Boomer Green Energy Hub – Wind Farm and BESS

Application Number: **01425** Commencement Date: **19/09/2022** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Boomer Green Energy Hub – Wind Farm and BESS

1.1.2 Project industry type *

Energy Generation and Supply (renewable)

1.1.3 Project industry sub-type

Wind Farm

1.1.4 Estimated start date *

1/01/2024

1.1.4 Estimated end date *

1/01/2026

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

Ark Energy Projects Pty Ltd (Ark Energy) proposes to develop a wind farm which will consist of up to 151 wind turbine generators and contribute ~1,150 megawatts of renewable power to the national electricity grid. The generation is enough to support up to 800,000 homes with renewable energy, avoiding the release of 1.2 million tonnes of CO_2 per annum if this electricity were produced through fossil fuels.

Boomer Green Energy Hub (the Project) is proposed across six leasehold and freehold lots, which together form the Site Boundary. The Site Boundary covers 52,537.2 hectares and is currently used for cattle grazing. The Site Boundary lies within three local government areas; Rockhampton Regional Council, Livingstone Shire Council and Central Highlands Regional Council in Central Queensland. The Project is located in the Brigalow Belt bioregion, within the Boomer Range subregion and between Rockhampton and Middlemount.

Within the Site Boundary lies the Project Area, encompassing 8,441.1 ha. Within the Project Area lies the Disturbance Footprint, covering 1694.1 ha. The Project Area is a buffer around the Disturbance Footprint. The Project Area and Disturbance Footprint layers are provided in Section 2.1.

Key infrastructure components include:

- Up to 151 wind turbine generators with a tip height of up to 275 m
- hardstand infrastructure for wind turbine construction, blade laydowns and crane pads
- permanent and temporary wind monitoring masts of up to 175 m height
- battery energy storage and grid-firming electrical infrastructure
- substations and switchyard
- telecommunication towers
- site offices, workshops, warehouses, staff amenities
- gravel-capped roads
- permanent site entries
- underground power and communication cables

- medium and high voltage overhead powerlines
- new fencing with grids and gates
- temporary facilities including construction compounds, workers accommodation, laydown and stockpile areas and site entrances
- mobile concrete batching plant and rock crushing facilities.

Construction activities will broadly consist of:

- site establishment and preparation, including access roads
- turbine installation using large mobile cranes
- permanent meteorological mast installation
- medium voltage overhead and underground cabling interconnecting wind turbine sites
- construction of substation and control room
- connection of the wind farm to the existing 275 kV overhead powerline
- testing and commissioning of the wind farm.

The Project is expected to have an operational life of 60 years. Operational activities would include the following:

- Monitoring and control of the wind farm: This would be undertaken both by on-site personnel and via a remote-control system accessed from a central off-site facility and providing real time and historical performance information.
- Maintenance activities: General repair and maintenance of all wind farm infrastructure as well as roads, drainage, grass and fences. This would also include occasionally responding to faults in the equipment which would be identified through alarms on the monitoring system.

Impacts to fauna and their habitats that may occur during construction of the Project include:

- Habitat clearance associated with the Project. The consequences of this impact may include:
- direct loss of native fauna habitat
- injury and mortality to fauna during clearing of fauna habitat, including hollow-bearing trees, bird nest, and ground-dwelling fauna denning sites
- removal of actual and potential breeding sites through disturbance to hollows, fallen timber, dead wood and bush rock
- introduction and spread of noxious weeds and pathogens that may negatively affect native flora and fauna
- reduced connectivity for wildlife movement
- Increased risk from introduced predators through greater access created by roads and potential increases in abundance due to access to human waste (if not removed)
- Fauna collisions with construction vehicles
- Threat of fire from construction activities such as:
- welding
- slashing and grading roads
- hot exhausts from vehicles and machinery
- Noise, lighting and vibration, which may disturb breeding and roosting fauna.
- Collision impacts on birds and bats

Impacts of these proposed activities are detailed in “Boomer Green Energy Hub Ecological Assessment Report”, Chapter 6, pgs. 92-111. A summary of direct and indirect/facilitated impacts to Matters of National Environmental Significance (MNES) from the Project are outlined in “Boomer Green Energy Hub Ecological Assessment Report” Table 6-4, pg. 104.

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

No

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act): A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage or National Heritage areas or items within the proposal Site Boundary. Search results also returned no Wetlands of International Importance that occur within 30 km of the center of the Site Boundary. The proposed development is not in the Great Barrier Reef Marine Park or a Commonwealth Marine Area and is not likely to impact Commonwealth land. The search results identified six listed threatened ecological communities, 38 threatened species and 17 migratory species within 30 km of the center of the Site Boundary. Given the nature and scale of the proposal, a potential significant impact to some Commonwealth listed threatened entities is considered likely. This referral has therefore been prepared and submitted to allow early identification of matters required to be addressed by the Commonwealth for an EPBC Act approval.

Results for the Protected Matters Search Tool search is attached in “Boomer Green Energy Hub Ecological Assessment Report Appendices B-H” Appendix C, pgs. 193-208.

Queensland Legislation

The Project requires approval from the Queensland Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) under the Planning Act 2016. The Planning Act sets out the overarching framework for Queensland's planning and development system. A combined development application for a material change of use (windfarm) and operational works (vegetation clearing) will be lodged with the DSDILGP. The application will be coordinated through the State Assessment and Referral Agency and will include:

- A material change of use development application for a wind farm is required to be assessed against State Code 23: Wind farm development (State Code 23) within the State Development Assessment Provisions (SDAP). Under State Code 23, wind farm developments should be appropriately located, sited, designed and operated to ensure that the development avoids, or minimises and mitigates adverse impacts on ecological values.
- An operational works permit development application is required to be assessed against State Code 16: Native vegetation clearing (State Code 16). Under State Code 16, operational work for clearing native vegetation should demonstrate that the development avoids impacts on vegetation and other applicable matters of state environmental significance (MSES), and where avoidance is not reasonably possible, minimises and mitigates impacts and provides an offset for any acceptable significant residual impacts where appropriate.

Results for the Widlife Online search is attached in "Boomer Green Energy Hub Ecological Assessment Report Appendices B-H", Appendix C, pgs. 209-211.

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

Ark Energy understands the importance and benefits to all parties of effective, comprehensive and meaningful consultation, and the Project team includes community engagement specialists.

