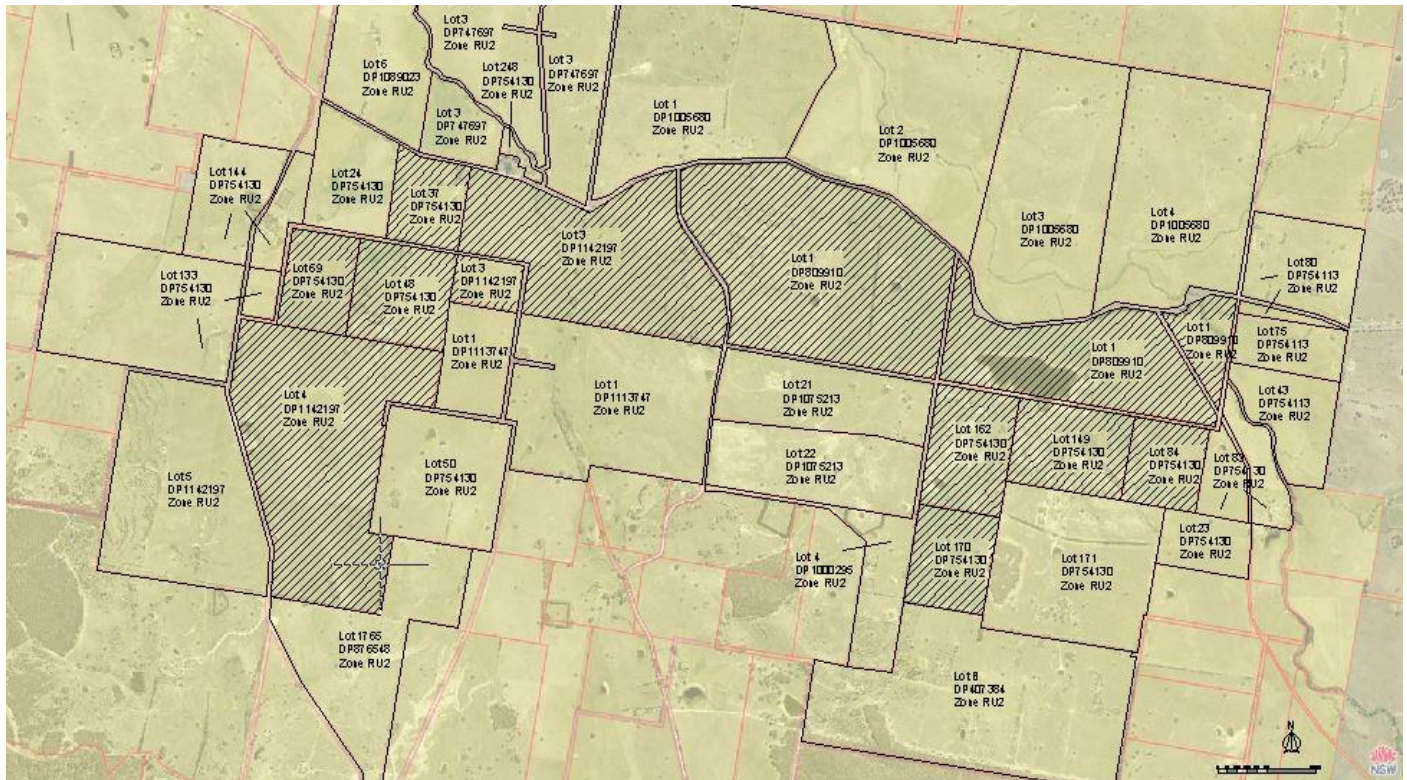


Figure 2.2 Surrounding Properties – note the hatch area is the “proposed site”

2.3. PROXIMITY OF SENSITIVE RECEIVERS

Six residential properties are located within 0.5 km of the project (Refer to Figure 2.3). The construction impacts on sensitive receivers would be relatively minor and temporary and are generally in line with 'normal' agricultural / farming activity. During operations the major potential impact would be visual. The three properties along the northern boundary would potentially be most affected by the visual impact of the project, as the solar panels would be facing north.

While the area of solar panels significant, the panels are less than 2.5 metres high and not intrusive within a flat landscape. Landscaping and other mitigation measures would be developed in consultation with affected property owners.

