

Bushfire Hazard Assessment and
Mitigation Plan
Cambridge Solar Farm- Stage 1
Upper Haughton, Queensland

For

Urbis Pty Ltd
By

Rob Friend & Associates Pty Ltd

RFA23-028 – January 2024

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Cover photograph – view of the northern extent of the proposed Cambridge Solar Farm within Lot 6.

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25th of January 2024

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Introduction

Site Description

Rob Friend & Associates Pty Ltd (RF&A) has been commissioned by the principal contractor, Urbis Pty Ltd to undertake an assessment of bushfire hazards and risks and prepare a Bushfire Hazard Assessment and Mitigation Report which is to also respond to the Bushfire Hazard Overlay Code in the Burdekin Shore Planning Scheme Bushfire Hazard Overlay Code and where applicable the State Planning Policy, Natural Hazards, Risk and Resilience Assessment Benchmarks.

General description

To assist in the preparation of this report, the site was inspected on the 24th of May 2023.

Proposal

Development Permit for Material Change of Use for Cambridge Solar Farm, Major Electricity Infrastructure and Substation in four stages.

Cambridge JMD Australia are proposing to develop a Solar Farm consisting of up to 300MW grid connected solar farm, substation and associated ancillary infrastructure (invertors, transformers and cabling) across 641ha located on Lot 6. Provision for a further 1,700MW of behind the meter (or grid connected at a future date) of solar, battery storage with associated ancillary infrastructure (invertors, transformers and cabling) will be developed across the 1400ha consisting of Lots 1 and 2 (see Figure 3).

The proposed development site for the Solar Farm is over a number of lots which include:



Lot 1 on SP302825 - 802.1 ha
Lot 2 on SP302825 - 713.6 ha and
Lot 6 on SP302825 - 764.4 ha

Other lots which are not the subject of this development application but may be subject to future development for renewable energy uses include;



Lot 10 on GS602,

Lot 2 on SP313057, and
Lot 3 on SP302825.

All of the lots are generally located at 834
Keith Venables Road Upper Haughton QLD
(see Figures 1 & 2).

Cambridge JMD Australia also has
development rights over other properties
around the Stage 2 area, however they do
not form part of the development application
for the Solar Farm.

The proposed development site is located
above the right bank of the Haughton River
and is accessible from the end of Keith
Venables Road, Upper Haughton.

Lot 6 and 2 is accessed via a vehicle track
from the end of Keith Venables Road,
Upper Haughton.

Another vehicle track which is located
entirely within Lot 6 before existing the lots
north-eastern boundary to traverse adjacent
lots and then traversing parts of Lot 1 within
and outside of a separate section of Black
Road, Upper Haughton. This vehicle track
exits lot 1's north-eastern boundary before

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-4rejoining with the Black Road road reserve to the east of Lot 1.

A high voltage powerline easement, Lot A on GS672 and GS683 traverses the western boundary of Lots 1 and 2 respectfully.

a Least Concern regional Ecosystems within and around the proposed Cambridge Solar Farm. These mapped Regional Ecosystems within and around the site include (see Figure 5);



Landform

The land over which the proposed Solar Farm is to be located in flat land of less than 5% slope across the three properties (see Figure 4).

To the north and west of the three lots is the upper reaches of the Haughton River which drains to the north-east into Bowling Green Bay.

A riparian zone and vegetated flood plain above the bed along the right bank of the Haughton Rover between approximately 52 metres to 970 metres at its maximum abuts the proposed development site's northern boundary.



The site has been cultivated for sugar cane and other agricultural uses in the past.

Apart from the retained vegetation above the right bank of the Haughton Rover, a patch of vegetation is located in the southeastern portion of Lot 6. This patch will be

retained as part of the development.

The lands around the site have been used for sugar cane cultivation of for pastoral grazing uses. It is believed that once the Solar Farm has been constructed and commissioned that adjacent land use would be expected to the continued.

Vegetation

The State Governments Regulated Vegetation Management Mapping maps areas of Category B/Remnant vegetation of



11.3.25a – *Eucalyptus raveretiana* (sometimes emergent), *Eucalyptus tereticornis* and *Melaleuca fluviatilis* woodland. A range of other species may be present including *Melaleuca leucadendra*, *Corymbia clarksoniana*, *Casuarina cunninghamiana*, *Melaleuca viminalis* and *Nauclea orientalis*. There is often a dense low tree layer dominated by species such as *Acacia salicina*, *Geijera salicifolia*, *Diospyros*

humilis and Mallotus philippensis. Coastal riverine terraces and river channels, of often siliceous sands and loams. Riverine. (BVG1M: 22c). 11.3.25b - Melaleuca leucadendra and/or M. fluviatilis, Nauclea orientalis open forest. A range of other canopy or sub-canopy tree species also occur including Pandanus tectorius, Livistona spp., Eucalyptus tereticornis, Corymbia tessellaris, Millettia pinnata, Casuarina cunninghamiana, Livistona decora, Lophostemon suaveolens or L. grandiflorus, rainforest species and, along drainage lines, Eucalyptus camaldulensis or E. tereticornis. A ground layer of tall grasses such as Chionachne cyathopoda, Mnesithea rottboellioides or Heteropogon triticeus may be present. Often occurs on coarse sand spits and levees within larger river channels. Riverine. (BVG1M: 22c). 11.3.35 - Eucalyptus platyphylla, Corymbia clarksoniana woodland, occasionally with Corymbia tessellaris. A secondary tree layer commonly occurs, including Planchonia careya, Pandanus spiralis, Melaleuca viridiflora or M. nervosa and Petalostigma pubescens. The ground layer is usually tussock grasses, including Themeda

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triandra, *Heteropogon contortus*,
Mnesithea rottboellioides and
Bothriochloa decipiens, together with
herbs or forbs such as *Glycine tabacina*,
Galactia tenuiflora or *Sida hackettiana*.
Occurs on Cainozoic alluvial plains.
Older floodplain complexes, major
stream levees and lighter deltaic
deposits. Not a Wetland. (BVG1M: 9e);
11.3.35a - *Corymbia tessellaris*, *C.*
clarksoniana and *Eucalyptus platyphylla*
woodland. Occurs on Cainozoic alluvial
plains. Older floodplain complexes,
major stream levees and lighter deltaic
deposits. Not a Wetland. (BVG1M: 9e).
11.3.10 - *Eucalyptus brownii* woodland
to open woodland. The ground layer is
typically tussock grasses, including
Aristida spp., *Chloris* spp., *Fimbristylis*
dichotoma, *Eriachne* spp., *Eragrostis*
spp. and *Chrysopogon fallax*. Areas on
fertile soils may contain *Heteropogon*
contortus, *Bothriochloa bladhii* and
Chrysopogon fallax. Occurs on
Cainozoic alluvial plains. Not a Wetland.
(BVG1M: 17a).

11.3.27x1c - Sedgeland to grasslands
on Quaternary deposits. Sedgeland
areas typically dominated by
Schoenoplectus subulatus although a
range of other sedges and grasses may
also dominate localised areas. Other
dominant species include the sedges
Eleocharis philippinensis, *Cyperus*
alopecuroides, *C. scariosus* and *C. iria*
and the grasses *Phragmites australis*,
Sporobolus virginicus and *Paspalum*
vaginatum. Other typical species in
shallower margins include *Fimbristylis*
ferruginea, *Phyla nodiflora* and *Cyperus*
polystachyos. Occasional twiners such
as *Vincetoxicum carnosum* may be
present. Occurs in depressions on old
Quaternary estuarine deposits. These
are seasonally inundated with fresh
water but become more brackish as
they dry out completely before the next



season's rain. Palustrine. (BVG1M:
34c). and

11.3.7 - *Corymbia clarksoniana*, *C.*
tessellaris and *C. dallachiana* woodland
to open woodland. There is usually a
secondary tree layer, including *Acacia*

salicina, Lysiphyllum hookeri or Grevillea striata. Occurs on levees and plains formed from Quaternary alluvial deposits. Soils are usually deep uniform sands with minor areas of sandy red earths. Not a Wetland. (BVG1M: 9e).

The mapped Vegetation Hazard Classes mapped by the QFES Redi-Portal are mapped in Figure 6.

Findings

Desktop analysis

Bushfire Hazard Mapping

State Planning Policy

The State Planning Policy, Natural Hazards, Risk and Resilience Bushfire hazard mapping maps all areas of remnant vegetation (Category B) within and around the proposed Solar Farm as areas of Medium potential bushfire hazard class (see Figure 7).

There area mapped areas of High potential bushfire hazard class mapped on the banks of the Haughton River, however these are too small to have a significant impact on bushfire behaviour and as such it is reasonable to conclude that all areas containing the Vegetation Hazard Class 9.2 can effectively be described as areas of Medium potential bushfire hazard class. It is noted that some areas mapped as medium potential bushfire hazard class based on the QFES Redi-Portal vegetation hazard class mapping can be considered to

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-6be areas of low bushfire hazard due to the removal of the vegetation in those areas.

Code is required. The response is located in Appendix 2 below.

The Qld Fire and Emergency Service maps the bushfire hazard characteristics over and around the proposed Cambridge Solar Farm

Fire scar mapping

1. Vegetation hazard classes;
 - o 9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges, and
 - o 22.2 Melaleuca woodlands on seasonally inundated lowland coastal swamps.
2. Fuel loads
 - o VHC9.2 surface fuel load 14.9t/ha and a total fuel load 17.2t/ha
 - o VHC22.2, Surface fuel load 17.7t/ha and a total fuel load of 19.7t/ha.
 - o VHC38.5A – surface fuel load 1.5t/ha and a total fuel load of 2t/ha.

Note A - this VHC is not reflective of cane crops as their fuel loads are significantly higher than that attributed for VHC38.5. However, as the Cambridge Solar Farm will replace the cane crops this VHC is not relevant for assessing fuel loads into the future.

The Queensland State Government provides fire scar mapping within its Qld Globe mapping. This mapping contains potential fire scars from 1987 to 2023. Figure 9 provides all fire scar mapping over the mapping period.

The analysis of this mapping indicates that there were vegetation fires within and around the proposed Cambridge Solar Farm in the following years:

■

■

■

■

3. FFDI 59.

Burdekin Shire Planning Scheme
The Burdekin Shire Planning Scheme (2022) Bushfire Hazard Overlay Map replicates the State Planning Policy bushfire hazard mapping and as such the issues of areas which have been cleared but are still mapped as a bushfire hazard area is also relevant to the planning scheme bushfire hazard overlay map over the proposed Solar Farm site (see Figure 8).
As there are areas of hazardous vegetation

within and within 100 metres of the site, a response to the Bushfire Hazard Overlay



1989 – fire scar within the Upper Haughton Solar Farm property (Lot 1 on 313057) in December 1989 and lands to the north of the Haughton River in September and October 1989.

A fire scar on another property to the north of the Haughton River in February 1990.

Fire scars are also mapped over the area burnt in 1991, however the size of the scars indicate they are unlikely to be actual fires.

A fire scar in August of 1999 is mapped over the properties burnt in 1989 and 1990. It appears that this fire may have also burnt vegetation on the right bank of the Haughton River and within or adjacent to Lot 1 on SP302825, in September and December 1999.

A fire scar from 2000 is located just to the south of Lot 2 on SP302825. This fire scar is from August 2000.

A number of fire scars are mapped over the property to the immediate east of Lot 1 on SP302825 with scars mapped from May to July of 2001. Another fire scar is mapped to the east of Lot 2 on SP302825 from November 2001.

A small fire scar is mapped to the immediate east of Lot 1 on SP205825 from November 2003.

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An area in the northern portion of Lot 1 and within the vegetation along the right bank of the Haughton River is recorded from December 2004. Additionally, two relatively small fire scar areas are also mapped from August 2004.

Two fire scars from June 2005 is located to the immediate east of lot 1 and Lot 2. Additional very small fire scares are also mapped within Lot 1 however these are potentially too small to be actual scaring from a vegetation fire.

Fire scars are mapped over Lot 6 on SP205825 in 2006. A fire scare from October 2006 involved vegetation along the right bank of the Haughton River within and outside of Lot 6, several smaller fire scares from November 2006 may be scars from the October fires? The 2007 fire scars maps a fire scar from January 2007. These fire scars are within the October 2006 area and as such may be a result of that fire. Additionally there are also fire scar polygons from October 2007 within Lot 1 and Lot 6.

2001 sees a large fire on the right bank of the Haughton River which involves the vegetation on the right bank and other areas within Lot 1 and part of Lot 2.

The fire scar mapping in December of 2013 maps a fire scar in the vegetation to the immediate east of Lots 1 and 2. This does not involve any vegetation within the site and as such is considered to be a controlled burn.

A fire scar polygon is mapped within the northern portion of Lot 1 in August of 2018.

A small fire scar is mapped along the western boundary of Lot 2 from September 2020. Due to its restricted area and size this was likely a controlled burn.





Fire scars were mapped over parts of Lot 2 from May and Lot 1 July 2021. While relatively small in size, these fires appear to have not been controlled burns due to the burn shape and perimeter.

2023 fire scars are mostly within Lot 6 and immediately adjacent to Lot 6 in July, August and October of 2023. Based on our site inspection in May it is likely that these fire scars were actually resulting from regrowth vegetation clearing and the use of fire to remove the cleared vegetation.

Site inspection

Based on our site inspection which looked at topography and vegetation structure, we found;



The upper banks of the Haughton River ranged between 4 to 18 degrees. However, the slope over the land proposed for the Solar Farm are approximately 1 to 3 degree slope.

Recent clearing of an area in the south-western corner of Lot 10 on GS602 mapped as containing the RE 11.3.35 and a mosaic of 11.3.35/11.3.10 has removed the remnant vegetation and as such this area should be mapped as a nonremnant and the vegetation hazard class of 40.4 low grass or tree cover in rural areas.

All areas mapped as the VHC 38.5 Cropping and horticulture could also now be identified as VHC40.4.

With respect to the areas mapped as 9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges, much if not all of this area for the purpose of bushfire behaviour ought to be mapped as an open woodland based on tree cover however there is no vegetation



hazard class which reflects an open woodland in a coastal or sub-coastal situation.

Additionally all areas mapped as the Regional Ecosystems, 13.3.25a & b, 13.3.35, 11.3.10 and 11.3.27x1b have all been invaded in the groundcover/understorey by the environmental weed grass, *Megathyrsus maximus* (Guinea grass) as well as several other environmental weedy herbs, and shrub species.

We would note that relatively undisturbed areas of VHC9.2 would not contain the level of attributed surface and near surface fuels. However, due to the presence of Guinea grass and the other weedy herbaceous and shrubby species, the total surface fuel of 19.4t/ha is an acceptable total surface fuels load to use when determining radiant heat flux setback distances using Method 2 in AS3959.

Conclusions

Based on our desktop analysis and field data we have concluded;

1. The principal bushfire hazard relative to the proposed Solar Farm are along the right bank and flood plain to the north of the development site.
2. Vegetated lands to the east and South of Lot 2 also present a bushfire hazard but due to the active use of these properties for grazing purposes, the surface and near surface fuels are considered to be less than and ungrazed riparian and flood plain along the right bank of the Haughton River.
3. The area of retained vegetation within the south-eastern corner of Lot 6 is

large enough to be mapped as an area of hazardous vegetation using the State Planning Policy, Natural Hazards, Risk and Resilience bushfire hazard mapping methodology, however, as the patch is greater than 100 metres from any area of significant bushfire hazard and the patch will be surrounded by managed areas and infrastructure and as such the likelihood that this area would become involved in a vegetation fire is very low.

4. While much of the infrastructure associated with a solar Farm are not particularly flammable, however

electrical storage and transmitting infrastructure could be considered to be essential community infrastructure and as such they need to be located no closer than a distance which is no less than that which is exposed to a Radiant heat flux of 10kW/m².

5. We note that the Bushfire Resilient Communities, Natural Hazards, Risk and Resilient SPP technical guideline requires that essential community infrastructure (which are referred to in the Scheme as Critical Infrastructure) and vulnerable uses are required to be located no closer than a distance which achieves a Radiant heat flux exposure of 10kW/m². All other infrastructure and uses i.e. residential use can be located no closer than that which achieves a Radiant heat flux exposure of 29kW/m².

6. Using method II in AS3959 and the states mapped FFDI and the mapped vegetation hazard classes surface and total fuel loads the separation distances which achieves a Radiant heat flux of 10kW/m² and 29kW/m² are 30 metres and 12 metres respectfully (the calculated figures have been rounded up).

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Table 1 – Method II Minimal Distance Calculator
Cambridge Solar Farm - VHC 9.2 - Minimum Distance Calculator - AS3959-2018
(Method 2)

(Calculated January 15, 2024, 4:53 pm (MDc v.4.9))

Inputs

Fire Danger Index

Vegetation

classification

Understorey

fuel

load

Total fuel load

Outputs

1.21 km/h

9.93 m

59

Woodland

Rate of spread

Flame length

14.9 t/ha

Flame angle

55 °, 65 °, 74 °, 79 °, 81 ° & 86 °

17.2 t/ha

Elevation of receiver

Vegetation height

Effective slope

n/a

2°

Fire intensity

Transmissivity

Site slope

2°

Viewfactor

Flame width

100 m

Windspeed

n/a

Heat of combustion

18,600

kJ/kg

1,090 K

Minimum distance to < 40
kW/m²
Minimum distance to < 29
kW/m²
Minimum distance to < 19
kW/m²
Minimum distance to < 12.5
kW/m²
Minimum distance to < 10
kW/m²

3.78 m, 4.11 m, 4.19 m, 4.04 m,
3.9 m & 2.34 m
10,761 kW/m
0.881, 0.867, 0.846, 0.822, 0.809
& 0.74
0.5954, 0.4364, 0.2949, 0.1996,
0.1622 & 0.0443
8.1 m

Flame temperature

11.1 m
16.4 m
23.9 m
28.8 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980
Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980
Elevation of receiver - Douglas & Tan, 2005
Flame angle - Douglas & Tan, 2005
Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire Management Plan

Firebreaks

1. A firebreak is to be constructed around the perimeter of the Cambridge Solar Farm to a minimum width of 10 metres
2. The firebreak is to be regularly maintained to a height of no greater than 100 mm at all time during the year. It is noted there would be minimal growth during the dry season.
3. Where practicable, any security fencing should be located within the perimeter firebreak to ensure it is not substantially damaged from a vegetation within the retained vegetation around the Cambridge Solar Farm.
4. The perimeter firebreak is to be accessible via the internal vehicle tracks with intersections no greater than 200 metres apart.

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Fire management lines

1. No specific fire management lines will be developed within the development however, the perimeter firebreak will provide access for emergency services around the Cambridge Solar Farm.
2. In addition, internal vehicle tracks will also be developed and maintained and these will be of a size which will enable Emergency Services access into and around the Cambridge Solar Farm for firefighting purposes.

Water

1. Water is to be made available within the development footprint with three (3) 20,000 litre steel/metal water tanks located at separate location around and within the Cambridge Solar Farm.
2. The location of the water tanks will be influenced by the location of existing or new water take-off points such as the irrigations canal near the eastern boundary of Lot 2, or licensed pumping points of the Haughton River.
3. A separate 10,000 litre water tank is to be located adjacent to a caretakers dwelling or staff cribb room.

Vegetation management

3. Vegetation located outside of the Solar Farm will be left in its current condition and all bushfire mitigation infrastructure will be provided and managed within the Solar Farm development footprint.

Location of Critical Infrastructure and caretakers building

1. All critical infrastructure is to be located no closer to any area of hazardous vegetation including the internal patch of vegetation within Lot 6 than that necessary to achieve a Radiant heat flux exposure of 10kW/m².
2. Table 1 in the above report has calculated this to be 28.8 metres however this separation distance has been rounded up to a setback distance of 30 metres.
3. All habitable structures, caretakers dwelling and cribb rooms control rooms will be separated from any area of hazardous vegetation including the internal patch of vegetation such that the maximum radiant heat flux exposure to these structures will be a Radiant heat flux of 29kW/m².
4. Table 1 in the above report has determined this to be a minimal separations distance of 11.1 metres which is to be rounded up to 12 metres.

1. A patch of vegetation within Lot 6 will be retained as part of the development of the proposed Cambridge Solar Farm. A 10 metre wide firebreak will be located around this patch and this firebreak will be linked by internal vehicle tracks to enable access to the perimeter of the patch for vegetation management purposes.

2. This patch may be managed to ensure its ecological and biodiversity values are maintained and enhanced however, unless required for that purpose, no controlled burning will be undertaken within the patch.

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Appendices

Appendix 1 – Figures

Figure 1 – Site Location

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State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure

0

4,600

¢

9,200

13,800

18,400

Metres

Disclaimer:

This map has been prepared with due care based on the best available information at the time of publication. However, the State of Queensland (acting through the department) makes no representations, either express or implied, that the map is free from errors, inconsistencies or omissions. Reliance on information contained in this map is the sole responsibility of the user. The State disclaims responsibility for any loss, damage or inconvenience caused as a result of reliance on information or data contained in this map.

Figure 2 – Aerial Image

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State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure

0

580

1,160
Metres

1,740

2,320

Date: 16/01/2024

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Figure 3 – Proposed Development Plan

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Cambridge
Solar Farm
Development Application Briefing
Site Development Plan
25 October // 2023

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MASTER PLAN SITE BOUNDARY
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SOLAR FARM DEVELOPMENT PLAN - ALL LOTS

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L OT 6

Haughton
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Farm
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LOT 6 SOLAR FARM DEVELOPMENT PLAN
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LOT 1 SOLAR FARM DEVELOPMENT PLAN
6

1:20,000 @ A3

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L OT 1

L OT 6
L OT 2

L OT 5

Haughton
Solar
Farm
L OT 3

LOT 2 SOLAR FARM DEVELOPMENT PLAN
7

1:20,000 @ A3

Figure 4 – Qldglobe Contour and Hillshade Map

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Cambridge Renewable Energy Park - Upper Haughton, North Qld
Hillshade Multidirectional
19°41'30"S 146°59'26"E

A product of
19°41'30"S 147°5'22"E

Legend located on next page

0

1 km
Scale: 1:33000

Printed at: A3
Print date: 11/1/2024
Not suitable for accurate measurement.
Projection: Web Mercator EPSG 102100 (3857)
For more information, visit
<https://qldglobe.information.qld.gov.au/help-info/Contactus.html>
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PBC, 2023

19°45'49"S 146°59'26"E

19°45'49"S 147°5'22"E

Department of Resources

Figure 5 – Qldglobe Regulated Vegetation Management Area & Regional Ecosystem Map

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19°41'37"S 147°5'24"E

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19°45'57"S 146°59'28"E

19°45'57"S 147°5'24"E

Department of Resources

Legend

Vegetation management
regional ecosystem map labels

Category A or B area
containing endangered

Attribution

Land parcel - gt 1000 ha
Parcel

Land parcel label

Motorway
Highway
Secondary
Connector

Land parcel label - gt 1 ha
Category A or B area
containing of concern

Roads and tracks

Local
Restricted Access Road

Land parcel label - gt 10 ha

Mall
Busway
Bikeway

Category A or B area that is
least concern

Land parcel label - gt 1000 ha

Restricted Access Bikeway
Walkway
Restricted Access Walkway

Category C or R area
containing endangered

Places: My Places(1)
My Place 1

Green bridges
Category C or R area
containing of concern

Category C or R area that is of
least concern

Land parcel
Parcel

Land parcel - gt 1 ha
Parcel

Land parcel - gt 10 ha

Parcel

Non-vehicular Track

Track

Restricted Access Track

Ferry

Proposed Thoroughfare

Bridges

Railway

Tunnels

Railway station

Cities and Towns

Maxar

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Figure 6 – QFES Vegetation Hazard Class and FFDI map

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25th of January 2024

Redi Map

Legend

Base Parcels Only

Forest Fire Danger Rating h20

Remnant Vegetation V10 (Regional Ecosystems)

Broad Vegetation Hazard Class

BVG 1-7 Rainforest and scrubs

BVG 8 Wet eucalypt open forest

BVG 9-15 Eastern eucalypt woodlands to open forests

BVG 16 Eucalypt open forests to woodlands on floodplains

BVG 17-19 Eucalypt dry woodlands on inland depositional plains

BVG 20 Callitris woodlands to open forests

BVG 21-22 Melaleuca open woodlands on depositional plains

BVG 23 Acacia aneura(mulga) dominated open forests, woodlands and shrublands

BVG 24-26 Other acacia dominated open forests, woodlands and shrublands

BVG 27 Mixed species woodlands - open woodlands (inland bioregions) includes wooded downs

BVG 28-29 Other coastal communities or heaths

BVG 30-32 Tussock grasslands, forblands

BVG 33 Hummock grasslands

BVG 34 Wetlands (swamps and lakes)

BVG 35 Mangroves and tidal saltmarshes

BVG 36 Exotic and hardwood plantation

BVG 37 Hoop plantations

BVG 38 Cropping and horticulture

BVG 39 Low to moderate tree cover in built-up areas

BVG 40 Low grass or tree cover in rural areas

BVG 41 Low grass or tree cover in built-up area

BVG 42 Nil to very low vegetation cover

BVG 43 Waterbodies

VHC

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

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Figure 7 – State Planning Policy – Bushfire Hazard Map

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Legend

Bushfire prone area
Very High Potential Bushfire Intensity
High Potential Bushfire Intensity
Medium Potential Bushfire Intensity
Potential Impact Buffer

Queensland Government
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¢

State Planning Policy

Making or amending a local planning instrument
and designating land for community infrastructure

0

1,100

2,200
Metres

3,300

4,400

Date: 16/01/2024

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Figure 8 – Burdekin Shore Bushfire Hazard Overlay Map

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25th of January 2024

Figure 9 – Fire Scar Mapping 1998-2023

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25th of January 2024

Cambridge Renewable Energy Park, Upper Haughton, Qld
Historic Fire Scar Mapping 1987 - 2023
19°41'44"S 146°59'27"E

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PBC, 2023

19°46'4"S 146°59'27"E

19°46'4"S 147°5'23"E

Department of Resources

Cambridge Renewable Energy Park, Upper Haughton, Qld
Historic Fire Scar Mapping 1987 - 2023
Legend

Local government

Fire scar mapping Queensland

- current

January

February

March

April

May

June

July

August

September

October

November

December

Land parcel

Parcel

Land parcel - gt 1 ha

Parcel

Land parcel - gt 10 ha

Parcel

Property

Attribution

1987 Fire scar mapping

Queensland

1989 Fire scar mapping

Queensland

1991 Fire scar mapping

Queensland

Maxar

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January

January

January

February

February

February

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March

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April

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April

May

May

May

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2018

June

June

June

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July

July

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November

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1988 Fire scar mapping
Queensland

1990 Fire scar mapping
Queensland

1992 Fire scar mapping
Queensland

January

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December

Appendix 2 – Response to the Burdekin Shire Planning Scheme
5.2.1.3

Specific benchmarks for assessment

Table 5.2.1.3--Benchmarks for assessable development

Performance outcomes

Compatible development

P01

Development does not increase the number of lots within the medium, high or very high potential bushfire intensity areas.

P02

Development involving critical or vulnerable uses is not located on land subject to bushfire hazard, unless it involves a minor extension to or redevelopment of an existing use and does not substantially increase the number of people accommodated or requiring evacuation from the site.

Acceptable outcomes

Response

A01


No new lots are created.


R1

 No

No acceptable outcome is nominated.

R2

 The proposed development does not include any Vulnerable Uses, however, it will contain critical uses in that the proposal is for a Solar Farm which will also involve substations and utility installations.

 It is noted that the State Planning Policy, Natural Hazards, Risk and Resilience Guidance Material stipulates that such uses have to be located no closer to an area of bushfire hazard than that which will be exposed to a maximum Radiant heat flux of 10kW/m2. The recommendations in the above report requires that Critical uses such as those associated with this development are to be located no closer than that which would be exposed to a Radiant heat flux of 10kW/m2.

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Performance outcomes

P03

Critical uses are able to function effectively during and immediately after a bushfire hazard event.

Acceptable outcomes

No acceptable outcome is nominated.

P04

No acceptable outcome is nominated.

Development either:

(a) does not involve the manufacture or storage of hazardous materials within a bushfire prone area; or

(b) is designed to prevent the ignition of hazardous materials during a bushfire hazard event.

Development design and separation from bushfire hazard – material change of use

P05

A05

Development is located and designed to ensure Buildings or building envelopes are separated from

proposed buildings or building envelopes achieve hazardous vegetation by a distance that achieves a

the following radiant heat flux level at any point:

radiant heat flux level at any point on the building or

2

(a) 10kW/m

where the use involves the envelope respectively, of 10kW/m² for a use accommodation or congregation of vulnerable mentioned in the performance outcome, or

sectors of the community such as child care 29kW/m², otherwise.

centres, community care centres, educational

Editor's note—Where a separation distance is

establishments, detention facilities, hospitals,

proposed to be achieved by utilising existing cleared

rooming accommodation, retirement facilities

developed areas external to the site, certainty must

be established (through tenure or other means) that

(b) 29kW/m² otherwise.

the land will remain cleared of hazardous

Response

R3

☞ This recommendations specified in the above report will ensure that the facility will and can operate during and after a local and district bushfire event.

☞ This continued operation of the Solar Farm will be ensured by separations of the facility for surrounding hazardous vegetation and regular maintenance of the bushfire mitigation infrastructure such as firebreaks and fire management lines.

R4

☞ the development will not involve the manufacture or storage of hazardous materials.

R5

☞ All structures which are or contain critical uses

as defined in Schedule 1 of the Scheme, will be located no closer than that which would be exposed to a maximum radiant heat flux of 10kW/m².

☞ Caretakers quarters or other onsite structures which will provide amenities for staff and workers within the facility will be located no closer than that which will be exposed to a Radiant heat flux of 29kW/m².

☞ All other structures are not of a structure which 25th of January 2024

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Performance outcomes

Editor's note—The radiant heat levels and separation distances are to be established in accordance with method 2 set out in AS3959:2018.

P06

A constructed perimeter road or a formed, all weather fire trail is provided between the hazardous vegetation and the site boundary or building envelope and is readily accessible at all times for the type of fire fighting vehicles servicing the area.

However, a fire trail will not be required where it would not serve a practical fire management purpose.

Editor's note—Fire trails are unlikely to be required where a development site is less than 2.5ha.

Acceptable outcomes vegetation.

Editor's note—For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.

Editor's note—The achievement of a cleared separation distance must be achieved in a way that ensures compliance with other provisions within the planning scheme seeking protection of certain ecological, slope, visual or character features or functions.

A06

Development is separated from hazardous vegetation by a public road or fire trail which has:

- (a) a reserve or easement width of at least 20m;
- (b) a minimum trafficable (cleared and formed) width of 4m capable of accommodating a 15 tonne vehicle and which is at least 6m clear of vegetation;
- (c) no cut or fill embankments or retaining walls adjacent to the 4m wide trafficable path;
- (d) a minimum of 4.8m vertical clearance;
- (e) turning areas for fire-fighting appliances in accordance with Qld Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots and Department of Transport and Main Roads' Road Planning and Design Manual (2nd edition);
- (f) a maximum gradient of 12.5%;
- (g) a crossfall of no greater than 10 degrees;
- (h) drainage and erosion control devices in accordance with the standards in Planning scheme policy – SC5.2 – Development works;
- (i) vehicular access at each end which is

Response

will be susceptible to radiant heat flux levels, however, solar panels and supporting infrastructure will be separated from all adjacent bushfire hazards but a minimal distance of 10 metres.

R6

☞ A 10 metre wide firebreak is recommended to be located around the perimeter of the Solar Farm. A security fence will be located with a minimum 2 metre separation from any area of hazardous vegetation.

☞ This firebreak will also perform as a fire management line/fire trail which will permit access around the Solar Farm by site maintenance and Emergency Services

responding to a vegetation fire event around the Solar Farm.

☞ The firebreak will be accessible from internal and external fire management line and existing and designated external vehicle tracks.

☞ High-vis signage will be used to identify access points and distances to the internal access tracks.

☞ We note the recommendations specify that the internal vehicle tracks are to intercept with the perimeter firebreak at intervals of no more than 200 metres

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Performance outcomes

P07

Effective safety and evacuation procedures and measures are established and maintained.

Acceptable outcomes

connected to the public road network at intervals of no more than 200m;

(j) designated fire trail signage;

(k) if used, has gates locked with a system authorised by Qld Fire and Emergency Services; and

(l) if a fire trail, has an access easement that is granted in favour of council and Qld Fire and Emergency Services.

Editor's note—Refer to exemptions for clearing vegetation to establish or maintain a necessary firebreak or fire management line under the Planning Regulation 2017.

No acceptable outcome is nominated.

Editor's note—A bushfire management plan prepared by a suitably qualified professional may be required to demonstrate compliance with the performance outcome.

Development design and separation from bushfire hazard—reconfiguration of lots

P08

A08.1

2

Where reconfiguration creates lots of 2,000m or No new lots are created within the bushfire prone

less, a separation distance from hazardous area.

vegetation is provided to achieve a radiant heat OR flux level of 29kW/m² at the edge of the proposed A08.2

lot(s).

Lots are separated from hazardous vegetation by a distance that achieves radiant heat flux level of

Editor's note—The radiant heat levels and 29kW/m² at all boundaries.

separation distances are to be established in

Editor's note—Where a separation distance is

accordance with method 2 set out in AS3959proposed to be achieved by utilising existing cleared

2018.

developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous

Response

R7

☞ An Emergency Response Plan will be prepared as part of the Operational Works approvals.

R8.1

☞ The proposal is not for a Reconfiguring a Lot purpose.

R8.2

☞ The proposal is not for a Reconfiguring a Lot purpose.

25th of January 2024

Performance outcomes

P09

Where reconfiguration creates lots of more than 2,000m², a building envelope of reasonable dimensions is provided on each lot which is separated from hazardous vegetation such that it achieves radiant heat flux level of 29kW/m² at any point.

P010

Where reconfiguration is undertaken in an urban zone, a constructed perimeter road with reticulated water supply is established between the lots and the hazardous vegetation and is readily accessible at all times for urban fire fighting vehicles.

The access is available for both firefighting and maintenance/defensive works.

Editor's note—Applicants should also have regard to the relevant standards set out in the reconfiguring a lot and development works codes in this planning scheme.

Acceptable outcomes vegetation.

Editor's note—For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.

Editor's note—The achievement of a cleared separation distance may not be achievable where other provisions within the planning scheme seek the protection of certain ecological, slope, visual or character features or functions.

No acceptable outcome is nominated.