Ark Energy has engaged with a range of stakeholders to discuss the Project and the approvals process and sought to identify and address concerns in a timely and professional manner, and where practicable incorporate consultation input into the proposal to improve project outcomes and community benefits. To date this engagement has included:

- Commonwealth government consultation (DCCEEW pre-referral meeting, 31 August 2022)
- State government consultation (SARA pre-lodgement meeting, 30 November 2021)
- Local government consultation (Livingstone, Central Highlands and Rockhampton Shire Councils, engagement commenced in late 2021)
- Adjoining and neighbouring landholders.
- An open house was held in Marlborough on Friday 11 March 2022. This was attended by 21 community members and other stakeholders. Issues raised included:
    - Properties open to hosting wind farm site
    - Economy boost
    - Local employment
    - Community development fund

Initial stakeholder feedback indicates support for the establishment of a community benefit fund, consistent with other wind projects developed by Epuron/Ark Energy. The purpose of a community benefit fund is to provide enduring value to the local communities and surrounding LGA communities for the life of the Project, commencing during construction.

Ark Energy intends to engage with additional stakeholder, including traditional owners, as the Project progresses.

In 2021 in preparation for broader community engagement a dedicated project webpage was established and promoted through all communications.

Traditional custodians

Ark Energy have engaged with the Barada Kabalbara Yetimarala People, who are the Traditional Owners of the land on which the Project occurs.

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

By completing and submitting this form, you consent to the collection of all personal information contained in this form. If you are providing the personal information of other individuals in this form, please ensure you have their consent before doing so.

The Department of Climate Change, Energy, the Environment and Water (the department) collects your personal information (as defined by the Privacy Act 1988) through this platform for the purposes of enabling the department to consider your submission and contact you in relation to your submission. If you fail to provide some or all of the personal information requested on this platform (name and email address), the

department will be unable to contact you to seek further information (if required) and subsequently may impact the consideration given to your submission.

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1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details

ABN/ACN	31124444622
Organisation name	NGH PTY LTD
Organisation address	U 17, level 3/21 Mary St, Surry Hills, NSW, 2010

Referring party details

Name	Beth Kramer
Job title	General Manager - Biodiversity
Phone	0428 379 894
Email	beth.k@nghconsulting.com.au
Address	2B/34 Tallebudgera Creek Rd, Burleigh Heads QLD 4220 (PO Box 424, West Burleigh QLD 4219

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details

ABN/ACN	84150163143
Organisation name	Ark Energy Projects Pty Ltd
Organisation address	L2, 275 George Street, Sydney NSW 2000

Person proposing to take the action details

Name	Jessica Picton
Job title	Project Manager
Phone	02 8456 7400
Email	Jessica.Picton@arkenergy.com.au
Address	L2, 275 George Street, Sydney NSW 2000

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

No

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

Boomer Green Energy Hub is under development by Ark Energy Projects Pty Ltd (Ark Energy). Ark Energy is a leading renewable energy company with a focus on the development of utility scale wind and solar projects across Australia. Ark Energy (through the former Epuron) has been developing renewable energy projects since 2003, with the successful permitting of over 4,000 MW of wind farm projects and over 400 MW of solar farm projects. Ark Energy is committed to avoiding, minimising and mitigating potential environmental impacts through the development of its renewable energy project portfolio. Ark Energy's projects have a history of responsible environmental management.

There are no past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment, or the conservation and sustainable use of natural resources against Ark Energy.

Ark Energy aims to ensure that all of its developments meet industry best practice, and that development practices are continually improved. Ark Energy is a leader in the renewable energy industry's best practice endeavours; contributing to the development of various government and industry guidelines, and taking a lead on project commitments.

The person making and proposing the action has not had any known past or present proceedings in relation to compliance with a Commonwealth, State or Territory law in relation to the protection of the environment or the conservation and sustainable use of natural resources.

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

Ark Energy aims to ensure that all of its developments meet industry best practice, and that development practices are continually improved. Epuron/Ark Energy is a leader in renewable energy industry's best practice endeavours, contributing to the development of various government and industry guidelines, and taking the lead on project commitments. For example, Epuron was the first company in Australia to propose a community development fund as part of a renewable energy project, a commitment which continues to this day. For the Boomer Green Energy Hub, Ark Energy will commit the Project to a suite of management actions under this referral, the Ecological Assessment Report, and other reports to be submitted for assessment under the Planning Act 2016. The tendering process to award construction contracts for the Project will consider past environmental performance, environmental policy and environmental management systems.

For the Epuron/Ark Energy Environmental Policy, see attached "Boomer Green Energy Hub Ecological Assessment Report Appendices B-H", Appendix B, pgs. 189-192.

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details	
ABN/ACN	84150163143
Organisation name	Ark Energy Projects Pty Ltd
Organisation address	L2, 275 George Street, Sydney NSW 2000

Proposed designated proponent details	
Name	Jessica Picton
Job title	Project Manager
Phone	02 8456 7400
Email	Jessica.Picton@arkenergy.com.au
Address	L2, 275 George Street, Sydney NSW 2000

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	31124444622
Organisation name	NGH PTY LTD
Organisation address	U 17, level 3/21 Mary St, Surry Hills, NSW, 2010
Representative's name	Beth Kramer
Representative's job title	General Manager - Biodiversity
Phone	0428 379 894
Email	beth.k@nghconsulting.com.au
Address	2B/34 Tallebudgera Creek Rd, Burleigh Heads QLD 4220 (PO Box 424, West Burleigh QLD 4219

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	84150163143
Organisation name	Ark Energy Projects Pty Ltd
Organisation address	L2, 275 George Street, Sydney NSW 2000
Representative's name	Jessica Picton
Representative's job title	Project Manager
Phone	02 8456 7400
Email	Jessica.Picton@arkenergy.com.au
Address	L2, 275 George Street, Sydney NSW 2000

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.5 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A?