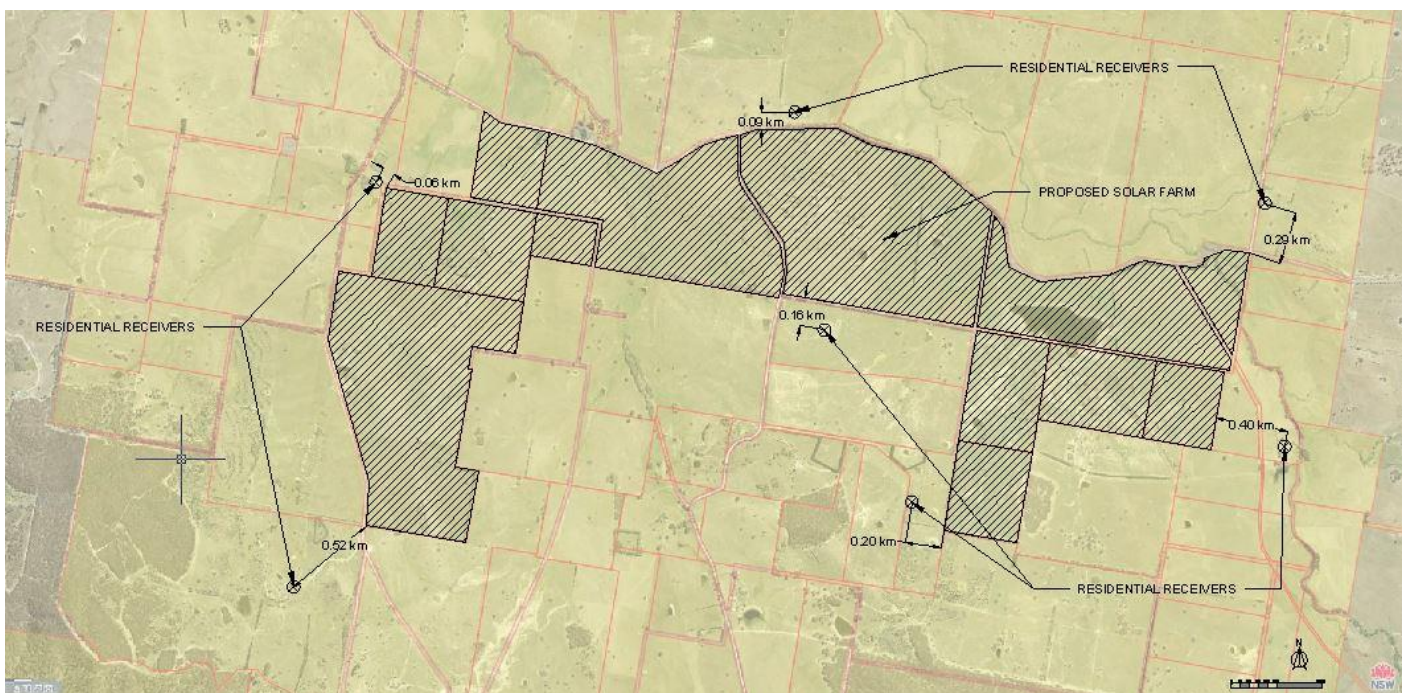


Figure 2.3 Proximity of Residential Properties to Proposed Solar Farm

3. PROJECT DESCRIPTION

The proposed solar farm will cover approximately 90% of the 500 ha of land available (refer to Figure 3.1). The remaining land would be dedicated to buffer zones required for waterways and wetlands, easements for the TransGrid powerline and current road reserves. There is also the opportunity to avoid disturbing other sensitive areas discovered during investigations for the EIS.

The project would consist of the following elements:

- Approximately 440 hectares of solar PV modules on ground screw or similar mounting structures. The modules will be monocrystalline, polycrystalline and could incorporate single or dual access tracking. These would generate about 316MW at maximum capacity;
- Central inverters located within the site;
- Underground cabling;
- A transformer kiosk to connect to Transgrid infrastructure;
- A Transgrid substation with transformer located within the site;
- A maintenance and office building;
- Security fencing with 24/7 monitoring and surveillance cameras;
- Maintenance and access tracks;
- Two culvert road crossings of the ephemeral creek;
- Up to three road accesses on Lade Vale Road suitable for use by semitrailers; and
- Landscaping and tree planting.

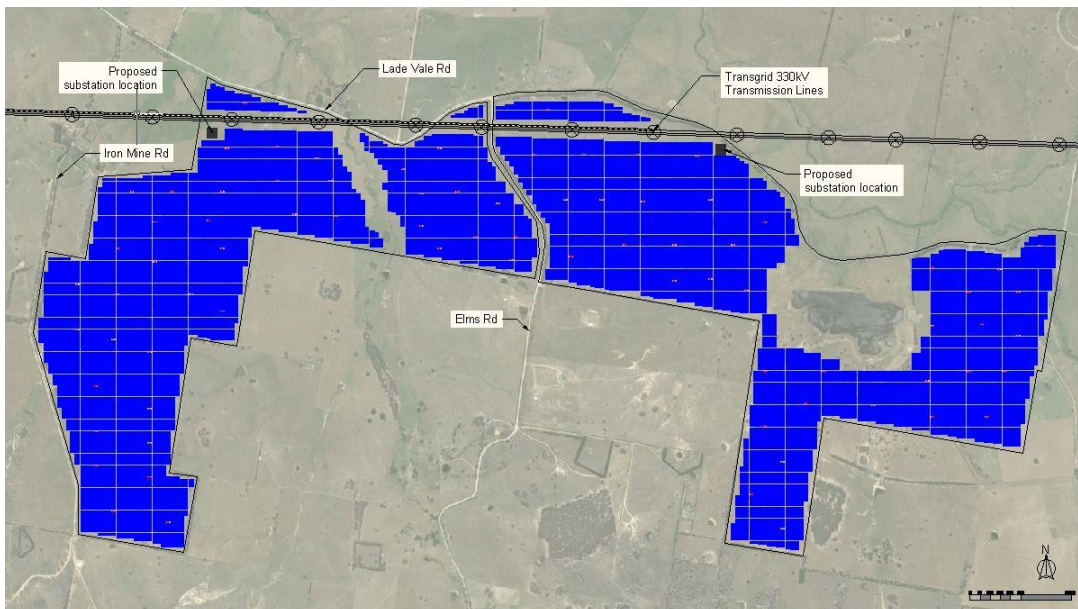


Figure 3.1 Site Layout

Construction

For the installation of the solar modules, minor earthworks would be required in some areas to remove any rocky outcrops or localised land anomalies and to fill in small dams. Temporary and permanent internal access roads would also require some earthworks. However the intention is to minimise the disturbance of the ground wherever possible. The angle of the solar panels can be adjusted to accommodate any variations in site topography.