Response

A010.1

Lot boundaries are separated from hazardous vegetation by a public road which:

- (a) has a two lane sealed carriageway;
- (b) contains a reticulated water supply;
- (c) is connected to other public roads at both ends and at intervals of no more than 500m;
- (d) accommodates geometry and turning radii in accordance with Qld Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots and Department of Transport and Main Roads' Road Planning and Design Manual (2nd edition);
- (e) has a minimum of 4.8m vertical clearance above the road;
- (f) is designed to ensure hydrants and water

R10.1

☞ The proposal is not for a Reconfiguring a Lot purpose.

R9

☞ The proposal is not for a Reconfiguring a Lot purpose.

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Performance outcomes

P011

Outside an urban zone, either a constructed perimeter road or a formed, all weather fire trail is established between the lots or building envelopes and the hazardous vegetation and is readily accessible at all times for the type of fire fighting vehicles servicing the area.

The access is available for both firefighting and maintenance/hazard reduction works.

Acceptable outcomes

access points are not located within parking bay allocations; and

(g) incorporates roll-over kerbing.

A010.2

Fire hydrants are designed and installed in accordance with AS2419.1 2005.

A011

Lot boundaries are separated from hazardous vegetation by a public road or fire trail which has:

(a) a reserve or easement width of at least 20m;

(b) a minimum trafficable (cleared and formed)

width of 4m capable of accommodating a 15 tonne vehicle and which is at least 6m clear of vegetation;

(c) no cut or fill embankments or retaining walls adjacent to the 4m wide trafficable path;

(d) a minimum of 4.8m vertical clearance; (e)

turning areas for fire-fighting appliances in accordance with Qld Fire and Emergency

Services' Fire Hydrant and Vehicle Access Guidelines;

(e) a maximum gradient of 12.5%;

(f) a crossfall of no greater than 10 degrees;

(g) drainage and erosion control devices in accordance with the standards in Planning

Response

R10.2

☞ The recommendations in the above report specifies that a minimum of three (3) 20,000 litre metal water tanks be provided near a water source for bushfire suppression purposes.

☞ If a care takers dwelling is to be constructed a separate 10,000 metal water tank is to be located at that location for firefighting operations.

☞ No fire hydrants will be installed.

R11

☞

a firebreak of 10 metres is to be located around the Solar Farm in conjunction with a security fence.

☞ The firebreak will be accessible from internal vehicle tracks with intersection intervals of 200 metres at a maximum.

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Performance outcomes

P012

The lot layout:

- (a) minimises the length of the development perimeter exposed to, or adjoining hazardous vegetation;
- (b) avoids the creation of potential bottle-neck points in the movement network;
- (c) establishes direct access to a safe assembly /evacuation area in the event of an approaching bushfire; and
- (d) ensures roads likely to be used in the event of a fire are designed to minimise traffic congestion.

Acceptable outcomes

scheme policy - SC5.2 - Development works;

- (h) vehicular access at each end which is connected to the public road network at intervals of no more than 500m;
- (i) designated fire trail signage;
- (j) if used, has gates locked with a system authorised by Qld Fire and Emergency Services; and
- (k) if a fire trail, has an access easement that is granted in favour of council and Qld Fire and Emergency Services.

Editor's note—Refer to exemptions for clearing vegetation to establish or maintain a necessary firebreak or fire management line under the Planning Regulation 2017.

No acceptable outcome is nominated.

Editor's note—In order to demonstrate compliance with the performance outcome, a bushfire management plan prepared by a suitably qualified person may be required. Advice from the Queensland Fire and Emergency Services (QFES) should be sought as appropriate.

Response

R12

☞ the development will not create any new lots.

Editor's note—For example, developments should avoid finger-like or hour-glass subdivision patterns or substantive vegetated corridors between lots.

25th of January 2024

Performance outcomes

P013

Critical or potentially hazardous infrastructure is sited, designed and managed to reduce risk of its ignition.

Acceptable outcomes

A013

Critical or potentially hazardous infrastructure such as water supply, electricity, gas and telecommunications are located underground.

P014

All premises are provided with vehicular access the enables safe evacuation for occupants and easy access by firefighting appliances.

A014

Private driveways:

(a) do not exceed a length of 60m from the street to the building;

(b) do not exceed a gradient of 12.5%; (c) have a minimum width of 3.5m;

(c) have a minimum of 4.8m vertical clearance;

(d) accommodate turning areas for fire- fighting appliances in accordance with Qld Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines for residential, commercial and industrial lots and Department of Transport and Main Roads' Road Planning and Design Manual (2nd edition); and

(e) serve no more than 3 dwellings or buildings.

A015

A water tank is provided within 10m of each building (other than a class 10 building) which:

P015

Development outside reticulated water supply areas, includes a dedicated static supply available solely for firefighting purposes and can be accessed by firefighting appliances.

(a) is either below ground level or is constructed or screened by non- combustible materials;

Response

R13

☞ all critical infrastructure as described in Schedule 1 of the Scheme will be located no closer to hazardous areas so that its radiant heat flux exposure will be a maximum of 10kW/m².

R14

☞ the Solar Farm will contain a number of private roadways and vehicle tracks. All of these will comply with the requirements of A014.

☞ Internal roadways will be longer than 60 metres in length, however these internal vehicle tracks are for maintenance and management of the Solar Farm and not providing access to residential dwellings.

R15

☞ the proposed development will be serviced by a minimum of three (3) 20,000 litre metal water tanks for fire suppression operations.

Editor's note—Non-combustible is defined in AS3959:2018 and means: "not deemed combustible as determined by AS 1530.1 or not deemed combustible in accordance with the BCA."

(b) has a take-off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters:

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Performance outcomes

P016

Landscaping uses species that are not likely to exacerbate a bushfire event and does not increase fuel loads within separation areas.

P017

Bushfire risk mitigation treatments do not have a significant impact on the natural environment or landscape character of the locality.

Acceptable outcomes

- i. 10,000 litres for residential buildings;
 - ii. 45,000 litres for industrial buildings; and
 - iii. 20,000 litres for other buildings;
- (c) includes a hardstand area allowing medium rigid vehicle (15 tonne fire appliance) access within 6m of the tank;
- (d) is provided with fire brigade tank fittings -50mm ball valve and male camlock coupling and, if underground, an access hole of 200mm (minimum) to accommodate suction lines; and
- (e) is clearly identified by directional signage provided at the street frontage.
- No acceptable outcome is nominated.

Response

No acceptable outcome is nominated.

R17

☞ the proposed Solar Farm is completely located within ex-cane farmlands and as such will have no impact on the areas existing biodiversity values.

R16

☞ the site will not be landscaped.

25th of January 2024

Appendix 3 - Photographic Plates

Photographic plate 1 – view of the northern boundary of the vegetated patch within Lot 6

Photographic plate 2 – view of north-western corner of the patch in Lot 6
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Photographic plate 3 – view of existing vehicle track along the western to northern boundary of the proposed Cambridge Solar Farm development footprint.

Photographic plate 4 – view of the western portion of Lot 6 where the proposed solar panels of the Cambridge Solar Farm are to be located.

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Photographic plate 6 - view of the typical vegetation and structure within the Haughton River right bank and adjacent flood plain

Photographic plate 7 - view of the boundary between Lot 6 and Lot 1 and the existing vehicle track

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Photographic plate 8 – view of the northern boundary of Lot 11 and the interface between the existing vegetation and the proposed Cambridge Solar Farm development footprint.

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URBIS

Cambridge Solar Farm
Noise Assessment Report

January 2024

Confidential

Cambridge Solar Farm
Noise Assessment Report
URBIS

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Rev

Date

Details

0

22/12/2023

DRAFT - Preliminary Report for review by Urbis

1

25/01/2024

Client comments reviewed

Name

Date

Prepared by:

L Eriksson

22/12/2023

Reviewed by:

B Ison

22/12/2023

Approved by:

B Ison

25/02/2024

Signature

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We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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January 2024

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Glossary
Noise terms
Ambient noise

The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.

Assessment period

The period in a day over which assessments are made.

Background noise

The underlying level of noise present in ambient noise, generally excluding the noise source under investigation, when extraneous noise is removed. This is described using the LAF90 descriptor.

Decibels (dB)

The level of noise is measured objectively using a sound level meter. The range of pressure variations associated with everyday living may span over a range of a million to one. Instead of expressing pressure in this enormous range of unit, it is convenient to condense this range to a logarithmic scale and give it the units of decibels.

dBA: A-weighted
decibels

A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear. Most environmental noise is measured using the 'A' filter.

dB(C): C-weighted
decibels

A-weighting is an adjustment made to sound-level measurement which is better suited for the assessment of low frequency noise.

Frequency

The time rate for each wave peak (of a sound wave) to pass a given point. Subjectively frequency is the pitch of noise and is measured in hertz (Hz).

L1

The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.

L90

The level of noise exceeded for 90% of the time for which a given sound is measured. The L90 noise level expressed in units of dB and is commonly used to describe the level of background noise.

Leq

Equivalent sound pressure level – the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.

LMax

The maximum noise level during a specified period.

Rating Background
Level (RBL)

Defined by the EPA as the median value of the L90 during each assessment period (day/evening/night) over the whole duration of monitoring period. This is the level used for the calculation of criterion under many assessment policies.

Sound level meter

An instrument consisting of a microphone, amplifier and indicating device, designed to measure sound pressure levels.

Sound pressure level The measured level noise at a specific location, expressed in decibels.

(SPL)

Sound Power Level

(SWL)

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A measure of the acoustic energy emitted from a source of noise, expressed in decibels.

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Structure-borne noise Vibration propagating through solid structures in the form of waves, heard as sound.

Vibration Terms

Acceleration

Indicates the rates of change in speed of a vibrating particle.

Accelerometer

A device that measures the level of vibration acceleration.

Ambient vibration

The all-encompassing vibration associated with a given environment, usually comprised of multiple sources.

Amplitude

The maximum value of a vibration waveform.

Displacement

Describes the distance a body or particle moves from its starting position.

Frequency

The time between each wave peak (of a vibration wave) to pass a given point. Frequency is measured in hertz (Hz).

Hertz (hz)

Units in which frequency is expressed in cycles per second.

Peak value

The maximum value of a quantity during a given interval.

Root Mean Square
(RMS)

RMS of the acceleration value of the vibration source. This measure allows for the magnitude of the vibration, regardless of its direction.

Spectrum

A description of a quantity as a function of frequency or wavelength.

Transducer

A device that detects vibrations and outputs vibration levels.

Velocity

The speed of something in a given direction.

Wavelength

Of a periodic wave. The distance between peaks of a periodic wave.

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Abbreviations

ANZECC

Australian New Zealand Environment and Conservation Council

AS

Australian Standard

BS

British Standard

CEMP

Construction Environmental Management Plan

CNVMP

Construction Noise and Vibration Management Plan

dB

Decibel

dBA

Decibel (A-weighted)

DIN 4150

German Standard DIN 4150-3: Structural vibration – Effects of vibration on structures

EIS

Environmental Impact Statement

eVDV

Estimated vibration dose value

ISO

International Organization for Standardization

LGA

Local Government Area

L1

Statistical noise descriptor: noise level not exceeded for 1% of the measurement period.

Typically used to represent the maximum noise level, excluding a few non-typical extraneous events.

L10

Statistical noise descriptor: noise level not exceeded for 10% of the measurement period.

Typically used to represent the upper noise level.

L90

Statistical noise descriptor: noise level not exceeded for 90% of the measurement period.
Typically used to represent the background noise level.

Leq

Equivalent noise level: equivalent energy averaged noise level which over a defined time period would contain the same energy as the time varying signal over the same time period.

Lmax

Maximum noise level

NCA

Noise Catchment Area

NVIA

Noise and vibration impact assessment

OOHW

Outside of hours work

PPV

Peak particle velocity

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Executive summary

Introduction

Cambridge JMD Australia are proposing to develop a renewable energy park consisting of grid connected solar farms, substation and associated ancillary infrastructure (invertors, transformers and cabling). The proposal site is located at Upper Haughton on an irrigated sugarcane farming business located adjacent to the Burdekin River and 24 kilometres to the west of Ayr, North Queensland.

UBRIS has commissioned WSP to assesses the potential impacts to noise and vibration from the construction and operation of the Project and has been prepared to support and inform the Environmental Impact Statement (EIS) for the Project:

- To assess the existing noise environment, including the undertaking of noise monitoring to measure pre-existing background noise levels.
- To determine assessment criteria in accordance with relevant legislation, policies and guidelines.
- To assess potential impacts of noise associated with construction and operation of the proposed premises.
- To provide recommendations for reasonable and practicable operational mitigation and management measures in accordance with relevant legislation, policies and guidelines, particularly where operational noise is predicted to emit unreasonable noise.

Regulatory environment

In establishing construction and operational noise level goals the following legislative and guideline documents have been considered:

- Environmental Protection Act 1994, Queensland Government
- Environmental Protection (Noise) Policy 1997, Queensland Government
- Noise and vibration – EIS information guideline, 2020, Department of Environment and Science (DES)
- Applications for activities with noise impacts, 2022, DES
- Noise measurement manual, 2020, DES
- Guideline, Noise - Noise and vibration from blasting, 2016, DES
- Transport Noise Management Code of Practice Volume 1 – Road Traffic Noise, Department of Transport and Main Roads, 2013

Methods

A desktop study has been conducted to identify potential noise and vibration impacts that may occur during construction and operation of the Project. These studies were based on preliminary design information and adopted conservative prediction methods to determine the potential maximum extent of noise and vibration impacts.

This study has adopted preliminary inputs and conservative assessment methods to determine the potential maximum extent of noise and vibration impacts during the construction and operation of the Project. Noise predictions have been made using a detailed 3-dimensional noise model has been prepared for each proposal component.

Minimum safe working distances have been nominated for likely vibration intensive plant, and the number of structures within these buffer distances have been identified.

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The identification of potential road traffic noise impact has been based on likely existing traffic numbers in the vicinity of the project and any likely increases during construction and operation.

Existing environment

The existing noise environment in the study area is defined by the rural and low-density land use in the area, and the lack of existing industrial or major transport related noise sources such as rail lines or airports. Existing noise levels would be very low, particularly in the absence of local noise sources such as agricultural machinery and local road traffic.

Potential impacts and mitigation

The assessment has found that while construction impacts are predicted to comply with Queensland construction noise legislation during daytime hours, some impacts may occur where impacts are carried out outside of standard working hours or when assessed against the conservative 'background creep' noise goals. In consideration of the extended construction period, consideration against the background creep goals is considered suitable.

Minor impacts may be associated with construction vibration, ground borne noise and road traffic, however these are highly dependent upon final design and the proposed properties for resumption. No operational impacts have been predicted however the project may be audible at nearby receptors, in particular during night-time hours.

Conclusion

The study has found that noise impacts may occur during construction of the Project, however the extent of severity of these impacts will be reduced substantially through the adoption of management measures. Other predicted noise and vibration impacts are generally considered minor. During operation of the Project, no exceedances of the noise goals have been predicted. However following finalisation of the final Project design, it is recommended an Operational Noise Review is prepared to confirm the predicted noise impacts from the Project and finalise suitable operational mitigation measures where required.

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Introduction

1.1

Purpose of this document

This report assesses the potential impacts to noise and vibration from the construction and operation of the Project and has been prepared to support and inform the Environmental Impact Statement (EIS) for the Project. Specifically, this report has the following objectives:

- To assess the existing noise environment, including the undertaking of noise monitoring to measure pre-existing background noise levels.
- To determine assessment criteria in accordance with relevant legislation, policies and guidelines.
- To assess potential impacts of noise associated with construction and operation of the proposed premises.
- To provide recommendations for reasonable and practicable operational mitigation and management measures in accordance with relevant legislation, policies and guidelines, particularly where operational noise is predicted to emit unreasonable noise.

1.2

Project overview

Cambridge Solar Farm are proposing to develop a renewable energy park consisting of up to 300MW grid connected solar farm, substation and associated ancillary infrastructure (invertors, transformers and cabling) across 641ha located on Lot 6.

Provision for a further 1,700MW of behind the meter (or grid connected at a future date) of solar panels with associated ancillary infrastructure (invertors, transformers and cabling) will be developed across the 1400ha consisting of Lots 1 and 2.

Figure 1.1

Proposed development

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1.3

Project location

The proposal site is located on an irrigated sugarcane farming business located adjacent to the Burdekin River and 24 kilometres to the west of Ayr, North Queensland. The site is predominately vacant, relatively flat, and includes tracts of vegetation and other natural features such as water bodies. Access to the site is via Keith Venables Road.

The location of the site is shown in Figure 1.2, with the site proximity to the nearby major centres of Townsville and Ayr.

The land adjacent to the south-east has an existing Pacific Hydro-owned solar farm (known as Haughton Solar Farm) occupying it.

Figure 1.2

1.4

Site proximity to major centres

Document structure

The structure and content of this noise and vibration technical paper is as follows:

- Chapter 1 – introduces this technical report (this chapter).
- Chapter 2 provides an overview of the regulatory context for the assessment, including an overview of the legislation, policy and guidelines that apply to the Project.
- Chapter 3 – outlines the methodology adopted for this noise and vibration impact assessment.
- Chapter 4 – describes the existing environment of the Project study area as it relates to noise and vibration.
- Chapter 5 – describes the potential impacts to noise from construction of the Project.
- Chapter 6 – describes the potential impacts to noise from operation of the Project.

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- Chapter 7 – provides recommended mitigation and management measures to avoid, minimise and manage any potential impacts to noise and vibration from construction and/or operation of the Project.

- Chapter 8 – describes the potential cumulative impacts to noise and vibration from the Project in combination with other known developments within the vicinity of the Project.

- Chapter 10 – identifies the key reports and documents used to prepare this technical report.

The attachments to this technical report are:

- Attachment A – Study area and noise sensitive receptors.
- Attachment B – Modelled construction sound power levels.
- Attachment C – Operational noise contour maps.
- Attachment D – Construction noise contour maps.

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Legislative and policy context

2

Environmental planning approval for the project is required in accordance with the provisions of the State Development and Public Works Organisation Act 1971 (SDPWO Act). The SDPWO Act provides a coordinated whole-of-government approach in the assessment of an EIS. The EIS, through a bilateral agreement with the Commonwealth of Australia, also assesses potential impacts on Matters of National Environmental Significance (MNES) by controlling provisions under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

This section describes the Commonwealth and State legislation and policies relevant to the assessment of noise and vibration impacts.

In establishing construction and operational noise level goals the following legislative and guideline documents have been considered:

- Environmental Protection Act 1994, Queensland Government
- Environmental Protection (Noise) Policy 1997, Queensland Government
- Noise and vibration – EIS information guideline, 2020, Department of Environment and Science (DES)
- Applications for activities with noise impacts, 2022, DES
- Noise measurement manual, 2020, DES
- Guideline, Noise - Noise and vibration from blasting, 2016, DES
- Transport Noise Management Code of Practice Volume 1 – Road Traffic Noise, Department of Transport and Main Roads, 2013

2.1

Queensland legislation

2.1.1

Environmental Protection Act 1994

Environmental noise in Queensland is managed under the Environmental Protection Act 1994 (EP Act) and subordinate legislation. The object of the Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The EP Act is generally applied through the Environmental Protection Act 1997 and subordinate guidelines which are discussed in the following sections.

In addition to providing guidance for the management of permanent noise sources, Section 440R of the EP Act contains guidelines for the management of temporary construction noise:

440R Building work

1

1

A person must not carry out building work in a way that makes an audible noise—
a

on a business day or Saturday, before 6.30a.m. or after 6.30p.m; or

b

on any other day, at any time.

The reference in subsection (1) to a person carrying out building work—
a

includes a person carrying out building work under an owner-builder permit; and

b

otherwise does not include a person carrying out building work at premises that are the person's principal place of residence.

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It is however noted that Section 3 of the Environmental Protection Act 1994 specifically excludes development carried out under a development approval from these and restrictions. However in the absence of alternative guidelines, they will be applied as objectives to guide the likely acceptability of predicted construction noise levels. As such, while no day time noise limit applies to construction noise, a night-time limit of the existing Rating Background level (RBL) – 10dB will apply.

2.1.2

Environmental Protection (Noise) Policy 1997

The Environmental Protection (Noise) Policy 1997 (EPP Noise) provides guidance on the application of the EP Act. This achieved by:

- (a) identifying and declaring the environmental values of the acoustic environment
- (b) stating acoustic quality objectives that are directed at enhancing or protecting the environmental values
- (c) providing a framework for making consistent, equitable and informed decisions that relate to the acoustic environment.

Schedule 1 of the EPP Noise provides the following acoustic quality objectives noise levels to quantify these environmental values:

Table 2.1

Relevant acoustic quality objectives (EPP Noise)

Sensitive receptor

Time of day⁵

Acoustic quality objectives dBA

Leq (adj) (1 hour)

L10 (adj) (1 hour)

L1 (adj) (1 hour)

Residence (outdoors)

Daytime and evening

50

55

65

Residence (indoors) 1, 2

Daytime and evening

42 (35)

47 (40)

52 (45)

Night-time

37 (30)

42 (35)

47 (40)

(1)

As noise predictions will be provided for external building facades, the first figure includes +7db to account for transmission loss from external to internal areas. This is based on typical noise loss across an open standard large sliding door.

(2)

As interior building layouts are unknown, this limit for sleeping areas will be conservatively applied to all areas of the building where required.

It is however noted that Section 3 of the Environmental Protection Act 1994 specifically excludes development carried out under a development approval from these environmental values and restrictions. However, in the absence of alternative guidelines, they will be applied as objectives to guide the likely acceptability of predicted construction and operational noise levels.

2.1.3

Background noise creep

It is important to note that even where noise levels comply with the objective levels set up above, and in consideration of the existing background noise levels in the project area (refer Section 4.2), noise levels may increase substantially as a result of the project, while remaining below the noise level objectives. In order to ensure that background noise levels do not increase substantially, background creep needs to be managed and in the absence of local guidance and in consideration of guidelines in other states, it is proposed that any noise as a result of the operation of the project is generally limited to a goal of the estimated, existing Rating Background Level (RBL) (refer Section 4.2) +5dB, with a maximum level of the relevant objective outlined in Table 2.1.

2.1.4

Road traffic noise

This Code of Practice (CoP) aims to demonstrate the compliance of the Queensland Department of Transport and Main Roads (the Department) with its General Environmental Duty as required by the Environmental Protection Act (1994), by assisting understanding of assessment and management of the impact of road traffic noise on the built environment.

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This Chapter specifies road traffic noise criteria of the Department of Transport and Main Roads (the Department). It applies to existing noise sensitive land uses only. The Department uses fixed criteria when considering implementing noise attenuation treatments. It acknowledges that it may not always be possible to achieve the criteria in all circumstances. The criteria represent a compromise between the need to improve acoustic amenity, visual amenity and the technical/cost constraints in providing treatments for noise attenuation.

Table 2.2

Road traffic noise goals

Category

Criteria dB LA10(18hr)
Existing residences

Educational, community
and health

Outdoor education,
passive recreation

68

65

63

Upgrade of existing road

2.1.5

Summary of noise goals

Based on the guidelines outlined above, and the assumptions on existing background noise levels, presented in Section 4.2, a summary of the external noise goals applicable to this proposal is provided in Table 2.3.

Table 2.3

Summary of noise assessment goals

Receiver
type

Residential

2.1.6

Noise assessment goals dB
Construction noise

Operational noise goals

Day
LAeq(1hr)
(7 am–
10 pm)

Night
LAeq(1hr)
(10 pm–

7 am)

Sleep
disturbance
LA1(1hr)

Road
traffic
LA10(18hr)

Day
LAeq(1hr)
(7 am–
10 pm)

Night
LAeq(1hr)
(10 pm–
7 am)

Sleep
disturbance
LA1(1hr)

Road
traffic
LA10(18hr)

-

<20
(Inaudible)

65

68

40

35

65

68

Construction vibration

Ground vibration can lead to:

- Cosmetic building damage (and structural damage in extreme cases).
- Loss of amenity due to perceptible vibration, termed human comfort.
- impacts on the condition and structural integrity of buildings or infrastructure.

Importantly, cosmetic damage is regarded as minor in nature; it is readily repairable and does not affect a building's structural integrity. It is described as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks, and separation of partitions or intermediate walls from load bearing walls. If there is no significant risk of cosmetic building damage, then structural damage is not considered a significant risk and is not assessed.

Minimum safe working distances from vibration intensive activities such as vibratory compaction or rock breaking typically extent up to approximately 100 m. As discussed in Section 4.1, the

nearest receiver is located approximately 2.3 km from the nearest project boundary and as such vibration is highly unlikely to impact any receptors and has not been considered further in this assessment.

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Methodology

3.1

Overview

This section outlines the methodology adopted for assessing the proposal's potential to generate noise and vibration impacts. The assessment has been completed in accordance with the policies and guidelines outlined in Chapter 2.

The key steps of the methodology for undertaking the proposal noise and vibration impact assessment included:

- Defining the study area for noise and vibration based on the proposed activities, sensitive receivers within the surrounding environment, and the anticipated level of impact.
- Reference to regulatory guidelines and standards to establish noise and vibration criteria and limits to define where impacts may be experienced and to quantify the performance of recommended noise and vibration management measures.
- Predictive modelling of noise levels at sensitive receivers to inform the assessment of the potential impacts to amenity from the construction and operation of the proposal.
- Calculation of safe working distances for plant and equipment for the management of ground borne vibration during construction activities.
- An assessment of the potential cumulative impacts of noise and vibration from the proposal in combination with other known developments within the vicinity of the proposal.
- A summary of recommended mitigation and management measures to avoid, minimise and manage any potential impacts of noise and vibration from construction and/or operation of the proposal.

3.2

Project methodology

3.2.1

Construction

The staged construction of the site will involve works occurring on Lots 1, 2, 6A and 6B with varying construction periods. A summary of the construction periods is provided in Table 3.1. The development site is anticipated to begin construction in 2025, with the site completely developed and operational in 2033.

Construction activities include:

- Vegetation clearance
- Earthworks (including construction of on-site access roads)
- Foundations and pads
- Equipment installation
- Demobilisation and rehabilitation
- Delivery of materials and equipment to site

It is understood that all construction activities are proposed to be undertaken during daytime hours as outlined in

Section 2.1.1.

For the purposes of this assessment, and to facilitate the clear geographical description of potential noise and vibration impacts, a number of scenarios comprising typical plant and equipment have been developed based on the indicative

staging of the project outlined in section 3.2.1. Details of the individual construction activities assessed are presented in

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the following sections and plant items are presented in Attachment B including assumptions on utilisation, maximum noise level and the number of plant items per works stage.

3.2.1.1

Construction timing

The Project is expected to commence with construction activities in 2025 after all relevant permits, approvals, and stakeholder engagements have been completed and / or granted. A construction period of approximately seven years has been estimated. Table 3.1 presents the approximate timeframes currently planned for the Project.

Table 3.1

Approximate Project Timeframes

Stage

Lot

Area (Ha)

Estimated construction duration

Estimated Estimated construction start construction end

1

6A

391.65

24 months

Q1 2025

Q4 2026

2

6B

268.35

18 months

Q1 2027

Q3 2028

3

1

687.77

24 months

Q3 2028

Q3 2030

4

2

400.60

24 months

Q4 2030

Q4 2032

3.2.1.2

Construction scheduling

It is understood that all construction activities are proposed to be undertaken during daytime hours as outlined in

Section 2.1.1 and set out below:

- on a business day or Saturday, before 6.30a.m. or after 6.30p.m; or
- on any other day, at any time.

A more detailed summary of the anticipated schedule of Project related activities, is provided in the Project description chapters of the EIS.

3.2.1.3

Construction road traffic

Construction of the project will require the delivery of equipment and personal to the construction areas, thereby generating road traffic and potential associated noise impacts. It is noted that this impact will be temporary, and an assessment is provided in Section 5.2.

3.2.2

Operational methodology

3.2.2.1

Normal operations

The site consists of solar panels that are fixed. As a result, they are not expected to be a contributing noise source in the power plant. It is expected that main noise sources in the plant are the equipment that is related to heating and cooling. Appropriate noise modelling has been done for the same in section 3.4.3. The proposed project also consists of a substation which hosts equipment such as transformers and circuit breakers which can emit noise to its surroundings during everyday operations. This equipment has been modelled to assess noise emissions to the nearest noise sensitive receivers. The substation at Lot 6 consists of a Battery Energy Storage system which have been included in the operational noise modelling scenario for Lot 6. It has been conservatively assumed that the site shall remain in operation for throughout the day.

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3.2.2.2

Maintenance activities

The majority of key electrical and mechanical assets are fixed and will not require ongoing maintenance. It is assumed that panels will require regular washing to maintain efficiency, and this is likely to be conducted using a high-pressure hose in conjunction with a light vehicle.

The replacement of faulty panels or other infrastructure will not usually be a work intensive task, as footings and mounting frames will typically remain intact. This would be carried out infrequently only where required and is not understood to require large or noise intensive equipment. Due to the projected infrequency of more substantial maintenance programs and as the precise activities are largely unknown and variable, impacts will be considered during their planning.

As such, routine maintenance activities have considered an indicative scenario of multiple washing teams and a single panel replacement being undertaken concurrently. Potential noise impacts associated with this activity is discussed further in Section 6.1.2.

Additionally, it is assumed that circuit breaker switches will require occasional routine testing. These unit can generate high levels of short-term noise, however, do not typically affect overall LAeq noise levels. As these will only be tested during daytime hours and impacts are likely to only affect sleep, testing of these units has not been considered further as maintenance activity.

3.2.2.3

Upset conditions

Upset conditions may occur from time to time during operation. This may involve the replacement of panels however, given the high number of panels proposed, this activity has been considered as maintenance, rather than an upset condition.

Additionally, the activation of circuit breaker switches may occur at the substation sites under upset conditions. The circuit breaker forms a key safety measure on site. When activated, which would be expected to occur infrequently (less than once per five years), this item would generate high noise levels for a short period of time (less than 1 second) and has been considered for potential sleep disturbance impacts.

3.2.2.4

Operation and maintenance workforce

An operational workforce of approximately 10 full-time equivalent personnel is anticipated to be required. It is expected that the operations team will work 8-hour days 5 days a week. After hours operations will be covered by the operations team on an availability type arrangement.

During typical operations this workforce will primarily travel to site from Townsville, generating an additional 20 light vehicle movements per day along the following route:

- Bruce Highway
- Upper Haughton Road

In consideration of existing and project road traffic numbers, operational road traffic noise impacts are highly unlikely

and have not been considered further in this assessment.

3.2.2.5

Decommissioning methodology

Near the completion of the Project's operational life, a detailed decommissioning plan will be developed that will consider reuse, recycling, and disposal in addition to environmental impacts during the decommissioning period.

The Project's decommissioning plan will identify the major decommissioning design and execution activities, the sequence in which they should be performed, their estimated resource requirements and durations, and a proposed schedule incorporating any restraints for project planning and cost estimating purposes. The major decommissioning activities for the Project may involve multiple contracts and include work required before, after, and concurrent with project infrastructure removal.

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The final objectives at the time will consider relevant legislative requirements, and the requirements of stakeholders including regulators, landowners, local council and the community. It will include a detailed assessment of potential noise and vibration impacts at all potentially impacted receivers in accordance with relevant environmental legislation. As such decommissioning noise and vibration impacts have not been considered further in this assessment.

3.3

Study area

The distance in which noise and vibration sensitive receivers may experience noise and vibration impacts from the proposal were used to determine the study area. To define an appropriate size for the study area of this assessment, preliminary calculations were undertaken to determine this likely maximum extent of construction and operational noise impacts. These calculations considered the likely maximum noise levels of construction and operational plant and equipment, as well as the distance between the construction and operational areas to sensitive receivers. This was used to determine the likely distance at which compliance with noise criteria and limits would be achieved. This area was defined as the study area and includes all noise and vibration sensitive receivers within a 8-kilometre radius of the construction area.

3.4

Noise assessment

3.4.1

General modelling assumptions

A detailed 3-dimensional noise model has been prepared for the proposal to assess potential noise impacts during construction and operation of each proposal component. Noise levels for construction were modelled for typical activities under worst-case meteorological conditions (as required and detailed in Section 3.4.3.1) to estimate noise impacts at the nearest receivers. Operational impacts have been assessed for both calm and worst-case meteorological conditions. A noise model was created with SoundPLAN 8.2 modelling software and the CONCAWE algorithm was adopted to assess the noise levels from key noise sources. Key modelling parameters and assumptions are shown in Table 3.2.

Table 3.2

Operational noise modelling inputs and assumptions

Parameter

Modelling input

Ground Absorption

Ground absorption factor of 0.5 has been applied to all the areas which is representative of grazing land and paddocks.
(0=hard ground, 1=soft ground)

Terrain data

5m terrain data was sourced from the Queensland Spatial Catalogue (QSpatial) (18/10/2023)

Meteorological conditions

Adverse conditions: Stability category F, 2 m/s wind from source to receiver (operational and construction noise assessment)

Receivers

Rural noise sensitive receivers are modelled as point receivers with heights set at 1.5 m above ground level

Location of noise sources

The type and location of construction and operational equipment has been determined with reference to the project descriptions and plans. Where there was any uncertainty in the proposed equipment location, noise sources have been placed at the nearest site boundary to each receiver to consider the assessment of worst-case potential impacts.

Construction equipment has typically been set at a height of 2m.

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Parameter

Modelling input

Modelled sound power levels

As described in Section 3.4.3.4.

Noise sources were typically modelled at 2.5 m height above ground level

Assessment parameter/ duration

L_{Aeq} (1 hour) (construction and operational noise sources)

L_{A1}(1 minute) (sleep disturbance for circuit breaker switches – upset conditions)

Assumed hours

Typical operational noise and maintenance activities will only occur during daytime hours.

Attention-drawing characteristics

The application of annoyance penalties to noise sources have been considered as described in Section 3.4.2.3

3.4.2

Construction staging

Construction equipment and staging was sourced from indicative information within the project description and with reference to similar projects.

3.4.2.1

Construction hours

Proposed construction hours for the Project are outlined in Section 3.2.1.1. This shows that all works are proposed to be undertaken during daytime hours (6:30am to 6:30pm) only. Where scheduled construction hours are altered to include audible noise between 10pm to 7am, further assessment would be required.

3.4.2.2

Construction equipment Sound Power Levels

Sound power levels (SWLs) for individual plant items were generally sourced from industry standard databases, including Construction Noise and Vibration Strategy (Transport for NSW, 7TP-ST-157/4.0, 2019) (CNVS) and Update of Noise Database for Prediction of Noise on Construction and Open Sites (Department for Environment Food and Rural Affairs (DEFRA), 2005). All equipment was conservatively assumed to be operating simultaneously within each work stage at the nearest site boundary to each receiver. These SWLs are provided in detail in Attachment B.