No

1.4.7 Has the department issued you with a credit note? *

No

1.4.9 Would you like to add a purchase order number to your invoice? *

No

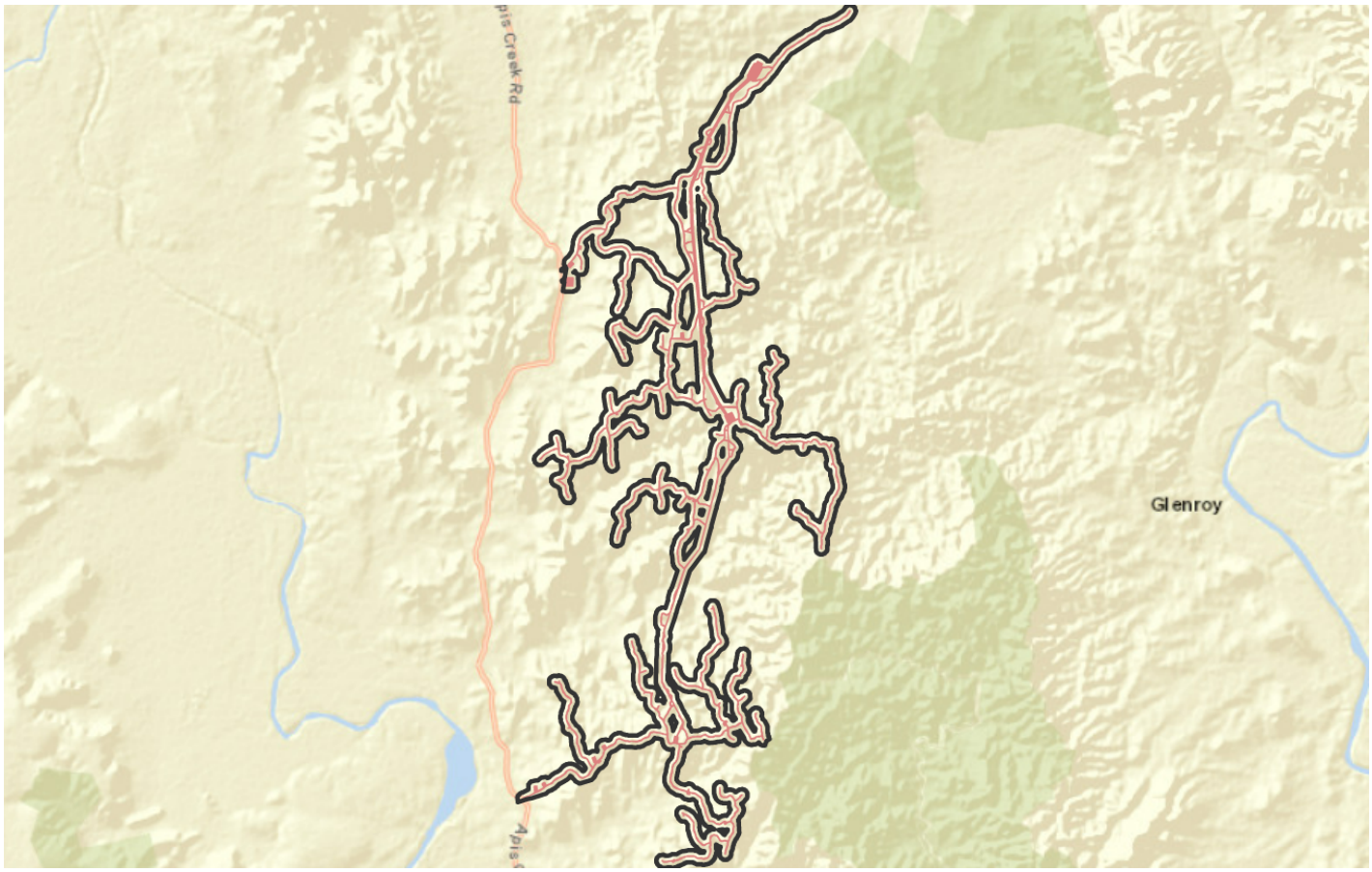
1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment? *

Person proposing to take the action

2. Location

2.1 Project footprint



2.2 Footprint details

2.2.1 What is the address of the proposed action? *

2319 Apis Creek Road, Mount Gardiner, Qld 4375

2.2.2 Where is the primary jurisdiction of the proposed action? *

Queensland

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

Five lots within the wind farm site boundary are freehold, and one lot is leasehold.

Property details are provided in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Table 1-1, pg .14), and are mapped in attached “Boomer Green Energy Hub Ecological Assessment Report Appendix A” (Figure A-2, pg. 162).

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area’s environment.

The approximate centre of the Site lies 95 km north-west of Rockhampton and 220 km south of Mackay.

Habitat condition

Habitat condition within the Site Boundary is varied, because of different soil types, historical disturbance, and current land management practices. Approximately two thirds of the Site Boundary no longer contains remnant native vegetation (see attached "Boomer Green Energy Hub Ecological Assessment Report Appendix A", pg. 168). Large portions of vegetation on the flats (predominantly in the west of the site) have been historically cleared of vegetation and are heavily grazed by cattle. Areas of erosion created by historic vegetation removal and seasonal heavy rainfall were observed in non-remnant areas on the flats throughout the site, and weed infestation is a common occurrence within the regrowth vegetation along creek lines on the flats. Remnant vegetation on steep slopes and ridgelines is generally in good condition. The site has rare to occasional fire scars, but no evidence of recent fires. Due to clearing, heavy grazing, erosion and weeds, the flats are in poor condition and present limited habitat value for native flora and fauna. In particular, a large proportion of Lot Plan 1LR74 has been historically cleared and is heavily grazed in the southwest.

Existing road infrastructure and access

During construction of the Project, transportation of major Project components is expected to be via the Port of Gladstone via two preferred route options. The Port of Mackay may also be considered, however the Port of Gladstone is preferred. Route 1 will use the Bruce Highway through Rockhampton and Marlborough, Marlborough-Sarina Road, and Apis Creek Road. Route 2 will use the Bruce Highway, Capricorn Highway to Duaringa and Apis Creek Road. Route 2 will be used to accommodate transport of any larger major components as required. Transportation of other project equipment and materials is expected to be sourced locally from townships within the region including Mackay, Blackwater, Rockhampton, Marlborough, and Emerald.

During project operation, the Project will be accessed via the site entry points on Apis Creek Road, and Clifton Road. Major components for major maintenance events will be transported to site using the same route used for major components during construction. At the end of the project life, the turbines and other project infrastructure will be re-powered (i.e. any components at the end of their design life would be replaced), or decommissioned and transported to recycling centres available at the time. Steel towers are expected to be recycled as per current standard practice. Wind turbine blade recycling is currently an area of research and prototyping with the wind industry, but is expected to commercially available by the time that wind turbines reach their design life.

3.1.2 Describe any existing or proposed uses for the project area.

The dominant land use is cattle grazing. Surrounding properties are a mixture of mostly cleared land for raising cattle. Eugene State Forest and Goodedulla National Park support intact native vegetation to the north-east and south-east outside of the Site Boundary.

The proposed use for the land is renewable electricity generation through construction of wind turbines. The remaining land will continue to be used for grazing, which is the current land use.

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

Field surveys undertaken to date have confirmed the following matters of national environmental significance (MNES) occur in the Site Boundary: Koala (*Phascolarctos cinereus*), Greater Glider (*Petauroides volans*), Squatter Pigeon (*Geophaps scripta scripta*), White-throated Needletail (*Hirundapus caudacutus*), Black Ironbox (*Eucalyptus raveretiana*), Fork-tailed Swift (*Apus pacificus*) and Rufous Fantail (*Rhipidura rufifrons*). Two threatened ecological communities (TEC) have potential to occur: Brigalow (*Acacia harpophylla* dominant and co-dominant) and Poplar Box Grassy Woodland on Alluvial Plains, however, these have not yet been confirmed.