A solar module consists of the mounting/tracking system, the solar panels and cabling. The solar PV mounting system is installed using ground screw or pole ramming technology that does not require concrete. The solar panel is then installed on the mounting system. Concurrently the required underground cabling and connection to the solar module is also installed.

Central inverters collect electricity from an area of solar panels, convert it to AC and feed it into the site cable network. These are small kiosks installed on a concrete slab.

Generally the solar farm would be constructed in one hectare stages – with up to 10 one hectare areas in various stages of construction at any one time.

The transmission kiosk and substation would be built adjacent to the powerlines on the site. They are approximately 30m x 30m in size. Two potential locations for the substation have been identified. Refer to Figure 3.1.

A 30m x 30m storage and maintenance building with 4 offices and amenities would also be constructed near one of the site entrances. Additional temporary demountable buildings would be required during the construction of the facility.

Minor earthworks would be required for the preparation of all building sites and in most cases a concrete slab would be required to support the auxiliary infrastructure. Most of the auxiliary infrastructure would be pre-fabricated off-site, delivered and then assembled on-site.

Further design of the auxiliary infrastructure would occur before the preparation of the EIS.

Construction would take 14 months and employ up to 50 people. The current estimated capital cost of the project is \$380 million.

Operation

During operation the solar panels would generate electricity which would be fed into the power grid via the substation. The only other activity on site would be maintenance activities.

The solar farm would generate very little noise during operations. Noise sources include maintenance vehicles and activities and noise from the transformers. Maintenance activities would be undertaken in day light hours only except in an emergency. Most noise generated would be inaudible at sensitive receivers.

Sheep grazing within the solar farm would be used to control vegetation and regrowth.

The solar farm has a life of 30 years and would have the option of either updating the infrastructure or removing the plant. Should the decision be made to remove the plant, then the site would be returned to its existing condition.

Figure 3.2 below is a project completed by Photon Energy which is similar in scope to the proposed Gunning site. The Gunning site will have a similar visual appearance as the site below.



Figure 3.2 Czech Republic – Brno Airport, 21.2MW

4. CONSULTATION

A stakeholder and community consultation plan will be prepared and implemented to consult with the community and local businesses allowing for feedback from the community on the proposal and any mitigation measures. Key regulatory stakeholders would be consulted during the preparation of the EIS.

5. STATUTORY CONTEXT

5.1. PERMISSIBILITY OF DEVELOPMENT

The site is situated within the Upper Lachlan LGA and is subject to the Upper Lachlan Local Environmental Plan 2010. This LEP sets the provisions for land-use planning and development permissibility. The site is located on land zoned for RU2 – Rural Landscape and the relevant zoning extract from the LEP is presented below.

Zone RU2 Rural Landscape

1 Objectives of zone

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To maintain the rural landscape character of the land.
- To provide for a range of compatible land uses, including extensive agriculture.
- To preserve environmentally sensitive areas including waterways and prevent inappropriate development likely to result in environmental harm.
- To protect the Pejar catchment area from inappropriate land uses and activities and minimise risk to water quality.
- To minimise the visual impact of development on the rural landscape.
- To minimise the impact of development on the existing agricultural landscape character.
- To protect and enhance the water quality of watercourses and groundwater systems and to reduce land degradation.
- To maintain areas of high conservation value vegetation.

2 Permitted without consent

Building identification signs; Business identification signs; Environmental protection works; Extensive agriculture; Farm buildings; Home-based child care; Home occupations

3 Permitted with consent

Bed and breakfast accommodation; Cellar door premises; Dwelling houses; Farm stay accommodation; Garden centres; Hardware and building supplies; Landscaping material supplies; Light industries; Plant nurseries; Restaurants or cafes; Roads; Roadside stalls; Rural supplies; Secondary dwellings; Timber yards; Any other development not specified in item 2 or 4

4 Prohibited

Amusement centres; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Car parks; Caravan parks; Charter and tourism boating facilities; Child care centres; Commercial premises; Crematoria; Eco-tourist facilities; Entertainment facilities; Exhibition homes; Exhibition villages; Freight transport facilities; Function centres; Health services facilities; Heavy industrial storage establishments; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Industries; Jetties; Marinas; Mooring pens; Moorings; Mortuaries; Passenger transport facilities; Public administration buildings; Recreation facilities (indoor); Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Service stations; Sex services premises; Storage premises; Tourist and visitor accommodation; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres; Water recreation structures; Wharf or boating facilities; Wholesale supplies

Within Zone RU2, Electricity generating works is permitted with consent in this zone as it is not “Prohibited” and any development that is not “Prohibited” is permitted with consent.

5.2. STATE ENVIRONMENTAL PLANNING POLICY (STATE AND REGIONAL DEVELOPMENT) 2011.

The State and Regional Development SEPP identifies types of developments and areas where development is considered State Significant. For State Significant Development (SSD) an Environmental Impact Statement (EIS) must be prepared and the approval authority for the development is the Department Planning and Environment (DPE). Schedule 1 of the State and Regional Development SEPP defines the type of non-

government development which is considered SSD. The relevant section of Schedule 1 which identified the thresholds for electricity generating works to be considered SSD is presented below

20 Electricity generating works and heat or co-generation

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:

- (a) *has a capital investment value of more than \$30 million*

As the proposed development is for Electricity generating works and exceeds \$30 million in capital investment, the proposed development would be considered SSD. Therefore, the proponent would be required to obtain Secretary's Environmental Assessment Requirements (SEARs), prepare and lodge an EIS and Submissions Report and have the development application assessed by DPE.

