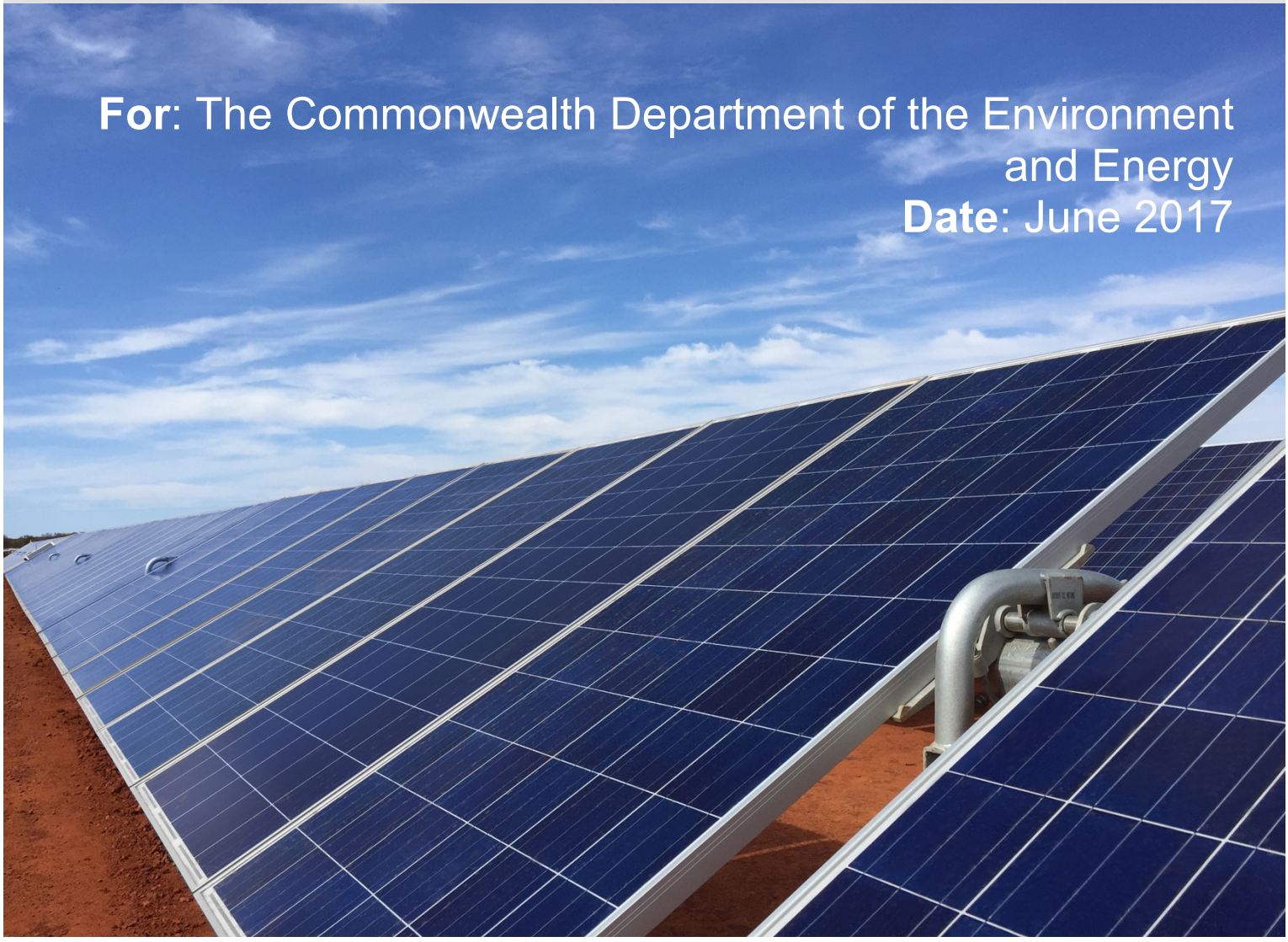
Edify Energy Solar Farm Development at Majors Creek Queensland

Attachment B: Description of the proposed action



For: The Commonwealth Department of the Environment and Energy

Date: June 2017

Detailed description of proposed action

The proposed action involves the establishment of approximately 200 MW AC of solar power photovoltaic (PV) facilities at Woodstock Giru Road, Woodstock (see Attachment C, Figure 1). The energy will be grid-connected through a new switchyard constructed at the site and connected to existing 275 kV transmission line running through the Project Area. The PV facilities will be located within the Project Area (shown as the "Survey Area" in Attachment C, Figure 2) and the development has been designed to avoid significant impacts to MNES. The project will also be designed to accommodate battery storage technology at a later date.