MNES survey locations and results are mapped in attached “Boomer Green Energy Hub Ecological Assessment Report Appendix A” (pgs. 164-166 for survey locations, and pgs. 171-186 for survey results).

AdditionallyGoodedulla National Park lies adjacent to the Project Area, and covers 26,025 ha. The vegetation is diverse and includes rosewood and large patches of semi-evergreen vine thicket. The park conserves the only land zone of granites, acid volcanics and Permian sediments within the central Brigalow Belt (Department of Environment and Science).

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The Boomer Range runs north to south through the Site Boundary, with elevations (AHD) spanning 60 m to 460 m (as shown on mapping with 10 m increments). The highest areas are generally in the southern, eastern and central portions.

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

Vegetation across the site is largely open forest to open woodland dominated by narrow-leaved ironbark (*Eucalyptus crebra*). Vegetation along the creeklines provides good shelter and foraging habitat for birds and arboreal mammals, however are in moderate condition due to weed infestation and cattle trampling. A large band of remnant vegetation extends along slopes and ridgelines and within gullies in the

eastern and northern portion of the Sante Fe property, the eastern portion of the Leura property, the southeast portion of the Seven Mile property, and the western and eastern portions of the Clifton property. Sections of this connecting patch of remnant vegetation are in good condition and include mixed eucalypt woodland that would provide potential foraging habitat for arboreal mammals.

Field surveys undertaken to date have identified four main vegetation communities within the Site Boundary, including:

- **Vegetation Community 1: Eucalyptus crebra Woodland to Open Woodland**

The canopy layer in this community is dominated by Narrow-leaved Ironbark (Eucalyptus crebra), with Variable-barked Bloodwood (Corymbia erythrophloia), Pink Bloodwood (C. intermedia), White Mahogany (E. acmenoides) and Spotted Gum (C. citriodora) occurring as associated species.

- **Vegetation Community 2: Riparian vegetation**

This vegetation community occurs along the banks of streams along watercourses and drainage lines. It is dominated by Queensland blue gum (E. tereticornis), river she-oak (Casuarina cunninghamiana) and tea-tree (Melaleuca spp.).

- **Vegetation Community 3: Mixed Eucalypt Open Forest communities**

Given the size and steep terrain, a large proportion of vegetation within the Site Boundary was not able to be surveyed. However, the majority of vegetation surveyed has been ground-truthed as a heterogeneous community dominated by a range of Eucalyptus and Corymbia species

- **Vegetation Community 4: Semi-Evergreen Vine Thicket (SEVT).**

This vegetation community consists of deciduous to semi-evergreen vine thicket and semi-evergreen vine thicket species. It is generally restricted to hillsides, and typically observed in small pockets within sheltered gullies on western-facing slopes along ridgelines.

Flora Species

One threatened flora species listed under the EPBC Act has been confirmed as occurring in the Site Boundary, Black Ironbox, listed as Vulnerable. Three additional threatened threatened flora species listed under the EPBC Act are considered to have a moderate to high likelihood of occurring within the Site Boundary, including Ooline (*Cadellia pentastylis*) (Vulnerable), Bluegrass (*Dichanthium setosum*) (Vulnerable) and Quassia (*Samadera bidwillii*) (Vulnerable).

To date, 93 flora species have been recorded during surveys, of which four are listed as Weeds of National Significance, including Rubber Vine (*Cryptostegia grandiflora*), Lantana (*Lantana camara*), Velvety Tree Pear (*Opuntia tomentosa*) and Parthenium (*Parthenium hysterophorus*).

Fauna Species

Fauna surveys undertaken to date resulted in 157 records of fauna. The total number of species recorded for each fauna group included:

- 112 bird species
- 15 mammal species, of which five are invasive
- 13 microbat species
- 11 reptile species
- Six amphibian species, one of which is invasive.

The Project Area supports foraging, nesting and roosting habitat for a variety of bird species. Nesting opportunities for hollow-dependent species are common in riparian and mixed-eucalypt woodlands within the Site Boundary. Hollow-dependant bird species (e.g., Southern Boobook Owl) were recorded during spotlighting activities within and adjacent to woodland areas.

The attached Boomer Green Energy Hub Ecological Assessment Report details vegetation communities (pgs. 40-43), flora species (pg. 44), and fauna species (pgs. 46-48). The attached Boomer Green Energy Hub Ecological Assessment Report Appendices B-H provides a list of regional ecosystems, and flora and fauna species observed on site (Appendix E, pgs. 231-241).

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

The vegetation communities within the Site Boundary are reflective of the Project's location within the Boomer Range in the Brigalow Belt Bioregion (Bioregion 11). The Brigalow Belt bioregion is a wide band of acacia wooded grassland that runs between tropical rainforest of the coast and semi-arid interior of Queensland. The Brigalow Belt is characterised by the presence of brigalow *(Acacia harpophylla* vegetation*)*. The Site Boundary is located within the Fitzroy Catchment and the Mackenzie and Fitzroy sub-catchments.

The majority of the Project Area falls within the Connors Volcanic Group, made up of felsic to mafic volcanic rocks; rhyolitic to andesitic flows, high-level intrusive, and volcaniclastic rocks including ignimbrite (Queensland Globe, State Surface Geology layer, 2022).

The Project Area is comprised of three dominant soil types (Queensland Globe, Atlas of Australian Soils layer, 2022):

1. In the north and west of the site, which have strongly undulating or dissected low hilly lands, the dominant soils are shallow mostly gravelly loamy duplex soils.
2. Through the centre and east of the site there are strongly dissected hilly lands with short steep slopes and rock outcrops are common, the dominant soils are shallow stony clay loams.

3. Through the centre of the site there are very high hilly or mountainous lands with steep slopes and some abrupt high dissected scarps, where flatter lands are very limited and are mostly confined to narrow valley floors), and igneous rock outcrops are extensive. The dominant soils here are shallow stony loams and shallow stony duplex soils.

Queensland State vegetation mapping (see attached “Boomer Green Energy Hub Ecological Assessment Report Appendices A”, pg. 168) shows a total of 19,709.19 ha of remnant vegetation occurs in the Site Boundary. Vegetation in the Site Boundary is dominated by *Eucalyptus crebra* woodland to open woodland. Vegetation in the Site Boundary is disturbed by cattle grazing, invasive weeds and timber harvesting. Invasive weeds are particularly severe in riparian areas.

3.3 Heritage

3.3.1 Describe any Commonwealth heritage places overseas or other places recognised as having heritage values that apply to the project area.

No Commonwealth heritage places overseas or other places recognised as having heritage values apply to the project area.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

Boomer Green Energy Hub has engaged with the Barada Kabalbara Yetimarala People Native Title Claim Group (BKY) who are the Aboriginal Party for the purposes of the Aboriginal Cultural Heritage Act (Qld) (ACHA) in regard to the identification and management of indigenous cultural heritage in the area of the project.