Other authorisations which can be approved concurrently with the EIS are presented in the table below along with an assessment of their need.

Concurrent Authorisations	Comment
(a) the concurrence under Part 3 of the Coastal Protection Act 1979 of the Minister administering that Part of that Act,	Not required - as project is not in coastal zone
(b) a permit under section 201, 205 or 219 of the Fisheries Management Act 1994,	Not required as the project would not impact threatened fish species or fish habitat
(c) an approval under Part 4, or an excavation permit under section 139, of the Heritage Act 1977,	Unknown but unlikely – A Non-Indigenous Heritage Assessment would be undertaken as part of the EIS
(d) an Aboriginal heritage impact permit under section 90 of the National Parks and Wildlife Act 1974,	Unknown but unlikely – An Indigenous Heritage Assessment would be undertaken as part of the EIS
(e) an authorisation referred to in section 12 of the Native Vegetation Act 2003 (or under any Act repealed by that Act) to clear native vegetation or State protected land,	Required – clearing of native vegetation will be required
(f) a bush fire safety authority under section 100B of the Rural Fires Act 1997,	Required – potentially in a bush fire prone area
(g) a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000.	Required – for road crossings of ephemeral creek which may be considered a controlled activity

Other approvals

The solar farm is not a scheduled activity under the POEO Act and does not have the potential to cause significant water pollution. Consequently it would not require an Environmental Protection Licence for its construction or operation.

Section 138 consent under the Roads Act 1993 for the design, construction and operation of road accesses between the site and local roads would be required.

Approval under relevant sections of the Threatened Species Conservation Act 1993 and Environment Protection and Biodiversity Conservation Act may be required. However significant impacts are not anticipated as the site contains very little remnant native vegetation and any high quality vegetation communities would be protected.

6. PRELIMINARY ENVIRONMENTAL ASSESSMENT – KEY ISSUES

6.1. BIODIVERSITY

Existing Environment

Based on the results of the initial desktop review, the proposed site appears to comprise predominantly exotic (improved) pasture grassland and appears devoid of native vegetation with the exception of scattered paddock trees and possibly small isolated patches of derived native grassland (DNG) or natural temperate grassland (NTG). No native woodland or forested areas occur within the proposed site, although a small forested stand occurs just outside the far south-eastern corner of the proposed site.

Method of Assessment and results

A GIS desktop review was undertaken to determine the spectrum of Threatened species, populations and ecological communities listed under the NSW Threatened Species Conservation Act 1995 (TSC Act) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) that have been previously recorded in the Gunning/Yass /Lade Vale localities which would form the suite of initial 'subject species' to be considered in the EIS. The following datasets were sourced from the OEH spatial data portal and imported into GIS software (arcmap 10.5) for review:

- Lachlan extant VISmap_3779 (regional vegetation map);
- SE LLS Biometric 2014 E 4211 (regional vegetation map);
- FE CRA Southern Forests revised 3858 (regional vegetation map);
- Grasslands Pre Settlement_P 4099 (pre 1750 native grasslands modelled mapping);
- SE High 3917 (remote sensing native grasslands mapping);
- Bionet atlas (Threatened flora and fauna – 20 and 50km radius searches, May 2017); and
- Soil landscapes of the Goulburn 1:250,000 map sheet (2010).

An EPBC Protected Matters Search Report (20km search, May 2017) was also generated to supplement the datasets listed to identify EPBC listed Threatened species, Commonwealth Ecological Endangered Community (CEEC) / Ecological Endangered Community (EEC) and migratory species considered as subject species for this proposal. In addition, 50cm resolution ortho-rectified digital aerial imagery supplied by NSW LPI/DFSI was obtained and imported into arcmap as an additional data layer for the desktop review.

The GIS review was supplemented with a search of the NSW DPE major projects portal to identify SSD/SSI projects in the Gunning-Yass-Lade Vale localities that included ecological assessments. The following ecological assessment reports were downloaded from the portal and were reviewed to supplement the GIS desktop analysis:

- ERM (2015) Biala Wind Farm – Ecological Impact Assessment;
- ngh environmental (2006) Cullerin Range Wind Farm – Biodiversity Assessment; and
- ngh environmental (2014) Rye Park Wind Farm – Biodiversity Assessment.

Based on the initial desktop review, a list of Threatened Species Communities (TSC)/EPBC-listed threatened species and CEECs/EECs provided below would be considered the initial subject species requiring consideration in the EIS based on suspected habitat types present in the proposed site area. These include:

Endangered Ecological Communities

- Tablelands Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions (TSC Act)
- White Box-Yellow Box-Blakelys Red Gum Woodland (TSC Act)

Critically Endangered Ecological Communities

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act)
- Natural Temperate Grassland of the South Eastern Highlands (EPBC Act)

Flora

- Yass Daisy (*Ammobium craspedioides*)
- Aromatic Peppergrass (*Lepidium hyssopifolium*)
- Doubletail Buttercup (*Diuris aequalis*)
- Austral Toad Flax (*Thesium australe*)