3.4.2.3

Annoying characteristics

Certain noise characteristics have a higher potential to cause annoyance,

generally requiring additional considerations during assessment. Tonality, low frequency and impulsivity are generally considered to be attention-drawing noise characteristics and can cause greater disturbance. Most construction noise sources associated with the project will be operating continually for extended periods. However common items such as reversing beepers may generate tonal noise which has been considered in the following section. No other annoying noise characteristics are considered relevant.

Tonal noise

Tonal noise can be defined as having a prominent frequency and characterised by a defined pitch. The Noise Management Manual (NMM) (DES) outlines an approach for the consideration of tonal noise and applies a penalty of up to 5dB on relevant noise sources. As a conservative approach for this assessment, this maximum 5dB penalty has been applied to all construction equipment involving extensive reversing beeper use, such as dozers or rollers.

3.4.2.4

Construction traffic noise assessment

Construction traffic volumes have been assessed for Upper Houghton Road. No sensitive receivers are located along any smaller routes to site. The likely routes for these vehicles and proposal traffic numbers have been adapted from the

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Cambridge Solar Farm – Transport Assessment report for the project. Predicted construction traffic numbers during the worst-case Stage 3 (Lot 1) construction phase have been adopted. Quantitative increases in road traffic noise as a result of additional construction traffic have been calculated using the Calculation of Road Traffic Noise (UK Department of Transport, 1988) (CoRTN) calculation method within a spreadsheet format. Base noise modelling assumptions are presented in Section 3.4.1 and specific road traffic modelling assumptions are provided in Table 3.3.

Table 3.3

Road noise modelling assumptions

Parameter

Modelling input

Vehicle numbers and speeds

Calculated from data contained within Technical paper 19 – Traffic and transport

Speed

100 km/hr

Surface corrections

0 for sealed roads

Delivery hours

All construction traffic has been assumed to operate during daytime hours only

Receiver locations

Through review of the proposed route, an indicative 50m from the road corridor has been modelled.

It is noted that oversized deliveries may occur during the night period in order to manage potential road safety impacts.

In order to assess the construction traffic noise impact on nearby receivers, existing traffic levels in each direction and predicted construction traffic volumes on key construction routes were considered.

The modelled traffic volumes for key construction routes that were assessed are presented in Table 3.4.

Table 3.4

Modelled construction traffic numbers

Road

Existing (Day time)

AADT 18hr

Upper Haughton Road

Existing + construction (Day time)

AADT 18hr

Light vehicles

Heavy vehicles

Light vehicles

Heavy vehicles

31

15

295

19

The location of noise sensitive receptors along the proposed haulage routes have been reviewed and the nearest receptor has been identified at a minimum setback distance of 50 m from the road corridor. Road traffic noise levels will be lower further from the road corridors and as such where compliance is predicted at this receptor, it is implied at all other receptors.

3.4.3

Operational assessment methodology

3.4.3.1

Typical operations

Acoustically significant operational equipment associated with the Project has been detailed in Table 3.5 and will include the inverters and transformers and related switch gear equipment. Where equipment datasheets that contain sound power levels have not been provided, the equipment sound power levels have been assumed based on similar projects.

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Table 3.5 Noise modelling inputs
Parameter

Number of units

Equipment Sound Power level

Lot 6A – Solar
Inverters

62

93 LAeq (1 hour)

96

93 LAeq (1 hour)

MV transformers

3

67 LAeq (1 hour)

HV transformers

3

85 LAeq (1 hour)

Circuit Breakers

3

95 to 115 Lmax

125

Front (3 Source Areas): 79 LAeq

Lot 6B – Solar
Inverters

Lot 6 – Substation

Lot 6 – BESS
Battery Pack System
Back (1 Source Area): 83 LAeq
BESS Inverters

125

93 LAeq (1 hour)

MV Switch Gear

125

67 LAeq (1 hour)

168

93 LAeq (1 hour)

MV transformers

4

67 LAeq (1 hour)

HV transformers

4

85 LAeq (1 hour)

Circuit Breakers

4

95 to 115 Lmax

130

93 LAeq (1 hour)

MV transformers

3

67 LAeq (1 hour)

HV transformers

3

85 LAeq (1 hour)

Circuit Breakers

3

95 to 115 Lmax

Lot 1 – Solar

Inverters

Lot 1 – Substation

Lot 2 – Solar

Inverters

Lot 2 – Substation

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3.4.3.2

Modelled scenarios

In consideration of the proposed schedule outlined in Table 3.1, the following operational scenarios will be modelled:

Table 3.6

Operational noise modelling scenarios

Scenario

Activities

1

Lot 6A in operation

2

Lot 6A and 6B in operation

3

Lots 6A, 6B and 1 in operation

4

Lots 6A, 6B, 1 and 2 in operation

3.4.3.3

Operational road traffic

During typical operations the site workforce will primarily travel to site from Townsville, generating up to an additional 10 light vehicle movements per day (per direction) along the Bruce Highway and Upper Haughton Road.

The impact of these vehicles above existing road traffic noise levels along the Bruce Highway is negligible, and this traffic would not increase noise levels by any measurable margin along this route.

Existing road traffic numbers along Upper Haughton Road are very low, and the addition of the project traffic would not increase road noise to levels that would approach the road noise criteria outlined in Section 2.1.4.

Potential noise impacts associated with the operation of these light vehicles is negligible and they have not been considered further.

3.4.3.4

Maintenance activities

Routine maintenance activities have considered an indicative scenario of multiple washing teams and a single panel replacement being undertaken concurrently. Potential noise impacts associated with this activity is discussed further in Section 6.1.2.

Additionally, it is assumed that circuit breaker switches will require occasional routine testing. These units can generate high levels of short-term noise, however do not typically affect overall LAeq noise levels. As these will only be tested during daytime hours and impacts are likely to only affect sleep, testing of

these units has not been considered further as maintenance activity.

Similarly, it is expected that any miscellaneous maintenance activities will occur during daytime hours only. Table 3.7 details the maintenance equipment modelled at the nearest Project boundary to each receiver.

Table 3.7

Modelled maintenance equipment and SWLs

Equipment

Number of items

Utilisation

Total SWL dB LAeq(1 hr)

Franna crane

1

25%

98

Hand tools

4

50%

108

Delivery truck

1

25%

103

Light vehicles

6

25%

88

High pressure hose and compressor

6

50%

95

TOTAL

3.4.3.5

Upset conditions

Potential upset conditions have been discussed in Section 3.2.2.3. Although specific upset conditions may be difficult to foresee, potentially noise generating upset conditions are likely to include the activation of circuit breaker switches.

As outlined in Section 3.4.3.4, noise emission from circuit breaker switches will not contribute to the overall LAeq noise level during a one hour period and noise impacts associated with these short term maximum events are considered for sleep disturbance only.

Although the emission of these sources can vary by up to 20dB, it is understood that the maximum SWL for a circuit

breaker switch is in the order of 115 dB L Amax. As a conservative approach, this has been assumed to consist of a 0.5

second event which equates to a SWL of 99 dB LA1(1 min). As outlined in Section 3.4.3.6, activation of circuit breaker

switches is considered to be an impulsive noise source and as such will incur the maximum 5dB penalty to calculated

LA1(1 min) noise levels. This equates to a final LA1(1 min) of 104dB.

3.4.3.6

Annoying characteristics

Certain noise characteristics have a higher potential to cause annoyance, generally requiring additional considerations

during assessment. Tonality, low frequency and impulsivity are generally considered to be attention-drawing noise characteristics and can cause greater disturbance.

The NMM outlines an approach for the consideration of annoying characteristics and applies a penalty of up to 5dB on

each relevant noise source, up to a maximum of 10dB.

Potentially annoying noise sources may include inverters and transformers and as a conservative approach, 10dB has

been added to results to ensure potentially annoying sources have been considered.

3.4.3.7

Meteorology

Certain meteorological conditions can enhance the propagation of noise. For the purposes of operational noise

components in this assessment, the frequency of occurrence of these noise-enhancing meteorological conditions was

considered, and their influence has been accounted for in the assessment and these have been listed in Table 3.2.

3.5

Methodology for determining noise and vibration impact mitigation and management measures

3.5.1

General mitigation measures

Noise and vibration impact mitigation and management measures have been developed to reduce the effects of noise and vibration impacts that have been predicted for operational and construction components of the proposal. Where impacts

have been predicted, all reasonable and feasible mitigation measures should be considered.

A feasible mitigation measure can be engineered and is practical to build and/or implement, given proposal constraints such as safety, maintenance and reliability requirements. It may also include options such as amending operational practices (for example, changing a noisy operation to a less-sensitive period or location) to achieve noise reduction.

Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. It considers the extent of exceedance, the cost benefit of mitigation and community views. The EPP Noise outlines the management hierarchy that should be applied to manage noise impacts for activities that may affect noise sensitive receivers.

2

This section states the management hierarchy for an activity involving noise that affects, or may affect, an environmental value to be enhanced or protected under this policy.

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3

To the extent it is reasonable to do so, noise must be dealt with in the following order of preference

a

firstly – avoid the noise

b

secondly – minimise the noise, in the following order

c

i

firstly – orientate an activity to minimise the noise

ii

secondly – use best available technology to minimise the noise

thirdly – manage the noise.

Where this assessment indicates that there is the potential for noise impacts at nearby sensitive receivers during construction, management measures will be recommended. The construction schedule and equipment and worksite locations are subject to further specification as detailed planning progresses; however a Construction Noise and Vibration Management Plan (CNVMP) is to be prepared as part of the Construction Environmental Management Plan (CEMP), which would identify measures to reduce the potential for noise impacts.

3.5.1.1

Construction noise

Construction noise would be managed by a detailed CNVMP to be prepared prior to commencement of construction.

This would be a sub-plan to the CEMP and would be based on the confirmed construction methodology, locations of works sites activities, durations, equipment types and numbers.

The CNVMP would address the following as a minimum:

- Confirm nearby residences and other sensitive land uses.
- Assess the potential impacts from the proposed construction methods and staging, including road traffic noise.
- Where management levels would be exceeded examine feasible and reasonable noise mitigation and develop associated noise and vibration monitoring programs, as required.
- Develop reactive and proactive strategies for dealing with noise and vibration complaints.
- Develop an out of hours work protocol.
- Assign roles and responsibilities for the management of noise and vibration complaints.

3.5.2

Operational noise management

Where exceedances of operational project noise criteria were identified, the provision of feasible and reasonable mitigation measures that could be implemented to reduce noise have been considered.

From an acoustic perspective, possible strategies to mitigate noise are typically investigated in the following order (decreasing preference):

- Noise control at the noise source
- Noise control along the noise transfer path
- Noise control at the receiver
- Land use planning and provision of appropriate buffer distances.

3.5.2.1

Noise control at the noise source

Generally, noise control at the source is considered as most effective in improving the overall acoustic outcomes at sensitive receivers. This may include sourcing equipment with lower acoustic specifications or providing localised noise shielding or housing equipment within sound insulated enclosures.

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3.5.2.2

Noise control along the noise transfer path

This typically involves the investigation and implementation of noise barriers (in the form of walls or earth mound) to block the direct line of sight between noise sources and receivers. Noise barriers are most effective when closer to the noise source or receiver. Implementation of noise barrier is considered more feasible and reasonable to provide protection for groups of closely spaced receivers and not considered cost-effective for isolated receivers.

3.5.2.3

Noise control at the receiver

Following consideration of all feasible and reasonable source and pathway noise mitigation measures, receiver property treatment may be considered for any residual noise impacts. This is typically only applicable for isolated residences in rural areas and may include upgrade of various construction elements of the dwellings and voluntary property acquisition. Internal noise goals shall consider the required internal noise levels outlined in Table 2.1
A discussion of recommended operational noise mitigation is presented in Chapter 7.

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Existing environment

4.1

Noise Sensitive receivers

Noise sensitive receivers are defined in relevant Queensland legislation and guidelines, and generally include land uses potentially affected by noise impacts such as residential, educational, medical or recreational areas. In the Project study area, eleven residential receivers have been identified within 8 km from the Project boundary. They are summarised in Table 4.1. These dwellings are generally isolate rural residential properties. Land in the vicinity of the project is predominantly used for cropping and no non-residential noise sensitive receivers have been identified. Noise sensitive receivers and their location in relation to the project have been presented graphically in Attachment A.

Table 4.1

Identified Potential Residential Receivers

ID

Lot Plan

Address

Distance from the
project boundary (kms)

1

1SP302825

Black Rd, Upper Haughton QLD

2.0

2

26CP885971

590 Black Rd, Upper Haughton QLD

2.0

3

3SP146640

Black Road, Woodstock QLD

2.2

4

93RP904076

Lot 93 Bill Britt Rd, Upper Haughton QLD 4809

3.3

5

5SP146640

1428 Dingo Park Road, Woodstock QLD

4.1

6

12SP221591

1457 Webb Road, Reid River QLD

4.9

7

71SP111327

98 Millet Road, Upper Hughton QLD

5.8

8

8SP207132

Dingo Park Road, Woodstock QLD

5.8

9

0SP146640

Dingo Park Road, Woodstock QLD

5.9

10

17SP248092

Barratta Road, Upper Haughton QLD

8.1

11

11EP1679

1464 Webb Road, Reid River QLD

8.1

4.2

Existing noise environment

The existing noise environment in the study area is defined by the rural and low-density land use in the area, and the lack of existing industrial or major transport related noise sources such as rail

lines or airports.

Existing noise levels would be very low, particularly in the absence of local noise sources such as agricultural machinery and local road traffic.

Given the nature of noise sources within the project vicinity, it is appropriate to assume typical minimum rating

background noise levels (RBLs) at this stage of assessment. These levels are commonly accepted as minimum rural noise levels used for the basis of noise assessment.

Existing estimated background noise levels in the study area are presented in Table 4.2.

Table 4.2

Estimated background RBL noise levels

Location

Project vicinity

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Estimated background noise level, RBL dBA

Day

Evening

Night

35

30

30

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4.3

Topography

The Project is located in large flat plain with very little variation in topography.

4.4

Meteorology

Noise-enhancing meteorological conditions can either involve light winds from the noise source to a specific receptor or the presence of temperature inversions. Assessment of noise-enhancing meteorological conditions typically requires at least one years' worth of wind and cloud data to consider the typical frequency of these conditions. This data is typically obtained from either a Bureau of Meteorology (BoM) weather station close to the Project (or in a similar geographical location), or a one-year deployment of a weather station specifically for the Project.

There are no suitable BoM weather stations that provide cloud data within the vicinity of the Project. And as such the frequency of temperature inversions in the Project area cannot be assessed at this stage.

According to BoM records for Townsville Airport (Station 032040), the majority of wind direction in the Project region is southerly to south-easterly during the morning, swinging to north easterly during the afternoon. This weather pattern is relatively consistent throughout the year.

These winds are likely to contribute to noise enhancing conditions for receptors to the west of the project area. Noise enhancing weather condition have been used as a worst case for assessment of construction and operational noise.

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Construction impact assessment

This section presents an assessment of the potential impacts that are expected to occur during construction of the Project.

The key potential construction impacts relating to noise and vibration include:

- Construction activities
- Road noise on public roads from construction traffic

5.1

Noise

It is noted that there is no day-time construction noise criterion applicable to the Project. However, to help establish the potential for the construction noise affecting the residential properties in the proximity to the Project noise levels predicted to exceed RBL + 5 dBA and have as such been determined for each work stage, presented in Table 5.1.

Table 5.1

Construction noise – Exceedances (RBL +5 dB) at surrounding receivers

Workstage

0-10 dB

10-20 dB

>20 dB

Highly Affected

Total above RBL +5

SC01 -Vegetation clearance

0

0

0

0

0

SC02 – Access and earthworks

1

0

0

0

1

SC03 -Foundations and pads

0

0

0

0

0

SC04 -Equipment installation

0

0

0

0

0

SC05 -Demobilisation and rehabilitation

0

0

0

0

0

SC01 -Vegetation clearance

0

0

0

0

0

SC02 - Access and earthworks

0

0

0

0

0

SC03 -Foundations and pads

0

0

0

0

0

SC04 -Equipment installation

0

0

0

0

0

SC05 -Demobilisation and rehabilitation

0

0

0

0

0

SC01 -Vegetation clearance

0

0

0

0

0

SC02 - Access and earthworks

1

0

0

0

1

SC03 -Foundations and pads

0

0

0

0

0

SC04 -Equipment installation

0

0

0

0

0

SC05 -Demobilisation and rehabilitation

0

0

0

0

0

SC01 -Vegetation clearance

0

0

0

0

0

SC02 - Access and earthworks

0

0

0

0

0

SC03 -Foundations and pads

0

0

0

0

0

SC04 -Equipment installation

0

0

0

0

0

SC05 -Demobilisation and rehabilitation

0

0

0

0

0

Lot 6A

Lot 6B

Lot 1

Lot 2

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5.1.1

SC01 – Vegetation clearance

Noise levels during this stage have been predicted to not exceed RBL + 5 dBA during working hours in the day. This work stage would occur during the Enabling (early) works phase. However, the construction of site access roads would be transitory and a temporary noise source, and thus these predicted impacts would not occur during the entire work phase. Night-time is not proposed and as such no night-time noise impacts are predicted.

5.1.2

SC02 – Site access and earthworks

Noise levels during this stage have been predicted to exceed RBL + 5 dBA at 1 residential property during working hours in the day. This receiver is predicted to experience noise levels of up to 40 dBA, occurring during the construction of Lot 1. This work stage would occur during the Enabling (early) works phase. However, the preparation of laydown areas and compounds would be a temporary noise source, and thus these predicted impacts would not occur during the entire work phase. Night-time work is not proposed and as such no night-time noise impacts are predicted. As the scenario with the highest noise impact, detailed construction noise predictions for this stage are presented graphically in the form of noise contours in Attachment C for each Lot.

5.1.3

SC03 – Foundations and pads

Noise levels during this stage have been predicted to not exceed RBL + 5 dBA during working hours in the day. This work stage would likely occur during the entirety of the Main construction works phase.

5.1.4

SC04 – Equipment installation

Noise levels during this stage have been predicted to not exceed RBL + 5 dBA during working hours in the day. This work stage would likely occur during the entirety of the Main construction works phase.

5.1.5

SC05 – Demobilisation and rehabilitation

Noise levels during this stage have been predicted to not exceed RBL + 5 dBA during working hours in the day. This work stage would likely occur during the entirety of the Main construction works phase.

5.1.6

Summary of construction noise impacts

Construction is proposed for daytime hours only, and as such is predicted to comply with Queensland construction noise criteria at all receptors. However due to the extended construction period, longer term, background creep noise goals may be appropriate. When these more stringent noise goals are considered, one property may be affected. Mitigation measures have been presented in Section 7.

5.2

Construction road traffic noise

This assessment has been presented in Table 5.2 and shows that noise levels are predicted to comply with relevant road noise criteria during construction of the project at all receivers located along the proposed haulage routes. However, to minimise the risk of annoyance, noise management measures have been recommended in Section 7 to assist in minimising the potential for noise disturbance from construction road traffic noise, in particular during night-time hours.

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Table 5.2

Predicted impacts of construction traffic noise along key construction routes

Construction route
section

Upper Haughton Road

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Road type

State Highway

Road noise criteria
LAeq (18 hour) (dBA)

68

Worst impacted receiver noise level
LAeq (18 hour) (dBA)
Existing

Existing plus
construction traffic

41

46

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Operational impact assessment

6

This section presents an assessment of the potential impacts that are expected to occur during operation of the Project.

6.1

Noise

6.1.1

Normal operations

As presented in Section 3.4.3, the noise-generating items regularly operating will be the BESS and ventilation fans, which have been modelled under standard and noise-enhancing meteorological conditions.

Table 6.1 outlines the predicted noise levels with the relevant noise goals for normal operations. Compliance with these goals is predicted to occur at all properties.

Table 6.1

Normal operations – Predicted noise levels at surrounding receivers

Receiver Receiver
ID
type

Predicted noise level (2)

Noise goals
Day (1)
LAeq(1hr)

Night

Sleep
disturbance
LAeq(1hr)
LA1(1hr)
(1)

Scenario 2
(Lot 6A)

Scenario 2
(Lot 6A and
6B)

Scenario 3
(Lots 6A, 6B
and 1)

Scenario 4
(Lots 6A, 6B, 1
and 2)

LAeq(1hr) LA1(1hr) LAeq(1hr) LA1(1hr) LAeq(1hr) LA1(1hr) LAeq(1hr) LA1(1hr)
1

Residential

28

-(3)

28

-(3)

28

-(3)

28

-(3)

2

Residential

-(3)

-(3)

-(3)

-(3)

33

27

34

27

3

Residential

32

34

33

34

35

34

35

34

4

Residential

-(3)

-(3)

-(3)

-(3)

28

-(3)

28

-(3)

5

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

6

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

7

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

8

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

9

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

10

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

11

Residential

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

-(3)

40

35

65

(1)

Daytime is defined as 7 am-10 pm and night-time as 10 pm-7 am

(1)

Noise levels were predicted as free field point receivers with a 2.5 dB façade correction applied. Due to tonality commonly being detected as part of the proposed equipment, a 5 dB correction to account for potential tonality has also been applied.

(2)

Predicted level are equal to or below 20 dBA LAeq(1hr) and considered likely to be inaudible.

Operational noise contour maps for normal operations of Scenario 4 (all lots operating) are presented in Attachment D.

It is noted that these predictions conservatively include a 5dB penalty for tonal noise and are based on the estimated, existing background noise levels presented in Section 4.2. Following the confirmation of final equipment noise specifications, these predicted impacts should be confirmed. Mitigation and management measures are considered in Chapter 7.

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6.1.2

Maintenance

As presented in Section 3.4.3, the noise-generating items involved in above-ground maintenance activities have been considered for assessment, which have been modelled under noise-enhancing meteorological conditions.

Table 6.2 outlines the predicted noise levels with the relevant noise goals for maintenance activities. Compliance with these goals is predicted to occur at all properties.

Table 6.2

Maintenance – predicted noise levels at surrounding receivers

Receiver ID

Receiver type

Noise goals

Predicted noise level (2)

Day (1) LAeq(1hr)

LAeq(1hr)

1

Residential

36

2

Residential

35

3

Residential

32

4

Residential

30

5

Residential

-(3)

6

Residential

7

Residential

-(3)

8

Residential

-(3)

9

Residential

-(3)

10

Residential

-(3)

11

Residential

-(3)

40

(1)

Daytime is defined as 7 am-10 pm

(2)

Noise levels have been predicted as free field point receivers with a 2.5 dB façade correction applied.

(3)

Predicted level are equal to or below 20 dBA LAeq(1hr) and are likely to be inaudible.

-(3)

When considering this impact, it is important to note that maintenance activities will be infrequent and short term. As any above-ground maintenance activities are likely to be temporary, and the noise level in Table 6.2 represents a worst-case scenario, these impacts are considered minor. Mitigation and management measures are considered in Chapter 7.

6.1.3

Upset conditions

As presented in Section 3.4.3, the only noise-generating items likely to be involved in upset conditions would be circuitbreakers located at the switching yard. This noise course has been modelled under noise-enhancing meteorological conditions and assessed against sleep disturbance criteria only. No exceedances of sleep disturbance criteria are predicted to be associated with the activation of circuit breaker switches. It is noted that the activation of circuit breaker switches is an emergency response which is essential to protecting the

integrity of the transmission system.
Mitigation and management measures are considered in Chapter 7.

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Recommended management and mitigation measures

7.1

Environmental management

Although noise impacts during these works are considered to be relatively minor, this assessment indicates that there is the potential for elevated noise levels to cause temporary impacts at nearby sensitive receivers during construction activities in Lot 6A and 1.

7.1.1.1

Construction noise and vibration management

Construction noise would be managed by a detailed Construction Noise Management Plan (CNVMP) to be prepared prior to commencement of construction. This would be a sub-plan to the Construction Environmental Management Plan (CEMP) and would be based on the confirmed construction methodology, locations of works sites activities, durations, equipment types and numbers.

The CNVMP would address the following as a minimum:

- Confirm nearby residences and other sensitive land uses.
- Assess the potential impacts from the proposed construction methods and staging, including road traffic noise.
- Where management levels would be exceeded examine feasible and reasonable noise mitigation and develop associated noise and vibration monitoring programs, as required.
- Develop reactive and proactive strategies for dealing with noise and vibration complaints.
- Develop an out of hours work protocol.
- Assign roles and responsibilities for the management of noise and vibration complaints.

Noise and vibration mitigation measures recommended for consideration in the CNVMP are provided in Section 7.2.

7.1.1.2

Operational noise management

The primary noise sources on site have been identified as being HV transformers and inverters, however no operational noise impacts have been predicted to occur as a result of operation of the Project. It is noted that this assessment was prepared using preliminary designs and proposed equipment and as such has made conservative assumptions regarding inputs.

An Operational Noise Review will be prepared to confirm the predicted noise impacts from the project (based on the final infrastructure specifications). Where necessary, suitable operational mitigation measures will be implemented to ensure that operational noise impacts are compliant with the project noise criteria, where feasible and reasonable. These may include localised screening of noise sources, the specification of lower noise emitting plant or the relocation of noise equipment to less sensitive locations within the site.

7.2

Mitigation measures

Although noise impacts during construction and operation of the Project are predicted to be minimal, this assessment has identified the potential for noise impacts at the nearest sensitive receivers under worst case construction scenarios.

Where impacts are predicted, reasonable and feasible mitigation measures to minimise noise levels from construction work have been proposed.

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The measures outlined in Table 7.1 are recommended to mitigate and manage the potential for noise impacts during construction of the project.

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Table 7.1

Proposed mitigation measures

Reference Impact

Mitigation measures

Timing

Applicable location(s)

NV1

As part of development of the detailed design and construction methodology, all reasonable and feasible mitigation measures will be considered, confirmed and implemented to minimise construction noise impacts and to avoid exceedances of the applicable noise goals at adjacent sensitive receivers where practicable. Measures that may achieve this outcome may include, but not limited to the following:

Detailed design/
pre-construction/
construction

All locations where
exceedances of the applicable
construction noise criteria are
predicted at nearby sensitive
receivers

Opportunities to reduce exceedances of the applicable construction noise goals through the implementation Detailed design/
of administrative controls will be examined, confirmed, and implemented where reasonable and feasible.

pre-construction/
Controls to be considered will include, but not limited to the following:
construction

All locations where
exceedances of the applicable
construction noise criteria are
predicted at nearby sensitive
receivers

Construction noise
(source controls)

- Spotters, "smart" reversing alarms, or broadband reversing alarms will be used in place of traditional tonal beeper reversing alarms, particularly on equipment where reversing alarms are frequently in use such as rollers, loaders or compactors.
- Heavy vehicles will ensure loads are secure when delivering materials and equipment to site.
- Machinery will be operated in a manner which reduces maximum noise level events such as shaking excavator buckets or dropping materials into trucks from a height.

NV2

Construction noise
(administrative

controls)

- Environmental awareness training and inductions for site personnel will include noise mitigation techniques/measures to be implemented when on site and accessing the site.
- Plant and equipment selection will consider noise emission levels.
- Noise-intensive works will be limited to less sensitive construction hours (i.e., away from early morning and late afternoon periods) as far as practicable.
- Plant and equipment and delivery vehicles will be well maintained to ensure that excessive noise is not generated.

Any works undertaken outside standard working hours will be avoided where reasonable and feasible and would be further assessed if required.

NV3

Construction noise

Opportunities to reduce the impacts associated with construction noise levels through the implementation Pre-construction of proactive community consultation will be examined, confirmed, and implemented where reasonable and feasible. Controls to be considered will include, but not limited to the following:

- Sensitive receivers potentially affected by the works will be notified of the commencement of construction activities at least five days prior to works starting. The notification will inform potentially impacted sensitive receivers of the nature of and duration of works, expected noise levels and contact details of where sensitive receivers can contact project representatives.

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All locations where exceedances of the applicable construction noise criteria are predicted at nearby sensitive receivers

Reference Impact

Mitigation measures

Timing

Applicable location(s)

– The community will be kept regularly informed of noise intensive activities in the immediate area.

NV4

Operational noise

An Operational Noise Review will be prepared to confirm the predicted noise impacts from the project

Pre-construction

(based on the final design). Where necessary, operational mitigation measures will be implemented to ensure that operational noise impacts are compliant with the project noise trigger levels, where feasible and reasonable.

All locations

These measures may include:

- Adoption of lower generating noise equipment (where practicable).
- The screening or insulation of major identified noise sources.
- Following the adoption of other noise mitigation measures, noise control at the receiver, such as 'at property' treatment to upgrade aspects of the dwellings including the façade or ventilation systems may be considered to mitigate residual impacts and ensure compliance with 'internal' noise criteria.

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7.3

Effectiveness of mitigation measures

7.3.1

Construction

The adoption of the recommended standard noise mitigation measures during construction activities will reduce the severity and impact of the predicted noise levels.

Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Similarly, high noise generating works and works which are likely to affect sensitive receivers should be scheduled during standard hours where reasonable and feasible. These two measures are considered to be the most effective in reducing predicted noise impacts.

The implementation of the recommended construction mitigation measures is expected to eliminate all predicted construction noise impacts.

7.3.2

Operation

During operation of the Project, no exceedances of the noise goals have been predicted. However following finalisation of the final Project design, it is recommended an Operational Noise Review is prepared following the confirmation of equipment noise specifications to confirm the predicted noise impacts from the Project and finalise suitable operational mitigation measures where required.

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Cumulative impact assessment

8.1

Approach to cumulative impact assessment

The cumulative impact assessment approach involves the consideration of two aspects:

- 1) The interaction of the project with the impacts of other relevant existing or future projects on noise and vibration
- 2) The interaction of intra project activities that may contribute to elevated noise and vibration impacts.

Cumulative impacts may generate noise up to 3 dB louder than the predicted noise level from the loudest project / work stage. Any increases in noise due to cumulative impacts would be restricted to areas where these impacted areas overlap and would either result in a minor increase in noise level at the receptor or be masked by the louder component.

8.2

Potential external cumulative impacts

8.2.1

Haughton Solar Farm

The Haughton Solar Farm is located directly to the south of Stage 6A and 6B of the Project. The site is a large-scale 100MW solar farm, which is proposed to expand to 500MW in the future. Cumulative impacts from this project are likely to impact receptors to the south and south-east.

Although the noise impact assessment for Haughton Solar Farm was unable to be obtained for reference in this report, it is likely that noise levels will be similar or lower than those predicted for the Project.

The nearest receiver to the south / south-east is located at an approximate distance of 7km from both the Haughton Solar Farm and the Project. Given that the Project is likely to be inaudible at this receiver, noise impacts during both construction and operation phases of the project are unlikely.

8.3

Potential internal cumulative impacts

Given the phased development of the Project, construction and operational noise is likely to be generated from multiple project stages at any time. The proposed Project timeline is presented in Figure 8.1 where indicative cumulative assessment scenarios are highlighted in blue.

Figure 8.1

Intra-Project cumulative impacts scenarios

The operational assessment presented in Section 6.1.1 considers cumulative impacts once all lots are operational. Those results show that cumulative impacts from within the Project site are unlikely.

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However, during the progressive nature of the proposed construction works, minor exceedances of background noise creep goal may occur at Receiver 2 and 3 during the loudest construction work stages. These impacts will be short term and temporary and levels may result in cumulative noise impacts up to 2dB louder than the impacts predicted in Section 5.1.

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Conclusion

This study has adopted preliminary inputs and conservative assessment methods to determine the potential maximum extent of noise and vibration impacts during the construction and operation of the Project.

The assessment has found that construction impacts may arise during works, particularly where night works are undertaken.

Minor impacts may be associated with construction vibration, ground borne noise and road traffic, however these are highly dependent upon final design and the proposed properties for resumption. The extended duration of works including the cumulative duration of different work stages may result in noise impacts during construction.

No major operational impacts have been predicted.

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Study area and noise sensitive receptors

Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 25/01/2024

Modelled By: LE

Prediction Algorithm :
CONCAWE

Checked by: BI

Legend
Residential Receivers
Inverters
To be read in conjunction with WSP document:
PS207263-Cambridge Solar Farm_NC_ACO_RevA

Sheet No : 1

Revision: 00

Cambridge Solar farm
Site Area and Surrounds

Solar Panels
substation area

www.wsp.com

Modelled construction Sound Power Levels

Construction Works Equipment
Work stage

Equipment

Vegetation clearance

20T excavator

Usage factor per
Base SWL dBA LAMax (Loudest Item)*
15 minutes
4
0.75
110

D10 Dozer

2

1

117

Generator

8

1

103

Hand tools

8

0.5

105

Skid Steer

2

1

104

Truck and trailer

8

0.25

108

Chainsaw

4

0.5

114

Mulcher

2

0.5

116

Number of items

TOTAL

Access and earthworks

124

30T excavator

4

0.75

110

Pad foot roller

2

1

109

Smooth drum roller

2

1

109

10kL water cart

2

1

107

D10 Dozer

4

1

117

Grader

2

1

113

Hand tools

8

0.5

105

Scraper

3

1

110

Truck and trailer

4

0.25

108

30T articulated dump truck

12

0.25

110

Telehandler (4T)

1

0.25

98

0.75

110

TOTAL

Foundations and pads

126

Equipment installation

2

20T franna crane

6

0.5

113

Concrete boom pump

2

0.25

109

Pad foot roller

2

1

109

Smooth drum roller

2

1

109

10kL water cart

2

1

107

Concrete agitator

4

0.3

109

Concrete vibrator

2

1

113

Grader

2

1

113

Hand tools

8

0.5

105

Bored piling rig

4

1

112

Skid Steer

1

1

104

Tipper

1

0.5

110

Truck and trailer

12

0.25

108

Deombilisation and rehabilitation

Telehandler

2

1

113

20T franna crane

4

0.5

113

60T mobile crane

2

1

113

EWP Boom lift (Cherry picker)

4

0.25

99

Generator

8

1

103

Hand tools

8

0.5

105

Tipper

1

0.5

110

0.75

110

122

2

Telehandler

1

1

113

20T franna crane

2

0.5

113

10kL water cart

2

1

107

D7 Dozer

1

1

115

EWP Boom lift (Cherry picker)

2

0.25

99

Generator

1

1

103

Hand tools

1

0.5

105

Skid Steer

1

1

104

Truck and trailer

4

0.25

108

120

117

122

20T excavator

TOTAL

121

125

125

TOTAL

126

126

30T excavator

TOTAL

128

128

121

121

Construction noise contour maps

Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 2: Access and Earthworks Lot 6B

Checked by: BI
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Sheet No : 2

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www.wsp.com

Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 2: Access and Earthworks Lot 1

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Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 2: Access and Earthworks Lot 2

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Sheet No : 4

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Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 2: Access and Earthworks Lot 6A

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Operational noise contour maps

Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 4: Lot 6A, Lot 6B, Lot 1 and Lot 2 in operation

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Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 2: Lot 6A and 6B in operation

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Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 1: Lot 6A in operation

Checked by: BI
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Sheet No : 1

Revision: 00
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Noise Level
dB LAeq(1hr)
30 to 35
35 to 40
40 to 45
45 to 50
50 to 55
55 to 60
60 to 65
65 to 70
> 70

Date: 22/01/2024

Legend

Modelled By: LE

Residential Receivers
Prediction Algorithm :
CONCAWE

Cambridge Solar farm
Scenario 3: Lot 6A, Lot 6B and Lot 1 in operation

Checked by: BI
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Social and
Economic
impact
assessment
Cambridge Solar Farm
Gugu-Badhun and Bindal
Country

Prepared for

Cambridge JMD Australia
23 February 2024

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P0044793

Report Number

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Executive Summary

Urbis Ltd (Urbis) was engaged by Cambridge JMD Australia (the proponent) to prepare a Social and Economic Impact Assessment (SEIA) to accompany a development application (DA) for a solar farm (the proposal) at Keith Venables Road, Upper Haughton, Queensland (the site).