Boomer Green Energy Hub and BKY have agreed to enter into a Cultural Heritage Management Plan under Part 7 of ACHA and has endorsed BKY for this purpose.

The CHMP development has commenced and 2 negotiation meetings have been held to progress the agreement.

The CHMP will provide for a range of cultural identification protection and management measures. Prior to the commencement of the CHMP development, Boomer Green Energy Hub representatives and senior BKY people accompanied by their archaeologist attended a one-day reconnaissance of the project area so that BKY were familiar with the project area prior to development of the CHMP.

To date no formal surveys have been undertaken, so at the time of writing there has not been any Indigenous heritage values identified by BKY.

A CHMP is not currently available for the Project. A CHMP will be prepared and, once approved, will be placed on the Aboriginal and Torres Strait Islander cultural heritage register.

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

The watercourse and drainage line map and wetland map established under the Vegetation Management Act 1999 (VM Act) shows a series of waterways within the Site Boundary (see attached “Boomer Green Energy Hub Ecological Assessment Report Appendix A”, pg. 170). To the north, Redcliffe Creek (stream order (SO) 5) is fed by Four Mile Creek and Blue Water Creek (both SO 4). In the northeast, Develin Creek (SO 4) runs for approximately 10 km along the Site Boundary. To the southwest, Mackenzie River (SO 9) runs for approximately 17 km along the Site Boundary.

The Project Area is intersected by the following watercourses:

- Four Mile Creek (SO 4) in the northeast
- Seven Mile Creek (SO 3) and an unnamed SO 3 watercourse in the northwest
- Leura Creek (SO 4) in the central portion
- Boundary Creek (SO 3) in the south.

One wetland within the Project Area is mapped under the VM Act; it occurs at the junction of Leura Creek and the unnamed watercourse. A number of farm dams also occur in the Site Boundary. Waterways are a mixture of creeks which either have a soft substrate bottom and/or rocky bottoms. Riparian vegetation commonly occurs in dense, narrow strips. The majority of the lower stream order watercourses were not running or were holding stagnant water at the time of the post-wet surveys, in April 2022 (survey conditions are outlined in attached "Boomer Green Energy Hub Ecological Assessment Report", Section 3.2.2, pgs. 24-25).

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	Yes	Yes
S21	Nuclear	No	Yes
S23	Commonwealth Marine Area	No	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth heritage places overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

A PMST search within 10 km of the Project Site did not identify any World Heritage Properties to be present.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

A PMST search within 10 km of the Project Site did not identify any National Heritage Places to be present.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

A PMST search within 10 km of the Project Site did not identify any Ramsar Wetlands to be present.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species
Yes	Yes	Eucalyptus raveretiana
Yes	Yes	Geophaps scripta scripta
Yes	Yes	Hirundapus caudacutus
Yes	Yes	Petauroides volans (southern and central)
Yes	Yes	Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)

Ecological communities

Direct impact	Indirect impact	Ecological community
No	No	Brigalow (Acacia harpophylla dominant and co-dominant)
No	No	Poplar Box Grassy Woodland on Alluvial Plains

4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Koala *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)

Evidence of Koala was recorded in three locations within the Site Boundary during field surveys, including scats, tracks, and scratches on tree trunks. Refuge habitat occurs in areas on alluvial soils where the vegetation provides shelter from extreme heat, such as riparian forest. General habitat equates to all communities which are dominated by any species of Eucalypt that provides opportunities for foraging and dispersal. A total of 925.41ha of Koala habitat occurs within the Disturbance Footprint, comprised of 33.92ha of refuge habitat and 891.49ha of general habitat. This equates to 0.76% of the refuge habitat and 5.08% of the general habitat available for Koala in the Site Boundary.

Direct impacts include removal of a maximum of 925.41 ha of Koala habitat, injury and mortality of Koalas during habitat removal, and vehicle strike during construction and operation.

An assessment of the direct and indirect/facilitated impacts is included in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Table 6-4, pgs. 104-105).

Greater Glider *Petauroides volans* (southern and central)

Greater Glider were observed on six occasions during field surveys in spring 2022. A total of 238.18ha of Greater Glider habitat occurs in the Development Footprint, which is comprised of 59.26ha of denning habitat and 178.92ha of foraging habitat. This equates to 1.33% of denning habitat and 1.03% of foraging habitat within the Site Boundary.

Direct impacts include removal of 923.70 ha of Greater Glider habitat, injury and mortality of Greater Glider during habitat removal, and removal of actual and potential breeding sites through removal of tree hollows.

An assessment of the direct and indirect/facilitated impacts is included in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Table 6-4, pg. 105).

Squatter Pigeon *Geophaps scripta scripta*

Squatter Pigeon was recorded 17 times in the Site Boundary during field surveys. The general habitat description for Squatter Pigeon is open forests or sparse, open woodlands and scrub within 1km (breeding) or 3km (foraging) of waterbodies (DCCEEW 2022h). A total of 898.87ha of Squatter Pigeon occurs in the Disturbance Footprint. This is comprised of 576.36ha of breeding habitat and a further 322.51 ha of foraging and dispersal habitat. This equates to 3.64% of the breeding habitat and 10.80% of the foraging habitat (noting that this is only calculated on remnant vegetation, although the species also forages in non-remnant vegetation) available in the Site Boundary.

Direct impacts include removal of 576.36 ha of Squatter Pigeon breeding habitat and an additional 322.51 ha of foraging habitat, removal of habitat for permanent and temporary facilities, and vehicle strike during construction and operation activities.

An assessment of the direct and indirect/facilitated impacts is included in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Table 6-4, pgs. 105-106).

White-throated Needletail *Hirundapus caudacutus*

White-throated needletail is predominantly aerial when in Australia, although it has been occasionally recorded roosting in dense canopy foliage or tree hollows. Potential impacts include avoidance of the site and turbine strike, as it is known to forage at rotor-swept height. It is acknowledged that a small impact may occur from White-throated Needletail colliding with turbines, however, it is not expected that numbers of White-throated Needletail passing through Boomer Green Energy Hub would be great enough to place the overall population at risk, as these birds use a range of habitats and are widespread.

Direct impacts include removal of 76.42 ha of roosting habitat and 1708.16 ha of foraging habitat (inclusive of roosting habitat), and collisions with turbines and other infrastructure. Indirect impacts include avoidance of habitat due to noise and disturbance.

An assessment of the direct and indirect/facilitated impacts is included in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Table 6-4, pg. 106).