Fauna

Birds

- Glossy Black Cockatoo (*Calyptorhynchus lathami*)
- Gang gang Cockatoo (*Callocephalon fimbriatum*)
- Powerful Owl (*Ninox strenua*)
- Barking Owl (*Ninox connivens*)
- Regent Honeyeater (*Anthochaera phrygia*)
- Painted Honeyeater (*Grantiella picta*)
- Little Eagle (*Hieraaetus morphnoides*)
- Square tailed Kite (*Lophoictinia isura*)
- Little Lorikeet (*Glossopsitta pusila*)
- Brown Treecreeper (eastern subsp.) *Climacteris picumnis victoriae*
- Hooded Robin (SE form) (*Melanodryas cucullata cucullata*)
- Black chinner Honeyeater (*Melithreptis gularis gularis*)
- Diamond Firetail (*Stagonopleura guttata*)
- Dusky Woodswallow (*Artamus cyanopterus*)
- Speckled Warbler (*Chthonicola sagittatus*)
- Scarlet Robin (*Petroica boodang*)
- Flame Robin (*Petroica phoenicea*)
- White fronted Chat (*Epthianura albifrons*)
- Varied Sitella (*Daphoenositta chrysoptera*)
- Australasian Bittern (*Botaurus poiciloptilus*)

Mammals

- Squirrel Glider (*Petaurus norfolcensis*)
- Yellow bellied Glider (*Petaurus australis*)
- Koala (*Phascolarctos cinereus*)
- Eastern Pygmy Possum (*Cercartetus nanus*)
- Spotted tail Quol (*Dasyurus maculatus maculatus*)
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*)
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Greater Broad nosed Bat (*Scoteanax ruepellii*)
- Southern Myotis (*Myotis macropus*)

Reptiles

- Pink-tailed Legless Lizard (*Aprasia parapulchella*)
- Striped Legless Lizard (*Delma impar*)
- Grassland Earless Dragon (*Tympanocryptis pinguicolla*)
- Little Whip Snake (*Suta flagellum*)
- Rosenberg's Goanna (*Varanus rosenbergi*)

Frogs

- Booroolong Frog (*Litoria booroolongensis*)

Invertebrates

- Golden Sun Moth (*Synemon plana*)

The initial list of subject species above does not include 'migratory species' listed under the EPBC as many of

these would likely be assessed as unlikely possible occurrences within the proposed site given the absence of native vegetation. This would be confirmed following an initial site inspection/habitat assessment.

Based on the results of the initial desktop review, the proposed site appears to comprise predominantly exotic (improved) pasture grassland and appears devoid of native vegetation with the exception of scattered paddock trees and possibly small isolated patches of derived native grassland (DNG) or natural temperate grassland (NTG). No native woodland or forested areas occur within the proposed site, although a small forested stand occurs just outside the far south-eastern corner of the proposed site. Based on the suspected absence of native vegetation within the proposed site, terrestrial ecology field surveys as part of the EIS would likely be limited to a:

- Flora and fauna habitat assessment/site inspection to identify, for example, any DNG/NTG patches and any areas of rock outcropping. The proposed site is mapped as supporting a small number of isolated stands of native grassland based on existing regional grassland mapping. Should any patches of DNG/NTG be recorded during the initial habitat assessment, these would need to be surveyed and mapped (through BAM plots) and may trigger the need for targeted surveys for a suite of Threatened flora (see subject species above) as well as the Golden Sun Moth in spring and summer. Should an abundance of rock outcropping occur across the proposed site (even within the exotic pasture grassland), this may trigger the need for targeted surveys for the Threatened legless lizards and earless dragon in the spring and summer seasons. Surveys for the Booroolong and/or Green and Golden Bell Frogs would be undertaken should suitable aquatic habitats exist along ephemeral creek lines and dams within the proposed site;
- Paddock tree survey (ie. identification of paddock tree species, tree hollows, raptor nests and Threatened woodland birds; stagwatching and spotlighting);
- Anabat surveys targeting microbats (Anabats to be attached to spatially representative paddock trees);
- Koala scat searches (if preferred paddock feed trees are present); and
- Waterbird surveys of the large dam in the western portion of the PA.

Additional flora and fauna surveys of the small forested stand outside the South east corner of the proposed site may be undertaken should this stand of remnant bushland be impacted by the proposal.

The proposed scope of works for the biodiversity assessment would be refined and finalised following receipt of the SEARs and following an initial 2 day site inspection/habitat assessment of the proposed site.

Construction and Operations

Biodiversity impacts from construction and operation of the solar farm may comprise the loss of a relatively small number of paddock trees and tree hollows (which may represent potential breeding habitat for Threatened woodland birds) and the possible loss of small patches of Threatened DNG/NTG. Cumulative impacts (eg. from local wind farms) would be addressed as would the potential impacts on migration movements of the bent wing bats (from their maternity caves to coastal sites) and waterbird movements (eg. from local large dams to lake George and lake Bathurst to the east).

Potential measures that may be considered to mitigate against possible biodiversity impacts include the installation of compensatory nest boxes in forested stands adjoining or proximate to the PA (to mitigate the loss of any paddock tree hollows) and possible offsetting of any mapped areas of DNG/NTG that cannot be retained, in accordance with the new Biobank Assessment Methodology (BAM).

6.2. NOISE

Existing Environment

As the surrounding environment is rural, background noise levels in the local area would be low especially at night. Day time noise is limited to normal agricultural / farming activities. To quantify the background noise levels noise monitoring will be undertaken as part of the EIS.

Construction

During construction, noise would be generated by the initial earthworks, installation of the solar modules, construction of the auxiliary infrastructure and construction traffic. Noise impacts during construction would be generally low as there are few sensitive receivers and the plant and equipment used for the installation of the solar panels are relatively small and comparable to farming equipment. However at some locations, the installation of solar panels would be near to sensitive receivers and higher noise impacts may occur.