Report purpose and scope

A Social and Economic Impact Assessment (SEIA) is an independent and objective study which identifies and analyses the potential positive and negative social and economic impacts associated with a proposed development. The two components of a SEIA are a Social Impact Assessment (SIA) and an Economic Impact Assessment (EIA).

A Social Impact Assessment (SIA) involves a detailed study to scope potential positive and negative social impacts, identify appropriate mitigation and enhancement measures and provide recommendations aligned with professional standards and statutory obligations. It is the intention that the SIA process will inform the proposal, not just reflect and report on impacts.

Social impacts can be understood as the consequences that people (individuals, households, groups, communities, or organisations) experience when a new project brings change. A SIA considers physical and intangible impacts, direct and indirect impacts, short term (construction) and long term (operational) impacts.

The QLD SIA Guideline (2018) states that SIA is a process for the identification, analysis, assessment, management and monitoring of the social impacts of a project, both positive and negative. The social impacts of a project are the direct and indirect impacts that affect people and their communities at all stages of the project lifecycle. This report is guided by the QLD SIA Guideline's (2018) 'Key Matters', including:

community and stakeholder engagement, workforce management, housing and accommodation, local business and industry procurement, and health and community wellbeing. It also takes guidance from the NSW Department of Planning, Housing and Infrastructure (DPHI) (formerly the Department of Planning and Environment, DPE) Social Impact Assessment Guideline (2023).

An Economic Impact Assessment (EIA) is an independent study which assesses the potential economic impacts, and whether they are positive or negative, which are expected to arise from the proposed development at the site. The key components of an EIA include the assessment of impacts such as net employment benefits, net value added benefits, and any other identified potential positive or negative impacts.

Methodology

The methodology undertaken to prepare this SEIA is outlined in Section 2. This methodology was informed by the QLD Social Impact Assessment Guideline (2018) and NSW DPHI SIA Guideline (2023). The assessment of economic impacts was guided by best practice industry principles. The potential social impacts of the proposal are assessed by comparing the magnitude of impact (minimal to transformational) against the likelihood of the impact occurring (very unlikely to almost certain). This risk assessment methodology has been applied from the SIA Guideline: Technical

Supplement (DPE 2023) and is outlined in Section 7 of this report. Further consultation is currently occurring and this SEIA will be updated as appropriate following these outcomes.

Potential positive and negative social impacts
The potential positive and negative social impacts identified are listed below. The full assessment of each impact is provided in Section 7.

-

Potential pressure on the road network and increased travel times

-

Provision of increased employment opportunities

-

Provision of increased opportunities for training and skills development

-

Additional stress on housing and accommodation

-

Perceived loss of productive agricultural land

6

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-

Contributions to Queensland's renewable energy transition

-

Potential increased access to reliable electricity

-

Impacted amenity related to noise disturbance

-

Impacted amenity related to visual impact

-

Potential change to sense of place

-

Potential disruption to sites of Aboriginal significance

-

Cumulative impacts

Potential positive and negative economic impacts

The proposed development will have a positive economic impact on the local and state by replacing the existing agriculture use with a solar farm. These positive impacts include:

-

A direct capital investment of \$2.4 billion (including GST)

-

1,355 direct and indirect construction jobs over the six-year construction period

-

\$1.7 billion Gross Value Added (GVA) to the QLD economy from construction, in net present value terms

-

Net increase of 76 direct and indirect jobs on site and in the surrounding region on an ongoing basis during operation of the proposed development compared to the existing use of the site

-

Net increase of \$25.4 million of annual direct and indirect GVA contribution to the QLD economy on an ongoing basis, in net present value terms

-

The potential to deliver an extra 1,329.8 MWp of renewable energy to Australia. This influx of renewable energy will contribute to the national effort to transition from fossil fuels to

clean energy, noting the renewable energy share of electricity generation in Australia increased from 10.5% in FY11 to 26.7% in FY21.

We have also assessed the impact of removing the existing sugar cane farm on the site from the supply of 389 sugar cane farms in the Burdekin LGA. When doing this, the number of sugar cane farms in the Burdekin LGA is only expected to decrease by 0.3% reflecting an immaterial economic impact to this industry.

Proposed mitigation, enhancement and management measures

A consolidated list of measures to enhance positive social impacts and mitigate negative social impacts identified throughout this report is provided in Section 8 of this report.

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1. Introduction

Urbis Ltd (Urbis) was engaged by Cambridge JMD Australia (the proponent) to prepare a Social and Economic Impact Assessment (SEIA) to support a development application (DA) for a solar farm (the proposal) at Keith Venables Road, Upper Haughton, Queensland (the site).

1.1. Report purpose and scope

A Social and Economic Impact Assessment (SEIA) is an independent and objective study which identifies and analyses the potential positive and negative social and economic impacts associated with a proposed development. The two components of a SEIA are a Social Impact Assessment (SIA) and an Economic Impact Assessment (EIA).

1.1.1. Social Impact Assessment

A SIA involves a detailed study to scope potential positive and negative social impacts, identify appropriate mitigation and enhancement measures and provide recommendations aligned with professional standards and statutory obligations. It is the intention that the SIA process will inform the proposal, not just reflect and report on impacts.

The QLD SIA Guideline (2018) states that SIA is a process for the identification, analysis, assessment, management and monitoring of the social impacts of a project, both positive and negative. The social impacts of a project are the direct and indirect impacts that affect people and their communities at all stages of the project lifecycle. Social impacts can be understood as the consequences that people (individuals, households, groups, communities, or organisations) experience when a new project brings change. A SIA considers physical and intangible impacts, direct and indirect impacts, short term (construction) and long term (operational) impacts. The assessment of impacts is guided by the QLD SIA Guideline's (2018) 'Key Matters', including: community and stakeholder engagement, workforce management, housing and accommodation, local business and industry procurement, and health and community wellbeing. This SIA has also been informed by the risk assessment framework outlined by the NSW Department of Planning, Housing and Infrastructure (DPHI) (formerly the Department of Planning and Environment, DPE) Social Impact Assessment Guideline (2023), which states that a SIA should consider the likely changes to the following social elements of value to people.

This SIA aligns with the best practice methods contained within the QLD SIA Guideline (2018) and the NSW DPHI's SIA Guideline (2023). Both guidelines provide a framework to identify, predict and evaluate likely social impacts and helps to provide greater clarity and certainty for proponents and the community.

Figure 1 SIA Categories

Source: SIA Guideline (DPHI 2023, p. 19)

1.1.2. Economic Impact Assessment

An EIA is an independent study which assesses the potential economic impacts, and whether they are positive or negative, which are expected to arise from the proposed development at the site. The key components of an EIA include the assessment of impacts such as net employment benefits, net value added benefits, and any other identified potential positive or negative impacts.

1.2. Project overview

Cambridge JMD Australia (Cambridge) are proposing to develop a renewable energy park in stages, with the first stage consisting of a 300MWac grid connected solar farm, substation and associated ancillary infrastructure (invertors, transformers and cabling) across part of Lot 6 being 407.3ha (Stage 1). Provision for a further 765MWac of behind the meter (or grid connected at a future date) of solar farm with associated ancillary infrastructure (invertors, transformers and cabling) will be developed across 913.8 ha being the balance of Lot 6 and Lot 1 (Stages 2 and 3). The site is strategically located within the North and Far North Queensland Renewable Energy Zones (REZs) and will support Queensland meet its 50% renewable energy target by 2030. In addition to supporting renewable energy targets, and contributing to Queensland's commitment to reduce emissions, the proposal will create new jobs and diversify the state's economy. The site was also selected by Cambridge because there is a high-voltage transmission line running adjacent to the site. The transmission line enables the power to be easily exported into the grid. The solar farm will be developed in three stages to allow for staged construction and grid connection approval.

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Other reasons for site selection include:

-

Ability for high solar irradiance (amount of direct sun per square metre).

-

Relatively flat and clear land with minimal environmental constraints.

-

Well located, with limited impact on surrounding community.

-

Detailed plans for the site will be developed with respect to all physical and environmental considerations, following engagement with neighbours and the wider community.

Figure 2 Proposed site area

Source: Urbis

1.3. Authorship

The authorship for this report is provided in the following sections.

1.3.1. Authors

This report has been prepared by a suitably qualified and experienced lead author and reviewed and approved by a suitably qualified and experienced co-author, who hold appropriate qualifications and have relevant experience to carry out the SEIA for this Project. The following introduces each author for the SIA and EIA components:
SIA Component

Alyce Noney

Review and quality assurance

Position

Associate Director

Qualifications

Master of Urban Management and Planning, Western Sydney University
Bachelor of Planning, Western Sydney University

Affiliations

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Affiliate, Planning Institute of Australia
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Experience

Experience in writing SIA reports for a range of development types and geographies in the context of the SIA Guideline (DPHI 2023) and best practice social research, evaluation and impact assessment.

Amanda Micallef

Review, quality assurance and report author

Position

Senior Consultant

Qualifications

Master of Development Practice, University of Queensland
Bachelor of Arts (International Development), University of Guelph

Experience

Experience in writing SIA reports for a range of development types and geographies including renewable energy projects in the context of the QLD SIA Guideline (2018) and SIA Guideline (DPHI 2023) and best practice social research, evaluation and impact assessment.

Tate Crofts

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Consultant

Qualifications

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Affiliations

Graduate member, Planning Institute of Australia

Experience

Experience in writing SIA reports for a range of development types and geographies including renewable energy projects in the context of the QLD SIA Guideline (2018) and SIA Guideline (DPHI 2023) and best practice social research, evaluation and impact assessment.

EIA Component
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Position

Director

Qualifications

Master of Business Administration, Macquarie University
Bachelor of Economics (Hons), University of Sydney

Experience

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Author and analytical lead

Position

Senior Consultant

Qualifications

Bachelor of Property Economics, University of Technology Sydney

Experience

Experience in preparing EIA reports across a variety of land uses including mixed use, residential, retail, industrial, childcare, health and fitness, renewable energy and agriculture.

Peter Youssef

Analytical support

Position

Research Analyst

Qualifications

Bachelor of Property Economics, University of Technology Sydney

Experience

Experience in assisting with the preparation of EIA reports across a variety of land uses.

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1.4. Structure of this report

This SIA has eight chapters as summarised below:

▪

Chapter 1 (this chapter) introduces the proposal, purpose and scope of this report.

▪

Chapter 2 outlines the legislative requirements and methodology applied to complete this SEIA.

▪

Chapter 3 provides a social baseline of the study area including the site's locality, social and demographic characteristics, and policy context.

▪

Chapter 4 provides an overview of the field study undertaken to inform the SIA, including an overview of the key findings.

▪

Chapter 5 provides a summary of the community identified values, strengths, and vulnerabilities which emerged through sections 4 and 5.

▪

Chapter 6 assesses the potential economic impacts of the proposal (Economic Impact Assessment)

▪

Chapter 7 assesses the positive and negative social impacts of the proposal, including with and without mitigation and enhancement measures (Social Impact Assessment).

▪

Chapter 8 outlines the mitigation, enhancement, and management measures of the assessed impacts.

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2. Methodology

This section outlines the methodology to prepare this SEIA, with reference to the relevant legislative requirements and guidelines.

2.1. Social Impact Assessment

The scope of this SIA has been developed in accordance with the:

-

QLD Social Impact Assessment Guideline (2018)

-

NSW DPHI SIA Guideline (2023)

-

The social characteristics and community values of the local area and Burdekin Shire.

The methodology undertaken to prepare this SIA is outlined in Table 1. The methodology was informed by the guidance contained within the QLD Social Impact Assessment Guideline (2018) and the NSW SIA Guideline and Technical Supplement (DPHI 2023).

Table 1 Methodology overview

Stage

Activities

Stage 1: Inception and social baseline

-

Site visit of surrounding land uses and site.

-

Review of relevant state and local policies and strategies to understand potential social implications.

-

Analysis of relevant data sets to understand the existing community profile and community values, strengths and vulnerabilities.

-

Identification of the project's study area and likely impacted groups.

-

Early identification of potential social impacts (positive and negative) based on research tasks undertaken.

-

Review of Engagement Outcomes Report

-

Review of engagement conducted with the local community and stakeholders through a series of one-on-one meetings, project briefings,

and emails

-

Analysis of field study data and identification of key themes.

-

Review of social baseline and SIA field study outcomes.

-

Review of proposal plans, project documentation and relevant technical assessments

-

Identification and scoping of potential social impacts (positive and negative), mitigation and enhancement measures.

-

Identify potential opportunities for additional measures to be incorporated into the proposal.

-

Assessment of social impacts (positive and negative) with and without mitigation and enhancement measures.

Stage 2: SIA field study

Stage 3: Impact scoping

Stage 4: Assessment and reporting

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Stage

Stage 5: Further consultation

Activities

-

Provision of recommendations to further reduce negative social impacts and enhance positive social impacts.

-

Preparation of draft and final SIA reports.

-

Further consultation is currently occurring, and this SEIA will be updated as appropriate following these outcomes.

2.1.1. Approach to assessing social impacts

The assessment of social impacts can be approached in several ways. While the QLD Social Impact Assessment Guideline (2018) outlines the 'Key Matters' which a SIA must address, the Technical

Supplement of NSW SIA Guideline (DPHI 2023) highlights a risk assessment methodology, whereby the significance of potential impacts is assessed by comparing the magnitude of an impact against the likelihood of the impact occurring.

The NSW DPHI's risk assessment methodology has been applied in this SIA and is outlined in Section 7.

Impacts have been grouped according to the QLD SIA Guidelines 'Key Matters'.

2.2. Economic Impact Assessment

This EIA is an independent study which assesses the potential economic impacts, and whether they are positive or negative, which are expected to arise from the proposed development at the site.

Key components of this EIA include:

-

Net employment benefits (construction and operational)

-

Net value added benefits (construction and operational)

-

Net impact on the Burdekin Sugar Cane Farming industry

-

Other positive impacts – supporting the emerging renewable energy sector in Australia

3. Social Baseline

This chapter provides a social baseline of the study area including the site's location, defined SIA Study Area, policy context, demographic characteristics, and identified vulnerable groups.

3.1. Site location

3.1.1. Local context

The site is located in Upper Haughton. The suburb is relatively small and predominantly consists of agricultural land uses such as cane farms. Directly adjoining the site is the existing Haughton Solar Farm, which includes ancillary infrastructure such as transmission towers and lines. The nearest regional town is Ayr, approximately a 40-minute drive from the site. Figure 3 Site context map.

Source: Google Maps, 2024

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Figure 4 Site photos

Picture 1 View of surrounding area along highway

Picture 2 View of cane farm from Keith Venables Road

Picture 3 Turn onto Keith Venables Road

Picture 4 Road leading to site

Picture 5 Field next to Haughton Solar Farm

Picture 6 Powerlines to neighbouring Haughton Solar Farm

Source: Urbis 2023

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3.1.2. Regional context

The site and suburb of Upper Haughton is located in the Burdekin Shire Local Government Area (LGA), approximately one hour from Townsville. The Burdekin Shire LGA is included within the North and Far North Queensland REZs.

The REZs are areas which have been identified by the State as being highly desirable locations to support renewable energy projects. REZs have been selected based on a range of factors including the site's proximity to potential customers, existing site constraints or hazards which may prevent development, the ability to leverage existing natural assets (i.e. solar) for renewable projects and existing investor interest.

3.2. Defining the study area for social impacts

A SIA Study Area identifies the social and geographic boundaries of the potential people and communities who may be positively or negatively impacted by the proposal. As outlined in the QLD SIA Guideline (4: 2018), the study area is informed by:

- the nature and scale of the proposed project, including associated infrastructure
- the scope of the potential social impacts throughout the project lifecycle
- the location and characteristics of potentially affected communities (including nearby regional communities)
- infrastructure, urban / rural centres, and land use patterns
- native title rights and other interests held by Aboriginal and Torres Strait Islander peoples
- location of other projects in the region which may contribute to cumulative social impacts over time.

Based on this, the most immediate social impacts are likely to be experienced by the Giru-Rural West demographic area (where the suburb of Upper Haughton is located). Due to the nature of the project in reaching customers and businesses beyond the site location, there are also likely to be impacts felt more broadly across the Burdekin Shire LGA, including those related to supply chains, transport networks and employment opportunities.

Table 2 Overview of SIA Study Area
Study area

Geographic area

Data category

Referred to in report
as:

Local area

Giru-Rural West area

District

Local area

Regional area

Burdekin Shire

LGA

Regional area

Regional Queensland

Regional Queensland

Regional Queensland

Regional QLD

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Figure 5 SIA Study Area

Source: Urbis, 2024

3.3. Policy context

A review of relevant state and local policies was undertaken to understand the strategic context of the proposed development and any potential impacts (positive and negative). This included:

State

-

Queensland Renewable Energy Zone Roadmap (2023)

-

Queensland Clean Energy Workforce Roadmap (2023)

-

Queensland SuperGrid Infrastructure Blueprint (2022)

-

Queensland Energy and Jobs Plan (2022)

Local

-

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Burdekin Planning Scheme (2022)

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▪

Burdekin Economic Development Strategy (2020-2025)

The key social themes from the policy review are summarised in Table 3 below.
Table 3 Key social themes from policy review

Theme

Summary of findings

Based on a strong agricultural industry

The Burdekin Planning Scheme (2022) explains that the region's economy and community have grown from a strong agricultural base, with the area's agriculture (especially cane farming) being of 'national significance'. The cattle industry is also of growing importance, particularly due to proximity to the Port of Townsville and the expansion of international markets. As a result, there is a strong priority to ensure the region's natural areas, habitats and ecosystems, and ecological functions are diverse and support the economic success, lifestyles, landscape and scenic qualities of the region.

Support for new and emerging industries

The Burdekin Economic Development Strategy (2020-2025) states that future prosperity will be underpinned by innovation and value-creation in the region's traditional industries, but also via the continued development of other key sectors. For example, the Burdekin Planning Scheme (2022) explains that the region is also becoming a hotspot for a range of other industries which will diversify and strengthen the local economy, including biofuel production from cane, renewable energy facilities (such as solar farms), mining and extractive resources, and aquaculture (mainly established in appropriate locations in rural areas).

Investing in Renewable Energy Zones

The Queensland SuperGrid Infrastructure Blueprint outlines the optimal infrastructure pathway to transform Queensland's electricity system to achieve the QLD Government's targets of 50 percent Renewable Energy by 2030, 30 percent reduction in economy-wide emissions by 2030, and to support the continued growth of renewable energy generation. To achieve this, the Blueprint requires investment into four focus areas: renewable investments, storage and dispatchable capacity, major network transmission and system strength augmentation, and clean energy hubs.

The Queensland Renewable Energy Zone Roadmap (QREZR) explains that the North and Far North REZ is a key component of the over \$60 billion Queensland Energy and Jobs Plan (QEJP), and in meeting the state's clean energy targets of 50 percent by 2030, 70 percent by 2032, and 80 percent by 2035. The QREZR explains that a REZ is an area with strong wind and sun that is developed in a coordinated way to lower costs and improve local community, environmental and cultural heritage outcomes. As such, REZs are critical to ensuring Queenslanders have access to affordable energy in the long term, as well as creating job opportunities and lowering Queensland emissions.

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Theme

Summary of findings

Planning for a 'clean energy' workforce

The Queensland Energy and Jobs Plan (QEJP) outlines several steps to deliver more jobs and industries, affordable power, lower emissions, and stronger growth. Specifically, the Queensland Clean Energy Workforce Roadmap (QCEWR) outlines how the initial investment of \$30 million into the clean energy workforce will contribute to achieving the vision of 'a skilled, ready workforce delivering Queensland's clean energy transformation across the state'. The roadmap reflects the Queensland Government's commitment to ensuring Queensland's clean energy sector has the skilled workers to continue to grow, and that Queenslanders benefit from the new clean energy job opportunities. A number of actions are outlined in the roadmap to help support this including:

-

Supporting student engagement in the industry by connecting school students through various activities such as partnership programs, career pathways and apprenticeships.

-

Delivering high quality training courses through vocational education pathways and industry working groups.

-

Partnering with industry groups to mobilise existing talent and build a more diverse and inclusive workforce, with consideration to a higher representation of women, Aboriginal and Torres Strait Islander people, people with a disability and culturally and linguistically diverse communities to name a few.

-

Collaborating across all levels of government, particularly in regional areas, to ensure a coordinated approach to support workforce planning, training delivery and development, and that industry workforce needs can be met.

Building supply chain capability and supporting small businesses, such as through the establishment of a dedicated Manufacturing Skills Queensland Renewables Project Officer and exploring opportunities to address workforce challenges through the state's Private Sector Pathways Program.

Ensuring connectivity to key infrastructure

The Burdekin Planning Scheme (2022) identifies the desire for safe and efficient road and rail transport infrastructure between the Burdekin and Port of Townsville. For example, the Townsville Airport supports the rural economy while also providing access to higher-order education and major health care facilities for Burdekin's communities. This is reflected by the vision outlined in the Burdekin Economic Development Strategy, wherein the Burdekin Shire is 'a vibrant and connected community and a location of choice in which to live, work, play, visit and invest'.

3.4. Demographic profile

A demographic profile identifies the demographic and social characteristics of a proposal's likely study area.

This is an important tool in understanding how a community currently lives and

that community's potential capacity to adapt to changes arising from a proposal. A demographic profile has been developed for the Giru-Rural West district based on demographic data from Profile.id, the Australian Bureau of Statistics Census of Population and Housing (2021), and QLD

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Government's Population Projections (2023). The demographic characteristics of Burdekin Shire LGA and Regional QLD have been used, where relevant, to provide a comparison.

3.4.1. Population and age

In 2021, there were 1,496 people living in the Giru-Rural West district, representing 9.0% of the Burdekin Shire population.

The largest age group was 55-59-year-olds, comprising 8.3% of the population in Giru-Rural West. There was a similar proportion of people aged over 60 in Giru-Rural West (27.6%), Burdekin Shire (31.4%) and Regional QLD (25.4%). Giru-Rural West has a similar average household size (2.39 people) compared to Burdekin Shire (2.29 people) and Regional QLD (2.44 people).

According to the QLD Government's Population Projections (2023), the Burdekin Shire is anticipated to experience a decline in population over the next 20 years, falling from 16,842 people in 2021 to 15,810 by 2046.

3.4.2. Culture and diversity

Giru-Rural West has a lower proportion of Aboriginal and/or Torres Strait Islander people (3.4%), compared to Burdekin Shire (6.6%), and Regional QLD (6.1%).

Giru-Rural West has lower levels of cultural and linguistic diversity than Regional QLD, though similar to the level across the Burdekin Shire. For instance, 10.9% of people in Giru-Rural West were born overseas, compared to 9.0% of people in Burdekin Shire, and 18.4% across Regional QLD.

A corresponding 8.7% of households in Giru-Rural West speak a language other than English at home, compared to Burdekin Shire (6.4%) and Regional QLD (8.9%).

The top non-English languages spoken in Giru-Rural West are Italian (2.1% of households) and Vietnamese (0.9% of households).

3.4.3. Education and qualifications

Giru-Rural West has lower levels of educational attainment than Regional QLD, though similar levels to Burdekin Shire.

Approximately 8.9% of Giru-Rural West residents have obtained a Bachelor's level qualification or above, compared to 9% in Burdekin Shire, and 17.1% across Regional QLD.

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Further, a slightly lower proportion (38.3%) of people aged 15 and above in Giru-Rural West have completed Year 12, compared to 36.5% in Burdekin Shire, and 49.0% across Regional QLD.

The top occupation in Giru-Rural West is Managers (30.9%), compared to 16% across the Burdekin Shire, of which 9.1% are Farmers and Farm Managers, reflecting a strong agricultural industry in the area. The following top occupations

in Giru-Rural West are Labourers (15.1%), Machinery Operators and Drivers (13.9%), and Technicians and Trade Workers (10.3%).

There is a similar proportion of people in Giru-Rural West with a vocational qualification (24.4%) compared to Burdekin Shire (24.5%), and Regional QLD (24.1%).

3.4.4. Workforce and employment

Giru-Rural West has a comparable proportion of people in the labour force (58.8%) to Burdekin Shire (57.6%) and Regional QLD (59.1%).

There is a very low level of unemployment in Giru-Rural West (1.5%), compared to Burdekin Shire (3.4%) and Regional QLD (5.2%).

The top industry of employment in Giru-Rural West was Agriculture, Forestry and Fishing (42.9%), followed by Manufacturing (12.8%), and Healthcare and Social Assistance (6.9%). These top industries are consistent across Burdekin Shire, with Agriculture, Forestry and Fishing employing 20.7% of workers, Manufacturing at 12.1%, and Healthcare and Social Assistance at 10.3%.

In the Giru-Rural West area, 62.3% of workers travelled via car to work, a slightly lower proportion compared to Burdekin Shire (72.8%) and Regional QLD (69.1%). This can be partly explained by the 17.0% of Giru-Rural West workers who worked at home, which could include farmers and farmhands who technically live at work.

3.4.5. Housing and income

The income quartile with the highest proportion of Giru-Rural West income earners was 'medium highest', wherein 27.3% of workers received between \$788 and \$1,424 per week. This proportion is higher, though comparable, than both Burdekin Shire (26.0%) and Regional QLD (25.0%). However, 25.4% of Giru-

Rural West workers received less than \$388 a week ('lowest group'), a similar proportion to Burdekin Shire (24.7%) and Regional QLD (25.5%).

The 'medium highest' quartile was also the most common bracket of household income across Giru-Rural West, with 30.8% of households earning between \$1,666 and \$2,791 a week. This is a higher proportion than both Burdekin Shire (23.7%) and Regional QLD (24.4%). Yet, there were 29.8% of households who received less than \$853 per week ('lowest group'), similar to Burdekin Shire (33.0%) and Regional QLD (28.0%).

There were no households in Giru-Rural West that paid rent more than \$300/week, compared to 15.5% of households in Burdekin, and 60.3% of households in Regional QLD that pay rent over \$300/week.

Over half of households in Giru-Rural West (52.9%) have home loan repayments of less than \$1,232/month and are ranked within the lowest quartile of housing loan repayments. This is a higher proportion than Burdekin Shire (50.2%) and Regional QLD (29.2%).

Almost all of Giru-Rural West residents live in separate houses (97.4%).

This is a higher proportion than across Burdekin Shire (85.3%) and Regional QLD (72.4%).

There are also high levels of home ownership within the area, with 45.9% of Giru-Rural West residents owning their home outright, compared to 40.9% in Burdekin Shire and 31% across Regional QLD. This correlates with a lower proportion of renters (15.5%) compared to Burdekin Shire (23.2%) and Regional QLD (29.5%).

3.4.6. Health and wellbeing

There is a similar proportion of people in Giru-Rural West who identified as having at least 1 long term health condition (32.1%) compared to Burdekin Shire (33.2%) and Regional QLD (32.9%).

The most common long term health conditions in Giru-Rural West were Asthma (affecting 7.6% of residents) and Mental Health Conditions (affecting 6.4% of residents).

3.4.7. Crime and safety

As part of the demographic profile, data from the Queensland Police Service - Online Crime Map was also

analysed to understand the crime and safety context around the site. This data is accurate as of 21

November 2023. Crime data from the Crime Map indicates that Upper Haughton experiences relatively lower

rates of crime compared to Burdekin Shire and QLD averages. There were no incidents of crime occurring in

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several categories over the last 6 months (21 May 2023 – 20 Nov 2023), including assault, robbery, other offences against the person, arson, fraud, drug offences, and trespassing and vagrancy.

However, there were some crime types where Upper Haughton had notably higher rates of crime per

10,000 people than the Burdekin LGA averages, including:

-

Unlawful entry: 2058.8 (compared to 67.1 in Burdekin Shire)

-

Other property damage: 294.1 (compared to 37.7 in Burdekin Shire)

-

Unlawful use of motor vehicle: 294.1 (compared to 12.6 in Burdekin Shire)

-

Other theft (excl. unlawful entry): 1764.7 (compared to 69.5 in Burdekin Shire)

As such, this crime profile indicates that the suburb may be more susceptible to opportunistic and theft crimes relating to residences and motor vehicles.

3.4.8. Vulnerable groups

There are numerous vulnerable groups within the study area community including socio-economically disadvantaged groups, elderly and persons with a disability (need for assistance), and people who are homeless. The following sections provide further detail on key vulnerable groups.

3.4.8.1. SEIFA

According to the 2021 Socio-Economic Indexes for Areas (SEIFA), there is some variation in terms of socioeconomic advantage and disadvantage between communities within the regional area.

-

The Burdekin Shire ranks in the top 50% of LGAs in the Index of Relative Socio-Economic Disadvantage and in the Index of Economic Resources. This suggests that the area has an average amount of people and households with low incomes, no qualifications, or low skilled occupations, as well as an average amount of households who pay low rent or who do not own their homes.

-

On the Index of Relative Socio-Economic Advantage and Disadvantage, Burdekin is ranked in the bottom 30% of LGAs, indicating that there may be more households with low incomes, and unskilled occupations, or few households with high incomes and people in skilled occupations.

-

Burdekin Shire also ranks in the bottom 20% of LGAs in the Index of Education and Occupation, indicating that the area may have many people without qualifications, people in low skilled occupations,

or people who are unemployed.

3.4.8.2. Disability

▪

In 2021, there were 90 people in Giru-Rural West (6.1%) who identified as having a need for assistance due to a severe or profound disability. This is a lower, though comparable, proportion to Burdekin Shire (6.6%) and Regional QLD (6.3%).

▪

There were an additional 118 people (9.8% of people aged 15+) in Giru-Rural West who provided unpaid assistance to someone with a disability, long term illness or old age in 2021. This proportion is slightly lower than in Burdekin Shire (11.5%) and Regional QLD (11.5%).

3.4.8.3. Homelessness

Data on the estimated levels of homelessness according to the ABS 2021 Estimating Homelessness:

Census is only available at a regional level and has been gathered for the Burdekin Shire LGA. The rates of homelessness per 10,000 people have also been calculated. Rates of homelessness have been compared to the state of Queensland.

▪

In 2021, there were 0 people in the Burdekin Shire living in improvised dwellings, tents, or sleeping out.

▪

There were 7 people residing in supported accommodation for the homeless (4.2 per 10,000 people compared to 8.0 per 10,000 people across Queensland), and 52 people temporarily residing in another household (31.2 per 10,000 compared to 9.7 across Queensland).

▪

Further, there were 32 people living in crowded dwellings (19.2 per 10,000 people compared to 27.8 across Queensland), and 22 people living in 'severely' crowded dwellings (13.2 per 10,000 people compared to 15.2 across Queensland).

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4. SIA Field Study

As specified in the QLD SIA Guideline (2018) and NSW Guideline (DPHI 2023), SIAs require community and stakeholder engagement to be undertaken to develop an understanding of impacts on communities and people as a result of a project. Community and stakeholder engagement also provides the opportunity for potentially impacted people and groups to provide feedback and input into a project. To achieve this, the SIA worked in collaboration with the Urbis Engagement team to maximise the efficiency and reach of community consultation activities undertaken. Online meetings and stakeholder briefings were used to engage and consult the community and key stakeholders regarding the Project. The methods of engagement and consultation with community and key stakeholders and details of participation are provided in Table 4. As outlined in the Engagement Outcomes Report, engagement with the broader community catchment – through geo-targeted advertising campaigns, project website and social impact survey – will commence early February (post-lodgement). This SEIA will be refined and updated as appropriate following outcomes from this consultation.

Table 4 Summary of community and stakeholder engagement activities

Method

Administered

Timeframes

Invited

Participated

Establish project
email and 1800
number

Online

Early December
2023

All stakeholders

No enquiries
received at time of
writing

Direct neighbour
briefings

Face-to-face

November/December
2023

Adjoining
landowners

Eight
neighbouring
landowners

Community
newsletter

Online via email

Expected early
February

All stakeholders

To be conducted

Geo-targeting
social media ads

Online

Expected early
February

People within a
20km radius
around the site

To be conducted

Project website

Online

Expected early
February

All stakeholders

To be conducted

SIA survey

Online via
targeted social
media ads

Expecting early
February

All stakeholders

To be conducted

4.1. Stakeholder engagement – Summary

Stakeholder engagement to date has been led by Cambridge, whom consulted with neighbours and stakeholders through a series of one-on-one briefings, project briefings, and emails.

Key feedback received throughout this engagement included concerns regarding potential traffic impacts, such as increased volume of vehicles and increased congestion, as well as the potential for visual change to occur. Most stakeholders did not feel that there would be any significant visual impact to their properties due to the existing vegetation and distance between the proposed site and their land. Another key theme raised

was the potential loss of productive agricultural land, however responses did not feel there would be any adverse effects on cattle and farming operations.

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4.2. Social Impact survey - summary

The social impact survey will be distributed early February (post-lodgement).

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5. Community Identified Values, Strengths and Vulnerabilities

Table 5 outlines the values, strengths, and vulnerabilities experienced in the local and regional areas, as identified by Sections 2.2 and 4.