Black Ironbox *Eucalyptus raveretiana*

Black Ironbox grows along watercourses. Nine Black Ironbox individuals were recorded at two locations during field surveys. None of those records were in the Disturbance Footprint. Habitat within the Disturbance Footprint is severely degraded by invasive weeds, cattle grazing and selective logging. An important population of Black Ironbox is unlikely to occur in the Disturbance Footprint. However, the potential for sedimentation and erosion poses an indirect impact to the species.

Direct impacts include removal of 33.92 ha of habitat, and removal of individuals (if present). Indirect impacts include changes in hydrology due to increased hard stand areas.

An assessment of the direct and indirect/facilitated impacts is included in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Table 6-4, pg. 107).

Brigalow (*Acacia harpophylla* dominant and co-dominant)

Brigalow threatened ecological community (TEC) has not been recorded in the Disturbance Footprint as there are no relevant vegetation communities mapped and the TEC was not observed during the initial field survey. Therefore, no direct or indirect impacts are expected.

Poplar Box Grassy Woodland on Alluvial Plains

Field surveys to date have not confirmed Poplar Box TEC in the Disturbance Footprint. Therefore, no direct or indirect impacts are expected.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

Yes

4.1.4.5 Describe why you consider this to be a Significant Impact. *

Koala *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)

The clearing of primary Koala habitat cannot be fully avoided and therefore a significant residual impact is anticipated.

Greater Glider *Petauroides volans* (southern and central)

Although denning habitat will be avoided where practicable, some clearance within the Disturbance Footprint is necessary for the Project. It is likely that this will have a significant residual impact.

Squatter Pigeon *Geophaps scripta scripta*

The Project will remove habitat that is considered critical to the survival of the species and therefore will result in a significant impact to Squatter Pigeon.

White-throated Needletail *Hirundapus caudacutus*

The numbers of White-throated Needletails passing through Boomer Green Energy Hub is not expected to be great enough for collisions to cause decline of this species. There is not expected to be significant impact on the population of White-throated Needletails in or surrounding the Project Area.

Black Ironbox *Eucalyptus raveretiana*

The Project is not expected to result in a significant impact on Black Ironbox as an important population of Black Ironbox is unlikely to occur in the Disturbance Footprint.

Brigalow (*Acacia harpophylla* dominant and co-dominant)

Brigalow TEC has not been recorded in the Disturbance Footprint as there are no relevant vegetation communities mapped and the TEC was not observed during the initial field survey. Therefore, no significant impact is expected.

Poplar Box Grassy Woodland on Alluvial Plains

Field surveys to date have not confirmed Poplar Box TEC in the Disturbance Footprint. Therefore, no significant impact is expected.

A detailed assessment of the significance of impacts for these species is included in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Chapter 8, pgs. 131-146).

4.1.4.7 Do you think your proposed action is a controlled action? *

Yes

4.1.4.8 Please elaborate why you think your proposed action is a controlled action. *

The project will result in significant residual impacts to Koala, Greater Glider, and Squatter Pigeon habitat that cannot be fully mitigated. Therefore, the action is considered a controlled action.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Koala *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT)

The Project design has sought to avoid Koala habitat as much as is practicable, or, where avoidance is not possible, minimise clearing areas by including underground powerlines, rather than above ground, as is standard. Construction activities may disturb Koalas and have a short-term impact on their movement. This impact will be mitigated by measures which include education for all personnel and visitors through the site induction process, ongoing awareness through the erection of signage and notices, and the enforcement of speed limits across the site. While roads and turbine hardstand could disrupt movement during operation, access to these will be restricted to private use only (for farmers and wind farm staff) and roads will have low speed limits that will be enforced. With these measures in place, it is not expected that vehicle movement will pose a threat to Koalas or impose a barrier to movement. Koalas will be able to move across roads without being injured or killed due to the low number and slow movement of vehicles, particularly at night when Koalas are more likely to move (although daytime movements are also undertaken by Koala), and when there would be almost no vehicle movements unless in the event of an emergency or urgent maintenance matter.

The Project will implement an array of measures designed to protect Koalas, including (but not limited to):

- Pre-clearance surveys to identify individuals in the clearing area and allow them to move offsite of their own volition
- Staged clearing under the supervision of a licensed fauna spotter catcher
- The fauna spotter team will include staff with wildlife health experience, who can identify any individual Koalas suffering from Chlamydia (if present) and transport them to a wildlife vet for treatment
- A pest animal management program will be enacted to control predators (wild dogs). If feral deer are observed, they will be included in a management program in order to improve natural regeneration of Koala habitat.
- Quarantine and biosecurity procedures will be maintained throughout the life of the action’s impact to manage the risk of disease spread through the site from wind farm activities
- Reduced speed limits on during construction and operation to avoid unintended collisions with wildlife.
- A bushfire management plan will be developed to manage the risk of bushfire.

Greater Glider *Petauroides volans* (southern and central)

The Project has been designed to avoid Greater Glider habitat as far as practicable, or, where avoidance is impossible, to minimise clearing widths to reduce the risk of habitat fragmentation. A range of species-specific measures designed to protect Greater Glider will be implemented, including (but not limited to):

- Avoid clearing denning habitat as far as practicable.
- Road widths to be kept as narrow as practicable (40m or less). Where this is not possible, fauna crossing structures will be installed, such as glider poles or bridges, or tall trees will be retained on either side of the road to facilitate a long glide across the road.
- Temporary infrastructure will be located outside of remnant vegetation to avoid unnecessary clearing
- Tree hollows to be salvaged and relocated to adjacent habitat where possible
- Wildlife friendly fencing to be used (no barbed wire) where possible
- Staged clearing under the supervision of a licensed fauna spotter catcher
- Soft-felling techniques used to fell all hollow-bearing trees
- Weed management to control invasive weeds which reduce recruitment of eucalypts
- A bushfire management plan will be developed to manage the risk of bushfire.

Squatter Pigeon *Geophaps scripta scripta*

The Project has been designed to avoid Squatter Pigeon habitat wherever practicable. Mitigation measures will be implemented to protect Squatter Pigeon, including (but not limited to):

- Pre-clearance surveys by a fauna spotter catcher to identify individuals, eggs or young
- Weed management measures to be included in the CEMP
- Natural regeneration of native grasses under powerlines and other infrastructure to provide foraging opportunities for Squatter Pigeon
- Reduced speed limits during construction and operation to avoid unintended collisions with wildlife or destruction of nests.
- Pest management measures to be included in CEMP to outline requirements for managing introduced predators
- A bushfire management plan will be developed to manage the risk of bushfire.

White-throated Needletail *Hirundapus caudacutus*

Not applicable.

Black Ironbox *Eucalyptus raveretiana*

The Project has been designed to avoid Black Ironbox habitat as much as practicable. Clearing areas will be micro-aligned to avoid mature individuals and erosion and sediment controls will be implemented to reduce indirect impacts on the species' habitat. Weed management measures will be in place to prevent habitat degradation from weed spread. Use of insecticides will be restricted on site to avoid impacts to pollinators.