The Project Area was chosen for its relatively flat topography and the High Voltage Transmission lines that crosses the site from the north west to south east.

The Project Area covers approximately 742 ha and is comprised of two lots (65EP197 and 4RP904776). Only a portion of this will be subject to development as described below. The area that will be subject to development is referred to as the proposed 'development envelope' and is the area that is subject to this referral. The development envelope covers an area of approximately 539.5 ha.

Design process to avoid significant impacts to Matters of National Environmental Significance (MNES)

Avoiding impacts to the environment is a critical part of the design philosophy of Edify Energy. The proposed action is specifically designed (footprint, construction processes, operational elements) to avoid significant impacts to MNES. This design process involved the following steps.

The first step was guided by a Preliminary Environmental Assessment (PEA) of the entire area acquired by Edify Energy for the proposed solar farm (including a total of 10 lots). The PEA was undertaken in February 2017. The assessment identified the key features of the environment including known and potential occurrences of MNES. As a result of this work a concept design was created that largely avoided MNES habitats and locations.

The second step involved more detailed ecological surveys in February/March 2017 of the Project Area and surrounds (ES&M 2017). This process involved intensive surveys and resulted in a significantly improved understanding of the ecological constraints across the Project Area. Areas of potential nesting habitat for the Black Throated Finch were identified as a key ecological constraint and were mapped within the Project Area. A development envelope was then designed to avoid these habitat areas (see Attachment A).

Black Throated Finch (southern) Management Plan

The proposed action includes a habitat enhancement program described in the Black Throated Finch Management Plan at Attachment E. This program is designed to improve the foraging habitat value within the proposed development envelope for the Black Throated Finch. A key component of this program includes extensive clearing of exotic species (including Chinee Apple and Rubber Vine) and reseeding of suitable grasses within the development envelope.

The habitat enhancement program will improve the value of the site for Black Throated Finch foraging, and the proposed action presents an opportunity for possible conservation gains for the species.

General description of the action

The proposed action will consist of solar panels mounted on a frame which tracks the sun to generate energy. The panels will be connected to inverter stations which convert DC power to AC power and step the voltage up to 33kV using integrated transformers. A medium voltage AC network will be installed in underground trenches to connect each inverter to a central switchgear. The switchyard is adjacent to the step up substation which is owned and operated by the network operator, Powerlink. This substation will step up the voltage to 275kV for injecting the green energy into the transmission network operated by Powerlink.

The development will contain the following infrastructure:

- Photovoltaic solar panels.
- Tracking system.
- Piled foundations.
- DC/AC Inverter stations.
- Internal access tracks.
- Underground medium voltage network.
- Administration and amenities building.
- Vehicle car park.
- Security fencing.
- Switchyard.
- Batteries, at a later date.

The development may also contain battery storage buildings.

Solar Array Areas

The development will consist of a number of solar array areas or blocks comprised of photovoltaic modules arranged in a series of long rows (see Image 1 below). The modules are mounted on frames which follow the sun to optimize energy generation. The frames are fixed to piles driven into the soil. The rows interconnect to form a single array block of either 2.5MW (AC) or 5 MW (AC). In each block there will be a prefabricated, containerized inverter and integrated transformer to convert and step up the voltage level. Electrical connections will also be constructed between the PV arrays, as well as associated monitoring and protection equipment via underground or frame secured cabling.

Image 1: Pictures illustrating type of solar arrays/trackers to be used for the proposed action

The solar module frames and inverter stations will be installed on piles and sit above ground level. This enables the restoration or establishment of grassland vegetation and habitats below and around this infrastructure. Where necessary, grasses will be

reseeded around solar arrays as described in the Black Throated Finch Management Plan (Attachment E). Given that the panels will rotate from a circa 60 degree tilt angle facing East to 60 degrees tilt to the West, no part of the ground under panel is expected to be in constant shade.

Medium Voltage Reticulation

Each inverter will be connected to the central 33kV switchboard by underground medium voltage cable reticulation. The cables will be installed in trenches typically 1m in depth and 1m in width. The excavation will comply with the Soil and Erosion Sediment Control Report and Regulations for construction within Queensland.

Temporary disturbances to vegetation from the underground installation of the cables will be rehabilitated in accordance with the habitat restoration program described in the Black Throated Finch Management Plan.

Solar Substation

The medium voltage switchboard will be connected through a step up transformer and to the existing Powerlink 275kV overhead with transgresses the land.
A high voltage switchyard will be constructed to connect the solar farm to the national transmission network. The final design for the switchyard is yet to be confirmed with Powerlink, but its footprint is likely to be approximately 100m by 100m. The switchyard will provide switching and protection of the electrical network and will be fenced separately from the solar farm for safety reasons. The switchyard will be owned and operated by the Network service Provider, Powerlink. This will form part of the National Transmission Network.

Battery Building

The proposed development may include battery storage to allow power generated during daylight hours to be used during periods of high demand. If battery storage is deployed at the site, it will be containerised and installed on a concrete pad. The footprint area of battery containers will depend on the efficiency of battery technology, which changes rapidly. It is not possible to quantify the area of battery storage at this time, but nevertheless it will be similarly designed and located to avoid MNES habitats.

Administration Building

The site office will be a generic space-frame structure with colour-bonded exterior cladding and installed on concrete footings. It will cover 250 m^2 (10 m x 25 m x 4.5 m) and will accommodate up to five maintenance and/or security staff at a time. It will also house the plant control room, spare parts storage and basic maintenance facilities.

Project phase description

Detailed components of the proposed action are discussed below in relation to the following project phases:

- Pre-mobilisation.
- Construction.
- Commissioning and operation.
- De-commissioning.

It is important to note that activities within the Project Area throughout the various phases will be guided by and comply with the mitigation, management and monitoring measures defined in an *Environmental Management Plan* that will be developed for the site. Relevant measures are discussed in Section 4 of the referral and address issues related to:

- Traffic Movement.
- Air Quality and Dust.
- Noise and Vibration.
- Solar Panel Glare and External Lighting.
- Land and Soil Management.
- Stormwater Management.
- Waste.
- Chemical Storage and Spill Management.
- Flora and Fauna, with specific measures to address key MNES.

Pre-mobilisation

Pre-mobilisation activities for each area of development will typically occur over a 1-2 month period and include the following as required:

- Temporary fencing of site offices and facilities for construction.
- Fencing of areas for development.
- Removal of any woody vegetation within the areas to be developed.
- Laydown of temporary offices and facilities. These will be temporary prefabricated buildings used for construction projects.

The current site construction works requirements include:

- Office facilities (1,400 sq metres)
    - Changing rooms.
    - Toilets.
    - Showers.

    - Offices.
    - First aid.
    - Lunch rooms.
    - Parking x 12.
- Lay down area x 2 (approximately 1,800 sq metres and 2,300 sq metres).
- Guard room (18 sq metres).

Construction

Construction activities will include the installation of the PV arrays and supporting infrastructure.

The PV arrays and site office components will largely be built off-site and transported to the site in modulated sections. Construction on-site will be limited to the unloading and joining together of the modulated sections, piling for the PV support structures and trenching electrical and control cabling to the electricity grid and control room. Construction activities are planned to occur during daylight hours only, up to seven days per week.

The proposed action will consist of installing the following components:

- Arrays of solar PV modules arranged in a series of long rows (generally 85 m) typically no higher than 2.4 m above the ground and supported by a steel and/or aluminium mounting structure including framing and piles which are either screwed or driven into the ground.
- A series of prefabricated, containerised inverters distributed throughout the PV arrays.
- Electrical connections between PV arrays, associated monitoring and protection equipment, and central inverters via underground or frame secured cabling.
- A tracker actuation system.
- Network interconnection facilities to connect the project to the existing High Voltage Transmission lines at the site including a substation, main power transformer, switchgear, protection, metering and communications equipment.

Construction activities for the PV arrays and their indicative timeframes (there may be overlap in timing) will include:

- Pile driving or screwing mounting pylons (~4 months).
- Trenching or underground cabling connecting PV (~2 months).
- Mounting pre constructed PV modules (~4 months)
- Network interconnection (~1 week).

To facilitate the future operational and maintenance activities on site the following infrastructure will be constructed:

- Site office and operations and maintenance facilities.
- Site entry road, internal access tracks and car park.
- Site fencing and associated security equipment.

Further details relating to construction of this infrastructure are as follows:

Operations and Maintenance Building

The building will be a prefabricated design approx. 10m x 25m and single storey. The facility will provide a working area for staff, ablutions and amenities including:

- Office.
- Toilet.
- Kitchen.
- First Aid area.
- Meeting room.
- Reception area.

Site fencing and security

The whole site will be secured with appropriate fencing and lockable gates will be placed at the main entrance, providing restricted access. Fencing will be designed with consideration for Koala movement (see Section 3.1(d)). A secondary temporary access gate will likely be provisioned remote from the main entrance for emergency purposes only.

Parking

Parking for staff and visitors will be provided.

Access roads

Townsville or Brisbane will be the main port of entry for much of the equipment, with the remainder being sourced locally or interstate. The primary transport route will be via the Flinders Highway, connecting to Woodstock Giru Road to the site.

The development will use a new site entry point on the southern boundary of the property along Woodstock Giru Road. The access will be designed to accommodate B Double vehicles delivering construction material directly to construction staging and assembly areas on site.

Internal roads
A number of internal access roads will connect with the site entry to the various work fronts for construction and materials. These roads are expected to be unsealed, single to dual vehicle width and include areas for maneuvering. Any impacts from internal roads will be included within the impact limits for koala habitat.

Commissioning and operation
The commissioning phase of the project will involve testing of PV system prior to energisation onto network. It is anticipated that this will take approximately 2 months for each area to be developed.

Operational elements of the proposed action include:

Operating hours
Once in operation, the normal operating hours of the solar farm will be during daylight hours between the hours of sunrise (say) 7:00 am to sunset 6:00 pm. There is no (very low levels of) noise in operations.

Water supply
As there is no reticulated water to site, any water use will need to be brought on to the site, or captured on site.

Water demand
Water may also be required for routine cleaning of panels and potentially for dust suppression on site. This activity will likely take place once per annum based upon current Australian best practice. This may require a small mobile water tanker, although dry techniques are being investigated. Water consumption for this activity is expected to be lower than current agricultural activity on the site.

Water may also be stored on site for firefighting purposes.

During construction, water will be trucked in and waste water will be taken out by engaging the services of a local service provider.

Sewerage
Solid waste and putrescible waste disposal will be by the regular service of a licensed waste management contractor. Site storage of waste will be in approved waste containers provided by the contractor.

Stormwater management
There are no major earthworks anticipated for the proposed action and as a result there will be no significant changes to the drainage regime of the site. The stormwater management provisions for the solar farm are designed in accordance with the Australian Rainfall and Runoff Guidelines.

Vegetation management
Regular vegetation maintenance will occur within the potential development envelope throughout the operational phase to control re-emerging woody vegetation and weeds and to maintain low fuel loads to reduce risks associated with wildfire.

The current level of vegetation without maintenance is low and below the lower level of the solar panels. Any vegetation maintenance will involve the slashing of grasses in the areas to be covered by and surrounding the solar panels and the application of selective herbicides to control emerging woody vegetation and weeds to maintain a grassland environment. The grass will remain in place under solar panels and there is unlikely to be a requirement to spray grasses with herbicides.

Vegetation management will be conducted in accordance with the Property Vegetation Management Plan submitted as part of the Development Application for this proposal.

Fire management
Bushfire management will be undertaken in accordance with a Solar Farm – Bushfire Management Plan. Asset Protection Zones will be maintained within the development envelope and bushfire management will not result in impacts to nearby vegetation. Fire breaks are expected to be 22.5 m wide, or 1.5 times the height of the tree canopy (estimated to be a maximum of 15m).

Decommissioning
Upon decommissioning of the solar farm, the site will be subject to certain rehabilitation regimes to restore the land to a standard appropriate for rural use. Restoration of the disturbed areas within the development envelope will include removal of all above ground structures and footings and capping of services.

References
Ecological Survey & Management (ES&M) (2017). Majors Creek Solar Farm Project Ecological Assessment Report. Report for Edify Energy.