A construction noise impact assessment using the Interim Construction Noise Management Guidelines (DECC 2009) would be undertaken for the EIS.

Operation

Once construction is completed, the solar farm would only generate minimal noise. The only noise would be from maintenance activities and vehicles. An appropriate noise assessment would be undertaken to assess the operational noise impacts appropriate to the level and potential impact of the development.

6.3. HYDROLOGY

Existing Environment

Elms Road which crosses the site has been built on the ridge line and is the subcatchment boundary for the site. Generally all the areas west of Elms Road drain towards the unnamed ephemeral creek which crosses the site. Areas east of Elms Road drain to the large dam and another offsite tributary of the unnamed creek. There is also a network of smaller drainage lines often with small dams for livestock. All the creeks and drainage lines are ephemeral and have limited ponding and almost no riparian vegetation.

The unnamed creek is part of a larger creek network which eventually drains to the Lachlan River about 20 km north.

The site is located in the upper catchment and consequently is not subject to regional flooding and is not in an identified flood affected area (i.e. below 1% AEP).

Construction

Some small drainage lines may need minor relocation and an alternative drainage line would be constructed and revegetated (i.e. Grassed swale). Larger drainage lines and the creek would be retained and a suitable buffer zone around these drainage lines would be maintained. Where required, works would be undertaken to mitigate erosion which is currently evident in some drainage lines. A number of dams may be filled in, however some dams would be retained for stock watering. This will be determined during the preparation of the EIS and design development.

Two crossings of the unnamed creek would be constructed to provide internal access across the waterway. These would be low level bridges which would be immersed when the creek is flowing and would have negligible hydrological impact.

Operation

It is expected that there would be negligible impact on the hydrology or drainage from the site for the following reasons:

- rain falling on the solar panels will runoff on to the ground beside the panels and would infiltrate into the ground naturally (i.e. there would no concentration of flows);
- The topography of the site would remain largely unchanged; and

- The solar panels and other infrastructure would only have negligible impact on overland flows, similar to normal agricultural / farming operations.

Due to the reasons above it is not proposed at this stage to conduct a flooding assessment as part of the EIS.

6.4. VISUAL IMPACT

Existing Environment

The existing visual environment is characterised as a rural landscape including undulating grassed paddocks, paddock and remnant trees and scattered rural residences and farm infrastructure. The existing 330 kV powerline has a strong visual presence.

Construction and operation

The solar farm would result in a new, modern and monolithic presence in the landscape. While the solar farm would occupy a substantial area, it would be relatively low in the landscape as the solar panels would extend a maximum of 2.5 m above ground level and the site is relatively flat. Reflectivity of the solar panels is very low (as solar panels aim to absorb light not reflect it) and less than some common surfaces. Table 1 below outlines the reflectance of common surfaces and solar panels.

Material	Reflectance
Snow	80%
White Concrete	78%
Aluminium Roof	74%
Water	5%
Black Asphalt	3%
Solar PV Modules	2.6%

Table 1 Reflectance of common surfaces including solar panels

As discussed in Section 2.1 there are 6 sensitive receivers with 500m of the solar farm and those to the north would experience the greatest impacts. Some of the close sensitive receivers are leasing land to the solar farm and understand and accept the potential visual impacts. Consultation would be undertaken with all nearby sensitive receivers to identify and agree upon mitigation measures such as landscaping. A full visual impact assessment of the solar farm would be undertaken for the EIS. The EIS would also address glare issues and the impact in relation to aviation.

6.5. HERITAGE

Searches of relevant Aboriginal and non-Aboriginal heritage databases, registers and other sources were undertaken. No registered Aboriginal and non-Aboriginal heritage sites were recorded on the site or the in vicinity. No known heritage assessments have been undertaken on the site.

There is the potential to encounter both Aboriginal and non-Aboriginal heritage items or sites during construction. An Aboriginal and non-Aboriginal heritage assessment complying with relevant guidelines would be undertaken as part of the EIS. Where significant or high value heritage sites are found, these would be protected and the solar farm would not be constructed in these areas to avoid impacts on the site/item.

6.6. TRAFFIC & ACCESS

Existing environment

Lade Vale Road forms the northern boundary of the site. Lade Vale Road is a two lane unsealed local road which becomes sealed about 2km west of the site. About 3km west of the site Lade Vale Road intersects with Veterans Road. About 200 m south of this intersection there is an at grade intersection with the Hume Highway – which permits turning in and out in all directions. This would be the primary route to access the site. Other local road users include the fertiliser plant about 2km west of the solar farm on Lade Vale Road and agricultural related traffic.

Construction

During the construction, traffic to the site will include semi-trailers, utility vehicles and mini buses delivering materials, prefabricated components and construction staff. Temporary site sheds will be installed along with a lay down area and car park to accommodate up to 15 cars/mini buses. It is estimated that 6 trucks a day on average will deliver materials and prefabricated components to the site.

Up to three major accesses from Lade Vale Road to the site would be constructed. Indicative locations for these are shown on Figure 6.6. These would be designed in compliance with AUSROADS and local Council standards and would be capable of handling of a semi-trailer. It is noted that a consent under Section 138 of the Roads Act 1993 may be required for these accesses. Smaller light vehicle accesses may be provided at other locations along Lade Vale Road and Elms Road.

Overall the construction traffic impacts of the solar farm would be minimal given the relatively small number of traffic movements generated by construction and the excellent access to Hume Highway.

Operation

The traffic generated by the operation of the solar farm would consist of worker's light vehicles and the occasional truck delivering maintenance materials. This would have a negligible impact on traffic and the road network.

A Traffic Impact Assessment will be undertaken as part of the EIS.

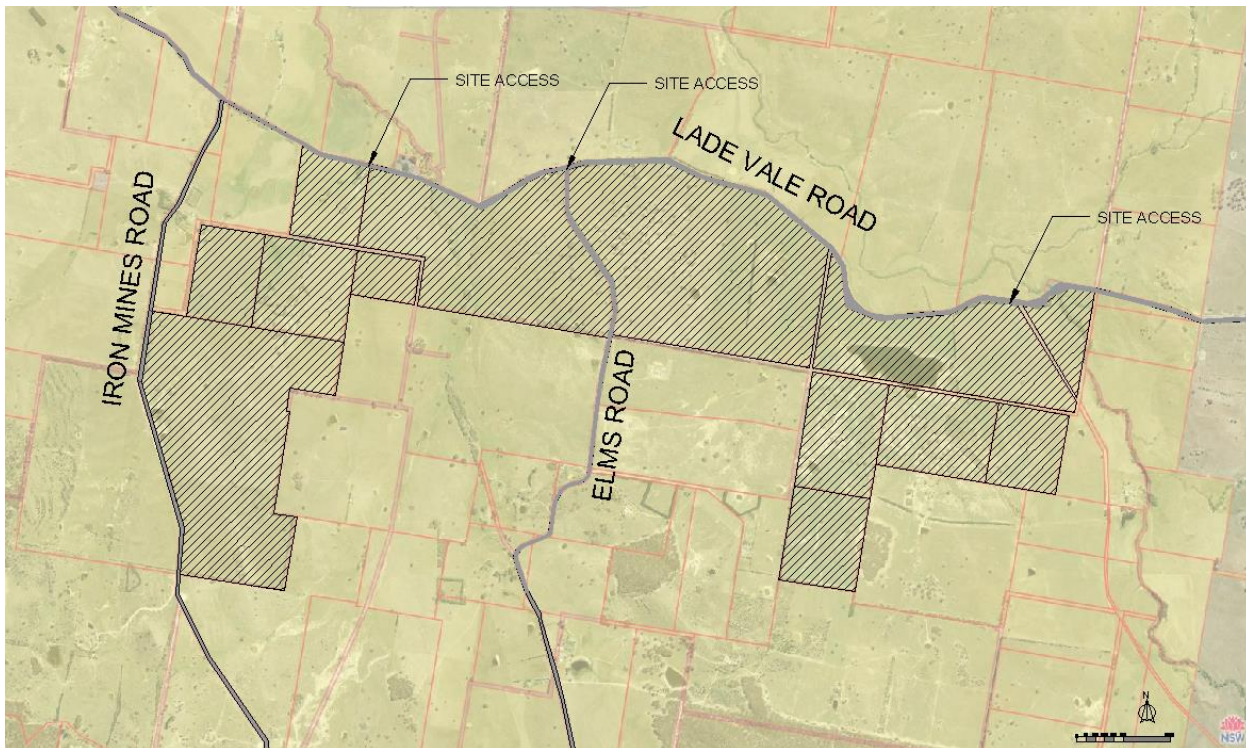


Figure 6.6 Indicative access locations to the proposed site.

7. PRELIMINARY ENVIRONMENTAL ASSESSMENT – NON-KEY ISSUES

Non-key issues were assessed and are presented the table below.

Issue	Existing Environment	Construction	Operation
Air quality	Air quality in the local area would be affected by dust from agricultural activities and unsealed roads. A fertiliser plant about 2km west would also emit odours and dust.	The construction would be staged so the area disturbed would be small reducing the potential for wind generated dust. Wherever possible existing vegetation and groundcover would be retained – and this is expected to be a significant proportion of the site. An air quality management plan would be included in the CEMP	The production of solar energy reduces the carbon footprint of the region by reducing the requirements of coal generated energy. The installation of a solar farm has a positive impact on the area in regards to carbon emissions. The solar farm does not emit any air contaminants.
Soil and Water	An unnamed ephemeral creek crosses the site and there are numerous drainage lines. There is evidence of some erosion especially in some of the drainage lines.	The construction would be staged so the area disturbed would be small reducing the potential for sedimentation and erosion. Wherever possible existing vegetation and groundcover would be retained – and this is expected to be a significant proportion of the site. There is no evidence or record of contamination on the site. The construction of the solar would not affect any groundwater resources. A soil and water management plan would be included in the CEMP.	Where applicable, disturbed areas would be revegetated with ground cover and erosion control works would be undertaken. There would be no change in the impacts compared to the existing situation. The operation of the solar would not affect any groundwater resources.
Socio economic	The solar farm is located in an agricultural area. The nearest town is Gunning about 12 km away.	The construction of the solar farm would generate local employment opportunities and work for local businesses.	The operation of the solar farm would generate about 6 local jobs and some work for local businesses.
Property and land use	The solar farm would be located on agricultural land primary used for sheep grazing.	The construction and operation of the solar farm would result in the partial loss of lands for sheep grazing. However it should be noted sheep grazing within the solar farm would occur for vegetation management albeit at lower stocking rates that currently occur. The land for the solar farm would be either purchased or leased from the relevant property owner. Agreements have been reached with all property owners.	
Fire		The solar farm will comply with the Rural Fires Act 1997 in regards to clearances and fire mitigation requirements.	
Geotechnical		A soil analysis will be carried out to ensure the suitability of the soil structure to support the solar mounting infrastructure. The solar farm will require minimal excavation and soil disruption as the solar system follows the natural contour of the land.	
Waste Management		A waste management plan will be developed after project approval. The plan will include recycling and reduction of waste and use of registered recycling and waste disposal facilities.	