Table 6 Community identified values, strengths, and vulnerabilities
Values

Strengths

Vulnerabilities

Rural lifestyle, value on the
environment

Strong agricultural industry

Anticipated population decline

Connectivity to Townsville and
key infrastructure

Emerging renewable energy
industry

Ability to support diverse
workforce opportunities

Local employment

Low unemployment

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6. Economic Impact Assessment

Property development and infrastructure projects provide economic benefits to a local economy and wider region during both the construction / development phase, and during the ongoing operation or working life of the project. Direct economic benefits during the development phase are identified in the form of expenditure, economic growth and employment benefits. These direct benefits in turn generate flow on (multiplier or indirect) benefits which also benefit the regional and state economies. In this assessment, we have used REMPLAN software to model and quantify the potential economic benefits associated with the proposed development. REMPLAN is an Input Output model that captures inter-industry relationships within an economy. It can assess the area specific direct and flow on implications across industry sectors in terms of employment, wages and salaries, output and value added (Gross State Product). The potential economic benefits of the proposed development have been quantified in terms of value-added expenditure generation and employment generation:

-

Expenditure Generation – Estimation of the direct and indirect expenditure impacts resulting from the proposed development. This estimates value added expenditure impacts to the regional and state economies during both the development and operational phases.

-

Employment Creation – Estimation of the direct and indirect employment impacts resulting from the proposed developments. Direct employment of existing and proposed development has been provided by the Proponent.

Key points regarding the workings and terminology of the model are as follows:

-

REMPPLAN uses the value of investment or employment generation as the primary inputs. For this analysis, we have used both the value of total upfront investment and the future employment (as provided by the Proponent) at the proposed development to assess the benefits of the construction phase and the ongoing economic benefits of the operational phase.

-

Outputs from the model include direct and indirect employment and value added (i.e. economic growth) generated through the project

-

Employment generated includes all full-time and part-time jobs created over the life of the construction phase; or in terms of the ongoing operations, total ongoing jobs generated

-

Both the direct and indirect benefits are modelled for employment and value added

▪

Direct refers to the effect felt within the industry where the investment is being made. For example, during the construction phase, new direct jobs are created within the construction industry

▪

Indirect effects are 1) those felt within industries that supply goods to the industries directly affected (industry effects) and 2) to industries that benefit from the wages that are earned and spent by those employed within the industries directly affected (consumption-induced effects). For the purposes of this analysis, consumption-induced effects have been excluded. Consumption-induced effects are prone to overstate the benefits of a particular investment as they overestimate the impact of wage and salary increases in the local economy. This is accepted industry practice.

The following sub-sections present a summary of benefits for the different scenarios for these two phases.

We have assessed the proposed development which is the delivery of a 1,222.5-ha solar farm across Lot 1 and 6 (the site). The proposed solar farm has a potential capacity of 1,329.8 MWp and potential power of 1,065.7 Mwac. The reason for this assessment is to properly understand the economic impact of the agricultural land across the entire site being utilised as a solar farm in lieu of the existing 300 ha sugar cane farm as well as the potential of the whole site area to be fully utilised as a 1,222.5-ha sugar cane farm.

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6.1. Development Phase

Direct economic benefits during the construction / development phase of the proposed development are identified in the form of employment and value-added benefits. These direct benefits, in turn, generate flow on (multiplier or indirect) benefits which also benefit the regional and state economies.

6.1.1. Project Expenditure

Total expenditure estimates for the proposed development have been provided by the Proponent. The total estimated capital investment value of the entire development is \$2.2 billion (excluding GST). However, for the purposes of assessing economic impacts, GST must be included. As such, the development is estimated to generate approximately \$2.4 billion of direct expenditure (Economic Output) including GST for the local region and state over an six-year development period.

6.1.2. Employment Benefits

New jobs will be supported during the six-year development phase by the direct expenditure on the proposed development. The direct (mostly on-site construction jobs) and indirect employment benefits according to our REMPLAN analysis are shown below:

▪

Direct Jobs = 400 jobs over six years

▪

Indirect Jobs = 935 over six years

▪

Total Jobs = 1,335 over six years.

6.1.3. Value Added Benefits at full potential use (Constant \$2024)

Value added benefits (Gross State Product) will be generated from the direct expenditure incurred on the proposed development. Value added essentially represents economic growth for the region and state (i.e.

Net Economic Output: this is total economic output minus output which is an input for other sectors). The direct and indirect value-added benefits are shown below:

▪

Direct Value Added = \$708.1 million

▪

Indirect Value Added = \$943.2 million

▪

Total Value Added = \$1.7 billion.

Table 7 Economic Benefits of the Proposed Development During the Development Phase

Project Expenditure
(\$M)
Avg Employment Per
Annum (Total Jobs)

Value Added (\$M)

Direct

Indirect

Total

\$2,413.6

-

\$2,413.6

400 jobs over 8 years

935 over 8 years

1,335 jobs over 8 years

\$708.1

\$943.2

\$1,651.3

Source: REMPLAN Economy; Cambridge RE Partners; Urbis

6.2. Operational Phase

In addition to economic benefits that are generated during the development phase of the project, there will be ongoing economic benefits created through the operation of the new facilities on the site. These benefits include growth in employment and value added (Gross State Product).

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6.2.1. Existing Use – Employment Benefits

To understand the net benefit of the proposed development, we have firstly calculated the economic benefits of the site if it were to continue operating as its current use, which is a 300-ha sugar cane farm. The existing sugar cane farm is heavily automated resulting in only one direct job being supported (based on information provided by the Proponent).

The direct and indirect employment benefits of the existing 300 ha sugar cane farm according to our REMPLAN analysis are shown below:

▪

Direct Jobs = 1

▪

Indirect Jobs = 3

▪

Total Jobs = 4.

We have also calculated the potential employment generation of the site in the scenario that it was fully utilised as a sugar cane farm (i.e. the entire site area of 1,222.5 ha), to reflect the economic impact of the loss of agricultural land being utilised across the entire site. To do this we have we have increased the direct employment in line with the required increased area of the existing sugar cane farm to reach its full potential.

As the size of the sugar cane farm would need to increase by nearly six times, we have increased the direct jobs by six. However, we note that this is a best-case scenario as the automation of the existing sugar cane farm would likely see direct jobs increase at a lower rate.

The hypothetical direct and indirect employment benefits of the site being fully utilised as a sugar cane farm according to our REMPLAN analysis are shown below:

▪

Direct Jobs = 4

▪

Indirect Jobs = 12

▪

Total Jobs = 16.

6.2.2. Existing Use – Value Added Benefits (Constant \$2024)

The continued ongoing operation of the existing 300 ha sugar cane farm would contribute value added via annual contributions to Gross State Product. We have used ABS benchmarks for output per hectare for sugar cane farming in the Burdekin region to reach the direct output of the site and then input this value into REMPLAN to reach the direct and indirect value added per annum, with the results as follows:

▪

Direct Value Added = \$680,000 per annum

▪

Indirect Value Added = \$430,000 per annum

▪

Total Value Added = \$1.1 million per annum.

When applying the same benchmarks to the scenario where the site is fully utilised as a sugar cane farm across 1,222.5 ha, the results are as follows:

▪

Direct Value Added = \$2.7 million per annum

▪

Indirect Value Added = \$1.8 per annum

▪

Total Value Added = \$4.5 million per annum.

Table 8 Operational Phase Benefits of the Existing 300 Ha Sugar Cane Use
Direct

Indirect

Total

Avg Employment Per
Annum (Total Jobs)

1 job

3 jobs

4 jobs

Value Added p.a. (\$M)

\$0.7

\$0.4

\$1.1

Source: REMPLAN Economy; Cambridge RE Partners; ABS Urbis
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Table 9 Operational Phase Benefits of the Site being fully utilised as a 1,222.5 Ha Sugar Cane Farm

Direct

Indirect

Total

Avg Employment Per Annum (Total Jobs)

4 jobs

12 jobs

16 jobs

Value Added p.a. (\$M)

\$2.7

\$1.8

\$4.5

Source: REMPLAN Economy; Cambridge RE Partners; ABS; Urbis

6.2.3. Proposed Development – Employment Benefits

The ongoing operation of the proposed solar farm will directly and indirectly support new jobs in the local region and state. The direct (based on information provided by the Proponent) and indirect employment benefits are shown below:

▪

Direct Jobs = 20 jobs per annum

▪

Indirect Jobs = 60 jobs per annum

▪

Total Jobs = 80 per annum.

6.2.4. Proposed Development – Value Added Benefits (Constant \$2024)

Once complete, the proposed solar farm facilities will generate ongoing additional value added via annual contributions to Gross State Product (GSP). This represents economic activity which would otherwise not have occurred.

▪

Direct Value Added = \$8.8 million per annum

▪

Indirect Value Added = \$17.7 million per annum

▪

Total Value Added = \$26.5 million per annum.

Table 10 Operational Phase Benefits of the Proposed Development

Avg Employment Per
Annum (Total Jobs)
Avg Value Added Per
Annum (\$M)

Direct

Indirect

Total

20

60

80

\$8.8

\$17.7

\$26.5

Source: REMPLAN Economy; Cambridge RE Partners; Urbis

6.2.5. Summary of Operational Phase Benefits

In Table 12, overleaf, we have compared the potential economic benefit of the three operational phase scenarios to understand the net economic impact of the proposed development. These figures highlight that the proposed development is likely to have a positive economic benefit on the local and state economy by replacing the existing agriculture use with a solar farm. This positive impact ranges from an additional 64 to 76 jobs and an additional \$22.0 million to \$25.4 million of GVA per annum.

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Table 11 – Comparison of Operational Phase Scenarios
Existing Use at
Proposed
Development

Existing Use

Full Capacity

(300 ha sugar

(1,222.5 ha

cane farm)

sugar cane
farm)

Impact of
Proposed
Development
vs Existing Use

Impact of
Proposed
Development
vs Existing Use
at Full Capacity

Avg Employment
Per Annum

80

4

16

76

64

\$26.5

\$1.1

\$4.5

\$25.4

\$22.0

(Total Jobs)
Avg Value Added
Per Annum (\$M)

Source: REMPLAN Economy; Cambridge RE Partners; ABS; Urbis

6.2.6. Economic Impact on the Burdekin Sugar Cane Farming Industry
According to the ABS there is currently around 389 sugar cane farms in the Burdekin LGA which generated around \$310.4 million as of 2021.
When removing the existing sugar cane farm on the site from this supply, the number of sugar cane farms in

the Burdekin LGA is only expected to decrease by 0.3% reflecting an immaterial economic impact to this industry.

6.2.7. Supporting the Emerging Renewable Energy Sector in Australia

Once the proposed development is complete and operational, it has the potential to deliver an extra 1,329.8

MWp of renewable energy to Australia. This influx of renewable energy will contribute to the national effort to transition from fossil fuels to clean energy, noting the achievement of a "100% renewables" electricity system is ideal (Grattan Institute, 2021).

As reflected in the chart below, Australia has experienced a shift towards more renewable energy sources, which have increased their share of total electricity generation from 10.5% in FY11 to 26.7% in FY21. During this period the reliance of coal dropped from 77% to 53%. This increased reliance on renewables is likely to substantially improve domestic energy security in the longer term as coal is a finite resource and has resulted in Australia being the world's sixth largest producer of solar energy, noting Australia has the second highest potential for solar power.

The proposed development will also contribute to the QLD Energy and Jobs Plan (2022), which targets a 70% reliance on renewable energy by 2032 and 80% by 2050.

Chart 1 – Australia Energy Generation by Source
100%

Share of Electricity Generation
(%)

90%

Coal

Gas

Oil

Renwables

80%

70%

60%

50%

40%

30%

20%

10%

0%

FY07 FY08 FY09 FY10 FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20 FY21

Source: DISR; Urbis

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7. Social Impact Assessment

This chapter provides a ranking of the identified social impacts of the proposal. It is structured according to the 'Key Matters' outlined by the QLD Social Impact Assessment Guideline (2018) (pgs. 9-14).

To determine impact significance, each impact is assessed in accordance with the risk assessment

methodology applied in the NSW SIA Guideline Technical Supplement (DPHI 2023), whereby the

significance of potential social impact is assessed by comparing the magnitude of the impact against the

likelihood of the impact occurring. This methodology is outlined below.

Table 12 Significance matrix

Magnitude level

1

2

3

4

5

Likelihood level

Minimal

Minor

Moderate

Major

Transformational

A

Almost certain

Low

Medium

High

Very high

Very high

B

Likely

Low

Medium

High

High

Very high

C

Possible

Low

Medium

Medium

High

High

D

Unlikely

Low

Low

Medium

Medium

High

E

Very unlikely

Low

Low

Low

Medium

Medium

Source: NSW DPHI, 2023, SIA Guideline: Technical Supplement, p. 13

Table 13 Likelihood levels

Level

Definition

Almost certain

Definite or almost definitely expected (e.g. has happened on similar projects)

Likely

High probability

Unlikely

Medium probability

Possible

Low probability

Very unlikely

Improbable or remote probability

Source: SIA Guideline: Technical Supplement (NSW DPHI 2023, p. 12)

Table 14 Magnitude levels

Magnitude level

Meaning

Transformational

Substantial change experienced in community wellbeing, livelihood, infrastructure, services, health, and/or heritage values; permanent displacement or addition of at least 20% of a community.

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Magnitude level

Meaning

Major

Substantial deterioration/improvement to something that people value highly, either lasting for an indefinite time, or affecting many people in a widespread area.

Moderate

Noticeable deterioration/improvement to something that people value highly, either lasting for an extensive time, or affecting a group of people.

Minor

Mild deterioration/improvement, for a reasonably short time, for a small number of people who are generally adaptable and not vulnerable.

Minimal

Little noticeable change experienced by people in the locality.

Source: SIA Guideline: Technical Supplement (DPHI 2023, p. 13)

Table 15 Dimensions of social impact magnitude
Dimension

Explanation

Extent

Who specifically is expected to be affected (directly, indirectly, and/or cumulatively), including any vulnerable people? Which location(s) and people are affected? (e.g., near neighbours, local, regional, future generations).

Duration

When is the social impact expected to occur? Will it be time-limited (e.g., over particular project phases) or permanent?

Intensity or scale

What is the likely scale or degree of change? (e.g., mild, moderate, severe)

Sensitivity or
importance

How sensitive/vulnerable (or how adaptable/resilient) are affected people to the impact, or (for positive impacts) how important is it to them? This might depend on the value they attach to the matter; whether it is rare/unique or replaceable; the extent to which it is tied to their identity; and their capacity to cope with or adapt to change.

Level of concern /
interest

How concerned/interested are people? Sometimes, concerns may be disproportionate to findings from technical assessments of likelihood, duration and/or intensity.

Source: SIA Guideline: Technical Supplement (DPHI 2023, p. 12)

Mitigation and enhancement measures

Social impacts are assessed before and after the implementation of mitigation measures (for negative social impacts) and enhancement measures (for positive social impacts). These measures can take different forms and may be incorporated in the design, planning, construction, or operational stage of the proposed development.

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7.1. Workforce Management

This section provides a detailed assessment, unmitigated and mitigated and unenhanced and enhanced, of the matters and social impacts related to workforce management as a consequence of the proposal. These impacts are outlined in Table 16 below.

Table 16 Summary of workforce management impacts
Matter

Social
impact

Affected
stakeholders

Duration

Extent

Unmitigated/
unenhanced

Mitigated/
enhanced

Potential
pressure on
the road
network and
increased
travel times

Way of life

Nearby
residents,
homes along
Keith
Venables
Road

Construction,
operation

Local area

Low negative

Low
negative

Provision of
increased
employment
opportunities

Livelihood

Relevant
skilled
workers
across the
regional area

Construction,
operation

Regional
area

High positive

High
positive

7.1.1. Potential pressure on the road network and increased travel times – Unmitigated

During construction and operation of the proposal, there is potential for the local road network to experience additional pressure from the increased volume and/or type of vehicles traveling to and from site. This additional pressure will be felt most severely by local residents and the surrounding community. Current access to the site is via Keith Venables Road, located approximately 12.3km from the Barratta Road/Keith Venables Road intersection.

As Section 3.3, the Burdekin region values connectivity to key infrastructure, as well as access to efficient road and rail transport. More specifically, the potential impact on travel times for the local community was raised by two nearby landholders, who were interested to know more about how it may affect them. The Transport Assessment Report (TAR) assesses the potential impact the construction and operation of the proposal will have on the capacity and quality of the road network. The impact to the road capacity is based on the likely level of delay (i.e. traffic saturation) the proposal would cause. This is assessed against recognised standards from the Guidelines for Assessment of Road Impacts and is predominately informed by the likely trips generated by the proposal, as well as existing and forecast traffic projections.

Based on this, the TAR found that the construction and operational traffic expected from the proposal would not have a significant impact to the operation or safety of all assessed intersections around the site. This includes the intersection of Barratta Road and Keith Venables Road, Upper Haughton Road and Bruce Highway (North and South) and the Bruce Highway Interchange.

In regards to road quality, the TAR notes that any increase in heavy vehicles along Council-controlled roads will likely result in some pavement degradation, particularly on unsealed sections of road such as the western portion of Keith Venables Road. Mitigation measures have been provided as part of the TAR which are discussed in detail below.

Based on the negligible to minor impact on the capacity and quality of the road network, this impact is assessed as unlikely and minor, ranking as low negative.

7.1.2. Potential pressure on the road network and increased travel times – Mitigated

Although some pavement degradation may occur as a result of project activities, the TAR notes that the Burdekin Shire LGIP identifies both Upper Haughton Road and Barratta Road as trunk roads which are planned to be newly paved as part of the TMR's Queensland Transport and Roads Investment program

2023-2024 to 2026-2027. This includes an investment for pavement rehabilitation works along Barratta Road at various locations.

To mitigate the potential impact on road quality, the TAR recommends developing a Road Use Management

Plan for construction and operations activities prior to construction commencing. The TAR recommends for

this plan to include a number of measures including undertaking dilapidation assessments during each

construction stage to assess the road condition, and investigating the need to seal Keith Venables Road.

The TAR also notes that the existing bridge on Keith Venables Road should be reviewed structurally prior to

the commencement of construction traffic movements to site.

SIA recommendation/s

-

Prepare a Road Use Management Plan (RUMP) in accordance with the Transport Assessment Report prior to construction commencing.

-

Advise the community, specifically nearby neighbours along Upper Haughton Road, Barratta Road, and Keith Venables Road, of any significant traffic changes that may impact travel times or road access as required.

-

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

In accordance with the mitigation measures outlined by the TAR, and acknowledging the planned road infrastructure upgrades in the area, this mitigated impact is considered unlikely and minor, hence assessed as low negative.

7.1.3. Provision of increased employment opportunities – Unenhanced

The proposal will require a significant number of skilled jobs to support the construction and operation phases, and will provide a number of employment opportunities for workers in the local and regional areas.

The Social Baseline (Section 3) revealed that the top occupations in Giru-Regional West were Managers

(30.9%), Labourers (15.1%) and Machinery Operators and Drivers (13.9%). These occupations are likely to

align for the range of skilled jobs provided by the proposal.

The Economic Impact Assessment (Section 6 of this report) finds that during the development phase, the

proposal will generate approximately 400 direct jobs and 935 indirect jobs over six years. The majority of

these will be on-site construction jobs. During operation, the proposed solar

farm is expected to support approximately 20 direct jobs per annum, and 60 indirect jobs per annum. The provision of a significant quantity of direct and indirect jobs throughout the project's lifecycle, particularly 20 operational jobs per annum, bring a likely and moderate positive impact to future workers in the local and regional areas, thus ranking as high positive.

7.1.4. Provision of increased employment opportunities – enhanced
The 2023 Queensland Renewable Energy Zone Roadmap outlines the vision of the REZ to foster a thriving clean energy economy, while creating job opportunities across the state. More specifically, two of its key priorities are to increase local jobs and secure work, as well as to build local capacity.
In addition to increased employment opportunities, the proposal may provide additional opportunities to provide training and skills development for workers in the local and regional area. As mentioned in the Policy Context (Section 3.3) the Queensland Clean Energy Workforce Roadmap outlines the need to ensure that Queenslanders benefit from new, clean energy job opportunities. Notably, it highlights several actions to help support this, including to support student engagement in the industry via partnership programs and apprenticeships, to deliver high quality training courses, to partner with industry groups to build a more
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diverse and inclusive workforce, and to collaborate across all levels of government to support a coordinated approach to workforce planning, training and development. As such, while there is currently no existing Employment Plan being prepared for the proposal, the QLD RZ Roadmap outlines clear priorities to prioritise local employment where possible. SIA recommendation/s

▪

Prepare an Employment Plan which outlines the policies for employment before commencing, such as targeting local employment hirers, businesses or including diverse hiring policies.

▪

Consider forming training partnerships or commitments with local businesses or educational institutions once a contractor has been engaged. This can form part of the Employment Plan (recommended above).

Given there is currently no Employment Plan or confirmed policies for enhancing employment opportunities, this livelihood impact remains high positive. However, this impact may be enhanced if SIA recommendations are incorporated into project delivery.

7.2. Housing and Accommodation

This section provides a detailed assessment, unmitigated and mitigated and unenhanced and enhanced, of the matters and social impacts related to housing and accommodation as a consequence of the Project.

These impacts are outlined in Table 17 below.

Table 17 Summary of housing and accommodation impacts
Matter

Social
impact

Affected
stakeholders

Duration

Extent

Unmitigated/
unenhanced

Mitigated/
enhanced

Additional
stress on
housing and
accommodation

Way of life

Local and
regional area

Operation

Regional
area

Medium
negative

Medium
negative

7.2.1. Additional stress on housing and accommodation – Unmitigated
The QLD SIA Guidelines have a focus on supporting the proposed workforce accommodation arrangements during the construction and operational phase of a project. Given the anticipated 400 direct and 935 indirect jobs which the project may support over its lifecycle, there is a potential risk of additional stress placed on housing and accommodation in the surrounding area. A review of demographic data from SQM Research (2023) also indicates that vacancy rates as of November 2023 within the Giru-Rural West District (approx. postcodes 4809) is 0%. Vacancy around Ayr (closest town to the site, postcode 4807) is 1.7% and vacancy rates in Townsville (postcode 4810) is 1.8%. This demonstrates very low vacancy rates, with industry standards noting anything under 2.5% is tight and shows a low availability of rental properties that are empty and available for lease. Given the existing lack of vacant available accommodation, the probability that the project's workforce will place additional pressure onto these housing markets, and the likelihood of concurrent projects occurring within the area which also require workforce accommodation (refer to Cumulative Impacts, Section 7.5), this way of life impact is considered possible and moderate. It has therefore been assessed as medium negative.

7.2.2. Additional stress on housing and accommodation – Mitigated
As stated in Section 3.3, the vision for economic development in the Burdekin Shire is 'a vibrant and connected community and a location of choice in which to live, work, play, visit and invest'. To achieve this, several strategies have committed attention towards housing the anticipated workforces drawn by REZ developments. For example, the QLD REZ Roadmap has committed \$6 million to strategically assess the three QLD REZ areas. This includes an assessment of the likely infrastructure, transport, housing and accommodation, workforce, supply chains, waste management, social infrastructure and First Nation

considerations across the three regions. These investigations are known as REZ Readiness Assessments and will feed into the creation of Regional Energy Reference Groups. SIA recommendation/s

▪

Prepare a Workforce Accommodation Plan which outlines strategies to minimise the additional pressure on housing and accommodation, such as to liaise with other nearby projects to maximise the efficiencies in workforce accommodation for current and future projects in the REZ. This detail could be included as part of the Construction Management Plan.

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Given there is currently no Workforce Accommodation Plan or confirmed strategies for mitigating housing and accommodation pressure, this way of life impact remains medium negative. However, this impact may be enhanced if SIA recommendations are incorporated into project delivery.

7.3. Local Business and Industry Procurement

This section provides a detailed assessment, unmitigated and mitigated and unenhanced and enhanced, of the matters and social impacts related to local business and industry procurement as a consequence of the proposal. These impacts are outlined in Table 18 below.
Table 18 Summary of local business and industry procurement impacts
Matter

Social
impact

Affected
stakeholders

Duration

Extent

Unmitigated/
unenhanced

Mitigated/
enhanced

Perceived
loss of
agricultural
and
productive
land

Livelihood

Nearby
landowners

Construction,

operation

Local area

Low negative

Low
negative

Contributions
to QLD's
renewable
energy
targets

Surroundings

Regional and
State areas

Operation

State

High positive

High
positive

7.3.1. Perceived loss of productive agricultural land – Unmitigated

In line with the changed use of the proposed development from farming to solar farm, there is potential for this to be perceived as a loss of productive agricultural land for both the broader economy and surrounding farmers.

The region's strong agricultural industry and land use are identified as core facets of the Burdekin Shire throughout the policy review (Section 3.3). This was evident during the site visit, which identified a vast expanse of cane farms surrounding the site.

According to the Queensland Renewable Energy Zone Roadmap (2023), the indicative location, size and timing of these REZs is based on analysis of available network capacity, renewable resources, project pipelines, investor interest, land use, and optimal network expansion. As such, this area has been selected with regard of land use impacts.

The Economic Impact Assessment (Section 6) found there are approximately 389 sugar cane farms in the Burdekin LGA which generated approximately \$310.4 million in revenue as of 2021. When removing the

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existing sugar cane farm from this supply, the number of sugar cane farms in the Burdekin LGA is only expected to decrease by 0.3% reflecting an immaterial economic impact to this industry.

Given the perception that lost agricultural land may impact the livelihoods of local residents, but recognising the EIA's assessment of a minor loss of agricultural land, this impact to livelihood is considered likely and minimal, ranking low negative.

7.3.2. Perceived loss of productive agricultural land - Mitigated

In addition to the EIA's conclusions that the Proposal will contribute to a decrease of 0.3% of productive land, the project could consider developing a Community Benefits Sharing Scheme to further mitigate any perceived loss of productive agricultural land.

SIA recommendation/s

-

Explore the potential of developing a Community Benefits Sharing Scheme to provide more direct benefits to the local community, informed by engagement and developed in partnership with the local community (in particular, stakeholders impacted by renewable energy infrastructure) to understand their needs and potential Community Benefits Sharing options (refer to Section 7.4.2 for further detail).

-

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Given there are no confirmed plans or strategies in place to mitigate the perceived loss of productive agricultural land, this impact to livelihood remains low negative. However, this impact may be enhanced if SIA recommendations are incorporated into project delivery.

7.3.3. Contributions to Queensland's renewable energy transition - unenhanced

While there may be a perceived loss of productive agricultural land, the proposed development will contribute notably towards achieving Queensland's renewable energy targets and supporting the transition towards renewable energy like solar.

The EIA found that once the proposal is complete and operational, it has the potential to deliver an extra 1,329.8 Mwp of renewable energy to Australia. This influx of renewable energy will contribute to the national effort to transition from fossil fuels to clean energy, noting the achievement of a "100% renewables" electricity system is ideal (Grattan Institute, 2021).

Given the notable provision of renewable energy and its potential contribution to achieving Queensland's renewable energy targets, this impact to surroundings is considered likely and moderate ranking a high positive.

7.3.4. Contributions to Queensland's renewable energy transition - enhanced

There are no further enhancement measures recommended for this surroundings impact, it remains high

positive.

SIA recommendation/s

▪

None

7.4. Health and Community Wellbeing

This section provides a detailed assessment, unmitigated and mitigated and unenhanced and enhanced, of

the matters and social impacts related to health and wellbeing as a consequence of the Project. These

impacts are outlined in Table 19 below.

Table 19 Summary of health and community wellbeing impacts

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Matter

Social
impact

Affected
stakeholders

Duration

Extent

Unmitigated/
unenhanced

Mitigated/
enhanced

Potential
increased
access to
reliable
electricity

Accessibility

Regional
area

Operation

Regional
area

High positive

High
positive

Impacted
amenity
related to
noise
disturbance

Surroundings

Houses along
Keith
Venables
Road, nearby
neighbours

Construction,
operation

Local area

Low negative

Low
negative

Impacted

amenity
relating to
visual
impact

Surroundings

Houses along
Keith
Venables
Road, nearby
neighbours

Construction,
operation

Local area
(potential
visual
catchment
defined in
Visual
assessment)

Low negative

Low
negative

Potential
change to
sense of
place

Surroundings

Upper
Haughton
community
(local area)

Construction,
operation

Local area

Low negative

Low
negative

Potential
disturbance
to sites of
Aboriginal
significance

Culture

Aboriginal
and/or Torres
Strait Islander
community

Construction,
operation

Local area

Low negative

Low
negative

7.4.1. Potential increased access to reliable electricity – Unenhanced

In line with the proposal's contributions to achieving Queensland's Renewable Energy targets via solar power, there is potential for nearby communities to experience increased access to reliable electricity.

The Queensland Energy and Jobs Plan shows that achieving a 70% renewable energy target by 2032 could lower annual electricity bills by \$150 for households and \$1,495 for small businesses. The project is expected to have capacity to power around 100,000 homes per year in North Queensland, and its proximity to the existing high-voltage transmission line enables power to be easily exported into the grid.

The energy generated by the project will be distributed into the National Energy Market, thus providing a net positive impact regionally.

Given the project's anticipated scale and contributions to renewable electricity regionally, this impact to accessibility is considered likely and major, rating high positive.

7.4.2. Potential increased access to reliable electricity – Enhanced

Increased access to reliable electricity is anticipated to create benefits across the North Queensland region.

However, potential negative impacts associated with construction and operation of the renewable energy

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infrastructure, which are required to enable increased access to reliable electricity regionally, may result in disproportionate negative impacts experienced locally, particularly by surrounding landholders and the local community.

To facilitate direct local benefits, there is an opportunity to explore a local Community Benefits Sharing Scheme. The concept of benefit sharing is based on acknowledging that the siting of renewable energy infrastructure results in changes in the local landscape and community. Sharing the financial and other benefits of a project enhances the social and economic outcomes for the local community. A successful benefit sharing strategy requires consideration of how a renewable energy project can add value in a local area and what it takes to be a welcomed development in a host community (Clean Energy Council 2019). The form that benefit sharing takes is dependent on project scale and context. However, it may include providing funding (e.g. grants, sponsorships or scholarships), establishing partnerships with important local groups or projects, providing in-kind support, developing innovative options for financing (e.g. community coinvestment) or innovative products (e.g. energy retailing options) (Clean Energy Council 2019). This ensures a fair allocation of the increased productivity (from the use of local land and resources) to local benefit.

SIA recommendation/s

▪

Explore the potential of developing a Community Benefits Sharing Scheme to provide more direct benefits to the local community, informed by engagement and developed in partnership with the local community (in particular, stakeholders impacted by renewable energy infrastructure) to understand their needs and potential Community Benefits Sharing options.

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations.

This impact to accessibility remains likely and major, ranking high positive. However, potential benefits to the local community specifically may be enhanced if SIA recommendations are incorporated into project delivery.

7.4.3. Impacted amenity related to noise disturbance – Unmitigated

The noise generated by the proposal's activities during construction and operation may cause noise disturbance to the surrounding area. This would mainly be experienced by nearby residents and landowners.

The Noise Assessment Report (NAR) notes that construction activities (and associated construction noise emissions) are proposed to be undertaken during daytime hours (6.30am – 6.30pm) and will include the

delivery of equipment and personnel to the construction areas.

The NAR identified eleven noise sensitive receivers within 8km of the project boundary, with the nearest receptor located a minimum distance of 50m from the road corridor. During construction, all noise levels are predicted to comply with the relevant road noise criteria at all receivers

located along the proposed haulage routes. According to the NAR, construction noise is also predicted to comply with Queensland Construction noise criteria at all receptors, as will operational noise comply with relevant noise goals for normal operations. Recognising the low risk outlined by the NAR, this impact is considered unlikely and minor, ranking low negative.

7.4.4. Impacted amenity related to noise disturbance - Mitigated

The NAR states that although construction and operational noise will be compliant with relevant noise criteria, there is a potential for longer term, background creep noise to occur as a result of prolonged construction activities. In order to mitigate any potential noise disturbance, the NAR recommends the proposal develop a Construction Noise and Vibration Management Plan (CNVMP) and an Operational Noise Review.

SIA recommendation/s

▪

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Recommend that the proposal develop a Construction Noise and Vibration Management Plan (CNVMP) and an Operation Noise Review following finalisation of the Project design, as recommended by the NAR.

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▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Given there are no current measures planned to mitigate potential noise impact, this impact to surroundings remains low negative. However, this impact may be enhanced if the NAR's recommendations to develop a Construction Noise and Vibration Management Plan (CNVMP) and an Operational Noise Review are incorporated into project delivery.

7.4.5. Impacted amenity relating to visual impact - Unmitigated

The introduction of a new land use in the form of a solar farm has the potential to disrupt the visual amenity of surrounding residents.

During consultation, one resident stated that they did not believe they would be affected, as they are 'unlikely to see anything due to the vegetation on both sides of the river between my property and the proposed solar farm'.

The Visual Impact Assessment (Viewshed analysis and preliminary visual advice) (VIA) notes that the surrounding topography is predominantly flat and surrounded by agricultural land uses as well as an existing solar farm and substation. For the purpose of assessment, the potential visual catchment is defined as the theoretical area within which parts of the site including the proposed solar array (approximately 5.2m above natural ground level) may be visible. There were 14 dwellings identified between 3-10kms away, with the largest number located predominantly north of the site though have mid to low visibility due to topography.

Based on analysis of the viewshed map and aerial photography, the VIA finds that the likely visual catchment of the site is considered low and constrained from both the private and public domain locations. As such, the VIA finds that visibility from, and the potential visual impact on private dwellings, is likely to be low due to surrounding vegetation and distance between dwellings and the site. Given the low assessment by the VIA, and the proximity of the existing solar farm, this impact to surroundings is considered unlikely and minor, ranking low negative.

7.4.6. Impacted amenity relating to visual impact - Mitigated

Given there are no planned mitigations, this surroundings impact remains low negative.

SIA recommendation/s

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

7.4.7. Potential change to sense of place - Unmitigated

The introduction of a solar farm into a predominantly agricultural area has the potential to impact the local community's sense of place, via new construction works and a change in current landscape.

The policy review (Section 3.3) revealed the local area's strong value on the existing agricultural industry and as a rural area. Though, as part of the North and Far North Queensland REZ, the

area has also been pinned for further renewable change. During the site visit, the existing Haughton Solar Farm was observed as directly adjoining the site. From these observations, the main change from surrounding landscape is the height of the existing transmission towers, though otherwise not noticeable from afar. Although the area has been identified as a REZ, the local community may still experience changes to sense of place because of any development or activity which influences the local character, and hence potentially changing people's relationships with those places. As discussed in relation to Impacted amenity relating to visual impact (Section 7.4.5), there is low visibility of the site due to surrounding vegetation and distance of surrounding dwellings. Given the low assessment of visual impact on nearby dwellings, the existing nearby solar farm, the location of the site within a REZ, and the lack of comments from nearby residents, this impact to surroundings is considered unlikely and minimal, ranking a low negative.