Brigalow (*Acacia harpophylla* dominant and co-dominant)

Brigalow TEC has not been recorded in the Disturbance Footprint as there are no relevant vegetation communities mapped and the TEC was not observed during the initial field survey. Therefore, no significant impact is expected. If Brigalow is found in the Disturbance Footprint, all attempts will be made to avoid impacts.

Poplar Box Grassy Woodland on Alluvial Plains

Field surveys to date have not confirmed Poplar Box TEC in the Disturbance Footprint. Therefore, no significant impact is expected. If Poplar Box TEC is found in the Disturbance Footprint, all attempts will be made to avoid impacts.

Proposed avoidance and mitigation measures are outlined in detail in the attached "Boomer Green Energy Hub Ecological Assessment Report" (Chapter 7, pgs. 112-130).

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

An offset will be provided to compensate the loss of Koala refuge and general habitat, Greater Glider primary habitat, and Squatter Pigeon breeding habitat. The offset site(s) will, at a minimum, match the quality of the habitat impacted by the proposed action, and will be managed and resourced over a defined period of time so that habitat quality is maintained or improved to meet the habitat quality requirements for the offset site.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species
Yes	Yes	Apus pacificus
Yes	Yes	Hirundapus caudacutus
Yes	Yes	Myiagra cyanoleuca
Yes	Yes	Rhipidura rufifrons

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.5.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Field surveys confirmed the presence of White-throated Needletail (*Hirundapus caudacutus*) (listed as Vulnerable and Migratory under the EPBC Act) in the Site Boundary. Satin Flycatcher (*Myiagra cyanoleuca*), Rufous Fantail (*Rhipidura rufifrons*) and Fork-tailed Swift (*Apus pacificus*) are also considered highly likely to occur, based on the presence of database records and suitable habitat. The Project will remove suitable habitat for these species, and there is potential for turbine strike of Fork-tailed Swift.

Direct and indirect/facilitated impacts to MNES are summarised in the attached “Boomer Green Energy Hub Ecological Assessment Report”, Table 6-4, pgs. 104-107.

4.1.5.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.5.6 Describe why you do not consider this to be a Significant Impact. *

There is not expected to be a significant impact on White-throated Needletail (*Hirundapus caudacutus*), Satin Flycatcher (*Myiagra cyanoleuca*), Rufous Fantail (*Rhipidura rufifrons*) or Fork-tailed Swift (*Apus pacificus*). A detailed assessment of significance for the above species is presented in the attached “Boomer Green Energy Hub Ecological Assessment Report” (Section 8.1.4, pgs. 146-149).

White-throated needletail is predominantly aerial when in Australia, although it has been occasionally recorded roosting in dense canopy foliage or tree hollows. Potential impacts include avoidance of the site and turbine strike, as it is known to forage at rotor-swept height. It is acknowledged that a small impact may occur from White-throated Needletail colliding with turbines, however, it is not expected that numbers of White-throated Needletail passing through Boomer Green Energy Hub would be great enough to place the overall population at risk, as these birds use a range of habitats and are widespread.

Fork-tailed Swift species is a non-breeding visitor to all states and territories in Australia. The species is almost exclusively aerial. Fork-tailed Swifts are at risk of mortality due to collision with wind turbine blades, however, the numbers of Fork-tailed Swifts passing through Boomer Green Energy Hub is not expected to be great enough for collisions to cause decline of this species.

Satin Flycatcher and Rufous Fantail have not been confirmed in the Site Boundary, however they are considered highly likely to occur based on database records and the presence of suitable habitat. These species typically occur in eucalypt woodland and wet sclerophyll forest, although when on migration they are known to occur in a variety of habitat types. These species are widespread throughout eastern Australia. Large areas of suitable habitat will remain in the surrounding area post-construction and clearing for the Project will not result in a barrier to movement for either species.

4.1.5.7 Do you think your proposed action is a controlled action? *

No

4.1.5.9 Please elaborate why you do not think your proposed action is a controlled action. *

The proposed action is not a controlled action because it will not have a significant impact on White-throated Needletail (*Hirundapus caudacutus*), Satin Flycatcher (*Myiagra cyanoleuca*), Rufous Fantail (*Rhipidura rufifrons*) or Fork-tailed Swift (*Apus pacificus*).

4.1.5.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Avoidance is the key principle that has been and will continue to be applied to Project design, with MNES being avoided wherever practicable. Following completion of Autumn site surveys (outlined in “Boomer Green Energy Hub Ecological Assessment Report” Section 3.2 and Chapter 4, pgs 23-52), the layout was revised and refined to avoid and minimise impacts on MNES identified within the Site Boundary.

Key avoidance outcomes include:
• Layout designed to avoid Black Ironbox, Greater Glider denning habitat and Koala refuge habitat, where practicable
• Realignment of overhead powerlines to avoid Black Ironbox habitat (“Boomer Green Energy Hub Ecological Assessment Report”, Figure 7-2, pg 113).
• Relocation of temporary compounds out of remnant vegetation (“Boomer Green Energy Hub Ecological Assessment Report”, Figure 7-3, pg. 114)
• Avoidance of impacts to Goodedulla National Park, situated to the east of the Site Boundary, through application of a 100 m buffer to the National Park (“Boomer Green Energy Hub Ecological Assessment Report”, Figure 7-4, pg. 114).

Management measures for migratory species include operational monitoring and analysis, including carcass searches, to enable detection of any mortality (an impact trigger, which enacts a decision-making framework to determine appropriate mitigation).

Management measures proposed to avoid, minimise or mitigate impacts to flora and fauna species and their habitat are summarised in the attached “Boomer Green Energy Hub Ecological Assessment Report”, Table 7-1, pgs. 116-123. Proposed avoidance and mitigation measures are discussed in further detail in the attached “Boomer Green Energy Hub Ecological Assessment Report” Section7, pgs. 112-130.

Further mitigation and monitoring measures will be provided in a detailed bird and bat management plan, with consideration of detailed project design.

4.1.5.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Offsets are discussed in the attached “Boomer Green Energy Hub Ecological Assessment Report”, Section 9, pgs 150-151 in relation to Koala habitat, Greater Glider denning habitat and Squatter Pigeon breeding habitat. No offsets are expected to be required for migratory species.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no Nuclear Actions identified within the impact area of the Project.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

A PMST search within 10 km of the Project Site did not identify any Commonwealth Marine Areas to be present.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Great Barrier Reef Marine Park (GBRMP) is located approximately 100 km to the east of the Site Boundary. The Site Boundary is located in the Fitzroy region of the Great Barrier Reef catchment. The *Water Plan (Fitzroy Basin) 2011* (Fitzroy WP) provides a strategic framework for sustainable management of water in the Fitzroy Basin.