8. CONCLUSION

Photon Energy has conducted this preliminary assessment to construct and operate a 316MW solar farm using photovoltaic technology at a site in Lade Vale, about 12 km south-west of Gunning in NSW. The proposed site is approximately 500 hectares over several lots, bisected by a 330kV TransGrid powerline. As the capital value of the solar farm would exceed \$30 million, the State and Regional Development SEPP determines that the project is State Significant Development (SSD) and consequently the proponent must prepare an Environmental Impacts Statement (EIS) and the relevant planning authority is the Department of Planning and Environment (DPE).

A review of the following has been undertaken:

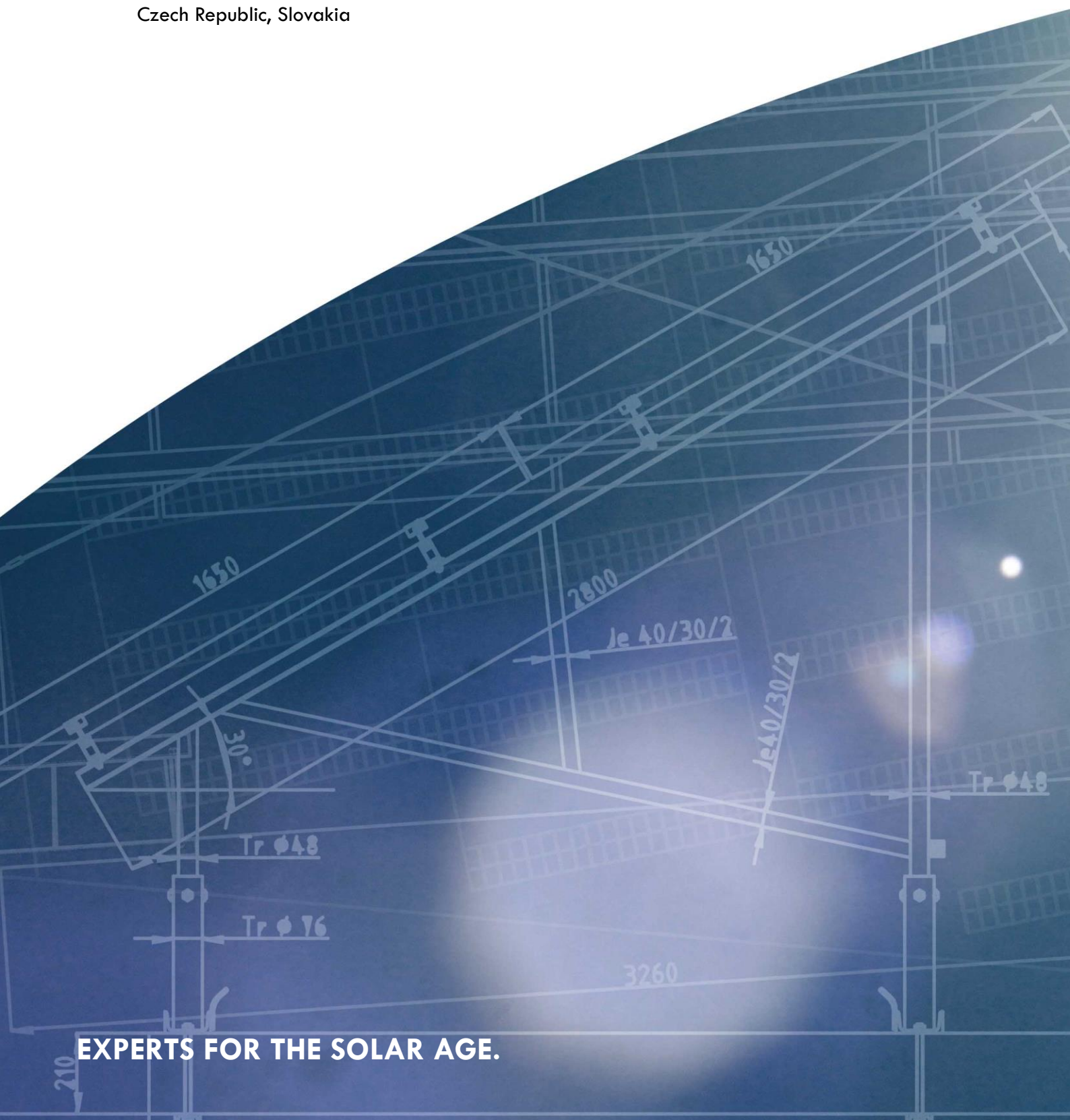
- Information on the site;
- Description of the solar farm and its construction and operation;
- Statutory context;
- Identification of key environmental issues; and
- Preliminary impact assessment for construction and operations.

The key environmental issues identified through this process include biodiversity and visual. These, and the other issues will be fully assessed including potential mitigation during the preparation of the EIS.



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A large, dark blue, curved graphic element on the right side of the page, containing a faint technical drawing of a solar panel mounting system. The drawing includes various lines, angles, and dimensions. Visible labels include '1650', '2800', 'Je 40/30/2', 'Tr Ø48', 'Tr Ø76', '3260', and '210'.

EXPERTS FOR THE SOLAR AGE.