7.4.8. Potential change to sense of place - Mitigated

Given there are no planned mitigations, the impact to surroundings remains low negative.

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SIA recommendation/s

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

7.4.9. Potential disruption to sites of Aboriginal significance – Unmitigated

There is a potential risk for some of the proposal's activities during construction and/or operation to disturb sites of Aboriginal significance. This impact would be primarily experienced the Aboriginal and/or Torres Strait Islander community, which comprises 3.4% of the population residing in the Giru-Rural West area.

As explained in the Aboriginal Heritage Duty of Care Assessment (DoCA), the traditional owners and custodians of the land are the Bindal and Wulgurukaba People, with evidence of Aboriginal occupation in the Townsville region and Bohle Plains dating between 2,000 and 4,000 years ago. Since European settlement, past land use of the site has included pastoral and agricultural land use. The DoCA notes the overall disturbance of the site appears to be vegetation clearance for agricultural use. According to the DoCA, the Duty of Care assessment for Lot 6 identified a low potential for tangible cultural heritage sites or artefacts within the site. However, this assessment did not take into consideration the potential intangible cultural assets of the subject site as consultation with 'Bindal Peoples #2' representatives had not taken place. Given the low risk rating from the DoCA, this impact to culture is considered unlikely and minor, ranking low negative.

7.4.10.

Potential disruption to sites of Aboriginal significance – Mitigated

The DoCA outlines recommendations to inform future planning of the site, including an unexpected finds procedure and a cultural heritage induction. Further, it notes that a Cultural Heritage Management Agreement is currently in place with the adjoining Haughton Solar Farm and 'Bindal People #2'.

SIA recommendation/s

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Assuming these mitigations are adopted, this impact to culture remains unlikely and minor, ranking low negative.

7.5. Cumulative impacts

Cumulative impacts are the result of incremental, sustained and combined effects of human action and natural variations over time, and can be both positive and negative (DPHI 2022, p.4). They can be caused by compounding effects of a single project or multiple projects in an area, and by the accumulation of effects from past, current, and future activities as they arise (ibid, p.4). There are several state significant and local projects operating or intended to

operate in and around the site which may contribute to cumulative impacts to the Project, particularly given the location of the proposal within QLD's Far North REZ. More broadly, the Queensland SuperGrid Infrastructure Blueprint outlines the optimal infrastructure pathway to 2035 to deliver a clean, reliable and affordable Queensland electricity system. To fuel this pathway, the Queensland Renewable Energy Zone Roadmap states that it will provide a steady pipeline of approximately 4,000 direct ongoing renewable energy construction jobs, which are part of a broader 100,000 direct and indirect jobs expected by 2041. As discussed in relation to Additional stress on housing and accommodation (Section 7.2.1), the QLD REZ Roadmap outlines the need to strategically assess the three REZ areas in the form of REZ Readiness Assessments. These strategic assessments will focus on infrastructure, transport, housing and accommodation, workforce, supply chains, waste management, other land uses, and social infrastructure, as well as local industry and First Nations considerations, across the three regions.

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Figure 6 Queensland SuperGrid Infrastructure Blueprint

Recognising the extent and scale of proposed projects within the Far North and North REZs and their collective contributions towards achieving QLD's renewable energy targets, the proposal can bring several cumulative positive impacts.

However, there is also a potential for construction and/or operational activities to overlap and cause cumulative amenity impacts. This may include noise and visual disturbance impacts, as well as access impacts from the potential additional stress on roads, social infrastructure and housing.

In order to mitigate these potential cumulative negative impacts, there are several management measures which the project can implement. For example, near the completion of the proposal's operational life, a detailed decommissioning plan will be developed that will consider reuse, recycling, and disposal of solar panels in addition to environmental impacts during the decommissioning period. The proposal's

decommissioning plan will identify the major decommissioning design and execution activities, the sequence in which they should be performed, their estimated resource requirements and durations, and a proposed schedule incorporating any restraints for project planning and cost estimating purposes.

The major decommissioning activities for the proposal may involve multiple contracts and include work required before, after, and concurrent with project infrastructure removal. The final objectives at the time will

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consider relevant legislative requirements, and the requirements of stakeholders including regulators, landowners, local Council and the community.

There is also a sustainability plan being prepared separate to this DA, which will likely address the lifecycle and decommissioning of the proposal. To further mitigate these potential negative impacts and to enhance any positive impacts, the following SIA recommendations are provided:
SIA recommendation/s

▪

Review the site's Construction Management Plan and/or Plan of Management following the approval of any nearby renewables projects, particularly in relation to aligning any workforce accommodation plans or employment strategies.

▪

Review outcomes of the additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

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8. Mitigation, Enhancement and Management

This section provides a summary of:

-

Identified positive and negative social impacts,

-

Corresponding unmitigated and mitigated risk rankings, and

-

Proposed mitigation, enhancement and management measures.

To inform the implementation of the proposed mitigation and enhancement strategies, key potential stakeholder and/or partners have been identified. The involvement and participation of these key stakeholders and/or partners in the monitoring and management of social impacts and social benefits will improve the outcomes of the proposed mitigation and management strategies. Not all potential impacts will be the responsibility of the proponent to mitigate or manage. In some cases, their role may be to cooperate or inform the mitigation or to provide data and information to future tenants. In other cases, they may have direct responsibility for mitigation and management of the identified potential social impacts and the opportunity for partnerships. A summary of the identified social impacts and benefits, risk ratings and proposed mitigation, enhancement and management strategies are provided in Table 20.

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Table 20 Summary of proposed mitigation, enhancement and management of social impacts

Theme

Matter

Unmitigated /
Unenhanced

Mitigated /
Enhanced

Proposed mitigation, enhancement and management (SIA Recommendations)

Responsibility

Potential partners

Workforce
management

Potential
pressure on the
road network and
increased travel
times

Low negative

Low negative

▪

Prepare a Road Use Management Plan (RUMP) in accordance with the Transport Assessment Report prior to construction commencing.

Proponent

TMR

▪

Advise the community, specifically nearby neighbours along Upper Haughton Road, Barratta Road, and Keith Venables Road, of any significant traffic changes that may impact travel times or road access as required.

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

▪

Prepare an Employment Plan which outlines the policies for employment before commencing, such as targeting local employment hirers, businesses or including diverse hiring policies.

Proponent

Local employment hirers

and businesses

▪

Consider forming training partnerships or commitments with local businesses or educational institutions once a contractor has been engaged. This can form part of the Employment Plan (recommended above).

▪

Prepare a Workforce Accommodation Plan which outlines strategies to minimise the additional pressure on housing and accommodation, such as to liaise with other nearby projects to maximise the efficiencies in workforce accommodation for current and future projects in the REZ. This detail could be included as part of the Construction Management Plan.

Proponent

Concurrent renewable energy projects in the REZ

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Proponent

Nearby landowners

▪

Explore the potential of developing a Community Benefits Sharing Scheme to provide more direct benefits to the local community, informed by engagement and developed in partnership with the local community (in particular, stakeholders impacted by renewable energy infrastructure) to understand their needs and potential Community Benefits Sharing options.

▪

Explore the potential of developing a Community Benefits Sharing Scheme to provide more direct benefits to the local community, informed by engagement and developed in partnership with the local community (in particular, stakeholders impacted by renewable energy infrastructure) to understand their needs and potential Community Benefits Sharing options.

Proponent

Local community,
Powerlink

Housing and
accommodation

Provision of
increased
employment
opportunities

High positive

Additional stress
on housing and
accommodation

Medium negative

Local business
and industry
procurement

Perceived loss of
productive
agricultural land

Low negative

Health and
community
wellbeing

Potential
increased access
to reliable
electricity

High positive

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High positive

Medium negative

Low negative

High positive

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Theme

Matter

Impacted amenity
related to noise
disturbance

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Unmitigated /
Unenhanced

Low negative

Mitigated /
Enhanced

Low negative

Proposed mitigation, enhancement and management (SIA Recommendations)

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations.

▪

Recommend that the proposal develop a Construction Noise and Vibration Management Plan (CNVMP) and an Operation Noise Review following finalisation of the Project design, as recommended by the NAR.

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Responsibility

Potential partners

Proponent

n/a

Impacted amenity
related to visual
impact

Low negative

Low negative

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Proponent

n/a

Potential change
to sense of place

Low negative

Low negative

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Proponent

n/a

Potential
disruption to sites
of Aboriginal
significance

Low negative

Low negative

▪

Review additional engagement activities occurring post-lodgement to inform any additional recommendations as needed.

Proponent

RAP

Cumulative
impacts

n/a

n/a

▪

Review the site's Construction Management Plan and/or Plan of Management following the approval of any nearby renewables projects, particularly in relation to aligning any workforce accommodation plans or employment strategies.

Proponent

Concurrent renewable
projects within the REZ

▪

Review outcomes of the additional engagement activities occurring post-lodgement

to inform
any additional recommendations as needed.

Acronyms

Acronym

Term

ABS

Australian Bureau of Statistics

BESS

Battery Energy Storage System

BOCSAR

NSW Bureau of Crime Statistics and Research

DA

Development Application

DoCA

Duty of Care Assessment

DPE

NSW Department of Planning and Environment

DPHI

NSW Department of Planning, Housing and Infrastructure

EIA

Economic Impact Assessment

EIS

Environmental Impact Assessment

LGA

Local Government Area

RUMP

Road Use Management Plan

SEIA

Social and Economic Impact Assessment

SEIFA

Socio-Economic Indexes for Areas

SIA

Social Impact Assessment

SIDRA

Signalised Intersection Design and Research Aid

SSC

State Suburbs

SSDA

State Significant Development Application

TAR

Traffic Assessment Report

VIA

Visual Impact Assessment

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References

This SIA has been informed by a range of data sources, information and technical studies. The following data sources have been used:

Demographic, crime and health data

Australian Bureau of Statistics, Census of Population and Housing, 2021, Burdekin Shire LGA (SA2) and Upper Haughton (SSC) data.

Australian Bureau of Statistics, Estimating Homelessness: Census, 2021, Burdekin Shire LGA.

Australian Bureau of Statistics, Socio-Economic Indexes for Areas (SEIFA), 2021 Profile id. Giru-Rural West community profile.

SQM Research, Residential Vacancy Rates (2023).

QLD Government, Population Projections (2023).

Queensland Police Service, Online Crime Map (2023).

Policy documents

Queensland Government, Queensland Renewable Energy Zone Roadmap (2023)

Queensland Government, Queensland Clean Energy Workforce Roadmap (2023)

Queensland Government, Queensland SuperGrid Infrastructure Blueprint (2022)

Queensland Government, Queensland Energy and Jobs Plan (2022)

Burdekin Shire Council, Burdekin Planning Scheme (2022)

Burdekin Shire Council, Burdekin Economic Development Strategy (2020-2025)

Technical studies prepared for this proposal

Urbis, Aboriginal Heritage Duty of Care Assessment (DoCA), 2023

WSP, Noise Assessment Report (NAR), 2024

Urbis, Transport Assessment Report (TAR), 2023

Urbis, Visual Impact Assessment (Viewshed analysis and preliminary visual advice) (VIA), 2023

Other

Clean Energy Council, 2019, A Guide to Benefit Sharing Options for Renewable Energy Projects.

NSW Department of Planning and Environment, 2023, Social Impact Assessment Guideline and Technical Supplement.

NSW Department of Planning and Environment, 2022, Cumulative Impact Assessment Guidelines for State Significant Projects.

QLD Coordinator-General, 2018, Social Impact Assessment Guideline.

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CAMBRIDGE SOLAR FARM
Ecological and Environmental Approvals Report
Matters of State and Local
Environmental Significance
2023-007

19 December 2023

DUE DILIGENCE ADVICE | DEVELOPMENT STRATEGY & PLANNING | ECOLOGICAL SURVEY &
ASSESSMENT
EPBC ACT ASSESSMENT & APPROVALS | STATE & LOCAL GOVERNMENT APPROVALS & PERMITS
VEGETATION, HABITAT, FAUNA & REHABILITATION MANAGEMENT PLANS | BIODIVERSITY
OFFSETS | EXPERT WITNESS

Ecological and Environmental Approvals Report

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Acronyms, Abbreviations & Definitions

AC – Alternating Current

Applicant – Cambridge JMD Australia Pty Ltd

BESS – Battery Energy Storage System

BSC – Burdekin Shire Council

CEMP – Construction Environmental Management Plan

DC – Direct Current

DCCEEW – Commonwealth Department of Climate Change, Energy, the Environment and Water

DES – Department of Environment and Science

EAR – Ecological Assessment Report

EO Act – Queensland Environmental Offsets Act 2014

EPBC Act – Commonwealth Environment Protection and Biodiversity Conservation Act 1999

HES – High ecological significance wetland

HRA – High Risk Area mapped on the Protected Plants Flora Survey Trigger Map

LGA – Local Government Area

MCU – Material change of use

MLES – Matters of local environmental significance

MNES – Matters of national environmental significance

MSES – Matters of state environmental significance

MW – Mega-watt

NC Act – Queensland Nature Conservation Act 1992

Planning Scheme – Burdekin Shire Council Planning Scheme 2022

PMST – Environment Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool

PV – Photovoltaic

RE – Regional ecosystem

REDD – Regional Ecosystem Description Database

SARA – State Assessment and Referral Agency

SMP – Species Management Program

SPP – State Planning Policy

TEC – Threatened Ecological Communities

VM Act – Vegetation Management Act 1999

WoNS – Weeds of National Significance

WPA – Wetland Protection Area

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1.

Introduction

1.1

Background

Cambridge JMD Australia Pty Ltd (the 'Applicant') propose to develop the Cambridge Solar Farm Project (the project) in north Queensland, approximately 15 km west of Clare and 55 km south of Townsville, in the Burdekin Shire Council (BSC) Local Government Area (LGA). The project will be located on Lots 1, 2 and 6 on SP302825, which total 2,282 hectares (ha) and is collectively referred to as the 'site' (Figure 1). The site encompasses a high voltage powerline, allowing for easy and direct connection to the region's power grid.

Once operational, the solar farm is expected to have a maximum electrical generation potential of 2 gigawatts alternating current (GWac), of which 300 megawatts AC (MWac) will be grid connected.

The site is situated within a large alluvial plain adjacent to the Haughton River, which borders portions of the northern boundary, and which is characterised by broad-scale land clearing to support irrigated sugar cane

cropping, and to a lesser extent cattle grazing, and other high value crops.

Oaky Creek runs along the southeastern boundary and the existing Houghton Solar Farm abuts the southern boundary of the site.

While the site is almost entirely cleared of native vegetation, large tracts of remnant vegetation communities are mapped throughout the surrounding landscape, particularly to the north, west and south. Mt Elliot and Bowling

Green Bay National Park are located approximately 10 km to the north and Lake Ross, 30 km to the north-northwest. Mingela State Forest is situated 16 km west of the site (Figure 1).

1.2

The Project

The Applicant is seeking a Development Permit for Material Change of Use (MCU) for Renewable Energy Facility (Solar Farm), Major Electricity Infrastructure and Substation in four stages. This application process will involve an application under the BSC Planning Scheme 2022 (Planning Scheme) and subsequent State referrals triggered to the State Assessment and Referral Agency (SARA). This application to BSC and SARA will involve all relevant project elements which include:



Establishment of photovoltaic (PV) module solar array spanning Lot 1, 2 and 6 on SP302825;



PV frames, footings, and underground electrical conduits/cabling to connect the array;



Site substation with transformer station and switchgear;



Direct Current (DC) to Alternating Current (AC) inverter system;



Overhead or underground power transmission lines to connect into existing electrical network;



Supervisory control and data acquisition control system;



Site office and maintenance building;



Facilitation of an on-site area for future Battery Energy Storage System (BESS); and



Accompanying infrastructure such as internal access tracks, access gates, security fencing, laydown area, lighting and signage.

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1.3

Purpose of this Report

The purpose of this report is to:



describe the existing ecological characteristics of the site and adjacent areas in relation to state and local statutory triggers



assess the potential impacts on ecological values



identify ways through which development of the site can avoid, minimise and mitigate the potential impacts on the ecological values of the site and adjacent areas



assess the project against relevant state and local legislation, policy and planning instruments.

2.

Legislative Framework

The following sections provide an overview of the legislative framework relevant to the project and ecological values of the site. The project has been referred to the Commonwealth Government under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) as described in Section 2.1. Therefore, this assessment will focus on additional matters of state and local interest, as outlined in Sections 2.2 and 2.3 respectfully.

2.1

Matters of Commonwealth Interest

The EPBC Act provides the legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are defined under the EPBC Act as Matters of National Environmental Significance (MNES). An action that will or is likely to have a significant impact on a MNES requires approval by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC Act, through a 'Referral' process. An assessment has been undertaken to determine the presence or potential presence of MNES at the site and potential for impacts to these MNES as a result of the project. This assessment has been provided to the Commonwealth DCCEEW, as a referral of the proposed action under the EPBC Act.

2.2

Matters of State Interest

Local governments are responsible for assessing solar farm proposals through the MCU development application process under the Queensland Planning Act 2016 (Planning Act). It is through this process that matters of state environmental significance (MSES) are identified and assessed via referral triggers where relevant by the responsible agency under various state legislation. Potential referral triggers relevant to this project include:



Regulated vegetation – vegetation clearing in Queensland can only take place for low-risk, exempt purposes, under accepted development vegetation clearing codes or for relevant purposes listed under the Vegetation Management Act 1999 (VM Act). A project must demonstrate it represents one of these three.



High ecological significance wetlands and wetland protection areas - development within a high ecological significance wetland or wetland protection area (WPA) or trigger area requires referral to the SARA for assessment under the Environmental Protection Act 1994.



Fish habitat areas and waterway barrier works – impacts to fish habitat areas and works that involve impeding the movement of aquatic species in waterways may require approval under the Fisheries Act 1994.



Protected wildlife - permits and licenses are required to take, kill, injure or trap protected wildlife or breeding places, including plants and high-risk areas (HRAs), access or undertake activities within or in proximity to protected areas under the Nature Conservation Act 1992. Impacts to animal breeding places requires a species management program (SMP) under the Act.

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The Planning Minister has identified that the relevant state planning provisions, including the State Planning Policy (SPP) July 2017, are appropriately integrated into the Planning Scheme. Therefore, separate assessment against this SPP is not required.

2.2.1 Environmental Offsets Act 2014

The environmental offsets framework in Queensland is underpinned by the Environmental Offsets Act 2014 (EO Act) and includes the Queensland Environmental Offsets Policy (DES, 2023), and Significant Residual Impact Guideline (EHP, 2014). The mitigation hierarchy of 'avoid - mitigate - offset' applies to the process of assessment and offsetting of impacts under the Act, and the EO Act is applied when it has been identified that an offset is required for a 'prescribed activity' that has a 'significant residual impact on a prescribed environmental matter'. A prescribed environmental matter includes MNES, MSES and Matters of Local Environmental Significance (MLES). Prescribed MSES under the EO Act includes:



Regulated vegetation



Connectivity areas



Wetlands and watercourses



Designated precincts in strategic environmental areas



Protected wildlife habitat



Protected areas



Highly protected zones of State marine parks



Fish habitat areas



Waterway providing for fish passage



Marine plants



Legally secured offset areas.

The Queensland Environmental Offsets Policy acknowledges the need to avoid duplication of assessment and potentially offsets for the same or substantially the same matter listed under State and Commonwealth legislation. Therefore, to avoid duplication of the assessment process, and given the project has been referred to the Commonwealth DCCEEW for approval/decision under the EPBC Act, dual listed matters (i.e. species and communities listed under both state legislation and the EPBC Act), will not be considered again as part of this EAR. Only additional matters as relevant to Queensland legislation will be addressed and this will be noted where relevant.

2.3

Matters of Local Interest

The site is located in the central west of the BSC LGA, where the Haughton River forms the boundary between Townsville City Council and BSC LGAs. The site is situated in largely rural coastal region with the greatest population densities at Ayr, Giru, Brandon and Home Hill along the national highway. The region is valued nationally for its cane farming agriculture, although other industries including renewable energy facilities (e.g. solar farms), mining, extractive resources, aquaculture and cattle are growing in importance. These industries are valued alongside residential amenity and the natural environmental, in order to maintain an attractive lifestyle with economic opportunities, a vibrant thriving community and diverse regional environment and amenity. The Planning Scheme has been considered as part of this report and specifically the Strategic Framework Map and Environmental Significance Overlay Map. The Strategic Framework Map illustrates that the site and broader surrounds fall within the Important Agricultural overlay and no environmentally focused overlays impact the site at a Strategic Framework level. The Strategic Framework provides a construct as to how BSC envisage the growth and development within the region, which include four themes; number four being the 'Natural resources, the

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environment and heritage'. Further, The BSC Planning Scheme calls up the Environmental Significance Overlay Code, which becomes applicable to any MCU, Reconfiguration of a Lot and Operational Works on a premises subject to matters of environmental significance identified in the State Planning Policy interactive mapping system. The Environmental Significance Overlay Map draws on the Queensland Government MSES mapping for the shire to highlight areas of environmental significance. The site is mapped as supporting regulated vegetation intersecting with a watercourse and mapped as essential habitat for threatened or near threatened wildlife listed under the NC Act and high ecological significance wetlands, as described in Plate 1 below. The site is surrounded by the North Queensland Regional Plan 2020 Regional Biodiversity Corridor, although this only just encroaches into the southeastern corner of the site. The Bushfire Hazard Overlay Map recognises remnant vegetated areas within the site as presenting medium potential bushfire intensity with potential impact buffers surrounding these remnant areas. Bushfire hazard assessments and management requirements have been assessed under separate cover. There are no specific MLES mapped for the site.

Plate 1: Burdekin Shire Planning Scheme Environmental Significance Overlay mapping for the site

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3.

Ecological Values

3.1

Desktop Assessment

Databases, mapping and other sources of information used in this assessment included:



Commonwealth EPBC Act Protected Matters Search Tool (PMST) (using a 5 km buffered search area generated from the boundary of the site)



Queensland Department of Environment and Science (DES) WildNet database (using a 10 km buffered search area generated from the centre of the site)



Vegetation management reports for each lot comprising the site, that considers:



o

vegetation management framework mapping

o

protected plants framework flora survey trigger mapping

o

koala protection framework mapping

MSES reports for each lot comprising the site, that considers the following additional information:

o

State conservation areas

o

wetlands and waterways

o

offset areas

Planning Scheme Environmental Significance Overlay Map.

3.1.1 Regulated vegetation

The majority of the site does not support mapped vegetation, although there are a number of isolated patches of

least concern remnant communities (Category B) mapped throughout the site and most notably along the northwestern boundary in association with the Haughton River that encroach across the northern boundary of the site (Figure 2). A very small patch of high-value regrowth vegetation is mapped in the far north-east of the site at the headwaters of a 1st order drainage channel running parallel with the Haughton River. Table 1 provides a summary of the remnant and regrowth REs mapped for the site.

Table 1: Queensland Government regional ecosystem mapping for the site

RE Code	Short Description	VM Act Status
11.3.7	Corymbia spp. open woodland on alluvial plains	Least concern
11.3.10	Eucalyptus brownii woodland on alluvial plains	Least concern
11.3.25	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Least concern
11.3.35	Eucalyptus platyphylla, Corymbia clarksoniana woodland on alluvial plains	Least concern

Source: Regional Ecosystem Description Database (Queensland Herbarium, 2023)

There are two 1st order streams originating within the site, a 2nd order and 4th order watercourse running along the outside of the southern boundary, known as Oaky Creek and the Haughton River, a 6th order watercourse running along the outside of the northern boundary of the site (Figure 2). Watercourses within the site are generally cleared of vegetation.

A number of vegetation management wetlands are mapped adjacent to the site, although none are mapped within the site (Figure 2).

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3.1.2 Wetlands and watercourses

A High Ecological Significance (HES) wetland is mapped centrally within Lot 1 of the site and another is mapped to the north of the site, on Lot 10 GS602, between the northern site boundary and the Haughton River (Figure 2).

These wetlands are also recognised as WPAs under the EP Act as the site is within the Greater Barrier Reef catchment.

The 1st order watercourses within the site are mapped as providing fish passage attributes of 1 (Low, Green), whereby fish population biomass is generally smaller than in downstream reaches and the fish present may have stronger swimming abilities, allowing them to navigate past waterway barriers with relatively greater ease (DAF, 2023).

3.1.3 Flora and fauna

Database searches indicate the potential for six significant (critically endangered, endangered, vulnerable or near threatened) flora and 21 significant (critically endangered, endangered, vulnerable, near threatened or specialist least concern) fauna to occur within the search areas as follows (refer also Attachment 1 and 2 respectively):

0

0

0

Plants:

0

Dichanthium setosum (a bluegrass) – vulnerable (EPBC Act), least concern (NC Act)

0

black ironbox (*Eucalyptus raveretiana*) – vulnerable (EPBC Act), least concern (NC Act)

0

Leichhardtia brevifolia (syn. *Marsdenia brevifolia*) (no common name) – vulnerable (EPBC Act and NC Act)

0

square tassel fern (*Phlegmariurus tetrastichoides*) – vulnerable (EPBC Act and NC Act)

0

granite nightshade (*Solanum graniticum*) – endangered (EPBC Act and NC Act)

0

Tephrosia leveillei (no common name) – vulnerable (EPBC Act), least concern (NC Act)

Birds:

o

curlew sandpiper (*Calidris ferruginea*) – critically endangered (EPBC Act and NC Act)

o

greater sand plover (*Charadrius leschenaultii*) – vulnerable (EPBC Act and NC Act)

o

red goshawk (*Erythrorhynchus radiatus*) – endangered (EPBC Act and NC Act)

o

grey falcon (*Falco hypoleucos*) – vulnerable (EPBC Act and NC Act)

o

squatter pigeon (southern) (*Geophaps scripta scripta*) – vulnerable (EPBC Act and NC Act)

o

white-throated needletail (*Hirundapus caudacutus*) – vulnerable (EPBC Act and NC Act)

o

star finch (eastern) (*Neochmia ruficauda ruficauda*) – endangered (EPBC Act and NC Act)

o

eastern curlew (*Numenius madagascariensis*) – critically endangered (EPBC Act),
endangered
(NC Act)

o

southern black-throated finch (*Poepila cincta cincta*) – endangered (EPBC Act and NC Act)

o

Australian painted snipe (*Rostratula australis*) – endangered (EPBC Act and NC Act)

o

masked owl (*Tyto novaehollandiae kimberli*) – vulnerable (EPBC Act and NC Act)

Mammals:

o

northern quoll (*Dasyurus hallucatus*) – endangered (EPBC Act), least concern (NC Act)

o

Semon's leaf-nosed bat (*Hipposideros semoni*) – vulnerable (EPBC Act), endangered (NC Act)

0

ghost bat (*Macroderma gigas*) – vulnerable (EPBC Act), endangered (NC Act)
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0

greater glider (northern) (*Petauroides minor*) – vulnerable (EPBC Act and NC Act)

0

greater glider (southern and central) (*Petauroides volans*)- endangered (EPBC Act), vulnerable (NC Act)

0

koala (*Phascolarctos cinereus*) – endangered (EPBC Act and NC Act)

0

bare-rumped sheath-tailed bat (*Saccolaimus saccolaimus nudicluniatus*) – vulnerable (EPBC Act), endangered (NC Act)

0

water mouse (*Xeromys myoides*) – vulnerable (EPBC Act and NC Act)

Reptiles:

0

yakka skink (*Egernia rugosa*) – vulnerable (EPBC Act and NC Act)

0

Mount Cooper striped skink (*Lerista vittata*) – vulnerable (EPBC Act), endangered (NC Act).

Another 14 migratory species were also returned from database searches for the search area (refer Attachment 1). There are no high-risk areas mapped on the protected plants flora survey trigger map for the site or adjacent areas.

Essential habitat is mapped at a number of locations within and adjacent to the site for the EPBC Act listed vulnerable and NC Act listed endangered bare-rumped sheath-tailed bat (*Saccolaimus saccolaimus nudicluniatus*) (Figure 2).

The southern black-throated finch (*Poephila cincta cincta*) is also known from the region. This species is listed as endangered under the EPBC Act and NC Act.

3.2

Site Values

Field flora and fauna surveys were undertaken for the site by specialists as follows:

0

Ecological habitat and connectivity analysis – 23 to 25 May 2023 and 19 to 21 June 2023 (28 South Environmental)



Flora survey – 19 to 22 June 2023, inclusive (Hansen Botanical Assessments)



Fauna survey – 20 to 23 June 2023, inclusive (EcoSmart Ecology).

Survey methods and outcomes of the surveys are provided in technical reports provided in Attachments 2 and 3, respectively. A summary of the results of these field surveys are provided in the following sections.

3.2.1 Vegetation and flora values

Field flora survey methods were undertaken in compliance with the Methodology for Survey and Mapping of

Regional Ecosystems and Vegetation Communities in Queensland, Version 6.0

(Neldner, V.J. et al., 2022) and

involved a total of 46 detailed quaternary vegetation assessment sites and site traverses.

The site is located on quaternary alluvium associated with the Haughton River and numerous tributaries, e.g. Oaky

Creek. Remnant vegetation was limited to the northern portion of the study area, with the majority of the site

representative of degraded pasture in disused sugar cane fields. Remnant RES mapped for the site include the

following and all are listed as least concern under the VM Act:



RE 11.3.10 – Reid river box (*Eucalyptus brownii*) open woodland on alluvial plains



RE 11.3.25a – black ironbox (*Eucalyptus raveretiana*), weeping teatree (*Melaleuca fluviatilis*) and/or weeping papering (*Melaleuca leucadendra*) woodland fringing drainage lines



RE 11.3.35/a – poplar gum (*Eucalyptus platyphylla*), carbeen (*Corymbia tessellaris*) and large-fruited bloodwood (*Corymbia clarksoniana*) woodland on alluvial plains (Figure 3).

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None of these communities are representative or have the potential to satisfy the diagnostic criteria or condition thresholds of any Threatened Ecological Communities (TECs) listed under the EPBC Act.

No species of conservation significance were detected within the site, or considered likely to occur in the site. The EPBC Act listed black ironbox (*Eucalyptus raveretiana*) was identified fringing the banks of the Haughton River, adjacent to the site, where it was recorded as a co-dominant canopy species in patches of RE 11.3.25a. This species was not recorded in the site.

A number of highly invasive exotic species were identified within and adjacent to the site, including the following restricted species under the Biosecurity Act 2014 (including three Weeds of National Significance (WoNS)):



rubber vine (*Cryptostegia grandiflora*) (WoNS)



chinee apple (*Ziziphus mauritiana*)



siam weed (*Chromolaena odorata*)



lantana (*Lantana camara*) (WoNS)



hymenachne (*Hymenachne amplexicaulis*) (WoNS) (Hansen Botanical Assessments, 2023).

3.2.2 Fauna and habitat values

The fauna survey involved a range of passive detection techniques to identify habitats and potential for significant fauna to use the site, including early morning birds surveys, Anabat Swift, habitat searches, koala scat searches, opportunistic observations. Survey sites extended beyond the site boundary providing greater context of the local fauna values.

The field survey recorded the bare-rumped sheath-tailed bat outside but in close proximity to the site. There are numerous historical records of this species from the site and local area and this species may forage in remnant habitats throughout the site.

Another three species were considered to potentially occur in the study area as follows:



white-throated needletail – the species has been frequently recorded in the local area and is expected to overly the site only, as this is an almost exclusively aerial species.



black-throated finch – this finch is known from the local area and the

Townsville region is recognised as a significant area for this species. The site is likely to be located within an important black-throated finch area and potentially suitable habitat is present in the form of remnant vegetation communities due to their proximity to suitable water sources (e.g. Haughton River).



northern quoll – the species is known from Mt Elliott/ Bowling Green Bay National Park and remnant vegetation provides connectivity of this protected area with the site. While there is potential for the species to use all areas of remnant vegetation within the site, larger contiguous tracts remnant areas are going to be more important (e.g. along the Haughton River), compared with isolated patches (EcoSmart Ecology, 2023).

The potential for the koala and squatter pigeon (southern) were also considered as part of this survey and given the limited records of these species in the region and the highly disturbed and cleared nature of alluvial plains in the local area, ultimately would be unlikely or very rarely occur in the local area (EcoSmart Ecology, 2023). Hybridised individuals of Squatter Pigeon were recorded during the survey, although these do not form part of the southern subspecies listing under the EPBC Act. Presence of these species, particularly koala, would most likely be restricted to the waterways, e.g. the Haughton River riparian communities. Two migratory species, the Glossy Ibis (*Plegadis falcinellus*) and Caspian Tern (*Hydroprogne caspia*) were also identified in nearby artificial wetlands during the survey, although not within the site itself. A number of introduced fauna were also recorded during the field survey, including:



dingo/dog (*Canis lupus/familiaris*)



cane toad (*Rhinella marina*)

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feral cat (*Felis catus*)



feral pig (*Sus scrofa*) (EcoSmart Ecology, 2023).

3.2.3 Wetland Values

The survey found the HES wetland mapped by the Queensland Government in Lot 10 on GS602 and the central portion of Lot 1 on SP302825 to be non-existent as they do not support plants or animals that are adapted to or dependent on living in wet conditions for at least part of their life cycle. The Lot 10 WPA is almost entirely vegetated by RE 11.3.7, which although situated on a floodplain, it is typically associated with the poorly consolidated sand veneers that are generally higher in the floodplain landscape than those on more clayey loam. The composite canopy species and many of the shrub and ground cover species of this open woodland would be intolerant of sustained inundation or soil saturation. The cleared portion of this WPA would appear to have primarily supported this RE but there is a possibility that portions of RE 11.3.35 may have also occurred. The primary composite species of this RE would also be intolerant of sustained inundation or soil saturation.

The Lot 6 WPA has been historically cleared and maintained, and appears to have been consistently laser levelled to facilitate cropping. Since being retained in fallow, and therefore not worked by machines, evidence of slumping or standing water was not evident. Woody vegetation was limited, however two of the recorded species are unlikely to be tolerant of sustained inundation or soil saturation, those being *Grevillea striata* and *Vachellia bidwillii*, noting that a couple of *Melaleuca viridiflora* were also observed. The ground cover layer, which is dominated by exotic pasture grasses and legumes, would also be intolerant of sustained inundation or soil saturation.

4.

Potential Impacts and Mitigation Measures

The project will involve construction and operation of a large-scale solar farm across 2,282 ha footprint on primarily farmland (Figure 1 and 3). Site preparation will involve a surficial scrape, by dozer or similar, to clear the existing crop land and obtain appropriate grades; however, historical agricultural use means the site is generally level and only minor clearance and scraping will be required. Each solar panel will be seated on plinth-style footings, seated onto bare ground. Hardstand foundation areas will be required to support built infrastructure such as the office and maintenance building, future BESS area, substation and infrastructure of a similar nature. This will require more intensive earthworks, though confined to small portions of the site.

Following installation of panels, the ground will be seeded with native grasses (noting specific black-throated finch feed species will be included into this mix) to suppress exotic weed regrowth, stabilise the surface, and support the

surrounding native environment. Grazing animals may be introduced either periodically or consistently enough to maintain native grass height so as to not compromise performance of the solar farm. Grazing will be managed at a low intensity so the native grasses can persist. Site preparation works are expected to commence in late 2025, with the first phase of solar panels to be installed and connected over a 12 month period. Commissioning of the first phase of panels is expected to occur in late 2026.

4.1

Iterative Design Process

The site of the project is key to its low ecological impact and economic benefit to the region. It is strategically located adjacent to the existing Haughton Solar Farm in a region forecast by the Department of Energy and Public Works to be a renewable energy hub. The site itself has been historically cleared and intensively cropped for cane and supports an already graded and relatively flat landform, requiring minimal earthworks. Furthermore, the site is benefited by an existing Powerlink high voltage transmission line that intersects the centre of the site, into which the project will directly integrate upon commissioning. The iterative design process has underpinned this proposed development, whereby review of constraints and opportunities available over the site has informed the design process from the outset. The process has involved desktop review and planning constraint analysis, site-based surveys, testing of designs and cost benefit analysis

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and refinement of design. This process has resulted in a project that completely avoids direct impacts to areas of ecological value and minimises the risk of indirect impact through establishing buffers and site-specific mitigation measures.

4.2

Ecological Impacts

No remnant or high-value regrowth vegetation is proposed to be cleared as part of the development. All areas of ecological value, i.e. remnant and high value regrowth, watercourses/drainage channels, areas of potential habitat for threatened fauna and connectivity areas, will be buffered from Built Infrastructure with a cleared and grassed setback that includes a perimeter access and maintenance road. This buffer has been set at 37.5 m to all Regulated Vegetation to ensure that all Built Infrastructure is separated by a minimum of 1.5 times the height of the tallest trees found within the mapped Regulated Vegetation, as shown on Figure 3. In this way fauna habitats and existing connectivity will be maintained and there will be limited indirect, temporary and localised impacts to fauna as discussed in Section 4.3. Significantly, the change in use of the site from intensive agricultural activities to the proposed solar farm, will result in subsequent beneficial environmental effects through reduced water extraction, nutrient loading and excess runoff into aquatic ecosystems and application of herbicides and insecticides. Other positive impacts that are/ can be included into the project's management include the re-introduction of foraging resources for the black-throated finch, water points (small dams within the buffer areas) and the sealing of access roads to reduce dust. The project will also increase the amount of renewable energy fed into the existing grid as well as provide back up storage through the BESS.

4.3

Mitigation Measures

The following key mitigation measures will be implemented to avoid and minimise impacts of the project to ecological values within and adjacent to the site:



A minimum 37.5 m grassed buffer will be maintained between the built infrastructure and all remnant and highvalue regrowth vegetation.



Re-introduction of black-throated finch foraging resources into the seed mix through the site and creation of small waterbodies, peripheral to the PV panel array, to create watering points.



Installation of fauna friendly fencing for the perimeter of the site (i.e. plain wire top strands) to allow for fauna movement through the site.



A responsive pest management approach in consultation with neighbouring land holders/ manager and local council.



The presence of a fauna spotter/catcher during all disturbance activities, e.g. scraping/earthworks, removal of individual paddock trees (if necessary).

A number of management plans will be developed for construction and operation of the development, to ensure the impacts are avoided and managed, including:



A Construction Environmental Management Plan (CEMP), which will be the overarching plan to manage all construction activities, will be important in the management of direct and potential indirect impacts to fauna and fauna habitats, in the form of noise, dust and potential lighting, created primarily through construction activities. These will be managed through industry accepted measures, such as clear delineation of work areas, lay down areas and 'no go areas', weed wash down, dust suppression, maintenance and normal operation of vehicles and machinery, sensitive direction of lighting/vehicle operation and regular monitoring and corrective actions of these measures. The extension of Keith Venables Road into the Site can be sealed to provide direct access for plant and infrastructure delivery, reducing the need for trucks to traverse areas of unsealed road.



An erosion and sediment control plan to ensure all aspects of earthworks and rehabilitation are undertaken with minimal impacts on adjacent waterways.

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Weed control and rehabilitation plan that guides the management of the introduction and spread of exotic flora during construction and maintenance activities, specifies the native grass reseeding program proposed for the site and ensures maintenance and potential grazing activities are appropriately implemented for ecological benefit.

5.

Statutory Compliance

5.1

EPBC Act

A referral of the project to the Commonwealth DCCEW will be made for assessment under the EPBC Act. Dual listed matters of MNES and MSES will be considered as part of this referral under the EPBC Act.

5.2

State Triggers

As the project has avoided impacts to ecologically important areas within and adjacent to the site, there are few state triggers (i.e. MSES) that will require referral to SARA as part of the development application process. The following MSES will not be directly impacted by the development:



regulated vegetation, including vegetation management wetlands and waterways



connectivity areas



protected wildlife habitat, including habitats for significant fauna known or potentially occupying habitats within and adjacent to the site



protected areas



designated precincts in strategic environmental areas



waterways providing for fish passage



marine parks, fish habitat areas, marine plants legally secured offset areas.

No works are proposed within waterways, therefore, the development is not required to be assessed against State Code 18 - waterway barrier works. The solar array is proposed to be located within the trigger area of a WPA located immediately adjacent to the north of the site (Lot 10 GS602) as well as directly within a WPA on Lot 1 SP302825. As noted in Section 3.2.3, detailed in-field ecological (botanical and terrestrial) have identified both of the WPA areas as not supporting any wetland features in line with the Queensland Wetland Definition and Delineation Guideline (DERM, 2011). To this end, the Applicant has submitted a 'map amendment' application to the DES for assessment in accordance with the Environmental Protection Regulation 2019 for the removal of both wetland overlays. As such, it is the Applicants position, supported by substantive technical information, that these wetlands do not exist, thus referral for assessment of the project is not applicable. Despite the inapplicability, the mapping amendments have yet to be confirmed by the DES as the MCU application has been lodged concurrently. Given this, a brief assessment of the project against the provisions of State Code 9: Great Barrier Reef wetland protection areas in Table 2 and Table 3.

5.3

Burdekin Shire Council Planning Scheme

Assessment of project has been undertaken against the Environmental Significance Overlay Code and is provided in Table 4. As a result of the strong design focus for this development to avoid impacts to ecologically significant areas all performance outcomes, and where relevant acceptable outcomes, have been demonstrated to have been met.

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Table 2: State Code 9: Great Barrier Reef wetland protection areas, Development with an acceptable outcome

Performance outcomes

General

P01 Development maintains or improves wetland environmental values and native vegetation within the wetland and the buffer.

Acceptable outcomes

Response

A01.1 The buffer surrounding a wetland has a minimum width of:

1. 200 metres, where the wetland is located outside a prescribed urban area; or
2. 50 metres, where the wetland is located within a prescribed urban area.

Complies with this PO.

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3.

Table 3: State Code 9: Great Barrier Reef wetland protection areas, Development with no acceptable outcome

Performance outcomes

General

P02 Development is not carried out in a wetland in a wetland protection area.

Hydrology

P03 Development maintains or improves the existing surface and groundwater hydrology in a wetland protection area.

Water quality

P04 Development does not unacceptably impact the water quality of the wetland in the wetland protection area and in the wetland buffer.

P05 Development does not use the wetland in the wetland protection area for stormwater treatment.

Land degradation

P06 Development is located and designed to protect the wetland protection area from land degradation.

Fauna management

P07 Development protects wetland fauna from any impacts associated with noise, light or visual disturbance.

Response

Complies with this PO.

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3.

Complies with this PO.

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3.

Regardless, the solar farm will be design to have no interface with groundwater and to result in no off-site surface hydrology affects.

Complies with this PO.

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the

mapping of WPAs across these same areas. Refer Section 3.2.3.
Regardless, the establishment of a solar farm across the site will result in the retirement of land that would otherwise be used for cane farming. This conversion of land use will result in a localised reduction loss of sediment and leached nitrogen and phosphorus into the Haughton River. Complies with this PO.
Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3. Complies with this PO.
Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3. Complies with this PO.

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Performance outcomes

P08 Development protects the movement of wetland fauna within and through a wetland protection area.

P09 Development does not introduce pest plants, pest animals or exotic species into a wetland and its buffer.

Matters of state environmental significance

P010 Development outside the wetland is designed and sited to:

1. avoid impacts on matters of state environmental significance; or
2. minimise and mitigate impacts on matters of state environmental significance after demonstrating avoidance is not reasonably possible; and
3. provide an offset if, after demonstrating all reasonable avoidance, minimisation and mitigation measures are undertaken, the development results in an acceptable significant residual impact on a matter of state environmental significance.

Response

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3.

Complies with this PO.

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3.

Complies with this PO.

Surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Refer Section 3.2.3.

Complies with this PO.

Development is wholly located outside of wetland areas as surveys have established that on-ground

conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas.

Refer Section 3.2.3.

Regardless, the development has been sited and orientated to avoid impacts on MSES.

Ecological and Environmental Approvals Report
Table 4: Response to Environmental Significance Overlay Code
Performance outcomes

Acceptable outcomes

Response

P01

A01

Development:

Development is:

a)

a)

The project has been specifically designed to avoid impacts to natural and environmentally significant areas. No regulated vegetation or intact functioning wetlands are proposed to be impacted and a minimum 37.5 m buffer (i.e. 1.5 times the height of the tallest adjacent vegetation) has been incorporated into the design between environmentally significant areas and infrastructure (i.e. solar panel array).

b)

c)

avoids impacts to areas of environmental significance; or where impacts cannot be avoided, they are minimised and mitigated through appropriate location, siting and design; or where impacts cannot be avoided or minimised and mitigated, an environmental offset is provided for any significant residual impact.

b)

not located within an area supporting matters of state environmental significance; or located wholly within an area that has a valid development approval for native vegetation clearing.

P02

A02

Development protects and complements the ecological function and

integrity
of
the
strategic
environmental
area
(designated
precinct).

Development is:

P03

No acceptable outcomes is nominated.

Development is located, designed and
operated to:

a)
b)

retain and protect significant
values; and
maintain the underlying ecological
functions
and
biophysical
processes.

a)
b)

The site is not located within the strategic environmental area (designated
precinct),
being at least 20 km from this area, and therefore no impacts to the ecological
function
or integrity of this area are proposed.

not located within a strategic
environmental area (designated
precinct); or
located wholly within an area that
has a valid development approval
for native vegetation clearing.

The project has been specifically designed to avoid impacts to natural and
environmentally significant areas. No regulated vegetation or intact functioning
wetlands are proposed to be impacted and a minimum 37.5 m buffer (i.e. 1.5 times
the
height of the tallest adjacent vegetation) has been incorporated into the design
between environmentally significant areas and infrastructure (i.e. solar panels
array).

In this way the values of these natural areas will be maintained and protected
and
continue to provide ecological function, e.g. habitat for threatened species,
waterway
protection.

It is advised that the HES wetlands mapped by the Queensland Government in the
centre of Lot 1 and Lot 10 are not a functioning wetland and an application has
been
made to the DES to amend the mapping.
All on-site waterways have been avoided.

Ecological and Environmental Approvals Report

Performance outcomes

Acceptable outcomes

Response

P04

No acceptable outcomes is nominated.

Vegetated areas are not proposed to be cleared as part of the proposed development.
Therefore, the connective ecological function and processes provided by the narrow strip of vegetation between Lots 1 and 6 and the riparian corridor along the Haughton River will be maintained. Additionally, fauna friendly fencing will be installed on site, e.g. with plain wire top strands to allow safe movement of fauna through the site.

P05

A05.1

Development maintains a buffer to wetlands and waterways, in order to:

Other than for linear infrastructure, riparian vegetation is retained and/or rehabilitated along each side of a waterway, within at least 50m of the defining banks of all waterways.

Vegetated areas are not proposed to be cleared as part of the proposed development.
Additionally, a minimum 37.5 m buffer (i.e. 1.5 times the height of the tallest adjacent vegetation) has been incorporated into the design of the project between infrastructure and remnant and habitat areas within and adjacent to the site.

Ecological corridors are retained to maintain ecological processes and functions and ensure viable connectivity between habitat areas for terrestrial and aquatic wildlife movement between habitat areas.

- a)
- b)
- c)
- d)

protect or enhance ecological processes and values;
protected water quality and aquatic conditions;
provide unimpeded movement of fauna within and along waterways or wetlands; and
improve bank stability and prevent

soil erosion.

A05.2

Development
buffers:

- a)
- b)

provides

the

following

100m from the maximum water level
of freshwater wetlands; and
100m from the Highest Astronomical
Tide (HAT) line of a tidal wetland.

A05.1: This buffer has resulted in a minimum 37.5 m distance between the
proposed
disturbance footprint and the nearby waterways, i.e. the Haughton River and
other
adjoining waterways. This will ensure the maintenance of water quality and
aquatic
condition, ecological function and processes, connectivity and bank stability
for these
waterways.

A05.2: It is advised that the HES wetlands mapped by the Queensland Government
in the centre of Lot 1 and Lot 10 are not functioning wetlands and an
application has
been made to the DES to amend the mapping. All waterways have been sufficient
buffered from the project to ensure their on-going, unimpeded function as they
currently do. The site is located well beyond the HAT.

No acceptable outcomes is nominated.

The project does not include substantial earthworks, drilling or resource
extraction due
to the already modified and relatively flat landform. Earthworks and landform
disturbance is not proposed to modify surface drainage channels; however,
previously
constructed irrigation channels are likely to be filled. The development does
not involve
significant drilling or extraction and therefore no impacts to groundwater are
proposed.

P07

A07

The ongoing protection of those parts of
a
development
site
supporting
significant ecological features or

Those parts of the site to be protected are
secured using one or more of the following
mechanisms:

A07: The proposed building envelope will be restricted in line with A07c of the
acceptable outcomes. The significant environmental areas within and adjacent to

the
site have been avoided as part of the proposed development and in order to
ensure
the ongoing protection of these areas a minimum 37.5 m buffer (i.e. 1.5 times
the
height of the tallest adjacent vegetation) between the development (the building

P06
Development maintains natural surface
water and groundwater hydraulic
regimes of wetlands and waterways.

Ecological and Environmental Approvals Report

Performance outcomes

Acceptable outcomes

Response

processes that are to be retained is secured.

- a)
- b)

envelope) and significant ecological features is proposed. This buffer restricts encroachment of buildings or infrastructure into these areas, avoiding the potential creation of future exempt clearing opportunities under the Planning Regulation 2017.

- c)
- d)

P08

transferring into public ownership;
setting aside for open space and conservation purposes within a group title arrangement;
restricted building envelopes; or
protection under a conservation covenant.

No acceptable outcomes is nominated.

In addition to maintaining an existing cleared buffer between the proposed development and adjacent remnant ecologically significant areas, weed control will be implemented across the site during the construction and operation of the project, whereby vehicle hygiene practices will be required, native grasses will be reestablished (with the inclusion of black-throated finch foraging species) on site postconstruction, and pest management controls will be put in place subject to agreement with BSC.

No acceptable outcomes is nominated.

Construction of the project has the potential to create disturbance noise, however, this will be temporary and highly localised in nature as the works move around the site and this will be managed through a CEMP for the development.

Development does not result in the introduction of pest species (plant or animal), that pose a risk to ecological integrity or disturbance to native flora and fauna.

P09

Development minimises potential for disturbance of wildlife as a result of noise, light, vibration or other sources.

Once construction has been finalised there will be limited ongoing noise disturbance as there will be minimal activity required at the site, other than infrequently and intermittent maintenance activities and the low tones of sub-station and BESS cooling facilities. Grasses will be maintained via low intensity and periodic cattle grazing rather than mowing or slashing. There is no intention to operate machinery or undertake construction activities at night, therefore light impacts are not proposed. No construction or operation activities will result in vibration impacts.

P010

Where development occurs within habitat areas (to the extent provided for by the other performance outcomes in this code):

- a)
- b)

fauna is safely relocated to suitable alternative locations; and the sequence of habitat disturbance ensures that fauna is

No acceptable outcomes is nominated.

The development has been strategically sited and designed to specifically avoid habitat areas by locating infrastructure a minimum 37.5 m buffer (i.e. 1.5 times the height of the tallest adjacent vegetation) from remnant vegetated areas. Therefore, the risk to fauna as a result of construction and operation of the development is very low. Nonetheless, there is potential for more common fauna to occupy the cleared and disturbed paddocks within the site, e.g. reptiles and amphibians, and for this reason a fauna spotter/ catcher will be present during all disturbance activities to ensure fauna is safely relocated if encountered during these activities.

Ecological and Environmental Approvals Report

Performance outcomes
not isolated from adjoining areas
of habitat.

Acceptable outcomes

Response

Due to the highly disturbed nature of the site proposed to be impacted and the presence of similar disturbed habitats, as well as better vegetated habitats, adjacent to the site, fauna will have the opportunity to disperse into these adjacent areas during disturbance activities. The program of clearing, will ensure no new areas are left intact and isolated within the site.

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6.

Summary and Conclusions

The Applicant proposal to develop a solar farm on the subject site presents an opportunity to contribute to the State's clean energy targets of 50 per cent by 2032 and 80 per cent by 2035. By way of intentional design, the project has been sited on land which has been previously subject to significant historical disturbance in the form of clearing and operates presently as a cane farm/ rested pastoral paddocks. In conjunction with strategic placement, the project relies heavily on the 'Avoid' principle of the mitigation hierarchy and represents an environmentally positive approach, seeking to retain existing environmental values on Site. Resultantly, the project is one which simultaneously contributes to a clean energy future while having minimal impact on the present environment.

The project will contribute to supplying local industry and agricultural operations in the area with clean energy and help to futureproof the region for further clean energy expansion in the future, such as green hydrogen production facilities. Indirectly, the project serves to reduce water demand in the local region, as the operation of the cane farm ceases. Simultaneously, fertiliser nutrient loads and excess runoff associated with this farming practice will be reduced, indirectly contributing to the betterment of aquatic and marine environments associated with the downstream catchment, inclusive of the Ramsar listed Bowling Green Bay and broader Great Barrier Reef catchment. Additionally, the reduction in use of insecticides and the reestablishment of native grass species will serve as beneficial to some known MNES in the area, increasing forage supply in the form of insects and native grain.

As noted in Section 5.1, the project has been concurrently referred to the Commonwealth for assessment against the provisions of the EPBC Act. This assessment will run concurrently with the MCU application to BSC, with the project being referred as being 'Not a Controlled Action'. Should the project receive this determination from the DCCEEW, the footprint and works associated with the project will maintain legal surety under the EPBC Act.

It is highlighted that the project has been strategically sited to make use of existing cleared lands and nearby electricity infrastructure. Furthermore, due to the iterative design process, impacts to MSES have been avoided.

As noted in Section 3.2.3, surveys have established that on-ground conditions within Lot 10 and Lot 1 are inconsistent with the mapping of WPAs across these same areas. Concurrent to this MCU application and referral, the Applicant has submitted a map amendment application to DES for the removal of the WPA mapping, thus removing the need to address State Code 9: Great Barrier Reef wetland protection areas.

Similarly, the project's compliance with relevant state environmental statutory considerations has lead to compliance with the Performance Outcomes of the Environmental Area Overlay Code and higher level considerations of the Strategic Framework.

In summary the project has been through a detailed and considered iterative design process. The 'Avoid' tenant of

conservation planning was a key element leant upon to maximise the project's compliance with various statutory provisions. It is considered that the project achieves compliance with relevant statutory provisions and presents a beneficial outcome for the site and regional environmentally and economically.

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7.

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Figures

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Attachment 1 -
Protected Matters
Search Tool

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 21-Nov-2023

Summary

Details

Matters of NES

Other Matters Protected by the EPBC Act

Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:

National Heritage Places:

Wetlands of International Importance (Ramsar)

Great Barrier Reef Marine Park:

Commonwealth Marine Area:

Listed Threatened Ecological Communities:

Listed Threatened Species:

Listed Migratory Species:

None

None

1

None

None

1

27

18

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated.

Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land,

when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on

Commonwealth land. Approval may also be required for the Commonwealth or

Commonwealth agencies proposing to

take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on

Commonwealth land, and the environment from actions taken by Commonwealth

agencies. As heritage values of a

place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a

Commonwealth Heritage place. Information on the new heritage laws can be found at

<https://www.dcceew.gov.au/parks-heritage/heritage>

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened

species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of

a listed marine species.

Commonwealth Lands:

Commonwealth Heritage Places:

Listed Marine Species:

Whales and Other Cetaceans:

Critical Habitats:

Commonwealth Reserves Terrestrial:

Australian Marine Parks:

Habitat Critical to the Survival of Marine Turtles:

None
None
23
None
None
None
None
None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:

None

Regional Forest Agreements:

None

Nationally Important Wetlands:

2

EPBC Act Referrals:

7

Key Ecological Features (Marine):

None

Biologically Important Areas:

None

Bioregional Assessments:

None

Geological and Bioregional Assessments:

None

Details

Matters of National Environmental Significance
Wetlands of International Importance (Ramsar Wetlands)
Ramsar Site Name
Bowling green bay

[Resource Information]

Proximity
10 - 20km upstream
from Ramsar site

Listed Threatened Ecological Communities

Buffer Status
In feature area

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name
Threatened Category
Poplar Box Grassy Woodland on Alluvial Endangered
Plains

Listed Threatened Species

Presence Text
Buffer Status
Community may occur In buffer area only
within area

[Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name
Threatened Category
Presence Text
BIRD
Calidris ferruginea
Curlew Sandpiper [856]
Critically Endangered
Species or species
habitat may occur
within area
Charadrius leschenaultii
Greater Sand Plover, Large Sand Plover Vulnerable
[877]

Species or species
habitat may occur
within area

Buffer Status

In feature area

In buffer area only

Erythrotriorchis radiatus
Red Goshawk [942]

Endangered

Species or species
In feature area
habitat likely to occur
within area

Falco hypoleucos
Grey Falcon [929]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

Geophaps scripta scripta
Squatter Pigeon (southern) [64440]

Vulnerable

Species or species
habitat may occur
within area

In feature area

Scientific Name
Hirundapus caudacutus
White-throated Needletail [682]

Threatened Category

Presence Text

Buffer Status

Vulnerable

Species or species
habitat known to
occur within area

In feature area

Neochmia ruficauda ruficauda
Star Finch (eastern), Star Finch
(southern) [26027]

Endangered

Species or species
In feature area
habitat likely to occur
within area

Numenius madagascariensis
Eastern Curlew, Far Eastern Curlew
[847]

Critically Endangered

Species or species
habitat may occur
within area

In feature area

Poephila cincta cincta
Southern Black-throated Finch [64447]

Endangered

Species or species
habitat known to
occur within area

In feature area

Rostratula australis
Australian Painted Snipe [77037]

Endangered

Species or species
In feature area
habitat likely to occur
within area

Tyto novaehollandiae kimberli
Masked Owl (northern) [26048]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

MAMMAL

Dasyurus hallucatus
Northern Quoll, Digul [Gogo-Yimidir],
Wijingadda [Dambimangari], Wiminji
[Martu] [331]

Endangered

Species or species
In feature area
habitat likely to occur
within area

Hipposideros semoni
Semon's Leaf-nosed Bat, Greater Wartnosed Horseshoe-bat [180]

Vulnerable

Species or species
habitat may occur
within area

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

Macroderma gigas
Ghost Bat [174]

Petauroides minor
Greater Glider (northern), Greater Glider Vulnerable
(north-eastern Queensland) [92008]

Petauroides volans
Greater Glider (southern and central)
[254]

Endangered

In buffer area only

Species or species
In feature area
habitat likely to occur
within area

Species or species
habitat may occur
within area

In feature area

Scientific Name
Threatened Category
Presence Text
Buffer Status
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)
Endangered
Species or species
Koala (combined populations of
In feature area
habitat likely to occur
Queensland, New South Wales and the
within area
Australian Capital Territory) [85104]

Saccolaimus saccolaimus nudicluniatus
Bare-rumped Sheath-tailed Bat, Barerumped Sheathtail Bat [66889]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

Xeromys myoides
Water Mouse, False Water Rat, Yirrkoo
[66]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

PLANT
Dichanthium setosum
bluegrass [14159]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

Eucalyptus raveretiana
Black Ironbox [16344]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

Leichhardtia brevifolia listed as Marsdenia brevifolia
[91893]
Vulnerable

Species or species
habitat may occur
within area

In feature area

Phlegmariurus tetrastichoides
Square Tassel Fern [86555]

Vulnerable

Species or species
habitat may occur
within area

In buffer area only

Solanum graniticum
Granite Nightshade [84819]

Endangered

Species or species
habitat may occur
within area

In buffer area only

Tephrosia leveillei
[16946]

Vulnerable

Species or species
habitat may occur
within area

In feature area

REPTILE
Egernia rugosa
Yakka Skink [1420]

Vulnerable

Species or species
In feature area
habitat likely to occur
within area

Vulnerable

Species or species
habitat may occur
within area

Lerista vittata
Mount Cooper Striped Skink, Mount
Cooper Striped Lerista [1308]

In buffer area only

Listed Migratory Species
Scientific Name
Migratory Marine Birds
Apus pacificus
Fork-tailed Swift [678]

[Resource Information]
Threatened Category

Species or species
In feature area
habitat likely to occur
within area

Migratory Terrestrial Species
Cuculus optatus
Oriental Cuckoo, Horsfield's Cuckoo
[86651]

Vulnerable

Monarcha melanopsis
Black-faced Monarch [609]

Motacilla flava
Yellow Wagtail [644]

Myiagra cyanoleuca
Satin Flycatcher [612]

Rhipidura rufifrons
Rufous Fantail [592]

Symposiachrus trivirgatus as *Monarcha trivirgatus*
Spectacled Monarch [83946]

Migratory Wetlands Species
Actitis hypoleucos
Common Sandpiper [59309]

Buffer Status

Species or species
In feature area
habitat likely to occur
within area

Migratory Marine Species
Crocodylus porosus
Salt-water Crocodile, Estuarine
Crocodile [1774]

Hirundapus caudacutus
White-throated Needletail [682]

Presence Text

Species or species
habitat may occur
within area

In feature area

Species or species

habitat known to
occur within area

In feature area

Species or species
habitat may occur
within area

In feature area

Species or species
habitat may occur
within area

In feature area

Species or species
habitat known to
occur within area

In feature area

Species or species
In feature area
habitat likely to occur
within area

Species or species
habitat may occur
within area

In feature area

Species or species
habitat may occur
within area

In feature area

Scientific Name
Calidris acuminata
Sharp-tailed Sandpiper [874]

Calidris ferruginea
Curlew Sandpiper [856]

Threatened Category

Buffer Status

Species or species
In feature area
habitat likely to occur
within area

Critically Endangered

Calidris melanotos
Pectoral Sandpiper [858]

Charadrius leschenaultii
Greater Sand Plover, Large Sand Plover Vulnerable
[877]

Gallinago hardwickii
Latham's Snipe, Japanese Snipe [863]

Numenius madagascariensis
Eastern Curlew, Far Eastern Curlew
[847]

Presence Text

Species or species
habitat may occur
within area

In feature area

Species or species
habitat may occur
within area

In feature area

Species or species
habitat may occur
within area

In buffer area only

Species or species
In feature area
habitat likely to occur
within area

Critically Endangered

Pandion haliaetus
Osprey [952]

Species or species
habitat may occur

within area

In feature area

Species or species
In feature area
habitat likely to occur
within area

Tringa nebularia
Common Greenshank, Greenshank
[832]

Species or species
habitat may occur
within area

In buffer area only

Other Matters Protected by the EPBC Act
Listed Marine Species
Scientific Name
Bird
Actitis hypoleucos
Common Sandpiper [59309]

[Resource Information]
Threatened Category

Presence Text

Buffer Status

Species or species
habitat may occur
within area

In feature area

Scientific Name
Anseranas semipalmata
Magpie Goose [978]

Threatened Category

Apus pacificus
Fork-tailed Swift [678]

In feature area

In feature area

Species or species
In feature area
habitat likely to occur
within area

Critically Endangered

Calidris melanotos
Pectoral Sandpiper [858]

Chalcites osculans as *Chrysococcyx osculans*
Black-eared Cuckoo [83425]

Charadrius leschenaultii
Greater Sand Plover, Large Sand Plover Vulnerable
[877]

Haliaeetus leucogaster
White-bellied Sea-Eagle [943]

Species or species
habitat may occur
within area overfly
marine area

Species or species
habitat may occur
within area overfly
marine area

Calidris acuminata
Sharp-tailed Sandpiper [874]

Gallinago hardwickii
Latham's Snipe, Japanese Snipe [863]

Buffer Status

In feature area
Species or species
habitat likely to occur
within area overfly
marine area

Bubulcus ibis as *Ardea ibis*
Cattle Egret [66521]

Calidris ferruginea
Curlew Sandpiper [856]

Presence Text

Species or species
habitat may occur
within area overfly
marine area

In feature area

Species or species
habitat may occur
within area overfly
marine area

In feature area

Species or species
In feature area
habitat likely to occur
within area overfly
marine area

Species or species
habitat may occur
within area

In buffer area only

Species or species
In feature area
habitat likely to occur
within area overfly
marine area

Species or species
habitat known to
occur within area

In feature area

Scientific Name
Hirundapus caudacutus
White-throated Needletail [682]

Threatened Category

Presence Text

Buffer Status

Vulnerable

Species or species
habitat known to
occur within area
overfly marine area

In feature area

Species or species
habitat may occur
within area overfly
marine area

In feature area

Species or species
habitat may occur
within area overfly
marine area

In feature area

Species or species
habitat may occur
within area overfly
marine area

In feature area

Species or species
habitat known to
occur within area
overfly marine area

In feature area

Species or species
habitat may occur
within area

In feature area

Merops ornatus
Rainbow Bee-eater [670]

Monarcha melanopsis
Black-faced Monarch [609]

Motacilla flava
Yellow Wagtail [644]

Myiagra cyanoleuca
Satin Flycatcher [612]

Numenius madagascariensis
Eastern Curlew, Far Eastern Curlew
[847]

Critically Endangered

Pandion haliaetus
Osprey [952]

Rhipidura rufifrons
Rufous Fantail [592]

Rostratula australis as *Rostratula benghalensis* (sensu lato)
Australian Painted Snipe [77037]
Endangered

Symposiachrus trivirgatus as *Monarcha trivirgatus*
Spectacled Monarch [83946]

Species or species
In feature area
habitat likely to occur
within area

Species or species
In feature area
habitat likely to occur
within area overfly
marine area

Species or species
In feature area
habitat likely to occur
within area overfly
marine area

Species or species
habitat may occur
within area overfly
marine area

In feature area

Scientific Name
Tringa nebularia
Common Greenshank, Greenshank
[832]

Threatened Category

Reptile
Crocodylus porosus
Salt-water Crocodile, Estuarine
Crocodile [1774]

Presence Text

Buffer Status

Species or species
habitat may occur
within area overfly
marine area

In buffer area only

Species or species
In feature area
habitat likely to occur
within area

Extra Information
Nationally Important Wetlands

[Resource Information]

Wetland Name
Barrattas Channels Aggregation

State
QLD

Buffer Status
In buffer area only

Haughton Balancing Storage Aggregation

QLD

In feature area

EPBC Act Referrals

[Resource Information]

Title of referral

Reference

Referral Outcome Assessment Status Buffer Status

CopperString Transmission Line
Project, Nth Qld

2019/8416

Post-Approval

In feature area

Haughton Pipeline Stage 2 Project

2021/9133

Post-Approval

In feature area

Controlled action
Gas pipeline

2002/728

Controlled Action

Post-Approval

In buffer area
only

2017/7876

Controlled Action

Post-Approval

In buffer area
only

Not controlled action
Haughton Pipeline Duplication
Project, QLD

2015/7606

Not Controlled
Action

Completed

In feature area

Haughton Solar Farm, Qld

2017/8000

Not Controlled
Action

Completed

In feature area

Improving rabbit biocontrol: releasing
another strain of RHDV, sthrn two
thirds of Australia

2015/7522

Not Controlled
Action

Completed

In feature area

Mio College Vegetation Clearing for
High Value Agriculture, Barratta
Road, Clare QLD

Caveat

1

PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2

DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3

DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries,

islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4

LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following

custodians who have contributed valuable data and advice:

- Office of Environment and Heritage, New South Wales
- Department of Environment and Primary Industries, Victoria
- Department of Primary Industries, Parks, Water and Environment, Tasmania
- Department of Environment, Water and Natural Resources, South Australia
- Department of Land and Resource Management, Northern Territory
- Department of Environmental and Heritage Protection, Queensland
- Department of Parks and Wildlife, Western Australia
- Environment and Planning Directorate, ACT
- Birdlife Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Museum Victoria
- Australian Museum
- South Australian Museum
- Queensland Museum
- Online Zoological Collections of Australian Museums
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Canberra
- University of New England
- Ocean Biogeographic Information System
- Australian Government, Department of Defence
- Forestry Corporation, NSW
- Geoscience Australia
- CSIRO
- Australian Tropical Herbarium, Cairns
- eBird Australia
- Australian Government - Australian Antarctic Data Centre
- Museum and Art Gallery of the Northern Territory
- Australian Government National Environmental Science Program
- Australian Institute of Marine Science
- Reef Life Survey Australia
- American Museum of Natural History
- Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
- Tasmanian Museum and Art Gallery, Hobart, Tasmania
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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Ecological and Environmental Approvals Report

Attachment 2 – Wildlife Online Results

WildNet species list
Search Criteria:

Species List for a Specified Point

Species: All

Type: Native

Queensland status: All

Records: Confirmed

Date: Since 1980

Latitude: -19.7347

Longitude: 147.0427

Distance: 10

Email: christopher@28south.com.au

Date submitted: Wednesday 22 Nov 2023 10:26:45

Date extracted: Wednesday 22 Nov 2023 10:30:03

The number of records retrieved = 11

Disclaimer

Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the

accuracy of this data, the State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.

The State of Queensland disclaims all responsibility for information contained in this product and all liability (including liability in negligence)

for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.

The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage

(<https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>)

to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom Class

Family

Scientific Name

plants
plants
plants
plants
plants
plants
plants
plants
plants
plants

Boraginaceae
Cyperaceae
Lauraceae
Poaceae
Poaceae
Poaceae
Poaceae
Poaceae
Poaceae
Poaceae
Rubiaceae

Heliotropium ovalifolium
Cyperus scariosus
Cryptocarya triplinervis var. triplinervis
Alloteropsis cimicina
Dactyloctenium radulans
Dichanthium fecundum
Oryza meridionalis
Oxychloris scariosa
Sporobolus actinocladus
Sporobolus caroli
Timonius timon var. timon

land plants
land plants
land plants
land plants
land plants
land plants
land plants
land plants
land plants
land plants
land plants

Common Name

button grass
curly bluegrass
winged chloris
katoora grass
fairy grass

I

Q

A

Records

C
C
C
C
C
C
C
C
C
C
C

1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1
1/ 1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.
Q - Indicates the Queensland conservation status of each taxon under the Nature Conservation Act 1992.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the Environment Protection and Biodiversity Conservation Act 1999.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).
Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon. This number is output as 999 if it equals or exceeds this value.

Page 1 of 1

Queensland Government Species lists (WildNet database) - Extract Date 22/11/2023
at 10:30:03

Ecological and Environmental Approvals Report

Attachment 3 – Preliminary Fauna
Survey of the Proposed Cambridge
Solar Farm (EcoSmart Ecology)

A.B.N. 34 137 963 190

08 December 2023

Mitch Taylor

28 South Environmental Pty Ltd

U11/24 Martin Street,

Fortitude Valley, Qld, 4006

Dear Mitch

Re: Preliminary Fauna Survey Of The Proposed Upper Haughton Solar Farm
Field surveys for fauna species and their habitats was conducted on the
aforementioned site on
the 20th to the 23rd June 2023. Our survey scope, methods, conditions and
results are provided
below.

Survey Scope

EcoSmart Ecology was commissioned by 28 South Environmental to undertake
preliminary
surveys to assess potentially important fauna values on the Upper Haughton Solar
Farm (see
Figure 1). At the time the area of interest extended beyond the current
proposed project and
survey effort was, therefore, across a broader area. While extending outside the
current
disturbance limits, the survey and results remain relevant as it provides
important context of
local fauna values.

The aim of the work was to determine what threatened terrestrial fauna species,
as listed on
the Environment Protection and Biodiversity Conservation Act 1999 (EPBC) and
Nature
Conservation Act 1992 (NCA), might occur and where. This could allow the project
footprint to
be revised, reducing impacts, and inform future detailed surveys (if needed).
This document

provides an overview of the survey results by focusing on the final area of
interest while using
relevant data collected from the surrounding area as background and context.

Methods

Desktop Assessment

The desktop assessment gathered existing publicly available information on fauna
values.

Sources and searches included:

-

The Atlas of Living Australia (ALA) based on a 50 km buffer. This database
includes records
from other sources including birds Australia, iNaturalist and WildNet. Most data
is location specific though some sensitive values are rounded.

-

WildNet database species list, based on a 30 km buffer. Location specific
coordinates are
not provided.

-

The EPBC Act Protected Matters Search Tool (PMST), a predictive search for
Matters of
National Environmental Significance (MNES). As this tool is predictive no buffer
is needed.
The results provided a list of both known and predicted species that have

potential to occur.
Location specific coordinates are not provided.
EcoSmart Ecology
48 Streeton Parade,
Everton Park, Qld, 4053

Ph: +61 7 3162 1161
info@EcoSmartEcology.com.au

www.EcoSmartEcology.com.au

Legend

Anabat

Bird survey

Bird survey/habitat search

Observation/Incidental

Habitat search

Project site boundary

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 1

Scale: 1:65,621

0

The Upper Houghton Solar Farm and fauna survey locations

0.5

1

2

3

Kilometers

Client:

28South Environmental

Project: Upper Houghton Solar Farm

4

5

±

-

Regulated vegetation property maps, which include government overlays (wetlands, essential habitat) and regional ecosystem mapping. Where it was possible, significant species locations were extrapolated from essential habitat if the record was not already captured in other database data.

The results of the desktop assessment was collated and included in a coordinate specific database. This allowed the proximity of historic threatened taxa records to be visually assessed.

Field Investigations

Field surveys were conducted between the 20th and 23rd June 2023 (four days inclusive).

Techniques used included:

-

Early morning bird surveys, which included 20 minutes of recording birds in proximity to a specific point. These were generally conducted within three hours of sunrise.

-

Anabat ultrasonic bat call recording using an Anabat Swift set to full-spectrum recording. Using full-spectrum recording increases the likelihood that calls of Bare-rumped Sheath-tail bat (*Saccolaimus saccolaimus*) can be identified.

-

Habitat searches where rocks, logs and other ground debris was moved in search of sheltering vertebrates. Shedding bark and hollows (where possible) was also inspected for sheltering arboreal vertebrates.

-

Koala scats around the base of Eucalypt trees conducted concurrently with habitat searching.

-

Opportunistic recording, where bird and vertebrate species were noted during all other activities including site traverse. Opportunistic recording continued throughout the day.

Survey Conditions

Surveys were conducted following several years of above average rainfall. Based on the nearest Bureau of Meteorology (BOM) rainfall station (Powerline MT, Stn 33280), most months preceding the survey in 2023 had also experienced above average rainfall (Figure 2). No rain had fallen in the preceding weeks of June and no rain fell during the survey. Based on the nearest BOM temperature station (Ayr DPI Research, Stn 033002), temperatures

ranged from
a minimum of 14.1oC (20th and 23rd June) to a maximum of 27.5 (23rd June).

Survey Limitations

The following limitations will have affected the survey and data:

-

Surveys did not included Elliot, pitfall, funnel, harp trapping or spotlighting. Some species or groups are difficult to detect without these methods and are likely under-represented in the dataset,

-

Surveys did not coincide with the spring/summer period or rainfall. Some species and groups are not detectable outside of these conditions and likely under-represented.

While noted, the above limitations are expected and will not have compromised the survey's aims.

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Everton Park, Qld, 4053

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info@EcoSmartEcology.com.au

www.EcoSmartEcology.com.au

A.B.N. 34 137 963 190

500

450

Observed Rainfall

Average Rainfall

475

400

Rainfall (mm)

350

300

250

263

200

249

191

150

100

110

50

74

73

72

0

32

0

Jan

Feb

Mar

Apr

May

Figure 2. Observed and average rainfall at the closest BOM rainfall station in the months preceding survey

Desktop Results

Threatened Vertebrates and Essential Habitat

Desktop searches yielded a list of 26 threatened terrestrial vertebrate species in the local area

(50 km). This included 20 species based on observations (ALA) and six species

based on predictive modelling (PMST). The WildNet search did not identify any additional species.

Searches identified one species as historically known from within the project area, the Barerumped Sheathail Bat (*Saccolaimus Saccolaimus*). Records of this species are also present in

the nearby surrounding area. A second species, the Black-throated Finch (*Poephila cincta*

cincta) has been recorded approximately 1 km to the north. Only one other notable species

has been historically recorded within 10 km, the White-throated Needletail (*Hirundapus*

caudatus). Several records of Squatter Pigeon are also present though these are not

expected to be the southern subspecies (see discussion below).

A number of the above records are associated with essential habitat (Figure 3).

Migratory Species

The following migratory species have been historically recorded within close proximity to the

project site: Glossy Ibis (*Plegadis falcinellus*), Caspian Tern (*Hydroprogne caspia*), Whitethroated Needletail and Eastern Osprey (*Pandion haliaetus cristatus*)

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www.EcoSmartEcology.com.au

Black-throated Finch

Black-throated Finch
Black-throated Finch

White-throated Needletail

Black-throated Finch

Black-throated Finch Black-throated Finch
Black-throated Finch
Black-throated Finch
Black-throated Finch Black-throated Finch

Black-throated Finch

Bare-rumped Sheathtail-bat

Bare-rumped Sheathtail-bat

Bare-rumped Sheathtail-bat

Bare-rumped Sheathtail-bat
Bare-rumped Sheathtail-bat

Bare-rumped Sheathtail-bat

Black-throated Finch

Legend

10 km Buffer

Threatened fauna record (1975+)

Project site boundary

Essential habitat

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 3

Historic records of threatened fauna and essential habitat
within 10 km of the project site

Scale: 1:147,883

0 0.5

1

2

3

4

Kilometers

Client:

28South Environmental

Project: Upper Haughton Solar Farm

5

6

7

A.B.N. 34 137 963 190

Field Results

Vertebrate Diversity

A total of 131 vertebrate species were identified during survey including 65 species from within the project site and 95 in the surrounding area (Table 1 and Attachment A). All species are

Least Concern under legislation except:

-

The Bare-rumped Sheathtail Bat which is 'vulnerable' under the EPBC and 'endangered' under the NCA. This species was recorded at three locations in nearby vegetation. While not recorded within the site during this survey it has been historically noted and is likely widespread in suitable vegetation (see below).

-

Glossy Ibis and Caspian Tern which are 'migratory' under the EPBC and 'special least concern' under the NCA. These were located on nearby artificial wetlands, they were not recorded within the project site.

Table 1. Vertebrate diversity noted during this survey within the project site and nearby

Summary

Amphibians

Reptiles

Birds

Mammals

TOTAL

Within

2

3

56

4

65

Nearby

2

1

95

22

120

Total

2

3

104

22

131

Four species located during survey are introduced and non-natives: Dingo/Dog (*Canis lupus/familiaris*), Cane Toad (*Rhinella marina*), Feral Cat (*Felis catus*) and Feral Pig (*Sus scrofa*).

The impact of the latter three species is recognised by their listing as key threatening processes under the EPBC Act.

The location of significant fauna identified during survey is shown in Figure 4.

Known and Potential MNES Species

Based on local records and habitat suitability, the following MNES species are known or

considered to have a reasonable possibility of occurring: White-throated Needletail, Blackthroated Finch, Northern Quoll and Bare-rumped Sheath-tail Bat. Each of these species are

briefly discussed below. All other species are either not likely to occur or may occur only as

transient individuals as they pass through the region (see Attachment B).

While the Squatter Pigeon has been recorded from the local area and in vegetation surrounding

the site (this survey), the Upper Houghton Solar Farm is situated within the hybrid zone between

two subspecies, *G. s. peninsulae* and *G. s. scripta* (Ford 1986). Only the latter, the southern

subspecies (*G. s. scripta*), is considered an MNES. The northern subspecies (*G. s. peninsulae*)

is characterised by red naked skin around the eye, compared to blueish-grey in the southern

subspecies. Birds observed during this survey were consistent with hybrids having a mix of red

and blue and, as such, are not the southern subspecies and do not require special management.

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Caspian Tern
Glossy Ibis

Bare-rumped Sheathtail Bat

Bare-rumped Sheathtail Bat

Legend
Project site boundary
Threatened
Bare-rumped Sheathtail Bat

Migratory
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 4

Scale: 1:69,897
0

Significant fauna sightings during the current survey

0.5

1

2

3

Kilometers

Client:

28South Environmental

Project: Upper Haughton Solar Farm

4

5

±

The Koala has also been recorded in the local area though in very low numbers; approximately five post-1990 records within 50 km. Furthermore, most vegetation within the site and surrounding the site is not dominated by important food trees (as identified in ANU 2021); only small areas of RE 11.3.10 contain the food tree *Eucalyptus brownii* (see Hansen 2023). The limited extent of important food trees and lack of local records suggests the Koala is unlikely to occur.

White-throated Needletail (*Hirundapus caudacutus*)

EPBC vulnerable; NCA vulnerable

The White-throated Needletail breeds in the northern hemisphere and is a regular visitor to

Australia during summer. They are almost exclusively aerial and, while probably most often

recorded over forested habitats, can be observed over most land-types including urban areas

and grazing land. Roosting has been recorded in dense foliage or hollows of large emergent

trees (Tarburton 1993), though they may also roost aerially (Schulz and Kristensen 1994).

This species has been frequently recorded within the local area and is expected to occur. As

the species is almost exclusively aerial and covers extremely large distances, no one habitat

type within the site will be more important than others. Further, the site itself will represent

only a fraction of this species' area of activity. Ground changes to vegetation are likely to have

little, if any, impact.

Black-throated Finch (*Poephila cincta cincta*)

EPBC Endangered; NC Act Endangered

Black-throated Finches occur as pairs or in small flocks, though several hundreds may

congregate around waterholes during drought. They occur in dry open woodlands and forests

with seeding grasses, patches of bare ground, and free-standing water (Higgins et al. 2006;

Rechetelo et al. 2016). Their diet primarily consists of native and introduced grasses but they

can occasionally take invertebrates (Higgins et al. 2006; DEWHA 2009). Foraging is typically

done on the ground from which they glean seeds or use their weight to lower seed inflorescence

before extracting seeds (DEWHA 2009). Perennial grass species thought to dominate the Blackthroated Finches diet includes *Urochloa mosambicensis*,

Enteropogon acicularis, *Panicum*

decompositum, *Panicum effusum*, *Dichanthium sericeum*, *Alloteropsis semialata*, *Eragrostis*

sororia and *Themeda triandra*. Other grasses which may be used as supplements include

Schizachyrium spp, *Echinopogon* sp, *Sorghum* spp and *Paspalum* spp (DEWHA 2009).

Of the grass species which dominate the Black-throated Finches diet, only two were noted

during flora surveys, *U. mosambicensis* from three sites and *T. triandra* from two sites, of the

49 quaternary sites completed (see Figure 3 of Hansen 2023 for site locations).

Neither grass
was dominant, but rather noted as sub-dominant or restricted to a few tussocks.
It is possible
other Black-throated Finch grasses might be present, though as there were not
detected it is
likely are in very low abundance. This preliminary data suggests the grassy
woodland, while
structurally suitable, may have a low forage amenity for Black-throated Finch.

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Black-throated Finches construct nest in tree forks or hollows, usually greater than four meters above the ground. Breeding birds aggregate into loose colonies resulting in multiple nests within a small area (50±m) (Higgins et al. 2006; DEWHA 2009). While poorly researched, it is thought a minimum remnant habitat patch of 40-50 ha may be required for a nesting colony to remain viable (DEWHA 2009); this corresponds with their home range which is typically up to approximately 50 ha (Rechetelo et al. 2016). Water is a critical resource for Black-throated Finch colonies as birds need to drink daily. Breeding colonies are usually within 400 m of seasonal water and birds may retreat to more permanent water (dry-season refugia) under drought conditions. Birds are typically sedentary, making short daily movements during breeding and increasing movements to around three kilometres during the non-breeding season, though larger movements may occur during droughts (DEWHA 2009). The proposed Upper Houghton solar farm is within the greater Townsville region which is recognised as a significant area for the species (DEWHA 2009). Within this region, important areas are defined as those within five kilometres of a post-1995 record and, within these important areas, caution should be taken to minimise impacts (DEWHA 2009). Essential habitat mapping reveals a Black-throated Finch record approximately 1 km to the north of the solar farm boundary, though the associated record is obscured from public searches. As a result, it is not possible to ascertain the date of this record though it is probably a post-1995 record. Consequently, a large portion of the site is likely to fall within the above definition of an important finch area. Activities within important finch areas may be considered to diminish the quality of habitat if (DEWHA 2009):

-

Water sources (either permanent or ephemeral) are lost or degraded,

-

There is widespread or indiscriminate loss of trees, including known nesting trees, within one kilometre of a water source,

-

Tree recruitment is decreased limiting the areas ability to be self-sustaining, and

-

Foraging habitat is degraded or reduced where known Black-throated Finch records exist, including through intensification of biomass reduction or stocking rates.

Most areas of remnant vegetation within the site is in proximity to a suitable

water source and should be considered suitable habitat. Habitat with the greatest potential is likely associated with the Haughton River, especially in the woodlands above the stream bank (e.g, areas of 11.3.7 and 11.3.35 on 10GS602). However, as discussed above, favoured forage grasses are uncommon suggesting the vegetation has low amenity. Based on this preliminary assessment, it seems most likely the species will be absent. While this survey failed to locate any Black-throated Finch, further surveys should be considered for areas of remnant vegetation which might be lost. These would be best undertaken during the breeding season (Sep/Oct) to ensure the site is not used for breeding purposes, as well as at the end of the dry season (Nov/Dec) to ascertain if waterbodies might provide drought refugia.

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Northern Quoll (*Dasyurus hallucatus*)

EPBC endangered; NCA least concern

Although found in a variety of habitats, it is most common in rocky eucalypt woodland and open

forest within 200 kilometres of the coast including areas such as Eungella, Cooktown, Mareeba,

The Kimberley, The Pilbara and the Top End (Van Dyck et al. 2013).

Northern Quolls have been on several occasions in Bowling Green Bay National Park, including

some post-2000 records. Suitable habitat extends from the National Park south, largely

uninterrupted, to the project site. Together, these records and habitat amenity suggest the

species may be naturally scarce in the region but has some potential to occur.

Northern quolls are generally nocturnal and shelter during the day in dens located in tree

hollows, termite mounds, fallen logs and rock crevices. Individuals will use a number of dens

across their territory (Baker and Gynther 2023). All areas of remnant vegetation across the site

has potential to provide habitat, though highest amenity is associated with larger contiguous

tracts rather than isolated patches. Best areas of habitat are therefore associated with the

Haughton River. The site and surrounding vegetation is not expected to have a permanent

population and any individuals possibly occurring are likely dispersing or transient.

Bare-rumped Sheath-tail Bat (*Saccolaimus Saccolaimus nudiclunatus*)

EPBC vulnerable; NCA endangered

The Bare-rumped Sheath-tail Bat is known to inhabit eucalypt forests and woodlands in near

coastal areas. It may also be recorded in lowland rainforests in Queensland (TSSC 2016). It is

a high-flying foraging species which hunts in open airspace, typically above the canopy (TSSC

2016; McKenzie and Bullen 2018). It is known to fly at altitudes of up to and above 400 m and

is likely capable of long-distance movements (TSSC 2016). The species is gregarious but is

usually detected in small groups of 3-4 individuals.

Several areas of essential habitat for this species are located within the project area, though

the records upon which this mapping is based is not publicly available (see Figure 3). The

species was also recorded at three locations in the surrounding vegetation during this survey

(see Figure 4). All areas of remnant vegetation should be considered suitable habitat and, as

the species is highly mobile, this would include smaller isolated patches.

Potential MSES

Based on local records and habitat suitability, no additional MSES species are considered likely

or possible to occur.

Summary of Findings

A total of 131 vertebrate species were identified during survey including 65 species from within

the project site and 95 in the surrounding area (Table 1). All species are Least Concern under

legislation except:

•

The Bare-rumped Sheathtail Bat (vulnerable EPBC, endangered NCA) which is likely to utilise any areas of remnant vegetation including isolated patches.

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•

Glossy Ibis and Caspian Tern (migratory EPBC, special least concern NCA), which were located on nearby artificial wetlands and not recorded within the project site.

In addition to the above species known to occur, the following are considered possible or likely:

•

White-throated Needletail (EPBC and NCA vulnerable), which is likely in airspace anywhere above the project site.

•

Black-throated finch (EPBC and NCA vulnerable), which could occur in any remnant vegetation with highest amenity habitat associated with vegetation adjacent and connected to the Haughton River.

•

Northern Quoll (EPBC endangered, NCA least concern) which has a low probability of occurring in areas of remnant vegetation with highest amenity habitat associated with the Haughton River.

Further survey for Black-throated Finch is recommended to determine if the species is absence/present or, if present, where important habitat occurs. Four species located during survey are non-native: Dingo/Dog (*Canis lupus/familiaris*), Cane Toad (*Rhinella marina*), Feral Cat (*Felis catus*) and Feral Pig (*Sus scrofa*). The impact of the latter three species is recognised by their listing as key threatening processes under the EPBC Act.

Regards,

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Attachment A
Observes Species List

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GROUP
Scientific Name
AMPHIBIANS

Common Name

Litoria caerulea

Green Tree Frog

Rhinella marina

EPBC

Cane Toad
TOTAL

Status*
NCA

Mig

Location
Proj. Site Nearby

LC

X

X

I

X
2

X
2

X

X

2

BIRDS
Acrocephalus australis

Australian Reed Warbler

LC

Anas gracilis

Grey Teal

LC

X

Anas rhynchotis

Australian Shoveler

LC

X

Anas superciliosa

Pacific Black Duck

LC

X

Anhinga melanogaster

Australasian Darter

LC

X

Anseranas semipalmata

Magpie Goose

LC

X

Anthus novaeseelandiae

Australasian Pipit

LC

X

Aprosmictus erythropterus

Red-winged Parrot

LC

X

X

Aquila audax

Wedge-tailed Eagle

LC

X

X

Ardea ibis

Cattle Egret

LC

X

Ardea intermedia

Intermediate Egret

LC

X

Ardea modesta

Eastern Great Egret

LC

X

Ardea pacifica

White-necked Heron

LC

X

Artamus leucorhynchus

White-breasted Woodswallow

LC

Aviceda subcristata

Pacific Baza

LC

X

Aythya australis

Hardhead

LC

X

Cacatua galerita

Sulphur-crested Cockatoo

LC

X

X

Cacomantis flabelliformis

Fan-tailed Cuckoo

LC

X

X

Calyptorhynchus banksii
Centropus phasianinus
Chenonetta jubata
Chlidonias hybrida
Chrysococcyx minutillus
Circus approximans
Cisticola exilis
Colluricincla megarhyncha
Coracina maxima
Coracina novaehollandiae
Corvus coronoides
Corvus orru
Coturnix ypsilophora
Cracticus nigrogularis
Cracticus torquatus
Cygnus atratus
Dacelo leachii
Dacelo novaeguineae
Dicaeum hirundinaceum
Dicrurus bracteatus
Dromaius novaehollandiae

Red-tailed Black Cockatoo
Pheasant Coucal
Australian Wood Duck
Whiskered Tern
Little Cuckoo-shrike
Swamp Harrier
Golden-headed Cisticola
Little Shrike-thrush
Ground Cuckoo-shrike
Black-faced Cuckoo-shrike
Australian Raven
Torresian Crow
Brown Quail
Pied Butcherbird
Grey Butcherbird
Black Swan
Blue-winged Kookaburra
Laughing Kookaburra
Mistletoebird
Spangled Drongo
Emu

[illegible]

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GROUP

Scientific Name

Common Name

EPBC

Status*

NCA

Mig

Location

Proj. Site Nearby

Entomyzon cyanotis

Blue-faced Honeyeater

LC

X

X

Ephippiorhynchus asiaticus

Black-necked Stork

LC

Falco berigora

Brown Falcon

LC

X

X

Falco cenchroides

Nankeen Kestrel

LC

X

X

Falco peregrinus

Peregrine Falcon

LC

Geopelia humeralis

Bar-shouldered Dove

LC

X

Geopelia striata

Peaceful Dove

LC

X

Geophaps scripta

Squatter Pigeon

LC

Gerygone olivacea

White-throated Gerygone

LC

Grallina cyanoleuca

Magpie-lark

LC

Gymnorhina tibicen

Australian Magpie

LC

Haliaeetus leucogaster

White-bellied Sea-eagle

LC

Haliastur sphenurus

Whistling Kite

LC

Himantopus leucocephalus

Pied Stilt

LC

Hirundo neoxena

Welcome Swallow

LC

Hydroprogne caspia

Caspian Tern

LC

Irediparra gallinacea

Comb-crested Jacana

LC

Lalage leucomela

Varied Triller

LC

X

X

Lichenostomus flavus

Yellow Honeyeater

LC

X

X

Lichmera indistincta

Brown Honeyeater

LC

X

X

Lonchura castaneothorax

Chestnut-breasted Mannikin

LC

X

Malurus melanocephalus

Red-backed Fairy-wren

LC

X

X

Megalurus timoriensis

Tawny Grassbird

LC

X

X

Meliphaga lewinii

Lewin's Honeyeater

LC

X

Melithreptus albogularis

White-throated Honeyeater

LC

X

Merops ornatus

Microcarbo melanoleucos

Microeca flavigaster

Milvus migrans

Mirafra javanica

Myiagra rubecula

Nectarinia jugularis

Neochmia modesta

Neochmia phaeton

Nettapus pulchellus

Ocyphaps lophotes

Pachycephala rufiventris

Pardalotus striatus

Pelecanus conspicillatus

Petrochelidon ariel

Petrochelidon nigricans

Phalacrocorax sulcirostris

Phaps chalcoptera

Platalea regia

Platycercus adscitus

Plegadis falcinellus

Rainbow Bee-eater

Little Pied Cormorant

Lemon-bellied Flycatcher

Black Kite

Horsefield's Bushlark

Leaden Flycatcher

Olive-backed Sunbird

Plum-headed Finch

Crimson Finch

Green Pygmy-goose

Crested Pigeon

Rufous Whistler

Striated Pardalote

Australian Pelican

Fairy Martin

Tree Martin

Little Black Cormorant

Common Bronzewing

Royal Spoonbill

Pale-headed Rosella

Glossy Ibis

LC

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GROUP

Scientific Name

Podiceps cristatus

Common Name

Great-crested Grebe

EPBC

Status*

NCA

LC

Mig

Location

Proj. Site Nearby

X

Porphyrio porphyrio

Purple Swamphen

LC

Ptilonorhynchus nuchalis

Great Bowerbird

LC

X

X

Ramsayornis modestus

Brown-backed Honeyeater

LC

X

X

Rhipidura albiscarpa

Grey Fantail

LC

X

X

Rhipidura leucophrys

Willie Wagtail

LC

X

X

Smicrornis brevirostris

Weebill

LC

Sphecotheres vieilloti

Australian Figbird

LC

X

X

Stomiopera unicolor

White-gaped Honeyeater

LC

X

X

Struthidea cinerea

Tachybaptus novaehollandiae

Taeniopygia bichenovii

Threskiornis moluccus

Threskiornis spinicollis

Todiramphus macleayi

Todiramphus pyrrhopygia

Trichoglossus haematodus

Vanellus miles

TOTAL

Apostlebird

Australasian Grebe

Double-barred Finch

Australian White Ibis

Straw-necked Ibis

Forest Kingfisher

Red-backed Kingfisher

Rainbow Lorikeet

Masked Lapwing

LC

LC

LC

LC

LC

LC

LC

LC

LC

MAMMALS

Rhinolophus megaphyllus

Chalinolobus gouldii

Chalinolobus morio

Chalinolobus nigrogriseus
Nyctophilus sp.
Pipistrellus adamsi
Scotorepens balstoni
Scotorepens greyii
Scotorepens sanborni
Vespadelus trougtoni

X

X

X

X

X

104

56

X

X

X

X

X

X

X

X

X

X

95

Eastern Horseshoe bat
Gould's Wattled Bat
Chocolate Wattled Bat
Hoary Wattled Bat
a long-eared bat
Cape York Pipistrellus
Inland Broad-nosed bat
Eastern Broad-nosed Bat
Northern Broad-nosed bat
Eastern Cave Bat

LC

LC

LC

LC

LC

LC

LC

LC

LC

LC

X

X

X

X

X

X

X

X

X

X

Miniopterus australis

Little Bentwing Bat

LC

X

Miniopterus orirnae oceanensis

Eastern Bentwing Bat

LC

X

Austronomus australis

White-striped Freetail Bat

LC

X

LC

LC

X

X

LC

LC

End

I

I

LC

I

X

X

X

X

X

X

X

22

Chaerephon jobensis

Ozimops lumsdenae

Ozimops ridei

Saccolaimus flaviventris

Saccolaimus saccolaimus

Canus sp

Felis felis

Notamacropus agilis

Sus scrofa

TOTAL

Eastern Freetail Bat

Yellow-bellied Sheathtail Bat

Bare-rumped Sheathtail Bat

Dog/Dingo

Feral Cat

Agile Wallaby

Feral Pig
22

Vul
X
X
X
X
4

REPTILES

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GROUP

Scientific Name

Liais fuscus

Cryptoblepharus sp

Carlia sp

Common Name

Water Python

TOTAL

EPBC

Status*

NCA

LC

LC

LC

Mig

3

Location

Proj. Site Nearby

X

X

X

X

3

1

* End = endangered, Vul = Vulnerable, LC = Least concern, I = Introduced
*

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Attachment B

Likelihood of Occurrence – Threatened Fauna Species

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Scientific Name

Common Name

AMPHIBIA

Cophixalus mcdonaldi

Mcdonald's Frog

REPTILIA

Phyllurus amnicola

Mount Elliot Broad-tailed Gecko

Lampropholis mirabilis

Saxicoline Sunskink

Egernia rugosa

Yakka Skink

Status

EPBC

NCA

Local Records (1975+)

Habitat preferences

Likelihood within project site

Justification

Cr End

Many records, all with location
rounding.

Restricted to rainforest above
950m on Mount Elliot.

Will not Occur

No Suitable habitat present on-site.

Many records, all with location
rounding.

All local records associated
with Bowling Green Bay NP

Restricted to rainforest above
400m on Mount Elliot
Rocks in hoop pine and rainforest
communities
Dry open forests and woodlands

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

Will not Occur

Lack of local records and very low habitat
amenity.

Unlikely

Few old local records and low habitat amenity

Vul

NT

Vul

Vul

None

Vul

Only three records, all from
early 1990s, at Bowling Green
Bay NP

Cr End

Cr End

Many coastal records

Cr End

Cr End

Many coastal records

Vul

Vul

Many coastal records

End

End

Many coastal records

Vul

Vul

Many coastal records

Cr End

End

Many coastal records

End

End

Records present along the subcoastal areas between
Townsville and Ayre

Acanthophis antarcticus

Common Death Adder

AVES

Calidris ferruginea

Curlew Sandpiper

Calidris tenuirostris

Great Kno

Charadrius leschenaultii

Greater Sand Plover

Charadrius mongolus

Lesser Sand Plover

Limosa lapponica

Bar-tailed Godwit

Numenius madagascariensis
Far Eastern Curlew
Rostratula australis
Australian Painted-snipe

Cr End

A variety of vegetation types,
especially areas with complex
ground debris including rocks/logs
and deep leaf litter

Tidal sand and mudflats within
close proximity to the coast

Tidal sand and mudflats within
close proximity to the coast

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close proximity to the coast

Tidal sand and mudflats within
close proximity to the coast

Tidal sand and mudflats within
close proximity to the coast

Freshwater (rarely brackish)
wetlands with a mosaic of open
mud areas and vegetation

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

Will not Occur

No Suitable habitat present on-site.

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A.B.N. 34 137 963 190

Scientific Name

Common Name

Status

EPBC

NCA

Local Records (1975+)

Falco hypoleucos

Grey Falcon

Vul

Vul

None

Habitat preferences

Open featureless plains, gibber

Erythrotriorchis radiatus

Red Goshawk

End

End

One 1998 record from the
Pinnacles

Tyto novaehollandiae kimberli

Masked Owl (northern)

Vul

Vul

Some mid 1990s records from
Harveys Range.

Large contiguous stretches of
forest and woodlands. Now
extremely rare south of Cape York
Peninsular

Large tracks of forest with a mosaic
of dry and mesic vegetation

Open woodlands and forest

Geophaps scripta scripta

Squatter Pigeon

Vul

Vul

Several local, recent records
within 50 km.

Hirundapus caudacutus

White-throated Needletail

Vul

Vul

Many local and recent records

Poephila cincta
Black-throated Finch

End

End

Many local and recent records.
The Townsville greater area is
considered to be important for
this species

Neochmia ruficauda ruficauda
Star Finch

End

End

None

End

Several records from 2020,
likely of the same bird from
Townsville Common. One
other record (2014) from near
Mingela.

LC

A few recent records from
Bowling Green Bay NP

Erythrura gouldiae
Gouldian Finch

End

An aerial species capable of using
airspace over any land types
Open grassy woodlands with open
areas and access to water

Open grassy woodlands within
proximity to water
Open grassy woodlands within
proximity to water

Likelihood within project site
Justification
Will not Occur
No Suitable habitat present on-site.
Transient
No longer resident in region, rare transient
individuals cannot be excluded.
Unlikely
Lack of local records and very low habitat

amenity.

Unlikely

The project site lies within the hybrid zone of the species. All local records are likely to be miss-attributed to this subspecies. See discussion above.

Likely

This species is expected to occur.

Possible

See discussion above

Unlikely

No longer considered to be present within the region.

Unlikely

Few local records and no known resident populations. Rare transient individuals possible.

MAMMALIA

Dasyurus hallucatus

Northern Quoll

End

A variety of eucalypt forest and rainforest habitats, especially those with large rocks or rock outcrops

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Possible

Habitat associated with recent records connected to vegetation along Haughton River. While habitats within the project site

A.B.N. 34 137 963 190

Scientific Name

Common Name

Petauroides volans

Greater Glider

Phascolarctos cinereus

Koala

Macroderma gigas

Ghost Bat

Status

EPBC

NCA

Vul

End

Vul

Local Records (1975+)

Habitat preferences

Tall eucalypt forests with abundant large hollow-bearing trees. Highest densities occur in mountainous regions

Vul

A single (1993) record within 50 km.

End

Three post 1975 records associated with Bowling Green Bay and the Burdekin River

Vul

None. Closest cluster of recent records associated with Palm Creek on Harveys Range.

Any eucalypt forests or open forests

Roosts in large complex caves or, less frequently, large artificial structures (old tunnels etc).

Forages in surrounding vegetation types

Open eucalypt forests

Likelihood within project site

Justification

are of lower amenity, the proximity of local records suggests there is a low possibility this species could occur. The site is not expected

to have a permanent population.

Unlikely

Poorly represented in local area. Habitats within and surrounding the project site of low amenity (open woodlands with low eucalypts low density hollow-bearing trees).

Unlikely

Poorly represented in local area.

Unlikely

No suitable roost habitat present. Rare transient individuals possible from Harveys Range.

Saccolaimus Saccolaimus

Known

Vul

End

Known from project site

Bare-rumped Sheath-tail-bat

Xeromys myoides

Mangroves and intertidal

Will not Occur

Vul

Vul

None

Water Mouse

grasslands

No Suitable habitat present on-site.

* Cr End = critically endangered, End = endangered, Vul = vulnerable, NT = near threatened, LC = least concern, I = Introduced

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