The Site Boundary is located in two sub-basins within the broader Fitzroy Basin – the Fitzroy River Sub-basin in the eastern portion of the Site Boundary and the Mackenzie River Sub-basin in the west. The environmental values and water quality objectives of the Mackenzie River Sub-basin and the Fitzroy River Sub-basin are established in the following documents under the Environmental Protection (Water) Policy 2009:

• Fitzroy River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Fitzroy River Sub-basin

• Mackenzie River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Mackenzie River Sub-basin

The Project will be managed under a Construction Environmental Management Plan (CEMP) and an Operational Environmental Management Plan (OEMP) which will include measures to prevent impacts the GBRMP. Water quality, erosion and sedimentation controls will be addressed in the CEMP and OEMP. Water quality controls will be designed to align with the general ecological outcomes provided in the Fitzroy WP and the water quality objectives of each sub-basin. To protect the environmental values identified for each sub-basin. Erosion and sediment control measures will be based on the Best Practice Erosion and Sediment Control publication, developed by the International Erosion Control Association.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The proposed development is not related to coal mining or coal seam gas.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Project is not on Commonwealth land.

4.1.11 Commonwealth heritage places overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Project is not related to Commonwealth heritage places overseas.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

- Threatened Species and Ecological Communities (S18)

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)

- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth heritage places overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

The project design has undergone an iterative process in order to minimise impacts. However, two points limit the extent to which alternatives can be considered:

- Site selection is dictated by factors such as wind speed, proximity to the grid and land access which together determine the overall viability of a development. These factors were the key drivers behind choosing the Site Boundary location, due to the presence of sufficient wind, ability to be connected to the grid, and reasonable site access.
- Project design is driven by the wind resource, which determines the layout of wind turbines within the Site Boundary, as well as site constraints including ecology and geology. The wind resource is typically the most economic at higher altitude, thus, wind turbines are often located at the top of ridgelines. Such areas generally contain less fertile soils than lowland areas and so are of less value for agricultural activities, including grazing and cropping. As such, remnant vegetation is often present within the preferred wind farm footprint.

Project design therefore requires a delicate balance between clearing vegetation to establish a viable wind farm which provides renewable energy to the grid and protecting in-situ environmental values. This balance has been achieved through a refined and iterative project design that avoids areas of the greatest environmental value where practicable and minimises impacts that cannot be avoided. The principles of avoidance and minimisation have been prioritised during Project design, with mitigation measures relied upon to address impacts only when absolutely necessary.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

1.2.6 Commonwealth or state legislation, planning frameworks or policy documents that are relevant to the proposed action

#1.	Boomer Green Energy Hub Ecological Assessment Report Appendices B-H	Document	Boomer Green Energy Hub Ecological Assessment Report Appendices B-H

1.3.2.18 (Person proposing to take the action) If the person proposing to take the action is a corporation, provide details of the corporation’s environmental policy and planning framework

#1.

	Boomer Green Energy Hub Ecological Assessment Report Appendices B-H	Document	Boomer Green Energy Hub Ecological Assessment Report Appendices B-H

2.2.5 Tenure of the action area relevant to the project area

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report
#2.	Boomer Green Energy Hub Ecological Assessment Report Appendix A	Document	Boomer Green Energy Hub Ecological Assessment Report Appendix A

3.1.1 Current condition of the project area's environment

#1.	Boomer Green Energy Hub Ecological Assessment Report Appendix A	Document	Boomer Green Energy Hub Ecological Assessment Report Appendix A

3.1.3 Natural features, important or unique values that applies to the project area

#1.	Boomer Green Energy Hub Ecological Assessment Report Appendix A	Document	Boomer Green Energy Hub Ecological Assessment Report Appendix A
#2.	Goodedulla National Park	Link (Webpage)	https://parks.des.qld.gov.au/parks/goodedulla/about

3.2.1 Flora and fauna within the affected area

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report
#2.	Boomer Green Energy Hub Ecological Assessment Report Appendices B-H	Document	Boomer Green Energy Hub Ecological Assessment Report Appendices B-H

3.2.2 Vegetation within the project area

#1.	Boomer Green Energy Hub Ecological Assessment Report Appendices A	Document	Boomer Green Energy Hub Ecological Assessment Report Appendices A
#2.	Queensland Globe, Atlas of Australian Soils layer, 2022	Link (Webpage)	https://qldglobe.information.qld.gov.au/
#3.			

Queensland Globe, State Surface Geology layer, 2022	Link (Webpage)	https://qldglobe.information.qld.gov.au/

3.4.1 Hydrology characteristics that apply to the project area

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report
#2.	Boomer Green Energy Hub Ecological Assessment Report Appendix A	Document	Boomer Green Energy Hub Ecological Assessment Report Appendix A

4.1.4.2 (Threatened Species and Ecological Communities) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.4.5 (Threatened Species and Ecological Communities) Why you consider the direct and/or indirect impact to be a Significant Impact

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.4.10 (Threatened Species and Ecological Communities) Avoidance or mitigation measures proposed for this action

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.5.2 (Migratory Species) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.5.3 (Migratory Species) Why your action is unlikely to have a direct and/or indirect impact

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.5.6 (Migratory Species) Why you do not consider the direct and/or indirect impact to be a Significant Impact

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.5.10 (Migratory Species) Avoidance or mitigation measures proposed for this action

#1.

Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

4.1.5.11 (Migratory Species) Proposed offsets relevant to avoidance or mitigation measures

#1.	Boomer Green Energy Hub Ecological Assessment Report	Document	Boomer Green Energy Hub Ecological Assessment Report

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	31124444622
Organisation name	NGH PTY LTD
Organisation address	U 17, level 3/21 Mary St, Surry Hills, NSW, 2010
Representative's name	Beth Kramer
Representative's job title	General Manager - Biodiversity
Phone	0428 379 894
Email	beth.k@nghconsulting.com.au
Address	2B/34 Tallebudgera Creek Rd, Burleigh Heads QLD 4220 (PO Box 424, West Burleigh QLD 4219

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ By checking this box, I, **Beth Kramer of NGH PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	84150163143
Organisation name	Ark Energy Projects Pty Ltd
Organisation address	L2, 275 George Street, Sydney NSW 2000
Representative's name	Jessica Picton
Representative's job title	Project Manager

Phone	02 8456 7400
Email	Jessica.Picton@arkenergy.com.au
Address	L2, 275 George Street, Sydney NSW 2000

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, **Jessica Picton of Ark Energy Projects Pty Ltd**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

✔ Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, **Jessica Picton of Ark Energy Projects Pty Ltd**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *