



Biodiversity Development Assessment Report

Blind Creek Solar Farm

September 2022

Project Number: 22-319



Document verification

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Accredited assessor quality control

I, Beth Noel (BAAS19015), certify that this Biodiversity Development Assessment Report has been prepared on the basis of the requirements of, and information provided under, the Biodiversity Assessment Method (BAM) 2020 as of 23 September 2022. The associated development case (00023058) within the BAM Calculator with the impact calculation report reflected in Revision 9.

Please notify NGH when you submit the BDAR and we will finalise and submit the BAM-C case to the appropriate regulator.

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Table of contents

Acronyms and abbreviations	viii
Executive summary	ix
1. Introduction	11
1.1 Definitions.....	11
1.2 Proposal.....	11
1.3 Subject land.....	12
1.3.1 Location	12
1.3.2 General description.....	13
1.4 Data sources.....	13
1.4.1 Spatial data.....	13
1.4.2 Other data.....	14
2. Landscape context	17
2.1 Native vegetation cover (%).....	17
2.2 Bioregions and NSW (Mitchell) landscapes.....	17
2.2.1 IBRA bioregion.....	17
2.2.2 IBRA subregion.....	18
2.2.3 NSW (Mitchell) landscape	18
2.3 Hydrology.....	19
2.3.1 Strahler	19
2.3.2 Wetlands.....	23
2.4 Habitat connectivity.....	25
2.5 Geology	25
2.5.1 Areas of geological significance	25
2.5.2 Soil hazard features	26
2.6 Areas of Outstanding Biodiversity Value	26
3. Native vegetation	29
3.1 Native vegetation extent	29
3.1.1 Existing native vegetation mapping and data	29
3.1.2 Floristic surveys	29
3.2 Plant Community Types (PCTs)	30
3.3 Non-native vegetation and cleared areas	36
3.4 Vegetation Integrity (VI) assessment.....	37
4. Threatened species	40

4.1	Ecosystem credit species	40
4.2	Species credit species	43
4.3	Species credit species survey summary.....	51
4.4	Species credit species survey details	54
4.4.1	Frog aural-visual surveys.....	58
4.4.2	Reptile tile surveys.....	59
4.4.3	Microbat acoustic surveys	61
4.4.4	Targeted plant surveys	63
4.4.5	White-fronted Chat survey	67
4.4.6	White-bellied Sea-Eagle (breeding)	69
4.4.7	Survey effort maps.....	69
5.	Matters of National Environmental Significance	71
5.1	Ramsar Wetlands of International Importance	71
5.2	Threatened Ecological Communities (TECs).....	71
5.3	Threatened species	71
5.4	Migratory species.....	72
6.	Prescribed impacts.....	73
6.1	Habitat features relevant to prescribed biodiversity impacts	73
6.1.1	Karsts, caves, crevices, cliffs, rocks and other geological features of significance .	73
6.1.2	Human-made structures	73
6.1.3	Non-native vegetation.....	73
6.1.4	Habitat corridors	75
6.1.5	Hydrological features	76
6.2	Vehicle strike	77
7.	Avoid and minimise impacts	78
7.1	Site selection	78
7.2	Proposal design	78
7.2.1	Alternative technologies.....	78
7.2.2	Development Footprint modification based on biodiversity constraints	79
8.	Assessment of unavoidable impacts.....	81
8.1	Direct impacts	81
8.1.1	Impacts to native vegetation	81
8.1.2	Impacts to native fauna.....	82
8.2	Indirect impacts.....	82
8.3	Prescribed impacts	88

8.3.1	Non-native vegetation	88
9.	Serious and Irreversible Impact (SAIL) entities	91
9.1	Principles for determining serious and irreversible impacts.....	91
9.2	SAIL entities associated with the Project.....	91
9.2.1	Threatened ecological communities	91
9.2.2	Threatened species	92
10.	Mitigation and management of impacts	93
10.1	Direct impacts	93
10.2	Indirect impacts.....	93
10.3	Prescribed impacts	94
11.	Offset requirement summary.....	102
11.1	Impacts requiring offset	102
11.1.1	Ecosystem credits.....	102
11.1.2	Species credits	102
11.2	Impacts not requiring offset	102
11.3	Areas not requiring assessment	103
12.	Conclusions	106
12.1	Native vegetation	106
12.2	Threatened entities	106
12.2.1	EPBC Matters of National Environmental Significance	106
13.	References	107

Figures

Figure 1-1 Site Map 1, showing the Development Site and Development Footprint/Subject Land	15
Figure 1-2 Site Map 2, showing lots and deposited plans; lots are coloured so that the lot boundary and full extent of each lot is clear.....	16
Figure 2-1 Photo of Butmaroo Creek (November 2020)	20
Figure 2-2 Photo of the south-west section of Wrights Creek (close to where it meets Butmaroo Creek) looking north. No evidence of channel or bank. Ground validation does not support the NSW Hydroline Dataset mapping.	21
Figure 2-3 Photo of north-eastern section of Wrights Creek during a dry period (April 2021)	22
Figure 2-4 Photo of north-east section of Wrights Creek following a period of high rainfall (November 2021)	22
Figure 2-5 Photo of Blind Creek (Bridge Creek) causeway, following period of high rainfall (November 2021)	23
Figure 2-6 Photo of the southern side of the wetland to the north of the Development Site (January 2021).....	24
Figure 2-7 Photo after periods of rainfall (July 2021) located north west of the woodland and south of Wrights Creek. It was a common occurrence, following rainfall, to have areas of standing water within the flat pastures within the Development Site.....	24
Figure 2-8 Photo of rocky outcrop within the Development Footprint	25
Figure 2-9 Location Map 1: NSW (Mitchell) Landscapes.....	27
Figure 2-10 Location Map 2: Estimated native vegetation extent within the 1500 m Assessment Area, riparian areas, Strahler stream order, Strahler buffers, and areas of rocky habitat.....	28
Figure 3-1 Photo of PCT 1100 in woodland area (November 2020), excluded from the Development Footprint.....	33
Figure 3-2 Photo of PCT 1100 under the powerline easement in grassland condition (November 2021).....	33
Figure 3-3 Photo of PCT 1110 at boundary with PCT 1100 woodland, showing clear delineation between woodland and PCT 1110 grassland dominated by sown ryegrass	35
Figure 3-4 Photo of PCT 1110 in low condition, with Serrated Tussock (<i>Nassella trichotoma</i>) evident in the foreground (April 2021).....	35
Figure 3-5 Photo of the eastern arm of the Development Site, with lines of sown grasses and vegetable crop evident (June 2020).....	36
Figure 3-6 Photo of field close to Wrights Creek, showing high coverage of Scotch Thistle (<i>Onopordum acanthium</i>) (November 2021)	37
Figure 3-7 PCTs, vegetation zones, and location of BAM plots within the Development Footprint and Development Site.....	39
Figure 4-1 Photo of dense <i>Juncus sp.</i> growth in the wetland (March 2022)	65
Figure 4-2 Close-up photo of ground cover in the wetland, dense <i>Juncus sp.</i> restricting growth of other species (March 2022)	66
Figure 4-3 Photo of wetland showing evidence of livestock grazing (March 2022)	66

Figure 4-4 Photo of Wrights Creek, demonstrating high exotic coverage and bare ground caused by livestock (March 2022)	67
Figure 4-5 Photo of dead Scotch Thistle during July 2022 survey	69
Figure 4-6 Threatened species survey locations	70
Figure 6-1 Lake George Trigonometrical Baseline - North Pillar	73
Figure 6-2 Elm tree in the north of the Development Site, excluded from the Development Footprint	74
Figure 6-3 Stand of exotic pines, remnants of a previously larger plantation	75
Figure 7-1 Changes to Development Site following fieldwork, demonstrating adherence to the principles of avoiding and minimising impacts	80
Figure 8-1 White-fronted Chat habitat within the Development Site	90
Figure 11-1 Vegetation zones not requiring offset	104
Figure 11-2 Areas not requiring assessment under the BAM	105

Tables

Table 3-1 PCT 1100 details	31
Table 3-2 PCT 1110 details	34
Table 3-3 Vegetation zones within the Development Footprint and Development Site; italic text indicates zones no longer within the Development Footprint.....	38
Table 4-1 Ecosystem credit species returned by the BAM-C. Species excluded from assessment due to habitat constraints are shown in italics.	41
Table 4-2 Full list of species credit species generated by the BAM-C. Italic text indicates species that have been included or excluded from further assessment.	43
Table 4-3 Summary of species credit species that could not be excluded from assessment based on habitat or geographic constraints, survey timing, associated vegetation zones and calculation of species polygon	52
Table 4-4 Full list of species surveyed for within the Development Footprint; italic text indicates that the species is not a BAM-C species credit species	55
Table 4-5 Summary of specific survey dates and personnel	56
Table 4-6 Frog survey weather conditions, recorded at ground level during surveys.....	58
Table 4-7 Reptile tile survey weather conditions, recorded at ground level during surveys. Full survey conditions are provided in Appendix B, B.5.....	60
Table 4-8 Anabat survey weather conditions. Temperature data was recorded by two Anabat Express devices, other weather data obtained from BOM Canberra Airport weather station.....	61
Table 4-9 Microbat species identified as being present, or potentially present, within the Development Footprint. Potentially present species are indicated by italic text.....	62
Table 4-10 White-fronted Chat survey weather conditions, obtained from BOM Canberra Airport weather station.....	68
Table 8-1 Current and future vegetation integrity (VI) scored for each vegetation zone within the Development Footprint.....	82
Table 8-2 Potential indirect impacts to biodiversity during the construction and operational phases of the Development.....	83
Table 10-1 Full list of mitigation measures proposed to avoid and minimise impacts to native vegetation and habitat.....	95
Table 11-1 Vegetation zones not requiring offset within the Development Footprint.....	102

Appendices

Appendix A BAM Calculator Credit Reports	A-I
Appendix B NGH survey data	B-I
Appendix C EPBC Protected Matters Search Report	C-I
Appendix D EPBC Habitat Evaluation Table	D-I
Appendix E Land Category Assessment	E-I
Appendix F BCD email correspondence	F-I
Appendix G Biodiversity Management Plan.....	G-XXXVI

Acronyms and abbreviations

BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BCD	Biodiversity Conservation Division (now BCS)
BCS	Biodiversity Conservation and Science
BDAR	<i>Biodiversity Development Assessment Report</i>
BMP	Biodiversity Management Plan
BOS	Biodiversity Offset Scheme
BVCS	BioNet Vegetation Classification System
CEEC	Critically Endangered Ecological Community
Cwth	Commonwealth
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
ha	hectares
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometres
m	metres
MNES	Matters of National Environmental Significance under the EPBC Act (<i>c.f.</i>)
OEH	(Former) Office of Environment and Heritage (NSW) (now BCS)
PCT	Plant Community Type
PV	photovoltaic
SII	Serious and irreversible impact
SEARs	Secretary's Environmental Assessment Requirements
SELLS	South East Local Land Services
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TBDC	Threatened Biodiversity Data Collection (NSW Bionet Threatened Biodiversity Profile Data Collection)
TEC	Threatened Ecological Community

Executive summary

The proposed Blind Creek Solar Farm (the Development) is classified as State Significant Development (SSD) under the State and Regional Development State Environmental Planning Policy (SEPP). This Biodiversity Development Assessment Report (BDAR) assesses the impacts of the proposed Development according to the NSW Biodiversity Assessment Methodology (BAM) as required by the Secretary's Environmental Assessment Requirements (SEARs). NGH has prepared this BDAR on behalf of the Proponent, Blind Creek Solar Farm Pty Ltd.

The proposed Development is located in the Queanbeyan-Palerang Local Government Area, approximately 8 km north of the town of Bungendore NSW. The Development would involve the construction, operation and decommissioning of a photovoltaic (PV) solar array and associated battery storage that would supply electricity to the national electricity grid.

The proposed Development Footprint (all areas that may be impacted, as defined in Section 1.1) covers 680 ha and is composed predominantly, of non-native vegetation however, as it contains some land defined as Category 2 land, it requires assessment under the BAM.

The vegetation within the Development Footprint has been assessed by NGH through stratification and vegetation integrity plot (BAM plot) surveys conducted in November 2020, July 2021 and November-December 2021. These data have been used to determine the type and condition of Plant Community Types (PCTs) and associated Threatened Ecological Communities (TECs) within the Development Site. Two PCTs were identified:

- 1100 - *Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*
- 1110 - *River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion*

No area of either PCT 1100 or 1110 within the Development Footprint had sufficient vegetation integrity to generate ecosystem credits under the BAM.

The targeted survey program confirmed the absence of many threatened species at the site, and as a result no species generate any offset credit requirements. White-fronted Chat (*Epthianura albifrons*) has been incidentally recorded at the site, as such BCD has requested that additional surveys are carried out to appropriately assess prescribed impacts. Further surveys were undertaken for this species in July 2022. The White-fronted Chat generates no species credits, however this species is subject to prescribed impacts as the species is known to occupy and utilise non-native vegetation within the Development Footprint.

No serious and irreversible impact (SAIL) candidates would be impacted by the project.

The public exhibition of the Development's assessment documentation (Environmental Impact Statement and all accompanying specialist reports), consideration and response to agency and community submissions and the finalisation of the Development prior to its determination is expected to take several months. White-fronted Chat July 2022 survey results and the prescribed impact assessment for this species is included in the Blind Creek Solar Farm Submissions Report for detailed consideration by BCD.

No ecosystem credits or species credits are generated by the Project, and as a result the retirement of any credits in accordance with the NSW Biodiversity Offsets Scheme (BOS) is not required.

This BDAR also documents impact on Commonwealth Matters of Environmental Significance (MNES). No impacts are anticipated on MNES and no referral under the EPBC Act has been undertaken for the Development.

1. Introduction

NGH has prepared this Biodiversity Development Assessment Report (BDAR) for the proposed Blind Creek Solar Farm Pty Ltd (the Proponent), in accordance with the *Biodiversity Conservation Act 2016* (BC Act) Biodiversity Assessment Method (BAM) 2020, as required by the Secretary's Environmental Assessment Requirements (SEARs). The proposed solar farm is classified as a State Significant Development (SSD) under the *State and Regional Development State Environmental Planning Policy 2011* (SEPP).

The purpose of this BDAR is to identify how the Blind Creek Solar Farm proposes to avoid and minimise impacts to biodiversity arising from the Development, this report will identify any potential impacts that could be characterised as serious and irreversible according to specified principles, and calculate the offset obligation generated by the Development.

1.1 Definitions

The following definitions, as defined in the BAM 2020, are used throughout this report.

Development Site: the broader area surrounding the Development Footprint. Refers to all lots as well as council roads that may be affected by the Development, shown in red in Figure 1-1.

Development Footprint: the upper-most area of land that will be directly impacted by the proposed Development, including access roads and areas used to store construction materials. This is the area where vegetation will be removed or modified by activities undertaken (Figure 1-1). This is the area that has been used to calculate offset credits. It is anticipated that the final infrastructure layout will not require all of this area to be impacted. It has been generously delineated to allow flexibility in the detailed design stages of the project.

Subject Land: land subject to a development, activity, clearing, biodiversity certification or a biodiversity stewardship proposal. It excludes the Assessment Area which surrounds the Subject Land (i.e., the area of land in the 1500 m buffer zone around the Subject Land, see below). For the purposes of this BDAR, the Subject Land and the Development Footprint refer to the same areas (Figure 1-1). This definition of Subject Land was agreed upon after consultation with the Biodiversity Conservation Division (BCD), who advised that for Major Projects, Development Footprint and Subject Land can refer to the same areas. This was the area surveyed for the purpose of this report.

NGH will use the term Development Footprint consistently through this report rather than Subject Land when referring to this Development, to avoid confusion.

Assessment Area: includes the Subject Land and the area of land within the 1500 m buffer zone surrounding the Subject Land see (Figure 2-9). This 1500 m buffer is used to assess biodiversity features outside of the subject land that may still be impacted or relevant to the development as per section 2 Landscape Context.

1.2 Proposal

The proposed Blind Creek Solar Farm (hereto also referred to as the Development) would involve the construction, operation and decommissioning of a photovoltaic (PV) solar array and battery storage facility that would supply electricity to the national electricity grid.

The Development is located along Tarago Road, approximately 8 kilometres (km) north of Bungendore, NSW, and 35km northeast of Canberra, Australian Capital Territory (ACT) (Figure 1-1). The Development Site would be accessible via Tarago Road which runs east-west at the southern boundary of the Development Site.

This Development covers the construction, operation (including any upgrades during the operational life) and decommissioning of the solar farm, Battery Energy Storage System (BESS) and associated infrastructure. The Development would have a generation capacity of up to 350MW-ac and would include a facility connection substation, BESS of up to 300MWh/600MWh and required ancillary infrastructure including inverter/transformer stations, operations and maintenance buildings, control room, internal access tracks, Tarago Road and Blind Creek Entrance intersection upgrades, Blind Creek Bridge upgrade, above ground and underground electrical cabling, security fencing, closed-circuit television (CCTV), lighting, landscape screening, perimeter fencing and communication tower.

An existing 330KV transmission line would be utilised as the grid connection for the Development to the national electricity grid.

The construction phase of the Development is expected to take 12 to 18 months and would have an operational life of up to 35 years.

1.3 Subject land

1.3.1 Location

The proposed Development is located in the Queanbeyan Palerang Local Government Area, approximately 50 km north-east of Canberra ACT, and approximately 8 km north of the town of Bungendore NSW (Figure 1-1).

The Blind Creek Solar Farm Project would be located on an approximately 700ha site. The Subject land is defined as all lots affected by the development and includes:

Solar farm array and ancillary infrastructure	Lot 1 DP237079	Lot 1 DP1154765
	Lot 2 DP237079	Lot 2 DP1154765
	Lot 3 DP237079	Lot 1 DP456698
	Lot 4 DP237079	Lot 17 DP535180
	Lot 9 DP237079	Lot E DP38379
Substation and battery (if AC coupled)	Lot 1 DP456698	
Access road upgrades	Lot 1 DP 1154765	

It also includes any Crown land within the Development Footprint, including:

- An isolated segment of Crown road in Lot 2 DP 1154765
- A Crown road which forms the southern boundary of Lot 1 DP 456698 and the northern boundary of Lot 1 DP1154765

- Two portions of Crown road that form the boundary between Lot 11 DP237079 and Lot 10 DP237079.

1.3.2 General description

The majority of the Development Footprint consists of agricultural land that has been cleared of its tree cover for decades, with some areas that may have been naturally devoid of tree cover. This land has been affected by grazing, pasture improvement and land clearing. A small area of remnant woodland vegetation remains in the eastern corner of the Development Site. The southwestern border is bounded by Butmaroo Creek (Strahler sixth order), which continues to flow through the south-eastern area of the site. Wrights Creek (Strahler fourth order) roughly bisects the Development Footprint. Blind Creek (Strahler fifth order) crosses the main site access road. The edge of Lake George is 600m from the north-western edge of the Development Footprint. There is an unnamed ephemeral wetland in the north of the Development Footprint (Figure 1-1).

The proposed Development Footprint covers 680.02 ha. The majority of the land is zoned RU1 Primary Production, with a smaller area zoned E3 Environmental Management. There are several small areas of Crown Land within the Development Footprint including Crown roads. For more detail on zoning, please see the Land Category Assessment (Appendix E).

The Development Site typically slopes from east to west with elevations ranging from about 670m AHD at Lake George to 720m AHD. On its northern flank the Development Site abuts a relatively steep terrain which rises to an elevation of about 870m AHD.

1.4 Data sources

The following data resources were used to prepare this BDAR. Information resources (i.e., non-data resources), are cited in text where appropriate.

1.4.1 Spatial data

- South East Local Land Services Biometric vegetation map, 2014. VIS_ID 4211 https://datasets.seed.nsw.gov.au/dataset/south-east-local-land-services-biometric-vegetation-map-2014-vis_id-4211 (accessed July 2021)
- CEEC: Monaro and Werriwa Tablelands Cool Temperate Grassy Woodlands v1.4 <https://datasets.seed.nsw.gov.au/dataset/ceec-monaro-and-werriwa-tablelands-cool-temperate-grassy-woodlands-v1-4>
- Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Regions) <https://datasets.seed.nsw.gov.au/dataset/interim-biogeographic-regionalisation-for-australia-ibra-version-7-regions> (accessed July 2021)
- Interim Biogeographic Regionalisation for Australia (IBRA), Version 7 (Subregions) <https://datasets.seed.nsw.gov.au/dataset/interim-biogeographic-regionalisation-for-australia-ibra-version-7-subregions> (accessed July 2021)
- NSW (Mitchell) Landscapes - version 3.1 <https://datasets.seed.nsw.gov.au/dataset/nsw-mitchell-landscapes-version-3-1> (accessed July 2021)
- Hydro line spatial data <https://www.industry.nsw.gov.au/water/licensing-trade/hydroline-spatial-data> (accessed July 2021)
- NSW Wetlands <https://datasets.seed.nsw.gov.au/dataset/nsw-wetlands047c7> (accessed July 2021)

- Ramsar Wetlands of NSW <https://datasets.seed.nsw.gov.au/dataset/ramsar-wetlands-of-nsw0c113> (accessed July 2021)
- Biodiversity Values Map <https://datasets.seed.nsw.gov.au/dataset/biodiversity-values-map> (accessed July 2021)
- NSW Bionet Threatened Biodiversity Profile Data Collection <https://data.gov.au/dataset/ds-nsw-9125a0e2-a575-40d4-83b0-45d985420d0e/details?q=> (Accessed 2021, multiple dates)
- Transitional - Native Vegetation Regulatory Map <https://datasets.seed.nsw.gov.au/dataset/native-vegetation-regulatory-map-clone-4ffa-clone-daa9> (accessed July 2021)
- Environmental Planning Instrument - Land Zoning <https://datasets.seed.nsw.gov.au/dataset/environment-planning-instrument-local-environmental-plan-land-zoning> (accessed July 2021)
- Acid Sulfate Soils Risk <https://datasets.seed.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c> (accessed July 2021)
- Environmental Planning Instrument – Salinity <https://datasets.seed.nsw.gov.au/dataset/epi-salinity> (accessed July 2021)

1.4.2 Other data

- Environmental Protection Authority (EPA) Contaminated Land - Record of Notices <https://datasets.seed.nsw.gov.au/dataset/contaminated-land-record-of-notice-iar> (accessed July 2021)
- Australia's IBRA Bioregions and sub-bioregions. Accessed December 2020 (DAWE, 2020) <http://environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps>
- Department of Environment and Climate Change NSW (DECC, 2002) (Descriptions for NSW (Mitchell) Landscapes, Version 3)
- NSW OEH's Biodiversity Assessment Method (BAM) calculator (<http://www.environment.nsw.gov.au/bbccapp/ui/mynews.aspx>)
- NSW OEH's BioNet threatened biodiversity database. Accessed online via login at <http://www.bionet.nsw.gov.au/>
- OEH BioNet Vegetation Classification Database (OEH 2021). Accessed online via login at <http://www.environment.nsw.gov.au/NSWVCA20PRapp/default.aspx>
- OEH VIS Mapping. Accessed online at <http://www.environment.nsw.gov.au/research/VISmap.htm>
- Office of Environment and Heritage (OEH) (2020). Biodiversity Assessment Method



20-403 Blind Creek Solar Farm BDAR
Site Map 1

Legend

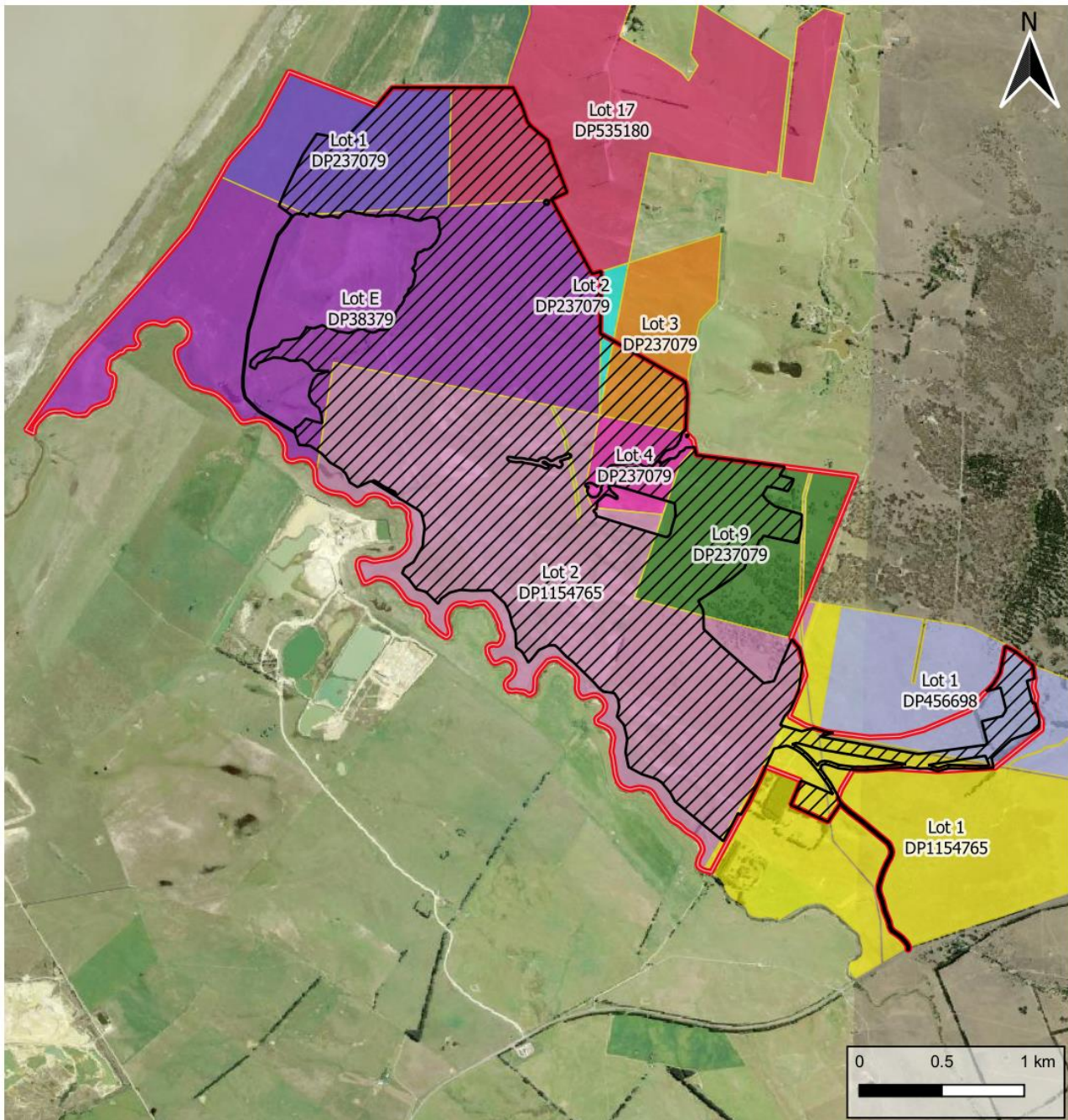
- Development Site
- Development Footprint / Subject Land
- ◆ Blind creek road entrance
- Roads
- Riparian buffer
- Wetlands
- 1st & 2nd order



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 20210630 \ Site Map 1
 Author: rebecca.r
 Date created: 05.05.2022
 Datum: GDA94 / MGA zone 55



Figure 1-1 Site Map 1, showing the Development Site and Development Footprint/Subject Land



20-403 Blind Creek Solar Farm BDAR
Site Map 2: Lots and Deposited Plans

Legend

- Development Site
- Development Footprint / Subject Land

Lots and Deposited Plans

- | | | |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Lot 1 DP1154765 | Lot 2 DP237079 | Lot 10 DP237079 |
| Lot 2 DP1154765 | Lot 3 DP237079 | Lot 11 DP237079 |
| Lot 1 DP1167699 | Lot 4 DP237079 | Lot E DP38379 |
| | Lot 9 DP237079 | Lot 1 DP456698 |
| | | Lot 17 DP535180 |

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Ref: 20-403 Blind Creek Solar Farm BDAR
 20210630 \ Site Map 2: Lots and Deposited Plans

Author: rebecca.r
 Date created: 05.05.2022
 Datum: GDA94 / MGA zone 55



Figure 1-2 Site Map 2, showing lots and deposited plans; lots are coloured so that the lot boundary and full extent of each lot is clear

2. Landscape context

Most of the landscape features described in the following section are illustrated in Location Maps 1 and 2 (Figure 2-9, Figure 2-10). Landscape features that are excluded from this mapping are discussed in detail below.

2.1 Native vegetation cover (%)

NGH has estimated that the native vegetation coverage within the 1500 m Assessment Area to be 9% (Figure 2-10) with 349 ha of native vegetation within a 1500 m buffer that totals 4044 ha.

The best available native vegetation mapping for this region is the South-East Local Land Services Biometric vegetation map, 2014. VIS_ID 4211 (SELLS, 2014). NGH have used this mapping as the basis for calculating the native vegetation cover. Some areas of native trees have been omitted from the SELLS map; we have added these areas to the map based on field assessments. Other large areas of trees are known to be pine plantations from field assessment. Without additional vegetation mapping outside the Development Site, it is difficult to determine whether any of the grassland areas within the 1500m buffer contain native vegetation or not; the majority of these areas appear to be clearly delineated paddocks used for agriculture.

2.2 Bioregions and NSW (Mitchell) landscapes

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies Australia's landscape into geographically distinct regions known as bioregions or IBRA regions. These IBRA regions are based on a common climate, geology landform, native vegetation and species information. They are further subdivided into subregions based on localised patterns of geomorphology within each bioregion.

NSW (Mitchell) landscapes, formerly known as Mitchell landscapes, are mapped at a broad scale. As such, the actual NSW (Mitchell) landscape in which the Subject Land occurs may not always be the landscape shown on the NSW (Mitchell) landscapes maps. Where the description of an adjacent NSW (Mitchell) landscape more accurately reflects the landscape based on field observation, the adjacent NSW (Mitchell) landscape should be chosen and justified. If the Subject Land is located within more than one NSW (Mitchell) landscape, the NSW (Mitchell) landscape in which the largest area of impact will occur is selected for the purposes of assessment.

2.2.1 IBRA bioregion

The Development Site occurs within the South Eastern Highlands Bioregion, this was entered into the Biodiversity Assessment Method Calculator (BAM-C) for the purposes of this assessment. As the Development Site is located well within the boundary of this bioregion, it is not shown on either Location Map. The description of the bioregion below is taken from *The Bioregions of New South Wales: their biodiversity, conservation and history* (NSW National Parks and Wildlife Service, 2003).

This bioregion lies just inland from the coastal South East Corner and Sydney Basin bioregions, including most of the ACT and extending down into Victoria. The Lachlan, Macquarie, Murray, Murrumbidgee, Shoalhaven and Snowy Rivers all flow across the bioregion. It is dominated by a temperate climate characterised by warm summers and no dry season. Significant areas in the north and south of the bioregion are at higher elevations in a montane climate zone, where

summers are much milder. Both soils and vegetation vary across the bioregion in relation to altitude, temperature and rainfall.

2.2.2 IBRA subregion

The Development Site is located within the Monaro Subregion. This was entered into the BAM-C for the purposes of this assessment. As the Development Site is located well within the boundary of this bioregion, it is not shown on either Location Map. The description of the subregion below is taken from *The Bioregions of New South Wales: their biodiversity, conservation and history* (NSW National Parks and Wildlife Service, 2003).

The geology of the Monaro subregion is characterised by block faulted ranges and closed lake basins in Silurian and Devonian acid fine grained sedimentary and metamorphic rocks, with some granites. There are also extensive areas of thin Tertiary basalt flows over lake and river sediments.

The characteristic landforms found in this subregion include sloping plateaus rising from 600-1300 m, north to south, with structural ridges of more resistant rock, stepped plains on basalt with intervening low areas of granite or sedimentary rocks, and shallow lakes and swamps (some permanent, many closed basins that are periodically dry). The subregion is in a rainshadow (an area of significantly reduced rainfall behind a mountainous region), with 450-700 mm rainfall annually.

Vegetation typically consists of Snow Gum, Ribbon Gum, Candle-bark Gum, Broad-leaved Peppermint and Mountain Gum Open Woodlands with Kangaroo Grass understorey, white gum, mottled gum on hills. Brown barrel and black ash forests in east with west facing patches of dwarf casuarina heathland, and extensive grasslands of snow grass, spear grass and wallaby grass on the driest plains with clumps of snow gum amongst rocky outcrops.

2.2.3 NSW (Mitchell) landscape

The Development Site is mapped as part of the Lake George Complex NSW (Mitchell) landscape, with smaller areas of Gundary Plains (Figure 2-9). Descriptions for these two NSW (Mitchell) Landscapes are taken from *Descriptions for NSW (Mitchell) Landscapes Version 2* (Mitchell, 2002). For the purposes of this BDAR (and BAM-C inputs), we have used the dominant Lake George Complex Landscape, as it covers the greater area and more accurately describes the site.

Lake George Complex. Closed drainage basins of Quaternary lakes and swamps set within block faulted ranges. Extensive Tertiary quartz gravel, sand, and mud overlying Silurian-Devonian gneissic granite and Silurian quartz sandstone and mudstone. General elevation 700 m, local relief of lake beds <50 m, rounded hills stand above the plain to 900m. Eastern margins with well-developed sandy lunettes. Maximum lake depths about 7 m, may be dry for periods of years or vary in water level over decades. Evidence of much greater extent and depth during the Pleistocene ice ages. Self-mulching grey clays on the lakebeds, yellow earths on the lunettes. Wet tussock grasslands of spear grass (*Austrostipa* sp.) and *Poa* sp. with kangaroo grass (*Themeda triandra*) on lake margins, now extensively altered by exotics. Clumps of sparse stunted snow gums (*Eucalyptus pauciflora*) on low hills and sandy lunettes. Common reed (*Phragmites australis*) around freshwater seepage areas on lake margins.

Gundary Plains. Wide open valleys with abandoned terraces and Quaternary lakebeds on lower Devonian siltstone, sandstone, andesite and quartz felspar porphyry. General elevation 75 m, local relief <30 m. Yellow, hard setting texture-contrast soils with distinct bleached A2 horizons. Grasslands of spear grass (*Austrostipa* sp.) and kangaroo grass (*Themeda triandra*) with small

clumps of sparse snow gum (*Eucalyptus pauciflora*) on rounded rocky hills and sandy lunettes of former lakes.

2.3 Hydrology

2.3.1 Strahler

There are four streams within the Development Site, all of which are tributaries of the Murrumbidgee River.

Butmaroo Creek

Butmaroo Creek, a sixth order stream runs through the southern part of the Development Site (Figure 2-9). There has been water in this stream on every occasion that NGH ecologists visited the Development Site. The vegetation adjacent the creek consists of the same predominantly exotic species that persist in adjacent paddocks, a result of the long history of agricultural land use (Figure 2-1). Butmaroo Creek has been excluded from the Development Footprint, by a buffer of at least 40 m or more each side of the Strahler identified waterway (Figure 2-10). A buffering distance guideline is provided in BAM 2020, Appendix E, Table 14 (buffer distance does not include the width of the water body but is measured from the Strahler line).

Wrights Creek

Wrights Creek, an ephemeral fourth order stream, roughly bisects the Development Site (Figure 2-9). During dry periods there appears to be no surface water flow, and the creek dries up and recedes to a series of shallow stagnant puddles restricted to the north-east section (Figure 2-3). During wetter periods with higher rainfall (e.g. spring 2021), it adopts a dispersed flow over the flat plain within the Development Site and occasional unconnected channelling in the north east section of the site (Figure 2-4). The vegetation adjacent to the creek consists of the same predominantly exotic species that persist in adjacent paddocks, a result of the long history of agricultural use of the land.

Although Wrights Creek has been mapped (NSW Hydroline Dataset) as a tributary of Butmaroo Creek with a confluence within the on the western edge of the Development Site, ground truthing shows that there is no direct discharge into Butmaroo Creek via a defined watercourse. Isolated channels occur in three locations in the east of the Development Site only (Figure 2-10). These channels are well vegetated and relatively stable (evidenced by the historic aerial imagery showing there have been no significant changes since 1959). Towards the south-western section, the creek bed flattens out and there is no clearly defined watercourse with bed and bank (Figure 2-2). Specifically, the western section of the mapped watercourse, where it is shown to join Butmaroo Creek, does not appear accurate. The bed and banks of Wrights Creek are not discernible or distinguishable from the surrounding landscape. As such there is no evidence of surface flow in this location and Wrights Creek does not discharge into Butmaroo Creek.

Blind Creek

Blind Creek (known locally as Bridge Creek), a fifth order stream, flows east to west across the Development Site's main access road, joining Butmaroo Creek. The existing road crossing over the creek is a low-level causeway that floods after periods of high rainfall (Figure 2-5).

First order stream

An unnamed ephemeral first order stream that flows into Blind Creek bisects the eastern arm of the Development Footprint (Figure 2-9). There was no evidence of a creek bed or flowing water in this area during any of the site visits.



Figure 2-1 Photo of Butmaroo Creek (November 2020)



Figure 2-2 Photo of the south-west section of Wrights Creek (close to where it meets Butmaroo Creek) looking north. No evidence of channel or bank. Ground validation does not support the NSW Hydroline Dataset mapping.



Figure 2-3 Photo of north-eastern section of Wrights Creek during a dry period (April 2021)



Figure 2-4 Photo of north-east section of Wrights Creek following a period of high rainfall (November 2021)



Figure 2-5 Photo of Blind Creek (Bridge Creek) causeway, following period of high rainfall (November 2021)

2.3.2 Wetlands

The south-eastern edge of Lake George borders the north-western edge of the Development Site is not connected with the site (Figure 2-9). A wetland mapped as a 'reservoir' in the NSW Wetlands spatial dataset (State Government of NSW & NSW Department of Planning, Industry and Environment, 2010) occurs in the north-western part of the Development Site, but has been excluded from the Development Footprint (Figure 2-6, Figure 2-9). The water level in the wetland varies with rainfall, at times drying out with historical imagery showing it has been frequently cropped in these dry times. Between October 2020 to November 2021 this wetland ranged from dry to almost full, shown at a high water level below in Figure 2-6.

During periods of high rainfall, other areas of the site become inundated with water and the ground becomes boggy, and occasionally shallow puddles form (Figure 2-7).



Figure 2-6 Photo of the southern side of the wetland to the north of the Development Site (January 2021)



Figure 2-7 Photo after periods of rainfall (July 2021) located north west of the woodland and south of Wrights Creek. It was a common occurrence, following rainfall, to have areas of standing water within the flat pastures within the Development Site.

2.4 Habitat connectivity

A review of available spatial data determined that there are no government identified biodiversity corridors within the Development Footprint.

The wooded area in the eastern part of the Development Site is connected to a larger forested area to the east of the site (Figure 3-7), however this area has been excluded from the Development Footprint and any existing connectivity should not be affected by the Development.

Butmaroo Creek and associated riparian vegetation may serve as a habitat corridor for aquatic or wetland species, however it has been excluded from the Development Footprint.

2.5 Geology

2.5.1 Areas of geological significance

There are no caves, karsts, or cliffs within the Development Footprint or Development Site.

There are some small rocky outcrop areas in the south-eastern arm of the Development Site, covering approximately 0.4 ha (Figure 2-9). NGH ecologists assessed the rocky outcrops in November 2021 and concluded that they were too large and too deeply embedded to provide suitable habitat for bushrock species such as the Pink-tailed Worm Lizard (*Aprasia parapulchella*) (Figure 2-8).



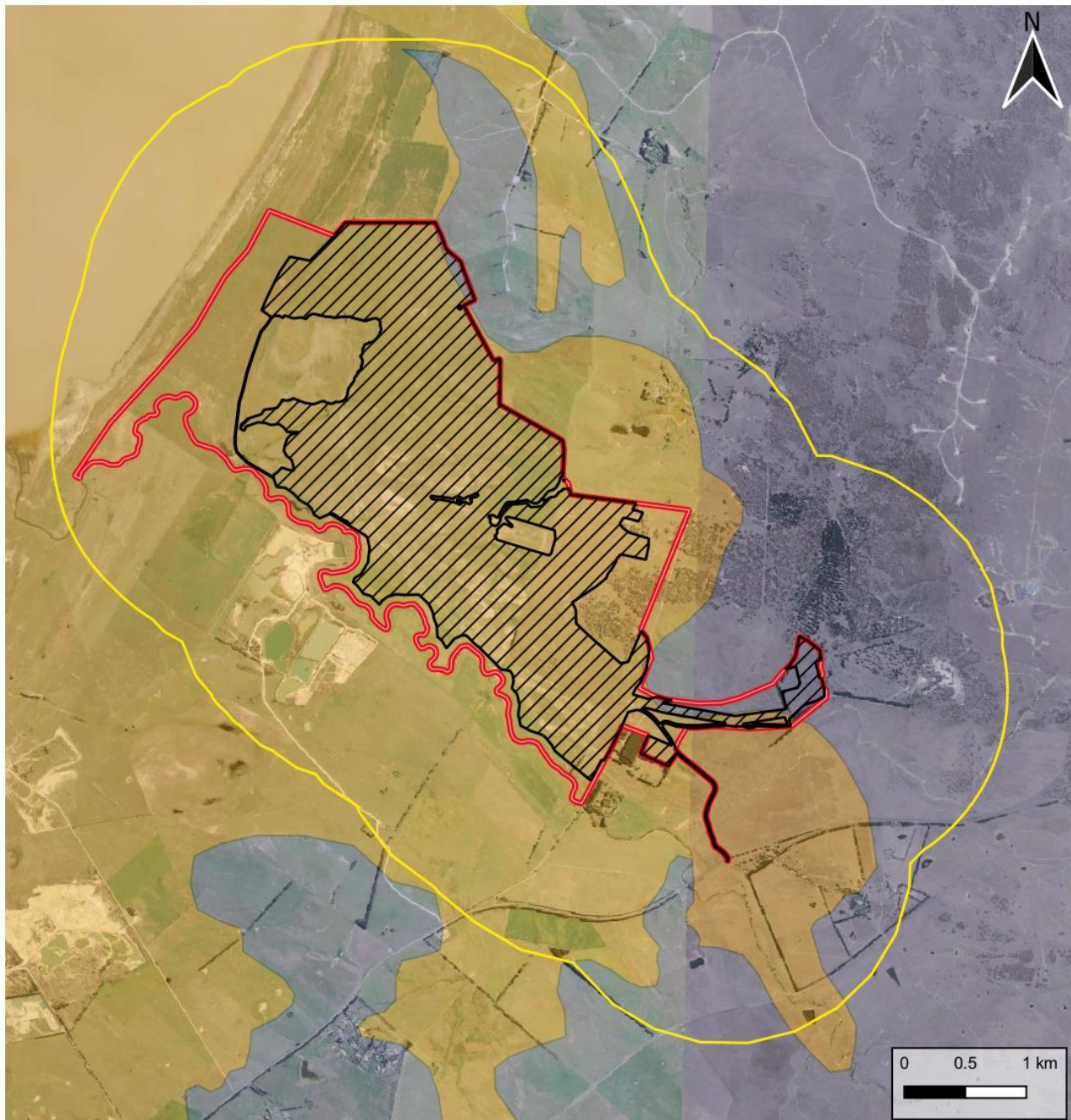
Figure 2-8 Photo of rocky outcrop within the Development Footprint

2.5.2 Soil hazard features

The *NSW Acid Sulfate Soils Risk* mapping, *Environmental Protection Authority contaminated lands records*, and *Environmental Planning Instrument – Salinity* mapping were reviewed, and no mapped area or records were identified within the Development Footprint.

2.6 Areas of Outstanding Biodiversity Value

Areas of Outstanding Biodiversity Value are special areas with irreplaceable biodiversity values that are important to the whole of New South Wales, Australia or globally. There are no Areas of Outstanding Biodiversity Value within the Development Footprint or Development Site.



20-403 Blind Creek Solar Farm BDAR

Location map 1

Legend

- Development Site
- Development Footprint / Subject Land
- Assessment Area (1500 m)

NSW (Mitchell) Landscapes

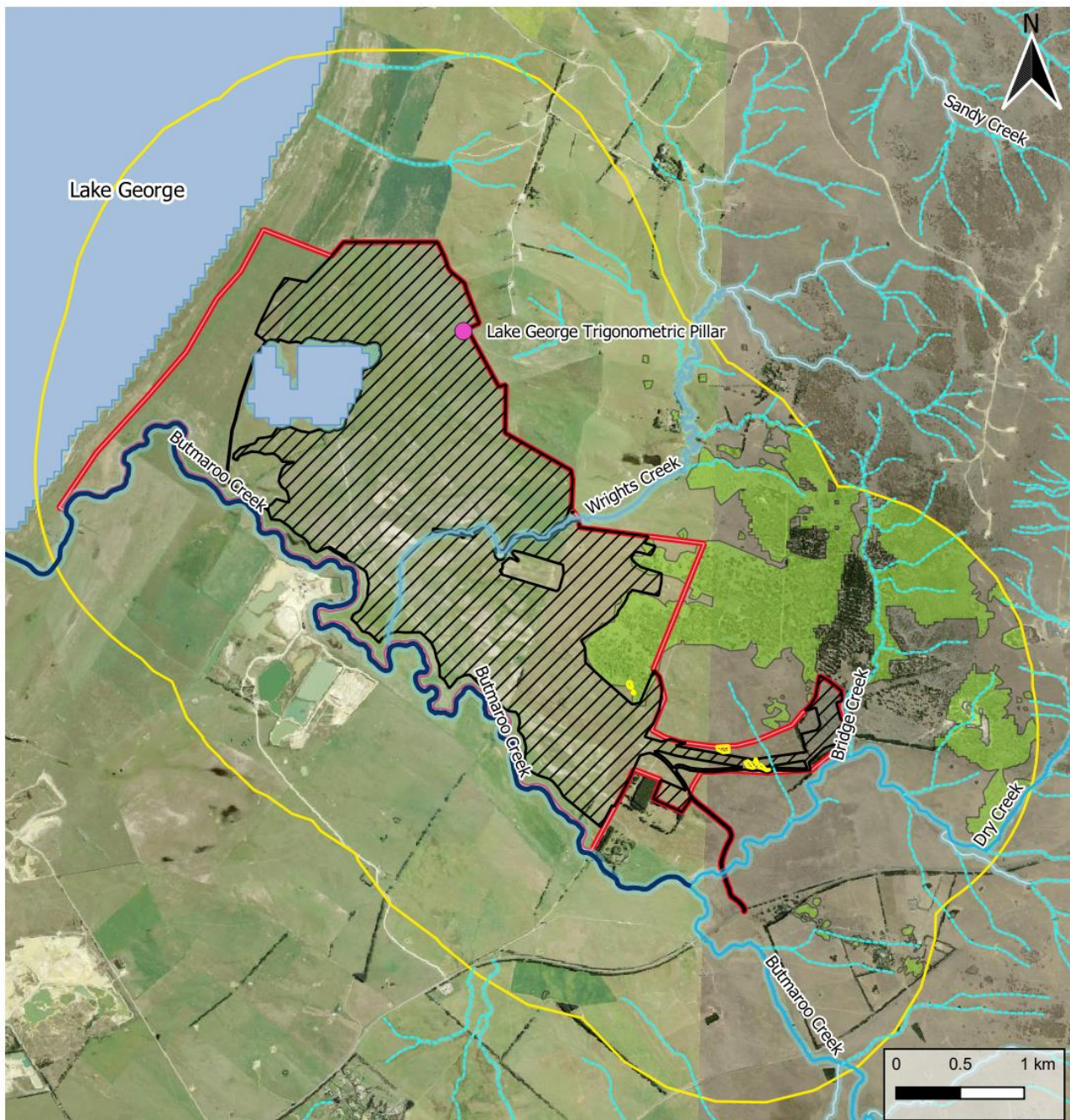
- Gundry Plains
- Lake George Complex

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Figure 2-9 Location Map 1: NSW (Mitchell) Landscapes



20-403 Blind Creek Solar Farm BDAR

Location map 2

Legend

- | | |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Development Site | --- Strahler stream order 1 & 2 |
| Development Footprint / Subject Land | --- 3 |
| Assessment Area (1500 m) | --- 4 |
| Native vegetation extent | |
| Native vegetation | --- 5 |
| Rocky areas | --- 6 |
| ● Lake George Trigonometric Pillar | Wetlands |
| | Riparian buffer |

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 20210630 \ Location map 2
 Author: rebecca.r
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Figure 2-10 Location Map 2: Estimated native vegetation extent within the 1500 m Assessment Area, riparian areas, Strahler stream order, Strahler buffers, and areas of rocky habitat

3. Native vegetation

3.1 Native vegetation extent

NGH assessed all areas of vegetation within the Development Footprint (Figure 3-7). Vegetation within the Development Site was also broadly assessed; some areas of vegetation now excluded from the Development Footprint were also assessed under older iterations of the Development Footprint (see Chapter 7: Avoid and minimise impacts).

The majority of the Development Footprint and Development Site is dominated by non-native vegetation. The site has a long history of agricultural use and has been extensively cropped with non-native grasses and other crops in recent years, as evidenced by recent aerial imagery and verification from site visits. Despite this, the majority of the Development Footprint is mapped Category 2 (regulated land), requiring all areas of Category 2 land within the Development Footprint to be assigned a Plant Community Type (PCT), and assessed under the BAM. (Refer to Appendix E Land Category Assessment for the Development Site).

Remaining areas of more intact native vegetation, including woody vegetation, are restricted to an area adjacent to the north-eastern boundary of the larger Development Site. However, the wooded area has been excluded from the Development Footprint, after consultation with the Proponent to avoid impacts on higher biodiversity value areas (see Chapter 7: Avoid and minimise impacts).

3.1.1 Existing native vegetation mapping and data

Review of existing **South East Local Land Services Biometric vegetation map, 2014. VIS_ID 4211** for the region shows only a small area of mapped native vegetation in the eastern edge of the Development Site, mapped as *PCT 888 - Inland Scribbly Gum - Brittle Gum low woodland of the eastern tablelands, South Eastern Highlands Bioregion*. After undertaking floristic surveys, NGH ecologists determined that this PCT mapping was not accurate, and have remapped this area (see Chapter 3.2 below).

Review of the existing **CEEC: Monaro and Werriwa Tablelands Cool Temperate Grassy Woodlands v1.4** map shows an area mapped as a Critically Endangered Ecological Community within the Development Site. After undertaking floristic surveys, NGH ecologists determined that the wooded area within the mapped areas contains PCTs associated with the *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion* Threatened Ecological Community (TEC), critically endangered under the BC Act. This TEC is also listed as a Serious and Irreversible Impact (SII) entity.

After BCD reviewed the BDAR during the exhibition of the EIS, BCD was satisfied that due to the highly degraded condition of the PCT associated with this TEC within the development footprint, this PCT no longer meet the criteria for the TEC and SII entity. Given that the area of land classed as this TEC is avoided by the Development Footprint (see Chapter 3.2 below) the SII assessment for the *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands* has now been removed from this BDAR version.

3.1.2 Floristic surveys

Floristic surveys were undertaken in November 2020, and July, November, and December 2021 as well as April 2022.

BAM accredited NGH ecologists completed 18 plot-based vegetation integrity surveys (BAM plots) in total across the Development Site to verify the existing PCT mapping, assign new PCTs where relevant, and stratify the vegetation within the site (Figure 3-7).

Note that some plots were undertaken under older iterations of the Development Footprint and Development Site, which is why they are not located within the current Development Footprint or Development Site. They are shown here to demonstrate the BAM principles of avoiding and minimising impacts (refer to Chapter 7: Avoid and minimise impacts).

In total, 10 BAM plots were undertaken within the current Development Footprint.

Each BAM plot consisted of an assessment of the vegetation composition and structure within a 20 x 20 m plot, and the vegetation function over an extended 20 x 50 m area, in accordance with the BAM 2020 methodology (NSW Department of Planning, Industry and Environment, 2020).

Ecologists also completed 30 rapid vegetation assessments within the Development Footprint to support NGH's vegetation classification as 'poor' for most of the Development Site, and to also assist in identifying any areas of potential habitat for threatened species. Rapid assessments make quick note of the overstorey species, if present, as well as the dominant mid- and lower-storey species (see Appendix B, B.3 for data).

Targeted flora surveys are discussed in Section 4.4.4.

3.2 Plant Community Types (PCTs)

NGH ecologists used the BioNet Vegetation Classification System (BVCS) to classify the PCTs within the Development Footprint. PCT Identification was based on:

- the dominant native species present inside 20 x 20 m plots
- the tree species observed in similar landforms adjoining the Development Footprint (where trees were absent in plots, for PCTs with an overstorey)
- the location within the IBRA subregion and distribution according to the BVCS.

The PCTs identified during floristic surveys differed from the available South East Local Land Services Biometric vegetation map. Two PCTs were identified:

- *1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*
- *1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion*

Despite the majority of the Development Footprint being dominated by exotic vegetation, as Category 2 land it requires a PCT designation. NGH has mapped most of the Development Footprint as PCT 1110 (Figure 3-7).

NGH has mapped the woody vegetation on the eastern edge of the Development Site as PCT 1100; this area is now excluded from the Development Footprint. There is also a thin strip of PCT 1100 under the existing powerline easement which is included in the Development Footprint, though it lacks an overstorey.

Descriptions and photographs of the PCTs are provided in Table 3-1 and Table 3-2 below.

Table 3-1 PCT 1100 details

1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion				
PCT common name	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion			
Vegetation formation	Grassy woodlands			
Vegetation class	Tableland Clay Grassy Woodlands			
Extent	Development Footprint/Subject Land	0.87 ha		
	Development Site (excluding Footprint):	38.22 ha		
Evidence used to justify classification	The dominant overstorey species, <i>Eucalyptus pauciflora</i> , within BAM plots, coupled with presence of <i>Eucalyptus stellulata</i> in areas adjacent to these plots, narrowed the number of possible PCTs down to 5 within the Monaro IBRA Subregion. More dominant coverage of <i>Pteridium esculentum</i> , <i>Lomandra longifolia</i> , and <i>Hydrocotyle laxiflora</i> narrowed the selection down to PCT 1100 and 1110 and 1191. 1110 and 1191 are classed as Temperate Montane Grasslands and Subalpine Woodlands respectively, neither of which accurately describe the vegetation class of this PCT.			
Species relied upon for PCT identification	Species	% cover in plot		
		Plot 1	Plot 2	Plot 9
	Overstorey: <i>Eucalyptus pauciflora</i>	30%	30%	0%
	Understorey: <i>Glycine clandestina</i>	0%	0.1%	0%
	<i>Hydrocotyle laxiflora</i>	0.5%	0.2%	0%
	<i>Lomandra longifolia</i>	4%	0.5%	0%
	<i>Pteridium esculentum</i>	50%	3%	20%
	<i>Themeda triandra</i>	0.1%	0%	0%
TEC status	<p>This PCT is associated with three TECs:</p> <ul style="list-style-type: none">Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions (Endangered under the BC Act)Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion (Critically Endangered under the BC Act)Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions (Critically Endangered under the BC Act) <p>After BCD reviewed the BDAR during the exhibition of the EIS, BCD was satisfied that due to the highly degraded condition of the PCT</p>			

1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion

	associated with this TEC within the development site, this PCT no longer meet the criteria for this TEC.
Estimate % PCT cleared	83%



Figure 3-1 Photo of PCT 1100 in woodland area (November 2020), excluded from the Development Footprint



Figure 3-2 Photo of PCT 1100 under the powerline easement in grassland condition (November 2021)

Table 3-2 PCT 1110 details

1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion		
PCT common name	River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	
Vegetation formation	Grasslands	
Vegetation class	Temperate Montane Grasslands	
Extent	Development Footprint/Subject Land:	635.38ha
	Development Site (excluding Footprint):	203.305
Evidence used to justify classification	During a preliminary site assessment, plant species within areas covered by this PCT were noted down. However, at the time BAM plots were undertaken the vegetation condition had changed and was not of sufficient quality to determine the PCT. The following species were opportunistically recorded during preliminary fieldwork, and these characteristic species, along with the vegetation class and sub IBRA region, were used to assign a PCT.	
Species relied upon for PCT identification	Species	
	<i>Themeda triandra</i>	<i>Helichrysum rutidolepis</i>
	<i>Rytidosperma sp.</i>	<i>Euchiton sp.</i>
	<i>Vittadinia sp.</i>	<i>Juncus sp.</i>
	<i>Eragrostis sp</i>	<i>Carex bichenoviana</i>
TEC status	This PCT is associated with one Commonwealth listed TEC: <ul style="list-style-type: none"> Natural Temperate Grassland of the South Eastern Highlands (Critically endangered under the EPBC Act – see Chapter 5.2) There are no TECs listed under the BC Act associated with this PCT.	
Estimate % PCT cleared	90%	



Figure 3-3 Photo of PCT 1110 at boundary with PCT 1100 woodland, showing clear delineation between woodland and PCT 1110 grassland dominated by sown ryegrass



Figure 3-4 Photo of PCT 1110 in low condition, with Serrated Tussock (*Nassella trichotoma*) evident in the foreground (April 2021)

3.3 Non-native vegetation and cleared areas

The majority of the Development Site and Development Footprint is dominated by non-native vegetation.

The Development Site comprises several large paddocks, which have been consistently used for cropping and grazing for many decades. The crops grown on the Development Site are characteristic of agriculture in the Queanbeyan-Palerang LGA, being a wheat/oat and brassica/lucerne rotation, interspersed with periods of perennial exotic pastures (e.g., Figure 3-5). BAM plot data and rapid vegetation assessment data (Appendix B: B.1, B.3) provides evidence of very little native vegetation coverage within these pasture/cropped areas.

However, as NGH conservatively mapped the majority of these areas as Category 2 (regulated land) (see Land Category Assessment, Appendix E), these areas require a PCT classification (see Chapter 3.2 above). Other non-native vegetation within the Development Footprint includes some stands of planted exotic pines and elm trees (Figure 3-7).



Figure 3-5 Photo of the eastern arm of the Development Site, with lines of sown grasses and vegetable crop evident (June 2020)



Figure 3-6 Photo of field close to Wrights Creek, showing high coverage of Scotch Thistle (*Onopordum acanthium*) (November 2021)

3.4 Vegetation Integrity (VI) assessment

BAM plots were used to further delineate PCTs into vegetation zones within the Development Footprint (Table 3-3).

Data for each plot was first entered individually into the BAM-C, generating a VI score (between 0-100) for each plot. Based on the PCT and VI score, areas of vegetation and BAM plots were grouped together into vegetation zones based on PCT and condition:

- VI scores <15 – ‘poor’
- VI scores between 15-29 – ‘low’
- VI scores between 30-59 – ‘moderate’
- VI scores <60 – ‘high’

Zones were also allocated vegetation classes, i.e., ‘woodland’, ‘grassland’. On site vegetation stratification and recent aerial imagery was used to support the delineation of the different vegetation zones.

Some of the vegetation zones featured in Table 3-3 below (shown in red) are present only in the Development Site, not the Development Footprint. These areas have not been entered into the BAM-C and do not generate credits. Similarly, some BAM plots fall outside of the Development Footprint, and Development Site. Their extent within the Development Site is shown below in Table 3-3 and Figure 3-7 for the purposes of evaluating prescribed impacts and demonstrating the BAM principles of avoidance and minimisation of impacts (for more detail see Chapter 7: Avoid and minimise impacts).

Table 3-3 Vegetation zones within the Development Footprint and Development Site; italic text indicates zones no longer within the Development Footprint

Zone #	PCT	Zone name	VI score	Area (ha)		Required no. plots (BAM)	No. plots undertaken	Patch size
				Dev. footprint	Development Site ¹			
1	1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	1110_non-nativegrassland_poor	2.4	635.38	808.57	7	9	101
2	1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	1100_non-nativegrassland_poor	0.8	0.87	0.87	1	1	101
-	<i>1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion</i>	<i>1100_woodland_moderate</i>	-	0	38.22	0	2	-
-	<i>1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion</i>	<i>1110_wetland_poor</i>	-	0	38.58	0	1	-
-	<i>1110 – River Tussock – Tall Sedge – Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion</i>	<i>1110_creekline_poor</i>	-	0	18.535	0	1-	-

¹ The broader Development site areas include the Development Footprint.

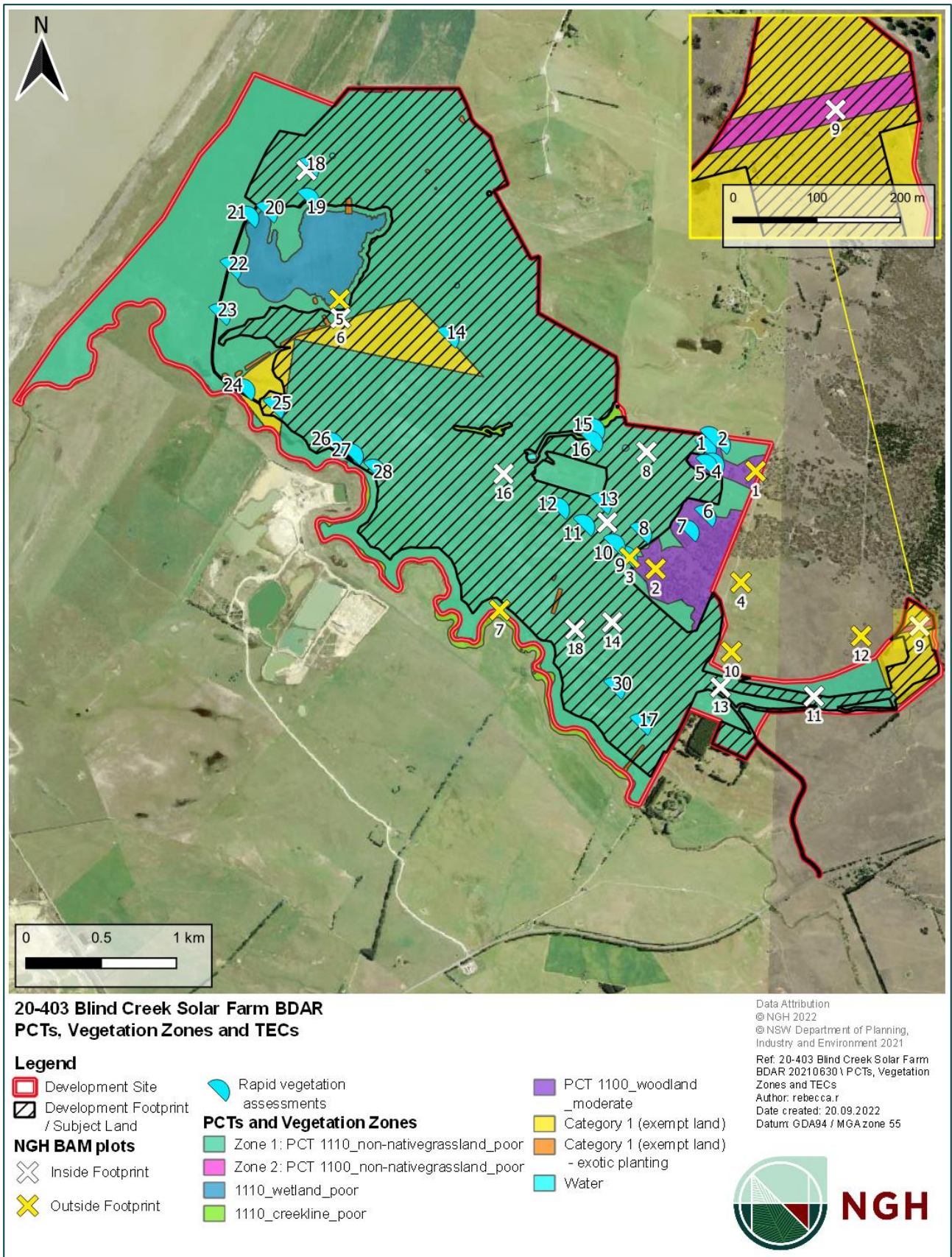


Figure 3-7 PCTs, vegetation zones, and location of BAM plots within the Development Footprint and Development Site

4. Threatened species

4.1 Ecosystem credit species

The ecosystem credit species listed in Table 4-1 were returned by the BAM-C as being associated with the PCTs present within the Development Footprint.

NGH excluded the following species from assessment as ecosystem credit species based on its documented habitat constraints (shown in italic text in Table 4-1):

- Glossy Black-Cockatoo (*Calyptorhynchus lathami*) (foraging) – excluded, as this species feeds on *Allocasuarina* and *Casuarina* species which are absent from the Development Footprint

An additional species, the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) was manually entered into the BAM-C as an ecosystem credit species after it was detected during microbat surveys (Chapter 0, Appendix B: B.5). It was added as an ecosystem credit species as it is not a species credit species (Chapter 4.3).

Table 4-1 Ecosystem credit species returned by the BAM-C. Species excluded from assessment due to habitat constraints are shown in italics.

Species	Habitat constraints and/or geographic limitations (BAM-C)	Associated Vegetation zones	Sensitivity to gain class	NSW listing	Cwlth listing	Justification for exclusion
Regent Honeyeater (<i>Anthochaera phrygia</i>) (Foraging)	None	1100_non-nativegrassland_poor	High	Critically Endangered	Critically Endangered	N/A – included
Dusky Woodswallow (<i>Artamus cyanopterus cyanopterus</i>)	None	1100_non-nativegrassland_poor 1110_non-nativegrassland_poor	Moderate	Vulnerable	Not listed	N/A – included
<i>Glossy Black-Cockatoo (Calyptorhynchus lathami) (Foraging)</i>	<i>Presence of Allocasuarina and Casuarina species</i>	<i>1100_non-nativegrassland_poor</i>	<i>High</i>	<i>Vulnerable</i>	<i>Not listed</i>	<i>Excluded due to no foraging habitat within Development Footprint</i>
Speckled Warbler (<i>Chthonicola sagittata</i>)	None	1100_non-nativegrassland_poor	High	Vulnerable	Not listed	N/A – included
Spotted-tailed Quoll (<i>Dasyurus maculatus</i>)	None	1100_non-nativegrassland_poor	High	Vulnerable	Endangered	N/A – included
White-fronted Chat (<i>Epthianura albifrons</i>)	None	1110_non-nativegrassland_poor	Moderate	Vulnerable	Not Listed	N/A – included
Little Lorikeet (<i>Glossopsitta pusilla</i>)	None	1100_non-nativegrassland_poor	High	Vulnerable	Not Listed	N/A – included
White-bellied Sea-Eagle (<i>Haliaeetus leucogaster</i>) (Foraging)	Within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines	1100_non-nativegrassland_poor	High	Vulnerable	Not Listed	N/A – included
White-throated Needletail (<i>Hirundapus caudacutus</i>)	None	1100_non-nativegrassland_poor 1110_non-nativegrassland_poor	High	Not Listed	Vulnerable	N/A – included

Species	Habitat constraints and/or geographic limitations (BAM-C)	Associated Vegetation zones	Sensitivity to gain class	NSW listing	Cwlth listing	Justification for exclusion
Swift Parrot (<i>Lathamus discolor</i>) (Foraging)	None	1100_non-nativegrassland_poor	Moderate	Endangered	Critically Endangered	N/A – included
Hooded Robin (south-eastern form) (<i>Melanodryas cucullata cucullata</i>)	None	1100_non-nativegrassland_poor	Moderate	Vulnerable	Not Listed	N/A – included
Large Bent-winged Bat (<i>Miniopterus orianae oceanensis</i>) (Foraging)	None	1100_non-nativegrassland_poor	High	Vulnerable	Not Listed	N/A – included
Scarlet Robin (<i>Petroica boodang</i>)	None	1100_non-nativegrassland_poor 1110_non-nativegrassland_poor	Moderate	Vulnerable	Not Listed	N/A – included
Flame Robin (<i>Petroica phoenicea</i>)	None	1100_non-nativegrassland_poor 1110_non-nativegrassland_poor	Moderate	Vulnerable	Not Listed	N/A – included
Koala (<i>Phascolarctos cinereus</i>) (Foraging)	None	1100_non-nativegrassland_poor	High	Vulnerable	Vulnerable	N/A – included
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) (Foraging)	None	1100_non-nativegrassland_poor	High	Vulnerable	Vulnerable	N/A – included
*Yellow-bellied Sheathtail-bat (<i>Saccolaimus flaviventris</i>)	None	1100_non-nativegrassland_poor 1110_non-nativegrassland_poor	High	Vulnerable	Not Listed	N/A – included (added in to the BAM-C manually)
Diamond Firetail (<i>Stagonopleura guttata</i>)	None	1100_non-nativegrassland_poor	Moderate	Vulnerable	Not Listed	N/A – included

4.2 Species credit species

The BAM Calculator predicted the presence of 27 species credit species listed in

Table 4-2 would occur within the Development Footprint. Under the BAM, these generate additional species credits unless:

1. They are excluded because habitat constraints required are not present, or
2. Habitat quality is sufficiently degraded such that they could not occur, or
3. Survey effort has demonstrated they are not present.

Criteria 1 and 2 are addressed in the table below. Italic text indicates that the species has been excluded from assessment. In total, 14 species were excluded, leaving 13 species to be assessed (Chapter 4.3).

Table 4-2 Full list of species credit species generated by the BAM-C. Italic text indicates species that have been included or excluded from further assessment.

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
Regent Honeyeater (<i>Anthochaera phrygia</i>) (Breeding)	High	Critically Endangered	Critically Endangered	Breeding habitat is geographically restricted – in NSW, breeding areas are confined to two known locations.	Excluded	Development Footprint is not within known breeding areas as per the Important Areas Mapping (BAM-C).
Pink-tailed Legless Lizard (<i>Aprasia parapulchella</i>)	High	Vulnerable	Vulnerable	Habitat consists of rocky areas, or within 50 m of rocky areas	Excluded	Associated with PCT 1110. Rocky habitat present within the Development Footprint, however rocks are too large and too deeply embedded to constitute suitable habitat.
Thick Lip Spider Orchid (<i>Caladenia tessellata</i>)	Moderate	Endangered	Vulnerable	None	Excluded	Habitat degraded. Associated with PCT 1100. However, favoured habitat consists of low, dry sclerophyll woodland with a heathy or sometimes

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
						grassy understorey on clay loams or sandy soils, not present within the Development Footprint. Area of PCT 1100 under the powerline easement has been cleared, and clearing maintained, since at least 1985 (see Land Category Assessment, Appendix E).
Mauve Burr-daisy (<i>Calotis glandulosa</i>)	Moderate	Vulnerable	Vulnerable	Geographically restricted to areas south of Michelago	Excluded	Development Footprint is not within known geographic range.
Glossy Black-Cockatoo (<i>Calyptrorhynchus lathami</i>) (Breeding)	High	Vulnerable	Not listed	Requires hollow bearing trees, living or dead, with hollows >15 cm diameter and >8 m above the ground for breeding	Excluded	Hollow bearing trees are not present within Development Footprint.
Dwarf Kerrawang (<i>Commersonia prostrata</i>)	High	Endangered	Endangered	None	Excluded	Associated with PCT 1110. Occurs on sandy, sometimes peaty soils in a wide variety of habitats, mostly woodland and open forest. appears to respond positively to some forms of disturbance, e.g. some Victorian records are from gravel road surfaces and the Tomago population is on an area previously subject to sandmining, however the extreme disturbance to the PCT 1110 vegetation within the Development Footprint through long term and ongoing agricultural use make it highly unlikely that the species would persist in this landscape.

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
Striped Legless Lizard (<i>Delma impar</i>)	Moderate	Vulnerable	Vulnerable	None	Included	Associated with PCT 1110. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as <i>Themeda triandra</i> , <i>Austrostipa</i> spp. And <i>Poa</i> spp., and occasionally <i>Austrodanthonia</i> spp. However, can also be found where exotic tussock grasses are present. Exotic dominated habitat is present in small areas of the Development Footprint.
Buttercup Doubletail (<i>Diuris aequalis</i>)	High	Endangered	Vulnerable	Geographically restricted to areas north of Hoskintown	Included	Associated with PCT 1100. Development Footprint is with the known geographic range. Recorded in forest, low open woodland with grassy understorey and secondary grassland on the higher parts of the Southern and Central Tablelands (especially on the Great Dividing Range) – potential habitat present within Development Footprint in the form of secondary grassland.
Black Gum (<i>Eucalyptus aggregata</i>)	High	Vulnerable	Vulnerable	Geographically restricted to areas east of a line that runs north to south about 5 km west of Bungendore	Excluded	Associated with PCTs 1100 and 1110. However, woodland area of PCT 1100 has been excluded from the Development Footprint, and there are no trees within the grassland area of 1100. It is not present in any of the grassland areas of 1110. Is also on the cusp of being outside of the known geographic range.

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
Paddys River Box, Camden Woollybutt (<i>Eucalyptus macarthurii</i>)	High	Endangered	Endangered	None	Excluded	Associated with PCT 1100. Habitat degraded; no Eucalypts remaining within PCT 1100 within the Development Footprint.
Silver-leafed Gum (<i>Eucalyptus pulverulenta</i>)	High	Vulnerable	Vulnerable	Geographically restricted to areas south of Tinderry Range.	Excluded	Development Footprint is not within known geographic range.
Rough Eyebright (<i>Euphrasia scabra</i>)	High	Endangered	Not listed	Habitat consists of montane bogs, or areas within 50 m or montane bogs.	Included	Associated with both PCTs 1100 and 1110. An annual species that occurs in or at the margins of swampy grassland or in sphagnum bogs, often in wet, peaty soil. Appear to be self fertilising. Is parasitic, but parasitic, the species does not appear to be host-specific. Habitat may be present within the wetland area of the Development Footprint. Surveys for this species were conducted around the wetland area in March 2022.
Baeuerlen's Gentian (<i>Gentiana baeuerlenii</i>)	High	Endangered	Endangered	Habitat includes semi-permanent/ephemeral wet areas, land containing seepage areas or seasonally wet areas with short herbfield/grassland, or within 50 m of swamps	Included	Associated with PCT 1110. This species is known only from west of Bombala, and in the Namadgi National Park. In the ACT, the species occurs in inter-tussock space in moist tussock grassland. Habitat may be present within the wetland area of the Development Footprint. Surveys for this species were conducted around the wetland area in March 2022.
White-bellied Sea-Eagle	High	Vulnerable	Not listed	Required breeding	Included	A small number of pine trees are present within

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
(<i>Haliaeetus leucogaster</i>) (Breeding)				habitat consists of living or dead mature trees within suitable vegetation within 1 km of rivers, lakes, large dams or creeks, wetlands and coastlines.		Development Footprint.
Swift Parrot (<i>Lathamus discolor</i>) (Breeding)	Moderate	Endangered	Critically Endangered	Breeding habitat is geographically restricted – breeds only in Tasmania	Excluded	Development Footprint is not within known breeding area as per Important Areas mapping BAM-C).
Hoary Sunray (<i>Leucochrysum albicans</i> var. <i>tricolor</i>)	Moderate	Not listed	Endangered	None	Included	Associated with PCT 1100, but also highly disturbed areas – road verges, table drains, road embankments, ploughed paddocks etc. Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils (Sinclair 2010). Plants can be found in natural or semi-natural vegetation and grazed or ungrazed habitat. Bare ground is required for germination. Conservatively, this kind of suitable habitat may be present within the Development Footprint.
Green and Golden Bell Frog (<i>Litoria aurea</i>)	High	Endangered	Vulnerable	Habitat includes semi permanent/ephemeral wet areas, and within 1km of wet areas, swamps, and other	Included	Riparian/wetland habitat present within Development Footprint.

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
				waterbodies.		
Southern Bell Frog (<i>Litoria raniformis</i>)	Moderate	Endangered	Vulnerable	None	Included	Riparian/wetland habitat present within Development Footprint.
Large Bent-winged Bat (<i>Miniopterus orianae oceanensis</i>) (Breeding)	Very High	Vulnerable	Not listed	Habitat includes caves, tunnels, mines, culverts and other structures	Excluded	Breeding habitat not present within the Development Footprint.
Trailing Monotoca (<i>Monotoca rotundifolia</i>)	High	Endangered	Not listed	Geographically restricted to areas east of the Monaro Highway	Included	Associated with PCT 1100. Found in shrubland; habitat may be present within the powerline easement area. The NSW populations of Trailing Monotoca occur in shrubland or Snow Gum woodland from 1250 -1360 m above sea level. Bungendore's elevation is 700 m, likely too low for this species. This species was surveyed for in the powerline easement and woodland area in March 2022.
Southern Myotis (<i>Myotis Macropus</i>)	High	Vulnerable	Not listed	Habitat includes hollow bearing trees, areas within 200 m of riparian zones, bridges, caves or artificial structures within 200 m of riparian areas and other waterbodies.	Included	Associated with PCT 1100 Riparian/wetland habitat present within Development Footprint.
Koala (<i>Phascolarctos</i>)	High	Vulnerable	Vulnerable	Habitat includes areas	Excluded	Habitat is not present within the Development

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
<i>cinereus</i>) (Breeding)				identified via survey as important habitat.		Footprint.
Tarengo Leek Orchid (<i>Prasophyllum petilum</i>)	High	Endangered	Endangered	None	Included	Associated with PCT 1100. Occurs on relatively fertile soils in grassy woodland or natural grassland. As it is only known from 5 sites, it is difficult to make broad generalisations about habitat requirements. Main threats within the context of this Development Site include loss, degradation and fragmentation of habitat and populations to residential, infrastructure and agricultural developments, inappropriate mowing or grazing regimes, especially in spring and summer when above-ground parts are present, competition from other plant species, both native and non-native. Potential habitat may be present within the PCT 1100 powerline easement area.
<i>Prasophyllum sandrae</i> (<i>Prasophyllum sandrae</i>)	Very high	Critically Endangered	Not listed	Geographically restricted to areas south of Braidwood.	Excluded	Development Footprint is not within known geographic range.
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) (Breeding)	High	Vulnerable	Vulnerable	Breeding occurs in camps.	Excluded	No breeding camps present within the Development Footprint.
Silky Swainson-pea (<i>Swainsona sericea</i>)	High	Vulnerable	Not listed	None	Included	Associated with PCT 1100. Occurs in grassland and eucalypt woodland, sometimes with <i>Callitris</i> species. Habitat may be present in PCT 1100

Species	Sensitivity to gain class	NSW Listing	Cwlth listing	Habitat constraints and/or geographic restrictions (BAM-C)	Included or Excluded	Reason for inclusion or exclusion
						powerline easement area.
Austral Toadflax (<i>Thesium australe</i>)	Moderate	Vulnerable	Vulnerable	None	Included	Associated with PCT 1100. Austral Toadflax is semi-parasitic on roots of a range of grass species, notably Kangaroo Grass (<i>Themeda triandra</i>). Species can occur within un-treed native grassland or heterogeneous native/exotic grassland if host flora for parasitisation are present. Habitat may be present within the PCT 1100 powerline easement area.

4.3 Species credit species survey summary

Surveys have been completed for all of the BAM-C candidate species predicted to occur within the Development Footprint, that could not be excluded from assessment based on habitat or geographic constraints.

Table 4-3 below provides a summary of all BAM-C species credit species that have been surveyed for. Table 4-3 additionally provides information on the vegetation zones the species are associated with, and how species polygons were calculated.

Following BCD's review of the BDAR during the EIS exhibition period, BCD recommended the credit species Southern Myotis (*Myotis Macropus*) was likely to be a misidentification due to the lack of suitable habitat and its similar call to long-eared Bats. It determined that species credits would not be required for the Southern Myotis. This is detailed further in section 4.4.3.

The BCD has also requested survey to be completed for the White-fronted Chat (*Epthianura albifrons*), This survey occurred in July 2022 following further consultation. However, it is an ecosystem credit species and does not generate species credits.

Table 4-3 Summary of species credit species that could not be excluded from assessment based on habitat or geographic constraints, survey timing, associated vegetation zones and calculation of species polygon

Species credit species	Biodiversity risk weighting	Surveyed?	Present (or assumed) on site?	Vegetation zone and species polygon (ha)	Calculation of species polygon
Striped Legless Lizard (<i>Delma impar</i>)	1.5	Surveyed – October to December 2021	No	N/A	N/A
Buttercup Doubletail (<i>Diuris aequalis</i>)	2	Surveyed – November 2021	No	N/A	N/A
Rough Eyebright (<i>Euphrasia scabra</i>)	3	Surveyed – March 2022	No	N/A	N/A
Baeuerlen's Gentian (<i>Gentiana baeuerlenii</i>)	3	Surveyed – March 2022	No	N/A	N/A
White-bellied Sea-Eagle (<i>Haliaeetus leucogaster</i>) - breeding	2	Surveyed – July, November December 2021	No	N/A	N/A
² Hoary Sunray (<i>Leucochrysum albicans</i> var. <i>tricolor</i>)	2	Surveyed – November 2021	No	N/A	N/A
Green and Golden Bell	2	Surveyed - January 2021	No	N/A	N/A

² The Hoary Sunray is an EPBC listed species, and credit cost is not generated by the BAM-C. The Biodiversity Conservation Trust (BCT) must be contacted for credit price.

Species credit species	Biodiversity risk weighting	Surveyed?	Present (or assumed) on site?	Vegetation zone and species polygon (ha)	Calculation of species polygon
Frog (<i>Litoria aurea</i>)					
Southern Bell Frog (<i>Litoria raniformis</i>)	2	Surveyed – January 2021	No	N/A	N/A
Trailing Monotoca (<i>Monotoca rotundifolia</i>)	3	Surveyed – March 2022	No	N/A	N/A
Southern Myotis (<i>Myotis Macropus</i>)	2	Surveyed – January 2021	No	N/A	N/A
Tarengo Leek Orchid (<i>Prasophyllum petilum</i>)	2	Surveyed – November 2021	No	N/A	N/A
Silky Swainson-pea (<i>Swainsona sericea</i>)	2	Surveyed – November 2021	No	N/A	N/A
Austral Toadflax (<i>Thesium australe</i>)	1.5	Surveyed – November 2021	No	N/A	N/A

4.4 Species credit species survey details

Chapter 4.4 provides detail on the timing, weather, personnel, and methodology for species surveys.

Several species additional to those returned as species credit species in the BAM-C were targeted during surveys. The Commonwealth Protected Mattes Search Tool (PMST) was used to search for any EPBC Act listed species within a 10 km radius of the Development Site (see Chapter 5 and Appendix C for further detail). Assessment of those species against potential suitable habitat within the Development Footprint returned a further three species of concern which were also surveyed for:

- Aromatic Peppergrass (*Lepidium hyssopifolium*)
- Button Wrinklewort (*Rutidosia leptorrhynchoides*)
- Yellow-spotted Tree Frog (*Litoria castanea*)

Additionally, BCD have requested surveys for one ecosystem credit species:

- White-fronted Chat (*Epthianura albifrons*)

The species has been incidentally recorded within the Development Site on several occasions however a more comprehensive understanding of how the species uses the vegetation within the Development Site is required to appropriately assess prescribed impacts (Chapter 6). A preliminary targeted survey in the northern section of the wetland has already been undertaken with more to follow in 2022, following further consultation with BCD as to survey and data requirements. Further survey results and the prescribed impact assessment for this species will be included in the Blind Creek Solar Farm Submissions Report for detailed consideration by BCD.

Weather data is provided for individually for surveys where relevant. Two summary tables are provided below:

- Table 4-4: The full list of all species surveyed for, detailing whether species is a BAM-C species credit species or was returned in the PMST search, its NSW and Commonwealth threat status, and whether it is at risk of a Serious and Irreversible Impact (SII) (Chapter 9). Blue cells indicate the recommended survey months as advised in the Threatened Biodiversity Data Collection (TBDC); ticks indicate the month the survey was undertaken, red text indicates that the species is not a BAM-C species credit species.
- Table 4-5: Specific dates for surveys, and details of personnel.

Table 4-4 Full list of species surveyed for within the Development Footprint; italic text indicates that the species is not a BAM-C species credit species

Species			Threatened status			Survey months											
	BAM-C	PMST	BC Act	EPBC Act	SAIL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
White-bellied Sea-Eagle (<i>Haliaeetus leucogaster</i>)	Y		V									✓				✓	✓
White-fronted Chat (<i>Epthianura albifrons</i>)			V													✓	✓
Southern Myotis (<i>Myotis macropus</i>)	Y		V			✓											
Green and Golden Bell Frog (<i>Litoria aurea</i>)	Y	Y	E	V		✓											
Southern Bell Frog (<i>Litoria raniformis</i>)	Y	Y	E	V		✓											
Yellow-spotted Tree Frog (<i>Litoria castanea</i>)		Y	CE	E	Y	✓											
Striped Legless Lizard (<i>Delma impar</i>)	Y	Y	V	V												✓	✓
Little Whip Snake (<i>Suta flagellum</i>)			V													✓	✓
Dwarf Kerrawang (<i>Commersonia prostrata</i>)	Y		E	E												✓	
Buttercup Doubletail (<i>Diuris aequalis</i>)	Y	Y	E	V												✓	
Rough Eyebright (<i>Euphrasia scabra</i>)	Y		E		Y			✓									
Baeuerlen's Gentian (<i>Gentiana baeuerlenii</i>)	Y		E	E	Y			✓									
Hoary Sunray (<i>Leucochrysum albicans</i> var. <i>tricolor</i>)	Y	Y		E												✓	
Trailing Monotoca (<i>Monotoca rotundifolia</i>)	Y		E		Y			✓									
Tarengo Leek Orchid (<i>Prasophyllum petilum</i>)	Y	Y	E	E												✓	

Species			Threatened status			Survey months											
	BAM-C	PMST	BC Act	EPBC Act	SAIL	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Silky Swainson-pea (<i>Swainsona sericea</i>)	Y		V													✓	
Austral Toadflax (<i>Thesium australe</i>)	Y	Y	V	V												✓	
Aromatic Peppercress (<i>Lepidium hyssopifolium</i>)		Y	E	E												✓	
Button Wrinklewort (<i>Rutidosia leptorrhynchoidea</i>)		Y	E	E												✓	

Table 4-5 Summary of specific survey dates and personnel

Survey	Dates	Personnel (Company)	Experience
Frog surveys	27/01/2021 28/01/2021 29/01/2021 01/02/2021	Sam Patmore (private sub-contractor) Alex Santiago (NGH) Taylor Hume (NGH) Rebecca Reid (NGH)	George Madani is a highly experienced wildlife ecologist who specialises in targeted endangered species monitoring programs and remote area fauna surveys. Sam Patmore is a highly experienced wildlife ecologist with many years of experience in fauna ecology and surveys. Rodney Armistead is a highly experienced wildlife ecologist with a PhD in fauna ecology and plant pathology.
Reptile tile surveys	Tiles installed: 28/09/2021 Tiles checked: 27/10/2021 03/11/2021 09/11/2021	George Madani (private sub-contractor) Alex Santiago (NGH) Yi (Susie) Shu (NGH)	Alex Santiago has three years' experience as an ecologist, with a particular interest in flora and reptiles. Flora survey experience includes transects, quadrats, random meander, and targeted searches for threatened species. Fauna survey experience includes pitfall trapping, Elliot trapping, mist netting, and call playback. Alex has experience in applying the BAM in undertaking biodiversity assessments. He has recently undertaken the BAM accreditation training, and will receive accreditation in 2022. Taylor Hume has two years' experience as an ecologist with NGH, with a

Survey	Dates	Personnel (Company)	Experience
	15/11/2021 02/12/2021		background in conservation and ecology working in threatened species management and research. She has conducted flora and fauna surveys using quadrat, transect, pitfall, and trapline methods in outback Australia. Taylor has also participated in threatened species translocations and population monitoring using radio telemetry and has experience working with various species of mammals, birds and reptiles.
Microbat acoustic surveys	12/01/2021 13/01/2021 14/01/2021	Taylor Hume (NGH) Rodney Armistead (Rod Armistead Environmental Consultants)	Rebecca Reid has a strong background in research biology with a focus on entomology. Rebecca regularly assists with ecological field surveys including BAM plot data collection, and has experience in small mammal, reptile and camera trapping.
White-fronted Chat survey	03/12/2021	Alex Santiago (NGH) Rebecca Reid (NGH)	Yi (Susie) Shu has worked for Parks Victoria, and currently works for the International Crane Foundation and is an ecologist with NGH.
Plant surveys	30/11/2021 31/03/2022	Alex Santiago (NGH) Rebecca Reid (NGH) Yi (Susie) Shu (NGH)	

4.4.1 Frog aural-visual surveys

Target species

- Green and Golden Bell Frog (*Litoria aurea*)
- Southern Bell Frog (*Litoria raniformis*)
- Yellow-spotted Tree Frog (*Litoria castanea*)

Weather

Weather conditions during January and early February 2021 were favourable for frog surveys, with reasonably cool temperatures, light wind, and frequent gentle rain. The monthly total rainfall according to the Bureau of Meteorology (BOM) in the Lake George area was 61.2mm which is above the average of 55.7mm. This weather data has been taken from the Sutton (Uba) meteorological station which is 17.1km to the east of Bungendore. The station has been used to obtain a monthly average because it is the closet station on the BOM with enough data to view these statistics. Daily rain in millimetres has been taken from the Bungendore Lockhart weather station, which is slightly closer, 11km from the Bungendore township. There was roughly 30mm of rain in early January, however the week prior to survey there was no rain recorded at either weather station. Weather conditions were recorded on site at ground level at the commencement of surveys (Table 4-6).

Table 4-6 Frog survey weather conditions, recorded at ground level during surveys

Date	Ave. temp. (°C)	Wind (km/h)	Oktas ³	Rain
27/01/2021	15.3	10-15	8	Light rain earlier in day, 8mm (Bungendore Lockhart weather station)
28/01/2021	13.3	10-15	8	Light rain during survey, 3.6mm (Bungendore Lockhart weather station)
29/01/2021	17	0	8	Intermittent light rain, 21mm (Bungendore Lockhart weather station)
1/02/2021	17	3.6	8	Intermittent light rain, 0mm (Bungendore Lockhart weather station)

Methodology

Aural-visual surveys were conducted in January 2021 in accordance with the *NSW Survey Guide for Threatened Frogs* (State of NSW and Department of Planning, Industry and Environment, 2020):

³ In meteorology, an okta is a unit of measurement used to describe the amount of cloud cover at any given location such as a weather station. Sky conditions are estimated in terms of how many eighths of the sky are covered in cloud, ranging from 0 oktas (completely clear sky) through to 8 oktas (completely overcast).

Four survey locations were selected; one adjacent to the wetland, and three along Butmaroo Creek (1110_wetland_poor and 1110_creekline_poor vegetation zones respectively, both now excluded from the Development Footprint) (Figure 4-6).

- Surveys were completed over three consecutive nights and one additional night.
- Two ecologists participated in aural-visual surveys each night.
- Ecologists walked 30-minute transects at each of the four survey locations each night, interspersing spotlighting and listening for frog calls with call-playback of threatened species calls, for a total of 480 minutes of survey effort.
- Green and Golden Bell Frog and Southern Bell Frog calls were played, after which ecologists listened to calls for approximately 5 minutes before moving along the transect to a new location to repeat calls.
- All calls or visual observations of frogs were recorded (Appendix B, B.4), for ecologists to identify the frog sightings or calls at the time of survey. Call identification was conducted by NGH ecologists and confirmed by Sam Patmore see Table 4-5.

Results

No threatened species were identified over the 4 nights of aural-visual surveys. Non-threatened species identified from calls and spotlighting include:

- Eastern Sign-bearing Froglet (*Crinia parinsignifera*)
- Common Eastern Froglet (*Crinia signifera*)
- Eastern Banjo Frog (*Limnodynastes dumerili*)
- Striped Marsh Frog (*Limnodynastes peronii*)
- Spotted Grass Frog (*Limnodynastes tasmaniensis*)
- Smooth Toadlet (*Uperoleia laevis*)

Yellow-spotted Tree Frog was not detected, although conditions were considered suitable for survey for this species to be detected due to suitable rainfall and the focus of surveys in suitable habitat.

4.4.2 Reptile tile surveys

Target species

- Striped Legless Lizard (*Delma impar*)
- Little Whip Snake (*Suta flagellum*)

Weather

Weather conditions were favourable for tile surveys, with reasonably mild morning temperatures, light wind, light cloud coverage, and no rain (Table 4-7). Weather conditions were recorded on site at ground level at the commencement of surveys.

Table 4-7 Reptile tile survey weather conditions, recorded at ground level during surveys. Full survey conditions are provided in Appendix B, B.5

Date	Ave. temp. (°C)	Ave wind (km/h)	Humidity (%)	Cloud cover
27/10/2021	18.3	9.5	Low	Clear
03/11/2021	19.6	12.2	62.6	Light
09/11/2021	21	6.5	50.8	Clear to light
15/11/2021	6.0	15.7	60.4	Moderate to high
02/12/2021	25.3	3.0	47.0	Clear

Methodology

A total of five sites were selected for tile grid installation (Figure 4-6). The locations selected were assessed as the most suitable habitat within the Development Footprint, with the highest coverage of tussock grass species across the Development Footprint.

A total of 245 concrete roof tiles were placed in a grid pattern on the ground, distributed at each of the five sites:

- Four grids of 5x10 tiles, spaced 5 m apart
- One grid of 3x15 tiles spaced 5 m apart (45 tiles placed instead of 50)

Tiles were installed on 28/09/2021 and allowed to establish for one month in order to act as supplementary habitat for reptiles. The tiles were partially embedded and left undisturbed before being checked for the first time. A Three-toed Earless Skink (*Hemiergis talbingoensis*) was identified under a tile the first time the tiles were checked (27 October 2021), indicating that they had been in place long enough to settle and form habitat for small reptiles.

A total of 245 tiles were then checked every 1-2 weeks, a total of five times, totalling 1,225 trap days. Tiles were flipped over to check for reptiles in the morning before temperatures became too high, on clear days without rain. Broken tiles were replaced if required. Photos of any fauna detected under the tiles were taken and species identified.

According to the Commonwealth *Survey guidelines for Australia's threatened reptiles* (Commonwealth of Australia, 2011) regarding survey effort for Striped Legless Lizard, trapping success rates during the active period (centred over November to December) are of the order of 0.3–0.4 Striped Legless Lizards per 100 trap days in Victoria, but are generally higher in the ACT, between 0.1–5.65 per 100 trap days, and usually greater than 1.0.

The guidelines stated above recommend one grid per three hectares on sites up to 30ha. Habitat that was thought to potentially contain the targeted species intersected the Development Footprint in six locations. The aggregated total was under 15ha. One of these six locations was within 30m to the other, so five survey points were chosen to adequately survey potential habitat.

There is some evidence that low rainfall may reduce lizard activity, with repeated trapping in November to December at sites in the ACT over several years showing low capture rates in drought years but recovering subsequently. However, this survey was undertaken in the second

year of above average rainfall. It is recommended that artificial shelter sites should be checked at least twice a month, and ideally once a week during spring to early summer (that is, between early September to December). Shelter sites should not be checked more than once a week as this may lead to Striped Legless Lizard abandoning the artificial shelters. Shelter sites should be checked when ambient temperatures do not exceed 28°C.

Results

No threatened species including Striped Legless Lizard, were identified during the survey period. Non-threatened species detected include:

- Three-toed Earless Skink (*Hemiergis talbingoensis*)
- Eastern Three-lined Skink (*Acritoscincus duperreyi*)
- Common Garden Skink (*Lampropholis guichenoti*)

Even at the lower success rate (0.1 individual per 100 days), enough trap days have been completed that the Striped Legless Lizard should have been detected if present. Surveys were conducted in a higher-than-average rainfall year and always during temperatures around or below 28°C. Identification of reptile species was conducted by Alex Santiago, see Table 4-5.

4.4.3 Microbat acoustic surveys

Target species

- Southern Myotis (*Myotis macropus*)

Weather

Anabat units recorded temperature data between 8:00 pm and 6:30 am each night. The 8 pm and average temperatures for the night are presented in Table 4-8. Additional weather data is from the nearest Bureau of Meteorology (BOM) weather station at Canberra Airport. Temperatures were warm to mild, with very little to no rainfall and light to moderate breezes, suitable conditions for recording bat activity.

Table 4-8 Anabat survey weather conditions. Temperature data was recorded by two Anabat Express devices, other weather data obtained from BOM Canberra Airport weather station

Date	Temp. 8 pm (°C)	Ave. temp. overnight (°C)	Lowest temp. overnight (°C)	Rainfall (mm)	Max wind gust (km/h)	9 am wind speed (km/h)	3 pm wind speed (km/h)
12/01/2021	24.5	16.9	12.5	0	70	7	26
13/01/2021	26.9	19.8	15.5	1.8	67	2	17
14/01/2021	27.0	14.8	10.25	1.1	56	24	30

Survey effort

Acoustic recorder surveys were conducted in January 2021. Two survey locations were selected; one adjacent the wetland and one on the edge of the woodland area (1110_wetland_poor and

1100_woodland_moderate vegetation zones, both now excluded from the Development Footprint) (Figure 4-6). Two Anabat Express detectors were passively deployed for a collective total of six survey nights, set to start and stop recording at sunset and sunrise respectively. Issues with the Anabat Express recorders resulted in only three nights of data being available for analysis. Calls were analysed by Rod Armistead of Rod Armistead Environmental Consultants see Table 4-5 (see Appendix B, B.5 for Microbat Ultrasonic Call Identification Report and details of analysis).

Survey results

During the survey period, 1056 call sequences were recorded. Of these, 700 (66.29%) were deemed useful because the call profiles were of sufficient quality and/or length to enable positive identification of a bat species. Based upon the recorded microbat calls, eight microbat species were positively identified as being present, and a further four as being potentially present (Table 4-9).

Definite calls for two species listed as Vulnerable under the BC Act were recorded: Large Bent-winged Bat (*Miniopterus orianae oceanensis*) and Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*). Unresolved Southern Myotis (*Myotis macropus*) calls were recorded at both survey sites indicating a possible presence for this species which is further supported by the suitable habitat.

Table 4-9 Microbat species identified as being present, or potentially present, within the Development Footprint. Potentially present species are indicated by italic text

Scientific name	Common name	Presence	BC Act listing
<i>Austronomus australis</i>	White-striped Free-tailed Bat	Definitely present	
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Definitely present	
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Definitely present	Vulnerable
<i>Myotis macropus</i>	<i>Southern Myotis</i>	<i>Potentially present</i>	<i>Vulnerable</i>
<i>Nyctophilus geoffroyi</i>	<i>Lesser Long-eared Bat</i>	<i>Potentially present</i>	
<i>Nyctophilus gouldii</i>	<i>Gould's Long-eared Bat</i>	<i>Potentially present</i>	
<i>Ozimops planiceps</i>	Inland Broad-nosed Bat	Definitely present	
<i>Ozimops ridei</i>	Little Broad-nosed Bat	Definitely present	
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tailed Bat	Definitely present	Vulnerable
<i>Vespadelus darlingtoni</i>	Large Forest Bat	Definitely present	
<i>Vespadelus regulus</i>	<i>Southern Forest Bat</i>	<i>Potentially present</i>	

Scientific name	Common name	Presence	BC Act listing
<i>Vespadelus vulturnus</i>	Little Forest Bat	Definitely present	

The Large Bent-winged Bat is a species credit species for breeding habitat only, and as there are no suitable caves, tunnels, mines or other structures within the Development Footprint suitable for breeding, NGH have excluded this species from further assessment.

While the Yellow-bellied Sheath-tailed Bat was not identified in the BAM-C as a species requiring survey, as it has been recorded within the site, NGH have added it to the BAM-C as an ecosystem credit species. It is not a species credit species and does not generate additional credits.

While the recordings for the Southern Myotis are unresolved, following BCD's review of the BDAR during the EIS exhibition period, BCD suggested the recording is likely to be a misidentification as:

- the parent PCT from which the non-native vegetation is derived is not included in list of PCTs associated with the species in the TBDC (refer to *Species' Credit Threatened Bats and their Habitats NSW Survey Guide*)
- The waterway likely does not meet the criteria of the habitat constraint for Southern Myotis - 'medium to large permanent creeks, rivers, lakes or other waterways (i.e. with pools/ stretches 3 m or wider)'

The low number— of survey nights means the record may not be reliable as Southern Myotis calls are easily confused with common Long-eared Bats. While only three nights of calls being available instead of the preferred four, the fact that the survey effort enabled the detection of two other threatened species indicates that the survey effort was sufficient.

Thus, BCD recommended the Southern Myotis was not present within the development footprint and no species credits are required.

4.4.4 Targeted plant surveys

Target species: PCT 1100 habitat

The following threatened plants are associated with PCT 1100 *Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*, found in the 0.87 ha area under the existing powerline easement in the Development Footprint (see PCT map Figure 3-7):

- Buttercup Doubletail (*Diuris aequalis*)
- Hoary Sunray (*Leucochrysum albicans* var. *tricolor*)
- Tarengo Leek Orchid (*Prasophyllum petilum*)
- Silky Swainson-pea (*Swainsona sericea*)
- Austral Toadflax (*Thesium australe*)
- Trailing Monotoca (*Monotoca rotundifolia*)

The following EPBC Act species are not associated with the PCTs within the Development Footprint, but were searched for within the PCT 1100 area also, as they are known to be associated with other woodland PCTs and secondary grassland derived from Box-Gum Woodland or in Natural Temperate Grassland; and often in the ecotone between the two communities:

- Aromatic Peppercress (*Lepidium hyssopifolium*)

- Button Wrinklewort (*Rutidosia leptorrhynchoides*)

Survey effort

The NSW *Surveying threatened plants and their habitats* guidelines was used to determine the survey effort. In open vegetation, as is in the easement, the estimate for potential survey time as given in Appendix A of the guidelines is:

$$STE = (SH / DPT) / 4000 \text{ m}$$

Where:

- STE = survey time estimate (hours)
- SH = ha of suitable habitat (m²)
- DPT = distance between parallel traverses (m)

For the 0.87 ha of suitable habitat within the easement, this equates to:

$$(8700 / 10) / 4000 = 0.22 \text{ hours, or approximately 13 minutes}$$

Three NGH ecologists spaced 10 m apart traversed the entire length of the powerline easement in November 2021 (Figure 4-6). This took approximately 30 minutes, which equates to 90 minutes of survey effort, well above the recommended survey time.

Surveys for Trailing Monotoca (*Monotoca rotundifolia*) were undertaken in March 2022, as November is outside of the survey window listed in the TBDC. The same survey area was covered as per November 2021 (Figure 4-6). Two ecologists traversed the powerline easement spaced 10 m apart for 20 minutes, for a total of 40 minutes survey effort. Two supplementary Trailing Monotoca transects were also undertaken in March 2022 in the 1100_woodland _moderate vegetation zone, a zone which has been excluded from the Development Footprint.

Target species: wetland periphery

Two species, Rough Eyebright (*Euphrasia scabra*) and Baeuerlen's Gentian (*Gentiana baeuerlenii*) were surveyed for in March 2022, as November is outside of the survey window as listed in the TBDC.

Prior to survey, potential habitat for these species was identified:

- Rough Eyebright (*Euphrasia scabra*) - Species habitat is listed in the TBDC as 'montane bogs, or within 50 m'.
- Baeuerlen's Gentian (*Gentiana baeuerlenii*) - Species habitat is listed in the TBDC as 'Land containing seepage areas or seasonally wet areas with short herbfield/grassland, or within 50 m'.

Survey effort

To quantify areas of suitable habitat for survey focus, NGH buffered the vegetation zones 1110_wetland_poor and 1110_creekline_poor (along Wright's Creek) to 50 m. The area falling within the Development Footprint, approximately 9 ha (Figure 4-6), was used to calculate the appropriate survey effort.

The NSW *Surveying threatened plants and their habitats* guidelines was used to determine the survey effort. In open vegetation, as surrounds the wetland and Wrights Creek, the estimate for potential survey time as given in Appendix A of the guidelines is:

$$STE = (SH / DPT) / 4000 \text{ m}$$

Where:

- STE = survey time estimate (hours)
- SH = ha of suitable habitat (m²)
- DPT = distance between parallel traverses (m)

For the 9.06 ha of suitable habitat within the easement, this equates to:

$$(90,600 / 10) / 4000 = \mathbf{2.3 \text{ hours, or x5 30 minute transects}}$$

For the March survey, two NGH ecologists undertook seven 30-minute transects in the wetland area, and two along Wright's Creek (Figure 4-6), for a total of 4.5 hours survey effort. While indicative survey transect locations were plotted prior to fieldwork, transects were relocated in the field where appropriate, to better canvass the most suitable habitat.

Survey results

No threatened plant species were found during any surveys. The habitat around the wetland and Wrights Creek is significantly degraded and comprised of predominantly exotic species, with relatively low species richness. The high rainfall over the past year and subsequent filling of the wetland and the usually dry Wrights Creek have led to a flush of incredibly dense *Juncus sp.*, which in many areas is choking the growth of other species (Figure 4-2, Figure 4-3). Livestock are kept in these areas, evidence of which can be seen in Figure 4-3 and Figure 4-4.



Figure 4-1 Photo of dense *Juncus sp.* growth in the wetland (March 2022)



Figure 4-2 Close-up photo of ground cover in the wetland, dense *Juncus sp.* restricting growth of other species (March 2022)



Figure 4-3 Photo of wetland showing evidence of livestock grazing (March 2022)



Figure 4-4 Photo of Wrights Creek, demonstrating high exotic coverage and bare ground caused by livestock (March 2022)

4.4.5 White-fronted Chat survey

White-fronted Chat (*Epthianura albifrons*), an ecosystem credit species, was observed several times within the Development Footprint by NGH ecologists and BCD representatives during their visit to the Development Site in November 2021. BCD recommended a preliminary survey for the Chat during other spring surveys. As the Chat had previously been seen several times at the locations shown in Figure 4-6, NGH chose to focus on the wetland area where it hadn't previously been seen, as according to the TBDC the Chat is usually found foraging on bare or grassy ground in wetland areas.

Due to critical construction timeframes, completing further targeted surveys for the White-fronted Chat during the breeding season (September to March), to determine if the areas of Scotch Thistle are being used as breeding habitat, was not feasible. In consultation with BCD, surveys for the extent of Scotch Thistle within the Subject Land were undertaken instead. All areas of Scotch Thistle can then be assumed as breeding habitat for the Chat.

Weather

Weather conditions were ideal for bird surveys, clear, warm and still. Weather data from the BOM Canberra Airport weather station is provided in Table 4-10.

Table 4-10 White-fronted Chat survey weather conditions, obtained from BOM Canberra Airport weather station

Date	Rainfall (mm)	9 am temp (°C)	9 am Oktas	9 am wind speed (km/h)
3/12/2021	0	21.8	0	6

Survey effort

The preliminary survey took place on 03/12/2021, starting at 8:00 am. Starting at the point shown on Figure 4-6, two NGH ecologists walked in opposite directions along the road in the thin northern strip of the Development Footprint for 30 minutes, noting down any birds seen or heard (Appendix B, B.7). After 30 minutes, ecologists walked back to the start point for another 30 minutes. The approximate distance of the transect was 1300 m (in one direction).

The survey of areas containing Scotch Thistle took place in 13/07/2022. The survey was completed by an NGH ecologist on foot and by vehicle using GPS tracking.

Due to accessibility, the survey of Scotch Thistle along northern boundary was conducted from a distance (>500m) away with binoculars. This was achieved by observing from high points in the landscape and using landmarks to navigate-map outbreaks

Results

No White-fronted Chats were seen or heard during the transect. However, a male Chat was observed in approximately the same location that BCD had observed the bird several days earlier while travelling to the transect start point (Figure 4-6).

No White-fronted Chats were seen or heard during the Scotch Thistle surveys. Several patches of Scotch Thistle were identified within the Development Site (Figure 4-6). Patches of Scotch Thistle along Butmaroo Creek were found to be the most dense. The total extent of Scotch Thistle within the Development Site is approximately 103.17 ha.

Access to northern parts of property were limited due to wet ground and time constraints in being able to walk and accurately map these areas. This has hindered the ability to accurately map boundaries of thistles along northern boundary.

Scotch Thistle is an exotic annual species, and due to the survey occurring in winter, dead Scotch Thistle was viewed (Figure 4-5). However, given the distinguishing features of Scotch Thistle the possibility of misidentification is considered low.



Figure 4-5 Photo of dead Scotch Thistle during July 2022 survey

4.4.6 White-bellied Sea-Eagle (breeding)

Breeding White-bellied Sea Eagle was incidentally surveyed for during other site visits in July, November and December 2021. There are relatively few large trees within the Development Footprint that would be capable of supporting a White-bellied Sea Eagle nest, mostly pines, elms and willows which are visible across the flat landscape from long distances. As a distinctive species with a highly conspicuous nest, NGH were able to confirm through incidental surveys that there is no detected nesting habitat within the Development Footprint. PCT 1100 bordering the Development Footprint has potential to support White-bellied Sea Eagle. The Development has avoided this habitat.

4.4.7 Survey effort maps

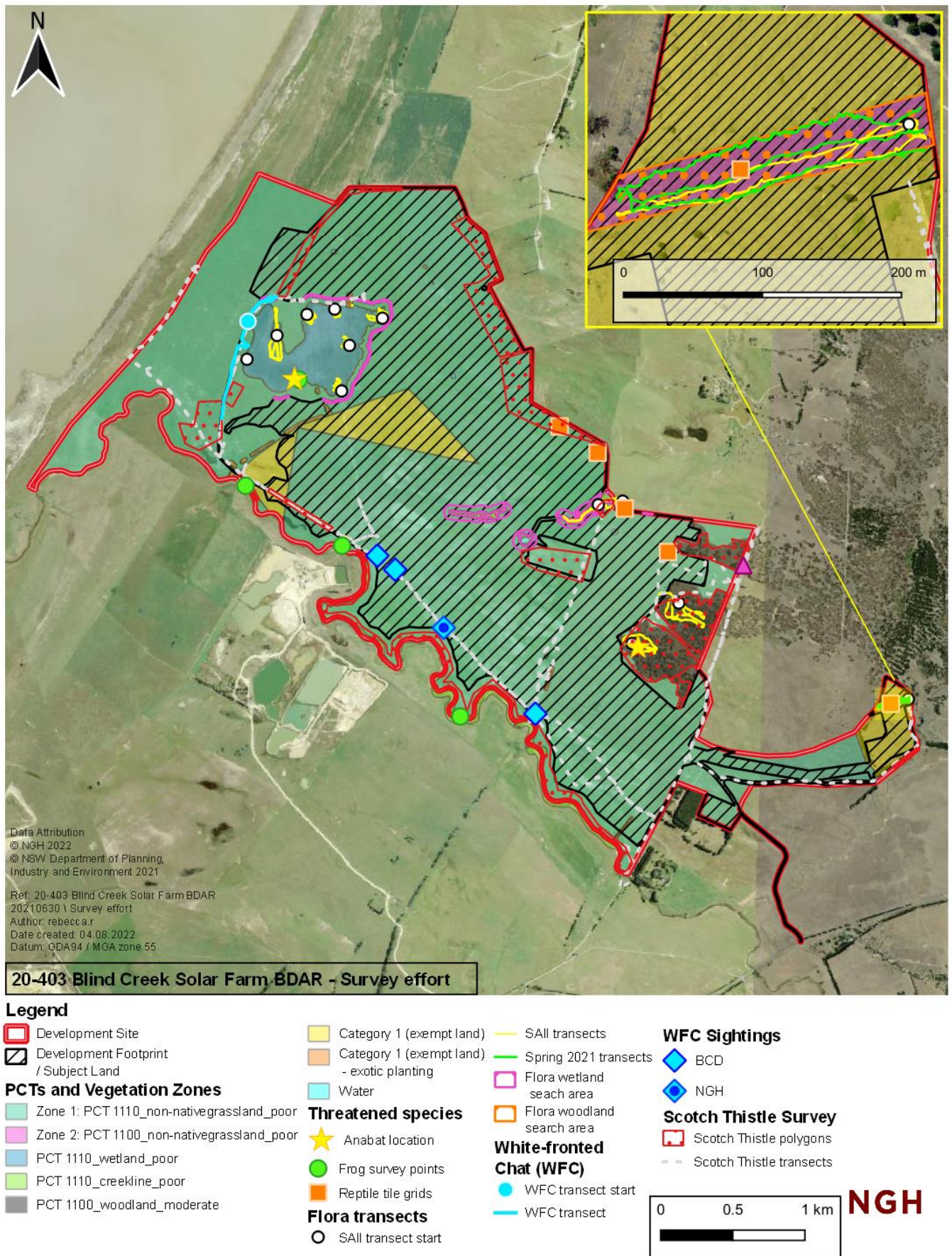


Figure 4-6 Threatened species survey locations

5. Matters of National Environmental Significance

An EPBC Act Protected Matters Report was generated on the 04/08/2021 to identify Matters of National Environmental Significance (MNES) that have the potential to occur within 10 km of the Development Footprint (Appendix C). Those relevant to this BDAR include:

- Wetlands of International Importance
- Threatened Ecological Communities
- Threatened species
- Migratory species

The potential for these MNES to occur at the site is discussed below.

5.1 Ramsar Wetlands of International Importance

The EPBC Protected Matters Report (Appendix C) identified the following four Ramsar Wetland of International Importance upstream of the Development Site:

- Banrock Station wetland complex 800 - 900km upstream
- Hattah-Kulkyne lakes 600 - 700km upstream
- Riverland 700 - 800km upstream
- The Coorong and Lakes Alexandrina and Albert Wetland 800 - 900km upstream

The closest Ramsar Wetland of International Importance is the Ginini Flats Wetland Complex, approximately 70 km southwest.

There is no apparent connectivity between the Ginini Flats Wetland Complex and the Development Footprint, and the remaining four wetlands are considered too far up stream to influence or be influenced by the Development.

5.2 Threatened Ecological Communities (TECs)

The EPBC Protected Matters Report identified the following two Critically Endangered Ecological Communities as likely to occur in the search area:

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

Neither were identified within the Development Footprint. No other Commonwealth listed TECs were identified within the Development Footprint.

5.3 Threatened species

The EPBC Protected Matters Report identified 41 threatened species with the potential to occur within the search area. The full list of species is provided in the Habitat Evaluation Table in Appendix C. Of these species, three were considered likely to utilise habitat found within the Development Footprint:

- Striped Legless Lizard (*Delma impar*) - Vulnerable

- Basalt Pepper-cress (*Lepidium hyssopifolium*) – Endangered
- Hoary Sunray (*Leucochrysum albicans* subsp. *tricolor*) – Endangered
- Button Wrinklewort (*Rutidosis leptorhynchoides*) – Endangered

However targeted surveys confirmed that these species are absent from the Development Footprint (Chapter 4.3).

5.4 Migratory species

The EPBC Protected Matters Report identified 14 listed migratory species with the potential to occur within the search area. The full list of species is provided in the Habitat Evaluation Table in Appendix D. None of these species are considered likely to utilise habitat found within the Development Footprint.

No impacts are anticipated on MNES and no referral under the EPBC Act has been undertaken.

6. Prescribed impacts

6.1 Habitat features relevant to prescribed biodiversity impacts

6.1.1 Karsts, caves, crevices, cliffs, rocks and other geological features of significance

There are no karsts, caves, crevices, or cliffs within the Development Footprint.

There are several areas of partially embedded rock within both the Development Footprint and Development Site (Figure 2-8, Figure 2-9), however these rocks are too large and too deeply embedded to be considered suitable habitat for bushrock specialists such as the Pink-tailed Worm Lizard (*Aprasia parapulchella*).

6.1.2 Human-made structures

There are no residential buildings within the Development Footprint. There is one small shed within the Development Site (which would not be impacted) which appears to be linked to an airstrip (that intersects northeast section of the Development Footprint). There are small agricultural infrastructure features dotted around the Development Footprint, such as small sheds/shelters and water tanks. None of these are predicted to provide habitat for any threatened species.

Towards the north of the Development Footprint stands the Lake George Trigonometrical Baseline – North Pillar, a 3m tall tower built of granite surmounted by a concrete theodolite mount (Figure 6-1, also marked in Figure 2-10). NGH ecologists considered whether this structure might serve as suitable breeding habitat for the Large Bent-winged Bat (*Miniopterus orianae oceanensis*), which was detected within the Development Site by acoustic call analysis (Chapter 4.4.3). However, upon inspection of the inside of the structure, there did not appear to be any evidence of past or present roosting. Additionally, the Proponent has determined that the historic Trigonometrical station will remain untouched by the Development.



Figure 6-1 Lake George Trigonometrical Baseline - North Pillar

6.1.3 Non-native vegetation

The majority of the Development Footprint and Development Site, while designated a PCT, comprises of non-native plant species. There are large areas of sown grasses (e.g., ryegrass), and

high coverage of other exotic weeds such as Scotch Thistle, African Lovegrass, and other pasture weeds.

There are several stands of exotic trees within the Development Footprint (Figure 3-7), including pines and elms. The Proponent has informed NGH that the elms (Figure 6-2) have personal significance to the landowner, and the solar array layout may be configured in a way that these trees can be retained if possible.

There are also some stands of exotic pines within the Development Footprint, including two stands planted in strips that appear to act as wind breaks. There are also remnants of what was once a larger pine forest in the eastern arm of the Development Footprint, which has mostly now been felled for a sand mining operation, categorised as Category 1 (exempt land) by NGH (Figure 6-3). Most of these pines are outside of the Development Footprint, with a small number to be impacted by clearing for the Development (Figure 3-7).

Some of this non-native vegetation is likely suitable habitat for threatened fauna species; see Chapter 8.3 for detail on prescribed impacts to non-native vegetation.



Figure 6-2 Elm tree in the north of the Development Site, excluded from the Development Footprint



Figure 6-3 Stand of exotic pines, remnants of a previously larger plantation

6.1.4 Habitat corridors

The wooded area in the eastern part of the Development Site is connected to a larger forested area to the east of the site (Figure 3 7), however this area has been excluded from the Development Footprint.

Butmaroo Creek and associated riparian vegetation may serve as a habitat corridor for aquatic or wetland species, however it has been excluded from the Development Footprint and the construction of the solar farm is not expected to have an impact upon stream connectivity.

The riparian vegetation along Wrights Creek has been modified by agricultural practices and mostly comprises of exotic grasses. There is currently limited lateral connectivity between the riparian habitats of the Wrights Creek and Butmaroo Creek, however the vegetation does provide a variety of habitat types for aquatic species. The riparian vegetation also provides bank stabilisation and erosion control and helps to minimise sedimentation. The vegetation along the alignment of Wrights Creek would be modified by the project. Currently the site is heavily grazed, however grazing pressure will decrease once the project is operational. As such, any lateral connectivity between riparian corridors will not be fragmented or degraded by the project once operational.

The longitudinal connectivity between upstream and downstream habitats of Wrights Creek and Butmaroo Creek only occurs intermittently following heavy rains and/or flooding. The aquatic ecology and aquatic fauna within these systems is adapted to the seasonal flow regime of Wrights Creek. The proposed crossing design will not change the overland flow patterns of Wrights Creek and would not impede longitudinal connectivity during flooding events, as such any aquatic fauna present within Butmaroo Creek would be able to migrate upstream if and when Wrights Creek is in flow or flood. Finally, no barriers are proposed within Wrights Creek during construction, and none are proposed in the design of the creek crossing. As such any longitudinal connectivity of Wrights

Creek would not be impacted by the proposal. Further detail on the Development's hydrological impacts is included in the EIS and supporting specialist study.

Blind Creek and associated riparian vegetation may serve as a habitat corridor for aquatic or wetland species. The causeway and road will be upgraded to facilitate construction of the Development. The proposed upgrade to the existing causeway would be approximately 5-6 m wide at the road level and be designed in accordance with the following guidelines:

- Guidelines for Watercourse Crossings on Waterfront land (NSW DPI, 2012)
- Guidelines for Laying Pipes and Cable in Watercourses on Waterfront Land (NSW DPI, 2012).

The pipes would be sized to facilitate crossings in normal flood conditions and will act to preserve upstream and downstream flow connectivity. As such, the proposed design and construction activities would not impact on the hydrology or connectivity of upstream and downstream environments. Further information is provided in the EIS.

6.1.5 Hydrological features

The existing surface water environment within the Development Site is characterised by several creeks and a larger ephemeral wetland area. Butmaroo, Wrights and Blind Creek are listed as Key Fish Habitat. However, Butmaroo's Freshwater Fish Community status is displayed as very poor on the Fisheries NSW Special Portal (DPI, 2022) and Blind Creek displayed as poor. Wrights Creek is not listed with any Freshwater Fish Community and the Development Footprint avoids any areas with this listing.

Butmaroo Creek

Butmaroo Creek, a sixth order stream runs through the southern part of the Development Site (Figure 2-10). The Development Footprint avoids the creek entirely. The construction and operation of the Development should have no impacts to the creek hydrology.

Wrights Creek

Strahler mapping shows Wrights Creek joining Butmaroo Creek downstream (Figure 2-10) however towards the south-western section of Wrights Creek, the creek bed flattens out and there is no evidence of surface flow within a clearly defined creek bed, even during periods of high rainfall. As such hydrological connectivity between these two creeks would only occur during flood events through dispersed flows over a flat plain. The proposed crossing design over Wrights Creek will not change the overland flow patterns of Wrights Creeks. No barriers are proposed within Wrights Creek during construction, and none are proposed in the design of the creek crossing. As such any longitudinal connectivity of Wrights Creek would not be impacted by the proposal.

The construction and operation of the Development should have no impacts to the creek hydrology, as stated in the EIS and supporting hydrological assessment.

Blind Creek

Blind Creek, a fifth order stream, flows east to west across the Development Site's main access road, joining Butmaroo Creek (Figure 2-10). The existing road crossing over the creek is a low level causeway that floods after periods of high rainfall (Figure 2-5). The causeway and road will be upgraded to facilitate construction of the Development. The proposed upgrade to the existing causeway would be approximately 5-6 m wide at the road level. The pipes would be sized to

facilitate crossings in normal flood conditions and will act to preserve upstream and downstream flow connectivity. As such, the proposed design and construction activities would not impact on the creek hydrology. Measures to mitigate sediment laden runoff and water quality will be implemented during construction.

First order stream

An unnamed ephemeral first order stream that flows into Blind Creek bisects the thin eastern arm of the Development Footprint (Figure 2-10). There was no evidence of a creek bed or flowing water in this area during any of the site visits. The construction and operation of the Development should have no impacts to the creek hydrology.

Wetland

The south-eastern edge of Lake George borders the north-western edge of the Development Footprint (Figure 2-10). The wetland mapped as a 'reservoir' in the NSW Wetlands spatial dataset occurs in the northern part of the Development Site, excluded from the Development Footprint (Figure 2-6, Figure 2-10).

Safeguarding and mitigation measures for watercourses and hydrology, and water use, and water quality are detailed in the Blind Creek Solar Farm Environmental Impact Statement. Given the implementation of these measures, impacts to hydrological processes are deemed manageable.

6.2 Vehicle strike

The installation of access roads within the Development Footprint will increase the likelihood of vehicle strike. However, there are no threatened fauna utilising habitat within the site that would be at risk from vehicle strike. Larger fauna observed within the Development Site include Eastern Grey Kangaroos (*Macropus giganteus*), Common Wombats (*Vombatus ursinus*) and introduced deer. Given the speed limit of access roads will likely be relatively low and will primarily be used during daylight hours, the likelihood of vehicle strike to either threatened and non-threatened species is considered low risk.

7. Avoid and minimise impacts

Various options relating to location, design and technology were evaluated in the planning of this Development, taking biodiversity values into account, as well as Development objectives, strategic needs, and benefits. Much of the information contained in this chapter regarding site selection and technology is derived from the Blind Creek Solar Farm Environmental Impact Statement (EIS).

7.1 Site selection

The Proponent has reviewed the solar generation potential of many areas in NSW by identifying grid connectivity capacity, planning constraints, biodiversity impacts and other site constraints. The selected Development Footprint provides the optimal combination of:

- Low environmental constraints (predominantly cleared cropping land).
- Flexibility to design the site to avoid impacts where possible, in particular archaeology and biodiversity.
- Access to an existing onsite transmission line, with spare capacity.
- Level terrain for cost-effective construction.
- High quality solar resource.
- Low-density population and limited neighbouring properties, with all adjacent land owned by participating landholders.
- Suitable planning context.
- Acceptable flood risk.
- Road access.
- Access to the distribution network for powering of ancillary services.
- Local community are supportive of a utility-scale solar project.
- Ability to effectively mitigate and manage residual impacts through the EIS process.
- Benefits that can be provided to the local region through economic development.

7.2 Proposal design

7.2.1 Alternative technologies

The Development will require up to 850,000 solar panels. The solar panels being considered for the Development would be expected to absorb 82% to 93% of the sun's light, and feature low reflective surface material that would limit glint and glare, reducing the potential impact of glare on aerially foraging species. Single axis tracking also reduces reflections by keeping the panels aligned with the sun and avoiding 'glancing' angles.

Several energy storage options were considered for the Development. Battery technology was selected over mechanical or physical storage methods or thermal storage, because it enables modular installation without major infrastructure or specialised landform features, reducing the risk of further disturbance to the landscape. Lithium-ion battery cells were selected for the Development because the technology is established and proven, compact, highly efficient and economical, and easily installed with low maintenance requirements, and are more environmentally friendly than other alternatives.

7.2.2 Development Footprint modification based on biodiversity constraints

The design of the Development is the result of an iterative process and has been adapted progressively as information regarding site constraints, and the potential impacts and risks associated with the development of the Development, have become available. Constraints related to biodiversity values in particular, in addition to other environmental and cultural constraints, have been taken into account in developing the proposed layout. The proposed layout achieves the objective of efficient electricity production while avoiding and minimising biodiversity and environmental impacts.

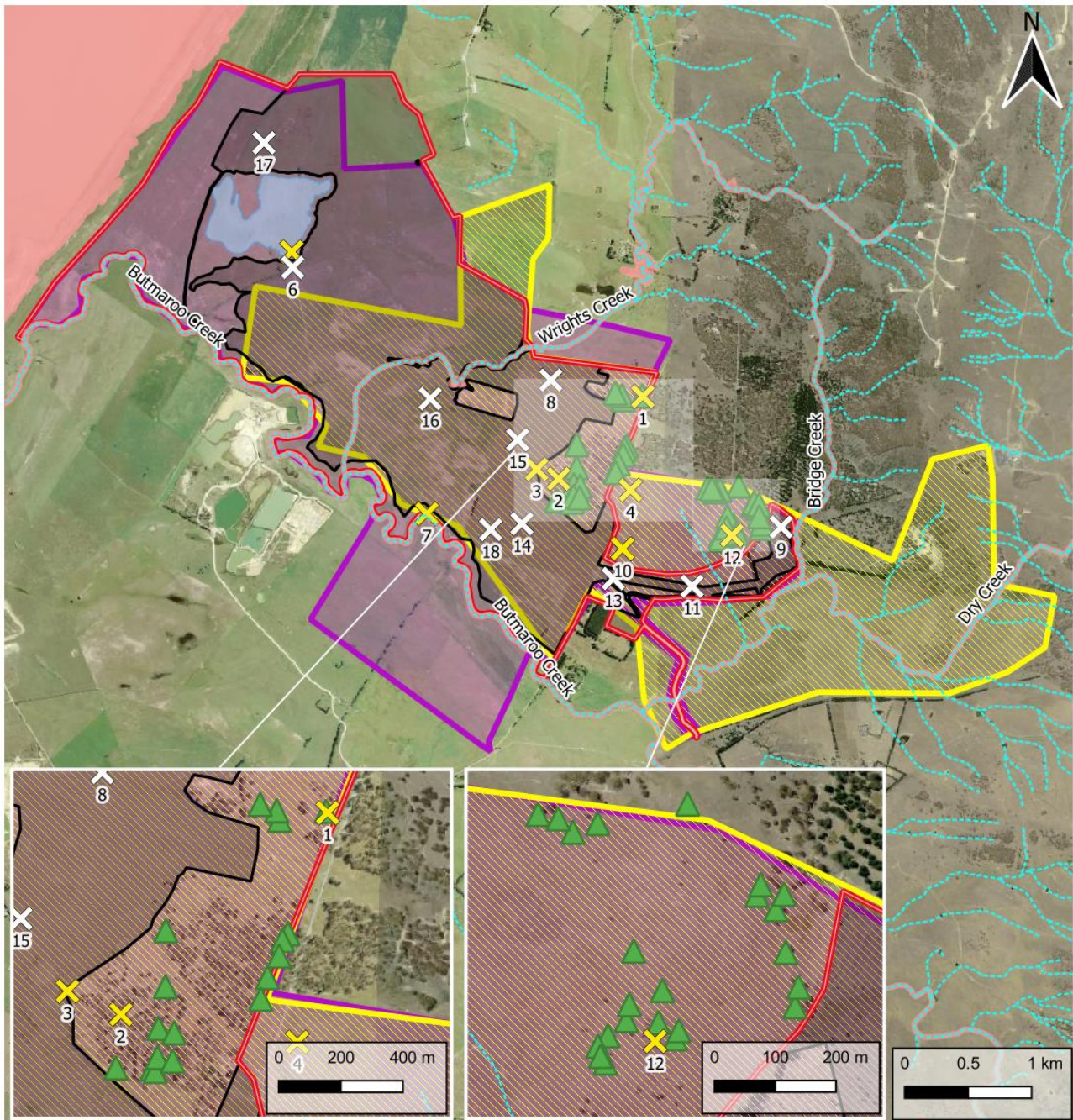
The Development Footprint remains broad so that, in the detailed design phase of the Development, final infrastructure layout can be developed with more accuracy and based on overlapping environmental and technical constraints. However, its extent has been reduced in response to early survey work including:

- Preliminary assessment which identified areas of high biodiversity value such as threatened species habitat, woodland and associated grassland PCTs, Threatened Ecological Communities, this included the assessment of areas likely to generate credits.
- Detailed Aboriginal heritage landscape modelling, which identified high potential areas better to avoid if possible.
- Hydrological modelling, which identified flow paths and velocities that made permanent infrastructure development unfeasible.

Key areas of avoidance now include:

- Critically Endangered Threatened Ecological Community *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion*.
- At least 41 hollow bearing trees (likely more; 41 were identified during preliminary surveys before the Development Site and Development Footprint were modified). No species polygons are generated by these habitat features.
- The wetland area, Butmaroo Creek and Wrights Creek.

Figure 7-1 shows two older Development Site layouts, which encompassed much larger areas of woodland including hollow bearing trees, and waterways.



20-403 Blind Creek Solar Farm BDAR
Project design: avoid & minimise impacts

Legend

- | | |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Development Site - current | Biodiversity Values Mapping |
| Development Footprint / Subject Land | Wetland |
| Development Site - November 2020 | --- Strahler mapping |
| Development Site - June 2020 | NGH BAM plots |
| ▲ Hollow bearing trees | ✕ Inside footprint |
| | ✕ Outside footprint |

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Ref: 20-403 Blind Creek Solar Farm BDAR
20210630 \ Project design: avoid & minimise impacts

Author: rebecca.r
Date created: 05.05.2022
Datum: GDA94 / MGA zone 55



Figure 7-1 Changes to Development Site following fieldwork, demonstrating adherence to the principles of avoiding and minimising impacts

8. Assessment of unavoidable impacts

8.1 Direct impacts

Despite the significant work completed to date to avoid and minimise impacts on sensitive areas of the Development Site, the construction and operational phases of the Development have the potential to impact biodiversity values within the Development Footprint that cannot be avoided. Direct impacts include habitat clearance, noise and disturbance associated with clearing and construction, and presence of infrastructure which may create barriers to movement.

8.1.1 Impacts to native vegetation

It is noted that solar panel modules, mounted on piles above the ground and widely spaced to allow ongoing grazing at this site, will not remove all native vegetation beneath the panels. In fact, microclimate / heat island effects associated with solar arrays (while not extensive) may improve conditions for several species of flora and fauna, reducing temperature extremes, improving the water utilisation of the plants and increasing humidity.

Solar panel modules are by far the largest infrastructure component by area. Impacts required to construct new tracks, establish footings for the buildings, the BESS and inverters and for temporary laydown and parking areas will have a more substantive impact, likely removing all vegetation. Because at this time the infrastructure layout is indicative and approval is sought for the broader Development Footprint, a conservative assumption is made in this assessment that all vegetation and habitat within the Development Footprint would be removed.

Clearing of native vegetation

Using the conservative assumption that all vegetation and habitat within the Development Footprint would be removed, the Development would necessitate the clearing of 642.86 ha native vegetation in total, consisting of two PCTs:

- 0.87 ha of 1100 – *Ribbon Gum – Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*
- 635.38ha of 1110 – *River Tussock – Tall Sedge – Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion*

This would be a one-off event, undertaken during the construction period. However, all native vegetation within the Development Footprint is in very poor condition; see Table 8-1 below.

Decreases in vegetation integrity scores

The VI scores of the existing vegetation zones are extremely low. The native vegetation is in very poor condition and much of the Development Site is dominated by exotic species as a result of long-term grazing and cropping. There are no TECs associated with any of the vegetation zones within the Development Footprint. Thus, there are negligible changes in VI scores associated with the Development within the Development Footprint (Table 8-1).

Table 8-1 Current and future vegetation integrity (VI) scored for each vegetation zone within the Development Footprint.

Zone #	Zone name	Area impacted (ha)	Current VI score	Future VI score
1	1100_non-nativegrassland_poor	0.87	0.8	0
3	1110_non-nativegrassland_poor	635.38	2.4	0

Loss of hollow-bearing trees

Hollow-bearing trees present within the Development Site have been avoided by the Development Footprint (Chapter 7), therefore there will be no loss of or impact upon hollow bearing trees and the hollow dependent species they support.

8.1.2 Impacts to native fauna

Potential loss of threatened fauna species

The White-fronted Chat has been observed several times within the Development Site and Development Footprint. In particular, the species was observed utilising areas containing Scotch Thistle. Due to critical construction timeframes, completing further targeted surveys for the White-fronted Chat during the breeding season (September to March) to determine if the areas of Scotch Thistle are being used as breeding habitat was not feasible, therefore all areas of Scotch Thistle can then be assumed as breeding habitat for the White-fronted Chat (refer to Section 4.4.5 and 8.3).

Approximately 103.17 ha of Scotch Thistle within the Development Site, of which 33.86 ha occurs within the development footprint. A Biodiversity Management Plan (BMP) has been developed in consultation with BCD to facilitate the offsetting of White-fronted Chat breeding habitat within the Development site (Appendix G). Approximately 33.86 ha of habitat will be restored within the Development Site (outside the Development Footprint) to offset the loss of breeding habitat.

NGH does not therefore consider that the Development would lead to the loss of significant foraging or breeding habitat for the White-fronted Chat from within the Development Site.

Potential impacts to other fauna

Removal of any trees, either native or non-native, may result in the displacement of non-threatened birds that use the trees for roosting or nesting.

8.2 Indirect impacts

Table 8-2 details the type, frequency, intensity, duration and consequence of the indirect impacts of the proposal. Standard mitigation measures are considered adequate to manage these risks (Chapter 10).

Table 8-2 Potential indirect impacts to biodiversity during the construction and operational phases of the Development.

Indirect impacts relevant to the Development, as listed in the BAM 2020						
Nature of impact	Extent	Frequency	Timing	Duration	PCTs, TECs, threatened species and/or habitats likely to be affected	Consequence for bioregional persistence
Inadvertent impacts on adjacent habitat or vegetation due to construction activities.	Unknown	Permanent	Construction and operational phases	Short term & long term	<ul style="list-style-type: none"> 1100 – Ribbon Gum – Snow Gum grassy forest 1110 – River Tussock – Tall Sedge – Kangaroo Grass moist grasslands, particularly riparian areas 	<p>PCT 1110 within the footprint is of very low quality and exotic dominated; surrounding grassland areas are likely to be of similar low quality, so impact to surrounding grasslands is likely to be low.</p> <p>Connectivity of woodland areas of PCT 1100 will not be affected.</p> <p>There may be impacts to riparian areas through increased dust from construction, which may affect aquatic flora and fauna.</p>
Reduced viability of adjacent habitat due to edge effects	Unknown	Permanent	Operational phase	Long term	<ul style="list-style-type: none"> 1100 – Ribbon Gum – Snow Gum grassy forest 	Impacts to viability of adjacent habitat due to edge effects is considered very low, due to the Development Footprint largely following existing vegetation shape. i.e., limited increases in edges.
Reduced viability of adjacent habitat due to increased noise, light and dust.	Unknown	One-off	Construction phase	Short term	<ul style="list-style-type: none"> 1100 – Ribbon Gum – Snow Gum grassy forest 1110 – River Tussock – Tall Sedge – 	<p>Disturbances to native fauna through excessive dust, noise and light during construction.</p> <p>There may be impacts to riparian areas through increased dust from construction, which may affect aquatic flora and fauna.</p>

Indirect impacts relevant to the Development, as listed in the BAM 2020						
					<p>Kangaroo Grass moist grasslands</p> <ul style="list-style-type: none"> • Reduced viability of wetland habitat during construction • Disturbance to Striped Legless Lizard and Pink-tailed Legless Lizard during construction 	
Transportation of weeds and pathogens from the Development Site to areas of adjacent vegetation	Entire construction area and adjacent land	Irregular intervals	Construction and operational phases	Long term	<ul style="list-style-type: none"> • 1100 – Ribbon Gum – Snow Gum grassy forest 	<p>PCT 1110 is already heavily exotic dominated, so weed ingress is irrelevant for this PCT.</p> <p>The risk of introduction of new weed outbreaks and pathogens during construction to PCT1100 woodland areas is more serious., however is considered manageable. Spread of weeds and pathogens will be limited by restricting the use of vehicles to roads. There is a remaining risk of weed and pathogen spread by the addition of new roads within the site.</p>
Increased risk of starvation, exposure and loss of shade or shelter due to vegetation clearance	Construction areas with suitable threatened fauna habitat	One-off	Construction phase	Short term	<ul style="list-style-type: none"> • White-fronted Chat (<i>Epthianura albifrons</i>) 	<p>White-fronted Chat have been observed within the Development Footprint. A male Chat has been seen in the same approximate location within the Footprint several times, suggesting that this habitat is particularly suitable, contains nesting habitat,</p>

Indirect impacts relevant to the Development, as listed in the BAM 2020						
						or that the species has a small range. Future surveys are planned to better understand how the species uses the habitat on site, and advice will be sought from species experts concurrent with the EIS exhibition to better quantify the risk of this impact. The results will be provided prior to the Development's determination.
Loss of breeding habitat due to vegetation clearance	Construction areas with suitable threatened fauna habitat	One-off	Construction Phase	Long term	<ul style="list-style-type: none"> White-fronted Chat (<i>Epthianura albifrons</i>) 	White-fronted Chat have been observed within the Development Footprint. A male Chat has been seen in the same approximate location within the footprint several times, suggesting that this habitat is particularly suitable, contains nesting habitat, or that the species has a small range. Future surveys are required to better understand how the species uses the habitat on site, and advice will be sought from species experts in 2022 to better quantify the risk of this impact.
Sediment laden runoff caused during the construction phase	Aquatic habitat in nearby waterways and wetlands	One-off	Construction and flood events	Short term	N/A	Measures to mitigate sediment laden runoff and protect water quality will be implemented during construction.
Inhibition of nitrogen fixation and increased soil salinity	N/A	N/A	N/A	N/A	N/A	It is unlikely that any adverse impact on soil microbial life and soil salinity will be made through the development and on-going operation. There is strong argument that by reducing the agricultural management intensity and providing microclimates beneath the arrays, that soil health and the

Indirect impacts relevant to the Development, as listed in the BAM 2020						
						persistence of ground cover throughout the year will improve.
Rubbish dumping due to improper management of waste	All construction areas	Irregular intervals	Construction Phase:	Short-term	<ul style="list-style-type: none"> 1100 – Ribbon Gum – Snow Gum grassy forest 1110 – River Tussock – Tall Sedge – Kangaroo Grass moist grasslands, particularly riparian areas 	Contamination of surrounding habitat with rubbish associated with construction if this is not managed.
Wood collection	All wooded vegetation within surrounding areas.	Irregular intervals	Construction and operation phase	Long term	<ul style="list-style-type: none"> 1100 – Ribbon Gum – Snow Gum grassy forest 	Potential to result in reduced habitat for reptiles, insects and fungi, but unlikely to occur as site will not be open to members of the public.
Removal and disturbance of rock, including bush rock	Rocky areas within the Development Footprint	One-off	Construction	Permanent	N/A	There are no rocky outcrops within the Development Footprint that are small enough, or embedded to the right depth, to be suitable habitat for bushrock species such as the Pink-tailed Legless Lizard.
Increase in predators due to increasing tracks	Entire site and surrounding vegetation.	N/A	Operation	Permanent	<ul style="list-style-type: none"> White-fronted Chat (<i>Epthianura albifrons</i>) 	Domestic/Feral cats, foxes and other feral predators could increase due to increasing habitat edges created by development increasing movement capacity and success of feral predators. This is unlikely, as the majority of the Development Footprint follows

Indirect impacts relevant to the Development, as listed in the BAM 2020						
						existing vegetation and will not greatly increase the edge effect and it will likely be fully fenced.
Increase in pest animal populations due to increased human activity	Entire site and surrounding vegetation.	N/A	Operation	Permanent	<ul style="list-style-type: none"> White-fronted Chat (<i>Epthianura albifrons</i>) 	Unlikely to impact PCTs, however increased human activity within the Development Footprint has the potential to introduce pest animals. Foxes, deer and rabbits are all common to the site and in line with a more intensive management of the land due to the Project, it is likely that these pest species can be managed more successfully.
Changed fire regimes due to increased use of vehicles and machinery	Entire site and surrounding vegetation.	Rare	Construction and operation	Permanent	<ul style="list-style-type: none"> 1100 – Ribbon Gum – Snow Gum grassy forest 1110 – River Tussock – Tall Sedge – Kangaroo Grass moist grasslands 	Moderate risk of increased fire frequency given use of vehicles and machinery which may cause sparks or leak fuel on dry vegetation. This risk is mitigated by fire and spill management plans that will accompany construction and operation.
Disturbance to specialist breeding and foraging habitat (e.g. beach nesting for shorebirds, bushrock) due to construction activities	Rocky areas within the Development Footprint	One-off	Construction	Permanent	N/A	There are no species using habitat within the site with specialist breeding habitat requirements.

8.3 Prescribed impacts

8.3.1 Non-native vegetation

The one identified prescribed biodiversity impact relevant to this Development is the impact to non-native vegetation that serves as breeding and/or foraging habitat for the White-fronted Chat, an ecosystem credit species listed as Vulnerable under the BC Act.

The majority of the Development Footprint and Project, while designated a PCT, comprises non-native plant species. There are large areas of sown grasses (e.g., ryegrass), and high coverage of other exotic weeds such as Scotch Thistle, African Lovegrass, and other pasture weeds.

Male Chats have been observed several times in November 2021 in weedy paddock vegetation adjacent to a track within the Development Footprint. In particular, the species was observed utilising areas containing Scotch Thistle. This species is known to inhabit damp open habitats, including rough pasture. Research suggests that White-fronted Chats feed on patchy food sources and capitalise on temporary outbreaks of abundant prey, and it is likely that this encourages flocking behaviour (Major, 1991b). The species roosts communally unless incubating or brooding, and they are non-territorial, feeding with other birds while not actually attending the nest (Major, 1991b). Nests are simple cups built in low vegetation, usually <2 m from the ground (Major, 1991a). Nests can be lined with thistle down (Major, 1991a), of which there are plenty in the areas the Chats have been observed.

The Chats known to be utilising habitat within the Development Footprint have been observed singly rather than in flocks, perhaps suggesting that there is a nest site nearby. While the Chat's relatively general breeding habitat requirements might mean that a large area of the Development Footprint constitutes suitable habitat, it therefore follows that a large area of vegetation outside of the direct impact area will remain intact and available for use by any individuals or flocks of Chats within the locality.

Due to critical construction timeframes, completing further targeted surveys for the White-fronted Chat during the breeding season (September to March), to determine if the areas of Scotch Thistle are being used as breeding habitat, was not feasible. Following BCD's review of the BDAR during the exhibition of the EIS, BCD recommended completing surveys for the extent of Scotch Thistle within the Subject Land instead. All areas of Scotch Thistle can then be assumed as breeding habitat for the White-fronted Chat.

Surveys for Scotch Thistle were undertaken in July 2022 (refer to section 4.4.5) and identified approximately 103.17 ha of Scotch Thistle within the Development Site. 33.86 ha occurs within the development footprint (Figure 8-1). As per BCD's recommendation, an equivalent 33.86 ha of habitat will be restored within the Development Site (outside the Development Footprint) to offset the loss of breeding habitat. A BMP has been developed in consultation with BCD to facilitate the restoration of the 33.86 ha of White-fronted Chat breeding habitat within the Development site (Appendix G).

Additionally, there are several stands of exotic trees within the Development Footprint (Figure 3-7), including pines and elms. The Proponent has informed NGH that the elms (Figure 6-2) have personal significance to the landowner, and the solar array layout may be configured in a way that these trees can be retained if possible.

The stands of exotic pines within the Development Footprint include two stands planted in strips that appear to act as wind breaks, and remnants of what was once a larger pine forest in the

eastern arm of the Development Footprint (Figure 6-3). This has mostly now been felled for a sand mining operation. Most of these pines are outside of the Development Footprint, with a small number to be impacted by clearing for the Development (Figure 3-7).

A review of Australian plantation forest biodiversity outlines several key findings (Lindenmayer & Hobbs, 2004):

- Fauna assemblages are less diverse in conifer plantations than in native forests.
- Hollow-dependent fauna, arboreal fauna, and nectivorous, frugivorous and canopy feeding species are significantly less abundant in conifer plantations, as they lack key nesting and foraging resources.
- Pine plantations do provide some foraging and/or nesting habitat for birds, small mammals and invertebrates.
- Pine plantation diversity is strongly related to the mosaic of native forest remnants among the plantations, and the plantation management history (e.g., thinning of trees), and the greatest diversity and abundance in plantations occurs in stands adjacent to existing native vegetation.

Species with particular life-history traits are more likely to be found in pine plantations; for example, Lindenmayer et al. (2002) found that European Goldfinch, European Blackbird, and Eastern Whipbird were detected more often in radiata pine plantations. The Blackbird and Whipbird are ground carnivores, a foraging guild more strongly associated with radiata pine stands. It is possible that the Chat may use these areas of vegetation for foraging, or less likely, breeding. The pine stands closer to the wetlands and riparian areas are more likely to be utilised.

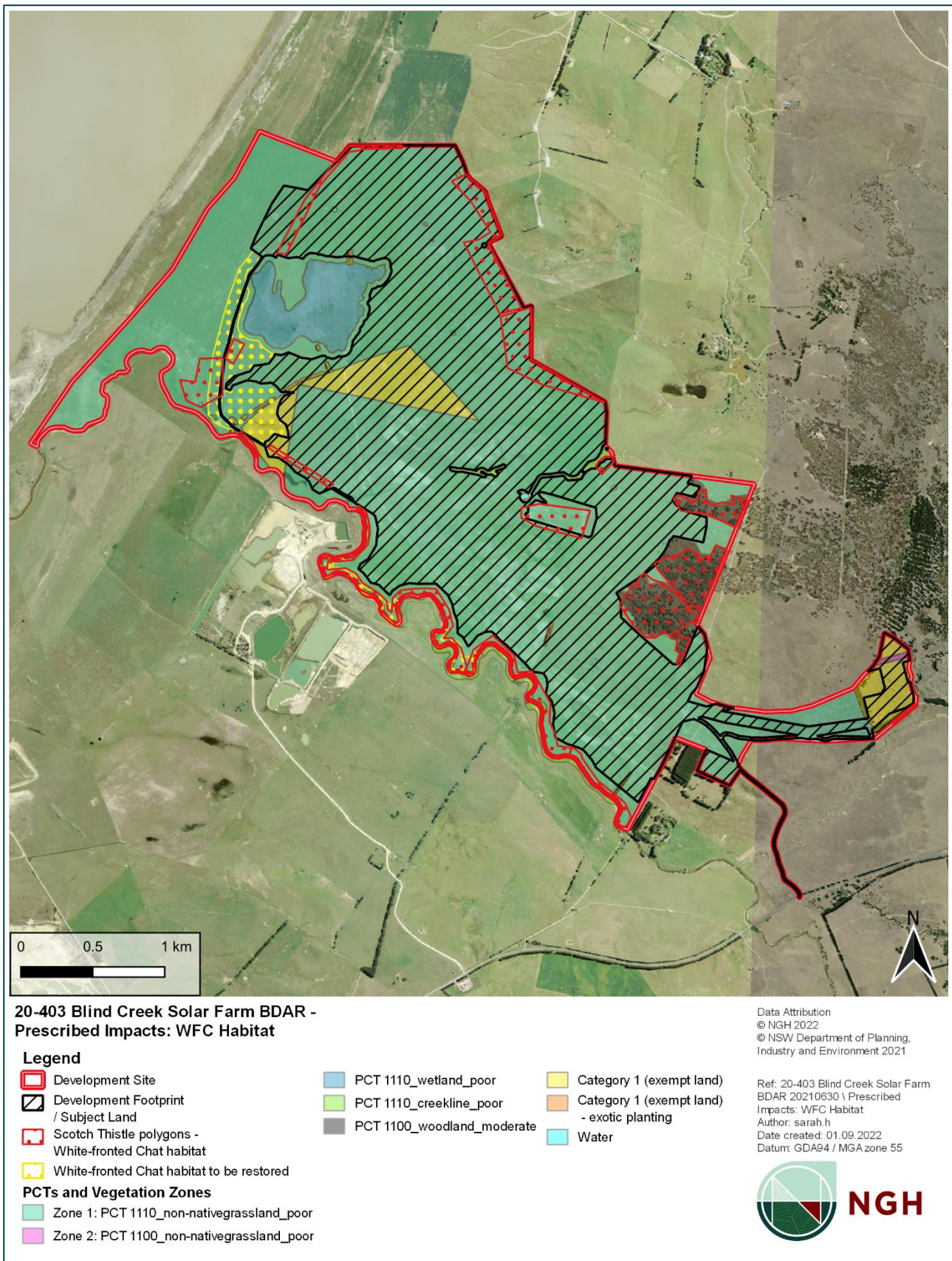


Figure 8-1 White-fronted Chat habitat within the Development Site

9. Serious and Irreversible Impact (SAIL) entities

9.1 Principles for determining serious and irreversible impacts

The concept of Serious And Irreversible Impacts (SAIL) is fundamentally about protecting threatened entities that are most at risk of extinction from potential development. The Biodiversity Offsets Scheme recognises that there are some types of serious and irreversible impacts that the community expects will not occur except where the consent authority considers that this type of impact is outweighed by the social and economic benefits that the Development will deliver to the State.

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct because:

1. it will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
2. it will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size
3. it is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution
4. the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

9.2 SAIL entities associated with the Project

9.2.1 Threatened ecological communities

One Threatened Ecological Community (TEC) at risk of a SAIL was identified within the Development Site:

- Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion

As detailed in Chapter 3, the woodland area of PCT 1100 meets the criteria for the Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion TEC. However, this area of TEC has been excluded from the Development Footprint by the Proponent. A 38.22 ha area of the TEC will remain within the Development Site, adjacent to the works areas.

The grassland area of PCT 1100 in the powerline easement does not meet the criteria for this TEC. A BAM plot undertaken in this area contained only two species that characterise the TEC flora assemblage, *Bossiaea buxifolia*, and a *Wahlenbergia* species, and there was only 21.9% native species coverage in the plot.

BCD reviewed the BDAR during the exhibition of the EIS, and was satisfied that due to the highly degraded condition of the PCT associated with this TEC within the development footprint, this TEC no longer meet the criteria for the TEC and SAIL entity. No SAIL Assessment is required for this TEC.

9.2.2 Threatened species

Three threatened species at risk of a SAI were identified in the BAM-C as potentially occurring within the Subject Land:

- Rough Eyebright (*Euphrasia scabra*)
- Baeuerlen's Gentian (*Gentiana baeuerlenii*)
- Trailing Monotoca (*Monotoca rotundifolia*)

Targeted surveys in March 2022 have demonstrated these species do not occur. No impacts are anticipated for these species and no further assessment is required.

10. Mitigation and management of impacts

A general summary of the key measures required to mitigate the impacts of the proposal are provided below. A full list of mitigation measures proposed to manage impacts, including proposed techniques, timing, frequency, responsibility for implementing each measure, risk of failure, and an analysis of the consequences of any residual impacts are provided in Table 10-1.

10.1 Direct impacts

The following mitigation measures for direct impacts to vegetation and habitat are recommended for this Development:

- Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecologist or licensed trained spotter catcher during clearing events.
- Relocating habitat features (fallen timber, hollow logs and embedded rock that requires removal during construction) from within the Development Footprint. All displaced habitat features can be placed in areas outside the Development Footprint, as directed as directed by the ecologist).
- Induct all staff prior to construction to identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance.

10.2 Indirect impacts

The following mitigation measures for indirect impacts to vegetation and habitat are recommended for this Development:

- Adopt clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed.
- Use noise barriers, or daily/seasonal timing of construction and operational activities to reduce impacts of noise, as appropriate. These barriers can be made from temporary fencing that are easily moved as required during construction.
- Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill, as appropriate.
- Using adaptive dust management and monitoring programs to control air quality.
- Implement erosion sediment control measures during the construction period.
- Install temporary fencing to protect significant environmental features such as riparian zones.
- Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas.
- Staff training and site briefing to communicate environmental features to be protected and measures to be implemented.
- Preparation of a vegetation management plan to regulate activity in vegetation and habitat adjacent to the proposed Development.
- Preparation of an adaptive Pest Action Management Plan (PAP) to regulate pest animal species and mitigate any potential impacts to the White Fronted Chat.

10.3 Prescribed impacts

The following mitigation measures for prescribed impacts to vegetation and habitat are recommended for this Development:

- Scheduling the timing of construction activities to avoid critical life cycle events (e.g. timing construction activities to avoid migratory species on site, or using the site).
- Instigating clearing protocols, including pre-clearing surveys, daily surveys and staged clearing, and using trained ecologist or licensed trained spotter catcher during clearing events, construction and maintenance activities for human-made structures and non-native vegetation.
- Retaining habitat features (e.g. fallen timber, hollow logs, rocks) within the Development Footprint, or relocating them to adjacent retained remnant vegetation.
- Erecting temporary fencing to protect significant environmental features, such as rock outcrops, theodolite and water bodies.
- Using sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment.
- Training staff and conducting site briefings to communicate environmental features to be protected and the measures implemented to protect them.
- Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the Development Footprint.
- Preparation of a BMP for the White-fronted Chat. The BMP will be prepared in consultation with BCD prior to issuing the conditions of consent during the Response to Submissions stage.

Table 10-1 Full list of mitigation measures proposed to avoid and minimise impacts to native vegetation and habitat

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
Direct impacts through displacement of resident fauna through vegetation clearing and habitat removal	Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecologist or licensed trained spotter catcher during clearing events	<ul style="list-style-type: none"> Staged clearing, supervised by Ecologist or trained spotter catcher to allow for resident fauna to relocate or be relocated where required 	Construction	Regular	Construction contractor	Moderate	High risk and consequences could include injury or death of fauna.
	Relocating habitat features (fallen timber, hollow logs and embedded rock) from within the Development Footprint.	<ul style="list-style-type: none"> All suitable embedded rock (removed as part of the Development), fallen timber and hollow logs should be relocated outside of the construction area under the supervision of an Ecologist or spotter catcher. 	Construction	Regular	Construction contractor	Low	Moderate risk and consequences could include loss of some species not being able to relocate to suitable habitat due to exposure or predation.
	Induct all staff prior to construction to identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance.	<ul style="list-style-type: none"> Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing. No stockpiling or storage within dripline of any mature trees. No stockpiling or storage within riparian buffers. 	Prior to and during construction	Regular	Construction Contractor	High	Low risk of inadvertent clearing of native vegetation and fauna habitat intended for conservation onsite.

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Adopt clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	<ul style="list-style-type: none"> Documented clearance protocols to mark and protect vegetation to be retained. Use handheld machinery where possible and have elevated work platform check hollows prior to tree felling 	Preconstruction	Regular	Construction contractor	High	With effective implementation of this protocol, risk is considered low.
Indirect impacts on native vegetation, habitat and fauna	Use noise barriers, or daily/seasonal timing of construction and operational activities to reduce impacts of noise	<ul style="list-style-type: none"> A Construction Environmental Management Plan could include measures to avoid noise encroachment on adjacent habitats such as avoiding night works as much as possible. 	Construction	Regular	Construction Contractor	Low	None
	Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	<ul style="list-style-type: none"> Avoid night works; and Direct lights away from vegetation. 	Construction/operation	Regular	Construction Contractor	Low	None
	Using adaptive dust management and monitoring programs to control air quality	<ul style="list-style-type: none"> Daily monitoring of dust generated by construction activities; and Construction would cease if dust observed being blown from site until control measures were implemented; and All activities relating to the proposal would be undertaken with the objective of preventing visible dust emissions from the Development. 	Construction	Regular	Contractor	Moderate	Sedimentation in riparian areas and dams.

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Install temporary fencing to protect significant environmental features such as riparian zones and TEC	<ul style="list-style-type: none"> Prior to construction commencing, exclusion fences and signage would be installed around habitat to be retained. 	Construction	Regular	Construction Contractor	Low	Sedimentation in riparian areas and dams.
	Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	<ul style="list-style-type: none"> A quarantine procedure could be developed for the proposal to prevent and minimise the spread of weeds. This would include: Management protocol for declared priority weeds under the <i>Biosecurity Act 2015</i> during and after construction Weed hygiene protocol in relation to plant, machinery, and fill; Wash down site vehicles prior to entering the site Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated, and reported and 	Construction/operation	Regular	Contractor	Moderate	Weed encroachment
	Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	<ul style="list-style-type: none"> Site induction; and Toolbox talks. 	Construction	Regular	Contractor	Moderate	Impacts to native vegetation or threatened species if staff protocols not followed.

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Preparation of a vegetation management plan to regulate activity in vegetation and habitat adjacent to the proposed Development	<ul style="list-style-type: none"> • Preparation of a management plan that would include protocols for: • Protection of native vegetation to be retained, particularly within the following areas: <ul style="list-style-type: none"> ○ Remnant <i>Monaro Tablelands Cool Temperate Grassy Woodlands</i> at the eastern end of the Subject Land ○ HBT's ○ The wetland area at the north western end of the Development Site ○ The setback area from Butmaroo Creek • The installation of permanent fencing around areas of native vegetation to be retained; • Best practice removal and disposal of vegetation cleared; • Weed management; • Unexpected threatened species finds; • Exclusion of vehicles from sensitive areas; • Rehabilitation of disturbed areas. 	Construction	One-off	Contractor	Moderate	Impacts to native vegetation or threatened species if Management Plan not followed.

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Scheduling the timing of construction activities to avoid critical life cycle events (e.g. timing construction activities to avoid migratory species on site, or using the site)	<ul style="list-style-type: none"> Hollow bearing tree removal should be timed to avoid August-November – breeding season for the highest number of species. Avoid works near wetland areas if threatened species are detected 	December-July (Construction)	One off	Construction contractor	Low	High risk and consequences could include injury or death to hollow dependent fauna.
	Preparation of an adaptive Pest Action Management Plan (PAP) to regulate pest animal species and mitigate any potential impacts to the White Fronted Chat.	<ul style="list-style-type: none"> An adaptive PAP detailing early, and ongoing pest species suppression methods will be implemented. The PAP will determine the most effective strategies and formalise ongoing management needs and methods to keep pest animals at low levels. 	Construction and operation	Regular	BCSF Environmental Manager Contractor	Low	High risk and consequences could include injury or death to native fauna including the White-fronted Chat.
Prescribed biodiversity impacts	Instigating clearing protocols, including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing, construction and maintenance activities for human-made structures and non-native vegetation	<ul style="list-style-type: none"> Staged clearing, supervised by Ecologist or trained spotter catcher to allow for resident fauna to relocate or be relocated where required 	Construction	Regular	Construction contractor	Moderate	High risk and consequences could include injury or death of fauna

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Retaining habitat features (e.g. fallen timber, hollow logs, rocks) within the Development Footprint, or relocating them to adjacent retained remnant vegetation	<ul style="list-style-type: none"> All suitable embedded rock, fallen timber and hollow logs should be relocated outside of the construction area under the supervision of an Ecologist or spotter catcher. 	Construction	Regular	Construction contractor	Low	Moderate risk and consequences could include loss of some species not being able to relocate to suitable habitat due to exposure or predation.
	Erecting temporary fencing to protect significant environmental features, such as karst, caves, rock outcrops and water bodies	<ul style="list-style-type: none"> Prior to construction commencing, exclusion fences and signage would be installed around habitat to be retained. 	Construction	Regularly	Construction Contractor	Low	None
	Using sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment	<ul style="list-style-type: none"> An erosion and sediment control plan would be prepared and implemented. Spill management procedures would be implemented. Stormwater management plan prepared and implemented. 	Construction	Regular	Construction Contractor	Moderate	Impacts may occur to waterway if erosion and sedimentation control plan not implemented.
	Training staff and conducting site briefings to communicate environmental features to be protected and the measures implemented to protect them	<ul style="list-style-type: none"> Site induction Toolbox talks 	Construction	Regular	Contractor	Moderate	Impacts to native vegetation or threatened species if staff protocols not followed

Impact	Mitigation measure	Proposed techniques	Timing	Frequency	Responsibility	Risk of failure	Risk and consequences of residual impacts
	Implementation of a BMP to restore an equivalent amount of White-fronted Chat breeding habitat impacted by the Project	<ul style="list-style-type: none"> Survey the extent of Scotch Thistle within the Subject Land to identify the exact area(ha) of White-fronted Chat breeding habitat being impacted. Identify areas within the Subject Land which are not being impacted and establish an area of equivalent size to be used to restore White-fronted Chat breeding habitat. Detail a monitoring plan in the BMP to assess the performance and effectiveness of the White-fronted Chat breeding habitat 	Pre-construction	Regular	Contractor	Moderate	Moderate risk and consequences could include loss of some White-fronted Chat individuals not being able to relocate to the new areas of breeding habitat. The new breeding habitat may not be favoured by the White-fronted chat individuals being displaced.
	Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the Development Footprint	<p>Preparation of a management plan that would include protocols for:</p> <ul style="list-style-type: none"> Protection of native vegetation to be retained; Best practice removal and disposal of vegetation cleared; Weed management; Unexpected threatened species finds; Exclusion of vehicles within sensitive areas; Rehabilitation of disturbed areas. 	Construction	One-off	Contractor	Moderate	Impacts to native vegetation or threatened species if Management Plan not followed.

11. Offset requirement summary

11.1 Impacts requiring offset

11.1.1 Ecosystem credits

An offset is required for all impacts of the Development on PCTs that are associated with:

- a) a vegetation zone that has a vegetation integrity score ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community, or
- b) a vegetation zone that has a vegetation integrity score of ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community, or
- c) a vegetation zone that has a vegetation integrity score ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

There are no vegetation zones within the Development Footprint requiring offset, as the VI scores are all < 15 (Table 11-1). As such, no map is provided for these areas. The full Biodiversity Credit Report is provided in Appendix A.

11.1.2 Species credits

No threatened species credit species require a credit offset due to surveys confirming the absence of targeted credit species (section 4.3 and section 4.4).

11.2 Impacts not requiring offset

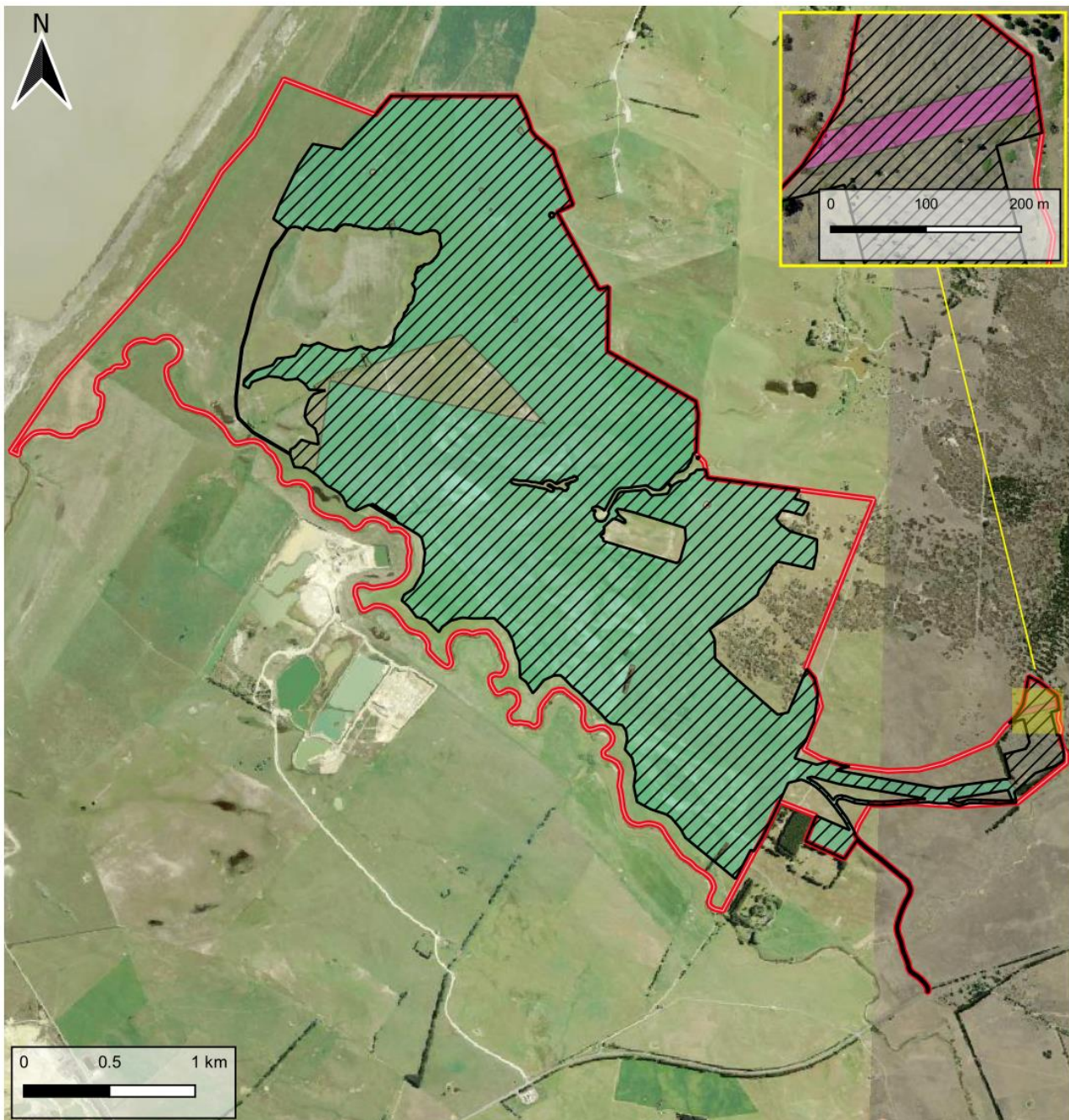
The two vegetation zones identified within the Development Footprint are degraded to the extent that they do not require an offset (as the VI scores are < 15). Refer to Table 11-1 and Figure 11-1 below.

Table 11-1 Vegetation zones not requiring offset within the Development Footprint.

Zone #	Zone name	PCT	Zone area (ha)	VI score	Ecosystem credits required
1	1110_non-nativegrassland_poor	1110 – River Tussock – Tall Sedge – Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	635.38	2.4	0
2	1100_non-nativegrassland_poor	1100 – Ribbon Gum – Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	0.87	0.8	0

11.3 Areas not requiring assessment

There are several areas of Category 1 (exempt land) within the Development Footprint, 45.91 ha in total, which are exempt from assessment under the BAM (Figure 11-2). For more information on land categorisation of the Development Site, please see the Land Category Assessment (Appendix E).



20-403 Blind Creek Solar Farm BDAR
Vegetation not requiring offset

Legend

 Development Site

 Development Footprint / Subject Land

PCTs and Vegetation Zones

 Zone 1: PCT 1110_non-nativegrassland_poor

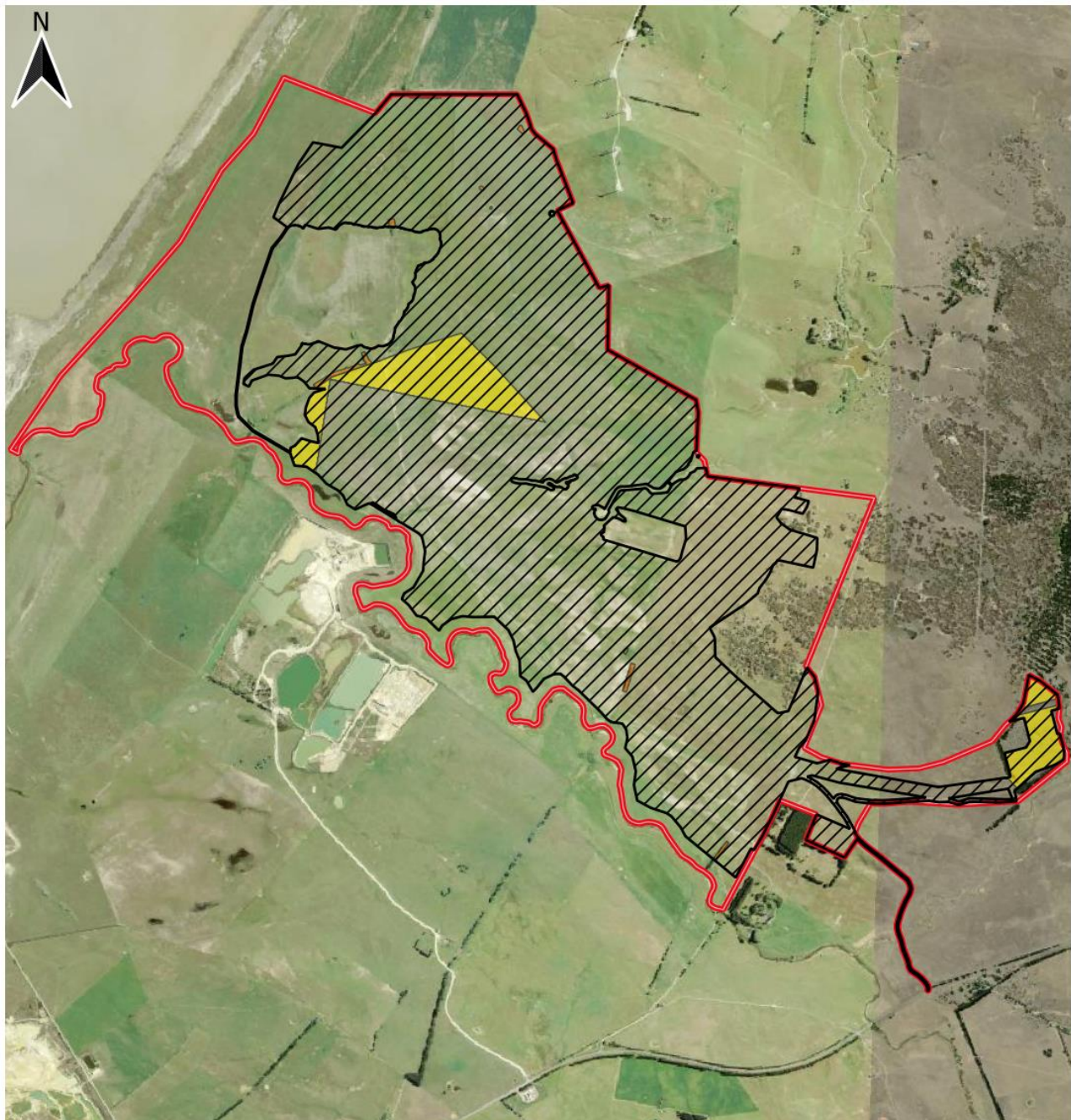
 Zone 2: PCT 1100_non-nativegrassland_poor

Data Attribution
 © NGH 2022
 © NSW Department of Planning, Industry and Environment 2021

Ref: 20-403 Blind Creek Solar Farm BDAR
 20210630 \ Vegetation not requiring offset
 Author: rebecca.r
 Date created: 03.08.2022
 Datum: GDA94 / MGA zone 55



Figure 11-1 Vegetation zones not requiring offset



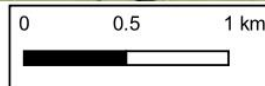
20-403 Blind Creek Solar Farm BDAR
Areas exempt from assessment

Legend

- Development Site
- Development Footprint / Subject Land

PCTs and Vegetation Zones

- Category 1 (exempt land)
- Category 1 (exempt land) - exotic planting



Data Attribution
 © NGH 2022
 © NSW Department of Planning, Industry and Environment 2021
 Ref: 20-403 Blind Creek Solar Farm BDAR
 20210630 \ Areas exempt from assessment
 Author: rebecca.r
 Date created: 05.05.2022
 Datum: GDA94 / MGA zone 55



Figure 11-2 Areas not requiring assessment under the BAM

12. Conclusions

NGH has prepared this BDAR for the proposed Blind Creek Solar Farm, in accordance with the Biodiversity Conservation Act 2016 (BC Act) Biodiversity Assessment Method (BAM) 2020, in order to:

- identify how the Development avoids and minimise impacts to biodiversity;
- characterise the offset obligation required to offset the biodiversity impacts not able to be avoided; and
- assess impacts that could be characterised as serious and irreversible according to specified principles.

12.1 Native vegetation

All vegetation within Development Footprint was assessed by NGH through stratification and vegetation integrity plot (BAM plot) surveys in November 2020, July 2021 and November 2021. These data have been used to determine the type and condition of Plant Community Types (PCTs), and associated Threatened Ecological Communities (TECs) within the Development Footprint. Two PCTs were identified within the Development Footprint:

- 1100 – *Ribbon Gum – Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*
- 1110 – *River Tussock – Tall Sedge – Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion*

No area of either PCT 1100 or 1110 within the Development Footprint had sufficient vegetation integrity to generate ecosystem credits under the BAM.

An area of *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion* TEC (Critically Endangered under the BC Act) was also identified within the Development Site, however after BCD reviewed the BDAR during the exhibition of the EIS, BCD was satisfied that due to the highly degraded condition of the PCT associated with this TEC within the development footprint, this PCT no longer meet the criteria for the TEC. This area has been avoided by the Development Footprint.

12.2 Threatened entities

No threatened species credit species require a credit offset, as surveys confirmed the absence of targeted credit species. No ecosystem credits or species credits are generated by the Project, and as a result the retirement of any credits in accordance with the NSW BOS is not required.

12.2.1 EPBC Matters of National Environmental Significance

There are no species listed as threatened under the EPBC Act considered likely to utilise habitat found within the Development Footprint. No impacts are anticipated on MNES and no referral under the EPBC Act has been undertaken for the Development.

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Appendix A BAM Calculator Credit Reports

Please see overleaf for full report.

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023058/BAAS19015/20/00023059	Blind Creek Solar Farm	16/06/2022
Assessor Name	Assessor Number	BAM Data version *
Elizabeth (Beth) Q Noel	BAAS19015	54
Proponent Names	Report Created	BAM Case Status
Emily Walker	23/09/2022	Finalised
Assessment Revision	Assessment Type	Date Finalised
9	Major Projects	23/09/2022

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added

BAM Biodiversity Credit Report (Like for like)

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

Calyptrorhynchus lathami / Glossy Black-Cockatoo

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	Not a TEC	642.0	0	0	0
1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	Not a TEC	0.9	0	0	0

1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Like for like)

	Tableland Clay Grassy Woodlands This includes PCT's: 507, 513, 534, 554, 606, 681, 722, 921, 1099, 1100, 1101, 1104, 1188, 1192, 1198, 1200, 1295	Tableland Clay Grassy Woodlands >=70% and <90%	1100_grassland_poor	No	0	Monaro, Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Temperate Montane Grasslands This includes PCT's: 894, 895, 896, 1110, 1288, 1298	Temperate Montane Grasslands >=90%	1110_grassland_poor	No	0	Monaro, Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.



BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023058/BAAS19015/20/00023059	Blind Creek Solar Farm	16/06/2022
Assessor Name	Assessor Number	BAM Data version *
Elizabeth (Beth) Q Noel	BAAS19015	54
Proponent Name(s)	Report Created	BAM Case Status
Emily Walker	23/09/2022	Finalised
Assessment Revision	Assessment Type	Date Finalised
9	Major Projects	23/09/2022

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added
None added

PCTs With Customized Benchmarks

BAM Biodiversity Credit Report (Variations)

PCT

No Changes

Predicted Threatened Species Not On Site

Name

Calyptrorhynchus lathami / Glossy Black-Cockatoo

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	Not a TEC	642.0	0	0	0.00
1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	Not a TEC	0.9	0	0	0.00

1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Tableland Clay Grassy Woodlands This includes PCT's: 507, 513, 534, 554, 606, 681, 722, 921, 1099, 1100, 1101, 1104, 1188, 1192, 1198, 1200, 1295	Tableland Clay Grassy Woodlands > =70% and <90%	1100_grass land_poor	No	0	Monaro,Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	Zone	HBT	Credits	IBRA region
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BAM Biodiversity Credit Report (Variations)

	Grassy Woodlands	Tier 2 or higher threat status	1100_grass land_poor	No	0	IBRA Region: South Eastern Highlands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Temperate Montane Grasslands This includes PCT's: 894, 895, 896, 1110, 1288, 1298	Temperate Montane Grasslands >=90%	1110_grass land_poor	No	0	Monaro, Bungonia, Crookwell, Kybayan-Gourock, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Grasslands	Tier 1	1110_grass land_poor	No	0	IBRA Region: South Eastern Highlands, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like options

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023058/BAAS19015/20/00023059	Blind Creek Solar Farm	16/06/2022
Assessor Name	Report Created	BAM Data version *
Elizabeth (Beth) Q Noel	23/09/2022	54
Assessor Number	Assessment Type	BAM Case Status
BAAS19015	Major Projects	Finalised
Assessment Revision	Date Finalised	
9	23/09/2022	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
<i>Commersonia prostrata</i> Dwarf Kerrawang	No (surveyed)	<div> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr </div> <div> <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug </div> <div> <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec </div> <div> <input type="checkbox"/> Survey month outside the specified months? </div>
<i>Delma impar</i> Striped Legless Lizard	No (surveyed)	<div> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr </div> <div> <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug </div> <div> <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec </div> <div> <input type="checkbox"/> Survey month outside the specified months? </div>
<i>Diuris aequalis</i> Buttercup Doubletail	No (surveyed)	<div> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr </div> <div> <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug </div> <div> <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec </div> <div> <input type="checkbox"/> Survey month outside the specified months? </div>

BAM Candidate Species Report

<i>Euphrasia scabra</i> Rough Eyebright	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Gentiana baeuerlenii</i> Baeuerlen's Gentian	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input type="checkbox"/> Apr <input checked="" type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input checked="" type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Leucochrysum albicans var. tricolor</i> Hoary Sunray	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Litoria aurea</i> Green and Golden Bell Frog	No (surveyed)	<input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Litoria raniformis</i> Southern Bell Frog	No (surveyed)	<input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

BAM Candidate Species Report

<i>Monotoca rotundifolia</i> Trailing Monotoca	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Myotis macropus</i> Southern Myotis	No (surveyed)	<input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Prasophyllum petilum</i> Tarengo Leek Orchid	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Swainsona sericea</i> Silky Swainson-pea	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Thesium australe</i> Austral Toadflax	No (surveyed)	<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

BAM Candidate Species Report

Common name	Scientific name	Justification in the BAM-C
Black Gum	<i>Eucalyptus aggregata</i>	Refer to BAR
Glossy Black-Cockatoo	<i>Calyptrorhynchus lathami</i>	Habitat constraints
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Habitat constraints
Koala	<i>Phascolarctos cinereus</i>	Refer to BAR
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Habitat constraints
Majors Creek Leek Orchid	<i>Prasophyllum sandrae</i>	Refer to BAR
Mauve Burr-daisy	<i>Calotis glandulosa</i>	Refer to BAR
Paddys River Box, Camden Woollybutt	<i>Eucalyptus macarthurii</i>	Habitat degraded
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	Refer to BAR
Regent Honeyeater	<i>Anthochaera phrygia</i>	Habitat constraints
Silver-leafed Gum	<i>Eucalyptus pulverulenta</i>	Refer to BAR
Swift Parrot	<i>Lathamus discolor</i>	Habitat constraints
Thick Lip Spider Orchid	<i>Caladenia tessellata</i>	Refer to BAR

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023058/BAAS19015/20/00023059	Blind Creek Solar Farm	16/06/2022
Assessor Name	Report Created	BAM Data version *
Elizabeth (Beth) Q Noel	23/09/2022	54
Assessor Number	BAM Case Status	Date Finalised
BAAS19015	Finalised	23/09/2022
Assessment Revision	Assessment Type	
9	Major Projects	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAI	Ecosystem credits
Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion												
2	1100_grassland_poor	Not a TEC	0.8	0.8	0.87	PCT Cleared - 83%	High Sensitivity to Gain			2.00		0
											Subtotal	0

BAM Credit Summary Report

River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion

1	1110_grassland_poor	Not a TEC	2.4	2.4	642	PCT Cleared - 90%	High Sensitivity to Gain			2.50		0
											Subtotal	0
											Total	0

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAIL	Species credits



Biodiversity payment summary report

Assessment Id	Payment data version	Assessment Revision	Report created
00023058/BAAS19015/20/00023059		9	23/09/2022
Assessor Name	Assessor Number	Proposal Name	BAM Case Status
Elizabeth (Beth) Q Noel	BAAS19015	Blind Creek Solar Farm	Finalised
Assessment Type	Date Finalised		
Major Projects	23/09/2022		

PCT list

Price calculated	PCT common name	Credits
Yes	1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	0
Yes	1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	0

Species list

Price calculated	Species	Credits
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Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Biodiversity payment summary report

IBRA sub region	PCT common name	Threat status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Monaro	1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	No	Temperate Montane Grasslands >90%	18.87%	\$189.86	0.9733	\$5,831.92	0	\$0.00
Monaro	1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	No	Tableland Clay Grassy Woodlands >=70% and <90%	19.12%	\$257.91	0.9258	\$7,938.33	0	\$0.00
Subtotal (excl. GST)									\$0.00
GST									\$0.00
Total ecosystem credits (incl. GST)									\$0.00

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price
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Biodiversity payment summary report

No species available

Grand total Contact BCT for
pricing

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023058/BAAS19015/20/00023059	Blind Creek Solar Farm	16/06/2022
Assessor Name	Report Created	BAM Data version *
Elizabeth (Beth) Q Noel	23/09/2022	54
Assessor Number	Assessment Type	BAM Case Status
BAAS19015	Major Projects	Finalised
Assessment Revision		Date Finalised
9		23/09/2022

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Diamond Firetail	Stagonopleura guttata	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion 1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Flame Robin	Petroica phoenicea	1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion 1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Little Lorikeet	Glossopsitta pusilla	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Regent Honeyeater	Anthochaera phrygia	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion

BAM Predicted Species Report

Scarlet Robin	Petroica boodang	1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion 1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Speckled Warbler	Chthonicola sagittata	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Swift Parrot	Lathamus discolor	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
White-fronted Chat	Epthianura albifrons	1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion
White-throated Needletail	Hirundapus caudacutus	1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion 1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Glossy Black-Cockatoo	Calyptorhynchus lathami	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Glossy Black-Cockatoo	Calyptorhynchus lathami	Refer to BAR

BAM Vegetation Zones Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00023058/BAAS19015/20/00023059	Blind Creek Solar Farm	16/06/2022
Assessor Name	Report Created	BAM Data version *
Elizabeth (Beth) Q Noel	23/09/2022	54
Assessor Number	Assessment Type	BAM Case Status
BAAS19015	Major Projects	Finalised
Assessment Revision	Date Finalised	
9	23/09/2022	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	1110_grassland_po or	1110-River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion	grassland_poor	641.99	7	

BAM Vegetation Zones Report

2	1100_grassland_po or	1100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion	grassland_poor	0.87	1	
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Appendix B NGH survey data

B.1 BAM plot data

BAM Site Field Survey							
Project:	Blind Ck	Plot Identifier	5	Pic 20x20		Pic 20x50	
Survey date:	25/11/2020	Compass Orientation (head of 20x20 plot)				75	
Recorders	bnoel breid	PCT:	1110	wetland			
GPS Easting	724151	GPS Northing	6104870	Datum	GDA94	Zone	55
Landform		Soils		Drainage & Slope			
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3						
Cultivation	3						
Soil erosion	0						
Firewood	0						
Grazing	1						
Fire Damage	0						
Storm Damage	0						
Weediness	3						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
wetland cropped							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
cropping							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot							

FUNCTION

Function attributes for			5	BAM Attributes (1 x 1m Plots)					
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)					
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos	
	Tree (TG)	0			5m	0%			7018
	Shrub (SG)	0			15m	0%			7019
	Forb (FG)	0			25m	15%			7020
	Grass & grasslike (GG)	2			35m	5%			7021
	Fern (EG)	0			45m	1%			7022
	Other (OG)	0		Bare ground cover	5m	10%			
	TOTAL	2			15m	20%			
Count of cover abundance (native vascular plants)	Stratum	Sum			25m	5%			
	Tree (TG)	0			35m	15%			
	Shrub (SG)	0		45m	1%				
	Forb (FG)	0		Cryptogam cover	5m	0%			
	Grass & grasslike (GG)	0.1			15m	0%			
	Fern (EG)	0			25m	0%			
	Other (OG)	0			35m	0%			
	TOTAL Native	0.1		45m	0%				
TOTAL 'HTE'	0		Rock Cover	5m	0%				
				15m	0%				
				25m	0%				
				35m	0%				
			45m	0%					

BAM Attribute (20 x 50m plot) Tree Stem Counts			
&	Euc	Non Euc	Hollows
>80	0	0	0
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2x2m
5%=4x5m
25%=10x10m

eurasian skylark
brown quail
black winged stilts
masked lapwing

COMPOSITION & STRUCTURE

Species recorded for									
5									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threa	EPBC Status
sper rubr	<i>Spergularia rubra</i>	Sandspurry	Caryophyllace	40	1000	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	60	10000	*		No	
chlo trun	<i>Chloris truncata</i>	Windmill Grass	Poaceae	0.1	20		Grass & grass	No	
phal	<i>Phalaris spp.</i>		Poaceae	0.1	1	*		No	
trif vesi	<i>Trifolium vesiculosum</i>		Fabaceae (Fat	0.1	5	*		No	

BAM Site Field Survey							
Project:	Blind Ck	Plot Identifier	6	Pic 20x20	on tablet	Pic 20x50	
Survey date:	25/11/2020			Compass Orientation (head of 20x20 plot)		355	
Recorders	bnoel breid	PCT:	exotic				
GPS Easting	724159	GPS Northing	6104747	Datum		Zone	55
Landform		Soils		Drainage & Slope			
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3						
Cultivation	3						
Soil erosion	0						
Firewood	0						
Grazing	1						
Fire Damage	0						
Storm Damage	0						
Weediness	3						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
cropped							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing, ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot		cassinia longifolia					

FUNCTION

Function attributes for			6					
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)				
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos
	Tree (TG)	0			5m	1%	0.4%	7036
	Shrub (SG)	0			15m	1%		7037
	Forb (FG)	0			25m	0%		7038
	Grass & grasslike (GG)	1			35m	0%		7039
	Fern (EG)	0		Bare ground cover	45m	0%	2.0%	7040
	Other (OG)	0			5m	10%		
	TOTAL	1			15m	0%		
BAM Attribute (20x20m plot)					25m	0%		
Count of cover abundance (native vascular plants)	Stratum	Sum		Cryptogam cover	35m	0%	0.0%	
	Tree (TG)	0			45m	0%		
	Shrub (SG)	0			5m	0%		
	Forb (FG)	0			15m	0%		
	Grass & grasslike (GG)	0			25m	0%		
	Fern (EG)	0		Rock Cover	35m	0%	0.0%	
	Other (OG)	0			45m	0%		
	TOTAL Native	0			5m	0%		
	TOTAL 'HTE'	5.1			15m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
&	Euc	Non Euc	Hollows
>80	0		
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			
0.1%=63x63cm			
0.5%=1.4x1.4m			
1%=2x2m			
5%=4x5m			
25%=10x10m			

COMPOSITION & STRUCTURE

Species recorded for									
6									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
brom madr	<i>Bromus madritensis</i>	Madrid Brome	Poaceae	0.5	250	*		No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.1	20	*		HTE	
aven	<i>Avena spp.</i>	Oats	Poaceae	3	400	*		No	
hirs inca	<i>Hirschfeldia incana</i>	Buchan Weed	Brassicaceae	0.1	10	*		No	
brom dian	<i>Bromus diandrus</i>	Great Brome	Poaceae	5	500	*		HTE	
brom hord	<i>Bromus hordeaceus</i>	Soft Brome	Poaceae	0.2	100	*		No	
brom rube	<i>Bromus rubens</i>	Red Brome	Poaceae	0.2	150	*		No	
cony bona	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Asteraceae	0.1	2	*		No	
eleu tris	<i>Eleusine tristachya</i>	Goose Grass	Poaceae	0.2	150	*		No	
erod cicu	<i>Erodium cicutarium</i>	Common Crowfoot	Geraniaceae	0.1	2	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	60	5000	*		No	
phal	<i>Phalaris spp.</i>		Poaceae	60	5000	*		No	
sper rubr	<i>Spergularia rubra</i>	Sandspurry	Caryophyllaceae	0.2	100	*		No	
junc bufo	<i>Juncus bufonius</i>	Toad Rush	Juncaceae	0.1	50	*		No	
stel medi	<i>Stellaria media</i>	Common Chickweed	Caryophyllaceae	0.1	5	*		No	
tara offi	<i>Taraxacum officinale</i>	Dandelion	Asteraceae	0.1	5	*		No	
trif glom	<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae (Fal	5	1000	*		No	
vulp	<i>Vulpia spp.</i>	Rat's-tail Fescue	Poaceae	5	500	*		No	

BAM Site Field Survey									
Project:	Blind Creek	Plot Identifier	8	Pic 20x20	tablet	Pic 20x50	tablet		
Survey date:	25/11/2020			Compass Orientation (head of 20x20 plot)			180		
Recorders	bnoel reid			PCT:					
GPS Easting	726193.7655	GPS Northing			Datum	GDA94	Zone	55	
Landform			Soils			Drainage & Slope			
Morphology				Soil Texture			Slope		
LandF Element				Soil Colour			Aspect		
LandF Pattern				Soil Depth			Drainage		
Microrelief				Geology			Watercourses		
Plot Disturbance									
	Severity	Age	Observational Evidence						
Clearing									
Cultivation									
Soil erosion									
Firewood									
Grazing									
Fire Damage									
Storm Damage									
Weediness									
Other									
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severeAge: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for			8	
BAM Attribute (20x20m plot)				
Count of Native Richness	Stratum	Sum		
	Tree (TG)	0		
	Shrub (SG)	0		
	Forb (FG)	6		
	Grass & grasslike (GG)	9		
	Fern (EG)	0		
	Other (OG)	0		
TOTAL		15		
BAM Attribute (20x20m plot)				
Count of cover abundance (native vascular plants)	Stratum	Sum		
	Tree (TG)	0		
	Shrub (SG)	0		
	Forb (FG)	1.5		
	Grass & grasslike (GG)	1		
	Fern (EG)	0		
	Other (OG)	0		
TOTAL Native		2.5		
TOTAL 'HTE'		0.5		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
&	Euc	Non Euc	Hollows
>80	0	0	0
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	
0.1%=63x63cm			
0.5%=1.4x1.4m			
1%=2x2m			
5%=4x5m			
25%=10x10m			

BAM Attributes (1 x 1m Plots)				
Litter Cover	Tape length	% cover	Average %	Photos
	5m	3%	2.2%	7067
	15m	1%		7068
	25m	3%		7069
35m	3%	7070		
Bare ground cover	45m	1%	5.8%	7071
	5m	5%		
	15m	10%		
	25m	5%		
Cryptogam cover	35m	5%	0.0%	
	45m	4%		
	5m	0%		
	15m	0%		
	25m	0%		
	35m	0%		
Rock Cover	45m	0%	0.0%	
	5m	0%		
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE									
Species recorded for			8						
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aust scab	<i>Austrostipa scabra</i>	Speargrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
care bich	<i>Carex bichenoviana</i>		Cyperaceae	0.1	10		Grass & grasslike (GG)	No	
chlo trun	<i>Chloris truncata</i>	Windmill Grass	Poaceae	0.2	500		Grass & grasslike (GG)	No	
cype	<i>Cyperus spp.</i>		Cyperaceae	0.1	30		Grass & grasslike (GG)	No	
eleo pusi	<i>Eleocharis pusilla</i>		Cyperaceae	0.1	50		Grass & grasslike (GG)	No	
erag brow	<i>Eragrostis brownii</i>	Brown's Lovegrass	Poaceae	0.1	2		Grass & grasslike (GG)	No	
junc	<i>Juncus spp.</i>	A Rush	Juncaceae	0.1	5		Grass & grasslike (GG)	No	
junc subs	<i>Juncus subsecundus</i>	Finger Rush	Juncaceae	0.1	100		Grass & grasslike (GG)	No	
poa sieb	<i>Poa sieberiana</i>	Snowgrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
aspe	<i>Asperula spp.</i>	Woodruff	Rubiaceae	0.1	4		Forb (FG)	No	
cras sieb	<i>Crassula sieberiana</i>	Australian Stonecrop	Crassulaceae	1	1000		Forb (FG)	No	
dysp pumi	<i>Dysphania pumilio</i>	Small Crumbweed	Chenopodiaceae	0.1	40		Forb (FG)	No	
epil	<i>Epilobium spp.</i>		Onagraceae	0.1	2		Forb (FG)	No	
micr unif	<i>Microris unifolia</i>	Common Onion Orchid	Orchidaceae	0.1	2		Forb (FG)	No	
oval pere	<i>Oxalis perennans</i>		Oxalidaceae	0.1	5		Forb (FG)	No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.5	500	*		HTE	
aira	<i>Aira spp.</i>	A Hairgrass	Poaceae	0.1	20			No	
brom hord	<i>Bromus hordeaceus</i>	Soft Brome	Poaceae	0.1	7	*		No	
cent tenu	<i>Centaurium tenuiflorum</i>	Branched Centaury, Slend	Gentianaceae	0.1	5	*		No	
chen	<i>Chenopodium spp.</i>	Goosefoot, Crumbweed	Chenopodiaceae	0.1	1	*		No	
chon junc	<i>Chandrilla juncea</i>	Skeleton Weed	Asteraceae	0.1	5	*		No	
cony bona	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No	
gamo calv	<i>Gamochaeta calviceps</i>	Cudweed	Asteraceae	0.1	2	*		No	
lact serr	<i>Lactuca serriola</i>	Prickly Lettuce	Asteraceae	0.1	5	*		No	
lepi afri	<i>Lepidium africanum</i>	Common Peppergrass	Brassicaceae	0.1	4	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	90	10000	*		No	
nass tric	<i>Nassella trichotoma</i>	Serrated Tussock	Poaceae	0.1	5	*		No	
paro bras	<i>Paronychia brasiliana</i>	Chilean Whitlow Wort, B	Caryophyllaceae	0.1	5	*		No	
poly avic	<i>Polygonum aviculare</i>	Wireweed	Polygonaceae	0.1	2	*		No	
sper rubr	<i>Spergularia rubra</i>	Sandspurry	Caryophyllaceae	0.1	8	*		No	
sper rubr	<i>Spergularia rubra</i>	Sandspurry	Caryophyllaceae	0.1	3	*		No	
stel pall	<i>Stellaria pallida</i>		Caryophyllaceae	0.2	300	*		No	
trif arve	<i>Trifolium arvense</i>	Haresfoot Clover	Fabaceae (Fab)	0.1	100	*		No	
trif camp	<i>Trifolium campestre</i>	Hop Clover	Fabaceae (Fab)	0.1	4	*		No	
trif dubi	<i>Trifolium dubium</i>	Yellow Suckling Clover	Fabaceae (Fab)	0.1	5	*		No	
trif glom	<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae (Fab)	0.2	100	*		No	
trif subt	<i>Trifolium subterraneum</i>	Subterranean Clover	Fabaceae (Fab)	0.1	1	*		No	
vulp	<i>Vulpia spp.</i>	Rat's-tail Fescue	Poaceae	0.1	200	*		No	

BAM Site Field Survey							
Project:	20-403	Plot Identifier	11	Pic 20x20	tablet	Pic 20x50	4496
Survey date:	25/11/2020	Compass Orientation (head of 20x20 plot)					
Recorders	A	PCT:	1110				
GPS Easting	727306.975	GPS Northing	6102234.93	Datum	GDA94	Zone	55
Landform		Soils		Drainage & Slope			
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3						
Cultivation	3						
Soil erosion	0						
Firewood	0						
Grazing	0						
Fire Damage	0						
Storm Damage	0						
Weediness	3						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
Oat crop							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
no trees possible hollows mod condition							
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
as above							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
none							
Dominant Species outside Plot		none nearby					

FUNCTION

Function attributes for			11					
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)				
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos
	Tree (TG)	0			5m	5%	1.0%	4491
	Shrub (SG)	0			15m	0%		4492
	Forb (FG)	2			25m	0%		4493
	Grass & grasslike (GG)	1			35m	0%		4494
	Fern (EG)	0			45m	0%		4495
	Other (OG)	0						
	TOTAL	3						
BAM Attribute (20x20m plot)				Bare ground cover	5m	15%	7.0%	
Count of cover abundance (native vascular plants)	Stratum	Sum			15m	0%		
	Tree (TG)	0			25m	10%		
	Shrub (SG)	0			35m	5%		
	Forb (FG)	0.2			45m	5%		
	Grass & grasslike (GG)	0.1						
	Fern (EG)	0						
	Other (OG)	0						
	TOTAL Native	0.3						
	TOTAL 'HTE'	0.7						
BAM Attribute (20 x 50m plot) Tree Stem Counts				Cryptogam cover	5m	5%	2.0%	
DBH (cm)	Euc	Non Euc	Hollows		15m	0%		
					25m	1%		
					35m	1%		
					45m	3%		
DBH (cm)	Euc	Non Euc	Hollows	Rock Cover	5m	0%	0.8%	
					15m	0%		
					25m	5		
					35m	3%		
					45m	0%		

COMPOSITION & STRUCTURE

Species recorded for									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
erag brow	<i>Eragrostis brownii</i>	Brown's Lovegrass	Poaceae	0.1	25		Grass & grasslike (GG)	No	
dich stri	<i>Dichapogon strictus</i>	Chocolate Lily	Anthericaceae	0.1	26		Forb (FG)	No	
oxal pere	<i>Oxalis perennans</i>		Oxalidaceae	0.1	3		Forb (FG)	No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.5	200	*		HTE	
aven	<i>Avena spp.</i>	Oats	Poaceae	50	50000	*		No	
briz mino	<i>Briza minor</i>	Shivery Grass	Poaceae	0.1	15	*		No	
brom dian	<i>Bromus diandrus</i>	Great Brome	Poaceae	0.1	20	*		HTE	
cart lana	<i>Carthamus lanatus</i>	Saffron Thistle	Asteraceae	0.1	1	*		HTE	
echi plan	<i>Echium plantagineum</i>	Patterson's Curse	Boraginaceae	0.1	14	*		No	
erod botr	<i>Erodium botrys</i>	Long Storksbill	Geraniaceae	0.5	50	*		No	
gamo calv	<i>Gamochaeta calviceps</i>	Cudweed	Asteraceae	0.1	2	*		No	
hypo radi	<i>Hypochaeris radicata</i>	Catsear	Asteraceae	0.1	6	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	0.1	30	*		No	
raph raph	<i>Raphanus raphanistrum</i>	Wild Radish	Brassicaceae	0.5	25	*		No	
trif arve	<i>Trifolium arvense</i>	Haresfoot Clover	Fabaceae (Fab	1	200	*		No	
trif camp	<i>Trifolium campestre</i>	Hop Clover	Fabaceae (Fab	10	10000	*		No	
trif glom	<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae (Fab	5	2000	*		No	
trif repu	<i>Trifolium repens</i>	White Clover	Fabaceae (Fab	0.1	50	*		No	
trif resu	<i>Trifolium resupinatum</i>	Shaftal Clover	Fabaceae (Fab	0.5	100	*		No	
trif vesi	<i>Trifolium vesiculosum</i>		Fabaceae (Fab	1	100	*		No	
vulp	<i>Vulpia spp.</i>	Rat's-tail Fescue	Poaceae	15	20000	*		No	

BAM Site Field Survey							
Project:	20-403	Plot Identifier	13	Pic 20x20	qfield	Pic 20x50	
Survey date:	6/07/2021			Compass Orientation (head of 20x20 plot)			25
Recorders	bn rr			PCT:	exotic		
GPS Easting	726685.977	GPS Northing	6102294.83		Datum	GDA94	Zone 55
Landform			Soils		Drainage & Slope		
Morphology			Soil Texture			Slope	
LandF Element			Soil Colour			Aspect	
LandF Pattern			Soil Depth			Drainage	
Microrelief			Geology			Watercourses	
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3						
Cultivation	3						
Soil erosion	1						
Firewood	0						
Grazing	2						
Fire Damage	0						
Storm Damage	0						
Weediness	3						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
cropping grazing							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
grazing cropping							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot							

FUNCTION

Function attributes for			13					
BAM Attribute (20x20m plot)			BAM Attributes (1 x 1m Plots)					
Count of Native Richness	Stratum	Sum	Litter Cover	Tape length	% cover	Average %	Photos	
	Tree (TG)	0		5m	25%		7627	
	Shrub (SG)	1		15m	5%		7628	
	Forb (FG)	0		25m	30%		7629	
	Grass & grasslike (GG)	2		35m	75%		7630	
	Fern (EG)	0		45m	40%		7631	
	Other (OG)	0	Bare ground cover	5m	10%	36.0%		
	TOTAL	3		15m	80%			
BAM Attribute (20x20m plot)				25m	50%			
Count of cover abundance (native vascular plants)	Stratum	Sum		35m	20%			
	Tree (TG)	0		45m	20%			
	Shrub (SG)	0.1	Cryptogam cover	5m	0%	0.2%		
	Forb (FG)	0		15m	0%			
	Grass & grasslike (GG)	0.3		25m	1%			
	Fern (EG)	0		35m	0%			
	Other (OG)	0		45m	0%			
	TOTAL Native	0.4	Rock Cover	5m	0%	0.0%		
TOTAL 'HTE'	0.7	15m		0%				
BAM Attribute (20 x 50m plot) Tree Stem Counts				25m	0%			
&	Euc	Non Euc		35m	0%			
				45m	0%			

COMPOSITION & STRUCTURE

Species recorded for		13							
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
lept laev	<i>Leptospermum laevigatum</i>	Coast Teatree	Myrtaceae	0.1	1		Shrub (SG)	No	
junc	<i>Juncus spp.</i>	A Rush	Juncaceae	0.1	2		Grass & grasslike (GG)	No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.1	50	*		HTE	
cart lana	<i>Carthamus lanatus</i>	Saffron Thistle	Asteraceae	0.1	1	*		HTE	
chon junc	<i>Chondrilla juncea</i>	Skeleton Weed	Asteraceae	0.3	15	*		No	
erag curv	<i>Eragrostis curvula</i>	African Lovegrass	Poaceae	0.5	40	*		HTE	
erod botr	<i>Erodium botrys</i>	Long Storksbill	Geraniaceae	0.1	50	*		No	
lepi afri	<i>Lepidium africanum</i>	Common Peppergrass	Brassicaceae	0.1	1	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	0.1	4	*		No	
trif	<i>Trifolium spp.</i>	A Clover	Fabaceae (Fab)	0.1	5	*		No	
trif subt	<i>Trifolium subterraneum</i>	Subterranean Clover	Fabaceae (Fab)	0.2	500	*		No	
poa	<i>Poa spp.</i>		Poaceae	0.2	1000	*	Grass & grasslike (GG)	No	
aven	<i>Avena spp.</i>	Oats	Poaceae	20	1000	*		No	

BAM Site Field Survey							
Project:	20-403	Plot Identifier	14	Pic 20x20	qfield	Pic 20x50	
Survey date:	6/07/2021	Compass Orientation (head of 20x20 plot)			275		
Recorders	bn rr	PCT:	1110	Datum	GDA94	Zone	55
GPS Easting	725965.571	GPS Northing	6102727.61				
Landform		Soils		Drainage & Slope			
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	2						
Cultivation	2						
Soil erosion	0						
Firewood	0						
Grazing	2						
Fire Damage	0						
Storm Damage	0						
Weediness	0						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
grazing cropping							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing, ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Australian Shelduck							
Dominant Species outside Plot							

FUNCTION

Function attributes for			14					
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)				
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos
	Tree (TG)	0			5m	2%		7659
	Shrub (SG)	0			15m	0%		7660
	Forb (FG)	3			25m	1%		7661
	Grass & grasslike (GG)	6			35m	1%		7662
	Fern (EG)	0			45m	1%		7663
	Other (OG)	0		Bare ground cover	5m	1%	14.6%	
	TOTAL	9			15m	60%		
BAM Attribute (20x20m plot)					25m	2%		
Count of cover abundance (native vascular plants)	Stratum	Sum			Cryptogam cover	35m		5%
	Tree (TG)	0		45m		5%		
	Shrub (SG)	0		5m		0%		
	Shrub (SG)	0		15m		0%		
	Forb (FG)	2.1		25m		0%		
	Grass & grasslike (GG)	1.7		35m		0%		
	Fern (EG)	0		45m	1%			
	Other (OG)	0		Rock Cover	5m	0%	0.0%	
TOTAL Native	3.8		15m		0%			
TOTAL 'HTE'	14		25m		0%			
			35m		0%			
BAM Attribute (20 x 50m plot) Tree Stem Counts					45m	0%		
&	Euc	Non Euc	Hollows					
>80								
50-79								
30-49								
20-29								
10-19								
5-9								
<5			N/A					
Length of logs (m)								
0.1%=63x63cm								
0.5%=1.4x1.4m								
1%=2x2m								
5%=4x5m								
25%=10x10m								

COMPOSITION & STRUCTURE

Species recorded for									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aust scab	<i>Austrostipa scabra</i>	Speargrass	Poaceae	0.1	8		Grass & grasslike (GG)	No	
care bich	<i>Carex bichenoviana</i>		Cyperaceae	0.1	2		Grass & grasslike (GG)	No	
cyno dact	<i>Cynodon dactylon</i>	Common Couch	Poaceae	0.3	100		Grass & grasslike (GG)	No	
junc fili	<i>Juncus filicaulis</i>		Juncaceae	1	250		Grass & grasslike (GG)	No	
poa	<i>Poa spp.</i>		Poaceae	0.1	10	*	Grass & grasslike (GG)	No	
ryti	<i>Rytidosperma spp.</i>		Poaceae	0.1	2		Grass & grasslike (GG)	No	
chry apic	<i>Chrysocephalum apiculat</i>	Common Everlasting	Asteraceae	2	500		Forb (FG)	No	
cras sieb	<i>Crassula sieberiana</i>	Australian Stonecrop	Crassulaceae	0.1	50		Forb (FG)	No	
vitt	<i>Vittadinia spp.</i>	Fuzzweed	Asteraceae				Forb (FG)	No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	4	1000	*		HTE	
chon junc	<i>Chondrilla juncea</i>	Skeleton Weed	Asteraceae	0.1	4	*		No	
cony	<i>Conyza spp.</i>	A Fleabane	Asteraceae	8	200	*		No	
eleu tris	<i>Eleusine tristachya</i>	Goose Grass	Poaceae	0.1	10	*		No	
erag curv	<i>Eragrostis curvula</i>	African Lovegrass	Poaceae	10	1000	*		HTE	
erod botr	<i>Erodium botrys</i>	Long Storksbill	Geraniaceae	0.1	25	*		No	
gamo	<i>Gamochaeta spp.</i>		Asteraceae	0.1	10	*		No	
hypo radi	<i>Hypochaeris radicata</i>	Catsear	Asteraceae	0.4	500	*		No	
lepi afri	<i>Lepidium africanum</i>	Common Peppergrass	Brassicaceae	0.1	2	*		No	
marr vulg	<i>Marrubium vulgare</i>	White Horehound	Lamiaceae	0.2	20	*		No	
trif repe	<i>Trifolium repens</i>	White Clover	Fabaceae (Fat)	0.1	2	*		No	
trif	<i>Trifolium spp.</i>	A Clover	Fabaceae (Fat)	0.1	50	*		No	
trif	<i>Trifolium spp.</i>	A Clover	Fabaceae (Fat)	0.1	2	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	20	5000	*		No	
sper rubr	<i>Spergularia rubra</i>	Sandspurry	Caryophyllac	0.1	2	*		No	

BAM Site Field Survey							
Project:	20-403	Plot Identifier	15	Pic 20x20	qfield	Pic 20x50	
Survey date:	6/07/2021	Compass Orientation (head of 20x20 plot)			135		
Recorders	bn rr	PCT:					
GPS Easting	725931.899	GPS Northing	6103389.99	Datum	GDA94	Zone	55
Landform			Soils		Drainage & Slope		
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	2						
Cultivation	2						
Soil erosion	0						
Firewood	0						
Grazing	1						
Fire Damage	0						
Storm Damage	0						
Weediness	2						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
Grazing cropping							
Disturbances (i.e. fire, grazing, ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
grazing, fox den							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot							

FUNCTION

Function attributes for			15					
BAM Attribute (20x20m plot)			BAM Attributes (1 x 1m Plots)					
Count of Native Richness	Stratum	Sum	Litter Cover	Tape length	% cover	Average %	Photos	
	Tree (TG)	0		5m	1%	1.2%	7664	
	Shrub (SG)	0		15m	1%		7665	
	Forb (FG)	1		25m	1%		7666	
	Grass & grasslike (GG)	5		35m	2%		7667	
	Fern (EG)	0		45m	1%	7668		
	Other (OG)	0		5m	1%			
	TOTAL	6		15m	1%			
BAM Attribute (20x20m plot)			Bare ground cover	25m	0%	0.8%		
Count of cover abundance (native vascular plants)	Stratum	Sum		35m	1%			
	Tree (TG)	0		45m	1%			
	Shrub (SG)	0		5m	0%			
	Forb (FG)	1	15m	0%				
	Grass & grasslike (GG)	1.5	25m	0%	0.0%			
	Fern (EG)	0	35m	0%				
	Other (OG)	0	45m	0%				
	TOTAL Native	2.5	5m	0%				
BAM Attribute (20 x 50m plot) Tree Stem Counts			Rock Cover	15m	0%	0.0%		
&	Euc	Non Euc		Hollows	25m		0%	
					35m		0%	
					45m		0%	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2x2m
5%=4x5m
25%=10x10m

COMPOSITION & STRUCTURE

Species recorded for			15						
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
care bich	<i>Carex bichenoviana</i>		Cyperaceae	0.1	2		Grass & grasslike (GG)	No	
cyno dact	<i>Cynodon dactylon</i>	Common Couch	Poaceae	0.2	100		Grass & grasslike (GG)	No	
cype	<i>Cyperus spp.</i>		Cyperaceae	0.1	4		Grass & grasslike (GG)	No	
junc	<i>Juncus spp.</i>	A Rush	Juncaceae	0.1	10		Grass & grasslike (GG)	No	
chry apic	<i>Chryscephalum apiculat</i>	Common Everlasting	Asteraceae	1	200		Forb (FG)	No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	4	2000	*		HTE	
cony	<i>Conyza spp.</i>	A Fleabane	Asteraceae	5	500	*		No	
erag curv	<i>Eragrostis curvula</i>	African Lovegrass	Poaceae	20	500	*		HTE	
gamo	<i>Gamochaeta spp.</i>		Asteraceae	0.1	50	*		No	
hypo radi	<i>Hypochaeris radicata</i>	Catsear	Asteraceae	0.1	1	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae			*		No	
nass tric	<i>Nassella trichotoma</i>	Serrated Tussock	Poaceae	15	200	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	60	5000	*		No	
poa	<i>Poa spp.</i>		Poaceae	1	5000	*	Grass & grasslike (GG)	No	

BAM Site Field Survey							
Project:	20-403	Plot Identifier	16	Pic 20x20	qfield	Pic 20x50	
Survey date:	6/07/2021	Compass Orientation (head of 20x20 plot)					
Recorders	bnoel rreid	PCT:					
GPS Easting	725243.362	GPS Northing	6103713.4	Datum	GDA94	Zone	55
Landform		Soils		Drainage & Slope			
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	2						
Cultivation	2						
Soil erosion	0						
Firewood	0						
Grazing	2						
Fire Damage	0						
Storm Damage	0						
Weediness	0						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
grazing							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing, ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
fox							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot							

FUNCTION

Function attributes for			16
BAM Attribute (20x20m plot)			
Count of Native Richness	Stratum	Sum	
	Tree (TG)	0	
	Shrub (SG)	0	
	Forb (FG)	0	
	Grass & grasslike (GG)	0	
	Fern (EG)	0	
	Other (OG)	0	
	TOTAL	0	
BAM Attribute (20x20m plot)			
Count of cover abundance (native vascular plants)	Stratum	Sum	
	Tree (TG)	0	
	Shrub (SG)	0	
	Forb (FG)	0	
	Grass & grasslike (GG)	0	
	Fern (EG)	0	
	Other (OG)	0	
	TOTAL Native	0	
TOTAL 'HTE'		0.1	

BAM Attributes (1 x 1m Plots)				
Litter Cover	Tape length	% cover	Average %	Photos
	5m	5%	8.6%	7670
	15m	5%		7671
	25m	30%		7672
	35m	2%		7673
	45m	1%		7674
Bare ground cover	5m	0%	0.6%	
	15m	1%		
	25m	1%		
	35m	1%		
Cryptogam cover	45m	0%	0.0%	
	5m	0%		
	15m	0%		
	25m	0%		
Rock Cover	35m	0%	0.0%	
	45m	0%		
	5m	0%		
	15m	0%		

BAM Attribute (20 x 50m plot) Tree Stem Counts			
&	Euc	Non Euc	Hollows
>80			
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)			

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2x2m
5%=4x5m
25%=10x10m

COMPOSITION & STRUCTURE

Species recorded for									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aven	<i>Avena spp.</i>	Oats	Poaceae	0.5	10	*		No	
cart lana	<i>Carthamus lanatus</i>	Saffron Thistle	Asteraceae	0.1	5	*		HTE	
hirs inca	<i>Hirschfeldia incana</i>	Buchan Weed	Brassicaceae	0.2	100	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	75	10000	*		No	
onop	<i>Onopordum spp.</i>		Asteraceae	0.5	30	*		No	
phal	<i>Phalaris spp.</i>		Poaceae	15	100	*		No	
trif subt	<i>Trifolium subterraneum</i>	Subterranean Clover	Fabaceae (Fa)	1	500	*		No	

BAM Site Field Survey							
Project:	20-403	Plot Identifier	17	Pic 20x20	tablet	Pic 20x50	
Survey date:	30/12/2021	Compass Orientation (head of 20x20 plot)				106	
Recorders	AS and RR	PCT:	1110				
GPS Easting	723936	GPS Northing	6105729	Datum	gda94	Zone	55
Landform		Soils		Drainage & Slope			
Morphology	flat floodplain	Soil Texture		Slope	flat		
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage	poor		
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3	Nr					
Cultivation	1	nr					
Soil erosion	0						
Firewood	0						
Grazing	3	r					
Fire Damage	0						
Storm Damage	0						
Weediness	3	r					
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
grazing land							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot							

FUNCTION

Function attributes for		17	BAM Attributes (1 x 1m Plots)							
BAM Attribute (20x20m plot)				Litter Cover	Tape length	% cover	Average %	Photos		
Count of Native Richness	Stratum	Sum			5m	10%	15.4%	beckys phone		
	Tree (TG)	0			15m	15%				
	Shrub (SG)	0			25m	5%				
	Forb (FG)	1			35m	17%				
	Grass & grasslike (GG)	0			45m	30%				
	Fern (EG)	0		Bare ground cover	5m	20%	11.2%			
	Other (OG)	0			15m	1%				
TOTAL	1	25m			30%					
Count of cover abundance (native vascular plants)	Stratum	Sum			35m	3%			1.6%	
	Tree (TG)	0			45m	2%				
	Shrub (SG)	0		Cryptogam cover	5m	3%	0.2%			
	Forb (FG)	0.1			15m	0%				
	Grass & grasslike (GG)	0			25m	5%				
	Fern (EG)	0			35m	0%				
	Other (OG)	0	45m		0%					
TOTAL Native	0.1	Rock Cover	5m	1%	0.2%					
TOTAL 'HTE'	0.1		15m	0%						
BAM Attribute (20 x 50m plot) Tree Stem Counts			25m	0%						
DBH (cm)	Euc		Non Euc	Hollows			35m	0%		
>80							45m	0%		
50-79										
30-49										
20-29										
10-19										
5-9										
<5				N/A						
Length of logs (m)										
0.1%=63x63cm 0.5%=1.4x1.4m 1%=2x2m 5%=4x5m 25%=10x10m										

COMPOSITION & STRUCTURE

Species recorded for									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
plan vari	<i>Plantago varia</i>		Plantaginaceae	0.1	3		Forb (FG)	No	
medi sati	<i>Medicago sativa</i>	Lucerne	Fabaceae (Fa)	0.1	40	*		No	
loli	<i>Lolium spp.</i>	A Ryegrass	Poaceae	1	100	*		No	
phal aqua	<i>Phalaris aquatica</i>	Phalaris	Poaceae	10	500	*		No	
trif subt	<i>Trifolium subterraneum</i>	Subterranean Clover	Fabaceae (Fa)	0.5	100	*		No	
hypo radi	<i>Hypochaeris radicata</i>	Catsear	Asteraceae	0.1	5	*		No	
fest elat	<i>Festuca elatior</i>	Tall Fescue	Poaceae	60	1000	*		No	
vulp myur	<i>Vulpia myuros</i>	Rat's Tail Fescue	Poaceae	10	300	*		No	
nass nees	<i>Nassella neesiana</i>	Chilean Needle Grass	Poaceae	10	200	*		No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.1	1	*		HTE	
brom cath	<i>Bromus catharticus</i>	Praire Grass	Poaceae	0.5	20	*		No	
cent tenu	<i>Centaureum tenuiflorum</i>	Branched Centaury, Slender cel	Gentianaceae	0.1	5	*		No	

BAM Site Field Survey							
Project:	20-403	Plot identifier	18	Pic 20x20	tablet	Pic 20x50	
Survey date:	3/12/2021		Compass Orientation (head of 20x20 plot)			310	
Recorders	AS and RR		PCT:		1110		
GPS Easting	725718	GPS Northing	6102683	Datum	gda94	Zone	55
Landform			Soils		Drainage & Slope		
Morphology	flat floodplain		Soil Texture	clay	Slope	flat	
LandF Element			Soil Colour	grey	Aspect		
LandF Pattern			Soil Depth		Drainage	poor	
Microrelief			Geology		Watercourses		
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3	r	tree and shrub layer removed				
Cultivation	3	r	current rye grass crop lines				
Soil erosion	1						
Firewood	0						
Grazing	1						
Fire Damage	0						
Storm Damage	0						
Weediness	3	r					
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
rye grass cropping							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
none							
Disturbances (i.e. fire, grazing, ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
clearing, weeds							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
none							
Dominant Species outside Plot		rye grass, small patches of Juncus in wet areas nearby					

FUNCTION

Function attributes for			18	BAM Attributes (1 x 1m Plots)				
BAM Attribute (20x20m plot)				Litter Cover	Tape length	% cover	Average %	Photos
Count of Native Richness	Stratum	Sum		5m	2%		0.8%	beckys phone
	Tree (TG)	0		15m	0%			
	Shrub (SG)	0		25m	1%			
	Forb (FG)	2		35m	1%			
	Grass & grasslike (GG)	1		45m	0%			
	Fern (EG)	0		5m	5%		27.4%	
	Other (OG)	0		15m	50%			
	TOTAL	3		25m	40%			
BAM Attribute (20x20m plot)				35m	40%			
Count of cover abundance (native vascular plants)	Stratum	Sum		45m	2%		0.0%	
	Tree (TG)	0		5m	0%			
	Shrub (SG)	0		15m	0%			
	Forb (FG)	0.2		25m	0%			
	Grass & grasslike (GG)	40		35m	0%			
	Fern (EG)	0		45m	0%		0.0%	
	Other (OG)	0		5m	0%			
	TOTAL Native	40.2		15m	0%			
BAM Attribute (20 x 50m plot) Tree Stem Counts				25m	0%			
DBH (cm)	Euc	Non Euc	Hollows	35m	0%		0.0%	
>80				45m	0%			
50-79								
30-49								
20-29								
10-19								
5-9								
<5			N/A					
Length of logs (m)								

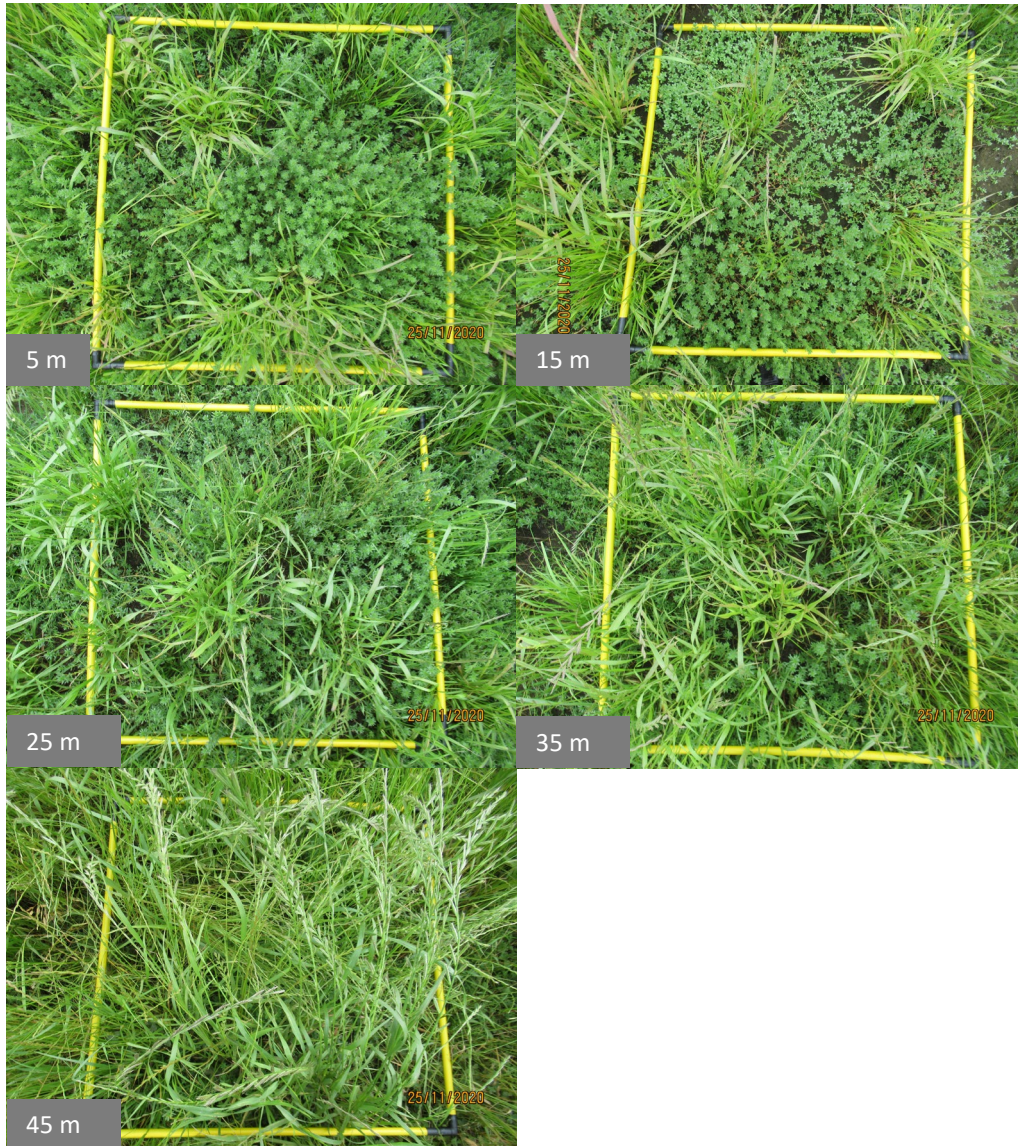
0.1%=63x63cm
0.5%=1.4x1.4m
1%=2x2m
5%=4x5m
25%=10x10m

COMPOSITION & STRUCTURE

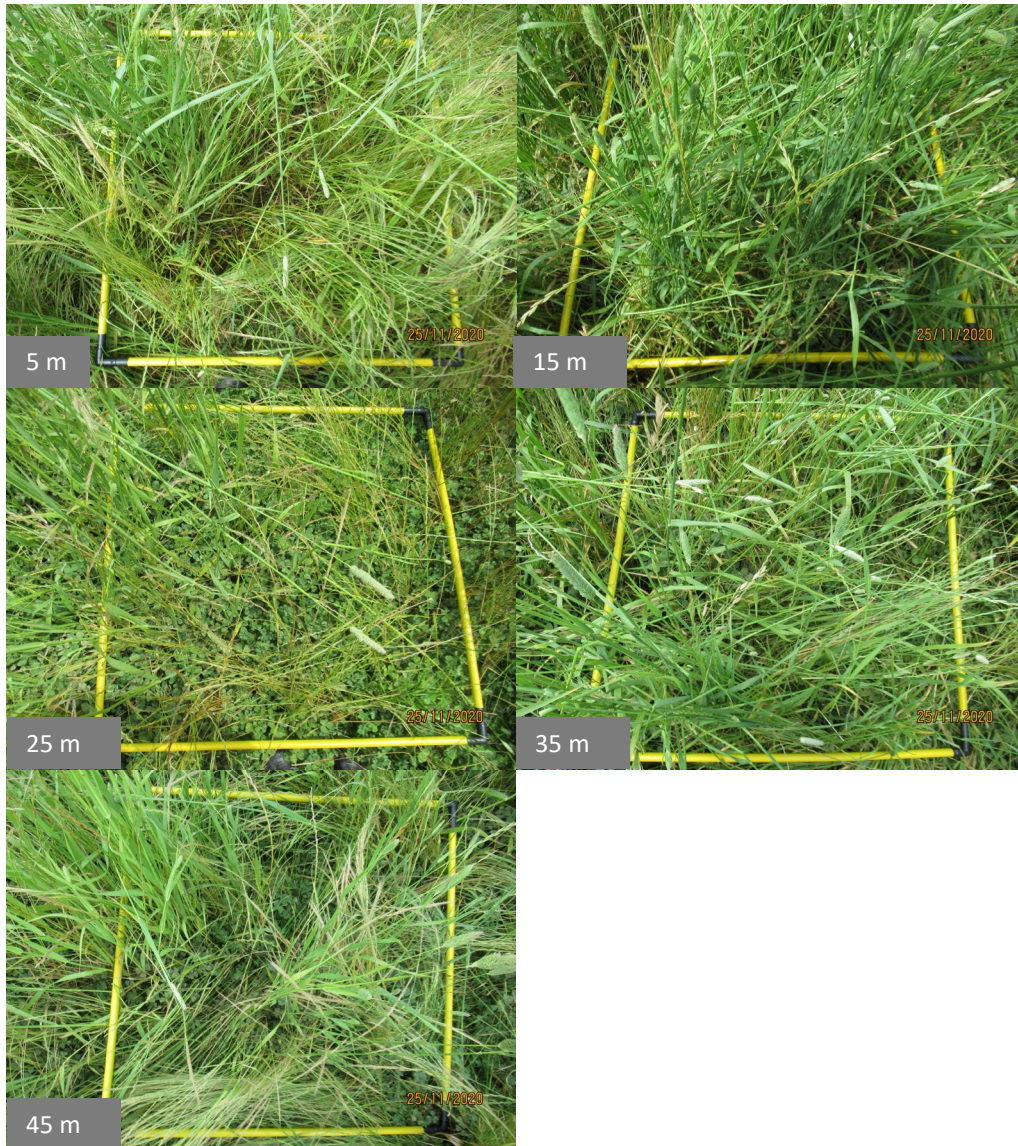
Species recorded for									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
aust scab	<i>Austrostipa scabra</i>	Speargrass	Poaceae	40	5000		Grass & grasslike (G)	No	
erod crin	<i>Erodium cicutarium</i>	Blue Crowfoot	Geraniaceae	0.1	30		Forb (FG)	No	
oxal pere	<i>Oxalis perennans</i>		Oxalidaceae	0.1	1		Forb (FG)	No	
loli	<i>Lolium spp.</i>	A Ryegrass	Poaceae	45	5000	*		No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	5	500	*		HTE	
trif arve	<i>Trifolium arvense</i>	Haresfoot Clover	Fabaceae (Fa)	0.1	50	*		No	
hypo radi	<i>Hypochaeris radicata</i>	Catsear	Asteraceae	0.1	50	*		No	
aira cary	<i>Aira caryophylla</i>	Silvery Hairgrass	Poaceae	0.1	25	*		No	
aste subu	<i>Aster subulatus</i>	Wild Aster	Asteraceae	0.1	10	*		No	
gamo coar	<i>Gamochaeta coarctata</i>		Asteraceae	0.1	3	*		No	
erag curv	<i>Eragrostis curvula</i>	African Lovegrass	Poaceae	1	500	*		HTE	
unknown grass	#N/A	#N/A	#N/A	0.1	1	*		No	#N/A
junc cogn	<i>Juncus cognatus</i>		Juncaceae	0.1	2	*		No	
verb virg	<i>Verbascum virgatum</i>	Twiggy Mullein	Scrophulariac	0.1	1	*		No	
trif camp	<i>Trifolium campestre</i>	Hop Clover	Fabaceae (Fa)	1	6	*		No	

B.2 BAM plot photos

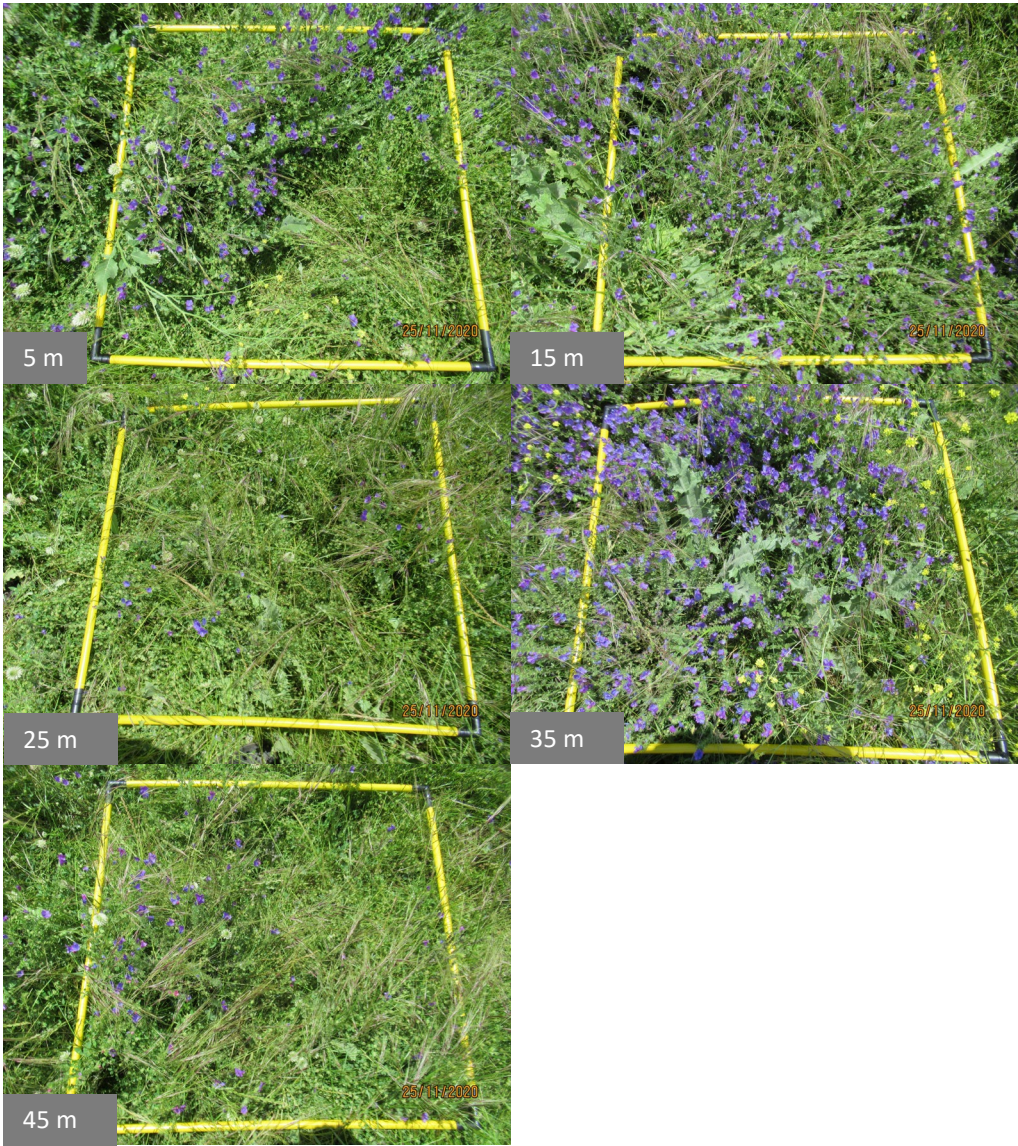
Plot 5



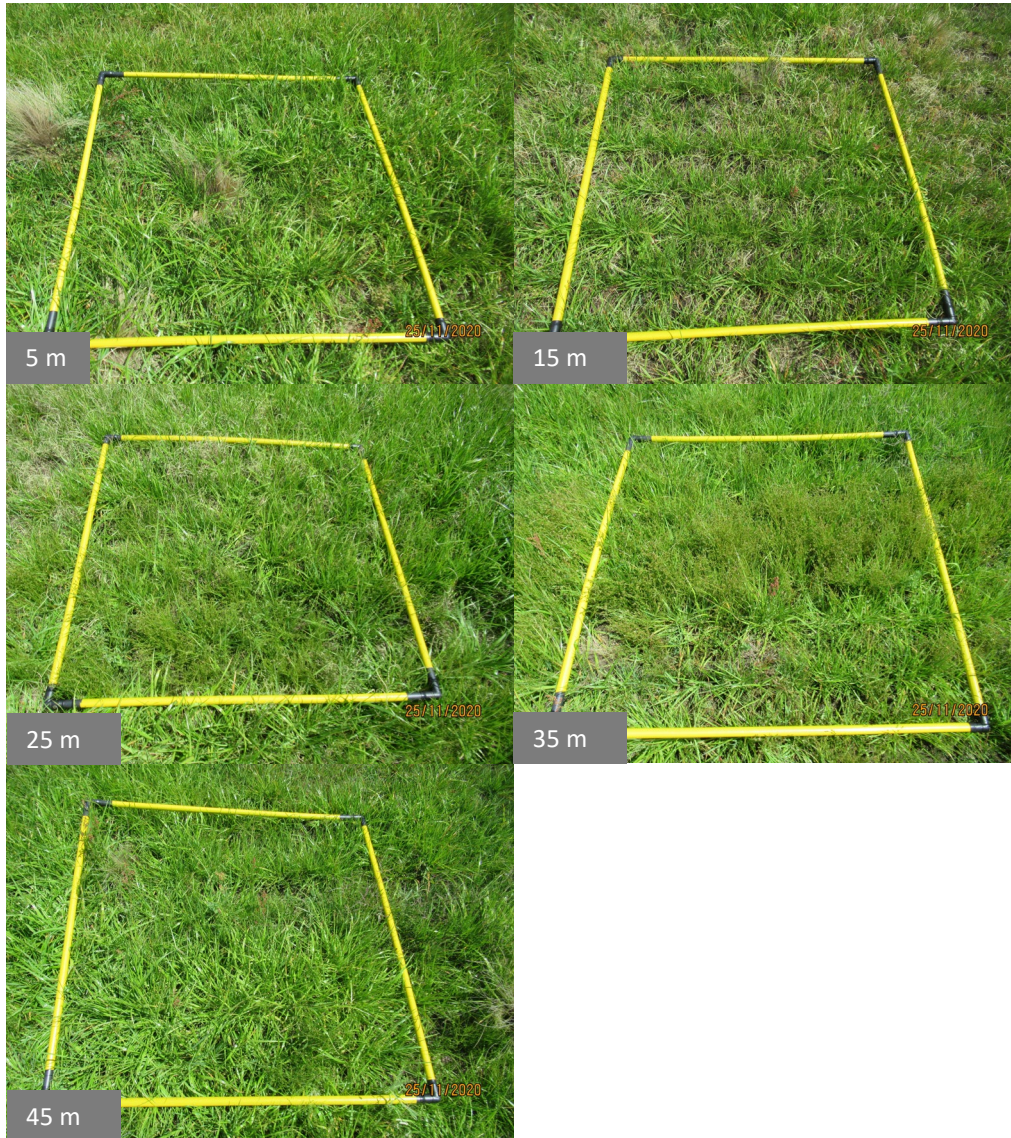
Plot 6



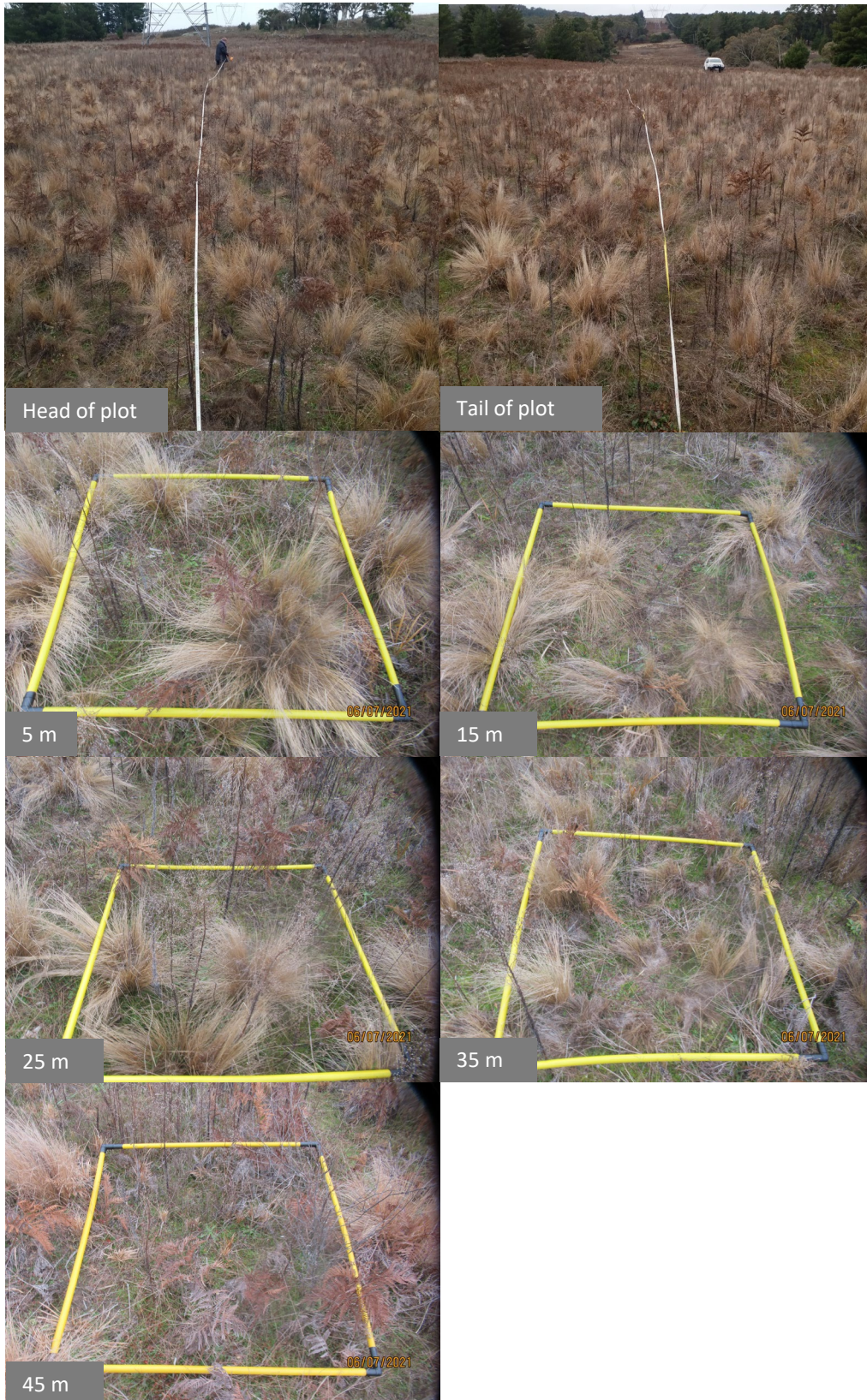
Plot 7



Plot 8



Plot 9



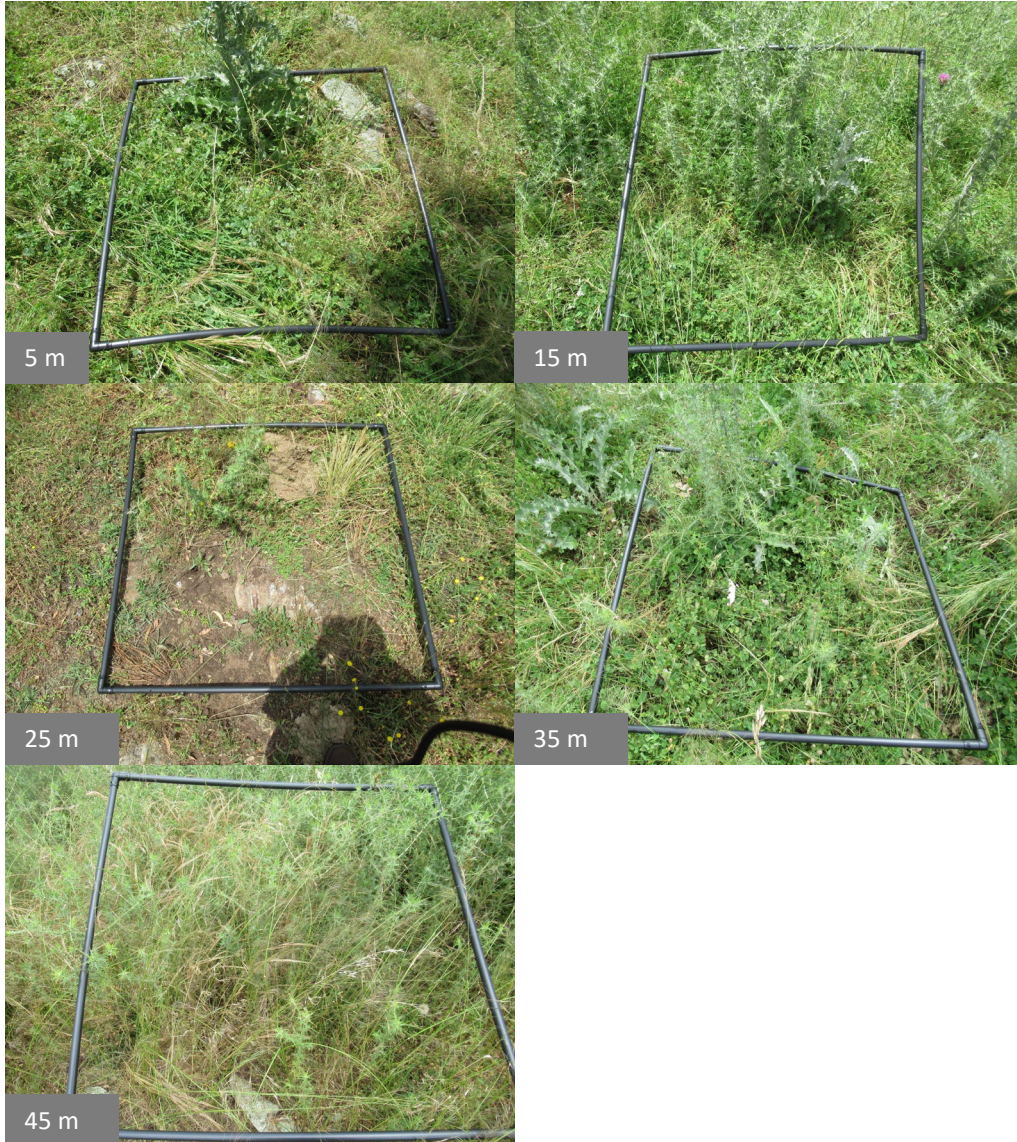
Plot 10



Plot 11



Plot 12



Plot 13



Head of plot



Tail of plot



5 m



15 m



25 m



35 m



45 m

Plot 14



Plot 15



Plot 16



Plot 17



Plot 18



B.3 Rapid vegetation assessment data

Date-Time	Easting	Northing	Name ID	Upper stratum	Mid stratum	Lower stratum
2021-11-30T10:43:41.695	726573.8	6103872	1	None	None	100% exotic. <i>Vulpia myuris</i> , <i>Tolpis barbata</i> , <i>Lolium perenne</i> , <i>Acetosella vulgare</i> , <i>Aira</i> sp., <i>Hypochaeris radicata</i>
2021-11-30T10:58:46.556	726667.7	6103902	2			100% exotic
2021-11-30T11:03:12.589	726607.4	6103942	3	<i>Eucalyptus pauciflora</i>	African boxthorn	100% exotic understorey. <i>Bromus</i> sp., Saffron thistle
2021-11-30T11:16:18.082	726627.1	6103767	4	<i>Eucalyptus pauciflora</i>	None	80% exotic. <i>Bromus</i> sp. Thistle, <i>Pteridium esculentum</i> , <i>Solanum nigrum</i>
2021-11-30T11:30:17.480	726579.7	6103758	5			80% exotic
2021-11-30T12:03:10.377	726570.9	6103420	6	<i>Eucalyptus pauciflora</i> , <i>Eucalyptus stellulata</i>		Approx 40% exotic, natives mostly bracken <i>Pteridium esculentum</i> , <i>Echinopogon</i> , Thistle, <i>Senecio</i> , <i>Vulpia</i> , <i>Trifolium</i>
2021-11-30T12:13:47.644	726458.7	6103321	7	<i>Eucalyptus pauciflora</i>		
2021-11-30T12:32:05.155	726144.1	6103308	8	None	None	99% <i>Lolium perenne</i>
2021-11-30T12:36:16.776	726048.6	6103148	9	None	None	<i>Lolium perenne</i> 99%
2021-11-30T12:40:15.991	725967	6103229	10	None	None	99% <i>Lolium perenne</i>
2021-11-30T12:43:22.530	725765.1	6103358	11	None	None	99% <i>Lolium perenne</i>
2021-11-30T12:47:26.120	725596.9	6103470	12	None	None	99% exotic <i>Phalaris aquatica</i> , <i>Vulpia</i> , <i>Bromus</i>
2021-11-30T12:54:43.206	725876.3	6103502	13	None	None	99% <i>Lolium perenne</i>
2021-11-30T13:00:49.111	724862.2	6104608	14			100% <i>Lolium perenne</i>
2021-11-30T13:20:21.488	725832	6103997	15			80% exotic
2021-11-30T13:24:17.824	725818.3	6103916	16			<i>Phalaris</i> , Bromsgrove, Needlegrass
2021-11-30T14:16:45.783	726141.8	6102035	17			<i>Bromus</i> sp and <i>Lolium</i> sp. 90% exotic
2021-11-30T15:33:57.879	723929	6105729	18	None	None	<i>Phalaris</i>
2021-11-30T16:47:00.642	723932.3	6105527	19	None	None	100% exotic <i>Festuca</i> sp., <i>Phalaris</i>
2021-11-30T17:01:35.986	723656.5	6105438	20			Almost 100% Swamp Wallaby Grass cover

Biodiversity Development Assessment Report
Blind Creek Solar Farm

Date-Time	Easting	Northing	Name ID	Upper stratum	Mid stratum	Lower stratum
2021-11-30T17:03:20.232	723531.8	6105407	21			Bromus sp., Austrostipa scabra
2021-11-30T17:06:59.664	723415.3	6105066	22			Austrostipa scabra, Vulpia myuris
2021-11-30T17:11:41.975	723341.9	6104758	23			Avena sp., Thistle
2021-11-30T17:18:54.373	723506	6104259	24			Phalaris aquatica, Chilean Needle Grass
2021-11-30T17:20:51.142	723703.1	6104140	25			Phalaris aquatica
2021-11-30T17:25:25.279	724092.6	6103903	26			Festuca sp. 100% exotic
2021-11-30T17:27:05.157	724226.2	6103828	27			Phalaris 100% exotic
2021-11-30T17:28:57.884	724374.9	6103726	28			Festuca sp., Phalaris. 95% exotic
2021-11-30T17:33:39.046	724373.2	6103726	29			100% exotic
2021-11-30T17:38:13.059	725966.7	6102275	30			Bromus sp., 100% exotic

B.4 Frog targeted survey data

FROG SURVEY NO:	1				
Red text indicates species not seen/heard					
Site	BFS1		Site	BFS3	
Easting	724982.095		Easting	723862.752	
Northing	6102605.266		Northing	6104941.725	
Date	27/01/2021		Date	27/01/2021	
Recorder(s)	S. Patmore, T. Hume		Recorder(s)	S. Patmore, T. Hume	
Time (start)	10.15pm		Time (start)	8.40pm	
Time (finish)	10.35pm		Time (finish)	9.00pm	
Temp	14		Temp	16	
Cloud	8/8		Cloud	8/8	
Wind	light-mod winds (10-15kph)		Wind	light-mod winds (10-15km/h)	
Rain	light rain earlier in day		Rain	light rain earlier in day	
Species recorded:	Observation type		Species recorded	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>		
<i>Limnodynastes dumerili</i>			<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>			<i>Limnodynastes peronii</i>		
<i>Limnodynastes tasmaniensis</i>	calling		<i>Limnodynastes tasmaniensis</i>		
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>	seen	
Site	BFS2		Site	BFS4	
Easting	723493.305		Easting	724162.747	
Northing	6104204.637		Northing	6103789.01	
Date	27/01/2021		Date	27/01/2021	
Recorder(s)	S. Patmore, T. Hume		Recorder(s)	S. Patmore, T. Hume	
Time (start)	9.10pm		Time (start)	9.45pm	
Time (finish)	9.40pm		Time (finish)	10.05pm	
Temp	16		Temp	15	
Cloud	8/8		Cloud	8/8	
Wind	light-mod winds (10-15kph)		Wind	light-mod winds (10-15km/h)	
Rain	light rain earlier in day		Rain	light rain earlier in day	
Species recorded:	Observation type		Species recorded	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>			<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>			<i>Limnodynastes peronii</i>	calling	
<i>Limnodynastes tasmaniensis</i>			<i>Limnodynastes tasmaniensis</i>	calling	
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		

Biodiversity Development Assessment Report
Blind Creek Solar Farm

FROG SURVEY NO:	2				
Red text indicates species not seen/heard					
Site	BFS1		Site	BFS3	
Easting	724982.095		Easting	723862.752	
Northing	6102605.266		Northing	6104941.725	
Date	28/01/2021		Date	28/01/2021	
Recorder(s)	S. Patmore, T. Hume		Recorder(s)	S. Patmore, T. Hume	
Time (start)	10.10pm		Time (start)	8.35pm	
Time (finish)	10.30pm		Time (finish)	9.00pm	
Temp	13		Temp	14	
Cloud	8/8		Cloud	8/8	
Wind	light-mod winds (10-15kph)		Wind	light-mod winds (10km/h)	
Rain	YES - light rain during survey		Rain	YES - light rain during survey	
Species recorded:	Observation type		Species recorded	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>	seen (juvenile)		<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>			<i>Limnodynastes peronii</i>		
<i>Limnodynastes tasmaniensis</i>			<i>Limnodynastes tasmaniensis</i>		
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		
Site	BFS2		Site	BFS4	
Easting	723493.305		Easting	724162.747	
Northing	6104204.637		Northing	6103789.01	
Date	28/01/2021		Date	28/01/2021	
Recorder(s)	S. Patmore, T. Hume		Recorder(s)	S. Patmore, T. Hume	
Time (start)	9.10pm		Time (start)	9.45pm	
Time (finish)	9.40pm		Time (finish)	10.05pm	
Temp	13		Temp	13	
Cloud	8/8		Cloud	8/8	
Wind	light-mod winds (10-15kph)		Wind	light-mod winds (10-15km/h)	
Rain	YES - light rain during survey		Rain	YES - light rain during survey	
Species recorded:	Observation type		Species recorded	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>	calling	
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>	seen		<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>			<i>Limnodynastes peronii</i>		
<i>Limnodynastes tasmaniensis</i>	calling		<i>Limnodynastes tasmaniensis</i>	calling	
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		

Biodiversity Development Assessment Report
Blind Creek Solar Farm

FROG SURVEY NO:	3				
Red text indicates species not seen/heard					
Site	BFS1		Site	BFS3	
Easting	724982.095		Easting	723862.752	
Northing	6102605.266		Northing	6104941.725	
Date	29/01/2021		Date	29/01/2021	
Recorder	T. Hume, A. Santiago		Recorder	T. Hume, A. Santiago	
Time (start)	10.40pm		Time (start)	10.40pm	
Time (finish)	11:00pm		Time (finish)	11:00pm	
Temp	17		Temp	17	
Wind	No wind		Wind	No wind	
Rain	Intermittent light rain		Rain	Intermittent light rain	
Species recorded:	Observation type		Species recorded:	Observation type	
<i>Crinia signifera</i>	calling		<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>			<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>			<i>Limnodynastes peronii</i>	calling	
<i>Limnodynastes tasmaniensis</i>	calling		<i>Limnodynastes tasmaniensis</i>	calling	
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		
Site	BFS2		Site	BFS4	
Easting	723493.305		Easting	724162.747	
Northing	6104204.637		Northing	6103789.01	
Date	29/01/2021		Date	29/01/2021	
Recorder	T. Hume, A. Santiago		Recorder	T. Hume, A. Santiago	
Time (start)	9.20pm		Time (start)	10.40pm	
Time (finish)	9:50pm		Time (finish)	11:00pm	
Temp	17		Temp	17	
Wind	No wind		Wind	No wind	
Rain	Intermittent light rain		Rain	Intermittent light rain	
Species recorded:	Observation type		Species recorded:	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>	seen		<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>	calling		<i>Limnodynastes peronii</i>		
<i>Limnodynastes tasmaniensis</i>			<i>Limnodynastes tasmaniensis</i>		
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		

Biodiversity Development Assessment Report
Blind Creek Solar Farm

FROG SURVEY NO:	4				
Red text indicates species not seen/heard					
Site	BFS1		Site	BFS3	
Easting	724982.095		Easting	723862.752	
Northing	6102605.266		Northing	6104941.725	
Date	1/02/2021		Date	1/02/2021	
Recorder	T. Hume, R.Reid		Recorder	T. Hume, R.Reid	
Time (start)	22:50		Time (start)	20:40	
Time (finish)	23:20		Time (finish)	21:10	
Temp	17		Temp	17	
Wind	2.5kph		Wind	3.2kph	
Rain	Light rain		Rain	Intermittent rain	
Species recorded:	Observation type		Species recorded:	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>			<i>Limnodynastes dumerili</i>		
<i>Limnodynastes peronii</i>			<i>Limnodynastes peronii</i>		
<i>Limnodynastes tasmaniensis</i>	calling, seen		<i>Limnodynastes tasmaniensis</i>	calling	
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		
Site	BFS2		Site	BFS4	
Easting	723493.305		Easting	724162.747	
Northing	6104204.637		Northing	6103789.01	
Date	1/02/2021		Date	1/02/2021	
Recorder	T. Hume, R.Reid		Recorder	T. Hume, R.Reid	
Time (start)	21:25		Time (start)	22:10	
Time (finish)	22:00		Time (finish)	22:40	
Temp	17		Temp	17	
Wind	No wind		Wind	5kph	
Rain	Intermittent rain		Rain	Light rain	
Species recorded:	Observation type		Species recorded:	Observation type	
<i>Crinia signifera</i>			<i>Crinia signifera</i>		
<i>Crinia parinsignifera</i>	calling		<i>Crinia parinsignifera</i>	calling	
<i>Limnodynastes dumerili</i>			<i>Limnodynastes dumerili</i>	seen	
<i>Limnodynastes peronii</i>	calling		<i>Limnodynastes peronii</i>	calling	
<i>Limnodynastes tasmaniensis</i>	observed		<i>Limnodynastes tasmaniensis</i>	calling	
<i>Litoria peronii</i>			<i>Litoria peronii</i>		
<i>Litoria vereauxii</i>			<i>Litoria vereauxii</i>		
<i>Uperolia laevigata</i>			<i>Uperolia laevigata</i>		

B.5 Reptile tile survey data

Week 1

Blind Creek	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
date	27/10/2021	27/10/2021	27/10/2021	27/10/2021	27/10/2021
time	125	12	1244	930	9
Eastings	727967.03	726422.55	726121.80	725934.15	725671.12
Northings	6102693.28	6103745.37	6104046.97	6104434.10	6104616.26
Datum/Zone	GDA94/55	GDA94/55	GDA94/55	GDA94/55	GDA94/55
Temp at ground level	19.8	18.2	20.5	15.1	17.8
Aspect	flat	flat	flat	nw	nw
Wind speed	10.1	10.1	11.1	8.4	7.6
Cloud cover	clear	clear	clear	clear	clear
Humidity	low	low	low	low	low
Number of tiles replaced	0	6	1	5	3
Species recorded (individuals)	none	none	None	Hemiergis talbingoensis (1)	none

Week 2

Blind Creek	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
date	3/11/2021	3/11/2021	3/11/2021	3/11/2021	3/11/2021
time	930	1230	1000	11	1145
Eastings	727967.03	726422.55	726121.80	725934.15	725671.12
Northings	6102693.28	6103745.37	6104046.97	6104434.10	6104616.26
Datum/Zone	GDA94/55	GDA94/55	GDA94/55	GDA94/55	GDA94/55
Temp at ground level	17.2	21	19.1	20.3	20.5
Aspect	flat	flat	flat	flat	flat
Wind speed	20	15	12	5	9
Cloud cover	low	low	low	low	low
Humidity (%)	93.00	50.00	64	54	52
Number of tiles replace	0	0	0	3	0
Species recorded (individuals)	Hemiergis talbingoensis (2)	None	none	none	none

Week 3

Blind Creek	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
date	9/11/2021	9/11/2021	9/11/2021	9/11/2021	9/11/2021
time	1230	12	1130	1030	11
Eastings	727967.03	726422.55	726121.80	725934.15	725671.12
Northings	6102693.28	6103745.37	6104046.97	6104434.10	6104616.26
Datum/Zone	GDA94/55	GDA94/55	GDA94/55	GDA94/55	GDA94/55
Temp at ground level	24.5	20	20.7	17.9	21.7
Aspect	flat	flat	flat	flat	flat
Wind speed	9.2	4.7	5.4	4.7	8.5
Cloud cover	clear	light	light	clear	clear
Humidity	48	42	52	58	54
Number of tiles replaced	0	0	0	0	1
Species recorded (individuals)	1 unidentified-too fast	none	none	hemiergis talbingoensis (1)	none

Week 4

Biodiversity Development Assessment Report
Blind Creek Solar Farm

Blind Creek ▼	plot 1 ▼	plot 2 ▼	plot 3 ▼	plot 4 ▼	plot 5 ▼
date	15/11/2021	15/11/2021	15/11/2021	15/11/2021	15/11/2021
time	1000	1245	1200	1130	1100
Easting	727967.03	726422.55	726121.80	725934.15	725671.12
Northing	6102693.28	6103745.37	6104046.97	6104434.10	6104616.26
Datum/Zone	GDA94/55	GDA94/55	GDA94/55	GDA94/55	GDA94/55
Temp at ground level	5.8	6.1	6.7	5.5	5.7
Aspect	flat	flat	flat	flat	flat
Wind speed	13	18.8	17.6	18.2	11
Cloud cover	low	high	high	moderate	moderate
Humidity	67	59	56	58	62
Number of tiles replaced	0	0		0	0
Species recorded (individuals)	Hemiergis talbingoensis x 3. Carlia tetradactyla	none	Acritoscincus duperyi x 1. Hemiergis talbingoensis x 1	none	none

Week 5

Blind Creek ▼	plot 1 ▼	plot 2 ▼	plot 3 ▼	plot 4 ▼	plot 5 ▼
date	2/12/2021	2/12/2021	2/12/2021	2/12/2021	2/12/2021
time	1000	1245	1215	1130	1100
Easting	727967.03	726422.55	726121.80	725934.15	725671.12
Northing	6102693.28	6103745.37	6104046.97	6104434.10	6104616.26
Datum/Zone	GDA94/55	GDA94/55	GDA94/55	GDA94/55	GDA94/55
Temp at ground level	24.4	26.5	24.9	23.3	27.2
Aspect	flat	flat	flat	flat	flat
Wind speed	1.6	1.1	6.6	4.6	1.3
Cloud cover	clear	clear	clear	clear	clear
Humidity	55	42	43	47	48
Number of tiles replaced					
Species recorded (individuals)	Lampropholis guichenotii x 1, Hemiergis talbingoensis x1			none	none

B.6 Microbat Ultrasonic Call Identification Report

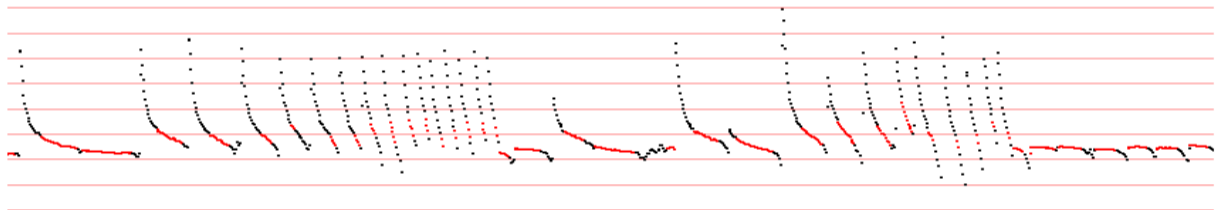
Please see overleaf for full report.

Blind Creek Solar Farm (Bungendore) Microbat Ultrasonic Call

Identification Report

Rod Armistead Environmental Consultants

ABN – 63 6685 875 27



Blind Creek Solar Farm (Bungendore) Microbat Ultrasonic Call Identification Report**Methods**

The microbat ultrasonic call data received for analysis was collected from two Anabat Express detectors (SN440504 and SN440643) that was passively deployed for a collective total of six survey nights at the Blind Creek Solar Farm (study area). The study area is located near to Bungendore, which is located approximately 30 Km north-east of Canberra, NSW.

Two survey sites were surveyed. One survey site is located near a wetland habitat (Wetlands survey site (SN440504)) associated with Lake George and the other survey site is located near to a woodland patch (Teeline survey site (SN440643)).

Call identifications were made using the microbat echolocation call guides that have been developed for New South Wales (Pennay et al 2004) as well as the south-east Queensland and north-east New South Wales (Reinhold et al 2001). The identification of a species as being present at the study area was supported following a desktop review of the available distribution information for each species (Churchill 2008; Pennay et al. (2011); Van Dyck and Strahan (2008); Van Dyck et al. (2013) and the Australian Bat Society web page located at <https://www.ausbats.org.au/>).

Microbat calls that were recorded in the zero-crossing format and were analysed using the software program Anabat Insight (Version 1.9.2-0g2fd2328) (Titley Scientific).

Whilst analysing the recorded microbat ultrasonic call data, the following protocols were applied:

- Short and low-quality calls with less than three pulses were removed from data manually or through Decision Tree function that is available in Anabat Insight. These short or low-quality calls were excluded from being used to identify any microbat species.

- For those calls that could be used to identify a species or genus making the call, two categories of confidence are used:
 - A microbat genus or species was identified as being ‘definitely present’ when the quality and the structure of the call profile was of sufficient length and quality that the identity of the bat species making the calls is not in doubt.
 - Microbat genus or species was identified as being is being ‘potentially present’ if the quality and structure of the call profile was such that there could be some confusion between another species that produces a similar call profile.

Results and Discussion

There were 1056 call sequences recorded during the ten survey nights. Of these, 700 (66.29%) were deemed useful because the call profiles were of sufficient quality and/or length to enable positive identification of a bat species. The remaining 356 (33.71%) call sequences were excluded from being analysed as they were either too short or were of low quality.

Based upon the recorded microbat calls, eight (8) microbat species were positively identified as being present (Table 1). A further four (4) species, including *Myotis macropus* (Southern Myotis), two *Nyctophilus* species and *Vespadelus regulus* (Southern Forest Bat), whose recorded call profiles could not be separated, resolved or assigned to a single species, were deemed to be potentially present at the study area (Table 1 – Table 3).

Definite calls for two species, *Miniopterus orianae oceanensis* (Large Bent-winged Bat) and *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat), which are listed as Vulnerable under the NSW Biodiversity Conservation Act (BC Act) were recorded (Table 1, Figure 1-Figure 9).

As stated above, unresolved Southern Myotis calls were recorded at both survey sites. Southern Myotis is listed as Vulnerable under the BC Act and is classified within the species credit class of the Biodiversity Assessment Method (OEH 2017).

Table 1. Microbat species that were recorded during the Blind Creek Solar Farm survey.

Species name	Common name	Definitely / potentially present
<i>Austronomus australis</i>	White-striped Free-tailed Bat	Definitely present
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Definitely present
<i>Miniopterus orianae oceanensis</i> *	Large Bent-winged Bat	Definitely present
<i>Myotis macropus</i> *	Southern Myotis	Potentially present
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	Potentially present
<i>Nyctophilus gouldii</i>	Gould's Long-eared Bat	Potentially present
<i>Ozimops planiceps</i>	Southern or South-eastern Free-tailed Bat	Definitely present
<i>Ozimops ridei</i>	Ride's Free-tailed Bat	Definitely present
<i>Saccolaimus flaviventris</i> *	Yellow-bellied Sheath-tailed Bat	Definitely present
<i>Vespadelus darlingtoni</i>	Large Forest Bat	Definitely present
<i>Vespadelus regulus</i>	Southern Forest Bat	Potentially present
<i>Vespadelus vulturnus</i>	Little Forest Bat	Definitely present

*listed as threatened under the BC Act

Table 2. Microbat species recorded and total number of calls for each species, including unresolved call profiles that were recorded at the Wetlands survey site (SN440504) during the Blind Creek Solar Farm survey between the 12 January and 14 January 2021.

Species name	Common Name	Definitely / confidently recorded / present	Potentially recorded / present	Total number of calls recorded
Those microbats that could be identified to genus and / or species level based on the data that was collected				
<i>Austronomus australis</i>	White-striped Free-tailed Bat	5	0	5
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	4	13	17
<i>Miniopterus orianae oceanensis</i> *	Large Bent-winged Bat	14	2	16
<i>Ozimops planiceps</i>	Southern or South-eastern Free-tailed Bat	5	0	5
<i>Ozimops ridei</i>	Ride's Free-tailed Bat	120	0	120
<i>Vespadelus darlingtoni</i>	Large Forest Bat	2	0	2
<i>Vespadelus vulturnus</i>	Little Forest Bat	7	0	7
Unresolved (low quality) calls				169
Unresolved calls including those microbats that could not be identified to genus and / or species level based on the data that was collected				
Species name	Common Name	Definitely / confidently recorded / present	Potentially recorded / present	Total number of calls recorded
<i>Chalinolobus gouldii</i> / <i>Ozimops</i> species complex. In this region the <i>O. planiceps</i> and <i>O. ridei</i> are likely to be present	Gould's Wattled Bat / In this region the Southern or South-eastern Free-tailed Bat and Ride's Free-tailed Bat are likely to be present	-	82	82
<i>Miniopterus orianae oceanensis</i> * / <i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	Large Bent-winged Bat / Large Forest Bat / Southern Forest Bat	-	19	19

<i>Miniopterus orianae oceanensis</i> * / <i>Vespadelus regulus</i> / <i>Vespadelus vulturinus</i>	Large Bent-winged Bat / Southern Forest Bat / Little Forest Bat	-	2	2
<i>Miniopterus orianae oceanensis</i> * / <i>Vespadelus vulturinus</i>	Large Bent-winged Bat / Little Forest Bat	-	2	2
<i>Myotis macropus</i> * / <i>Nyctophilus</i> spp., in this region include <i>N. geoffroyi</i> and <i>N. gouldii</i> are likely to be present and their calls do overlap.	Southern Myotis / In this region Lesser and Gould's Long-eared Bat species are all likely to be present.	-	7	7
<i>Ozimops</i> species complex. In this region the <i>O. planiceps</i> and <i>O. ridei</i> are likely to be present	In this region the Southern or South-eastern Free-tailed Bat and Ride's Free-tailed Bat are likely to be present	-	15	15
<i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	Large Forest Bat / Southern Forest Bat	-	197	197
<i>Vespadelus regulus</i> / <i>Vespadelus vulturinus</i>	Southern Forest Bat / Little Forest Bat /	-	7	7

*listed as threatened (Vulnerable) under the NSW BC Act

Table 3. Microbat species recorded and a total number of calls for each species, including unresolved call profiles that were recorded at the Treeline Survey site (SN440643) during the Blind Creek Solar Farm survey between the 12 January and 14 January 2021.

Species name	Common Name	Definitely / confidently recorded / present	Potentially recorded / present	Total number of calls recorded
Those microbats that could be identified to genus and / or species level based on the data that was collected				
<i>Austronomus australis</i>	White-striped Free-tailed Bat	32	0	32
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	12	37	49

<i>Ozimops ridei</i>	Ride's Free-tailed Bat	19	0	19
<i>Saccolaimus flaviventris</i> *	Yellow-bellied Sheath-tailed Bat	1	1	2
<i>Vespadelus darlingtoni</i>	Large Forest Bat	2	0	2
Unresolved (low quality) calls				187
Unresolved calls including those microbats that could not be identified to genus and / or species level based on the data that was collected				
Species name	Common Name	Definitely / confidently recorded / present	Potentially recorded / present	Total number of calls recorded
<i>Austronomus australis</i> / <i>Saccolaimus flaviventris</i> *	White-striped Free-tailed Bat / Yellow-bellied Sheath-tailed Bat	-	3	3
<i>Chalinolobus gouldii</i> / <i>Ozimops</i> species complex. In this region the <i>O. planiceps</i> and <i>O. ridei</i> are likely to be present	Gould's Wattled Bat / In this region the Southern or South-eastern Free-tailed Bat and Ride's Free-tailed Bat are likely to be present		43	43
<i>Miniopterus orianae oceanensis</i> * / <i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	Large Bent-winged Bat / Large Forest Bat / Southern Forest Bat	-	26	26
<i>Myotis macropus</i> * / <i>Nyctophilus</i> spp., in this region include <i>N. geoffroyi</i> and <i>N. gouldii</i> are likely to be present and their calls do overlap.	Southern Myotis / In this region Lesser and Gould's Long-eared Bat species are all likely to be present.		6	6
<i>Ozimops</i> species complex. In this region the <i>O. petersi</i> and <i>O.</i>	In this region the Southern or South-eastern Free-tailed Bat	-	1	1

<i>planiceps</i> are likely to be present and their calls may overlap.	and Ride's Free-tailed Bat are likely to be present			
<i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	Large Forest Bat / Southern Forest Bat	-	20	20

*listed as threatened (Vulnerable) under the NSW BC Act

Unresolved call profiles

In this survey, there were some call sequences that could not be resolved, and therefore could not be used to positively identify the microbat making the call to species level. This is because some of the species that are likely to occur in this geographic region, and therefore the study area has call profiles that do overlap. The species that are likely to occur within the study area and were deemed as being present in this survey with overlapping call profiles are described below.

Calls (mostly due to variations in call harmonics from both species) from the White-striped Free-tailed Bat and the threatened Yellow-bellied Free-tailed bat can overlap. Calls from both species are typically flat, but they can also produce flat and curved calls with irregular pulses. In this survey calls with pulses fitting the discretions above with characteristic frequency ranges between 8 kHz and 15 kHz were assigned to White-striped Free-tailed Bat, while calls above 17 kHz were generally assigned to the Yellow-bellied Sheath-tailed Bat. When none of the previously mentioned distinguishing characteristics were present within a call profile, the call was assigned to multi-species groups or excluded from the data.

The calls of *Chalinolobus gouldii* (Gould's Wattled Bat) and the *Ozimops* species complex (Free-tailed Bats) can be difficult to separate.

- Calls were identified as *Ozimops* species complex when the call shape was flat (slope S1 of less than 100 OPS generally) and the frequency was between 24 – 36 kHz.
- Gould's Wattled Bat was distinguished by a frequency of 27.5 – 32.5 kHz and alternation in call frequency between pulses.

In this region, the calls of Large Bent-winged Bat overlap in frequency with those of Large Forest Bat, Southern Forest Bat and Little Forest Bat between 44 and 48.5 kHz.

- Large Bent-winged Bat calls were distinguished by having down-sweeping tails with a characteristic frequency range between 43 – 48.5 kHz.
- Large Forest Bat (characteristic frequency range between 40 – 44 kHz), Southern Forest Bat (characteristic frequency range between 40 – 44 kHz) and Little Forest Bat calls (characteristic frequency range between 44 – 47 kHz) are curved, have a regular pulse shape with (generally) up-sweeping tails.

When there were no distinguishing characteristics present within a call profile that fell within these unresolved call profiles, the call was assigned to multi-species groups or excluded from the data.

Furthermore, *Nyctophilus* spp. (Long-eared bats) are difficult to identify or separate confidently to species level based upon their recorded calls. Therefore, no attempt was made to separate the two *Nyctophilus* species based upon the calls recorded during this survey (Pennay et al. 2004).

Recorded species call profiles

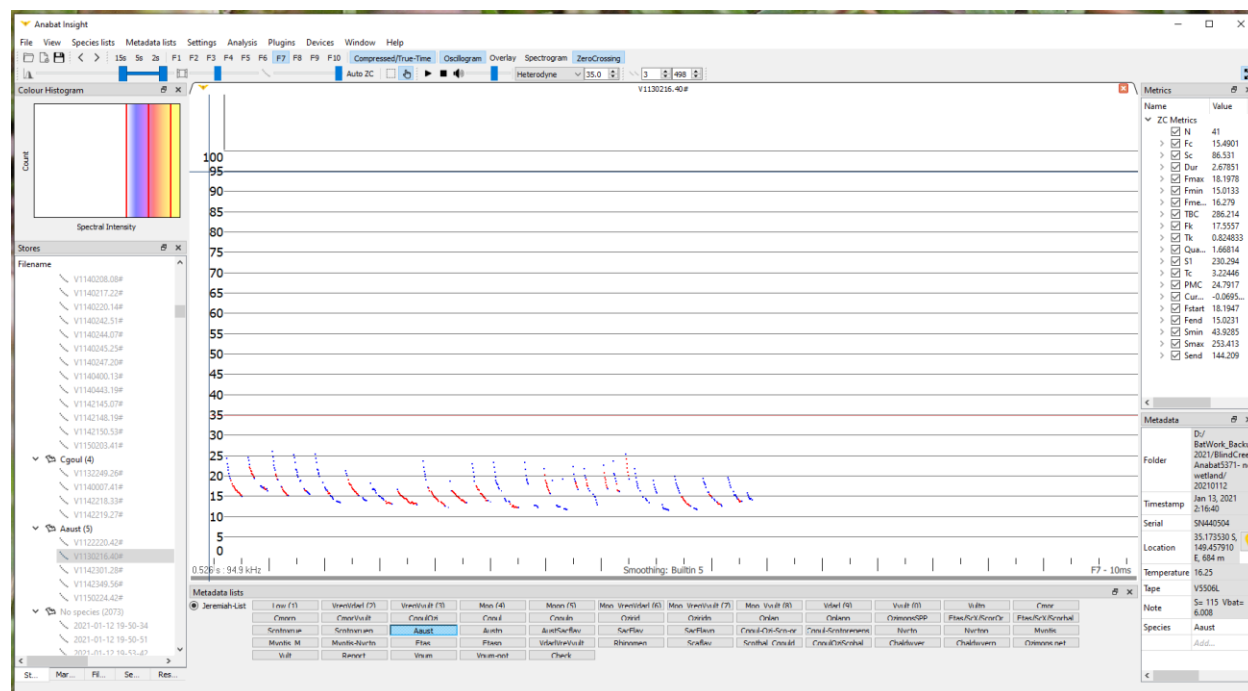


Figure 1. Call profile for *Austronomus australis* (White-striped Free-tailed Bat) recorded at the Blind Creek Solar Farm study area at 2.16 am on the 13th January 2021.

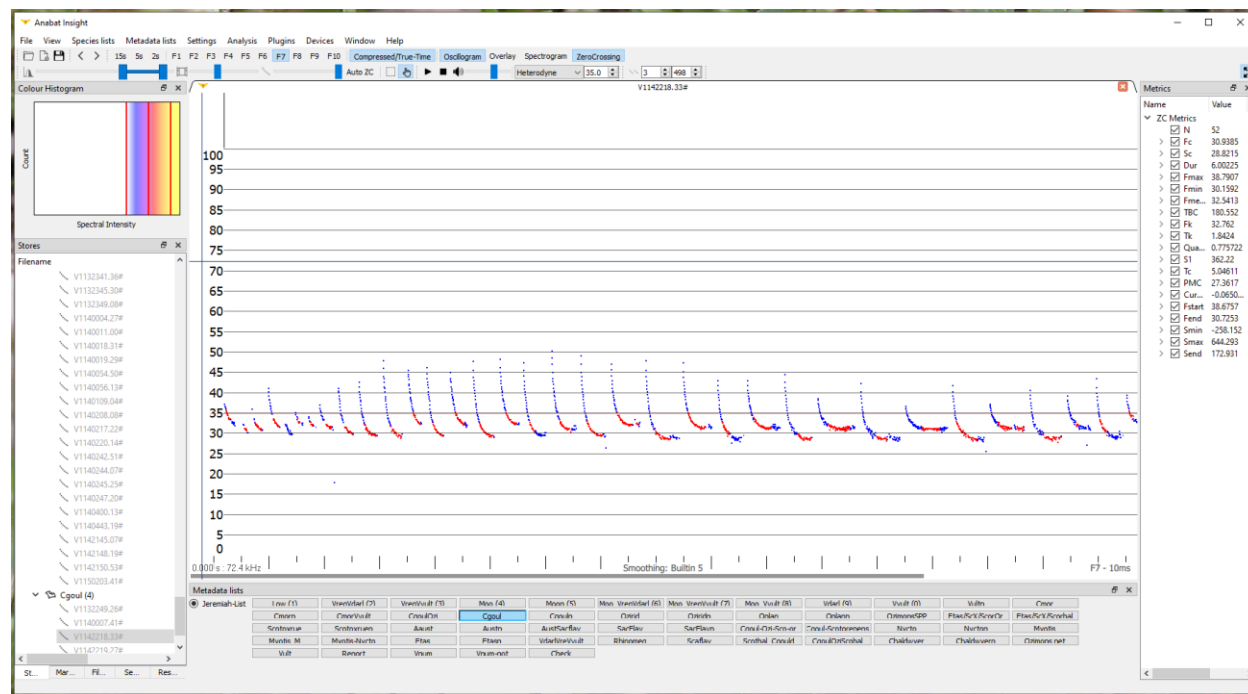


Figure 2. Call profile for *Chalinolobus gouldii* (Gould's Wattled Bat) recorded at the Blind Creek Solar Farm study area at 10.18 pm on the 14th January 2021.

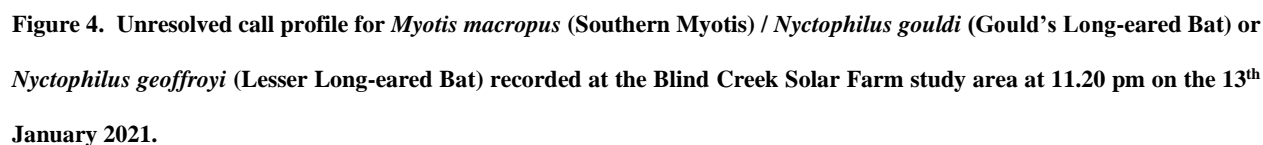




Figure 5. Call profile for *Ozimops planiceps* (Southern or South-eastern Free-tailed Bat) recorded at the Blind Creek Solar Farm study area at 12.02 am on the 14th January 2021.

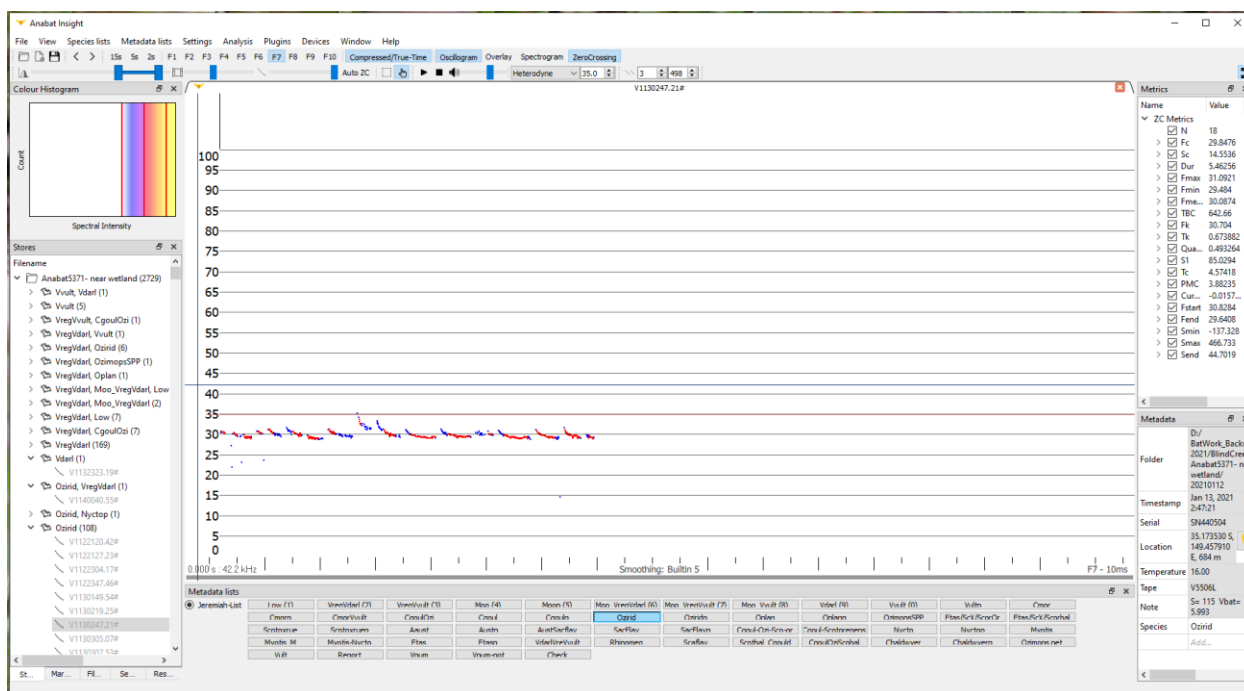


Figure 6. Call profile for *Ozimops ridei* (Ride's Free-tailed Bat) recorded at the Blind Creek Solar Farm study area at 2.47 am on the 13th January 2021.

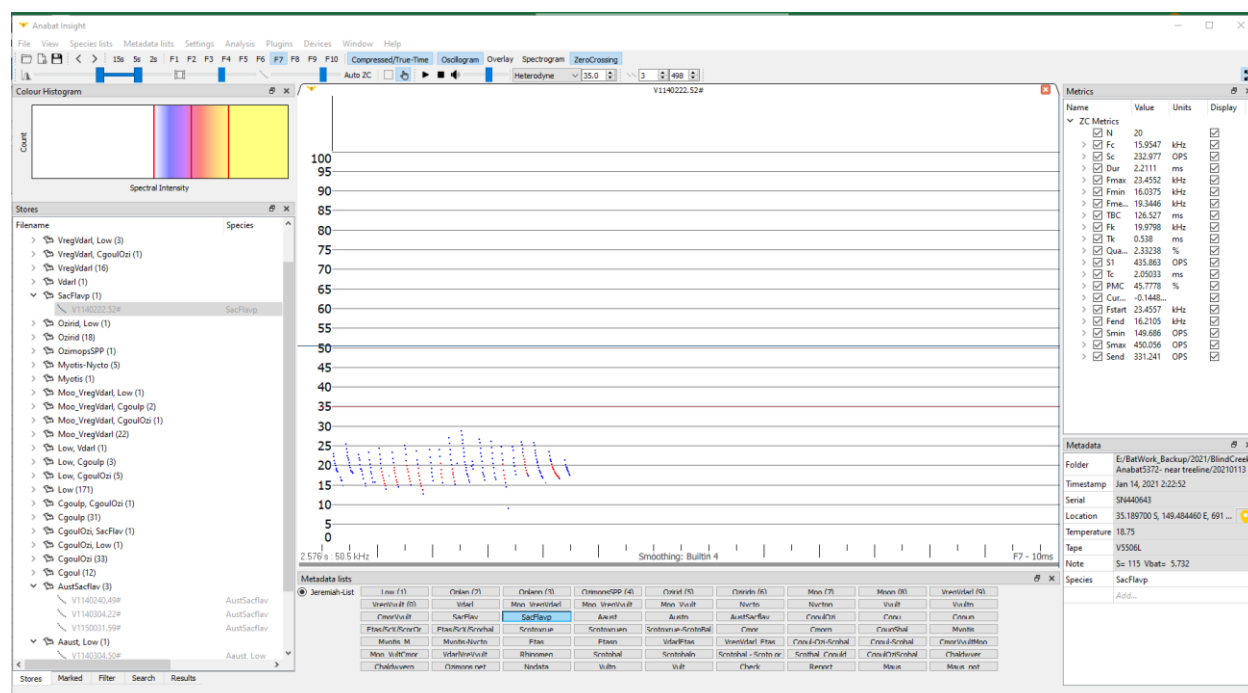


Figure 7. Call profile for *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat) recorded at the Blind Creek Solar Farm study area at 2.22 am on the 14th January 2021.

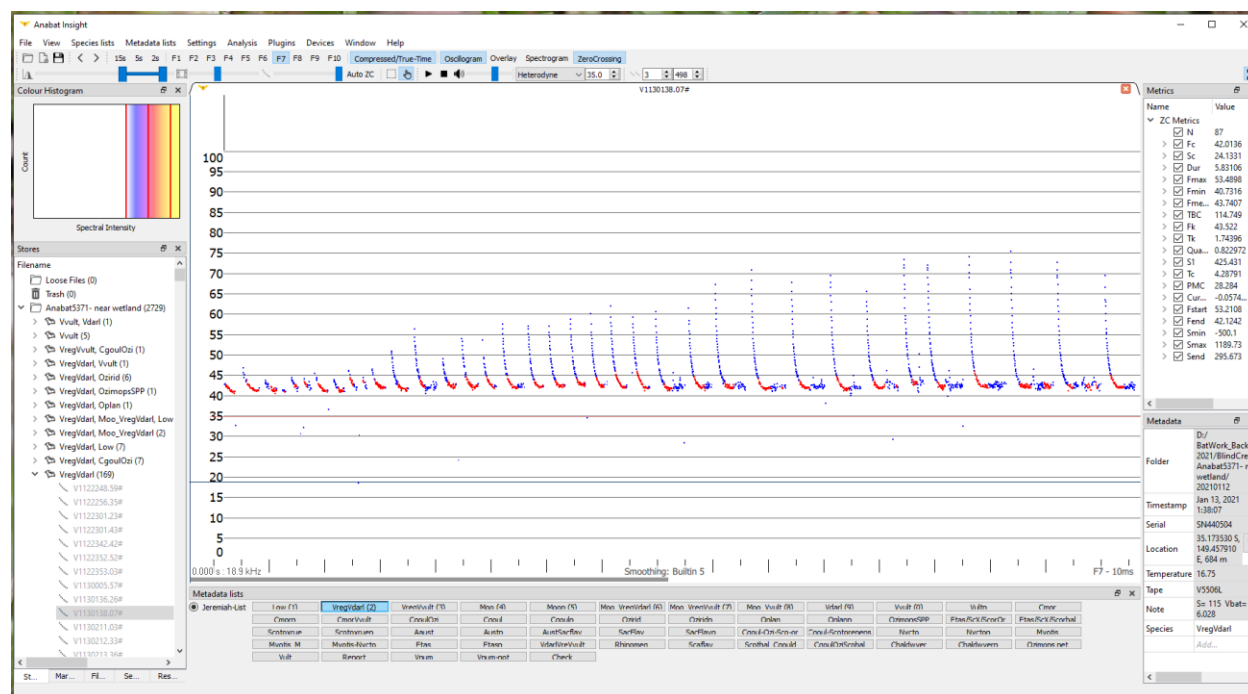


Figure 8. Unresolved call profile for *Vespadelus darlingtoni* (Large Forest Bat) / *Vespadelus regulus* (Large Forest Bat) recorded at the Blind Creek Solar Farm study area at 1.38 am on 13th January 2021.



References

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B.7 White-fronted Chat survey data

Survey type:	Diurnal bird transect					
Survey date:	3/12/2021					
Recorder:	Rebecca Reid					
Coordinates start:	723505.725967, 6105349.668974					
Approx. distance covered:	350 m one way					
Target species:	White-fronted Chat					
Habitat description:	Adjacent ephemeral wetland, currently very full. Some native coverage of <i>Austrostipa scabra</i> . No trees close. Tallest vegetation is Scotch Thistle					
Survey description:	Start at car, walk for 30 mins along track looking for chat, note down other birds as seen/heard. After 30 mins, turn back and walk 30 mins back to car.					
Time	Species	Number	Obs. Type	Distance (m)	Note	Notes 2
8:00:00 AM					Start of transect	
8:00:00 AM	Eurasian Skylark	Many	Heard		Heard throughout entire survey	
8:26:00 AM			Heard		Squeaky noise (not chat) - possibly rabbit?	
8:27:00 AM	Galah	5	Seen	100		
8:28:00 AM			Heard		Squeaky noise (not chat)	
8:29:00 AM	Heron	1	Seen	200	Taking off from other side of wetland	
8:33:00 AM	Eurasian Skylark	3	Seen			
8:40:00 AM	Eurasian Skylark	1	Seen		Bird perched on thistle	
8:42:00 AM	Raptor	1	Seen		Other side of wetland	
8:51:00 AM	Eurasian Skylark					
8:51:00 AM	Australian Magpie	1	Heard			
	Eurasian Skylark	1	Seen		Flying	Lost pen. 1
	Australian Magpie	1	Seen			
	Australian Magpie	1	Heard			
	Australian Magpie	1	Seen	500	Flying	
	Australian Magpie	1	Seen	500	Flying	
	Australian Magpie	1	Heard			
	Masked Lapwing	1	Heard	Far away		
	Eurasian Skylark	1	Seen		Flying	
	Eurasian Skylark	2	Seen		Flying	
	Australian Magpie	1	Heard			
9:00:00 AM					End of transect	

Biodiversity Development Assessment Report
Blind Creek Solar Farm

3/12/2021	Bird survey 1	Wetland		
Start time	815			
End time	915			
eastings	723506			
northings	6105347			
recorder	AS			
Species recorded ▼	time ▼	observation ▼	No. individuals ▼	Notes ▼
Eurasian skylark	820	heard	several	calling the entire survey
Eurasian skylark	822	seen	2	
Magpie	823	seen	1	
Eurasian skylark	823	seen	3	
Black Swan	824	seen	1	
Eurasian skylark	826	seen	2	
Purple swamphen	829	seen	1	
Unidentifiable ducks	832	seen	4	too far away
large brown BOP. Wh	846	seen	2	
pacific black duck	847	seen	1	
Eurasian skylark	849	seen	2	
Magpie lark	851	seen	1	
Magpie lark	853	seen	1	
Eurasian skylark	854	seen	1	
Magpie	906	seen	1	
Eurasian skylark	908	seen	1	
Eurasian skylark	911	seen	3	
Incidental frog observations				
smooth toadlet	Uperoleia laevis	1	heard	
Striped marsh frog	Limnodynastes	several	heard	seen

Appendix C EPBC Protected Matters Search Report

Please see overleaf for full report.



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.

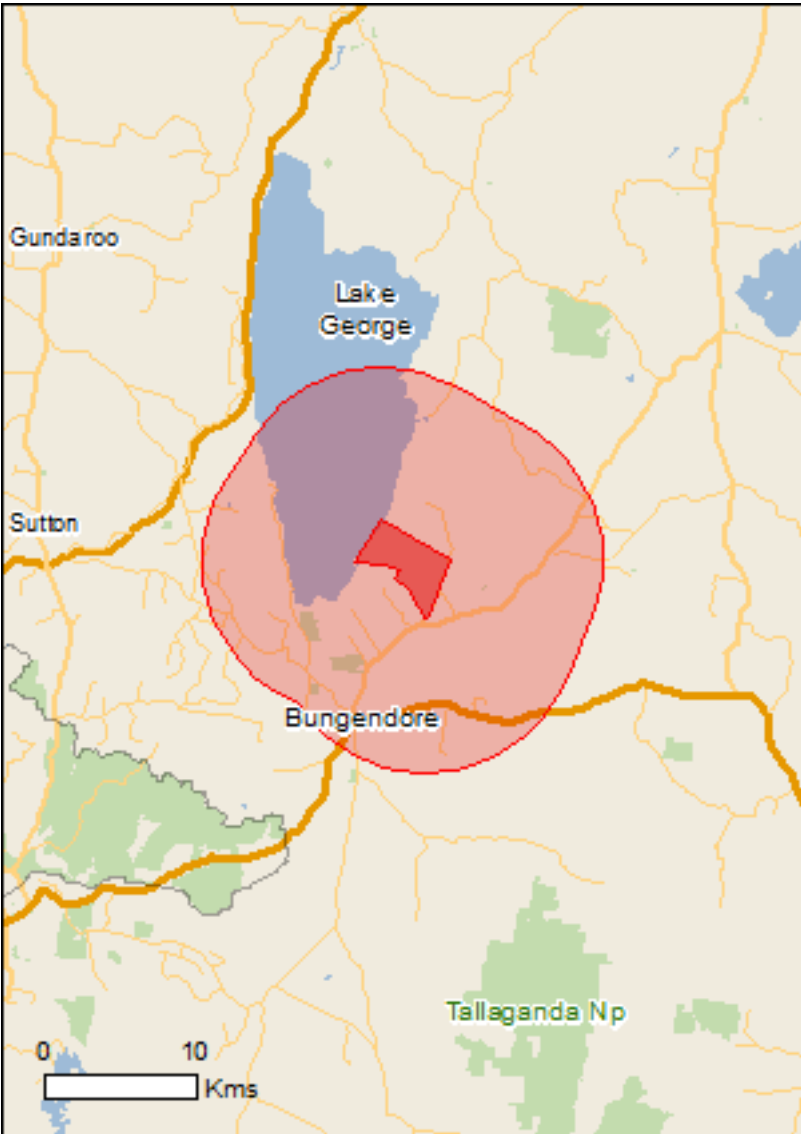
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 04/08/21 15:45:19

- [Summary](#)
- [Details](#)

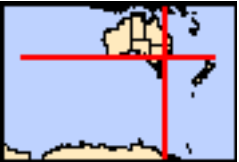
[Matters of NES](#)[Other Matters Protected by the EPBC Act](#)[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental 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:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	41
Listed Migratory Species:	14

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 <http://www.environment.gov.au/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 Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	35
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Banrock station wetland complex	800 - 900km upstream	
Hattah-kulkyne lakes	600 - 700km upstream	
Riverland	700 - 800km upstream	
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream	

Listed Threatened Ecological Communities	[Resource Information]
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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.

Name	Status	Type of Presence
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species	[Resource Information]
---------------------------	--------------------------

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
area		
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Fish		
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat likely to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp	Vulnerable	Species or species

Name	Status	Type of Presence
Wallaby-grass [19215]		habitat may occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Calotis glandulosa		
Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat known to occur within area
Diuris aequalis		
Buttercup Doubletail [21588]	Endangered	Species or species habitat known to occur within area
Dodonaea procumbens		
Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus aggregata		
Black Gum [20890]	Vulnerable	Species or species habitat known to occur within area
Lepidium hyssopifolium		
Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat known to occur within area
Leucochrysum albicans subsp. tricolor		
Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat known to occur within area
Pomaderris pallida		
Pale Pomaderris [13684]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Rutidosis leptorhynchoides		
Button Wrinklewort [67251]	Endangered	Species or species habitat likely to occur within area
Senecio macrocarpus		
Large-fruit Fireweed, Large-fruit Groundsel [16333]	Vulnerable	Species or species habitat known to occur within area
Swainsona recta		
Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area
Delma impar		
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area

Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
<p>The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.</p>	

Name
Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species	[Resource Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		

Name	Threatened	Type of Presence
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Turallo	NSW

Regional Forest Agreements	[Resource Information]
----------------------------	------------------------------------------

Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

Invasive Species	[Resource Information]
------------------	------------------------------------------

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species

Name	Status	Type of Presence
Turdus merula Common Blackbird, Eurasian Blackbird [596]		habitat likely to occur within area Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Nationally Important Wetlands		[Resource Information]
Name	State	
Lake George	NSW	

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-35.209141 149.479928,-35.209141 149.479756,-35.193571 149.469285,-35.189363 149.461903,-35.185154 149.464478,-35.182348 149.454522,-35.180804 149.438042,-35.161019 149.453492,-35.179682 149.494519,-35.209141 149.479928

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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Appendix D EPBC Habitat Evaluation Table

An EPBC Act Protected Matters Report (Appendix C) was generated using the Commonwealth EPBC Protected Matters Search Tool⁴ on the 4 August 2021 to identify Matters of National Environmental Significance (MNES) that have the potential to occur within 10 km of the Development Footprint. The following table evaluates the habitat for the listed threatened ecological communities, threatened species, migratory species, and endangered populations generated by the report. The table indicates whether they are listed under the EPBC Act, BC Act, or both.

- CE = listed as Critically Endangered under the EPBC Act 1999 and BC Act 2016.
- E = listed as Endangered under the EPBC Act 1999 and BC Act 2016.
- V = listed as Vulnerable under the EPBC Act 1999 and BC Act 2016.
- M = listed as Migratory under the EPBC Act 1999.

NGH evaluates the likelihood of occurrence of a species or community based on the presence of suitable habitat within the Development Footprint, proximity of nearest records (NSW BioNet Atlas⁵) and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence.

The following classifications are used:

Presence of habitat:

- Present: Potential or known habitat is present within the study area
- Absent: No potential or known habitat is present within the study area

Likelihood of occurrence:

- Unlikely: Species known or predicted within the locality but unlikely to occur in the study area
- Possible: Species could occur in the study area
- Present: Species was recorded during the field investigations

Impact likely:

⁴).Managed by the Commonwealth Department of the Environment and Energy.

⁵ The **No. BioNet records** (column 7), is derived directly from the BioNet Atlas records '*NumberInd*' attribute column, i.e., number of individuals. This column often provides a zero when there is a low number of sightings. For the purpose of this table, all zeros have been assumed as at least one sighting but may be more. Zeros within this table are indicative of there being no BioNet records within a 10 km radius of the Subject Land.

- No: The proposal would not impact this species or its habitats. No Assessment of Significance (AoS) is necessary for this species
- Yes: The proposal could impact this species or its habitats. An AoS has been applied to these entities.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Threatened Ecological Communities							
Natural Temperate Grassland of the South Eastern Highlands	-	CE	Natural Temperate Grassland is a natural grassland community dominated by a range of perennial grass species and, in highly intact sites, containing a large range of herbaceous species in many plant families, including daisies, peas, lilies, orchids and plants in many other families, all collectively known as forbs, or "wildflowers" in the case of the more showy species. A number of distinct associations have been described in Armstrong et al. (2013), identified by combinations of the co-occurring grasses and forbs, and each found in particular regions and/or landscape positions.	Absent. While PCT 1110 is the closest relatable PCT to the site's small percentage of native vegetation, it is a very weak correlation. Due to the low VI score and dominance of exotic vegetation it cannot be justified as meeting the requirements of the associated TEC.	Absent.		No.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	CE	Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In the Nandewar Bioregion, Grey Box (Eucalyptus microcarpa or E. moluccana) may also be dominant or dominant. The tree-cover is generally discontinuous and consists of widely spaced trees of medium height in which the canopies are clearly separated.	Absent. PCT 1110 and 1100 have been confirmed on site.	Absent.		No.

⁶ Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

BCD threatened species database: <http://www.threatenedspecies.environment.nsw.gov.au/index.aspx>

SPRAT: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Flora							
<i>Amphibromus fluitans</i> River Swamp Wallaby-grass	V	V	grows mostly in permanent swamps. The species needs wetlands which are at least moderately fertile and which have some bare ground, conditions which are produced by seasonally-fluctuating water levels.	Absent. No BioNet records. No permanent swamps.	Absent.	0	No.
<i>Caladenia tessellata</i> Thick Lip Spider Orchid, Daddy Long-legs	E	V	Generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. Known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	Absent. Species associated with PCT 1100. However, favoured habitat consists of low, dry sclerophyll woodland with a heathy or sometimes grassy understorey on clay loams or sandy soils, not present within the Development Footprint. Area of PCT 1100 under the powerline easement has been cleared, and clearing maintained, since at least 1985 (see Land Category Assessment, Appendix E).	Unlikely	0	No.
<i>Calotis glandulosa</i> Mauve Burr-daisy	V	V	Found in montane and subalpine grasslands in the Australian Alps. Found in subalpine grassland (dominated by <i>Poa</i> spp.), and montane or natural temperate grassland dominated by Kangaroo Grass (<i>Themeda triandra</i>) and Snow Gum (<i>Eucalyptus pauciflora</i>) Woodlands on the Monaro and Shoalhaven area.	Marginal. One record in Bungendore 2005. However, Development Footprint is considered unsuitable for the species due to the amount of disturbance and lack of native species.	Unlikely, due to the agricultural use of land, it is unlikely any are present. There are records within the 10km buffer.	1	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
<i>Diuris aequalis</i> Buttercup Doubletail	E	V	Recorded in forest, low open woodland with grassy understorey and secondary grassland on the higher parts of the Southern and Central Tablelands (especially on the Great Dividing Range).	Marginal. Associated with PCT 1100. Development Footprint is with the known geographic range. However, the habitat is unsuitable, no open woodland present.	Unlikely, due to the agricultural use of land, it is unlikely any are present. There are records within the 10km buffer.	126	No
<i>Dodonaea procumbens</i> Trailing Hop-bush	V	V	Grows in Natural Temperate Grassland or fringing eucalypt woodland of Snow Gum (<i>Eucalyptus pauciflora</i>). Grows in open bare patches where there is little competition from other species. Found on sandy-clay soils, usually on or near vertically-tilted shale outcrops.	Absent. Soil type not suitable within the Development Footprint.	Due to the agricultural use of land it is unlikely any are present.	0	No
<i>Eucalyptus aggregata</i> Black Gum	V	V	Often grows with other cold-adapted eucalypts, such as Snow Gum or White Sallee (<i>Eucalyptus pauciflora</i>), Manna or Ribbon Gum (<i>E. viminalis</i>), Candlebark (<i>E. rubida</i>), Black Sallee (<i>E. stellulata</i>) and Swamp Gum (<i>E. ovata</i>). Black Gum usually occurs in an open woodland formation with a grassy groundlayer dominated either by River Tussock (<i>Poa labillardierei</i>) or Kangaroo Grass (<i>Themeda triandra</i>), but with few shrubs.	Marginal. Not identified and conditions unsuitable within the Development Footprint. May be present in PCT 1100 or in the close by woodland. Many records along Tarago road.	Unlikely. There are records in vegetation close to the Proposal footprint. Due to no native trees observed and the agricultural use of land it is unlikely any are present.	1	No
<i>Lepidium hyssopifolium</i> Basalt Pepper-cress	E	E	In NSW the species was known to have occurred in both woodland with a grassy understorey and in grassland. The species may be a disturbance opportunist, as it was discovered at the most recently discovered site (near Bungendore) following soil disturbance. The cryptic and non-	Potentially present. Known from records around Bungendore and 2.5km to the east of the Development	Absent - surveyed	1	No

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			descript nature (appearing like several weed species) of the species makes it hard to detect.	Footprint in the pine forest.			
<i>Leucochrysum albicans subsp. tricolor</i> Hoary Sunray	-	E	The Hoary Sunray occurs at relatively high elevations in woodland and open forest communities, in an area roughly bounded by Goulburn, Albury and Bega (Sinclair 2010). The species has been recorded in the Yass Valley, Tumut, Upper Lachlan, Snowy River and Galong (ACT Commissioner for the Environment 2004; Umwelt 2009). The species is known from the South Eastern Highlands, Australian Alps and Sydney Basin bioregions (Sinclair 2010). Herbarium records indicate that the taxa once occurred more widely in inland NSW, near Cobar, Dubbo, Lithgow, Moss Vale and Delegate (Sinclair 2010).	Potentially present. BioNet record 2 km to the east 1999. Likes disturbance.	Absent - surveyed.	1	No
<i>Pomaderris pallida</i> Pale Pomaderris	V	V	This species usually grows in shrub communities surrounded by Brittle Gum (<i>Eucalyptus mannifera</i>) and Red Stringybark (<i>E. macrorhyncha</i>) or <i>Callitris</i> spp. woodland.	Absent. No appropriate shrub and associated canopy trees present. No BioNet records in 10km buffer.	Absent.		No
<i>Prasophyllum petilum</i> Tarengo Leek Orchid	E	E	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock <i>Poa labillardieri</i> , Black Gum <i>Eucalyptus aggregata</i> and tea-trees <i>Leptospermum</i> spp. near Queanbeyan and within the grassy groundlayer dominated by Kanagroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT). Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (near Queanbeyan, Ilford and Hall).	Marginal. No BioNet records. Highly susceptible to disturbance.	Unlikely	0	No
<i>Rutidosia leptorhynchoides</i> Button Wrinklewort	E	E	Occurs in Box-Gum Woodland, secondary grassland derived from Box-Gum Woodland or in Natural Temperate Grassland; and often in the ecotone between the two communities. Grows on soils that are usually shallow, stony red-brown clay loams;	Potentially present. One records from Atlas of Living Australian form 2005 about 8km north of the	Absent - surveyed.	1	No

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			tends to occupy areas where there is relatively less competition from herbaceous species (either due to the shallow nature of the soils, or at some sites due to the competitive effect of woodland trees). Exhibits an ability to colonise disturbed areas (eg. vehicle tracks, bulldozer scrapings and areas of soil erosion). Normally flowers between December to March; plants do not usually flower until their second year.	Development Footprint. Knows to colonise disturbed areas.			
<i>Senecio macrocarpus</i> Large-fruit Fireweed	-	E	In NSW, Large-fruit Fireweed occurs in partly cleared dry forests and box-gum woodlands which transition to Brittle Gum Forest with a relatively undisturbed understorey of native grasses, forbs and subshrubs (Fallding 2002; R. Rehwinkel 2008, pers. comm.).	Marginal. Within known distribution. One record on BioNet to the south of Bungendore. Habitat likely too disturbed for the species, disturbance is listed as a major threat to the species.	Unlikely.	1	No.
<i>Swainsona recta</i> Small Purple-pea	E	E	before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum Eucalyptus blakelyi, Yellow Box E. melliodora, Candlebark Gum E. rubida and Long-leaf Box E. goniocalyx. Grows in association with understorey dominants that include Kangaroo Grass <i>Themeda triandra</i> , poa tussocks <i>Poa spp.</i> and spear-grasses <i>Austrostipa spp.</i>	Marginal. BioNet record 7km to the southwest of Development Footprint. Not associated with PCTs. Needs woodland.	Unlikely.	1	No.
<i>Thesium australe</i> Austral Toadflax	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast, in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (<i>Themeda triandra</i>).	Marginal. Associated with PCT 1100, though no records within 10km buffer on BioNet.	Unlikely. No BioNet records within 10km buffer of site.	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Birds							
<i>Anthochaera phrygia</i> Regent Honeyeater	CE	CE	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak, that inhabit woodlands that support a significantly high abundance and species richness of bird species, and have large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Recently recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. A generalist forager, although mainly feeds on the nectar from a relatively small number of eucalypts that produce high volumes of nectar e.g. Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important e.g. Lower Hunter Spotted Gum forests support regular breeding events. Flowering of associated species such as <i>Eucalyptus eugenioides</i> and other Stringybark species, and <i>E. fibrosa</i> can also contribute important nectar flows at times. Nectar and fruit from <i>Amyema miquelii</i> , <i>A. pendula</i> and <i>A. cambagei</i> are also utilised. When nectar is scarce, lerp and honeydew can comprise a large proportion of the diet. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Nests in horizontal branches or forks in tall mature eucalypts, mistletoes and Sheoaks. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands.	Absent. Not within known breeding areas. Site does not have trees suitable for foraging.	Unlikely.	1	No.
<i>Botaurus poiciloptilus</i>	-	E	Favours permanent freshwater wetlands with tall, dense vegetation, particularly <i>Typha</i> spp. and <i>Eleocharis</i> . Hides during	Marginal. Due to Lake Georges proximity. Proposal	Unlikely under drier normal	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Australasian Bittern			the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch. Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges.	area avoiding foraging habitat that may become present during rain periods.	circumstance. Possible during rainy periods where Lake George and swampy areas hold water.		
<i>Calidris ferruginea</i> Curlew Sandpiper	CE	CE	Generally, occupies littoral and estuarine habitats, and in NSW is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Feeds on worms, molluscs, crustaceans, insects and some seeds. Distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration.	Absent.	Unlikely. No BioNet records within 10 km.	0	No
<i>Falco hypoleucos</i> Grey Falcon	E	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast, and near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in	Absent. Lacking habitat suitable for species to forage in. May be present portaging in the woodlands surrounding or flying over the site.	Unlikely. No BioNet records within 10km buffer.	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			late winter and early spring. Sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Believed to be extinct in areas with more than 500mm rainfall in NSW.				
<i>Grantiella picta</i> Painted Honeyeater	V	V	Nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Absent. No Box Gum Woodland present.	Unlikely. No BioNet records within 10km buffer.	0	No
<i>Lathamus discolor</i> Swift Parrot	E	CE	Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. No breeding in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany <i>Eucalyptus robusta</i> , Spotted Gum <i>Corymbia maculata</i> , Red Bloodwood <i>C. gummifera</i> , Mugga Ironbark <i>E. sideroxylon</i> , and White Box <i>E. albens</i> .	Absent. Not associated with PCTs.	Unlikely	1	No
<i>Limosa lapponica baueri</i> Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed	-	V	Arrive in Australia each year in August from breeding grounds in the northern hemisphere. More numerous in northern Australia. Inhabit estuarine mudflats, beaches and mangroves. Common in coastal areas around Australia. They are social birds and are often seen in large flocks and in the company of other waders.	Absent. Habitat within Development Footprint not appropriate.	Absent	0	No

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Godwit							
<i>Polytelis swainsonii</i> Superb Parrot	V	V	<p>The Superb Parrot occurs only in south-eastern Australia. The Superb Parrot is found in NSW and northern Victoria, where it occurs on the inland slopes of the Great Divide and on adjacent plains, especially along the major river-systems; vagrants have also been recorded in southern Queensland. In NSW, it mostly occurs west of the Great Divide, where it mainly inhabits the Riverina, the South-west Slope and Southern Tableland Regions: west to Mathoura, Boorooban, Goolgowi, and east to Canberra, Yass and Cowra. Its range extends north to around Narrabri and Wee Waa in the North-west Plain Region, from a line joining Coonabarabran and Narrabri, and extending at least as far west as Tottenham and Quambone, with occasional records even further west.</p> <p>The Superb Parrot forages on many different species of plants, most of which occur in woodlands dominated by gum and box eucalypts, and, in some areas, in woodlands dominated by Boree, native pine, Callitris, or box-native pine associations.</p>	Absent. Habitat within Development Footprint not appropriate.	Absent	1	No
<i>Rostratula australis</i> Australian Painted Snipe	E	E	<p>A small freshwater wader restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella and wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses</p>	Marginal. Due to Lake Georges proximity. Proposal area avoiding foraging habitat that may become present during rain periods.	Unlikely under drier normal circumstance. Possible during rainy periods where Lake George and swampy areas hold water. Records around Lake George (BioNet & ALA).	2	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			and leaves.				
Mammals							
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	V	V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies. Females have been recorded raising young in maternity roosts from November to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months.	Absent. Habitat within Development Footprint not appropriate.	Absent - surveyed	0	No.
<i>Dasyurus maculatus maculatus</i> (SE mainland population) — Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	V	CE	Absent. Habitat within Development Footprint not appropriate.	Absent. Habitat within Development Footprint not appropriate.	Absent.	0	No.
<i>Petauroides volans</i> Greater Glider	-	V	Absent. Habitat within Development Footprint not appropriate.	Absent. Habitat within Development Footprint not appropriate.	Absent.	0	No.
<i>Phascolarctos cinereus</i> (combined populations)	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range.	Absent. Habitat within Development Footprint not	Absent.	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
of Qld, NSW and the ACT) Koala			Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.	appropriate.			
<i>Potorous tridactylus</i> Long-nosed Potoroo, Cobaki Lakes and Tweed Heads West population	-	V	Habitat is characterised by dense groundcover for shelter in proximity to small open areas for foraging. At Cobaki, appear to prefer Scribbly Gum Heathland, although they have been recorded in a variety of other vegetation communities, including Scribbly Gum/Swamp Mahogany Forest, Tree Broom Heath, Scribbly Gum Forest, Black She-oak Heath and Swamp Mahogany Forest. Breeding occurs throughout the year, although there is a peak from late winter to early summer. Fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet and they are considered to play an important role in fungi dispersal. Also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Leave characteristic diggings as a result of their foraging, and may improve the soil through turnover and aeration. Nocturnal and crepuscular and rarely seen. Spend the day in "squats" in dense vegetation and their regular movement through the vegetation creates characteristic runways.	Absent. Habitat within Development Footprint not appropriate.	Absent.	0	No.
<i>Pteropus poliocephalus</i> Grey-	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally	Absent. Habitat within Development Footprint not	Absent.	1	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
headed Flying-fox			located within 20 km of a regular food source and commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, giving birth and rearing young. Annual mating commences in January and single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Banksia</i> , and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.	appropriate.			
Frogs							
<i>Litoria aurea</i> Green and Golden Bell Frog	E	V	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha spp.</i>) or spikerushes (<i>Eleocharis spp.</i>), Optimum habitat includes waterbodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas.	Absent. Habitat within Development Footprint not appropriate.	Absent - surveyed.	0	No.
<i>Litoria castanea</i> Yellow-spotted Tree/Bell Frog	E	CE	The southern population has a restricted distribution between Canberra, ACT, and Bombala, NSW, on the Southern Tablelands at altitudes between 700 and 800 m. The Yellow-spotted Bell Frog occupies similar habitat to <i>Litoria aurea</i> and <i>L. raniformis</i> which includes permanent ponds, swamps, lagoons, farm dams and the still backwaters of rivers usually with tall reeds present.	Absent. Habitat within Development Footprint not appropriate.	Absent - surveyed..	1	No.
<i>Littoria raniformi</i>	E	V	The Growling Grass Frog has been recorded across a suite of land tenures including freehold, leasehold, Crown land,	Absent. Habitat within Development Footprint not	Absent -	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Growling Grass Frog, Southern Bell frog			<p>conservation estate, State Forest and other public (NSW DEC 2005a). The species is known from:</p> <ul style="list-style-type: none"> • NSW - Bondi State Forest, • Boomanoomana State Forest, • Mulwala State Forest, • Berry Jerry State Forest, • Euston State Forest, • Woomargama State Forest, • Buckingbong State Forest, • Cocoparra National Park, • Willandra Lakes World Heritage Area. <p>This species is found mostly amongst emergent vegetation (Robinson 1993), including Typha sp. (bullrush), Phragmites sp. (reeds) and Eleocharis sp.(sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams (NSW DEC 2005a). The Growling Grass Frog can be found floating in warmer waters in temperatures between 18–25°C. Additionally, this species occurs in:</p> <ul style="list-style-type: none"> • clays or well-watered sandy soils; • open grassland, open forest, and ephemeral and permanent non-saline marshes and swamps; • montane eucalypt forest, dry schlerophyll forest in coastal Victoria; • steep-banked water edges (like ditches and drains) and gently graded edges containing fringing plants; and • formerly, areas of high altitudes (Ehmann & White 1997; NSW DEC 2005a). 	appropriate.	surveyed.		
Fish							

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
<i>Maccullochella macquariensis</i> Trout Cod	E	E	Trout Cod are often found in faster flowing water with rocky and gravel bottoms, but can also be found in some slower flowing, lowland rivers. Large woody snags are very important for the species as they provide complex habitats for each stage of the species' life cycle.	No. Water body not within Development Footprint.	Absent.	0	No.
<i>Maccullochella peelii</i> Murray Cod	-	V	The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs (McDowall 1996).	No. Water body not within Development Footprint.	Absent.	0	No.
<i>Macquaria australasica</i> Macquarie Perch	E	E	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks (Cadwallader & Eden 1979). Spawning occurs just above riffles (shallow running water). Populations may survive in impoundments if able to access suitable spawning sites (Wager & Jackson 1993).	No. Water body not within Development Footprint.	Absent.	0	No.
Reptiles							
<i>Aprasia parapulchella</i> Pink-tailed Legless Lizard	E	V	Inhabits open woodland areas with predominantly native grassy ground layers. Commonly found beneath small, partially-embedded rock.	Absent – rocky habitat unsuitable, rocks are too large and too deeply embedded to comprise suitable habitat.	Unlikely	0	No
<i>Delma impar</i> Striped Legless Lizard	E	V	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-	Potentially present in rocky and tussocky sections of Development Footprint.	Absent - surveyed.	0	No

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			<p>forming grasses such as Kangaroo Grass <i>Themeda triandra</i>, spear-grasses <i>Austrostipa</i> spp. and poa tussocks <i>Poa</i> spp., and occasionally wallaby grasses <i>Austrodanthonia</i> spp.</p> <p>Sometimes present in modified grasslands with a significant content of exotic grasses. Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter. Sometimes utilises dried cowpats for shelter. Actively hunts for spiders, crickets, moth larvae and cockroaches. Two papery eggs are laid in early summer. Goes below ground or under rocks or logs over winter.</p>				
Migratory Marine Birds							
<i>Hirundapus caudacutus</i> White-throated Needletail	-	V, M	<p>This large swift has long curved wings and white markings. The plumage of the White-throated Needletail is predominantly grey-brown, glossed with green and the wings are long and pointed. The tail is short and square, with the protruding feather shafts giving a spiky appearance. The throat and undertail are white. White-throated Needletails arrive in Australia from their breeding grounds in the northern hemisphere in about October each year and leave somewhere between May and August. White-throated Needletails are non-breeding migrants in Australia. Breeding takes place in northern Asia.</p>	Present. Foraging habitat. Records around Bungendore.	Possible.	25	No.
<i>Monarcha melanopsis</i> Black-faced Monarch		M	<p>Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating. Builds a deep cup nest of casuarina needles, bark, roots, moss and spider web in the fork of a tree, about 3-6 m above the ground. Only the female builds the nest, but both sexes incubate the eggs and feed the young.</p>	There is open eucalyptus woodland in the form of Dry sclerophyll forest.	Unlikely. No BioNet record in the 10km buffer.	0	No.
<i>Motacilla flava</i> Yellow		M	<p>This species occupies a range of damp or wet habitats with low</p>	Absent. Habitat within the	Unlikely. No	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
Wagtail			vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range it is also found in large forest clearings. It breeds from April to August, although this varies with latitude. The nest is a grass cup lined with hair and placed on or close to the ground in a shallow scrape. Normally it lays four to six eggs. It feeds on a wide variety of terrestrial and aquatic invertebrates as well as some plant material, particularly seeds. The species is almost wholly migratory with European populations wintering in sub-Saharan Africa, central and eastern populations mainly migrate to South Asia with some moving to Africa. The species is resident in Egypt (Tyler and Christie 2016).	Development Footprint does not align well for the species.	BioNet record in the 10km buffer		
<i>Myiagra cyanoleuca</i> Satin Flycatcher		M	Found along the east coast of Australia in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. Nests in loose colonies of two to five pairs nesting at intervals of about 20-50 m apart. It builds a broad-based, cup-shaped nest of shredded bark and grass, coated with spider webs and decorated with lichen. The nest is placed on a bare, horizontal branch, with overhanging foliage, about 3-25 m above the ground.	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.
<i>Rhipidura rufifrons</i> Rufous Fantail		M	Found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas. Builds a small compact cup nest, of fine grasses bound with spider webs, that is suspended from a tree fork about 5 m from the ground. The bottom of the nest is drawn out into a long stem.	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.
Migratory Wetland							

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
<i>Actitis hypoleucos</i> Common Sandpiper		M	Found along all coastlines of Australia and in many areas inland. The population that migrates to Australia breeds in the Russian far east. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags the species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks.	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.
<i>Calidris acuminata</i> Sharp-tailed Sandpiper		M	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. shores or on rocks in water (Higgins & Davies 1996). They have also been recorded roosting in mangroves (Minton & Whitelaw 2000).	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	1	No.
<i>Calidris ferruginea</i> Curlew Sandpiper	CE	CE, M	Generally, occupies littoral and estuarine habitats, and in NSW is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Roosts on shingle, shell or	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Feeds on worms, molluscs, crustaceans, insects and some seeds. Distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration.				
<i>Calidris melanotos</i> Pectoral Sandpiper		M	In NSW, it is widespread, but scattered. Records exist east of the Great Divide, from Casino and Ballina, south to Ulladulla. West of the Great Divide, the species is widespread in the Riverina and Lower Western regions. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum.	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.
<i>Gallinago hardwickii</i> Latham's Snipe		M	Usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). Known to occur in the upland wetlands of the New England Tablelands and Monaro Plateau.	Absent. No suitable habitat within the Development Footprint. When Lake George contains water the species may forage in areas close to the Development Footprint.	Unlikely within Development Footprint. Possible in the immediate surrounds in lesser disturbed habitat.	3	No.
<i>Limosa lapponica</i> Bar-			Arrive in Australia each year in August from breeding grounds in	Absent. No suitable habitat	Unlikely. No	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
tailed Godwit			the northern hemisphere. More numerous in northern Australia. Inhabit estuarine mudflats, beaches and mangroves. Common in coastal areas around Australia. They are social birds and are often seen in large flocks and in the company of other waders.	within the Development Footprint	BioNet record in the 10km buffer.		
<i>Numenius madagascariensis</i> Eastern Curlew	-	CE, M	In NSW, occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLS of the south coast. Generally, occupies coastal lakes, inlets, bays and estuarine habitats, and in NSW is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. Forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. Roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. May also roost on wooden oyster leases or other similar structures. Is carnivorous, mainly eating crustaceans.	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.
<i>Pandion haliaetus</i> Osprey		M	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia (Johnstone & Storr 1998; Marchant & Higgins 1993; Olsen 1995). They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993). They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (Czechura 1985; Domm 1977; Fleming 1987; Gosper 1983; Gosper & Holmes 2002; Johnstone & Storr 1998; Olsen 1995; Roberts & Ingram 1976). They exhibit a preference for coastal	Absent. No suitable habitat within the Development Footprint	Unlikely. No BioNet record in the 10km buffer.	0	No.

Name/species	BC Act	EPBC Act	Description of habitat ⁶	Presence of habitat	Likelihood of occurrence	No. BioNet records	Impact likely
			cliffs and elevated islands in some parts of their range (Boekel 1976; Domm 1977), but may also occur on low sandy, muddy or rocky shores and over coral cays (Marchant & Higgins 1993). They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging sites (Czechura 1985; Hembrow 1988; Pruett-Jones & O'Donnell 2004; Roberts & Ingram 1976).				

Appendix E Land Category Assessment

Please see overleaf for full report.



NGH



Land Category Assessment

Blind Creek Solar Farm

September 2021

Project Number: 20-403



Document verification

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Table of contents

Acronyms and abbreviations	iii
1. Introduction	1
1.1 Study area	Error! Bookmark not defined.
1.2 Overview of land categorisation.....	1
2. Methodology	2
2.1 Land categorisation criteria.....	2
2.2 Legislative framework	3
2.2.1 <i>Biodiversity Conservation Act 2016</i>	3
2.2.2 Section 60J of the <i>Local Land Services Act 2013</i>	3
2.2.3 Section 114 of the <i>Local Land Services Regulation</i>	4
2.3 NGH assessment methodology	4
2.3.1 Desktop assessment	4
2.3.2 Field assessment.....	6
3. Results	7
3.1 Desktop analysis.....	7
3.1.1 Transitional NVR Map.....	7
3.1.2 Aerial imagery	7
3.1.3 NSW Landuse 2017.....	7
3.1.4 NSW Woody Vegetation Extent & FPC 2011	8
3.2 Field assessment.....	8
3.3 Proposed Land Categorisation	10
3.3.1 Category 2	10
3.3.2 Category 1	10
3.3.3 Proposed Land Categories	12
3.4 Conclusion	13

Figures

Figure 3-1 Row of exotic planted pines, classified as Category 1 (exempt land)	9
Figure 3-2 Native vegetation under the powerline easement in the eastern arm of the Project Site, classified as Category 2 (regulated land), surrounded by exotic pines classified as Category 1 (exempt land).	9
Figure 3-3 Wetland area in the northern part of the Project Site.	10
Figure 3-4 Proposed land categorisation of the Project Site, including existing NVR mapping.	12

Tables

Table 2.1 Land categories and criteria that applies to each category.....	2
Table 2.2 Datasets used in desktop analysis.....	4

Appendices

Appendix A Project site.....	A-I
Appendix B Native Vegetation Regulatory Map.....	B-II
Appendix C Advice from the Biodiversity Conservation Division	C-I
Appendix D Historical aerial imagery	D-II
Appendix E NSW Landuse 2017 mapping.....	E-I
Appendix F NGH vegetation and PCT mapping	F-I
Appendix G NSW Woody Vegetation Extent & FPC 2011.....	G-I
Appendix H NSW EPI Mapping – Land Zoning	H-II

Acronyms and abbreviations

BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BDAR	Biodiversity Development Assessment Report
DPIE	Department of Planning, Industry and Environment (NSW)
FPC	Foliage Projective Cover
ha	hectares
km	kilometres
LGA	Local Government Area
LLS Act	<i>Local Land Services Act 2013</i>
LLS Regulation	<i>Local Land Services Regulation 2014</i>
m	metres
NVR Map	Native Vegetation Regulatory Map
OEHS	(Former) Office of Environment and Heritage (NSW) (now EES)
DCS SS	Spatial Services, a business unit of the NSW Department of Customer Service (NSW)

1. Introduction

NGH were engaged by Blind Creek Solar Farm Pty Ltd to prepare this Land Category Assessment (LCA) for the proposed Blind Creek Solar Farm.

The development of the Blind Creek Solar Farm requires assessment under the Biodiversity Assessment Method (BAM) and the preparation of a Biodiversity Development Assessment Report (BDAR). Section 6.8(3) of the *Biodiversity Conservation Act 2016* (BC Act) determines that the BAM is to exclude the assessment of the impacts of clearing of native vegetation within areas categorised as Category 1 (exempt land).

1.1 Project Site

The Blind Creek Solar Farm Project Site is located in the rural locality of Bungendore NSW within Queanbeyan Palerang Local Government Area (LGA), bordering the south-eastern edge of Lake George, to the east of Canberra. The Development comprises all or part of the following Lots and Deposited Plans (DPs) (Appendix A):

- Lot E DP38379
- Lots 1, 2, 3, 4, 9, 10, & 11, DP237079
- Lot 1 DP456698
- Lot 17 DP535180
- Lot 1 & 2, DP1154765
- Lot 2 DP1167699

1.2 Overview of land categorisation

Rural land in NSW is categorised under the *Local Land Services Act 2013* (LLS Act) into three main categories:

- Category 1 (exempt land)
- Category 2 (regulated land, vulnerable regulated land, or sensitive regulated land), and
- Excluded land.

The main purpose of land categorisation under the LLS Act is to govern clearing of vegetation associated with agricultural activities in rural areas. Clearing of vegetation within Category 1 (exempt land) does not require assessment or offsetting under the BAM. In practice, this means that native vegetation within Category 1 (exempt land) is not included in any area clearing calculations when determining whether the Biodiversity Offset Scheme (BOS) applies to a proposal.

A Native Vegetation Regulatory (NVR) Map of existing land categorisations is maintained by the Department of Planning, Industry and Environment (DPIE). The NVR Map is currently in a transitional stage, and only Category 2 (vulnerable regulated land), Category 2 (sensitive regulated land) and excluded land are publicly viewable (see NVR Map viewer <https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap>).

During the transitional period, BAM accredited assessors may establish the categorisation of land for the Environment Agency Head to consider, following the method utilised to develop the Native Vegetation Regulatory Map. This methodology is used in section 2 to establish areas of Category 1 and Category 2 land.

2. Methodology

2.1 Land categorisation criteria

The following Table 2.1 outlines the various criteria that allow for the categorisation of areas of land according to the LLS Act.

Table 2.1 Land categories and criteria that applies to each category.

Land category	Criteria
Category 1 Exempt Land	<ul style="list-style-type: none"> Land cleared of native vegetation as at 1 January 1990 Land lawfully cleared of native vegetation between 1 January 1990 and 25 August 2017 Low conservation value grasslands Land containing only low conservation groundcover (not being grasslands) Native vegetation identified as regrowth in a Property Vegetation Plan (PVP) under the repealed <i>Native Vegetation Act 2003</i>, only where the PVP specifies a regrowth date. Land bio-certified under the <i>Biodiversity Conservation Act 2016</i>
Category 2 Regulated Land	<ul style="list-style-type: none"> Land not cleared as at 1 January 1990 or Land unlawfully cleared of native vegetation between 1 January 1990 and 25 August 2017 Native vegetation grown with the assistance of public funds (clearing under the <i>Land Management (Native Vegetation) Code 2018</i> is not permitted on such land while the agreement providing the funds is in force) Land that was subject to a Private Native Forestry property vegetation plan (PVP) that is no longer in force Grasslands that are neither low nor high conservation grasslands Travelling Stock Reserves, apart from Travelling Stock Reserves in the Western Division
Category 2 Vulnerable Regulated Land	<ul style="list-style-type: none"> Steep or highly erodible land Protected riparian areas Land susceptible to erosion, or land that is otherwise environmentally sensitive
Category 2 Sensitive Regulated Land	<ul style="list-style-type: none"> Land subject to a private land conservation agreement as set aside under the <i>Land Management (Native Vegetation) Code 2018</i> Land subject to a biocertification conservation measure Land comprising an offset under a Property Vegetation Plan or set aside under a code under the <i>Native Vegetation Act 2003</i> Coastal wetlands and littoral rainforests (<i>Coastal Management Act 2016</i>) High conservation grasslands Core Koala habitat identified in a plan of management (Koala Habitat Protection State Environmental Planning Policy) Critically endangered plants and critically endangered ecological communities

Land category	Criteria
	<ul style="list-style-type: none"> Ramsar wetlands listed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> Land subject to remedial action or conservation measures under the <i>Biodiversity Conservation Act 2016</i> Land subject to a property, trust or conservation agreement Land recommended for listing as an Area of Outstanding Biodiversity Value Land subject to a Private Native Forestry Plan or Private Native Forestry PVP that is in force Conservation Areas under the Southern Mallee Land Use Agreement Native vegetation that must be retained under the <i>Plantation and Reafforestation Act 1999</i> Land subject to a condition of development consent requiring the land to be set aside for conservation purposes under the <i>Environmental Planning and Assessment Act 1979</i> Rainforest and old-growth forest
Excluded land	<ul style="list-style-type: none"> Land that is not subject to the LLS Act, such as National Parks, State Forests and urban areas (subject to the Vegetation SEPP).

2.2 Legislative framework

2.2.1 Biodiversity Conservation Act 2016

Section 6.8(3) of the BC Act determines that the BAM is to exclude the assessment of the impacts of clearing of native vegetation on Category 1 - Exempt Land (within the meaning of Part 5A of the LLS Act).

- BC Act s6.8(3):** The biodiversity assessment method is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on Category 1 (exempt land) (within the meaning of Part 5A of the LLS Act), other than any impacts prescribed by the regulations under section 6.3;
- BAM 2020, s1.5** The BAM does not assess biodiversity values for:
 - d. native vegetation and loss of habitat on Category 1 (exempt land) (within the meaning of Part 5A of the LLS Act), other than the additional biodiversity impacts under clause 6.1 of the BC Regulation (referred to as prescribed impacts in the BAM).

2.2.2 Section 60J of the Local Land Services Act 2013

Under section 60J of the *Local Land Services Act 2013* (LLS Act), matters relating to the determination of mapped Category 1 (exempt land) or Category 2 (regulated land) include:

60J (2) Native vegetation that comprises grasslands or other non-woody vegetation is taken to have been cleared if the native vegetation was significantly disturbed or modified. The regulations may make provision for the purposes of determining whether native vegetation has been significantly disturbed or modified for the purposes of this Division.

The clearing of native vegetation after 1990 must have been done legally, and the vegetation must have been cleared as of 1st January 1990 or between 1st January 1990 and 25th August 2017. Satellite imagery may be used to determine the native vegetation clearing.

2.2.3 Section 114 of the *Local Land Services Regulation*

Section 114 of the *Local Land Services Regulation 2014* (LLS Regulation) outlines how to determine whether non-woody native vegetation has been significantly disturbed or modified.

(1) Native vegetation that comprises grasslands or other non-woody vegetation is taken to have been significantly disturbed or modified (and therefore cleared) only if—

- (a) there has been a detectable variation (from information obtained from aerial or satellite imagery) in the structure or composition, or both, of non-woody vegetation, and*
- (b) that variation is consistent with management of pasture or crops for agricultural purposes, and*
- (c) that variation has been sustained for at least 12 months on more than one occasion before the commencement of Part 5A of the Act, and*
- (d) that variation has **not been caused only by grazing** on the land, and*
- (e) that variation occurred (from information obtained from aerial or satellite imagery) between 1 January 1990 and the date of commencement of Part 5A of the Act.*

2.3 NGH assessment methodology

In order to complete this Land Category Assessment, NGH ecologists undertook both field and desktop assessments.

2.3.1 Desktop assessment

NGH undertook a desktop mapping analysis of the Project Site, using historic and current aerial imagery and several spatial datasets, outlined in Table 2.2 below, also presented in the Appendices.

NGH predominantly used the existing Transitional NVR Map, historical imagery, NSW Landuse 2017, and information obtained during our site visits to inform this analysis. NSW Woody Vegetation Extent & FPC 2011 data was used to supplement past and recent aerial imagery of woody vegetation.

Table 2.2 Datasets used in desktop analysis

Dataset	Purpose
Historical aerial imagery – 1985, 1992	Appendix D Used to show historic evidence of land use, cropping, disturbance, vegetation clearing
Transitional NVR Map v3.0 (updated 26/03/2021)	The transitional Native Vegetation Regulatory (NVR) Map is a tool that landholders can use to display the most critical land categories at a property scale during the transitional

Dataset	Purpose
	<p>period.</p> <p>As this map is updated on a monthly basis, published spatial layers used in this assessment were cross checked against the online web portal map to ensure the NVR mapping was the most up to date available for the site.</p>
<p>Spatial data provided by BCD (19/07/2021)</p> <ul style="list-style-type: none"> • E3 zoning outline • Expired Property Vegetation Plan (PVP) • CEEC: Monaro and Werriwa Tablelands Cool Temperate Grassy Woodlands v1.4 	<p>Appendix C</p> <p>After a first draft of this Land Category Assessment was provided to the Biodiversity Conservation Division (BCD), NGH were advised that the areas outlined in the E3 zoning and Expired PVP spatial datasets were areas that the BCD did not consider to be Category 1 (excluded land).</p> <p>The Critically Endangered Ecological Communities layer is not relevant to this LCA, but was included on the Appendix C map for completeness.</p>
<p>NSW Landuse 2017 v1.2 (updated 24/06/2020)</p>	<p>Appendix E</p> <p>This dataset captures how the landscape in NSW is being used (as at 2017, updated for some regions in 2020) for food production, forestry, nature conservation, infrastructure and urban development. It can be used to monitor changes in the landscape and identify impacts on biodiversity values and individual ecosystems.</p> <p>The 2017 Landuse data is based on Aerial imagery and Satellite imagery available for NSW, and classified according to the Australian Land Use and Management (ALUM) Classification system.</p>
<p>NSW Environmental Planning Instrument - Land Zoning (data updated on a weekly basis)</p>	<p>Appendix H</p> <p>This spatial dataset identifies land use zones and the type of land uses that are permitted (with or without consent) or prohibited in each zone on any given land as designated by the relevant NSW environmental planning instrument (EPI) under the Environmental Planning and Assessment Act 1979.</p>
<p>NSW Woody Vegetation Extent & FPC 2011 (updated 02/04/2015)</p>	<p>Appendix G</p> <p>This dataset shows the location, extent, and foliage cover for stands of woody vegetation in NSW for the year 2011.</p>

Dataset	Purpose
South East Local Land Services Biometric vegetation map, 2014. VIS_ID 4211	Datasets show vegetation mapping. Map quality can be variable; vegetation and Plant Community Type (PCT) mapping was used as a starting point and was verified by NGH ecologists during site assessments.
NGH PCT and vegetation mapping	Appendix F PCT and vegetation mapping undertaken during site assessments, based on the above South East Local Land Services Biometric vegetation map.

2.3.2 Field assessment

Several field assessments of the site were undertaken by BAM accredited ecologists in June and November 2020, and January and July 2021.

The purpose of these visits relevant to this LCA was to broadly survey the site in order to stratify vegetation and conduct BAM plots to assess native vegetation. BAM plots can be used to support land categorisation, where aerial imagery and Landuse mapping might be lacking.

3. Results

3.1 Desktop analysis

3.1.1 Transitional NVR Map

The existing NVR mapping shows areas already classed as Excluded land and Category 2 (vulnerable regulated land) (Appendix B). The pre-existing classification of these areas cannot be changed, and thus our analysis and classification pertains to all remaining areas of land.

3.1.2 Aerial imagery

No aerial imagery was available for 1990; we therefore used imagery from the closest years, 1985 and 1992.

1985 imagery, while of poor resolution, shows that the land was extensively cleared prior to 1990. However, the 1985 image resolution is not high enough to demonstrate any clear evidence of cropping (Appendix D - D.1).

The historic 1992 imagery and recent imagery from the Project Site map (Appendix D - D.2, Appendix A) is evidence that this intensive agriculture and land disturbance has been maintained within the Project Site beyond 1990, and is ongoing today. However, it is difficult to discern any clear evidence of cropping specifically. There is one paddock with some evidence of cropping, as evidence by crop lines (Appendix D - D.2). Much of this paddock is currently mapped as Excluded Land on the NVR Map. NGH has mapped areas of the cropped paddock that are not already classed as Excluded land as Category 1 (exempt land). The rest of the historic aerial imagery is unable to support the classification of any of the rest of the Project Site as being Category 1 (excluded land).

3.1.3 NSW Landuse 2017

The NSW Landuse 2017 dataset classifies the majority of the site as 'Grazing modified pastures' (Appendix E). This class is applied when there is greater than 50 per cent dominant exotic species. However, the mapping in this dataset is based on analysis of more recent aerial imagery rather than imagery dating to circa 1990. NGH have therefore taken a precautionary approach and have mapped these areas as Category 2 (regulated land) rather than Category 1 (exempt land).

Other areas identified on the NSW Landuse 2017 map that NGH has classified as Category 1 (exempt land) include 'Plantation forests', 'Intensive animal production', 'Residential and farm infrastructure', 'Transport and communication', and 'Mining'.

A large area of the site is mapped as 'Grazing native vegetation', the class which is used when there is >50% native vegetation. NGH has categorised these areas as Category 2 (regulated land). There is also an area mapped as 'River', however the majority of this is already mapped as Category 2 (vulnerable regulated land) on the NVR map.

One thin strip of land is mapped as 'Managed resource protection' (Appendix E), defined as an area with largely unmodified natural systems that are managed primarily to ensure the long-term protection and maintenance of biological diversity, water supply, aquifers or landscapes, while providing a sustainable flow of natural products and services. During the July 2021 site visit, NGH ecologists viewed this area and confirmed that it consists of exotic pines, and thus we have mapped it as Category 1 (exempt land) (Figure 3-1).

3.1.4 NSW Woody Vegetation Extent & FPC 2011

Most 'woody' areas shown on the NSW Woody Vegetation Extent & FPC 2011 dataset (Appendix G) fall within areas classified as 'Grazing native vegetation' and thus are already classified as Category 2 (regulated land). Some small areas of woody vegetation that have not been visited by NGH ecologists have been precautionarily mapped as Category 2 (regulated land). Other woody areas have been confirmed during site assessments to consist of exotic pines, and thus have been mapped as Category 1 (exempt land).

3.2 Field assessment

Field assessments by NGH ecologists enabled the Project Site vegetation to be more accurately mapped (Appendix F). NGH mapped an area of wetland, which resulted in the northern area of Category 2 (regulated land) being extended out beyond the 'Grazing native vegetation' area indicated by the NSW Landuse 2017 mapping. We also extended the riparian areas out beyond what is already mapped as Category 2 (vulnerable regulated land) in the Transitional NVR Map.

Field assessment enabled accurate assessment of some of the woody vegetation on site, including areas of exotic pines visible on the NSW Woody Vegetation Extent & FPC 2011 and aerial imagery.

The July 2021 site visit enabled accurate mapping of native vegetation within the power line easement in the eastern arm of the site, surrounded by exotic pine plantings (Figure 3-2).

The July 2021 site visit also identified areas of rocky outcrops, which may be important habitat for threatened species such as the Pink-tailed legless lizard (*Aprasia parapulchella*) (Appendix F). These areas have been conservatively mapped as Category 2 (regulated land).

Photographs taken during site visits are presented below to illustrate some of the vegetation on site and support NGH's land category classifications.



Figure 3-1 Row of exotic planted pines, classified as Category 1 (exempt land)



Figure 3-2 Native vegetation under the powerline easement in the eastern arm of the Project Site, classified as Category 2 (regulated land), surrounded by exotic pines classified as Category 1 (exempt land).



Figure 3-3 Wetland area in the northern part of the Project Site.

3.3 Proposed Land Categorisation

NGH's field and desktop analyses identified the following within the development site (disregarding areas already mapped on the Transitional NVR Map). Our proposed land category mapping is shown in Figure 3-4.

3.3.1 Category 2

The majority of the Project Site has been precautionarily mapped as Category 2 (regulated land), based predominantly on historic aerial imagery, NSW Landuse 2017 mapping, and Plant Community Type ground truthing by NGH.

Areas adjacent to the riparian areas, shown on the Transitional NVR map as Category 2 (vulnerable regulated land), have also been mapped as Category 2 (regulated land).

There are a small number of scattered trees that NGH identified in the desktop analysis of aerial imagery and visible in the NSW Woody Vegetation Extent & FPC 2011 dataset; those that have not yet been able to be confirmed as exotic species have been precautionarily mapped as Category 2 (regulated land).

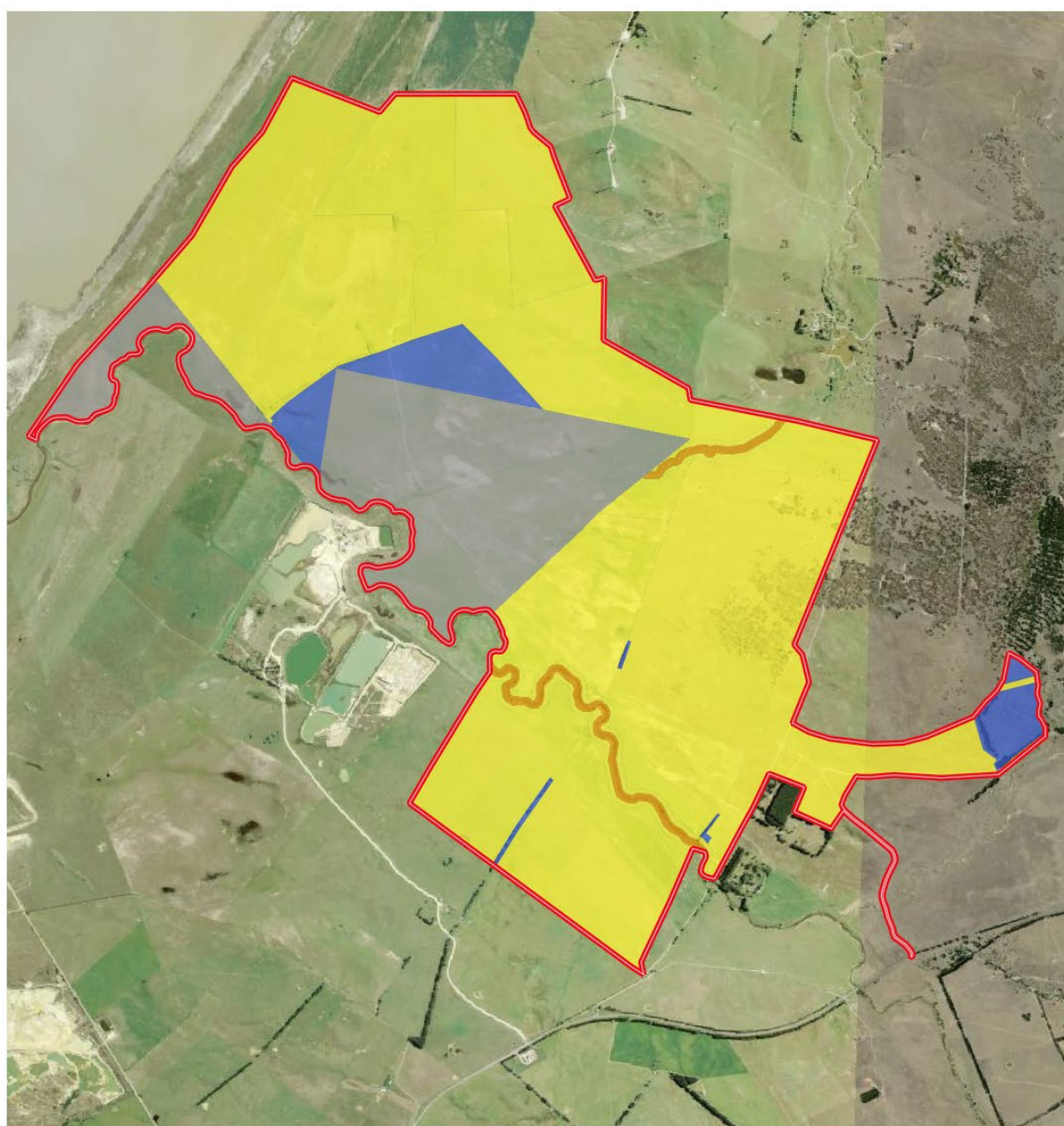
3.3.2 Category 1

Thin stands of planted exotic pine, identified during fieldwork, have been mapped as Category 1 (exempt land). Some of these mapped areas are also identified on the NSW Landuse 2017 map as 'Managed resource protection', and 'Plantation forests'. Other areas include stockyards, also identified on the NSW Landuse 2017 map.

An area at the end of the eastern arm of the Project Site containing plantation pine forest/mining has also been mapped as Category 1 (exempt land).

A partial area of one paddock has been mapped as Category 1 (exempt land), based on aerial photos from 1992 showing evidence of cropping. This paddock is largely overlain by the Excluded Land area, and so the Category 1 mapping only applies to areas not covered by Excluded Land.

3.3.3 Proposed Land Categories



20-403 Blind Creek Solar Farm BDAR
LCA: Proposed Land Categorisation

Legend

Project Site

Existing and proposed land categorisation

Category 1 (exempt land)

Category 2 (regulated land)

Category 2 (vulnerable regulated land)

Excluded land

0 0.5 1 km



Data Attribution
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Ref: 20-403 Blind Creek Solar Farm BDAR
20210630 \ LCA: Proposed Land
Categorisation
Author: rebecca.r
Date created: 01.09.2021
Datum: GDA94 / MGA zone 55



NGH

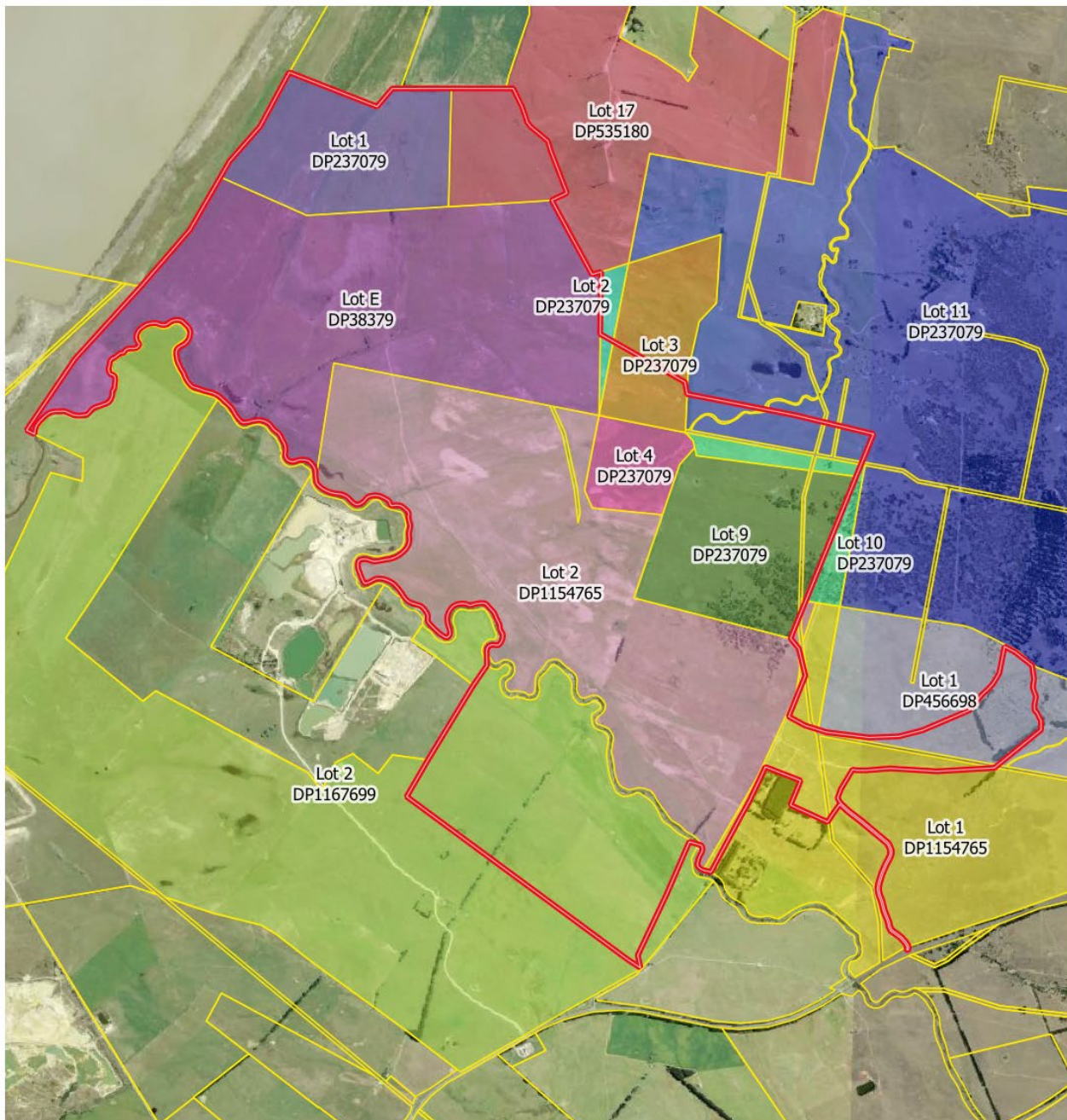
Figure 3-4 Proposed land categorisation of the Project Site, including existing NVR mapping.

3.4 Conclusion

There is evidence that the majority of the Project Site has been extensively modified by intensive agriculture prior to and since 1990. However, clear evidence of cropping is not evident across most of the site in the historic aerial images. Therefore, we have precautionarily only mapped areas containing planted exotic pines, stockyards, and a paddock showing evidence of crop lines, as Category 1 (exempt land).

The remainder of the Project Site, where not already mapped on the Transitional Native Vegetation Regulatory map, has been classed as proposed Category 2 (regulated land). This categorisation is supported predominantly by NSW Landuse 2017 mapping, historic imagery, and field assessment by NGH.

Appendix A Project Site



20-403 Blind Creek Solar Farm BDAR
LCA: Study Area

Legend

- Project Site
- Lot 1 DP1154765
- Lot 2 DP1154765
- Lot 2 DP1167699
- Lot 1 DP237079
- Lot 2 DP237079
- Lot 3 DP237079
- Lot 4 DP237079
- Lot 9 DP237079
- Lot 10 DP237079
- Lot 11 DP237079
- Lot E DP38379
- Lot 1 DP456698
- Lot 17 DP535180

0 0.5 1 km

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 20210630 \ LCA: Study Area
 Author: rebecca.r
 Date created: 01.09.2021
 Datum: GDA94 / MGA zone 55



NGH

Appendix B Native Vegetation Regulatory Map



20-403 Blind Creek Solar Farm BDAR
LCA: Native Vegetation Regulatory Map

Legend

-  Project Site
-  Excluded land
-  Category 2 (vulnerable regulated land)

0 0.5 1 km

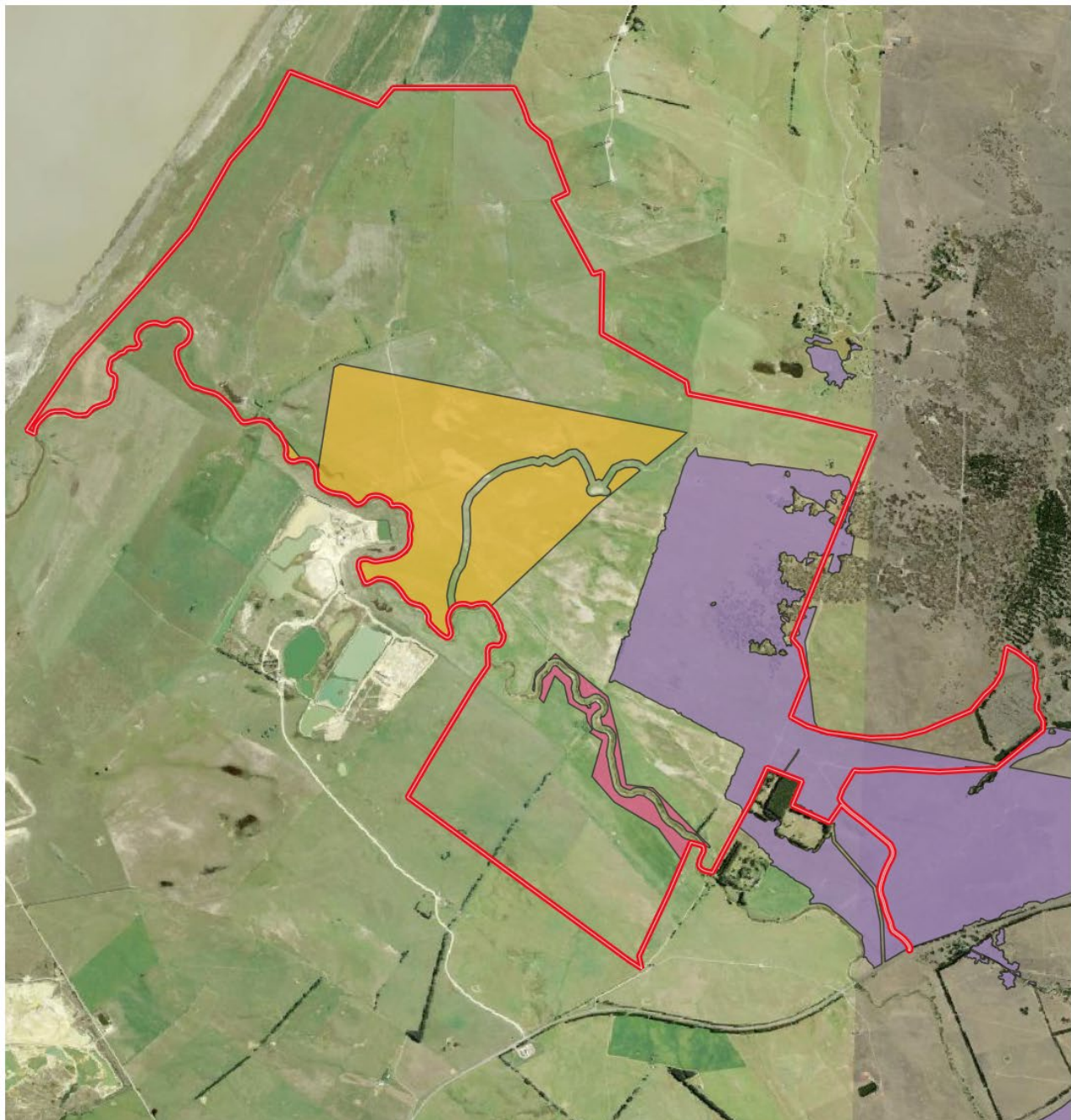
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Ref: 20-403 Blind Creek Solar Farm BDAR
20210630 \ LCA: Native Vegetation
Regulatory Map
Author: rebecca.r
Date created: 01.09.2021
Datum: GDA94 / MGA zone 55



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Appendix C Advice from the Biodiversity Conservation Division



20-403 Blind Creek Solar Farm BDAR
LCA: Advice from BCD

Legend

- Project Site
- E3 zoning - also Excluded land
- Expired Property Vegetation Plan
- CEEC: Monaro and Weriwa Tablelands Cool Temperate Grassy Woodlands v1.4

0 0.5 1 km

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 20210630 \ LCA: Advice from BCD
 Author: rebecca.r
 Date created: 01.09.2021
 Datum: GDA94 / MGA zone 55





Appendix D Historical aerial imagery

D.1 1985



20-403 Blind Creek Solar Farm BDAR
LCA: 1985 Imagery

Legend

-  Project Site
-  Evidence of land modification

0 0.5 1 km

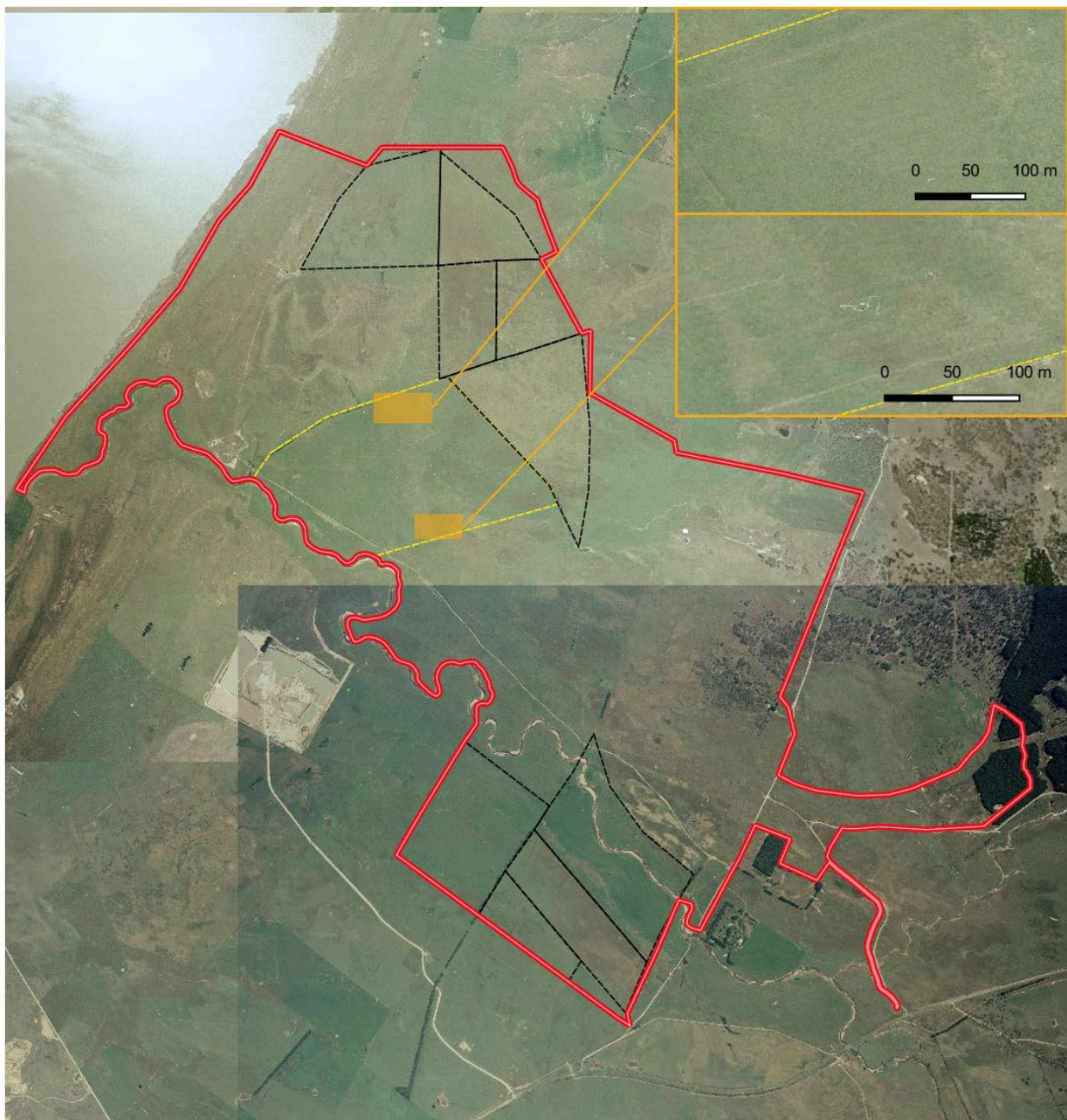
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20210630 \ LCA: 1985 Imagery
Author: rebecca.r
Date created: 01.09.2021
Datum: GDA94 / MGA zone 55



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D.2 1992



20-403 Blind Creek Solar Farm BDAR
LCA: 1992 Imagery

Legend

Project Site

Land modification

Evidence of agricultural land modification

Evidence of cropping

0 0.5 1 km

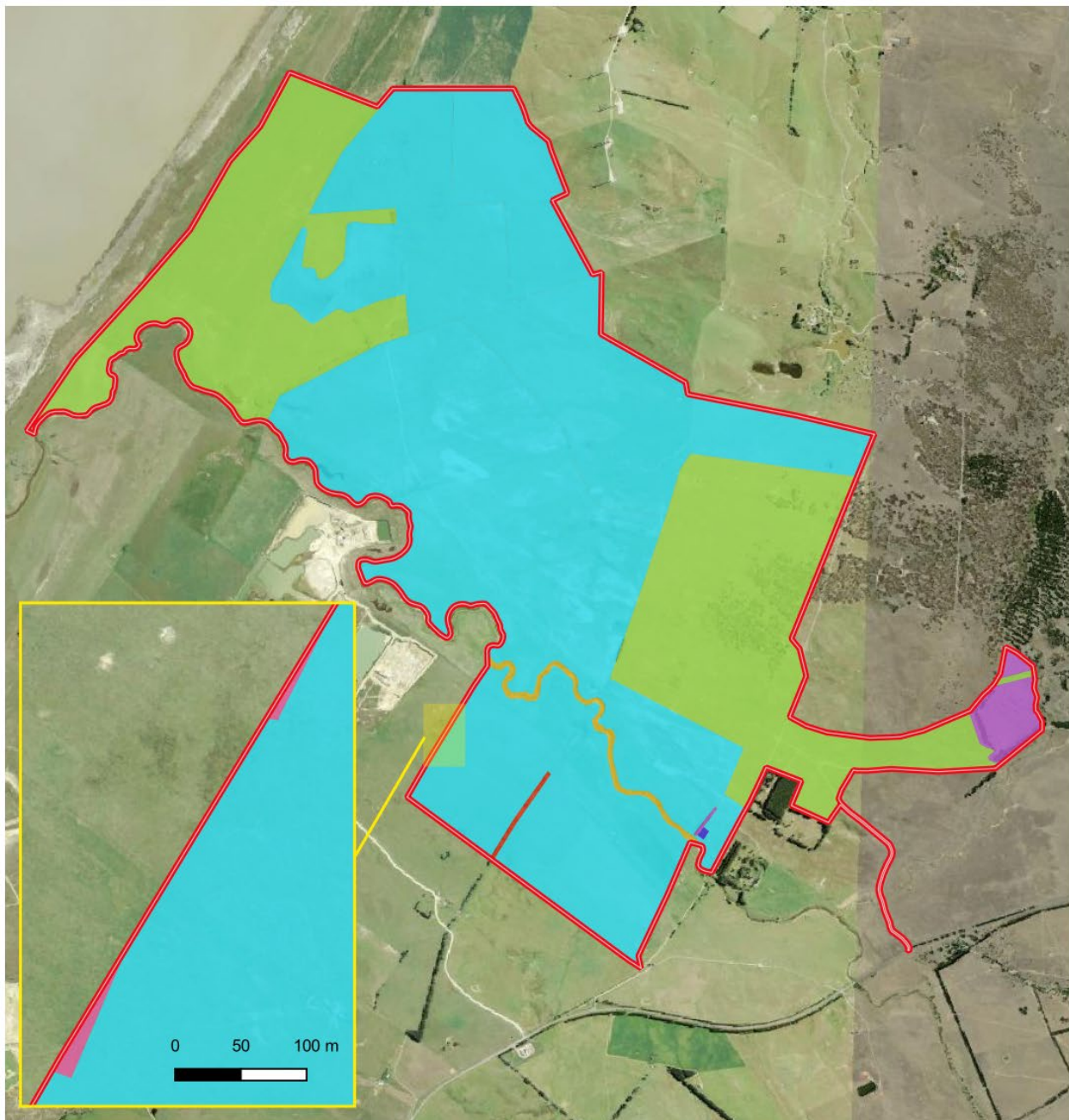
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20210630 \ LCA: 1992 Imagery
Author: rebecca.r
Date created: 01.09.2021
Datum: GDA94 / MGA zone 55



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Appendix E NSW Landuse 2017 mapping



20-403 Blind Creek Solar Farm BDAR
LCA: NSW Landuse 2017

0 0.5 1 km

Data Attribution
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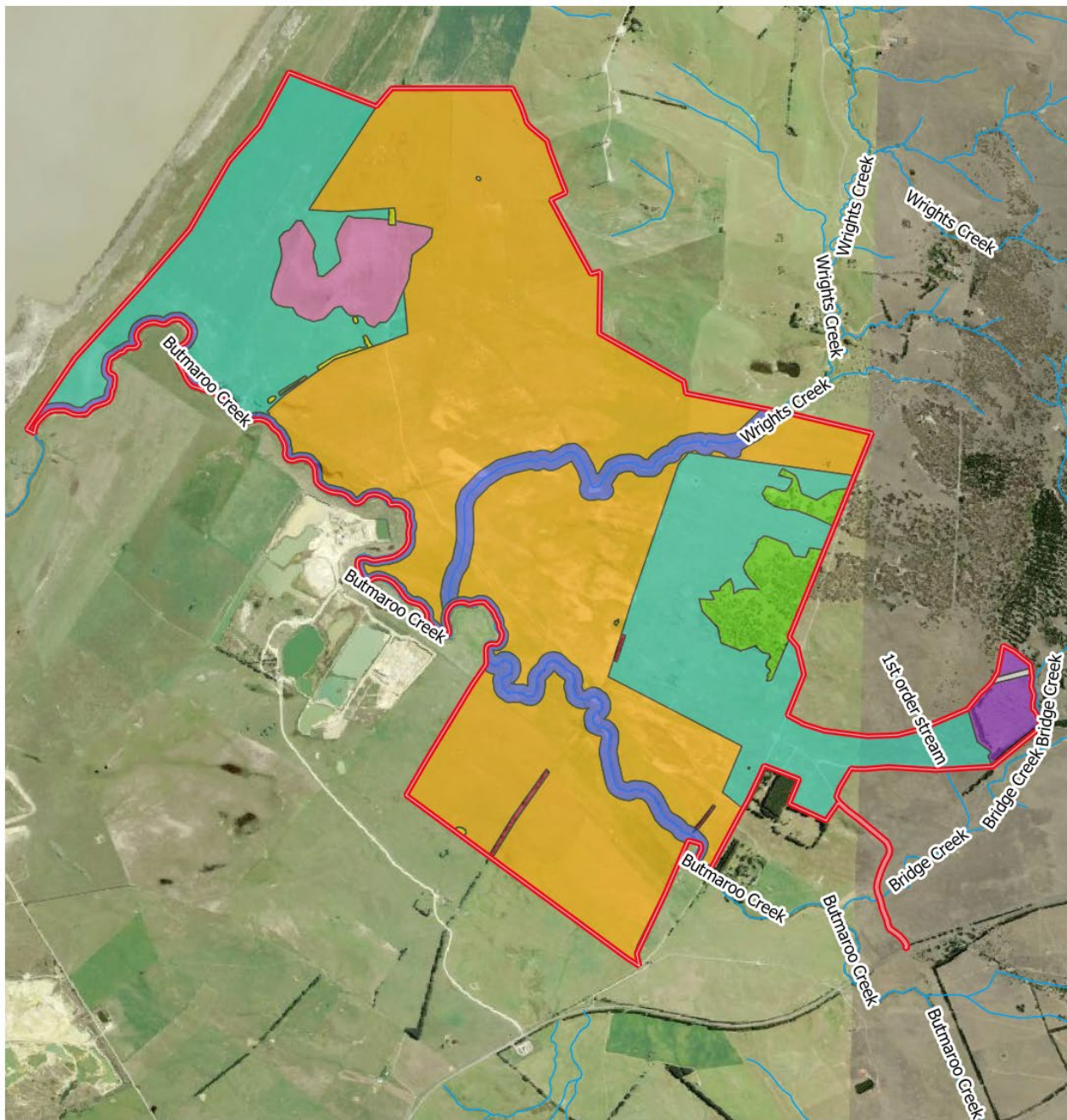
Legend

- | | |
|-----------------------------------|-----------------------------------|
| Project Site | 3.2.0 Grazing modified pastures |
| NSW Landuse 2017 | 5.2.0 Intensive animal production |
| 1.2.0 Managed resource protection | 5.8.0 Mining |
| 2.1.0 Grazing native vegetation | 6.3.0 River |
| 3.1.0 Plantation forests | |

Ref: 20-403 Blind Creek Solar Farm BDAR
 20210630 \ LCA: NSW Landuse 2017
 Author: rebecca.r
 Date created: 01.09.2021
 Datum: GDA94 / MGA zone 55



Appendix F NGH vegetation and PCT mapping



20-403 Blind Creek Solar Farm BDAR
LCA: Plant Community Types

Legend

- Project Site
- Strahler

Plant Community Types and other vegetation

- 1100 Ribbon Gum - Snow Gum grassy forest on damp flats
- 1110 River Tussock - Tall Sedge - Kangaroo Grass moist grasslands
- 1110 River Tussock - Tall Sedge - Kangaroo Grass moist grasslands - creekline
- 1110 River Tussock - Tall Sedge - Kangaroo Grass moist grasslands - exotic dominated
- 1110 River Tussock - Tall Sedge - Kangaroo Grass moist grasslands - wetland
- Exotic dominated pasture
- Exotic pine plantation/mine
- Exotic trees
- Scattered trees - TBC

0 0.5 1 km

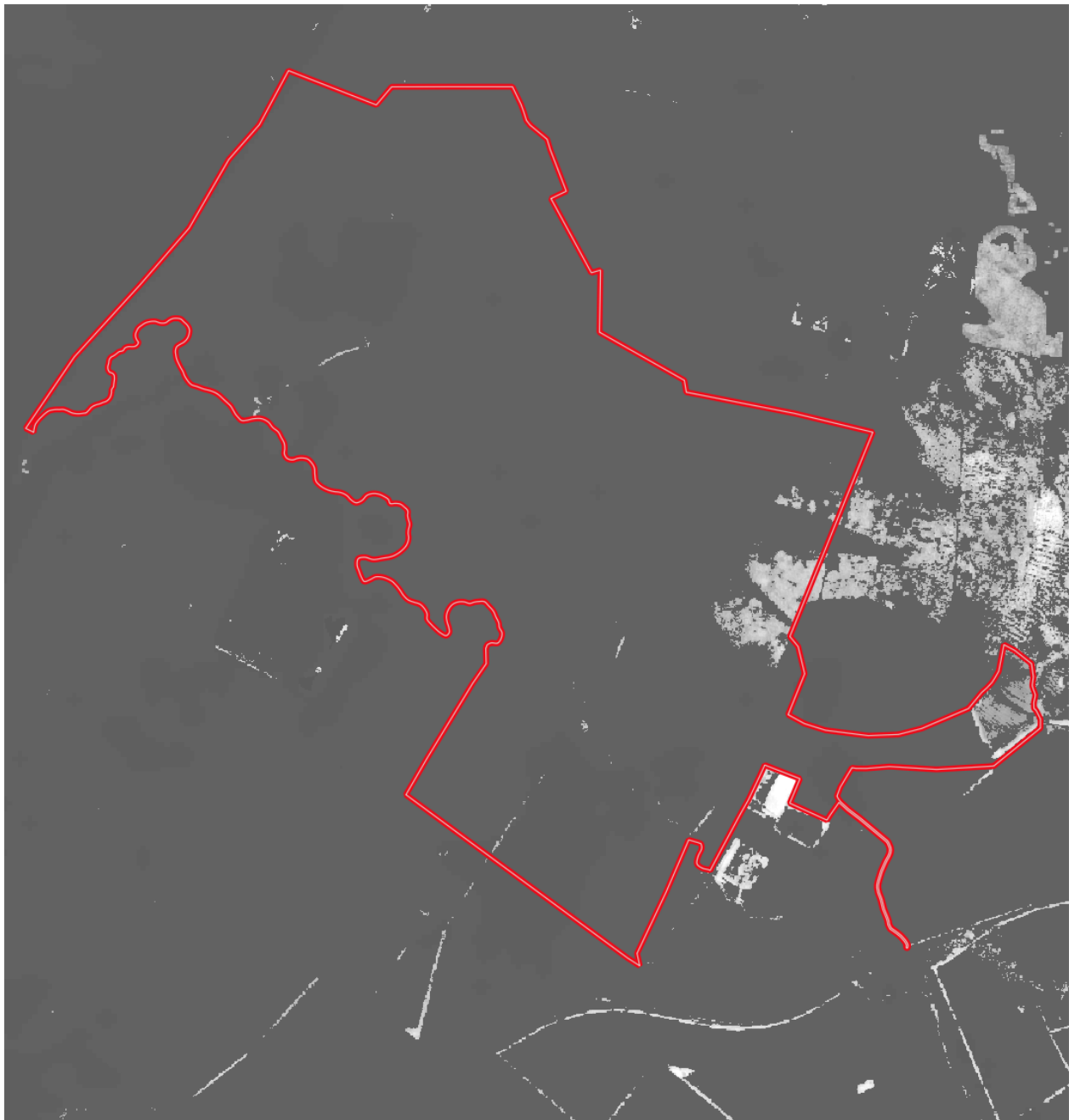
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20210630 \ LCA: Plant Community Types
Author: rebecca.r
Date created: 01.09.2021
Datum: GDA94 / MGA zone 55



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Appendix G NSW Woody Vegetation Extent & FPC 2011



20-403 Blind Creek Solar Farm BDAR
LCA: Woody Vegetation Extent

0 0.5 1 km

Data Attribution
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Legend

Project Site

Woody Vegetation Extent

Woody vegetation absent

Woody vegetation present

Ref: 20-403 Blind Creek Solar Farm BDAR
20210630 \ LCA: Woody Vegetation Extent
Author: rebecca.r
Date created: 01.09.2021
Datum: GDA94 / MGA zone 55



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Appendix H NSW EPI Mapping – Land Zoning



20-403 Blind Creek Solar Farm BDAR
LCA: EPI Land Zoning

Legend

- Project Site
- EPI Land Zoning**
- Environmental Management
- Infrastructure
- Primary Production

0 0.5 1 km

Data Attribution
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Ref: 20-403 Blind Creek Solar Farm BDAR
 20210630 \ LCA: EPI Land Zoning
 Author: rebecca.r
 Date created: 01.09.2021
 Datum: GDA94 / MGA zone 55



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Appendix F BCD email correspondence

Consultation point	Summary of consultation	Outcome	BDAR Chapter reference	Email reference
Subject Land clarification	NGH requested confirmation of the definition of Subject Land within the context of this BDAR, as BAM 2020 definitions are unclear	BCD confirmed that after speaking with their policy team that the subject land has the same definition of definition as Development Footprint in the BAM.	1.1 Definitions	Email 1 Email 5
BCD Site visit	<p>BCD requested accompanying NGH ecologists on a site visit to better understand the site and to:</p> <ul style="list-style-type: none"> Verify NGH's Category 1 (exempt land) mapping Verify NGH's PCT mapping and vegetation condition classification Assess reptile survey tile placement 	<p>BCD's comments following site visit were:</p> <ul style="list-style-type: none"> NGH's land categorisation is appropriate NGH's PCT type and condition are appropriate, however they suggested considering mapping an area observed to have high coverage of <i>Juncus</i> as a separate zone <ul style="list-style-type: none"> <i>NGH completed a BAM plot in this area (BAM Plot 18) and determined that the zone mapping should remain unchanged</i> Tile placement is appropriate White-fronted Chat was observed on site, and surveys are now required for this species Consider mapping more of the avoided areas of vegetation outside of the Project Site Confirm with Stride Renewables that there will not be any further impacts to the east within the Powerline easement <ul style="list-style-type: none"> <i>This was the final iteration of the Development Footprint, changes at this stage not possible</i> 	<p>3.1.2 Native vegetation – floristic surveys</p> <p>3.2 Plant Community Types</p> <p>3.3 Non-native vegetation and cleared areas</p> <p>3.4 Vegetation integrity assessment</p> <p>4.4.2 Reptile tile surveys</p> <p>11.3 Areas not requiring assessment</p> <p>Appendix E Land Category Assessment</p>	Email 2 Email 5 Email 6 Email 7
Threatened	White-fronted Chat, an ecosystem credit	Surveys will be undertaken in March 2022, at the same	4.1 Ecosystem credit	Email 1

Consultation point	Summary of consultation	Outcome	BDAR Chapter reference	Email reference
species – White-fronted Chat	<p>species, was flagged as a species of concern due to nearby NSW BioNet records, and because the species has been recorded on site by both NGH and BCD in November 2021.</p> <p>BCD requested that surveys be undertaken for this species, and that they will provide guidelines on how to complete a prescribed impact assessment for an ecosystem credit species.</p>	<p>time as the remaining outstanding threatened plant species. The BDAR will subsequent be amended to reflect the survey results and assessment.</p> <p>At time of writing (24 February 2022):</p> <ul style="list-style-type: none"> • BCD are awaiting feedback from their Accountable Officer regarding appropriate survey methodology • BCD are awaiting feedback from their policy team regarding a draft proposed assessment and offsetting methodology for the species • Once survey and assessment procedure are finalised, surveys will be completed and offset requirements determined 	<p>species</p> <p>8.3 Prescribed impacts</p>	<p>Email 3</p> <p>Email 4</p> <p>Email 8</p>
Threatened species – Yellow-spotted Tree Frog, Green and Golden Bell Frog	<p>The Yellow-spotted Tree Frog was flagged as a species of concern due to there being a NSW BioNet record for the species in the wetland area from 1974.</p> <p>Similarly Green and Golden Bell Frog was flagged, although there are no records from within the site.</p>	<p>The Yellow-spotted Tree Frog was not returned by the BAM-C, while Green and Golden Bell Frog was (in addition to Southern Bell Frog). Four nights of frog surveys were undertaken in January and February 2021. All frog species seen or heard during that time were noted; no threatened species were recorded during surveys.</p>	<p>4.4.1 Frog aural-visual surveys</p>	<p>Email 6</p> <p>Email 7</p> <p>Email 8</p>
Threatened species – Golden Sun Moth	<p>Golden Sun Moth was flagged as a potential species of concern.</p>	<p>This species was not returned by the BAM-C. NGH ecologists Completed 18 BAM plots and 30 rapid vegetation assessments across the Development Site, including documenting habitat with numerous photos, and determined that none of the vegetation within the site would provide the habitat required by the Golden Sun Moth.</p>	<p>3.1.2 Native vegetation – floristic surveys</p>	<p>Email 8</p>

Consultation point	Summary of consultation	Outcome	BDAR Chapter reference	Email reference
Threatened species – Little Whip Snake	Little Whip Snake was flagged as a potential species of concern.	This species was not returned by the BAM-C. There were no areas of rocky habitat or fallen timber suitable for the species within the Subject Land, so no rock-flipping surveys were undertaken. Tile surveys were undertaken in five locations approved of by BCD. The species was not recorded during any of the surveys.	4.4.2 Reptile tile surveys	Email 6 Email 8
Threatened species – Southern Myotis	<p>BCD noted that the detection of the Southern Myotis during surveys is likely to be a misidentification as:</p> <ul style="list-style-type: none"> the parent PCT from which the non-native vegetation is derived is not included in list of PCTs associated with the species in the TBDC The waterway likely does not meet the criteria of the habitat constraint for Southern Myotis - '<i>medium to large permanent creeks, rivers, lakes or other waterways (i.e. with pools/ stretches 3 m or wider)</i>' The low number of survey nights means the record may not be reliable as Southern Myotis calls are easily confused with common Long-eared Bats. 	The species credit Southern Myotis has been excluded from BAM-C and as a result the project no longer generates any threatened species credits.	<p>4.3 Species credit species survey summary</p> <p>4.4.3 Microbat acoustic surveys</p> <p>11.1.2 Species credits</p>	Email 9
Vegetation zones	BCD requested the following vegetation zones should be renamed to reflect their highly degraded non-native status –	The vegetation zones have now been renamed to:	3.2 Plant Community Types (PCTs)	Email 9

Consultation point	Summary of consultation	Outcome	BDAR Chapter reference	Email reference
	<ul style="list-style-type: none"> Zone 1 - 1110_grassland_poor Zone 2 – 1100_grassland_poor 	<ul style="list-style-type: none"> Zone 1-1110_non-nativegrassland_poor Zone 2 – 1100_non-nativegrassland_poor 	<p>3.4 Vegetation Integrity (VI) assessment</p> <p>11.2 Impacts not requiring offset</p>	
SAIL assessment	<p>BCD noted that the SAIL assessment for <i>Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands</i> is not necessary because it is not being impacted.</p> <p>BCD also noted that due to the highly degraded condition of the PCTs associated with this TEC, these PCT's no longer meet the criteria for this SAIL entity.</p>	The SAIL assessment for Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands has been removed.	3.1.1 Existing native vegetation mapping and data.	Email 9

F.1 Email 1

From: [Mallory Barnes](#)
To: [Rebecca Reid](#)
Subject: RE: Blind Creek site visit notes - Tuesday 30 November
Date: Thursday, 2 December 2021 6:09:38 PM
Attachments: [image003.png](#)
[BCDsitevisit_points_BlindCreekSolar_30Nov2021.zip](#)

Hi Rebecca,

Just following on from our discussion this afternoon. I can confirm from speaking with the policy team this afternoon that the subject land has the same definition of definition as development footprint in the BAM. The reason for the different term is so it can be applied to Stage 1, 2 and 3 of the BAM.

Plots outside the development footprint in the wetland and woodland are extremely useful for demonstrating avoidance, but they're not a part of the minimum plot density requirements for the purposes of Table 3.

We are seeking advice about how to undertake a prescribed impact assessment for the White Fronted Chats. The most useful information would be knowing the population extent. Are they localised or do they occur across the entire site and is it breeding or foraging habitat?

So after you've done the extra BAM plot, your time tomorrow might be better spend surveying for WFC, even if it's non-systematic.

I've attached the shapefile of sites that we visited on Tuesday. WFCs were detected at site 9, 10 and 11 (near the creekline). What I called Veg6, I renamed to site 8 after cleaning up the shapefile.

Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

Biodiversity and Conservation | Department of Planning, Industry and Environment **T** (02) 6229 7192 | **M** 0407 529 557 | **E** Mallory.Barnes@environment.nsw.gov.au
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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Sent: Thursday, 2 December 2021 1:43 PM
To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Subject: RE: Blind Creek site visit notes - Tuesday 30 November

F.2 Email 2

From: [Mallory Barnes](#)
To: [Rebecca Reid](#); [Alex Santiago](#)
Cc: [Nat O'Rourke](#); [Allison Treweek](#)
Subject: Blind Creek site visit notes - Tuesday 30 November
Date: Wednesday, 1 December 2021 5:13:41 PM

Hi Rebecca and Alex,

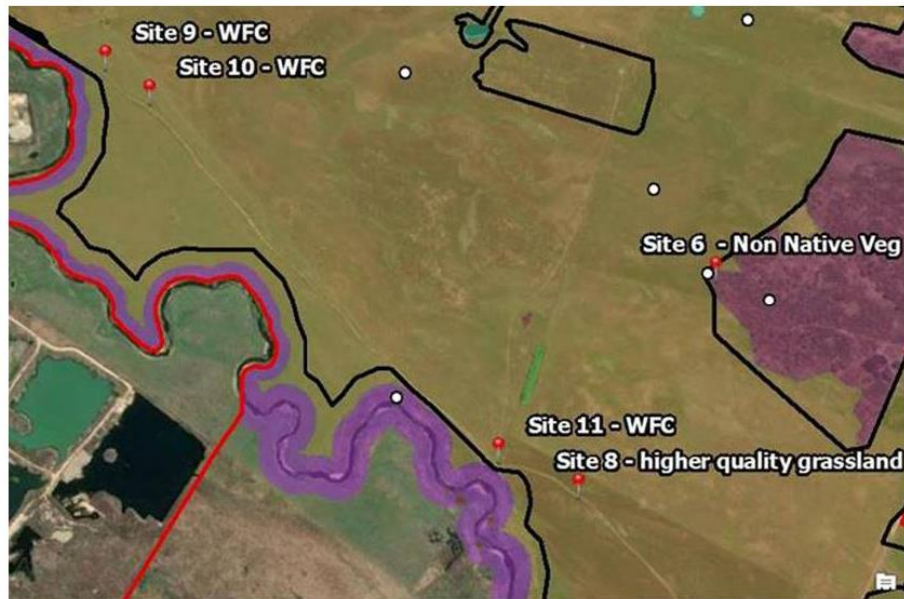
Thanks for meeting us in the field yesterday. We really appreciate all your engagement with us prior to submission of the BDAR.

Overall impression

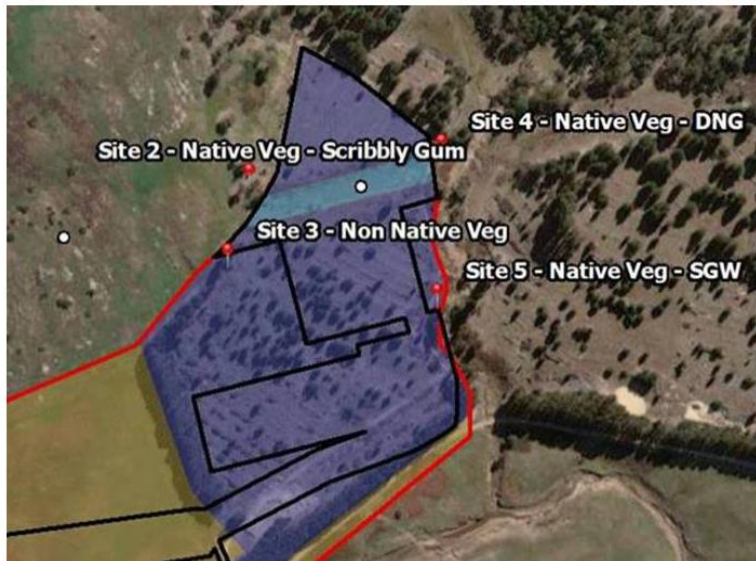
- Great work with the veg mapping. We agree with -
 - the PCT classification 1100 - *Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*
 - the PCT classification 1110 - *River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion*
 - Areas classified as Category 1
 - Condition state. Much of the area classified as 'PCT 1110_grassland_degraded' was, in fact, a highly degraded agricultural landscape that lacked the key species associated with PCT 1110. These areas appear unlikely to generate an offset. But agree with the approach of classifying as a degraded PCT, rather than non-native, and then using BAM data and the BAMC to conclusively demonstrate that it's not native because it doesn't generate an offset.
- Tile survey locations had been selected well and included DNG and areas of non-native tussock, which will be useful in determining if there is a prescribed impact.

Items for further discussion

- **White Fronted Chat**
 - We detected White Fronted Chats in 3 locations in the area mapped as PCT PCT1110_grassland_poor (See screen shot below)
 - Any area of non-native vegetation that supports threatened species needs to be assessed as a prescribed impact in accordance with Section 6.1.2 of BAM 2020, even if it's an ecosystem credit species.
 - We recommend the following –
 - Undertake WFC survey in all potential suitable habitat
 - Determine the size of the WFC population to be impacted by the development footprint
 - Determine the size of the population that will be avoided in the subject land
 - Consider using the 5-part test of significance to determine if there will be a significant impact to the local population of WFC
 - Consider if impact can be minimised or avoided by altering the construction process or design in areas of suitable habitat for WFC
 - Consider retiring ecosystem credit species to offset residual prescribed impact (section 8.6 of BAM 2020)



- **Consider separating the area of grassland with higher cover of *Austrostipa scabra* and *Juncus sp.* as a separate zone (Eg 'PCT1110_grassland_poor to moderate')**
 - The reason for this is that it has a different composition and condition from the areas further west which were completely dominated by exotics like Phalaris and Scotch Thistle, Buchan Weed, Barley Grass and Sheep Sorrel.
 - It seems unlikely that this area would generate an offset because -
 - It doesn't have any of the characteristic species of PCT1110 like Poa Tussock, Tall Sedge or Kanagaroo Grass.
 - It appeared to be approximately 50% exotic cover
 - African Lovegrass was present (ie a High Threat Exotic)
 - It's recently been ploughed and sown
 - However, because it appeared approximately 50% native cover, it's important to demonstrate that it doesn't generate an offset.
- **Consider mapping more of the avoided areas that are outside the development footprint**
 - Consider mapping additional avoided native veg eg. Snow Gum Woodland on creekline near powerline easement or the remnant PCT 1093 to the northeast of the easement (see screen shot below). The purpose of this is twofold, it -
 - Demonstrates avoidance really clearly and
 - Facilitates avoidance in the event of a future change to the development footprint
 - This would mean adjusting the subject land slightly. But don't worry about increasing the number of plots even if it tips it over a threshold of Table 3 in the BAM 2020. We are just interested in seeing that avoidance.



- **Development Footprint clarification**

- Confirm with Strider Renewables that there will not be any further impacts to the east within the Powerline easement
- Is no upgrades to the transmission line which would result in further impacts in the powerline easement outside of the current development footprint.

Let us know when is a good time to discuss the above issues.

Mallory Barnes

Senior Regional Biodiversity Conservation Officer, South East

Biodiversity and Conservation | Department of Planning, Industry and Environment **T** (02) 6229

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This email is intended for the addressee(s) named and may contain confidential and/or privileged information.

If you are not the intended recipient, please notify the sender and then delete it immediately.

Any views expressed in this email are those of the individual sender except where the sender expressly and with authority states them to be the views of the NSW Office of Environment, Energy and Science.

PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL

F.3 Email 3

From: [Mallory Barnes](#)
To: [Rebecca Reid](#); [Matt Cameron](#)
Cc: [Zeina Jokadar](#); [Beth Noel](#); [Nat O'Rourke](#); [Allison Traweek](#)
Subject: RE: Blind Creek site visit notes - Tuesday 30 November
Date: Friday, 18 February 2022 11:40:14 AM
Attachments: [image009.png](#)
[image001.png](#)

Hi Rebecca,

I had a great break. I took 4 weeks and I think a lot of developers did too because nothing much had happened on most of my projects when I got back in Jan. Things are warming up now though...

I discussed proposed an assessment and offsetting method to the Offsets Policy team last year and wrote it up as a draft for comment earlier in the month. I'm still waiting to hear back from them, so will give them a hurry along.

In terms of survey, I think the sensible thing to do would be to undertake systematic survey around waterways, locations where you've already detected them, and any records in Bionet (I can't remember if there were any in the subject land for this project). I'll talk to the accountable officer ([@Matt Cameron](#)) about a suitable buffer distance around waterways, transect spacing and transect length.

Mallory Barnes

Senior Regional Biodiversity Conservation Officer, South East Branch

I live and work on Nggunawal country 🟦🟡🟢

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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Sent: Friday, 18 February 2022 11:24 AM
To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Cc: Zeina Jokadar <zeina.j@nghconsulting.com.au>; Beth Noel <beth.n@nghconsulting.com.au>
Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Mallory,

Hope you had a relaxing Christmas and New Years!

I'm just touching base with you about the White Fronted Chat surveys for Blind Creek. Have you heard back from the species experts, or the policy team about the prescribed impact assessment

for an ecosystem credit species?

We've currently got an autumn survey scheduled in for the week of 28 March to get the last of our threatened plants, and would like to be able to do the WFC at the same time (no specific window detailed in TBDC).

My main concern is what level of survey effort would be required; as a species that does nest in disturbed habitat, should we be interspersing transects across the entire Development Footprint? As the survey was not originally costed for, we need to get an idea of the effort required so that we can advise the client and get approval for this additional survey cost. They are already aware that this species now requires survey but we just need to quantify the effort. After survey we can update the BDAR with the prescribed impacts assessment.

Happy to discuss with you over the phone if that's easier!

Cheers,
Becky

REBECCA REID
ECOLOGIST

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E. rebecca.r@nghconsulting.com.au
Unit 8, 27 Yallourn St
(PO Box 62) Fyshwick ACT 2609

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From: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Sent: Thursday, 9 December 2021 6:14 PM
To: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Cc: Nat O'Rourke <Nat.O'Rourke@environment.nsw.gov.au>; Allison Treweek <Allison.Treweek@environment.nsw.gov.au>
Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Rebecca,

One of the experts is on Christmas leave (Dr Damon Oliver) and the other I have been chasing up but still haven't heard back from (Dr Matt Cameron).

I'm still waiting to hear back from our Policy team about how to undertake a prescribed impact assessment on an ecosystem credit species. I have attached the request to this email. They have confirmed that it has been received but I think we are unlikely to get a response before the Christmas shutdown period.

From a brief scan of the literature, we know –

- Nest caging is a highly effective management measure because it is accepted by White-Fronted Chats, it reduces predation and increases reproductive success ([Major, Ashcroft and Davis 2015](#)). ***This could be proposed as a management measure in the BDAR if impacts cannot be avoided***
- It has been known to nest in highly disturbed habitat – including suburban landscapes – since at least 1920 ([Littlejohns 1920](#))
- WFCs prey on arthropods and normally flock in groups <10 individuals. They tend to select patches of profitable habitat ([Major 1991](#))
- They are threatened by nest predation ([Major & Sladek 2012](#))
- The NSW population underwent rapid decline between 2000 and 2010 ([Jenner et al 2016](#))

Can I suggest getting in touch with [RE Major](#).

For your prescribed impact assessment, I think you should innovate an approach based on what we've discussed and we can consider the need for further survey or assessment during the Response to Submissions phase if the Applicant doesn't want to undertake survey before BDAR submission. As previously discussed, I think using the Test of Significance as a framework for your prescribed impact assessment is a good place to start.

The key thing with prescribed impacts is demonstrating **avoidance** (eg not installing panels in known WFC habitat) and **minimisation** (eg sensitive installation that minimises ground disturbance in known habitat) of impacts. The reason for this is that prescribed impacts are extremely difficult to offset, however offsetting it is still possible and the BAM allows for this.

Where impacts cannot be avoided or minimised, the residual impact should be offset using ecosystem credits in accordance with section 8.6 of BAM 2020. We would have to develop a method for doing this.

Mal

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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Sent: Thursday, 9 December 2021 9:25 AM
To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Mallory,

Just checking in – during our site visit last Friday we did a 2h targeted survey around the northern edge of wetland as the species is supposed to forage in wetland areas, but didn't observe the Chat. We did see it along the access road however, in roughly the same place that you saw it. It (or a few birds, unsure, we have only ever seen one male at a time), appears to stick close by that area. Have you been able to find out any more information from the species expert?

We didn't have much time on Friday to do much more than that in terms of chat survey, as we had the additional BAM plot and some other data to gather. It's my understanding that making an accurate estimate of population size is a very time and labour intensive survey requirement. Having only observed one bird at a time, we can't be sure if it's the same bird or separate birds, without intensive monitoring that there just isn't scope for at this time. If additional surveys were requested by BCD for this species the client would need to approve the cost.

Have you managed to find out any more about how we should undertake a prescribed impact assessment for this species? I will be revising the BDAR soon with our Spring survey data and submitting to the client, so if there is a specific way you would like us to approach this it would be good to know asap.

Cheers,
Becky

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ECOLOGIST

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From: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Sent: Thursday, 2 December 2021 6:09 PM
To: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Rebecca,

Just following on from our discussion this afternoon. I can confirm from speaking with the policy team this afternoon that the subject land has the same definition of definition as development footprint in the BAM. The reason for the different term is so it can be applied to Stage 1, 2 and 3 of the BAM.

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So after you've done the extra BAM plot, your time tomorrow might be better spend surveying for WFC, even if it's non-systematic.

I've attached the shapefile of sites that we visited on Tuesday. WFCs were detected at site 9, 10 and 11 (near the creekline). What I called Veg6, I renamed to site 8 after cleaning up the shapefile.

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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>

Sent: Thursday, 2 December 2021 1:43 PM

To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>

Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Mallory,

Thanks for your summary, hope you enjoyed your time on site!

Would you be free for a call soon? Alex and I will be going to site again tomorrow for any outstanding work, Alex is out there again today doing tile surveys. I'd like to clarify some things with you before we head out to site tomorrow.

Cheers,
Becky

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Sent: Wednesday, 1 December 2021 5:14 PM

To: Rebecca Reid <rebecca.r@nghconsulting.com.au>; Alex Santiago
<alex.s@nghconsulting.com.au>

Cc: Nat O'Rourke <Nat.ORourke@environment.nsw.gov.au>; Allison Treweek
<Allison.Treweek@environment.nsw.gov.au>

Subject: Blind Creek site visit notes - Tuesday 30 November

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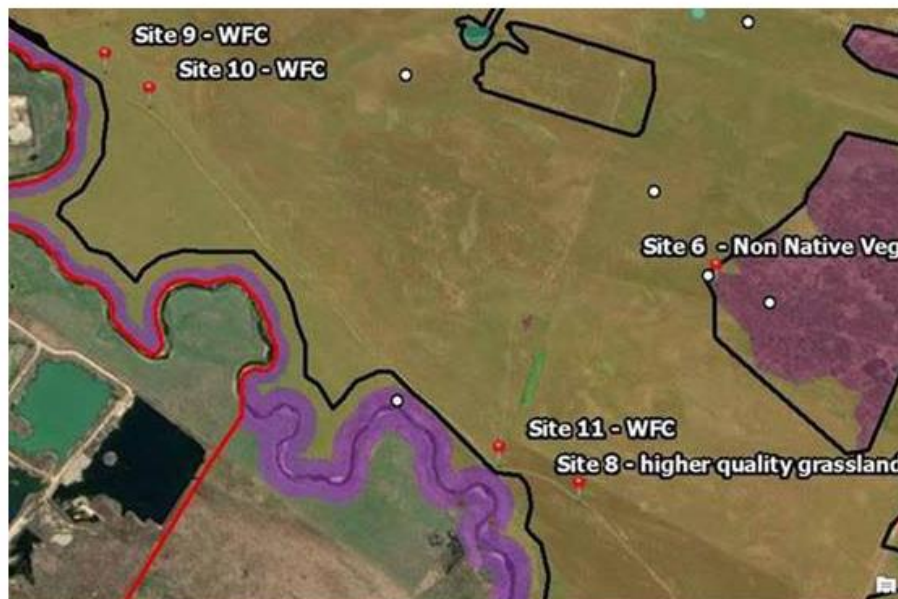
Overall impression

- Great work with the veg mapping. We agree with -
 - the PCT classification 1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
 - the PCT classification 1110 - River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion
 - Areas classified as Category 1
 - Condition state. Much of the area classified as 'PCT 1110_grassland_degraded' was, in fact, a highly degraded agricultural landscape that lacked the key species associated with PCT 1110. These areas appear unlikely to generate an offset. But agree with the approach of classifying as a degraded PCT, rather than non-native, and then using BAM data and the BAMC to conclusively demonstrate that it's not native because it doesn't generate an offset.
- Tile survey locations had been selected well and included DNG and areas of non-native tussock, which will be useful in determining if there is a prescribed impact.

Items for further discussion

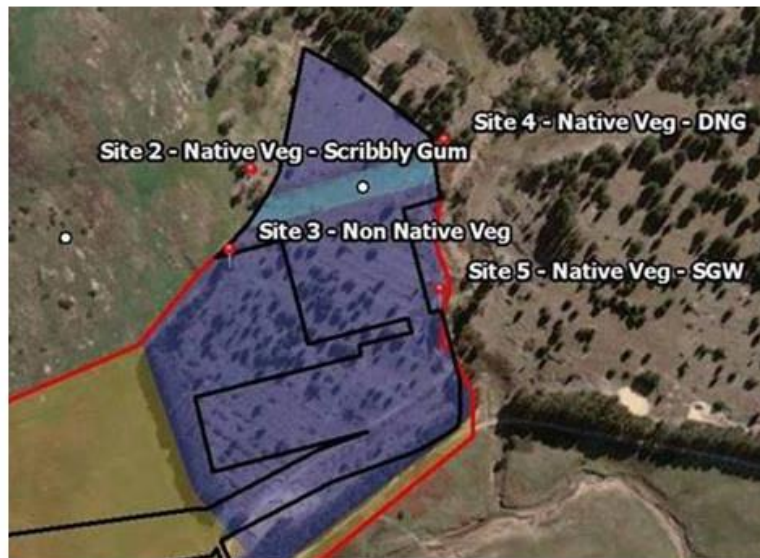
• **White Fronted Chat**

- We detected White Fronted Chats in 3 locations in the area mapped as PCT1110_grassland_poor (See screen shot below)
- Any area of non-native vegetation that supports threatened species needs to be assessed as a prescribed impact in accordance with Section 6.1.2 of BAM 2020, even if it's an ecosystem credit species.
- We recommend the following –
 - Undertake WFC survey in all potential suitable habitat
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 - Consider retiring ecosystem credit species to offset residual prescribed impact (section 8.6 of BAM 2020)



- **Consider separating the area of grassland with higher cover of *Austrastipa scabra* and *Juncus sp.* as a separate zone (Eg 'PCT1110_grassland_poor to moderate')**
 - The reason for this is that it has a different composition and condition from the areas further west which were completely dominated by exotics like Phalaris and Scotch Thistle, Buchan Weed, Barley Grass and Sheep Sorrel.
 - It seems unlikely that this area would generate an offset because -
 - It doesn't have any of the characteristic species of PCT1110 like Poa Tussock, Tall Sedge or Kanagaroo Grass.

- It appeared to be approximately 50% exotic cover
 - African Lovegrass was present (ie a High Threat Exotic)
 - It's recently been ploughed and sown
 - However, because it appeared approximately 50% native cover, it's important to demonstrate that it doesn't generate an offset.
- **Consider mapping more of the avoided areas that are outside the development footprint**
 - Consider mapping additional avoided native veg eg. Snow Gum Woodland on creekline near powerline easement or the remnant PCT 1093 to the northeast of the easement (see screen shot below). The purpose of this is twofold, it -
 - Demonstrates avoidance really clearly and
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- **Development Footprint clarification**
 - Confirm with Strider Renewables that there will not be any further impacts to the east within the Powerline easement
 - ie no upgrades to the transmission line which would result in further impacts in the powerline easement outside of the current development footprint.

Let us know when is a good time to discuss the above issues.

Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

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F.4 Email 4

From: [Mallory Barnes](#)
To: [Rebecca Reid](#)
Cc: [Nat O'Rourke](#); [Allison Treweek](#)
Subject: RE: Blind Creek site visit notes - Tuesday 30 November
Date: Thursday, 9 December 2021 6:14:36 PM
Attachments: [image003.png](#)
[White Fronted Chats - Solar Farm - nonna.msg](#)

Hi Rebecca,

One of the experts is on Christmas leave (Dr Damon Oliver) and the other I have been chasing up but still haven't heard back from (Dr Matt Cameron).

I'm still waiting to hear back from our Policy team about how to undertake a prescribed impact assessment on an ecosystem credit species. I have attached the request to this email. They have confirmed that it has been received but I think we are unlikely to get a response before the Christmas shutdown period.

From a brief scan of the literature, we know –

- Nest caging is a highly effective management measure because it is accepted by White-Fronted Chats, it reduces predation and increases reproductive success ([Major, Ashcroft and Davis 2015](#)). ***This could be proposed as a management measure in the BDAR if impacts cannot be avoided***
- It has been known to nest in highly disturbed habitat – including suburban landscapes – since at least 1920 ([Littlejohns 1920](#))
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Can I suggest getting in touch with [RE Major](#).

For your prescribed impact assessment, I think you should innovate an approach based on what we've discussed and we can consider the need for further survey or assessment during the Response to Submissions phase if the Applicant doesn't want to undertake survey before BDAR submission. As previously discussed, I think using the Test of Significance as a framework for your prescribed impact assessment is a good place to start.

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Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

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Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Mallory,

Just checking in – during our site visit last Friday we did a 2h targeted survey around the northern edge of wetland as the species is supposed to forage in wetland areas, but didn't observe the Chat. We did see it along the access road however, in roughly the same place that you saw it. It (or a few birds, unsure, we have only ever seen one male at a time), appears to stick close by that area. Have you been able to find out any more information from the species expert?

We didn't have much time on Friday to do much more than that in terms of chat survey, as we had the additional BAM plot and some other data to gather. It's my understanding that making an accurate estimate of population size is a very time and labour intensive survey requirement. Having only observed one bird at a time, we can't be sure if it's the same bird or separate birds, without intensive monitoring that there just isn't scope for at this time. If additional surveys were requested by BCD for this species the client would need to approve the cost.

Have you managed to find out any more about how we should undertake a prescribed impact assessment for this species? I will be revising the BDAR soon with our Spring survey data and submitting to the client, so if there is a specific way you would like us to approach this it would be good to know asap.

Cheers,
Becky

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ECOLOGIST

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From: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>

Sent: Thursday, 2 December 2021 6:09 PM

To: Rebecca Reid <rebecca.r@nghconsulting.com.au>

Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Rebecca,

Just following on from our discussion this afternoon. I can confirm from speaking with the policy team this afternoon that the subject land has the same definition of definition as development footprint in the BAM. The reason for the different term is so it can be applied to Stage 1, 2 and 3 of the BAM.

Plots outside the development footprint in the wetland and woodland are extremely useful for demonstrating avoidance, but they're not a part of the minimum plot density requirements for the purposes of Table 3.

We are seeking advice about how to undertake a prescribed impact assessment for the White Fronted Chats. The most useful information would be knowing the population extent. Are they localised or do they occur across the entire site and is it breeding or foraging habitat?

So after you've done the extra BAM plot, your time tomorrow might be better spend surveying for WFC, even if it's non-systematic.

I've attached the shapefile of sites that we visited on Tuesday. WFCs were detected at site 9, 10 and 11 (near the creekline). What I called Veg6, I renamed to site 8 after cleaning up the shapefile.

Mallory Barnes

Senior Regional Biodiversity Conservation Officer, South East

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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>

Sent: Thursday, 2 December 2021 1:43 PM

To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>

Subject: RE: Blind Creek site visit notes - Tuesday 30 November

Hi Mallory,

Thanks for your summary, hope you enjoyed your time on site!

Would you be free for a call soon? Alex and I will be going to site again tomorrow for any outstanding work, Alex is out there again today doing tile surveys. I'd like to clarify some things with you before we head out to site tomorrow.

Cheers,
Becky

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From: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>

Sent: Wednesday, 1 December 2021 5:14 PM

To: Rebecca Reid <rebecca.r@nghconsulting.com.au>; Alex Santiago <alex.s@nghconsulting.com.au>

Cc: Nat O'Rourke <Nat.O'Rourke@environment.nsw.gov.au>; Allison Treweek <Allison.Treweek@environment.nsw.gov.au>

Subject: Blind Creek site visit notes - Tuesday 30 November

Hi Rebecca and Alex,

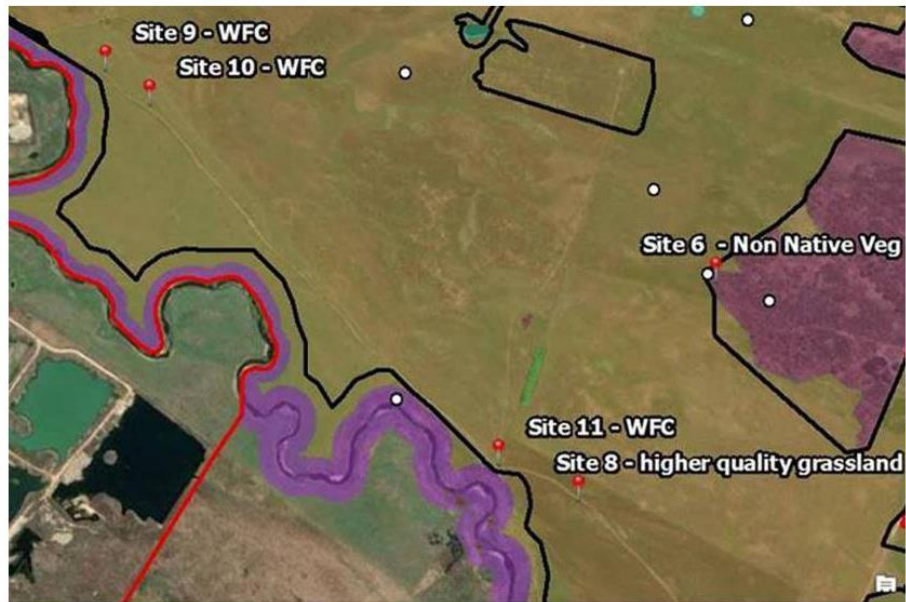
Thanks for meeting us in the field yesterday. We really appreciate all your engagement with us prior to submission of the BDAR.

Overall impression

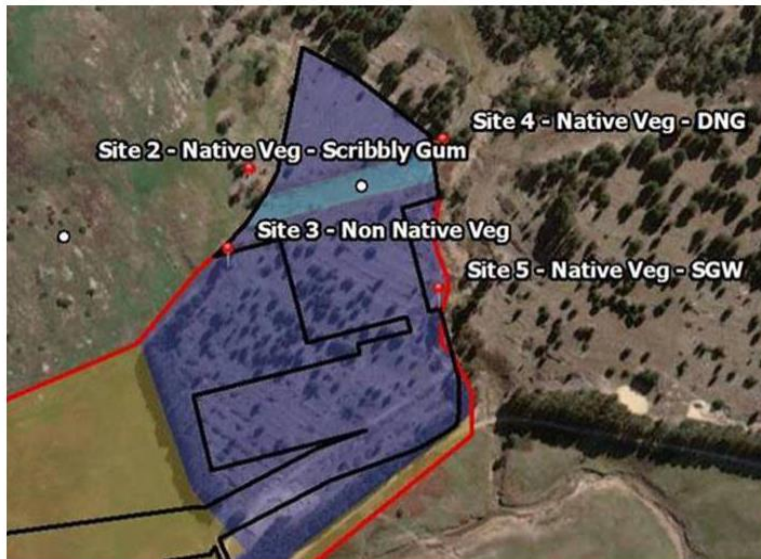
- Great work with the veg mapping. We agree with -
 - the PCT classification 1100 - *Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion*
 - the PCT classification 1110 - *River Tussock - Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion*
 - Areas classified as Category 1
 - Condition state. Much of the area classified as 'PCT 1110_grassland_degraded' was, in fact, a highly degraded agricultural landscape that lacked the key species associated with PCT 1110. These areas appear unlikely to generate an offset. But agree with the approach of classifying as a degraded PCT, rather than non-native, and then using BAM data and the BAMC to conclusively demonstrate that it's not native because it doesn't generate an offset.
- Tile survey locations had been selected well and included DNG and areas of non-native tussock, which will be useful in determining if there is a prescribed impact.

Items for further discussion

- **White Fronted Chat**
 - We detected White Fronted Chats in 3 locations in the area mapped as PCT PCT1110_grassland_poor (See screen shot below)
 - Any area of non-native vegetation that supports threatened species needs to be assessed as a prescribed impact in accordance with Section 6.1.2 of BAM 2020, even if it's an ecosystem credit species.
 - We recommend the following –
 - Undertake WFC survey in all potential suitable habitat
 - Determine the size of the WFC population to be impacted by the development footprint
 - Determine the size of the population that will be avoided in the subject land
 - Consider using the 5-part test of significance to determine if there will be a significant impact to the local population of WFC
 - Consider if impact can be minimised or avoided by altering the construction process or design in areas of suitable habitat for WFC
 - Consider retiring ecosystem credit species to offset residual prescribed impact (section 8.6 of BAM 2020)



- **Consider separating the area of grassland with higher cover of *Austrostipa scabra* and *Juncus sp.* as a separate zone (Eg 'PCT1110_grassland_poor to moderate')**
 - The reason for this is that it has a different composition and condition from the areas further west which were completely dominated by exotics like Phalaris and Scotch Thistle, Buchan Weed, Barley Grass and Sheep Sorrel.
 - It seems unlikely that this area would generate an offset because -
 - It doesn't have any of the characteristic species of PCT1110 like Poa Tussock, Tall Sedge or Kanagaroo Grass.
 - It appeared to be approximately 50% exotic cover
 - African Lovegrass was present (ie a High Threat Exotic)
 - It's recently been ploughed and sown
 - However, because it appeared approximately 50% native cover, it's important to demonstrate that it doesn't generate an offset.
- **Consider mapping more of the avoided areas that are outside the development footprint**
 - Consider mapping additional avoided native veg eg. Snow Gum Woodland on creekline near powerline easement or the remnant PCT 1093 to the northeast of the easement (see screen shot below). The purpose of this is twofold, it -
 - Demonstrates avoidance really clearly and
 - Facilitates avoidance in the event of a future change to the development footprint
 - This would mean adjusting the subject land slightly. But don't worry about increasing the number of plots even if it tips it over a threshold of Table 3 in the BAM 2020. We are just interested in seeing that avoidance.



- **Development Footprint clarification**

- Confirm with Strider Renewables that there will not be any further impacts to the east within the Powerline easement
- Is no upgrades to the transmission line which would result in further impacts in the powerline easement outside of the current development footprint.

Let us know when is a good time to discuss the above issues.

Mallory Barnes

Senior Regional Biodiversity Conservation Officer, South East

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F.5 Email 5

From: [Mallory Barnes](#)
To: [Rebecca Reid](#); [Nat O'Rourke](#)
Cc: [Zeina Jokadar](#); [Beth Noel](#); [Alex Santiago](#)
Subject: RE: 20-403 - Blind Creek Solar Farm - site visit
Date: Tuesday, 23 November 2021 5:50:13 PM
Attachments: [image004.png](#)

Hi Rebecca,

Responses below in red.

Thanks for the chat this evening.

Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Sent: Tuesday, 23 November 2021 5:32 PM
To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Cc: Zeina Jokadar <zeina.j@nghconsulting.com.au>; Beth Noel <beth.n@nghconsulting.com.au>; Alex Santiago <alex.s@nghconsulting.com.au>
Subject: 20-403 - Blind Creek Solar Farm - site visit

Hi Mallory,

Thanks for your call this afternoon, just going to jot down my notes to make sure we're all on the same page, and hopefully we'll be able to meet on site this week!

1. You are willing to accept NGH's definition of the term 'Subject Land' in this case, due to ambiguity in the BAM 2020 definition of Subject Land – i.e., the Subject Land equates to the Development Footprint, plus a 100 m buffer around the Footprint. For this site, it's not practical to consider the entire Project Site (the red boundary line on maps previously provided to you) as the Subject Land, as the Project Site boundary extends extremely far beyond the Development Footprint and areas of direct and indirect impact in many areas. The Project Site boundary also does not align with lot boundaries, which also makes applying the definition harder. **I'll check with Allison if she agrees that the buffer is big enough to capture avoided areas. This could be something we check on site. Bu I agree**

that in the absence of a clearer definition of 'Subject Land' in BAM 2020, using a buffer around the development footprint seems appropriate. The most important thing for us on all of our projects is that the subject land captures the full extent of the impacted areas (direct + indirect + prescribed) AND the avoided areas.

2. Your main areas of concern and purpose of accompanying us to site is to confirm our PCT/vegetation zone and Category 1 designations, and to verify that the Category 1 areas do not contain any suitable habitat for threatened fauna. **Correct**
3. We will be out on site on Thursday, and possibly Friday if we aren't able to complete all that we require on Thursday. You're going to see if your colleague can do Thursday. Let me know tomorrow which day you can manage, and we will work out our survey plan around you. **I've sent an email to @Nat O'Rourke this evening to check if Thursday works for him. He'll be in touch with you tomorrow to confirm.**

Hope I haven't missed anything, hope to see you later in the week!

Cheers,
Becky

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F.6 Email 6

From: [Beth Noel](#)
To: [Mallory Barnes](#)
Cc: [Rebecca Reid](#)
Subject: RE: HPE CM: RE: 20-403 - Blind Creek Solar Farm BDAR - survey plan
Date: Monday, 22 November 2021 10:27:58 AM
Attachments: [image006.png](#)
[48b9a05c-d287-4a36-a88a-d389a5ae913b.png](#)

Mallory,
Thanks for the call, I'll have a good read through the email and let you know if anything needs clarifying.
Cheers
Beth

From: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Sent: Monday, 22 November 2021 10:26 AM
To: Beth Noel <beth.n@nghconsulting.com.au>
Subject: RE: HPE CM: RE: 20-403 - Blind Creek Solar Farm BDAR - survey plan

Hey sorry Beth,

I'll try and fix up the issue with my headset and give you a call back.

Maybe in the meantime just let me know if any of what I wrote last week doesn't make sense.

Mal

Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

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From: Mallory Barnes
Sent: Monday, 15 November 2021 12:20 PM
To: Rebecca Reid <rebecca.r@nghconsulting.com.au>; Beth Noel <beth.n@nghconsulting.com.au>
Cc: Zeina Jokadar <zeina.j@nghconsulting.com.au>
Subject: HPE CM: RE: 20-403 - Blind Creek Solar Farm BDAR - survey plan

Hi Rebecca,

Thanks for the chat this morning. My notes are in red below. I think this covers off on everything we discussed.

[@Beth Noel](#), feel free to give me a call if anything below doesn't make sense.

Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

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From: Rebecca Reid <rebecca.r@nghconsulting.com.au>

Sent: Tuesday, 26 October 2021 2:55 PM

To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>

Cc: Zeina Jokadar <zeina.j@nghconsulting.com.au>; Beth Noel <beth.n@nghconsulting.com.au>

Subject: 20-403 - Blind Creek Solar Farm BDAR - survey plan

Hi Mallory,

We thought it would be best to touch base with you and let you know what we have already done in terms of surveys at Blind Creek, and the further surveys we currently intend to carry out in the week of the 15th November. That way if you feel there is anything outstanding that we've missed you can let us know and we can incorporate it into the November survey. I will primarily address the points made in your email to Zeina of 13/10/21.

I have attached a map of our relevant survey effort to date showing the most up to date development footprint from the client, which now avoids the wetland and Butmaroo Creek. We are aware of needing to take indirect impacts to these areas into account, however.

Survey/plots already completed

1. Aural visual and callback **frog surveys** last summer as per the *NSW Threatened frogs survey guidelines*, locations of surveys shown on map. We did not hear or see Green and Golden Bell Frog, Southern Bell Frog, or Yellow Spotted Tree Frog – **excellent**
2. Tiles (**reptile surveys**) were placed at locations shown on map approximately one month ago, they will be checked for the first time this week and weekly until December, or longer if required. We have placed these in the locations we determined had the most suitable

habitat for Striped Legless Lizard and Little Whip Snake. – excellent

3. **BAM plots** already completed are shown on the map; those in white fall within the up-to-date footprint and will be used for credit calculation, those in yellow show plots that fell within older iterations of the footprint. The map also shows the vegetation zones. There are sufficient plots for the vegetation zones, with the exception of the access road which has been added to the updated footprint. A plot is planned for this area. – See Table 3 in BAM 2020. BAM plot density is based on the hectares of each vegetation zone within the subject land not the development footprint. This is because vegetation zones are mapped based on their extent in the subject land (see snippets of BAM 2020 below as justification). This will allow you to use the plots that are outside your development footprint. As discussed, what you have called Project Site in the attached map seems to be consistent with the definition of subject land in BAM 2020. While the definition is vague, we interpret it as the land on which the development occurs. The reason survey is required on the subject land – and not just the development footprint - is because it is how you demonstrate avoidance (eg with your Snow Gum Woodland BAM plots)

4.2.1 Perform a plot-based vegetation survey

1. Using the information from Section 4.1, the assessor must perform a plot-based vegetation survey of the subject land to identify the most likely PCTs on the subject land (Box 1). The survey must be stratified and targeted to assess the expected environmental variation and address any areas with gaps in existing mapping and information.

4.3.1 Map vegetation zones

1. The assessor must:
 - a. use the PCT map from Section 4.2 to identify and map the area of each PCT into a vegetation zone on the subject land

4.3.4 Sample vegetation integrity survey plots

Required number of plots

1. Table 3 shows the minimum number of plots that must be sampled by the assessor for each vegetation zone. Relevant attributes from the plot-based floristic vegetation survey data from Subsection 4.2.1, which was established to identify a PCT, may be used to meet the minimum number of plots that must be sampled for a vegetation zone.
2. If the broad condition state of the vegetation varies across the zone, additional plots may be needed to ensure a representative sample is taken for the vegetation zone.

Table 3 Minimum number of plots required per zone area

Vegetation zone area (ha)	Minimum number of plots
<2	1 plot
>2–5	2 plots
>5–20	3 plots
>20–50	4 plots
>50–100	5 plots
>100–250	6 plots
>250–1000	7 plots; more plots may be needed if the condition of the vegetation is variable across the zone
>1000	8 plots; more plots may be needed if the condition of the vegetation is variable across the zone

- a. E3 zoned area: a BAM plot (number 16) has already been completed in this area. There were zero native flora species in this plot at the time of survey, which is why we have mapped it as poor quality PCT 1110. We did not put out tiles in this area as it did not appear to be suitable habitat for any grassland species. We have photos for this plot – **Excellent, just make sure you meet the plot density in Table 3 of the BAM. Also remember to include justification in the BDAR as to why your classifying an area as a DNG rather than a grassland, eg evidence of coarse woody debris from clearing, historical photographs or satellite imagery.**
- b. Powerline easement: a BAM plot (number 9) has already been completed in this area. There was low native coverage, and the veg zone didn't generate any credits in the BAM-C. We have photos for this plot – **Excellent. Remember to include the powerline easement in your calculations of subject land.**
- c. Cat 1 areas: a BAM plot (number 6) was completed close to the larger area mapped as Cat 1 (also close to the E3 zoned area), this plot also recorded zero native flora species at the time of survey. We have photos for this plot.

Planned surveys

1. We have one BAM plot outstanding to complete along the access road; this area was recently added to the footprint and so we will complete a BAM plot to verify the PCT/vegetation quality. - **excellent**
2. There are some areas shown on the map that have not been visited since the footprint changed (pink polygons, 'to be assessed'), these areas will be visited to ensure the PCT and zone is the same as the adjacent vegetation. - **excellent**
3. We had also planned to conduct a further two BAM plots in the wetland area to satisfy the number required for the area of impact, however the footprint has since been changed to avoid the wetland, so we do not see these as necessary anymore; **please advise if you disagree.** We previously conducted one BAM plot in the wetland within an older iteration of the footprint, which demonstrated the vegetation to be of low quality. - **Are both direct and indirect impacts being avoided?**
4. We have **targeted flora searches** planned in areas of the site that look like better quality habitat for several threatened flora species (either returned from the BAM-C or PMST 10 km search). One search will be undertaken in the powerline easement. We have tentatively mapped some other proposed targeted search locations (along the northern boundary); these areas are likely slightly better quality than the rest of the site, however the location of these searches may change once we are on site and the habitat better assessed. The species we intend to search for are as follows:
 - a. Dwarf Kerraung (Commersonia prostrata)
 - b. Buttercup Doubletail (Diuris aequalis)
 - c. Hoary Sunray (Leucochrysum albicans var. tricolor)
 - d. Tarango Leek Orchid (Prasophyllum petilum)
 - e. Silky Swainson-pea (Swainsona sericea)
 - f. Austral Toadflax (Thesium australe) – **if there are any species credit species in the BAMC case which you are not surveying for, make sure you provide justification for not surveying based on absent habitat constraints or absent microhabitat for each zone.**
5. Most rocky habitat is now avoided by the new development footprint; a small area that

can't be avoided will be surveyed for Pink-Tailed Legless Lizard by rock flipping in November. - **excellent**

6. **Grassland fauna habitat assessments** – we had intended to conduct these in any areas that seemed to be of better quality/tussocky. Last time we visited the site these areas seemed to be mostly in the powerline easement, and along the norther edge (mostly where targeted flora searches will occur); this is where we intend to target these searches. **If there are areas you would particularly like us to target, please advise.** Last time ecologists visited these areas the, E3 and Cat1 areas did not appear to be suitable habitat for any of the grassland species (e.g. Striped Legless Lizard, Golden Sun Moth), however we can conduct some in these areas if advised. – **We suggest using the Grassland Fauna Habitat Assessment transects to demonstrate that these areas are not suitable habitat. The recommended density for that method is 4 per zone. Method is attached.**
7. We also had targeted surveys planned for March/April to cover 3 SAI flora species that may be found in the wetland area, though as above, these are unlikely to be necessary now that the footprint has changed to avoid the wetland. **We would welcome your advice in this regard:**
 - a. Rough Eyebright (*Euphrasia scabra*)
 - b. Baeuerlen's Gentian (*Gentiana baeuerlenii*)
 - c. Trailing Monotoca (*Monotoca rotundifolia*) – **I'll contact the accountable officer to see if they have any advice about survey methods**
8. Most of the scattered trees on site are exotic planted trees, a couple here and there that will be assessed in November.

We have not done any surveys in the mapped Cat1 area in the eastern arm of the footprint; this was a pine plantation, and is currently under control of a mining operation. The trees have mostly been ripped up and the ground is pockmarked with holes and has been severely disturbed. We did not think that plots or habitat assessment were warranted in this case and that photos would suffice; **please let us know if you disagree.** – **This seems sensible. The only consideration is prescribed impact to native vegetating supporting threatened species (ie the same issue with the exotic grassland). As discussed, pine plantations can be suitable habitat for microbats due to their structural attributes, but it doesn't sound like there is a large enough patch size at Blind Creek to justify deploying an acoustic detector.**

If there is anything else we haven't covered here that you'd like us to address during November surveys, please let us know.

Kind regards,
Rebecca

REBECCA REID
ECOLOGIST

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E. rebecca.r@nghconsulting.com.au
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(PO Box 62) Fyshwick ACT 2609

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F.7 Email 7

From: [Beth Noel](#)
To: [Rebecca Reid](#)
Subject: FW: Grassland Fauna Habitat Assessment data sheet
Date: Friday, 24 September 2021 10:21:02 AM
Attachments: [image007.png](#)
[Grassland_fauna_habitat_assessment_data_entry_template_V2.xlsx](#)

From: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Sent: Monday, 19 July 2021 4:49 PM
To: Louiza Romane <louiza.r@nghconsulting.com.au>; Beth Noel <beth.n@nghconsulting.com.au>; Brooke Marshall <brooke.m@nghconsulting.com.au>
Cc: Allison Treweek <Allison.Treweek@environment.nsw.gov.au>; Angela Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Subject: Grassland Fauna Habitat Assessment data sheet

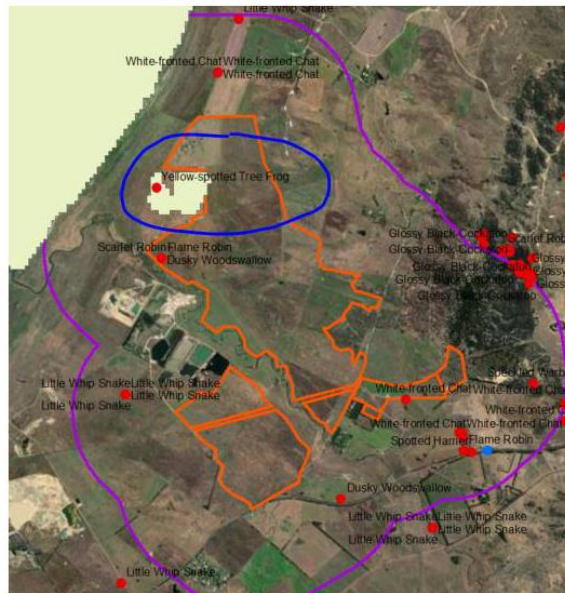
Hi Louiza, Beth and Brooke,

Grassland Fauna Habitat Assessment

Please find Rod Pietsch's Grassland Fauna Habitat Assessment field sheet attached. This will be useful for both Blind Creek Solar Farm and Wallaroo Solar Farm.

Candidate species credit species

With regards to Blind Creek Solar Farm, there are nearby records of Yellow-Spotted Tree Frog and Green and Golden Bell Frog. See the record of the Yellow Spotted Tree Frog below overlain with the NSW wetland mapping. Both species will likely be drawn in by the BAM-C. If there is suitable habitat in the riparian and wetland areas, we recommend surveying for both. There's plenty of information in the TBDC about the habitat requirements of both species.



Cat 1 land assessment

I have also attached the areas that our Map Review team does not consider to be Cat1. Note that this assessment they've done is not determinative and that the only conclusive way of ruling out land as Cat1 is using direct observations from plot data. Once this Greater Sydney lockdown has lifted, our team will be able to undertake a site and verify the Cat1 land assessment.

There are also some other small areas which are mapped on the Werriwa/Monaro CEEC advisory layer, but this layer isn't relevant to Category 1. However, as discussed previously, even if the land is considered Cat1, we would still likely require threatened species survey to inform the application of the avoidance principle.

Mallory Barnes

Senior Regional Biodiversity Conservation Officer, South East

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From: Mallory Barnes

Sent: Friday, 9 July 2021 9:13 AM
To: Louiza Romane <louiza.r@nghconsulting.com.au>
Cc: Allison Treweek <Allison.Treweek@environment.nsw.gov.au>; Angela Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Subject: RE: 20-403 - Blind Creek Solar Farm EIS

Morning Louiza,

Unfortunately our ban on face-to-face meetings is continuing for another week with the Greater Sydney lock down. The earliest we would be available is w/c 19 July, but it'll be contingent on whether the lockdown has ended.

We had a good chat with Beth Noel and Les Seddon yesterday about Wallaroo Solar Farm and many of the issues we discussed will be relevant to Blind Creek.

I left it with Beth to chat with you and Brooke about it, but I've also attached my notes from the meeting.

Mallory Barnes
Senior Regional Biodiversity Conservation Officer, South East

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From: Louiza Romane <louiza.r@nghconsulting.com.au>
Sent: Thursday, 8 July 2021 4:41 PM
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Cc: Allison Treweek <Allison.Treweek@environment.nsw.gov.au>; Angela Jenkins <Angela.Jenkins@environment.nsw.gov.au>
Subject: 20-403 - Blind Creek Solar Farm EIS

Hi Mallory,

Just touching base about rescheduling the Blind Creek site meeting. We will not be available next week but could be on site the week after if that suits you?

Cheers,

LOUIZA ROMANE

F.8 Email 8

From: [Brooke Marshall](#)
To: [Beth Noel](#); [Rebecca Reid](#)
Cc: [Zeina Jokadar](#)
Subject: FW: Discussion with Alison Treweek
Date: Thursday, 23 September 2021 5:10:18 PM
Attachments: [image001.png](#)

Hi ladies, re below, White fronted chat we actually had a management plan and monitoring around this species for the solar project. sounds like a good result from the discussion
Cheers, B.

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From: Luke Osborne <luke@striderenewables.com>
Sent: Thursday, 23 September 2021 5:00 PM
To: Brooke Marshall <brooke.m@nghconsulting.com.au>
Cc: Zeina Jokadar <zeina.j@nghconsulting.com.au>; Dominic Osborne <dosborne@treeworks.net.au>; Amy Kean <amy@striderenewables.com>
Subject: Discussion with Alison Treweek

Hi Brooke

Amy and I had a good discussion with Alison. We asked her what concerns her on this site in this area. She came up with the following

1. Golden Sun Moth (she conceded that this needed checking as Rod, the grasslands specialist, may have stated it was unlikely)
2. Little Whip Snakes. The known habitat is nearby in the Turallo Reserve.
3. White fronted chat. This was apparently noted in the Capital Solar Farm study?

She is also interested in

1. Yellow spotted tree frogs. She says an old record had them near the lagoon, and she is pleased we are avoiding that. She says she would be delighted if we voluntarily surveyed for it.
2. Run off from the solar farm contaminating the wetland.
3. Management of reserves and setbacks. She doesn't want these to be abandoned and the subject of weed invasion (serrated tussock and lovegrass).
4. She would like consideration for some natives sown back onto the site if any sowing is to take place. Kangaroo grass was suggested as a species that competes well with serrated tussock.

She would also like us to have a chat to Mallory about the design, and for you to chat through the supplementary survey strategy before going back to site. She does not think they can get on

site till late Oct.

Thanks

Luke

--



Luke Osborne BE MBA FIEAust CPEng EngExec
Director, [Stride Renewables](#)
0402574384

F.9 Email 9

From: [Mallory Barnes](#)
To: [Rebecca Reid](#)
Cc: [Brooke Marshall](#); [Zeina Jokadar](#); dosborne@treeworks.net.au; [Allison Treweek](#); [Luke Osborne](#)
Subject: RE: HPE CM: 20-403 - Blind Creek Solar Farm EIS
Date: Monday, 4 July 2022 5:39:36 PM
Attachments: [image001.png](#)
[Outgoing - BCD to Planning and Assessment - Blind Creek Solar Farm - BDAR - June 2022.PDF](#)

Hi Rebecca

Very sorry for the very delayed reply to this email following our meeting on 2 May about White – Fronted Chat at the proposed Blind Creek Solar Farm.

Our internal experts didn't think that it was appropriate to commence WFC survey until September. Their view was that local populations will not have commenced breeding any earlier.

As September survey would cause considerable delays to the construction timeframes, we've suggested that the prescribed impact is addressed through the development of a robust Biodiversity Management Plan (see Attachment 1 in letter for further details) which is submitted prior to consent. This would be instead of undertaking targeted survey for WFC.

There were no other major concerns with the BDAR, however the Southern Myotis credit liability could be reduced. See attachment 2 of the letter for further details.

Let me know if you have any questions.

Mal

From: Rebecca Reid <rebecca.r@nghconsulting.com.au>
Sent: Monday, 6 June 2022 11:04 AM
To: Mallory Barnes <Mallory.Barnes@environment.nsw.gov.au>
Cc: Brooke Marshall <brooke.m@nghconsulting.com.au>; Zeina Jokadar <zeina.j@nghconsulting.com.au>; 'Dominic Osborne (Treeworks Pty Ltd (ACT/NSW))' <dosborne@treeworks.net.au>; Luke Osborne <luke@striderenewables.com>; Allison Treweek <Allison.Treweek@environment.nsw.gov.au>
Subject: HPE CM: 20-403 - Blind Creek Solar Farm EIS

Hi Mal,

We've put together a summary of our meeting on Friday below; please let us know if you have any comments.

NGH and Stride discussed the White-fronted Chat prescribed impact species on 2/5/2022 with BCD.

Key to assessing prescribed impacts in this case is an understanding of where breeding habitat is on site and how this may be used (i.e., is it ephemeral or likely to be an important core area of habitat for this species).

The following steps are proposed between now and submission of the Response to Submissions (post EIS exhibition; Exhibition starts 7 June 2022).

1. Detailed survey plan prepared in consultation with BCD, based on existing surveys and nearby monitoring and knowledge of the site's habitat structure and farm operations at the site and in adjacent areas. We will shortly be liaising with Dom and Luke about specific areas of habitat they feel would be best to target surveys, subject to your approval
2. Survey during breeding season, identified during the meeting on 2/5/2022 as July to March
3. Update BDAR's Prescribed Impact Assessment, following survey
4. Prepare an outline of a Management Plan based on the survey findings (i.e., objectives, key protection, enhancement strategies proposed), to be included in the submission report

Key meeting points:

1. BCD: Aim of the surveys and data analysis is to understand how much of the site is suitable breeding habitat for the Chat, and how much of the breeding habitat will be impacted by the project.
2. BCD: The preferred outcome for the management of impacts for the WFC is breeding habitat protection and regeneration. Calculating offsets to manage the outcome would not provide a suitable outcome for the bird.
3. BCD: acknowledge the site is suitable for the Solar Farm and would just like to see a management plan that is focused on managing the WFC habitat.
4. BCD: If there is habitat along the creek, and we are avoiding these areas, it would be great outcome to show that these areas have been avoided
5. BCD: Agency response will acknowledge that consultation was held with the proponent regarding the WFC and they will consider the impacts to the WFC in the response to Submissions.
6. NGH: we have surveyed much of the site and have some data from incidental sightings. However, we did not do targeted surveys across the entire site, as we did not anticipate a survey for an ecosystem credit species. We did a single targeted survey near the wetland in December 2022 following BCD's site visit, however there wasn't time for additional surveys at that time.
7. NGH: has good monitoring and survey data from the neighbouring Capital Solar Farm site
8. NGH: has an approved management plan for the WFC for the Capital solar farm

Cheers,
Becky

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SENIOR ECOLOGIST

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NGH acknowledges that we work on the traditional lands of First Nations people across Australia and recognises the enduring connection to the land. We pay our respects to elders, past present and emerging.



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Appendix G Biodiversity Management Plan

Please see overleaf for full report.



NGH

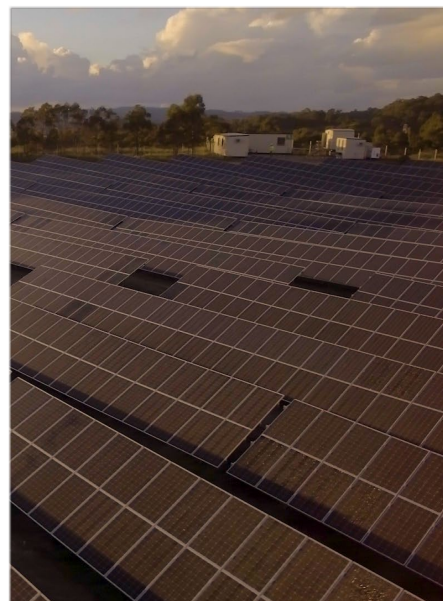


Biodiversity Management Plan

Blind Creek Solar Farm

September 2022

Project Number: 22-319



Document verification

Project Title:	Blind Creek Solar Farm
Project Number:	22-319
Project File Name:	22-319 Blind Creek SF BMP Final Clean

Revision	Date	Prepared by	Reviewed by	Approved by
Draft V.10	24/08/2022	D. Van Tholen, J. Russo	Beth Noel Nicola Smith	Nicola Smith
Final V.10	21/09/2022	D. Van Tholen, Z. Renner, D. Bambrick, J. Russo	Michelle Patrick	Michelle Patrick

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Table of contents

Acronyms and abbreviations	v
1. Introduction	7
1.1 Purpose and objectives	7
1.2 The Project	7
1.3 Environmental Management System	10
2. Planning	11
2.1 Relevant legislation and guidelines	11
2.1.1 Legislation	11
2.1.2 Guidelines and standards	11
2.1.3 Consent conditions and EIS mitigation measures	11
3. Consultation	18
4. Existing environment	20
4.1 Environmental aspects	20
4.1.1 Plant Community Types	22
4.1.2 Threatened Ecological Communities	22
4.1.3 Threatened species	24
4.1.4 Priority weeds	28
5. Environmental aspects and impacts	30
5.1 Construction activities	30
6. Environmental Management Zones	33
7. Environmental management, protocols, and procedures	39
7.1 Ecological management strategies	39
7.2 Demarcation of site boundary	40
7.3 Habitat and vegetation protection	40
7.4 Clearing protocols and surveys	41
7.4.1 Pre-clearing surveys	41
7.4.2 Clearing	41
7.4.3 Post-clearing surveys	41
7.5 Fauna rescue and release procedure	42
7.6 Weed and pathogen management procedure	42
7.7 Vehicle Hygiene Procedure	42
7.8 Feral animal management	42
7.9 Unexpected threatened species finds	43

7.10	Rehabilitation and material salvage.....	43
7.11	Vegetation management.....	45
7.11.1	Management zones	45
7.11.2	Weed Management	45
7.11.3	Vegetation condition	50
7.11.4	Management actions	50
7.12	White-fronted Chat management.....	51
7.12.1	Management zones	51
7.12.2	Vegetation condition, plantings and utilisation.....	51
7.12.3	Management of Noisy Miners	52
7.12.4	Management actions	53
7.13	Performance criteria, triggers, and responsibilities.....	53
7.14	Management and mitigation measures.....	63
8.	Compliance management	69
8.1	Roles and responsibilities	69
8.2	Training.....	69
8.3	Monitoring and inspections	69
8.4	Auditing.....	69
8.5	Reporting	70
9.	Review and improvement	71
9.1	Continuous improvement.....	71
10.	References	72

Figures

Figure 1-1	Indicative infrastructure layout (subject to detailed design).....	9
Figure 4-1	Biodiversity Constraints	21
Figure 4-2	BCSF PCTs, Vegetation and TECs.....	23
Figure 4-3	Male White-fronted Chat (<i>Sourced: Hermonslade Foundation</i>).....	25
Figure 4-4	Female White-fronted Chat (<i>Sourced: Hermonslade Foundation</i>)	25
Figure 4-5	White-fronted Chat nest (<i>Sourced: Hermonslade Foundation</i>).....	26
Figure 4-6	A full brood of Chats on the day of fledging (<i>Sourced: Hermonslade Foundation</i>)	26
Figure 4-7	White-fronted Chat habitat and habitat restoration areas	27
Figure 6-1	Environmental management zones – overview.....	35
Figure 6-2	Environmental management zones – map 1	36

Figure 6-3 Environmental management zones – map 2	37
Figure 6-4 Environmental management zones – map 3	38
Figure 7-1 Management zones identifying	46
Figure 7-2 Exclusion zones - map 1	47
Figure 7-3 Exclusion zones - map 2	48
Figure 7-3 Exclusion zones - map 2	49

Tables

Table 2-1 Mitigation measures relevant to biodiversity management from the approved Project Submissions Report.....	12
Table 3-1 Status of consultation with BCS.....	18
Table 4-1 PCTs confirmed within the Development Site by field surveys.....	22
Table 4-2 Threatened species observed during field surveys	24
Table 5-1 Blind Creek Solar Farm construction activities	30
Table 7-1. Relative abundance categories	43
Table 7-2 Summary of performance criteria, triggers for actions and responses for environmental management protocols and procedures	55
Table 7-3 Performance criteria, triggers for actions and responses for environmental management protocols and procedures of weed and pest species	58
Table 7-4 Biodiversity management and mitigation measures	63
Table 9-1 Sample vehicle hygiene register.....	I-I
Table 9-2 Recommended species list for planting	K-II

Appendices

Appendix A Consultation	A-I
Appendix B Procedure for vegetation clearing	B-I
Appendix C Pre-clearing checklist.....	C-I
Appendix D Post-clearing checklist	D-I
Appendix E Fauna pre clearance procedure.....	E-I
Appendix F Fauna interaction register	F-I
Appendix G Weed and pathogen management procedure	G-I
Appendix H Unexpected threatened species finds procedure	H-I
Appendix I Vehicle hygiene register	I-I
Appendix J Baseline Plot Data from BDAR	J-I

Appendix K Planting specification for Zone 2.....K-I

Acronyms and abbreviations

AC	Alternating current
BAM	Biodiversity Assessment Methodology
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BCS	Biodiversity, Conservation and Science Directorate
BCSF	Blind Creek Solar Farm
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	<i>Biosecurity Act 2015 (NSW)</i>
CCTV	Closed Circuit Television
CEMP	Construction Environmental Management Plan
CoC	Condition of Consent
Cth	Commonwealth
DC	Direct current
DPE	Department of Planning and Environment (NSW) (formerly DPIE)
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement
ha	hectares
HBT	Hollow-bearing tree
km	kilometres
kV	kilovolt
m	metres
MW	megawatt
MWh	megawatt hour
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NES	Matters of National Environmental Significance under the EPBC Act (<i>c.f.</i>)
NMP	Noise Management Plan
NSW	New South Wales
PCT	Plant Community Type
PCUs	Power Conversion Units

POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
PV	Photovoltaic
SSD	State Significant Development
SWMP	Soil and water Management Plan
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
WFC	White-fronted Chat

1. Introduction

1.1 Purpose and objectives

The Blind Creek Solar Farm (BCSF) Project (the Project) includes the construction, operation and decommissioning of a solar photovoltaic (PV) energy generation facility with an estimated capacity of up to 350 megawatt (MW) alternating current (AC) (420MW direct current (DC)). It includes associated infrastructure, including grid connection and battery storage of nominally 300MW / 600MWh. The Project is located on the south-eastern shores of Lake George 30 kilometres (km) from Queanbeyan, the closest major regional centre, and 7km from the nearby township of Bungendore.

As of August 2022, the current status of the Project (SSD-13166280) is in the Response to Submissions stage. This Biodiversity Management Plan (BMP) has been developed in collaboration with Biodiversity, Conservation and Science Directorate (BCS) and will be submitted prior to consent as a part of the Response to Submissions. BCS comments and suggestions that have guided this BMP are attached in Appendix A and consultation outlined in Section 3. This BMP should be read in context to the updated BDAR (August 2022) and will be referred to in the Conditions of Consent once approval is complete. Additionally, Section 1.3 outlines the relationship between the BMP and the Project overall Environmental Management System (EMS).

This BMP is an implementation plan for conservation and protection, restoration and enhancing the biodiversity value through all phases of the BCSF Project. It sets out the objectives and relevant management actions, along with identifying the mitigation measures necessary to deliver the outcomes of the assessment process and consent conditions of approval. The implementation of this BMP also has the objective of managing and restoring an equivalent amount of White-fronted Chat (*Epthianura albifrons*) breeding habitat in response to the prescribed impact of the BCSF. Further, this BMP will be submitted prior to consent as a part of the Response to Submissions as an appendix of the BDAR and be referred to in the Conditions of Consent. Ultimately, the BMP will be a subplan in the BCSF Environmental Management System (EMS).

1.2 The Project

The key features of the Project are summarised in the following list and shown in Figure 1-1. The component specifications and location of infrastructure are subject to some modification during detailed design.

The Project includes the following main infrastructure components:

- Approximately 850,000 PV single axis tracking solar modules (mounted on pile-driven foundations)
- Approximately 85 inverters and transformers
- A BESS including nominally 300MW / 600MWh of lithium-ion batteries with inverters
- An onsite 330 kilovolt (kV) substation connected to the existing 330kV transmission line that passes through the site
- Underground cabling to connect solar modules, combiner boxes, Power Conversion Units (PCUs) and batteries, data services and communications
- Buildings to house a site office, switchgear, protection and control facilities, maintenance facilities, storage and staff amenities

- A communications tower for high reliability grid operations
- Internal tracks, new and upgraded sections totalling approximately 27km
- Perimeter security fencing (if required), closed-circuit television (CCTV) and security lighting at the switching station, BESS and O&M building area, only
- Stock fencing and water
- Visual amenity plantings in specific locations
- Site access intersection upgrades off Tarago Road.

During construction phase, temporary facilities would include a laydown area with secure compound, construction site offices and amenities and car and bus parking areas for construction staff. The construction phase of the Project is expected to take approximately 12 to 18 months and the Project would have an operational life of nominally 35 years or more.

Infrastructure components are detailed in Section 4.3 of the Project EIS (NGH, 2022).

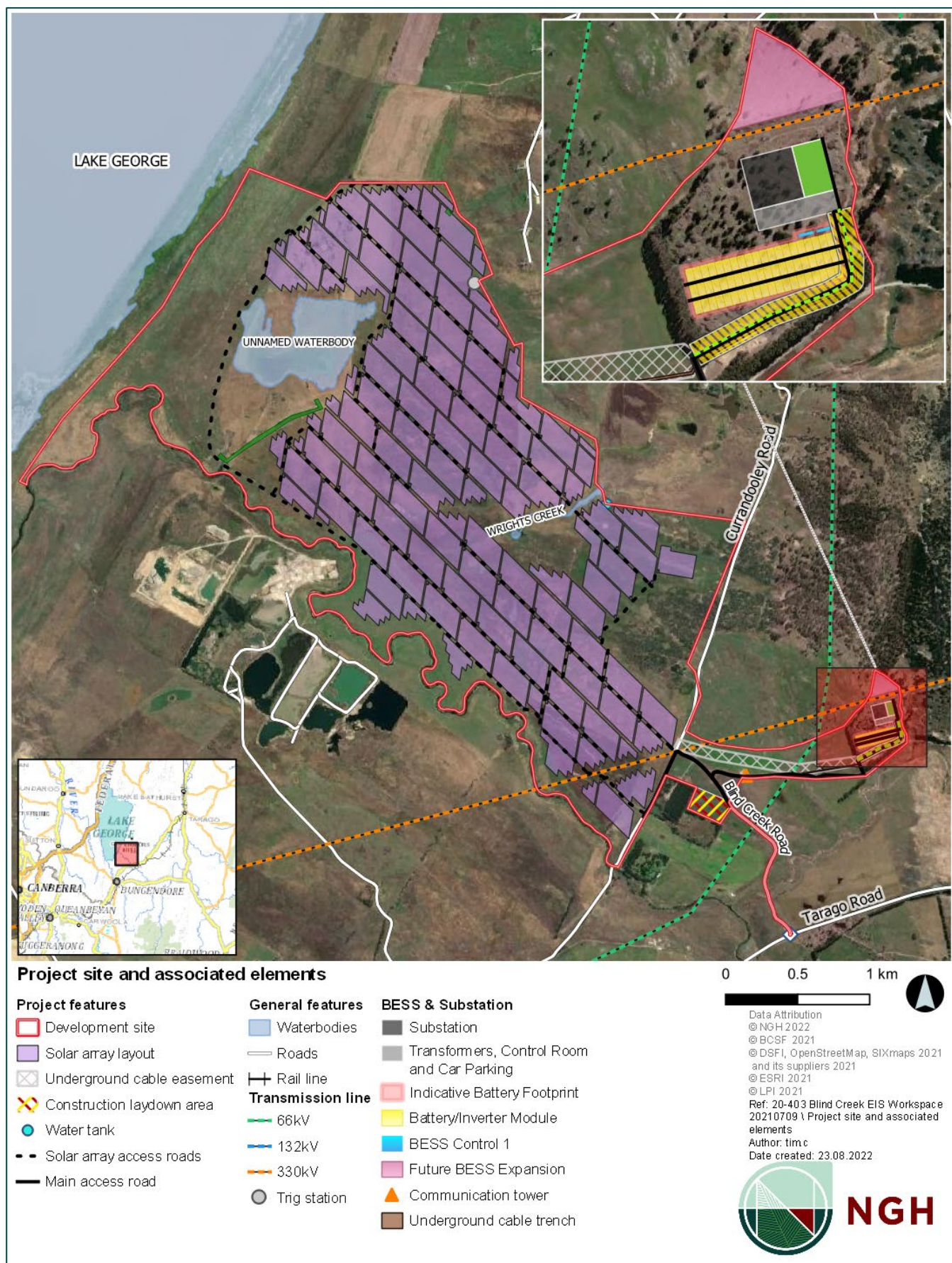


Figure 1-1 Indicative infrastructure layout (subject to detailed design)

1.3 Environmental Management System

This BMP is part of the Project's overall Environmental Management System (EMS). Mitigation and management measures identified in this BMP will be incorporated into site or activity-specific Environmental Work Method Statements (EWMS). Importantly it will be developed further and updated once the Project is in post-approval and prior to any construction being undertaken, completing the EMS.

When used concurrently, the overarching EMS, BMP and other subplans, procedures and EWMS form management guides that clearly identify the necessary environmental management actions for reference by the proponent's personnel and contractors.

The review and document control processes for this plan are described in the EMS. A summary of consultation regarding this plan is included in Appendix A.

2. Planning

2.1 Relevant legislation and guidelines

2.1.1 Legislation

Legislation relevant to the development and implementation of the BMP includes:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *National Parks and Wildlife Act 1974* (NPW Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Protection of the Environment Operations Act 1997* (POEO Act)
- *Biosecurity Act 2015*

2.1.2 Guidelines and standards

Guidelines and standards relevant to the development and implementation of the BMP include:

- NSW National Parks & Wildlife Service. 2001. Policy for the Translocation of Threatened Fauna in NSW: Policy and Procedure Statement No. 9 Threatened Species Unit, Hurstville NSW
- Australian Standard 4970 – 2009 Protection of Trees
- NSW Biosecurity Strategy 2013 – 2021
- NSW Invasive Species Plan 2018 – 2021
- New South Wales Weeds Action Guidelines 2020 – 2025
- Southeast Regional Strategic Pest Animal Plan 2018 - 2023
- Monitoring, Evaluation, Reporting and Improvement (MERI) framework for pest animal management in NSW (May 2020)

2.1.3 Consent conditions and EIS mitigation measures

The mitigation measures relevant to the BMP are listed in Table 2-1. A cross reference is also included to indicate where the requirement is addressed in this Plan or other project management documents. This section will be updated post-approval outlining the conditions of approval and a reference to where each condition is addressed.

Table 2-1 Mitigation measures relevant to biodiversity management from the approved Project Submissions Report

No.	Mitigation measure	Phase	Reference
Biodiversity			
B1	<p>Preparation and implementation of a Biodiversity Management Plan (BMP) for the site to include:</p> <ul style="list-style-type: none"> • How to remove and dispose of vegetation and topsoil containing weeds declared under the <i>Biosecurity Act 2015</i> during and after construction. • Identification and protection of biodiversity exclusion zones during construction and operation. • Restoration of an equivalent amount of White-fronted Chat breeding habitat impacted by the Project. 	Pre-construction Construction Operations	<p>This Plan Section 7.5</p> <p>Section 6</p> <p>Section 7.12</p>
B2	Instigating clearing protocols including pre-clearing surveys, daily surveys during clearing works and staged clearing, the presence of a trained ecologist or licensed trained spotter catcher during clearing events, construction and maintenance activities for human-made structures and non-native vegetation	Pre-construction Construction	This Plan Section 7.4
B3	<p>Induct all staff prior to construction to identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance:</p> <ul style="list-style-type: none"> • Staff training and site briefing to communicate environmental features to be protected and measures to be 	Pre-construction Construction	This Plan Section 8.2

No.	Mitigation measure	Phase	Reference
	<p>implemented</p> <ul style="list-style-type: none"> • Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing • No stockpiling or storage within dripline of any mature trees • No stockpiling or storage within riparian buffers. 		
B4	<p>Adopt clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed:</p> <ul style="list-style-type: none"> • Documented clearance protocols to mark and protect vegetation to be retained • Use handheld machinery where possible and have elevated work platform check hollows prior to tree felling. 	Pre-construction Construction	This Plan Section 7.4
B5	<ul style="list-style-type: none"> • Use noise barriers, or daily/seasonal timing of construction and operational activities to reduce impacts of noise 	Construction	NMP (Post Approval)
B6	Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	Construction	CEMP (Post Approval)
B7	Using adaptive dust management and	Construction	TMP

No.	Mitigation measure	Phase	Reference
	monitoring programs to control air quality	Operations	(Post Approval)
B8	Install temporary fencing to protect significant environmental features such as riparian zones, karst, caves, rock outcrops and water bodies: Prior to construction commencing, exclusion fences and signage would be installed around identified exclusion zones.	Pre-construction Construction	This Plan Section 7.2, CEMP (Post Approval)
B9	Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Construction Operations	This Plan Section 7.6 and Section 7.7
B10	Preparation of a vegetation management plan to regulate activity in vegetation and habitat adjacent to the proposed Project	Construction	VMP (Post Approval)
B11	Scheduling the timing of construction activities to avoid critical life cycle events (e.g., timing construction activities to avoid the white fronted chat, or using the site): <ul style="list-style-type: none"> Any clearing works should be timed to avoid September-November – breeding season for the WFC. Avoid works near wetland areas if threatened species are detected 	Construction	CEMP (Post Approval)
B12	Using sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment	Construction	CEMP SWMP (Post Approval)
B13	Ecological restoration, rehabilitation actions and/or maintenance of retained native	Construction	This Plan VMP

No.	Mitigation measure	Phase	Reference
	vegetation on, or adjacent to, the Development Footprint		
B14	Relocating habitat features (fallen timber, hollow logs and embedded rock that requires removal during construction) from within the Development Footprint. All displaced habitat features can be placed in areas outside the Development Footprint, as directed as directed by the ecologist).	Construction	This Plan Section 7.10
Visual Amenity			
V1	<p>A Landscape Management Plan (LMP) is recommended to address the 'as built' visual impacts of the proposed solar farm. The plan should include:</p> <ul style="list-style-type: none"> • On-site vegetation screening including details of selected species aimed at 'breaking up' not blocking views of onsite infrastructure. • Vegetation screening along Butmaroo Creek would potentially impact Archaeological and ecological sensitive areas. Consultation with the RAPs will be undertaken to inform the location of this vegetation screening. • Location of planting locations, generally expected to be between the perimeter / security fencing and the property boundary. • Band width, generally expected to be approximately 6m with three (3) rows of vegetation in high visual impact 	Design Construction	LMP (Post Approval)

No.	Mitigation measure	Phase	Reference
	<p>areas and two (2) rows in low / moderate visual impact areas.</p> <ul style="list-style-type: none"> Maintenance schedule for a period of 24 months. Maintenance should generally include the removal of weeds and replacement of dead or non-performing plants. The plan would be implemented nearing completion of construction and would be subject to agreement with the relevant landowner. 		
Soils and Landforms			
S3	<p>As part of the CEMP, a Soil and Water Management Plan (incorporating a Site Drainage Plan and Erosion and Sediment Control Plan) will be prepared, implemented and monitored during the Project to minimise soil and water impacts. These plans would include provisions to:</p> <ul style="list-style-type: none"> Install, monitor and maintain erosion controls. As part of the CEMP, a Soil and Water Management Plan (incorporating a Site Drainage Plan and Erosion and Sediment Control Plan) would be prepared, implemented and monitored during the Project to minimise soil and water impacts. These plans would include provisions to: Install, monitor and maintain erosion controls. Identify and protect sensitive features 	Pre-construction	SWMP (Post Approval)

No.	Mitigation measure	Phase	Reference
	<p>such as native vegetation, dams and water courses.</p> <ul style="list-style-type: none"> • Ensure that machinery leaves the site in a clean condition to avoid tracking of sediment onto public roads. • Manage topsoil: in all excavation activities, separate subsoils and topsoils to restore natural soil profiles and assist revegetation, guided by the findings of the pre-works soil survey. Topsoils stockpiled for extended periods would be managed to avoid contact with overland runoff, minimise weed risks, and maintain soil organic matter, soil structure and microbial activity. • Minimise the area of disturbance from excavation and compaction and rationalise vehicle movements to minimise soil impacts. • Ensure any discharge of water from the site is managed to ensure ANZECC (2000) water quality criteria are met as far as practicable, ensure excavations are not scheduled when heavy rainfall events are predicted, or soils are saturated. 		

3. Consultation

This Biodiversity Management Plan (BMP) has been developed in collaboration with BCS and will be submitted prior to consent as part of the Response to Submissions. BCS comments and suggestions that have guided this BMP primarily relate to the 2020 Biodiversity Assessment Methodology (BAM) prescribed impact assessment for impacts to White-fronted Chat (*Epthianura albifrons*), and are attached at Appendix A and summarised below in Table 3-1

This draft has been developed to facilitate early input from regulatory authorities, namely BCS and other agencies and councils. It will then be updated and finalised post approval consultation, resulting in those comments being cited and incorporated.

Table 3-1 Status of consultation with BCS

Key matters for consultation	Status
Collaborate on the Development of a BMP to better address the requirements of the 2020 BAM prescribed impact assessment for impacts to White-fronted Chat (<i>Epthianura albifrons</i>), Vulnerable, <i>Biodiversity Conservation Act 2016</i>) which is utilising non-native vegetation in the Subject Land.	This document (on-going)
The BMP should:	
Be easy for operational staff to use and provide a clear, concise, and auditable environmental management framework.	This Document (on-going)
Identify the threats known to affect the viability of WFC. At a minimum, include known threats listed in the threatened species profile in the Threatened Biodiversity Data Collection (TBDC).	Section 7.12
Detail management actions that would be applied to management zones to address threats. Identify the management zones on a site map. Identify and map any management zones which require different management actions. Suggested management actions include – Establishing dense plantings of indigenous species that support WFC breeding such as <i>Poa labillardieri</i> , prickly <i>Acacia</i> species such as <i>Acacia paradoxa</i> , <i>Bursaria spinosa</i> , <i>Leptospermum</i> and <i>Chenopodiaceae spp.</i> Fencing revegetated areas and installation of tree guards around each plant to prevent trampling and grazing by domestic livestock and overabundant native macropods. Aggressive exclusion or suppression of foxes,	Section 7.1. Note, <i>Chenopodiaceae</i> species have not been recommended for planting as these species do not typically grow in the habitat identified within the development site.

Key matters for consultation	Status
cats, and, where relevant, overabundant populations of non-threatened native species such as Noisy Miners (<i>Manorina melanocaphala</i>) macropods. Aggressive control of weed species not associated with WFC breeding habitat. Identify a specific and measurable performance criteria for each threat. This might be within a range eg, <i>>80% cover is comprised of indigenous species that support WFC breeding and <5% total cover comprised of weed species</i>	
Detail an achievable monitoring program which is designed to assess the delivery of each performance criteria, e.g. <i>Management zones will be surveyed three times each breeding season for WFC utilisation, commencing two years after planting and continuing for the first 10 years of operation or until WFCs are consistently utilising management zones.</i>	Section 7.12
Identify a trigger (value outside of the target range) that would initiate adaptive management, e.g. <i>No WFC utilisation of a management zone for three consecutive surveys or weed species comprise greater than 10% total groundcover.</i>	Section 7.13
Identify a realistic management action that is likely to place the variable back within the target range, e.g. <i>in-fill planting or spot application of herbicide.</i>	Section 7.13
Identify the person responsible for undertaking monitoring, identification of triggers, and commence the management action, e.g. <i>Blind Creek Solar Farm's Environmental Manager will be responsible for implementing a weed monitoring program.</i>	Section 7.13 Section 8.1
Provide a time frame for the monitoring program and achieving the target range. Interim performance criteria might be necessary.	Section 7.13
Provide a reporting frequency to assess the delivery of each performance criteria.	Section 7.13
Consider payment of a bond until performance criteria are met.	N/A
Be prepared to the satisfaction of BCS and submitted prior to the issue of conditions of consent.	Refer to Appendix A for consultation details

4. Existing environment

4.1 Environmental aspects

The following sections summarise the existing ecological features within and adjacent to the Development Site, including species, communities, and habitats. The ecological constraints, features and general Project layout of the site are presented in Figure 1-1 and Figure 4-1.

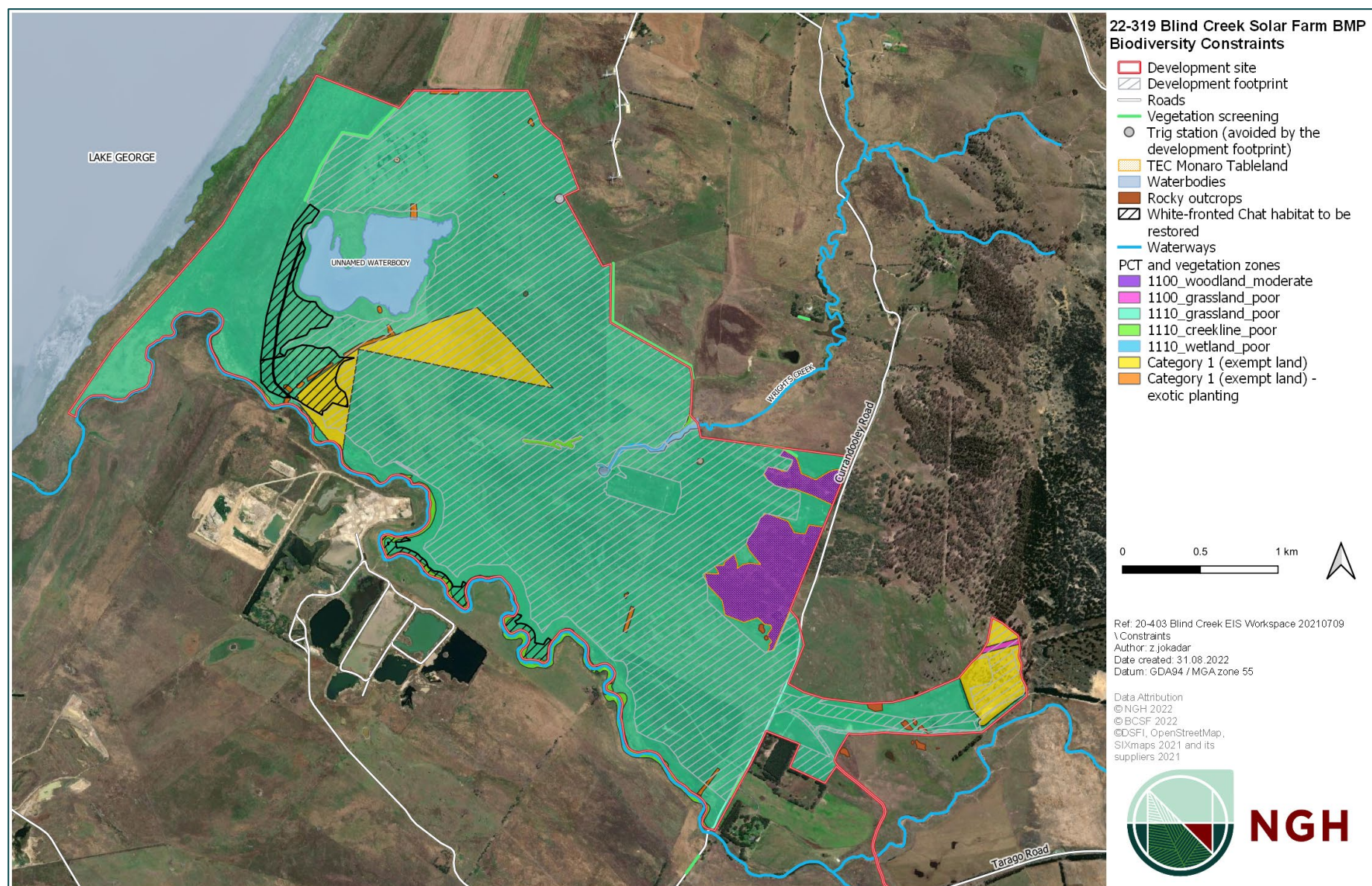


Figure 4-1 Biodiversity Constraints

4.1.1 Plant Community Types

The Development Site is comprised of highly degraded Plant Community Types (PCTs) 1100 and 1110 dominated by exotic species, as observed during field surveys. A summary of these PCTs and their characteristics are provided in Table 4-1.

Table 4-1 PCTs confirmed within the Development Site by field surveys

Plant Community Type	Description	Location
PCT 1100 – Ribbon Gum	<i>Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion</i>	<i>Avoided by the BCSF but within the Development Site</i>
PCT 1110 – River Tussock – exotic dominated	<i>Tall Sedge - Kangaroo Grass moist grasslands of the South Eastern Highlands Bioregion</i>	<i>Majority of BCSF footprint</i>

A map outlining the location of these observed PCTs is provided in Figure 4-2.

4.1.2 Threatened Ecological Communities

Threatened Ecological Community (TEC) Monaro Tableland Cool Temperate Grassy Woodland was identified within the Development Site. However, after BCS reviewed the BDAR during the exhibition of the EIS, BCS was satisfied that due to the highly degraded condition of the PCT associated with this TEC within the development footprint, this PCT no longer meet the criteria for the TEC. Therefore, no TEC occurs within the development footprint.

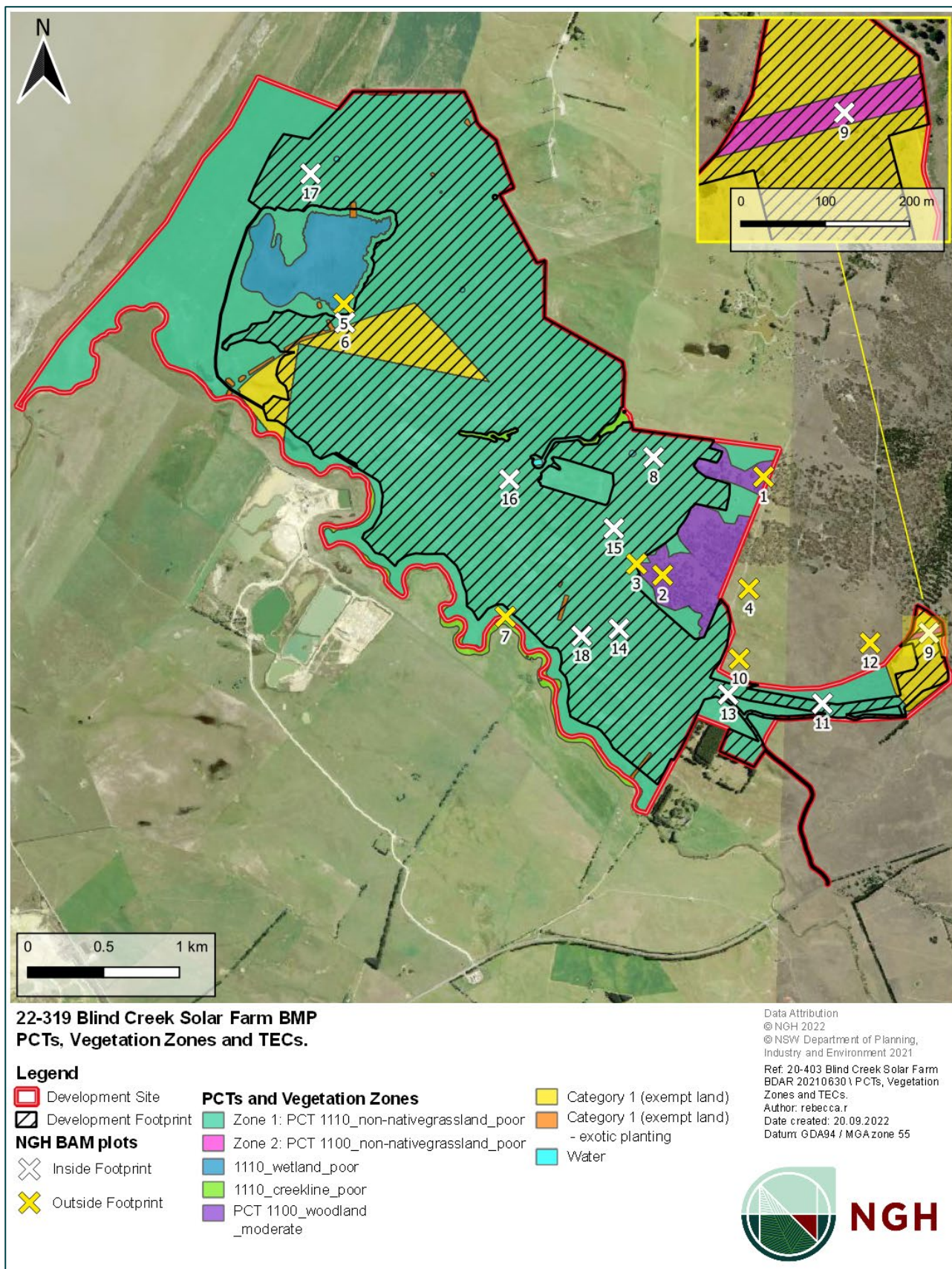


Figure 4-2 BCSF PCTs, Vegetation and TECs

4.1.3 Threatened species

Two threatened species were detected within the Development Site. Table 4-2 summarises these threatened species and anticipated impacts.

Table 4-2 Threatened species observed during field surveys

Species	Anticipated impacts
Microbats	
Large Bent-winged Bat (<i>Miniopterus orianae oceanensis</i>)	Foraging habitat only, no direct impacts anticipated as woodland has been retained
Birds	
White-fronted Chat (<i>Epthianura albifrons</i>)	Breeding and foraging habitat. Development of supplementary breeding habitat for this species is proposed in this document to cater for loss of habitat

White-Fronted Chat

White-Fronted Chats (WFC) were detected at four locations in the Development Footprint along the northern side of Butmaroo Creek in dense, non-native vegetation dominated by Scotch Thistle (*Onopordum acanthium*) (Figure 4-7). The BDAR identifies that this represents a prescribed impact. It is unclear if the non-native vegetation forms foraging and/or breeding habitat for WFC, however the latter is of greater conservation significance. The species is known to utilise several prickly non-native species as breeding habitat.

The fragmentation of habitat and urban development compounded with the impacts of climate change is also a major threat to the WFC. WFC populations are being increasingly reduced to isolated declining populations, each heading toward extinction. Inland swamps associated with changed hydrological conditions have shown significant declines. This is the impetus for the protection and conservation of the species whilst not being listed as a threatened species.

Due to critical construction timeframes, completing further targeted surveys for the WFC during the breeding season (September to March), to determine if the areas of Scotch Thistle are being used as breeding habitat, was not feasible. Following BCS's review of the BDAR during the exhibition of the EIS, BCS recommended completing surveys for the extent of Scotch Thistle within the Subject Land. All areas of Scotch Thistle can then be assumed as breeding habitat for the WFC and supplementary habitat restoration undertaken.

Surveys for Scotch Thistle identified approximately 103.17 hectares (ha) of Scotch Thistle within the Development Site, of which 33.86ha occurs within the Development Footprint (Figure 4-7). As per BCS's recommendation, at least an equivalent area of land is to be restored for WFC breeding habitat within the Development Site. Approximately 33.86ha has been identified within the Development Site (outside the Development Footprint). A monitoring program in this BMP (Section 7.12 and 7.13) has been developed in consultation with BCS to facilitate the establishment and ongoing management of this habitat for the White-fronted Chat.

Photographs of the WFC and its nest and fledglings are shown in Figure 4-3, Figure 4-4, Figure 4-5 and Figure 4-6. These photographs serve as good examples of what the species looks like including male, female, young and the nest of a WFC.



Figure 4-3 Male White-fronted Chat (Sourced: [Hermonslade Foundation](#))



Figure 4-4 Female White-fronted Chat (Sourced: [Hermonslade Foundation](#))



Figure 4-5 White-fronted Chat nest (Sourced: [Hermonslade Foundation](#))



Figure 4-6 A full brood of Chats on the day of fledging (Sourced: [Hermonslade Foundation](#))

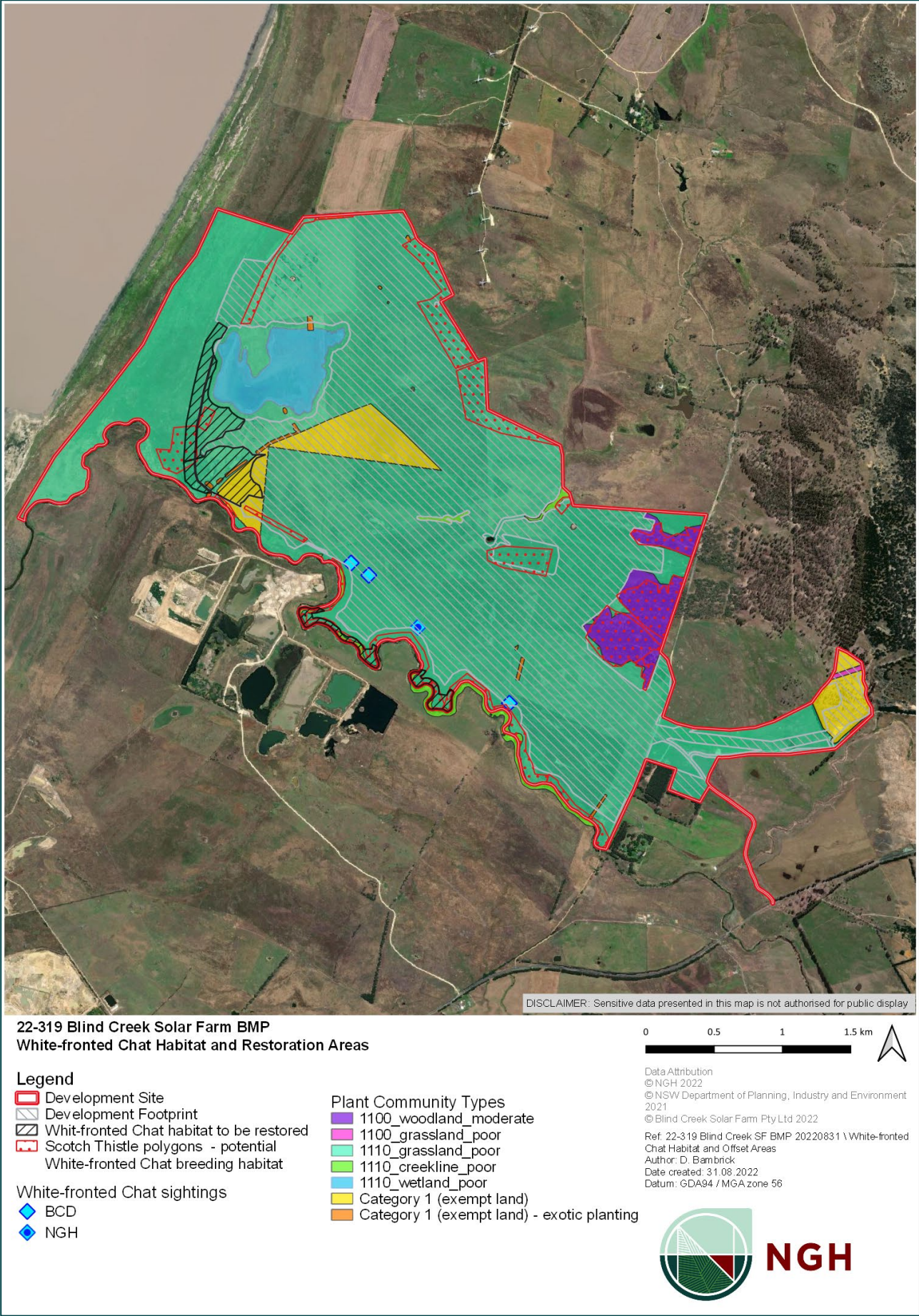


Figure 4-7 White-fronted Chat habitat and habitat restoration areas

Key Threats

The major threats to the WFC are the fragmentation of habitat and urban development compounded with the impacts of climate change (OEH, 2021). WFC populations are being increasingly reduced to isolated declining populations, each heading toward extinction (OEH, 2021). Inland swamps associated with changed hydrological conditions have shown significant declines. This is the impetus for the protection and conservation of the species whilst not being listed as a threatened species.

The NSW Scientific Committee final determination identifies six key threats to the White-fronted Chat:

- Reduction in habitat size and quality
- Human disturbance (particularly in urban areas) and elevated nest-predation levels
- Much of their natural habitat is prone to alteration due to modification of river flows and floodplains
- Prone to predation from snakes and mammals, particularly feral cats, European red foxes and rodents, as well as birds, particularly ravens
- In coastal areas mangrove encroachment and sea-level rise associated with global warming present an additional future threat to their preferred habitat (not relevant at BCSF)
- Feral animals.

The Red Fox (*Vulpes vulpes*) and cats (*Felis catus*) are identified as key feral species for management, and over abundant populations of Noisy Miners (*Manorina melanocaphala*). Domestic / feral cats, foxes and other feral predators can increase in number, due to increasing habitat edges created by the development increasing movement capacity and success of feral predators. This is unlikely for this Project, as the majority of the Development Footprint follows existing vegetation and will not greatly increase the edge effect.

4.1.4 Priority weeds

From field surveys undertaken as part of the Project Biodiversity Development Assessment Report (BDAR), approximately 635.38ha of the Development Site was assessed as native vegetation in poor condition.

Eight weeds are listed as priority weeds for the South East Region under the NSW Biosecurity Act. These are:

- Serrated tussock (*Nassella trichotoma*)
- African Lovegrass (*Eragrostis curvula*)
- Chilean Needle Grass (*Nassella neesiana*)
- Blackberry (*Rubus fruticosus* species aggregate)
- Fleabane (*Conyza* spp.)
- Scotch Thistle (*Onopordum acanthium*)
- Saffron Thistle (*Carthamus lanatus*)
- White Horehound (*Marrubium vulgare*).

The *Biosecurity Act 2015* dictates that all priority weeds are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any land managers or

authorities who deal with any plant has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Other exotic flora that was identified within the study area are common within the region and are often found within disturbed areas. No weeds of national significance were observed during field surveys.

5. Environmental aspects and impacts

5.1 Construction activities

A variety of construction activities that have the potential to impact upon biodiversity management will be undertaken as part of the Project. These activities include, but are not limited to, those outlined in the following Table 5-1.

Table 5-1 Blind Creek Solar Farm construction activities

Activity	Details
Site establishment and preparation	<ul style="list-style-type: none"> Detailed site survey. Establishment of site access. Establishment of the construction set out area involving excavation works to level the site and installation of any required drainage infrastructure. Construction of internal access roads and their associated drainage works. Delivery of equipment and materials (ongoing). Installation of security fencing requiring minor excavation works and construction of concrete footings.
Installation of solar panels	<ul style="list-style-type: none"> Site survey to determine levels and depth of steel posts (part of the mounting structure). Driving of steel posts into the ground using specialist pile driving equipment. Depending on site survey results, some piles may need to be predrilled and grouted in. Installation of mounting structure on posts. Installation of tracking equipment and solar modules onto the mounting structure.
Installation of PCU	<ul style="list-style-type: none"> Excavation works to level the ground at location of the unit only. Installation of form work and pouring of concrete slab. Use of crane to lift the PCU into place.
Cabling	<ul style="list-style-type: none"> Install low voltage DC wiring electric cable to each solar module and connection to collectors at end of each row of panels. Install underground cabling to the PCUs. Install medium voltage AC electric cables from the PCUs to the site substation. Cable would be installed either underground in trenches, or overhead across water courses, to be designed in accordance with HV electrical industry best practice.
Substation and control room (works may be undertaken concurrently with the solar panel installation)	<ul style="list-style-type: none"> Excavation works to level site area only. Installation of form work and pouring of concrete slabs. Installation of road-base to provide level hard standing as required. Construction of the buildings. Installation of transformers, switchgear, circuit breakers, electrical

Activity	Details
	<p>equipment and cable structures using cranes where necessary.</p> <ul style="list-style-type: none"> • Installation of control room and connecting facilities, including septic tank. • Laying and connection of cables to transformers and switching equipment. • Commissioning.
Connection of the solar farm to the 330kV overhead powerline	<ul style="list-style-type: none"> • Stringing of high voltage cables from the site substation to connect to high voltage overhead line. These would be either above or below ground. • Cable terminations and testing.
Testing and commissioning of solar farm	<ul style="list-style-type: none"> • This would include testing all cable connections and electrical equipment and progressively connecting stages of the Project to the grid as commissioning is completed. Comprehensive regulatory approvals are required at this stage prior to final connection to the grid.

6. Environmental Management Zones

The Project area has been divided into six discrete zones for the purposes of biodiversity management (Figure 6-1):

1. Category 1 areas and native grassland that will be impacted by the Project
2. White-fronted Chat habitat that will be restored by the Project
3. Riparian areas that will be avoided and retained by the Project
4. Woodland areas that will be avoided and retained by the Project
5. Native grassland that will be avoided and retained by the Project
6. Native grassland and Category 1 areas that are not subject to construction and retained by the Project, but subject to grazing.

Management zones 2, 3, 4 and 5 are Exclusion Zones where, habitat is being restored or avoided and retained by the Project.

The six management zones are described below, and their location is shown in Figure 6-1, Figure 6-2, Figure 6-3, and Figure 6-4. These zones are referred to in the management protocols and procedures described in Section 7.

Zone 1 – Category 1 areas and native grassland that will be impacted by the Project

These are areas where much of the solar farm infrastructure will be constructed and includes the removal of trees. Vegetation zones within this management zone includes Category 1 land and PCT 1110_non-nativegrassland_poor.

Specific protocols will need to be employed to manage the impacts of vegetation clearance. These areas will require ongoing management particularly during operation to ensure adequate groundcover is retained and to manage weeds.

Zone 2 - White-fronted Chat habitat that will be restored by the Project

These are areas along Butmaroo Creek (within the Development Site) which will be restored to provide breeding habitat for the WFC and are to be protected through all phases of the Project. This zone requires protection fencing suitable for the exclusion of livestock.

Vegetation zones within this management zone includes PCT 1110_non-nativegrassland_poor, PCT 1110_creekline_poor, Category 1 (exempt land)-exotic planting and Category 1 (exempt land).

Zone 3 - Riparian areas that will be avoided and retained by the Project

The riparian areas within the Development Site are exclusion zones and are to be protected for the life of the Project. Vegetation zones within this management zone includes PCT 1110_creekline_poor and PCT 1110_wetland_poor.

This zone is particularly vulnerable to erosion, sedimentation and contamination. Enrichment and improvement of this zone can occur during construction and operation. This zone requires protection fencing.

Zone 4 – Woodland areas that will be avoided and retained by the Project

These are areas of native woodland vegetation (PCT 1100_woodland_moderate) that are identified to be protected for the life of the Project. Enrichment and improvement of this zone can occur during construction and operation. This zone requires protection fencing.

Zone 5 – Native grassland that will be avoided and retained by the Project

These are areas of native grassland (PCT 1110_non-nativegrassland_poor) that are identified to be protected for the life of the Project.

Enrichment and improvement of this zone can occur during construction and operation. This zone requires protection fencing (but can be incorporated into Zone 2 fencing where appropriate).

Zone 6 – Native grassland and Category 1 areas that are not subject to construction and retained by the Project, but subject to grazing

These are areas of category 1-Exempt Land containing exotic woodland and grassland, and native grassland areas (PCT 1110_non-nativegrassland_poor). Enrichment and improvement of this zone can occur during construction and operation but is not required. This zone does not require fencing. A grazing regime in line with the existing practices are proposed to occur within this zone.

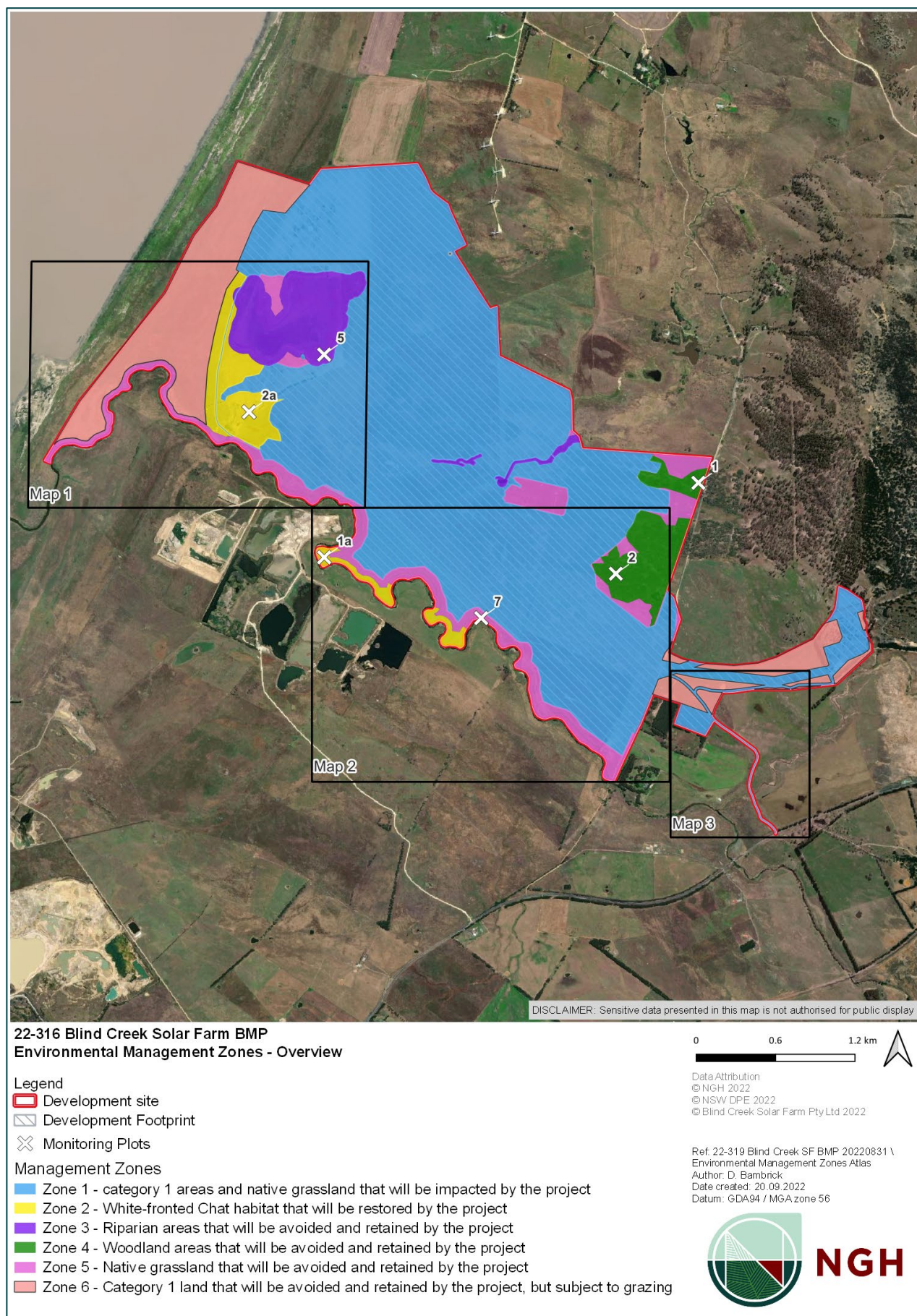


Figure 6-1 Environmental management zones – overview

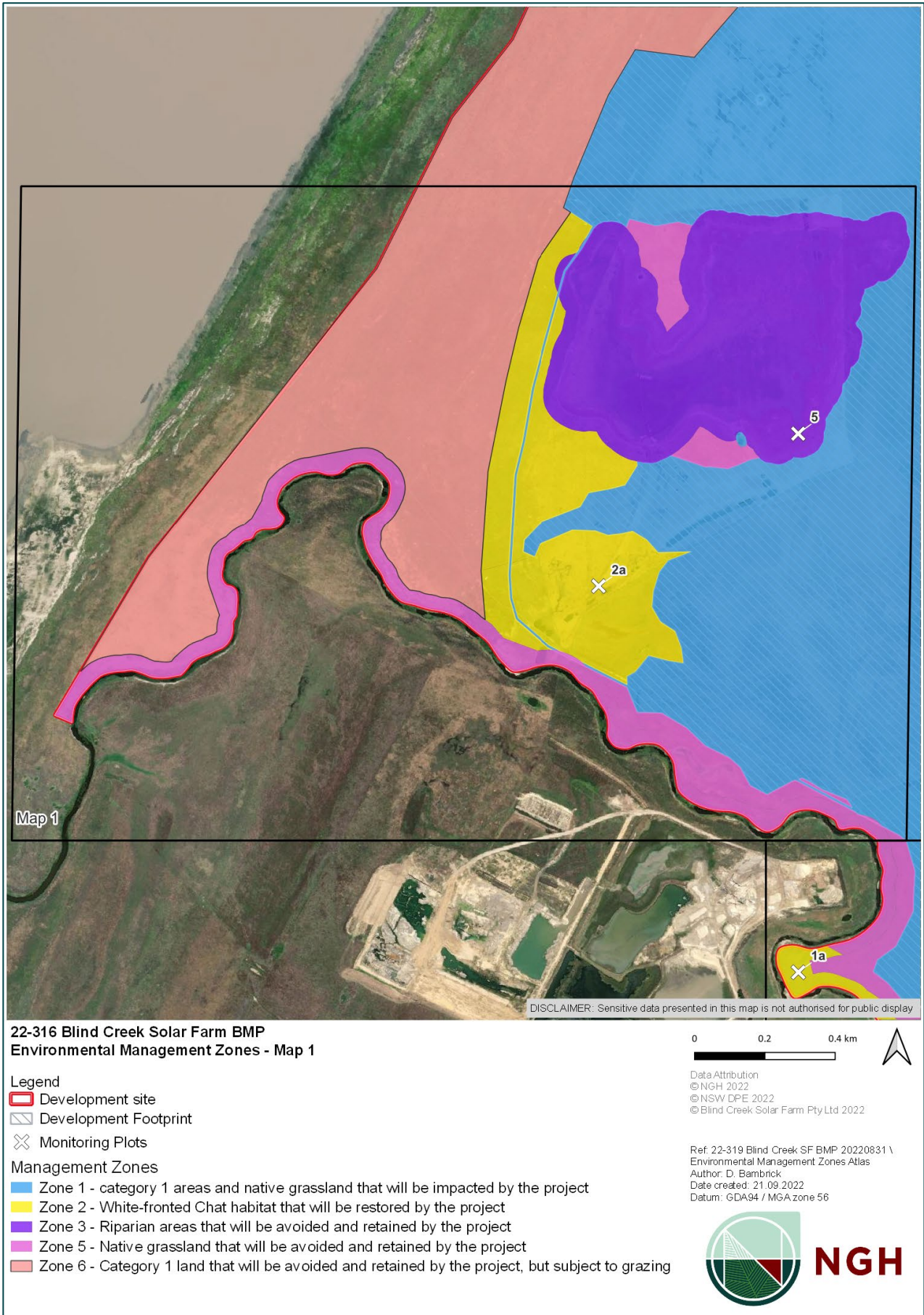


Figure 6-2 Environmental management zones – map 1

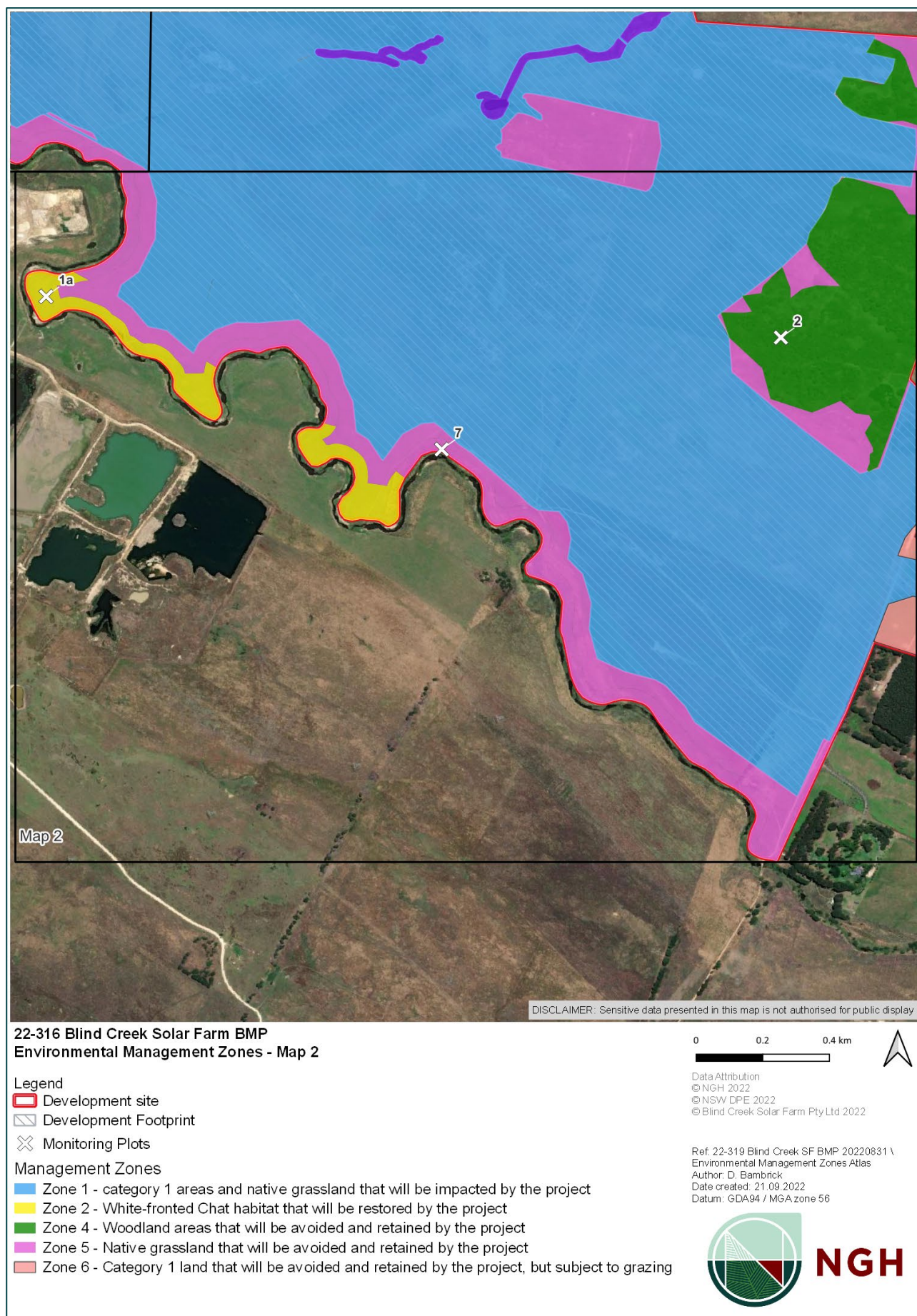


Figure 6-3 Environmental management zones – map 2

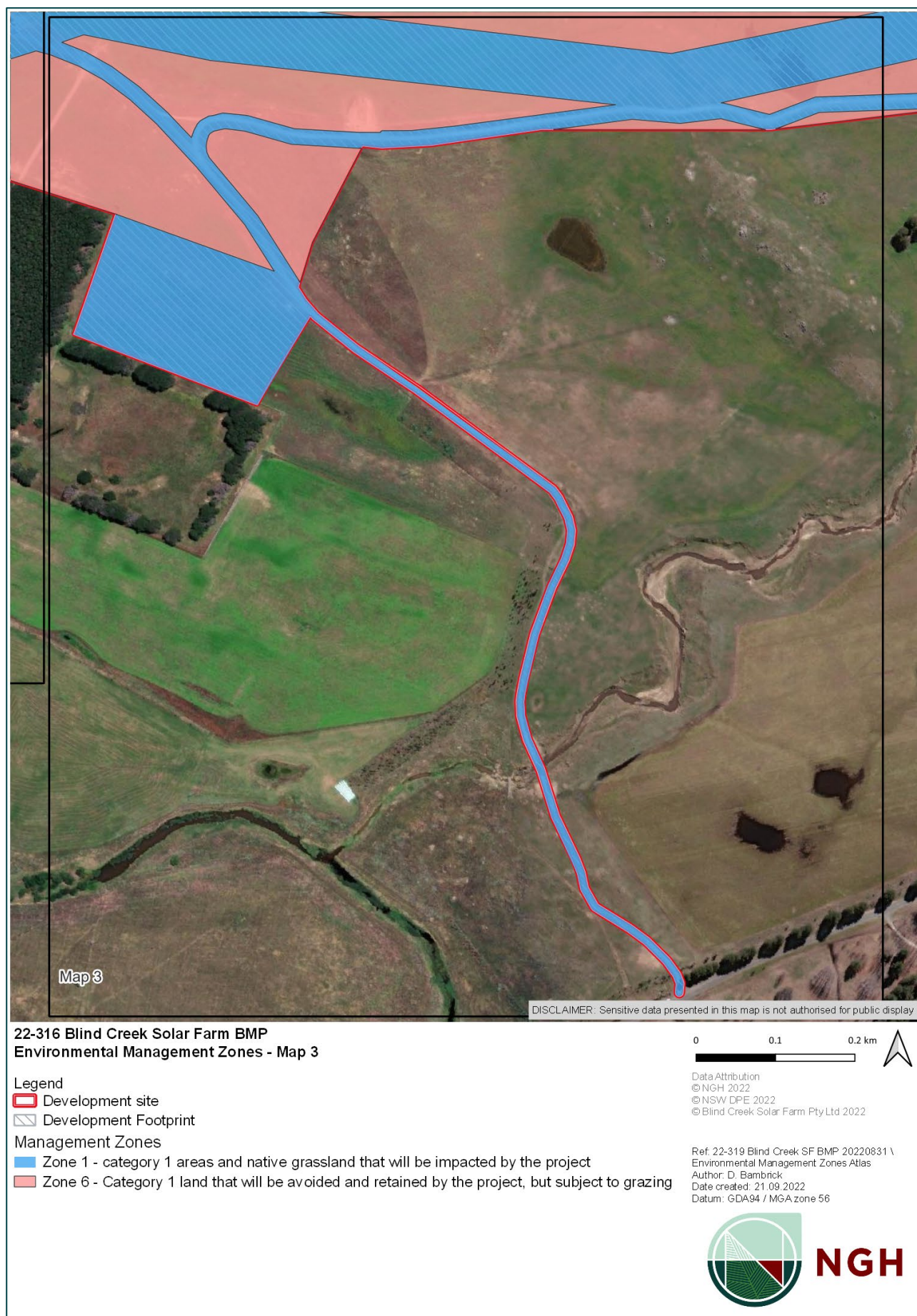


Figure 6-4 Environmental management zones – map 3

7. Environmental management, protocols, and procedures

7.1 Ecological management strategies

Unless otherwise specified, the following environmental controls apply to the Development Site and are to be carried out during the pre-construction, construction, and post-construction phases of the Project. The flora and fauna management strategies are designed to ameliorate impacts on flora and fauna and are based on the mitigation measures listed in Table 7-4. An overview of fauna and flora mitigation strategies include:

- Demarcation of the site boundary and protection of retained management zones 2-5: Clearing protocols, pre-clearing, and post-clearing surveys
- Fauna recovery and conservation procedures
- Weed and pathogen management
- Aquatic habitat and riparian zone management
- Unexpected threatened species finds.
- Habitat and vegetation protection
- Fauna management zones for the WFC Habitat (Figure 6-1)
- Weed and pathogen management
- Feral animal control.

7.2 Demarcation of site boundary

Set up site boundary and exclusion zones with permanent fencing and signage to restrict access to sensitive areas and the WFC management zone for the life of the Project. See Figure 4-7, which identifies exclusion zones and key habitat features. Recommendations for defining the site boundary are listed below:

- Prior to the commencement of infrastructure construction, establish exclusion zones (Zone 2-5) before clearing commences
- Select the appropriate fence type to ensure stock, humans and other disturbances are prevented between adjacent management zones
- Mark out exclusion zones, for habitat or vegetation protection, with temporary markings and where permanent fencing is required use a qualified surveyor to mark boundaries (e.g., WFC management zone)
- Erect signs to inform personnel of the purpose of fencing. Signs should be clearly visible from a distance of at least 20 m and should be general in nature, for example 'Exclusion Zone' or 'WFC management zone'. All gates from one Zone to another Zone must have signage to ensure management zones transitions are clear.
- Ensure fences are maintained (regularly inspected and repaired). Removal of exclusion fences should be undertaken in consultation with the Environmental Site Representative (ESR)
- Communicate the importance of exclusion zones in site inductions and toolbox talks
- Ensure exclusion zones are up to date and marked on site plans used for inductions and toolbox talks
- Ensure breaches of fencing are reported to BCSF Site Manager
- Perimeter fencing and exclusion fencing will be constructed with plain wire (not barbed) on the top row of the fence to reduce the likelihood of entanglement by birds and mammals
- Exclusion fencing and relevant signage will be installed around habitat to be retained prior to the commencement of construction
- Plan fencing in advance to ensure that where practicable, the delineation of the permanent site perimeter boundary will be located to avoid habitat fragmentation within retained vegetation zones.

7.3 Habitat and vegetation protection

A number of habitat and vegetation protection practices will be employed during works to protect retained vegetation both adjacent to and within the Development Site.

In areas to be cleared, which are adjacent to areas to be retained, chainsaws will be used rather than heavy machinery to minimise risk of accidental disturbance.

- Design and construction planning for installation of fencing would aim to maximise retention of significant vegetation in the riparian and management zones to minimise clearing where possible.
- No stockpiling or storage will occur within the dripline of any native trees
- Patches of vegetation to be retained close to busy construction zones will be fenced. Signage indicating 'SENSITIVE ENVIRONMENTAL AREA' will be affixed to the fencing.
- Staff inductions will include a description of the activities allowed within vegetation protection zones. No other activities, stockpiling or material handling (apart from tree maintenance) will be allowed in these areas.

- Fauna habitats adjacent to the Development Site are to be protected from construction impacts with use of temporary fencing and control of potential sediment and erosion impacts as outlined in the Construction Soil and Water Management Plan, and Erosion and Sediment Control Plans (ESCP).
- Store materials and equipment outside the exclusion zones in accordance with Australian Standard AS 4970-2009 Protection of trees on Development Sites.
- No stockpiling of materials and equipment or parking of vehicles and machinery within the dripline of any tree.

7.4 Clearing protocols and surveys

A summary of clearing protocols is provided below. No clearing will be undertaken outside of the approved Project boundary or within clearing exclusion zones at any time during construction.

7.4.1 Pre-clearing surveys

The purpose of pre-clearing surveys from a fauna management perspective is to identify habitat containing fauna which might otherwise be killed or injured during the approved tree-felling or clearing. Standard environmental controls for the pre-clearing surveys are listed below:

- Pre-clearing surveys will be supervised by a suitably qualified ecologist or fauna spotter catcher with experience in fauna handling
- No more than 24 hours before clearing, using the checklist attached as per Appendix C, the following will occur:
 - Boundaries for construction, clearing and exclusion zones will be confirmed
 - The supervising ecologist or fauna spotter catcher will check marked habitat trees within the works area are correctly marked, as either for protection or removal
 - Contact will be made with the local vet and wildlife rescue organisation (contact details outlined in Appendix E) prior to the commencement of clearing works to ensure they are available in case injured fauna or dependent young are found
 - Fauna relocation will be conducted by the ecologist or fauna spotter catcher, refer to Appendix E.
- At the completion of the pre-clearing surveys a report will be compiled of all the activities completed during the survey including records of fauna detected and the outcome for each individual.

7.4.2 Clearing

Further instructions for fauna rescue and release during clearing are detailed in Appendix E and the Unexpected Threatened Species Finds in Appendix H.

7.4.3 Post-clearing surveys

Post-clearing, the Project Ecologist or fauna spotter catcher will survey the cleared area using the checklist attached as Appendix D.

A post-clearing survey report will be compiled and provided to BCSF Environmental Manager.

7.5 Fauna rescue and release procedure

A Fauna Rescue and Release Procedure has been developed and is included in Appendix E of this BMP. The Fauna Rescue and Release Procedure must be implemented whenever fauna is encountered on the site which require rescuing or relocation. Fauna rescue and/or relocation will be carried out by an experienced ecologist or licenced wildlife handler/carer.

All fauna interactions, including observed and unobserved fatalities, will be recorded in the Project Fauna Register, as included in Appendix F.

7.6 Weed and pathogen management procedure

A Weed and Pathogen Management Procedure has been developed and is included at Appendix G of this plan. This procedure contains details of the following:

- Requirements for weed identification across the Development Site
- Weed hygiene protocols to ensure no weeds are transported to or from the Development Site
- Methods for undertaking weed control and treatment (including requirements for herbicide application)
- Requirements for monitoring of weeds
- Requirements for transportation and disposal of weeds.

7.7 Vehicle Hygiene Procedure

Vehicle Hygiene Procedures will be implemented for any vehicle that enters the Development Site during construction and operation which is likely to come into contact with the natural ground or weeds (Appendix G). The procedures include:

- Inspection upon arrival in laydown area
- Removal of dirt and/or plant matter from newly arrived vehicles at a designated washdown area by trained site personnel
- Washing and inspection prior to vehicles being given the 'all clear' to enter indirect disturbance areas
- Inspection and washing after leaving indirect disturbance areas and prior to leaving the site
- Inspections and washdowns will be recorded on a Vehicle Hygiene Register. An example is shown in Appendix I.

Any water from the washdown area will be managed in accordance with the Soil and Water Management Plan (SWMP) which will be prepared prior to the commencement of construction.

7.8 Feral animal management

Suppression and control measures for foxes, cats, rabbits and hares will be undertaken. Noisy Miners (*Manorina melanocapala*) can occur at times as an over abundant population. Noisy miners only require control if a direct threat to the White-fronted Chat has been determined. There are several methods to control foxes, rabbits/hares and cats with the main methods involving poisonous baits, warren and den destruction (ripping warrens) and direct elimination (shooting).

Any program to control feral animals should be put in place early to reduce population numbers as far as possible and this is achieved through consistent monitoring. Feral animal populations

can be reduced to minimise pressure on native plants and animals. Due to feral animal populations in surrounding areas, eradication will be largely unachievable. However, prevention and containment can be achieved by implementing an adaptive Pest Management Plan (PAP).

An adaptive Pest Management Plan (PAP) detailing early, and ongoing suppression methods will be implemented. The PAP will determine the most effective strategies and formalise ongoing management needs and methods to keep pest animals at low levels. Pest animal density levels will be defined by relative abundance categories (Table 7-1) as defined in the Monitoring, Evaluation, Reporting and Improvement (MERI) framework for pest animal management in NSW (DPI, 2020). Additionally, the PAP will be guided by and the South East Regional Strategic Pest Animal Plan 2018 - 2023.

Table 7-1. Relative abundance categories

Relative Abundance Rating	Definition
High (abundant)	Many animals seen at any time and much sign of activity. Animals always observed and reliable sightings or sign. Significant sign of animals on more than 80% of occasions.
Medium (common)	Some animals seen at almost any time / Much active sign / Frequent but unreliable sightings of animals. Significant sign of animals on 50-80% of occasions.
Low (occasional)	Few or no sightings, little active sign. Very little sign of animals on 1-50% of occasions
Absent	No animals - No sign of animals, or animals have been removed from this location.
Unknown	Unsure, no information to base your judgement.
Present, but abundance unknown	Species is present, but abundance is unknown

7.9 Unexpected threatened species finds

An Unexpected Threatened Species Finds Procedure has been developed and is included in Appendix H of this BMP. The procedure will be implemented following the discovery of any known or suspected threatened flora or fauna within the Development Site.

The WFC is a threatened species, and its occurrence should be recorded along with any threatened species finds. See Figure 4-3, Figure 4-4, Figure 4-5 and Figure 4-6 for images of the WFC and their nest and fledglings.

7.10 Rehabilitation and material salvage

During construction, a variety of materials may be reclaimed for reuse in habitat relocation and site rehabilitation works. Landscaping rehabilitation works are addressed in greater detail in the Project Landscaping Plan, including the use of indigenous species in screening and landscaping plantings.

Any salvageable habitat material, such as coarse woody debris or bush-rock, will be salvaged from the Development Site in accordance with the requirements of the pre-clearance survey and clearing procedures included in Appendix B and Appendix C. Habitat rehabilitation and enhancement will be undertaken within exclusion Zones 2 to Zone 5 and approved by the Project Ecologist/Fauna spotter catcher and BCSF through the placement of habitat features within areas adjacent to the Development Site.

Of the two dams within the Development Site, one will be retained and one removed. The identified wetland would be avoided and retained by the Project and will be planted with native riparian vegetation in order to create wetland environments for local wildlife and habitat for the WFC.

7.11 Vegetation management

7.11.1 Management zones

As identified in Section 6, Management Zones 2, 3, 4 and 5 contain vegetation (non-native and native) that require specific management actions. These vegetation zones will be protected during construction and operation through exclusion fencing (outlined in Section 6). These areas will be managed throughout construction, operation and decommissioning phases of the Project to protect native vegetation present in these zones from any potential impacts from the Project.

Figure 7-1, Figure 7-2 and Figure 7-3) show the exclusion zones for Management Zones 2, 3, 4 and 5.

The following sections outline specific management actions for each management zone including weed management, improving vegetation condition and management actions.

7.11.2 Weed Management

Weed surveys will occur quarterly through the first two years (construction phase) and annually through the operational phase. The surveys will inform the implementation of targeted weed control measures of priority weeds in each management zone.

The aim of undertaking weed management is for the condition of the vegetation in each management zone to be maintained or improved during the lifetime of the Project. Baseline conditions are identified in Appendix J.

The following targets have been established:

- Maintain and improve the condition of vegetation in management zones (zone 2- 5) throughout the life of the Project.
- Achieve an overall reduction in weed abundance in exclusion zones throughout the operational period.

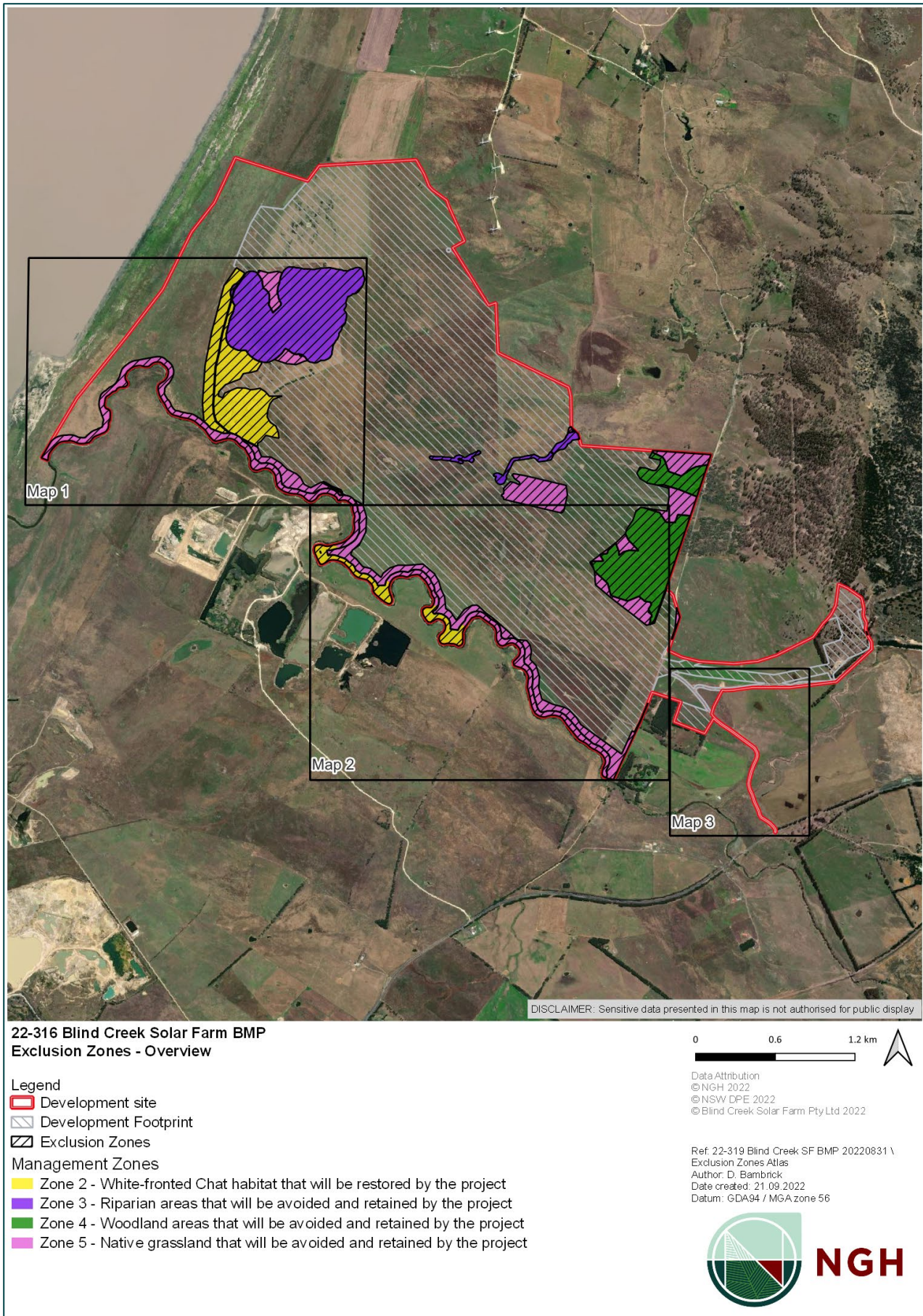


Figure 7-1 Management zone overview

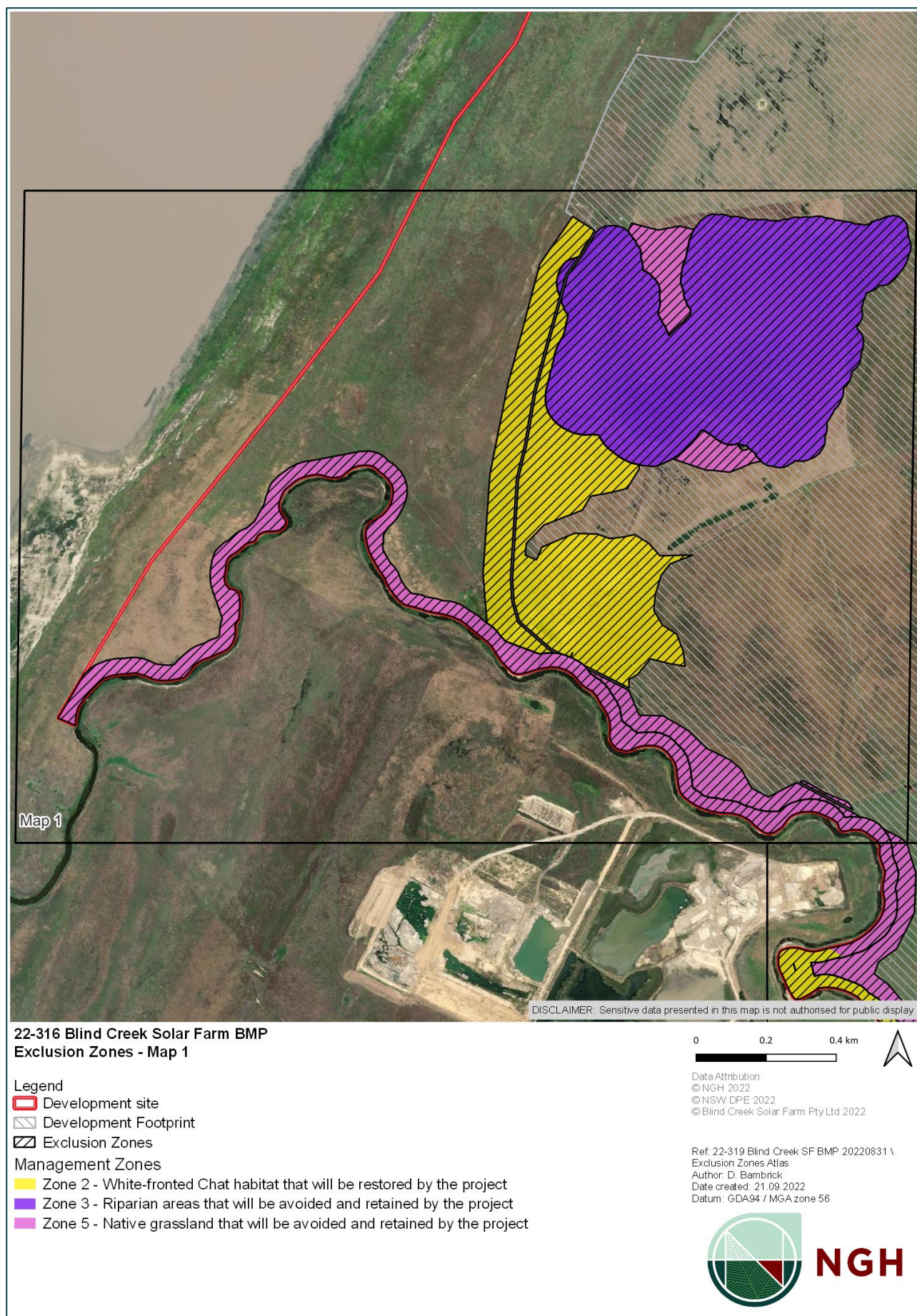


Figure 7-2 Management zones - map 1

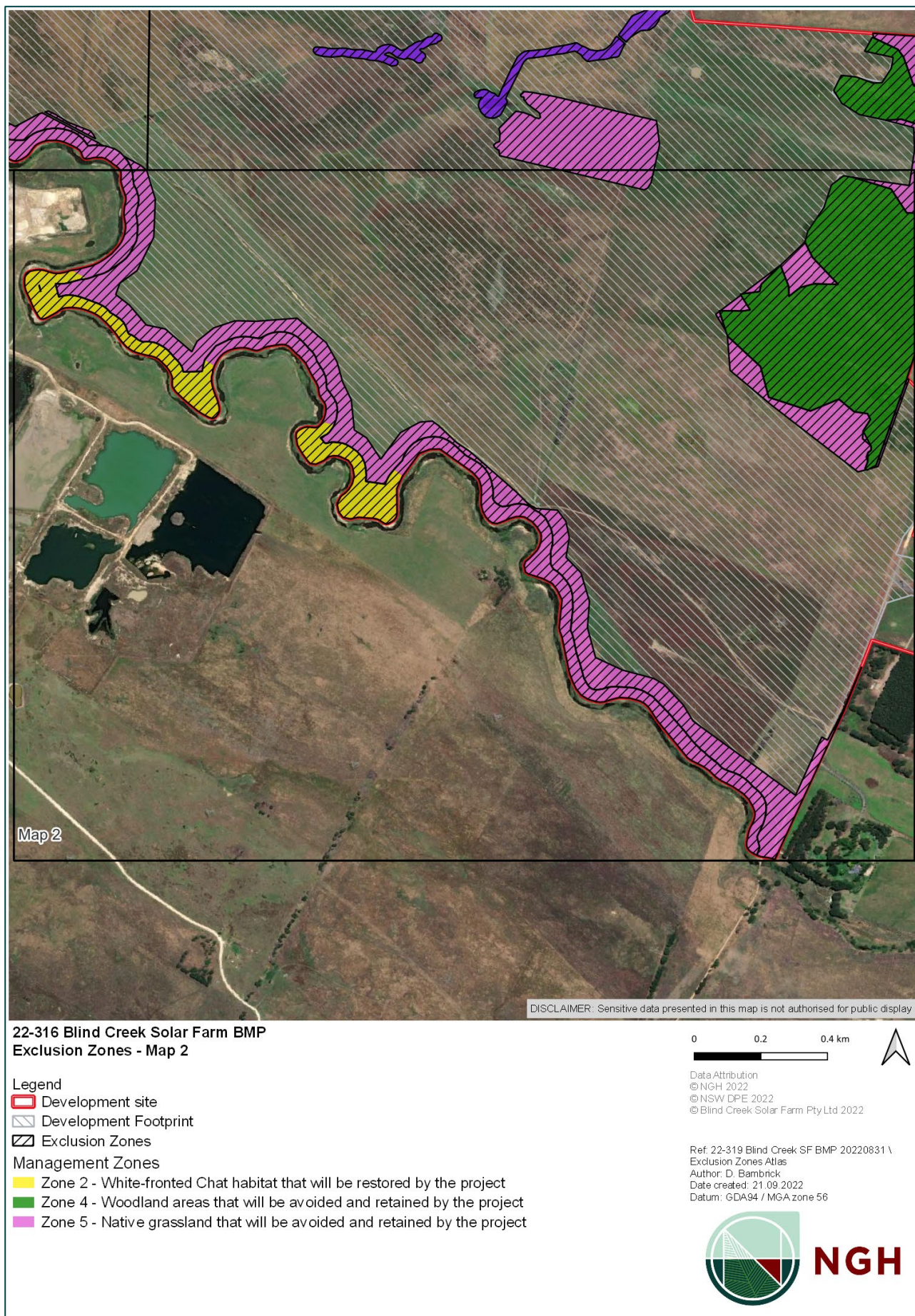


Figure 7-3 Exclusion zones - map 2



Figure 7-4 Management zones - map 3

7.11.3 Vegetation condition

In order to monitor changes in the vegetation condition of exclusion zones, the baseline vegetation condition has been quantified using biometric plots prior to construction commencing (plot 1, 2, 5 and 7). Plots will be conducted immediately following construction to determine an updated condition assessment at the commencement of the operation phases. The exclusion zones will be included in quarterly weed monitoring for a period of two years during construction to manage weed ingress during the construction phase.

An ecologist will conduct biometric assessments in the location of plot 1, 2, 5 and 7 within Zones 3, 4 and, 5 every five years throughout operation (Figure 6-1). If a noticeable decline in condition is recorded, this will trigger the need for an assessment to determine the appropriate management response.

7.11.4 Management actions

Exclusion zones will be demarcated with the appropriate fencing prior to clearing in accordance with the vegetation clearing protocols (Section 7.4). These zones will be demarcated using permanent protective fencing around zone 2-5 (described in Section 6) to ensure that the vegetation within these zones is not impacted accidentally. If livestock are to be on site during operation, then stock-proof exclusion fencing must be used to protect exclusion zones. The location of exclusion areas will be communicated to site staff (including equipment operators) through site inductions, toolbox talks and targeted training prior to works taking place in the vicinity.

Indirect impacts on vegetation constraints will be reduced by:

- Avoiding vehicle or plant access within exclusion zones
- Where night works cannot be avoided, work must not take place within 100 metres (m) of exclusion zones
- Directing lights away from exclusion zones
- When not in use, vehicles and plant will not be left idling near exclusion zones but will be switched off whenever possible.

There is a risk of weed encroachment during construction and operation from infested areas into exclusion zones, and potentially from exclusion zones into disturbed areas following groundcover rehabilitation. To manage these risks, weed management as described in Section 7.6, will include monitoring exclusion zones and implementing weed control measures as required throughout construction, operation and decommissioning.

Weeds in the exclusion zones will be controlled in accordance with the Weed Management Procedure (Appendix G).

Response to decline in condition

If a quantitative assessment of vegetation condition across zones 2 -5 determines the need for an additional management response (refer to Section 7.11.3), actions may include but are not limited to:

- Exclude stock and human/vehicle access through stock exclusion fencing
- Targeted weed or pest control
- Groundcover rehabilitation and shrub/tree plantings for habitat enhancement

- Ecological cool burns in consultation with appropriate authorities to reduce fuel loads or control over-dominant groundcover species, in accordance with relevant fire regimes for the vegetation community.

7.12 White-fronted Chat management

7.12.1 Management zones

Management zone 2, which is also identified as an exclusion zone, contains native vegetation (PCT 1110_creekline_poor) which will be restored to provide breeding habitat for the WFC (Figure 6-1). These areas will be managed throughout construction, operation and decommissioning of the Project.

The aim of vegetation management within zone 2 is for degraded grassland areas to be planted with preferred shrubs and groundcovers to create suitable breeding and foraging habitat for WFC and other small birds. The vegetation will be planted and maintained during the lifetime of the Project.

Quarterly surveys for the first two years then once a year thereafter of priority weed abundance in management zone 2 will be used as a basis for implementing targeted weed control measures throughout construction, operation and decommissioning.

The following targets have been established:

- Improve the condition of native vegetation in management zone 2 throughout construction, operation and decommissioning of the Project.
- Establish dense plantings (>80% cover) of indigenous flora species which support WFC breeding. Shrubs and groundcovers that would provide protection for this and other small birds.
- WFC are observed utilising the vegetation in zone 2.
- Exclusion or suppression of feral pest species such as foxes, rabbits, cats, noisy miners and hares (refer to Section 7.7).

7.12.2 Vegetation condition, plantings and utilisation

In order to monitor changes in the vegetation condition of management zone 2, the baseline vegetation condition will be quantified using biometric plots. The plots will be completed by a BAM accredited ecologist once planting within management zone 2 is completed. The locations of these plots are shown in Figure 6-1.

Once baseline biometric plots have been completed, an ecologist will conduct biometric assessments within Zone 2 for plot 1a and 2a (Figure 6-1) every five years throughout operation to monitor changes in the vegetation condition. If a noticeable decline in condition is recorded (>50% non-native groundcover, loss of more than 10% of plantings), this will trigger the need for an assessment to determine the appropriate management response.

Dense plantings of indigenous flora species will be established in management zone 2 during construction. Plantings will include a mix of the following species (subject to availability):

- Snow Gum (*Eucalyptus pauciflora*)
- Silver Wattle (*Acacia dealbata*)
- Kangaroo thorn (*Acacia paradoxa*)

- Sweet Bursaria (*Bursaria spinosa*)
- Small-fruited Hakea (*Hakea microcarpa*)
- Tea-tree species (*Leptospermum* spp. including *Leptospermum continentale*, *Leptospermum polygalifolium*)
- Common Woodruff (*Asperula conferta*)
- Spiny-headed Mat-rush (*Lomandra longifolia*) Tussock (*Poa labillardierei*)
- Tall Sedge (*Carex appressa*)
- Knob Sedge (*Carex inversa*)
- Matgrass (*Hemarthria uncinata*)
- Kidney Weed (*Dichondra repens*)
- Kangaroo Grass (*Themeda australis*).

Native shrubs plantings would be spaced 5m apart and established within management zone 2. All plantings will be planted with tree guards (refer to Appendix K).

The planting specification provided in Appendix K details:

- A strategy to obtain effecting breeding habitat for the WFC within two years
- Locations for plantings
- Species selection
- Planting establishment and monitoring requirements
- Roles and responsibilities.

An ecologist will complete three surveys every year for a period of 10 years for the WFC within zone 2 during the species breeding period (September to March) to determine if the species is utilising the habitat for breeding. Surveys will commence two years after planting and continue for the first 10 years of operation, or until the WFC is confirmed to be consistently utilising the habitat in management zone 2.

Consistent use of habitat is defined as when the WFC is confirmed to be utilising the habitat over two consecutive years of survey.

Predation of the WFC by feral pest species such as foxes, cats, and overabundant populations of non-threatened native species such as Noisy Miners, and Ravens which can significantly reduce the breeding population of this species will be managed. Control and suppression of feral pest species and overabundant populations of non-threatened native species is described in Section 7.8.

7.12.3 Management of Noisy Miners

Management of overabundant species such as Noisy Miners (*Manorina melanocephala*) requires careful consideration. Noisy miners are territorial so replanting with dense shrubs and understorey species provides habitat for small woodland birds (Watershed Landcare 2021). Shrub selection should preference shrubs with spikes or thorns. To determine if noisy miners are chasing the white fronted chats, monitoring must be undertaken prior to any planned control. The BCSF Environmental Manager should engage a suitably qualified specialist (ecologist) to monitor the overabundance and behaviour of the noisy miner. The ecologist should work with BCSF Environmental Manager and a pest animal contractor to determine the best control methods and apply for permits that are required. Follow up monitoring will be an important step in management

of noisy miners. Permits for controlling native species will need to be investigated prior to implementing any control measures.

7.12.4 Management actions

An exclusion zone around management zone 2 and management zone 5 will be demarcated prior to the commencement of construction in accordance with the vegetation clearing protocols (Section 7.4). This zone will be demarcated using protective fencing to ensure that vegetation is not impacted accidentally, which may consist of star pickets at 4m to 5m intervals with a strand of plain wire and flagging tape. If stock are to be on site during operation, then stock-proof exclusion fencing must be installed to protect these exclusion zones. The location of exclusion areas will be communicated to site staff (including equipment operators) through site inductions, toolbox talks and targeted training prior to works taking place in the vicinity.

Indirect impacts on the WFC breeding habitat will be reduced by:

- Avoiding vehicle or plant access within the exclusion zone
- Where night works cannot be avoided, work must not take place within 100m of the exclusion zone
- Directing lights away from the exclusion zone
- When not in use, vehicles and plant will not be left idling near exclusion zones but will be switched off whenever possible
- Ensuring the fencing is wildlife friendly and that entanglement is not likely.

There is a risk of weed encroachment during construction and operation from infested areas into exclusion zones. To manage these risks, weed management as described in Section 7.6 will include monitoring exclusion zones and implementing weed control measures as required throughout construction and operation.

Weeds in this exclusion zones will be controlled in accordance with the overarching Weed Management Procedure in Appendix G and additional weed control methods identified in Appendix K.4.1. Planting methods relating to Zone 2 management covered in Appendix K include actions required to rectify the potential failure of plantings in this management area (Appendix K.4).

Response to decline in condition or lack of habitat utilisation

If a quantitative assessment of vegetation constraint condition determines the need for an additional management response, actions may include but are not limited to:

- Targeted weed or pest control
- Additional plantings in zone 2 for further habitat enhancement
- Establish additional areas of planting within the Development Site to improve habitat connectivity across the site.

7.13 Performance criteria, triggers, and responsibilities

Table 7-2 provides a summary of the key performance criteria and triggers for corrective actions. The actions to be implemented should the trigger arise are also described. This combined with the monitoring described in Section 10.3 forms the Trigger, Action Response Plan (TARP) for the Project. The monitoring triggers have been used to inform the triggers for protocols and procedures that require monitoring in 7.11. Table 7-3 outlines specific details for weeds and pest animals to

protect the White-fronted Chat. The actions should follow monitor, control measures and follow up monitoring with an annual reporting component. A suitably qualified contractor will be required for the pest animal control and best practice methods applied.

Table 7-2 Summary of performance criteria, triggers for actions and responses for environmental management protocols and procedures

Management protocol or procedure	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
Clearing protocol and surveys	Zone 1	<ul style="list-style-type: none"> No more than 642.86ha of native vegetation will be removed. Comprising of 0.87ha of PCT 1100, 635.38ha of PCT 1110. Pre-clearance surveys conducted. No impact on exclusion zones. 	<ul style="list-style-type: none"> Clearing outside of approved clearing areas. Pre-clearance surveys not completed. Clearing of trees not identified for removal. 	<p>Environmental Manager or Project Manager to:</p> <ul style="list-style-type: none"> Implement relevant corrective actions. Consider undertaking further environmental awareness training and incorporate into toolbox talks Check demarcation of approved clearing areas Identify the cause of incident Report to relevant government authorities Undertake corrective rehabilitation 	<ul style="list-style-type: none"> A post-clearing survey report will be compiled by Project Ecologist or fauna spotter catcher and provided to BCSF Environmental Manager. Monthly monitoring of high disturbance areas, groundcover, exclusion zones and boundary fencing during construction. Progressive monitoring of the cumulative amount of vegetation cleared Inspection of exclusion zone disturbance. 	BCSF Environmental Manger
Fauna rescue and release procedure	Zone 1	<ul style="list-style-type: none"> Fauna encountered on site is rescued by an experienced ecologist/fauna spotter catcher. Fauna is relocated injury free. Fauna interaction is recorded in the Project fauna register (Appendix F). 	<ul style="list-style-type: none"> Fauna is not relocated by an experienced ecologist/fauna spotter catcher or licenced wildlife handler/carer. Fauna is injured. Fauna interaction is not recorded in the Project fauna register (Appendix F). 	<p>Environmental Manager to:</p> <ul style="list-style-type: none"> Undertake further environmental awareness training to personnel working on site about the fauna rescue and release procedure and measures to be implemented. 	<ul style="list-style-type: none"> All fauna interactions, including observed and unobserved fatalities, will be recorded in the Project fauna register (Appendix F). The Project fauna register will be reviewed monthly during construction. 	BCSF Environmental Manger
<p>Weed and pathogen management procedure</p> <p>See the following Table 7-3 for more detailed information on weed species management.</p>	All zones	<ul style="list-style-type: none"> Annual reduction in non-native groundcover by at least 5% in mapped infestation areas from previous year's inspections until there is less than 5% coverage. A general reduction in the abundance of weeds in exclusion zones during the operation period as evidenced by annual inspections. New invasive weeds detected in Project area are controlled during operation. Listed priority weeds eradicated from the Development Site within 3 years of detection. 	<ul style="list-style-type: none"> >50% non-native ground cover. Presence of priority weeds detected during quarterly or annual monitoring. New weed species on site detected during quarterly or annual monitoring. Moderate or High levels of observed pest animal activity. See Section 7.8 for a definition of relative abundance. 	<ul style="list-style-type: none"> Eliminate priority weed species as soon as practicable in accordance with recommended control methods and timing. Increase targeted weed or pest animal control measures (Section 7.6 and 7.8). Seek additional advice from Local Land Services and adhere to recommendations. 	<ul style="list-style-type: none"> Photo points will be established as reference points for monitoring and incorporated into weed maps. Quarterly during construction. Annually during operation: <ul style="list-style-type: none"> October for weeds 	<p>BCSF Environmental Manger</p> <p>Contractor</p> <p>Trained Ecologist</p>
Vehicle hygiene procedure	All zones	Vehicle Hygiene Procedure implemented for all vehicles.	Vehicle Hygiene Procedure not being implemented.	<p>Environmental Manager or Project Manager to:</p> <ul style="list-style-type: none"> Implement relevant corrective 	<ul style="list-style-type: none"> All vehicle inspections and washdowns are recorded in the Vehicle Hygiene Register 	BCSF Environmental Manger

Management protocol or procedure	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
				<p>actions.</p> <ul style="list-style-type: none"> Consider undertaking further environmental awareness training and incorporate into toolbox talks Ensure the Vehicle Hygiene Procedure is included in site inductions, toolbox talks etc and that staff responsible are implementing the procedure. 		
Rehabilitation and material salvage	All zones	<ul style="list-style-type: none"> Coarse Woody Debris, rocks and topsoil (as described in Section 7.10 removed during construction are retained. Retained resources are relocated appropriately into Management Zones 2, 3, 4, and 5 under direction of an ecologist during pre-clearance. 	<ul style="list-style-type: none"> Resources are stockpiled and not relocated. Resources are taken to landfill. 	<ul style="list-style-type: none"> Stockpiled resources are to be relocated immediately under the guidance of an Ecologist to ensure minimal damage to 2, 3, 4, and 5. Conduct a meeting to refresh all personnel working on site about rehabilitation and material salvage. Ensure the rehabilitation and material salvage procedure is included in site inductions, toolbox talks etc and that staff responsible are implementing the procedure. 	<ul style="list-style-type: none"> Relocation of materials recorded as it occurs 	BCSF Environmental Manger
Unexpected threatened species finds	Zone 1	<ul style="list-style-type: none"> Threatened Species Finds Procedure followed if threatened species found (Appendix H). No harm occurs to threatened species. 	Threatened species found to be present (living or dead) that were not previously identified.	<p>Environmental Manager or Project Manager to:</p> <ul style="list-style-type: none"> Prepare and implement an education program for personnel working on site to increase awareness of threatened species that may be encountered. 	<ul style="list-style-type: none"> As it occurs. 	BCSF Environmental Manger
Vegetation management	Zone 2, 3, 4, and 5	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native ground cover. Moderate to high pest animal activity recorded in exclusion zones. See Section 7.8 for a definition of relative abundance. 	<p>Investigation into reason for decline by suitable qualified person(s). Recommendations following investigation to be followed which may include but not be limited to:</p> <ul style="list-style-type: none"> Exclude stock and human/vehicle access. Targeted weed or pest control. Groundcover rehabilitation and shrub/tree plantings for habitat enhancement. Ecological burns in consultation with appropriate authorities to reduce fuel loads or control over- 	<ul style="list-style-type: none"> Quarterly surveys of priority weeds through the construction phase. Undertake season weed control for new individuals of high threat weeds Annual weed surveys in each zone throughout construction and operation prior to undertaking weed control. Biometric plots will be conducted at the location of plot 1, 2, 5 and 7 immediately following the completion of construction (in spring) and every year throughout operation (in spring) 	BCSF Environmental Manger Contractor/ Trained Ecologist

Management protocol or procedure	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
				dominant groundcover species, in accordance with relevant fire regime for the vegetation community.		
White-fronted Chat management	Zone 2	<ol style="list-style-type: none"> White-fronted Chat are observed utilising the vegetation in zone 2. Improve the condition of vegetation in management zone 2 throughout construction, operation and decommissioning of the Project. Including the establishment of dense plantings (>80% cover) of indigenous flora species which support White-fronted Chat breeding. Exclusion or suppression of feral pest species. 	<ol style="list-style-type: none"> White-fronted Chat not detected in zone 2 during surveys. Decline in vegetation condition in zone 2 as evidenced by monitoring. <ul style="list-style-type: none"> Weed abundance not decreasing in zone 2; >50% non-native ground cover Loss of more than 10% of plantings Medium to high pest animal activity recorded in exclusion zones. See Section 7.8 for a definition of relative abundance. 	<ol style="list-style-type: none"> Investigation into reason for WFC decline by suitable qualified person(s). Recommendations following investigation to be followed which may include but not be limited to: <ul style="list-style-type: none"> Targeted weed or pest control In-fill planting Additional plantings in zone 2 for further habitat enhancement. Establish additional areas of planting within the Development Site to improve habitat connectivity across the site and points above. Investigation into medium to highest animal activity by Environmental Manager or Project Manager and the implementation of relevant corrective actions and update the PAP. 	<ol style="list-style-type: none"> Complete three surveys every year for the WFC during the species breeding period (September to March) for a period of 10 years. <ul style="list-style-type: none"> Surveys will commence two years after planting. <p>If the WFC is confirmed to be consistently utilising the habitat over two consecutive years of survey, surveys can cease before 10 years. Quarterly surveys for the first two years then once a year thereafter of priority weed abundance and used as basis for implementing targeted weed control measures throughout construction, operation, and decommissioning.</p> Biometric plots will be conducted at the location of plot 1a and 2a immediately following the completion of planting (in spring) and every five years throughout operation (in spring). Priority weeds surveyed quarterly throughout construction and annually through operation. 	BCSF Environmental Manager Contractor/ Trained Ecologist
Pest Animal See the following Table 7-3 for more detailed information on pest management.	All zones	<ul style="list-style-type: none"> To reduce and maintain a low number of pest animal species within the Project management zones. 	Moderate to high pest animal activity recorded in exclusion zones.	Environmental Manager or Project Manager to: <ul style="list-style-type: none"> Implement relevant corrective actions and update the PAP. 	Quarterly during construction. Annually during operation Yearly report to BCS.	BCSF Environmental Manager Suitably qualified Contractor

Table 7-3 Performance criteria, triggers for actions and responses for environmental management protocols and procedures of weed and pest species

Pest Species	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
European Fox	All zones	<ul style="list-style-type: none"> To reduce and maintain a low number of pest animal species within the Project management zones. 	<ul style="list-style-type: none"> Pest animal species numbers are high Predation of White-fronted Chat by European Fox 	<p>Control methods will comply with the NSW Vertebrate Pest Control Manual (DPI, 2021) and the DEH. The Code of Practice for the Humane Control of Foxes (PestSmart, n.d.) includes an integrated approach. control measures include:</p> <ul style="list-style-type: none"> 1080 Baiting Cage trapping Shooting Den collapse Removal of harbour 	<ul style="list-style-type: none"> Stakeholders including Local Land Services (LLS) and local pest management groups will be engaged to assist with strategic pest management control Engage a suitably qualified contractor to undertake pest animal monitoring and control. Spotlighting and camera trap monitoring will occur prior to control efforts to establish presence and baseline population numbers Yearly reporting on numbers of European Foxes present on site through monitoring. Yearly report to BCS. Annual monitoring to be undertaken prior to any control works. 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p> <p>Ecologist for White-fronted Chat.</p>
Feral Cat	All zones	<ul style="list-style-type: none"> To reduce and maintain a low number of pest animal species within the Project management zones. 	<ul style="list-style-type: none"> Pest species numbers not decreasing Predation of White-fronted Chat by Feral Cats 	<p>Control methods will comply with the Model Code of Practice for the Humane Control of Feral Cats (Sharp, 2012). Management measures may include:</p> <ul style="list-style-type: none"> Shooting by a qualified contractor Cage trapping 	<ul style="list-style-type: none"> Stakeholders including Local Land Services (LLS) and local pest management groups will be engaged to assist with strategic pest management control Spotlighting and recording of warrens being used will occur prior to on ground eradication efforts to establish presence and baseline population numbers Yearly monitoring. If an increase in pest species occurs from the previous year the proposed actions will be undertaken again. Yearly reporting on numbers of cats present on site through monitoring 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p> <p>Ecologist for White-fronted Chat.</p>
European Rabbit	All zones	<ul style="list-style-type: none"> To reduce and maintain a low number of pest animal species within the Project management zones. 	<ul style="list-style-type: none"> Pest species numbers not decreasing 	<p>Control methods will comply with the NSW Vertebrate Pest Control Manual (DPI, 2021), the Code of Practice for the Humane Control of Rabbits (Sharp & Saunders, 2012) and related standard operating procedures and include:</p> <ul style="list-style-type: none"> Baiting (1080 or Pindone) Warren fumigation (phosphine or CO2) and hand collapse Opportunistic shooting Removal of harbour 	<ul style="list-style-type: none"> Stakeholders including Local Land Services (LLS) and local pest management groups will be engaged to assist with strategic pest management control Spotlighting and GPS recording of warrens being used will occur prior to on ground eradication efforts to establish presence and baseline population numbers Yearly monitoring. If an increase in pest species occurs from the previous year the proposed actions will be undertaken again. Yearly reporting on numbers of European Rabbits present on site through monitoring 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>

Pest Species	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
Hare	All zones	<ul style="list-style-type: none"> To reduce and maintain a low number of pest animal species within the Project management zones. 	<ul style="list-style-type: none"> Pest species numbers not decreasing 	Control methods will comply with the NSW Vertebrate Pest Control Manual (DPI, 2021),	<ul style="list-style-type: none"> Stakeholders including Local Land Services (LLS) and local pest management groups will be engaged to assist with strategic pest management control Spotlighting will occur prior to on ground eradication efforts to establish presence and baseline population numbers Yearly monitoring. If an increase in pest species occurs from the previous year the proposed actions will be undertaken again. Yearly reporting on numbers of Hares present on site through monitoring. 	BCSF Environmental Manager Suitably qualified Contractor
Noisy Miner	All zones	<ul style="list-style-type: none"> To monitor and determine if control of noisy miner is required based on their behaviour and White-fronted Chat response in management zones. 	<ul style="list-style-type: none"> White-fronted Chat being driven out of Zone 2 by overabundant Noisy Miners 	Control methods will comply with the NSW Vertebrate Pest Control Manual (DPI, 2021), and related standard operating procedures.	<ul style="list-style-type: none"> Noisy Miner bird surveys will occur at a minimum annually to establish presence and behaviour as a baseline population numbers Engage an ecologist and contractor to monitor bird behaviours and determine if control is required. Apply for necessary permits for noisy miner. Follow up bird surveys after any control works. Yearly monitoring. If an increase in pest species occurs from the previous year the proposed actions will be undertaken again. Yearly reporting on numbers of Noisy Miners present on-site through monitoring 	BCSF Environmental Manager Suitably qualified Contractor Ecologist for White-fronted Chat.
African Lovegrass (<i>eragrostis curvula</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<ul style="list-style-type: none"> Mature plants should be controlled year round with extra effort in spring before flowering Monitoring for flushes of seedlings after rainfall when temperatures are over 10°C and kill seedlings before they are six weeks old Keep looking for new plants each year as some seed remains viable for up to 17 years <p>Chemical control is the most effective technique for controlling African Lovegrass. Spraying should occur from spring to summer. Spraying should occur three times a year for the first three years then once a year after that.</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	BCSF Environmental Manager Suitably qualified Contractor

Pest Species	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
Blackberry (<i>Rubus fruticosus</i> species aggregate)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>Long term control of Blackberry is an ongoing process. A combination of control methods and follow up is needed.</p> <p>The most effective and reliable control method is chemical control. Used in conjunction with other techniques such as physical removal. To maximise effort physical slashing should be conducted first with herbicide sprayed after the slashing to stop regrowth.</p> <p>Control methods should occur three times a year for the first three years then once a year after that.</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>
Chilean Needle Grass (<i>Nassella neesiana</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>Chilean needle grass requires long term control. Aim to stop the needle grass from seeding, and to reduce the soil seed bank. Control efforts should consider that:</p> <ul style="list-style-type: none"> adult plants are long-lived and very hardy Chilean needle grass produces lots of seeds, and develops a long-lived seed bank it can produce flowers in the first season seed heads emerge during late spring most seeds have dropped from the plant by late February seeds can germinate year-round, but mostly in autumn and spring seedlings grow slowly but most survive seeds buried deep remain viable for longer than those near the surface. <p>For effective control of Chilean Needle Grass combine herbicide application with physical removal as herbicide spraying alone can leave bare patches where more Needle Grass can grow.</p> <p>Control methods should occur three times a year for the first three years then once a year after that.</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>
Fleabane (<i>Conyza</i> spp.)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>The most effective control method for Fleabane is herbicide application with double-knocking being the most effective.</p> <p>The most consistent double-knock</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>

Pest Species	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
		<p>thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation.</p> <ul style="list-style-type: none"> A general reduction in weed abundance in exclusion zones throughout the operational period. 	decreasing within exclusion zones; >50% non-native	approach is a mix of glyphosate and 2, 4-D as the first application or knock followed by paraquat and diquat based option as the second-knock. Spraying should occur three times a year for the first three years then once a year after that.	<ul style="list-style-type: none"> Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	Contractor
Saffron Thistle (<i>Carthamus lanatus</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>A management programme conducted over several years is required to control saffron thistle, because of seed dormancy.</p> <p>Herbicide application is the effective form of control. Spraying should occur three times a year for the first three years then once a year after that</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>
Scotch Thistle (<i>Onopordum acanthium</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>An integrated management program is the key to successful thistle management. The use of a range of tools such as the maintenance of a strong perennial pasture, strategic herbicide application, chipping by hand and use of biological control agents where appropriate is the best strategy for long term control.</p> <p>Herbicide control in conjunction with chipping. Chipping followed by spraying is the recommended approach.</p> <p>Control methods should occur three times a year for the first three years then once a year after that</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>
Serrated Tussock (<i>Nassella trichotoma</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. A general reduction in weed abundance in 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>Successful weed control relies on early action and follow up after initial efforts. Using a combination of control methods is usually more successful.</p> <p>Physical removal in conjunction with herbicide is the most effective way to control Serrated Tussock.</p> <p>Control methods should occur three times a year for the first three years then once a</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on groundwork and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>

Pest Species	Management Zone	Performance Criteria	Trigger for additional actions	Action Proposed	Monitoring and/reporting requirements	Responsibility
		exclusion zones throughout the operational period.		year after that	<ul style="list-style-type: none"> Complete annual report 	
Spear Thistle (<i>Cirsium vulgare</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>Using a combination of control methods is usually more successful.</p> <p>Physical removal in conjunction with herbicide is the most effective way to control Spear Thistle</p> <p>Control methods should occur three times a year for the first three years then once a year after that</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>
White Horehound (<i>Marrubium vulgare</i>)	All zones	<ul style="list-style-type: none"> Maintain or improve the condition of vegetation in exclusion zones throughout the life of the Project. Quarterly (for first two years then twice a year thereafter) surveys of priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. A general reduction in weed abundance in exclusion zones throughout the operational period. 	<ul style="list-style-type: none"> Decline in exclusion area condition as evidenced by monitoring. Weed abundance not decreasing within exclusion zones; >50% non-native 	<p>Chemical control is the most effective method of controlling White Horehound.</p> <p>Spraying should occur three times a year for the first three years then once a year after that</p>	<ul style="list-style-type: none"> Map all weeds present in the first 12 months Quarterly seasonal surveys for first two years prior to any on ground work and again after weed control works to determine if follow up is required. Weed control to be conducted by suitably qualified contractor Monitor weed twice a year (after two years) to record and track priority weed abundance in exclusion zones and use as basis for implementing targeted weed control measures in each zone throughout construction and operation. Complete annual report 	<p>BCSF Environmental Manager</p> <p>Suitably qualified Contractor</p>

7.14 Management and mitigation measures

Table 7-4 Biodiversity management and mitigation measures

ID	Mitigation measure	Resources required	Timing	Responsibility	Reference
Biodiversity					
B1	Preparation and implementation of a Biodiversity Management Plan (BMP) for the site to include: <ul style="list-style-type: none"> How to remove and dispose of vegetation and topsoil containing weeds declared under the <i>Biosecurity Act 2015</i> during and after construction Identification and protection of biodiversity exclusion zones during construction and operation 	BMP EIS BDAR	Prior to construction During construction Operations	BCSF Environmental Manager (EM)	This Plan Section 7.5 Section 6 Section 7.12
B2	Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecologist or licensed trained spotter catcher during clearing events, construction and maintenance activities for human-made structures and non-native vegetation.	Pre-clearing checklist	Pre-construction Construction	BCSF EM	This Plan Section 7.4
B3	Relocating habitat features (fallen timber, hollow logs and embedded	Environmental inspection records	Pre-construction	BCSF EM	This Plan Section 7.10

ID	Mitigation measure	Resources required	Timing	Responsibility	Reference
	rock) from within the Development footprint.		Construction	Project Ecologist Superintendent	
B4	<p>Induct all staff prior to construction to identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance:</p> <ul style="list-style-type: none"> • Staff training and site briefing to communicate environmental features to be protected and measures to be implemented • Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing • No stockpiling or storage within dripline of any mature trees • No stockpiling or storage within riparian buffers. 	<p>Induction records</p> <p>Toolbox records</p>	<p>Pre-construction</p> <p>Construction</p>	BCSF EM	This Plan Section 8.2
B5	<p>Adopt clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed:</p> <ul style="list-style-type: none"> • Documented clearance protocols to mark and protect vegetation to 	<p>Induction records</p> <p>Toolbox records</p> <p>Environmental inspection records</p>	<p>Pre-construction</p> <p>Construction</p>	BCSF EM	This Plan Section 7.4

ID	Mitigation measure	Resources required	Timing	Responsibility	Reference
	<p>be retained</p> <ul style="list-style-type: none"> Use handheld machinery where possible and have elevated work platform check hollows prior to tree felling. 				
B6	Use noise barriers, or daily/seasonal timing of construction and operational activities to reduce impacts of noise.	Environmental Management Plan Noise Management Plan	Construction	BCSF EM Superintendent	NMP (Post Approval)
B7	Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill.	EMP	Construction	BCSF EM Superintendent	CEMP (Post Approval)
B8	Using adaptive dust management and monitoring programs to control air quality.	CEMP DMP	Construction Operations	BCSF EM Superintendent	TMP (Post Approval)
B9	<p>Install temporary fencing to protect significant environmental features such as riparian zones, karst, caves, rock outcrops and water bodies:</p> <ul style="list-style-type: none"> Prior to construction commencing, exclusion fences and signage would be installed around identified exclusion zones. 	Environmental inspection records	Pre-construction Construction	BCSF EM Superintendent	This Plan Section 7.2, CEMP (Post Approval)

ID	Mitigation measure	Resources required	Timing	Responsibility	Reference
B10	Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas.	BMP	Construction Operations	BCSF EM Superintendent	This Plan Section 7.6 and Section 7.7
B11	<p>Preparation of a vegetation management plan to regulate activity in vegetation and habitat adjacent to the proposed Project.</p> <ul style="list-style-type: none"> Preparation of a management plan that would include protocols for: Protection of native vegetation to be retained, particularly within the following areas: <ul style="list-style-type: none"> Remnant Monaro Tablelands Cool Temperate Grassy Woodlands at the eastern end of the Subject Land HBT's The wetland area at the north-western end of the Development Site The setback area from Butmaroo Creek The installation of permanent fencing around areas of native vegetation to be retained Best practice removal and disposal of vegetation cleared 	VMP	Construction	Environmental Consultant (NGH)	VMP (Post Approval)

ID	Mitigation measure	Resources required	Timing	Responsibility	Reference
	<ul style="list-style-type: none"> Weed management Unexpected threatened species finds Exclusion of vehicles from sensitive areas Rehabilitation of disturbed areas. 				
B12	Scheduling the timing of construction activities to avoid critical life cycle events (e.g., timing construction activities to avoid migratory species on site, or using the site).	CEMP	Construction	BCSF EM Superintendent	CEMP (Post Approval)
B13	Using sediment barriers and spill management procedures to control the quality of water runoff released from the site into the receiving environment.	ESCP	Construction	BCSF EM Superintendent	CEMP SWMP (Post Approval)
B14	Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the Development Footprint.	BMP EMP VMP	Construction	BCSF EM Superintendent	This Plan Section 7 VMP
B15	Implementation of a Biodiversity Management Plan to restore an equivalent amount of White-fronted Chat breeding habitat impacted by the Project:	BMP EIS BDAR	Prior to construction During construction Operations	BCSF Environmental Manager (EM)	This Plan Section 7.5 Section 6

ID	Mitigation measure	Resources required	Timing	Responsibility	Reference
	<ul style="list-style-type: none"> • Survey the extent of Scotch Thistle within the Subject Land to identify the exact area(ha) of White-fronted Chat breeding habitat being impacted. • Identify areas within the Subject Land which are not being impacted and establish an area of equivalent size to be used to restore White-fronted Chat breeding habitat. • Preparation of an adaptive Pest Action Management Plan (PAP) to regulate pest animal species and mitigate any potential impacts to the White Fronted Chat. • Detail a monitoring plan in the BMP to assess the performance and effectiveness of the White-fronted Chat breeding habitat 				Section 7.12

8. Compliance management

8.1 Roles and responsibilities

The EMS describes the roles and responsibilities of the BCSF Project team in relation to environmental management, which will be developed post-approval prior to the commencement of construction. Specific responsibilities for the implementation of environmental controls are detailed in Section 7.11 of this Plan.

8.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to biodiversity management issues. The induction training will address elements related to biodiversity management, including:

- Existence and requirements of this sub-plan
- Relevant legislation
- Specific species likely to be affected by the construction works and how these species can be recognised
- Vegetation communities and trees to be retained
- Dams to be retained
- Site speed limits and their enforcement in minimising fauna strike
- Vehicle hygiene and biosecurity risks and procedures
- Fauna rescue requirements
- Weed control measures
- General flora and fauna management measures
- Specific responsibilities for the protection of flora and fauna.

Further details regarding staff induction and training will be outlined in the EMS post-approval, prior to the commencement of construction.

8.3 Monitoring and inspections

Inspections of sensitive areas and activities with the potential to impact biodiversity will occur for the duration of the Project.

Requirements and responsibilities in relation to monitoring and inspections are outlined in Table 7-2.

8.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, infrastructure approval and other relevant approvals, licences, and guidelines. Audit requirements will be detailed in the EMS post-approval, prior to the commencement of construction.

8.5 Reporting

Reporting requirements and responsibilities are outlined in Table 7-2, and will be included in the EMS post-approval prior to the commencement of construction.

Details on incident reporting will be included in the EMS post-approval. Environmental incidents relating to biodiversity management may include, but are not limited to:

- Clearing outside of the approved Project boundary or management zones identified in Section 6
- Clearing within exclusion zones
- Fauna injury or death
- Discovery of threatened species
- Spread of weed or pathogens
- Vehicle access within prohibited vegetation zones.

Specific information required from this BMP includes a pre-clearing survey and post-clearing report. These reports are to be provided to the BCSF Project team and generally include:

- The name and qualifications of the Ecologist/Fauna spotter catcher present during clearing
- An assessment of the habitat and handling of fauna
- Information on clearing operations, dates, procedures, areas
- Including the number of trees and hollows cleared
- Live animal sightings, captures, any releases or injured/shocked wildlife
- Any dead animals located
- Photographs of rescued fauna.

9. Review and improvement

9.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance
- Determine the cause or causes of non-conformances and deficiencies
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies
- Verify the effectiveness of the corrective and preventative actions
- Document any changes in procedures resulting from process improvement
- Make comparisons with objectives and targets.

The processes described in the EMS may result in the need to update or revise this Plan. This will occur as needed.

Only the BCSF Environmental Manager, or delegate, has the authority to change any of the environmental management documentation. Consultation with an ecologist should be undertaken if any changes to this document are likely to impact upon flora or fauna not originally proposed to be impacted by the BCSF or if any changes to protocol are required.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure.

10. References

- BDAR, 2022. Biodiversity Development Assessment Report - Blind Creek Solar Farm. NGH Consulting, May 2022. <https://www.planningportal.nsw.gov.au/major-projects/projects/blind-creek-solar-farm>
- DPE, 2021. WFC White-fronted Chat population in the Sydney Metropolitan Catchment Management Area – profile. <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20144#:~:text=Description,tipped%20tail%20and%20rounded%20wings>.
- DPI, 2018. New South Wales Weed Control Handbook. A guide to weed control in non-crop, aquatic and bushland situations. NSW dpi management guide, seventh edition.
- DPI, 2020. Monitoring, Evaluation, Reporting and Improvement (MERI) for pest animal management in NSW. Department of Primary Industries, 2021. https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0011/1217783/NSW-MERI-framework-for-pest-animal-management-FINAL-web.pdf
- EIS, 2022. Environmental Impact Statement - Blind Creek Solar Farm. NGH Consulting, May 2022. <https://www.planningportal.nsw.gov.au/major-projects/projects/blind-creek-solar-farm>

Appendix A Consultation

Kurtis Wathen

Environmental Assessment Officer
Energy Resource Industry Assessments
kurtis.wathen@dpie.nsw.gov.au

Our ref: DOC22/444834-9
Your ref: SSD 13166280

Dear Mr Wathen

Blind Creek Solar Farm (SSD -13166280) Biodiversity Development Assessment Report (BDAR)

I refer to the request from Energy Resource Industry Assessments to comment on the Blind Creek Solar Farm Environmental Impact Statement (EIS).

We have reviewed the Biodiversity Development Assessment Report (BDAR) in Appendix G of the EIS. We have also inspected the site on 30 November 2021. The BDAR demonstrates that:

- the direct impacts are entirely isolated to non-native vegetation in a highly disturbed, agricultural landscape
- no ecosystem credits are generated because the vegetation is in such poor condition that the Vegetation Integrity (VI) score is below the offsetting threshold.

We are satisfied that the BDAR has adequately addressed the requirements of the 2020 Biodiversity Assessment Method (BAM), except for the prescribed impact assessment for impacts to White-fronted Chat (*Epthianura albifrons*, Vulnerable, *Biodiversity Conservation Act 2016*) which is utilising non-native vegetation in the Subject Land.

Recommendations are provided in **Attachment 1** as to how the impacts to this species can be addressed through the preparation of a Biodiversity Management Plan (BMP). We suggest that this is prepared prior to issuing conditions of consent during the Response to Submission stage. This would assist the Applicant in meeting construction timeframes without needing to undertake targeted survey, while also ensuring the maximum benefit to the local population of White-fronted Chat. The BMP could form an appendix to the BDAR.

Additionally, some minor amendments to the BDAR are recommended in **Attachment 2**. Of particular note, is that there may have been a misidentification resulting in an unnecessary species credit liability for Southern Myotis (*Myotis Macropus*).

With regard to avoidance, the applicant has avoided the most significant ecological entities, including:

- >38 ha of remnant *Monaro Tablelands Cool Temperate Grassy Woodlands* at the eastern end of the Subject Land
- > 41 hollow bearing trees

- the wetland area at the north western end of the Development Site
- a setback area from Butmaroo Creek running along the southwestern boundary of the Subject Land.

It would be beneficial for the long-term maintenance of these values if some form of permanent formal protection is put in place.

If you require any more information please contact Mallory Barnes, Senior Regional Biodiversity Conservation Officer, South East BCD by email at mallory.barnes@environment.nsw.gov.au.

Yours sincerely



1/7/2022

MICHAEL SAXON
Director South East
Biodiversity and Conservation Division

Enclosure: Attachment 1 – Recommendations for Biodiversity Management Plan (BMP) for White Fronted Chat.
Attachment 2 – Minor recommended amendments to Biodiversity Development Assessment Report (BDAR)

Attachment 1 – Recommendations for Biodiversity Management Plan (BMP) for White Fronted Chat (*Epthianura albifrons*)

White-Fronted Chat (WFC) was detected at four locations in the Subject Land along the northern side of Butmaroo Creek in dense, non-native vegetation dominated by Scotch Thistle (*Onopordum acanthium*). The BDAR has correctly identified that this represents a prescribed impact.

It is unclear if the non-native vegetation forms foraging and/or breeding habitat for WFC, however the latter is of greater conservation significance. The species is known to utilise several prickly non-native species as breeding habitat.

Prescribed impacts would normally require the Proponent to alter the design of the solar array to avoid the habitat completely or to implement minimisation measures that reduce the severity of the impact (s 7.2 BAM 2020). This is because –

‘[Prescribed impacts] cannot be readily replaced or offset, [so] it is important that measures to avoid or minimise impacts are undertaken and are clearly documented in the BDAR or BCAR.’ (s 7.2.1 BAM 2020)

To facilitate avoidance, the BAM requires that the assessor provides a description of the type of non-native vegetation which forms habitat for the threatened species (s 6.1.2.1.c BAM 2020) and identifies this vegetation a site map (s 6.1.2.2 BAM 2020).

To achieve this, we have previously recommended undertaking targeted survey of WFC during the breeding season to determine if it is being used as breeding habitat and if so, how far it extends within the Subject Land.

However, according to BCD experts, breeding commences from September and continues through to March. Any survey prior to this would be of limited value in determining the true extent of breeding habitat, if present (pers comm. Dr Damon Oliver 3 June 2022).

Given that this timing for targeted survey would conflict with critical construction time frames, an alternative approach would be to –

1. Undertake immediate survey for the extent of Scotch Thistle within the Subject Land. This could be undertaken on foot, in vehicle or using a Remotely Piloted Aircraft System (RPAS) to maximise speed of survey.
2. Assume that all areas of Scotch Thistle are WFC breeding habitat
3. Develop a costed Biodiversity Management Plan (BMP) which aims to restore at least an equivalent amount of White Fronted Chat breeding habitat within the Development Site but outside the Subject Land in the avoided areas such as –
 - Butmaroo and Wright Creek riparian set back area,
 - the remnant woodland (PCT 1100) at the eastern end of the Subject Land,
 - the perimeter of the northern wetland and further north until the shore of Lake George.
4. The BMP should be developed in collaboration with BCD and preferably submitted prior to consent as a part of the Response to Submissions. The BMP would then be able to form an appendix to the BDAR and be referred to in the conditions of consent.

It is suggested that the BMP:

- be easy for operational staff to use and provide a clear, concise, and auditable environmental management framework.
- identify the threats known to affect the viability of WFC. At a minimum, include known threats listed in the threatened species profile in the Threatened Biodiversity Data Collection (TBDC).
- detail management actions that would be applied to management zones to address threats. Identify the management zones on a site map. Identify and map any management zones which require different management actions. Suggested management actions include –
 - Establishing dense plantings of indigenous species that support WFC breeding such as *Poa labillardieri*, prickly *Acacia* species such as *Acacia paradoxa*, *Bursaria spinosa*, *Leptospermum* and *Chenopodiaceae* spp.
 - Fencing revegetated areas and installation of tree guards around each plant to prevent trampling and grazing by domestic livestock and overabundant native macropods.
 - Aggressive exclusion or suppression of foxes, cats, and, where relevant, overabundant populations of non-threatened native species such as Noisy Miners (*Manorina melanocaphala*) macropods.
 - Aggressive control of weed species not associated with WFC breeding habitat.
- identify a specific and measurable performance criteria for each threat. This might be within a range eg, *>80% cover is comprised of indigenous species that support WFC breeding and <5% total cover comprised of weed species.*
- detail an achievable monitoring program which is designed to assess the delivery of each performance criteria, e.g. *Management zones will be surveyed three times each breeding season for WFC utilisation, commencing two years after planting and continuing for the first 10 years of operation or until WFCs are consistently utilising management zones.*
- identify a trigger (value outside of the target range) that would initiate adaptive management, e.g. *No WFC utilisation of a management zone for three consecutive surveys or weed species comprise greater than 10% total groundcover.*
- identify a realistic management action that is likely to place the variable back within the target range, e.g. *in-fill planting or spot application of herbicide.*
- identify the person responsible for undertaking monitoring, identification of triggers, and commence the management action, e.g. *Blind Creek Solar Farm's Environmental Manager will be responsible for implementing a weed monitoring program.*
- provide a time frame for the monitoring program and achieving the target range. Interim performance criteria might be necessary.

- provide a reporting frequency to assess the delivery of each performance criteria.
- consider payment of a bond until performance criteria are met.
- be prepared to the satisfaction of BCD and submitted prior to the issue of conditions of consent.

Attachment 2 – Minor recommended amendments to BDAR

Southern Myotis

The BDAR identified a credit liability for the Southern Myotis (*Myotis macropus*). However this is likely to be a misidentification as:

- the parent PCT from which the non-native vegetation is derived is not included in list of PCTs associated with the species in the TBDC (refer to *Species' Credit Threatened Bats and their Habitats NSW Survey Guide*).
- The waterway likely does not meet the criteria of the habitat constraint for Southern Myotis - '*medium to large permanent creeks, rivers, lakes or other waterways (i.e. with pools/ stretches 3 m or wider)*'
- The low number of survey nights means the record may not be reliable as Southern Myotis calls are easily confused with common Long-eared Bats.

Rename vegetation zones

The following vegetation zones should be renamed to reflect their highly degraded non-native status –

- Zone 1 - 1110_grassland_poor
- Zone 2 – 1100_grassland_poor

For instance -

- Zone 1 - 1110_non-nativegrassland_poor
- Zone 2 – 1100_ non-nativegrassland_poor

Serious and Irreversible Impact (SAIL) assessment

The SAIL assessment for *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands* is not necessary because it is not being impacted.

Although the derived communities can meet the criteria for the Scientific Determination (para 3.1.3 of the *Notice of and reasons for the Final Determination*), and vegetation zone 2 is derived from a Plant Community Types (PCTs) which is consistent with the SAIL entity, it is likely in such a high state of degradation that it no longer meets the criteria. Therefore, the SAIL assessment should be removed from the revised BDAR at the Response to Submissions stage.

The 38 ha area of avoided woodland in the east of the Development Site that does meet the criteria in the Scientific Determination for *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands* should be included as a management zone in BMP and subject to management actions to improve its condition and minimise the likelihood of indirect impacts from increased weed transport..

Human made structure

The historic Trigonometrical Station, which is a human made structure that potentially forms habitat for threatened bat species. If this structure is going to be removed an acoustic detector needs to be deployed at the entrance to determine if it is suitable breeding or roosting habitat.

Appendix B Procedure for vegetation clearing

Purpose

The purpose of this procedure is to describe the clearing and grubbing processes to be implemented throughout the construction phase to minimise threat to remnant vegetation and waterways within the local area.

This should be read in conjunction with Appendix G – Weed and pathogen management procedure, Appendix C Pre Clearing Checklist, Appendix D Post Clearing Checklist and Appendix E Fauna Pre Clearance Procedure.

Scope

The works to be executed under this procedure comprise the following:

- Clearing of all vegetation, both living and dead
- Clearing of minor built structures (such as fences)
- Clearing of all rubbish and other materials which are unsuitable for use in the works
- Grubbing of trees and stumps within the approved area.

The work includes the removal of native trees, mulching or relocation of vegetation and the removal of waste material including built structures, rubbish, weeds and exotic plants.

Procedure

1. Liaise with the BCSF Environmental Manager and confirm that the clearing extent and site feature surveys have been completed and that hollows, bush rocks and woody debris have been identified for relocation and removed.
2. Assess the work area to determine if traffic management is required and implement if necessary.
3. Notify the Services Manager of the area to be cleared to check for underground and overhead services. If services are located in the line of clearing, take action to avoid damaging them.
4. Ensure the pre-clearing checklist (Appendix C) has been completed.
5. Notify personnel of priority weeds on site and any relevant requirements associated with their removal.
6. Remove target weed species as per requirements.
7. Ensure protective measures are in place to protect sensitive areas, as marked during the site feature survey. This includes delineation, site inductions and sediment control measures. Ensure access routes are clearly marked.
8. Commence clearing in conjunction with pre-clearing surveys and fauna pre-clearance procedure (Appendix E). Clearing is to be conducted in two stages. Only areas within the required clearing footprint should be cleared. No clearing should be undertaken outside the marked approved clearing boundary.
9. Chip vegetation at the time of clearing and stockpile on site for later use. Inspect for fauna presence immediately before starting chipping process.
10. Clear area to within marked area.

11. Manually fell trees within 15m of rivers, creeks, watercourses and drainage lines. Prevent trees from falling into exclusion zones.
12. Identify overhanging tree branches and trim (as per instruction of the Project Ecologist).
13. Compact and backfill holes within the area caused by grubbing to at least that of surrounding adjacent land.
14. Habitat trees will be felled one at a time at the direction of the fauna specialist, 24 hours after the clearing non-habitat trees.
15. Felled habitat trees will be inspected by an ecologist to allow all opportunities to capture any potentially undetected fauna.
16. As per Appendix E, hollow bearing limbs, woody debris and bush rock marked for relocation should be inspected for presence of fauna before being moved to fauna translocation sites or other recipient sites previously marked during the site features survey. If any animal emerges, ecologist or fauna spotter catcher should capture, inspect for injuries and relocate to pre-determine fauna release area. If injured, fauna should be referred to vet or wildlife carer
17. Remove all remaining materials cleared, primed and grubbed for recycling or disposal.
18. A post clearing survey will be done and a Post Clearance Checklist completed (Appendix D).
19. Post-completion clearing reports will be provided to BCSF and provide a summary of the results of results of surveys, fauna rescues, fauna injury and mortality. These reports will include:
 - The name and qualifications of the Ecologist/Fauna spotter catcher present during clearing
 - An assessment of the habitat and handling of fauna
 - Information on clearing operations, dates, procedures, areas
 - Live animal sightings, captures, any releases or injured/shocked wildlife
 - Any dead animals located
 - If fauna is detected, fill in Appendix F and take photographs of rescued fauna, Records of the number of trees cleared. For the purposes of this requirement, a tree has a trunk diameter 100mm or more at a point 1.5m above the adjacent ground level.
20. Provide to the Principal a Post-Completion Clearing Report within 21 days from the completion of substantial clearing (as determined by BCSF) providing a final summary of the Progressive Clearing Report.

Appendix C Pre-clearing checklist

Inspection Date:		Time:	
Project Ecologist:		Location:	
#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action
1	Boundary of clearing zone fenced?		
2	Has the Project Ecologist/Fauna spotter catcher completed Pre-clearing surveys for Threatened Species?		
3	Has the pre-clearance survey been completed within two hours of clearing?		
4	Has all fauna been relocated outside the proposed impact footprint?		
5	Have all workers been shown the limit of clearing, advised of fauna handling procedures and any other controls?		
6	Has the Project Ecologist/Fauna spotter catcher marked habitats to be disturbed using the recognised colour coding protocol?		
7	Has protective fencing and appropriate signage installed around threatened ecological communities, vegetation to be retained and exclusion zones?		
8	Have hollow bearing trees been checked for inhabiting species?		
9	Has vegetation to be salvaged for re-use been identified?		
10	Mulching and chipping plant established?		
11	Have all residents adjoining the Development Site been advised at least 5 days prior to vegetation clearing?		
12	Has all equipment been inspected and cleaned to remove materials and debris prior to entering site?		
13	Are environmental control measures including erosion and sediment controls in place to prevent down-stream biodiversity impacts?		
14	Is a suitably qualified person present when necessary to supervise clearing works and relocate or rescue fauna as required.		
15	Hollows are to be felled 24 hours after the non-habitat vegetation has been cleared, then felled in a controlled manner and inspected by a qualified ecologist or fauna spotter catcher for presence of fauna that needs to be relocated		

#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action
	and potential injuries. All hollows have the potential to support fauna and should be placed in adjacent habitat until the following day for further inspection by an ecologist or fauna spotter catcher to verify no fauna is present. If possible, the hollows could be permanently relocated in adjacent areas. Has this been done?		
16	Retained logs outside of construction area to be checked for native fauna; any animals impacted by clearing works are to be relocated in accordance with the Project Fauna Rescue and Release Procedure.		
17	Any other comments or issues?		

Appendix D Post-clearing checklist

Inspection Date:		Time:	
Project Ecologist:		Location:	
#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action
1	Was clearing of vegetation within the boundaries?		
2	Were any hollow-bearing trees, hollow logs and/or bush rocks impacted?		
3	Were any fauna, nests or other fauna features impacted?		
4	Were any animals shocked, injured or killed as a result of clearing works?		
5	Were the fauna recovery procedures followed? If yes, what actions were taken?		
6	Has woody debris been inspected for fauna immediately before chipping to avoid injury or death to fauna that may be present?		
7	Any other comments or issues?		

Environmental Representative Signature: _____

Appendix E Fauna pre clearance procedure

Purpose

This procedure explains the pre clearance process to ensure that suitable action is undertaken in the event fauna (included injured, shocked, juvenile, eggs, dependent or other animal) are discovered on the Development Site that require handling or rescue during vegetation and soil clearance and ongoing construction activities.

Scope

This procedure is applicable to all areas where clearing of vegetation or removal of habitat features is to be undertaken and relates to native and introduced fauna species that are found on the Development Site.

If there is an unexpected threatened species find, the unexpected threatened species finds procedure outlined in Appendix H will be followed. If any fauna is detected the fauna interaction register is to be completed in Appendix F.

Induction and training

All site personnel and subcontractors will be made aware of the actions to be taken during clearance (including pre clearance) and in the event that fauna is discovered on the Project. This training will occur on site during the Project induction and as required in toolbox talks.

Pre clearance procedure

Pre-clearing survey

1. Prior to works commencing, the fauna spotter¹ /ecologist is to undertake a brief site inspection to ensure that each hollow-bearing tree (HBT) to be removed is (still) clearly marked so that machinery operators and site construction workers are aware of their presence. This is to avoid any indirect impacts occurring beyond, or in a manner not consistent with the methodology specified in this or other regulatory documents. Marking of the HBTs to be removed and/or retained is to be clear and must differentiate between removed/retained trees such as through the use of different coloured flagging tape or spray paint.
2. All known hollows must be individually inspected for occupancy and current use. This would require a pole mounted inspection camera or support from an arborist on an Elevated Work Platform. If hollows are found to be occupied, then a plan for how to minimise impacts to the fauna would be prepared (by the fauna spotter/ecologist) specific to the species and its lifecycle and implemented prior to tree removal commencement.
3. A fauna spotter/ecologist will undertake a visual inspection of all hollows and habitat features within 24 hours of clearing to identify resident fauna species that might require relocation.

¹ The 'fauna spotter' / ecologist must be trained and experienced in handling fauna, , and recognise fauna species and required habitats. If handling microbats the spotter/ ecologist must be appropriately vaccinated.

4. Contact veterinarian/wildlife carers in the area prior to clearing starting. At least one must confirm to be willing to accept wildlife if orphaned or injured fauna are encountered. Do not use vets or wildlife carers in place of ecologist or fauna spotter catchers.
5. The fauna spotter/ecologist must assess the surrounding area for alternative hollows suitable for fauna relocation. If these are not present then nest boxes should be made available, and if fauna detected, installed so that mobile hollow dependent fauna have alternative locations to relocate. Nest boxes should be installed within 100m of the tree removal site and must be suitably sized and designed to accommodate the species of concern².

Clearing of habitat features

1. The fauna spotter/ecologist must have appropriate catching, handling and housing equipment present on site in the event of the need to detain fauna. This includes enclosures suitable for common and suspected threatened species of varying needs and sizes. Housing and transport of wildlife must be in accordance with the Code of Practice for Injured, Sick and Orphaned Protected Fauna:
<https://www.environment.nsw.gov.au/research-and-publications/publications-search/code-of-practice-for-injured-sick-and-orphaned-protected-fauna>. Remove non-habitat adjacent trees and understorey (if applicable) 24-48 hours prior to the felling of the habitat trees. Ensure that entire area within drop radius of habitat tree cleared of debris.
2. Prior to clearing hollow-bearing trees, use an excavator (preferable) or loader to hit the trunk as high up the tree as possible several times. Wait at least 30 seconds. Repeat this process several times. The use of machinery noise can also encourage any resident fauna to vacate the tree. These disturbance actions are best performed at the end of the day to encourage nocturnal species to relocate overnight. The tree is to be left overnight (at a minimum) before being removed. Any HBT that has been left for longer than 48 hours since being shaken/tapped, is to be re-shaken/tapped at least the day prior to removal.
3. When removing hollow-bearing trees, a fauna spotter/ecologist should be present at each tree to be removed to look for signs of animal movement in the tree to be cleared. The fauna spotter should be able to communicate directly with plant operators, ideally utilising a UHF radio. If an excavator or large machinery (as opposed to a chain saw) is used to clear hollow bearing trees, an inspection of each hollow must be undertaken by the fauna spotter/ecologist prior to commencement of clearing even if tapping has occurred the night before. Hollow bearing tree removal should be timed to avoid August-November – breeding season for the highest number of species.
4. The excavator or equivalent machinery operator will slowly lower HBT trees. HBTs must not be pushed and left to fall under their own weight as this can cause direct injury or death to resident fauna.
5. If taking the tree down in stages, remove non-hollow-bearing limbs first. Then remove hollow-bearing limbs
6. Once the hollow-bearing limbs or hollow-bearing tree are on the ground, the fauna spotter/ecologist must check each hollow for signs of wildlife before the next limb/tree

² Common Brushtail Possum are the most common species encountered in tree removal, therefore this sized nest box should be made available as a minimum if no suitable hollows exist within 100m. If other species are encountered, then alternative nest boxes must be sourced.

is removed. Remove any fauna into a handling bag or suitable secure housing. The fauna spotter will release any adult uninjured fauna into the designated release area (a distance of ~50m outside the clearing footprint at the appropriate time of day for the species).

7. Where practical, relocate fauna in their hollow by relocating entire hollow sections to areas of retained vegetation.
8. If dependent young or injured fauna are discovered following or during tree felling then fauna must be delivered to a licensed wildlife carer or veterinarian (previously notified of the works).
9. Records of any animals removed or injured must be retained.
10. Once felling, if uninjured fauna is detected within the felled tree and the hollow is in good condition, the fallen tree will be marked and left in situ over night to allow the fauna to self-relocate. The following day fallen trees would be left in place or moved to a nearby area to retain fauna habitat once the fauna has relocated.
11. Other habitat features such as rocks, logs and even man-made items should also be inspected for fauna presence.

Handling wildlife

1. Direct contact with any wildlife should be avoided wherever possible. Wildlife should be encouraged to leave hollows or habitat through controlled disturbance as detailed above.
2. Any uninjured wildlife that does not include dependent young (unless in the company of its healthy parent) must be encouraged to leave the Development Site.
3. No handling of microbats unless trained and vaccinated for Australian Bat Lyssavirus with current titre levels.
4. If wildlife is injured or orphaned, WIRES or similarly qualified and licensed wildlife. Wildlife care and rescue organisation should be contacted to collect and treat any injured or orphaned individuals. This organisation would be notified of the tree removal works, prior to works commencing. See below for contact details of wildlife rescue organisations in the area of works.

Organisation	Contact
Wildcare Queanbeyan	02 6299 1966
Bungendore Veterinary Surgery	(02) 6238 1133

5. If the fauna species is identified as a threatened species that is not a species identified in the BMP, the SER must:
 - a. Immediately cease all work likely to affect the threatened species
 - b. Implement the Unexpected Threatened Species Find procedure –Appendix H.
6. If the fauna is to be released, the Project Ecologist must identify suitable fauna release locations within or near the Development Site.

All fauna handling and rescue events will be recorded via the Fauna interaction register (Appendix F).

Clearing during June to January

1. Should clearing of hollow-bearing trees be required during the breeding or hibernation periods of threatened species, consultation is to be undertaken with local wildlife carers and/or specialist carers for those faunal groups (e.g., microbats, parrots, reptiles). Confirmation is to be sought from these groups that they would accept rescued fauna.
2. Should inspections identify threatened species attending hollows, a detailed assessment is to be undertaken of their activity within the hollow. If investigating only, clearing may proceed with the above measures employed. Where threatened species are actively building nests (i.e., bringing material to hollows), it is recommended that clearing be postponed until fledging. Where threatened species are attending eggs, it is recommended that clearing be postponed until fledging. Where threatened species are attending young, it is recommended that clearing be postponed until fledging.
3. Microbats in torpor (a kind of hibernation) Hibernating microbats are likely to occur throughout the winter months, however and bats in torpor may occur year-round. Where it is considered highly likely that microbats would be in torpor/hibernation, it is recommended that supervised clearing occur, and that recovered bats are relocated to a dedicated bat carer to ensure they are sufficiently fed throughout the remainder of winter, prior to release back to the site in spring. The removal of bats from torpor/hibernation puts excessive stress on their fat reserves, which may be depleted prior to them being able to forage effectively in spring, thus intervention is recommended.

Fauna relocation and release

Relocation and release of uninjured fauna must be done in a way that is suitable for each species.

1. Nocturnal species must be held in a safe and secure way during day light hours to ensure they are protected and ready for release. Animals that might be in brumation or torpor should be warmed before releasing and in some cases may need to go into care with a wildlife rescue organisation depending on the time of year.
2. Species should be released into the same or similar habitat they were removed from.
3. Records of the species, number of individuals, the location and the habitat they were released into should be kept for all fauna detected (Appendix F).
4. If animals go into care, be sure to provide the carer with suitable information so that the animal can be released into suitable habitat when it is ready and get them to notify the ecologist when this occurs or if another outcome occurs.
5. Consider the use of nest boxes for relocation of mammals such as adult possums and gliders.
6. If unsure consult another ecologist, species expert or wildlife rescue organisation species coordinator. Document all responses and decision pathways.

Appendix F Fauna interaction register

Date	Time	Location discovered (easting northing)	Fauna species	Healthy, injured or deceased?	Released? (Y/N)	Required rescue or veterinary attention?	Release location (easting northing)	Comments (outcome)

Appendix G Weed and pathogen management procedure

Purpose

This procedure details weed and pathogen management and control practices to be implemented throughout the pre-construction and construction phases, and for the maintenance phase of the Project to minimise the threat the remnant vegetation, native flora and fauna habitats and waterways within the local area.

Scope

Weed management within the Development Site will consist of initial removal of vegetative cover in the approved area (including weeds) and ongoing monitoring and maintenance to ensure effective control of any new weed infestation that occurs. This procedure applies to the control of weeds within the Development Site in areas managed by BCSF Environmental Manager.

The term 'weed' applies broadly to either unwanted or invasive non-natives, declared priority weeds specific to the area, environmental weeds and alien native plants (i.e. those growing aggressively outside their normal range).

The scope of weed management and control on site will target those weeds declared as weeds within greater NSW under the *Biosecurity Act 2015*, as well as additional agricultural weeds found during field surveys.

The plan also outlines pathogen identification onsite and reporting requirements.

Induction and Training

All site personnel and subcontractors will be inducted in the existence of priority weeds on the Project, including the identification and disposal of priority weeds. This training will occur on site during the Project Induction and as required in Toolbox talks, which may include the provision identification guide for priority weeds in induction or crib rooms.

All site personnel will be made aware of the limits of clearing and the importance of threatened species and populations and any vegetation of significant value.

Identified weed species

From field surveys undertaken as part of the Project BDAR, approximately 635.38 hectares (ha) of the Development Site was assessed as native vegetation in poor condition.

Eight weeds are listed as priority weeds for the South East Region under the NSW Biosecurity Act. These are:

- Serrated tussock (*Nassella trichotoma*)
- African Lovegrass (*Eragrostis curvula*)
- Chilean Needle Grass (*Nassella neesiana*)
- Blackberry (*Rubus fruticosus* species aggregate)
- Fleabane (*Conyza* spp.)

- Scotch Thistle (*Onopordum acanthium*)
- Saffron Thistle (*Carthamus lanatus*)
- Spear Thistle (*Cirsium vulgare*)
- White Horehound (*Marrubium vulgare*)

The *Biosecurity Act 2015* dictates that all priority weeds are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any land managers or authorities who deal with any plant has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Other exotic flora that was identified within the study area are common within the region and are often found within disturbed areas. No weeds of national significance were observed during field surveys.

Weed control procedure

To control weed infestations prior to and during construction, the BCSF Environmental Manager will ensure the following procedure is implemented:

Weed inspection

Prior to any clearing and grubbing the BCSF Environmental Manager or weed control contractor will survey the Development Site and record the locations and extent of weed infestations, to be used as a baseline for ongoing monitoring. Information recorded will include species, distribution, and density. Photo points will be established as reference points for future monitoring and marked on weed maps.

Any priority weed species or significant environmental weeds will also be identified during any pre-clearing inspections and recommendations for control and limiting spread will be made in associated reports.

Weed treatment methodology

The BCSF Environmental Manager or weed control contractor will identify areas of weed infestation; advise the appropriate weed control methods and timing for each area of works.

As a guide, removal techniques involve the following approaches:

Further specific weed control measures will be recommended as relevant in any weed monitoring reports provided by a suitability qualified individual.

Additional weed management strategies include:

- Minimal impact techniques are to be used, ensuring no native species within the Project corridor are damaged during weed control activities.
- Soil disturbance is to be kept at a minimum and stabilisation of any soil damage is to be undertaken immediately.
- All persons undertaking weed control are to consult with the nominated suitably qualified individual to ensure accurate identification of species.
- Weed control contractors will be made aware of the potential threatened species identification guide in order to reduce the risk of accidental impact to threatened plant species that may be unexpectedly encountered.
- Hand removal and other manual techniques are to be used where possible and economically feasible and use of herbicides avoided/minimised.
- Herbicide application is to be administered by authorised personnel only.
- Herbicide application should not be used when in close proximity to waterways or sensitive areas such as mangroves, or where there is the potential for herbicide runoff into these ecological features.

Only locally indigenous plant species and mulch uncontaminated by weeds are to be used in revegetation of the site

Follow up inspection

BCSF Environmental Manager will ensure that a follow-up inspection is undertaken of identified weed infestation sites to ensure treatment was successful.

Weed inspection

Where weeds cannot be effectively destroyed prior to topsoil stripping, weed contaminated topsoil will be isolated and either encapsulated by deep burying or disposed of at an approved offsite licensed facility.

Annual weed monitoring during construction to assist with the ongoing identification and management of weeds is detailed in the following section.

Vehicle, plant and equipment movement plan

Construction personnel should be made aware of this plan, including identification guides for priority weeds.

To prevent the spread of weeds throughout the construction site and surrounding areas, the movement of weed-contaminated plant and equipment will be monitored by BCSF Environmental Manger. The BCSF Environmental Manger will ensure that all plant and machinery entering the site is inspected and free of weeds by applying standard weed hygiene protocols.

Plant and equipment will be checked and cleaned before leaving a worksite that contains priority weeds.

BCSF Environmental Manger will also check vehicles and footwear are free of soil before entering or exiting the site to prevent the introduction of soil borne pathogens. Suitable vehicle and boot wash down facilities will be provided.

Records of all construction plant screening checks will be recorded on mobile plant inspection checklists and monitored by BCSF Environmental Manger.

Weed disposal

Where priority weed areas are disturbed by construction activities, weeds and topsoil potentially containing weed propagules will be removed and disposed in consultation with Queanbeyan-Palerang Council.

All weeds physically removed (particularly those bearing seeds) are to be disposed of appropriately at a licensed landfill which is able to receive green waste. Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles. They are not to be mulched for re-used. Remove weeds immediately onto suitable trucks/containers and dispose of without stockpiling.

Ongoing management and monitoring

Monitoring of weed infestations will occur quarterly through the construction phase to determine the effectiveness of management controls. Post construction monitoring and reporting will occur annually in October and include the use of photo points to monitor the success of weed management and updating weed maps.

Instances of priority weeds identified during construction are to be verified by a suitably qualified individual. Where presence is confirmed, weed species should be disposed of in accordance with DPI Guidelines.

Listed priority weeds eradicated from the Development Site within 3 years of detection.

Management of priority weeds

As a general guide, Priority Weeds should be controlled in accordance with the methods and guides outlined in the *New South Wales Weed Control Handbook* (DPI 2018) and profiles available from the NSW WeedWise website (DPI 2020).

The use of herbicides must be completed according to the *NSW Pesticides Act 1999*, Material Safety Data Sheets and labelling instructions for specific trade name herbicides and off label use permits registered with the Australian Pesticides and Veterinary Medicines Authority (APVMA). The use of herbicide as part of this plan will be limited to direct application to cut stumps and spot spraying. Any contractors using herbicides on the site must be trained and appropriately qualified to do so.

Weed control of Scotch Thistle and other weeds in proximity of Scotch Thistle will be avoided during WFC breeding season (September to March). This action assumes that Scotch Thistle is WFC breeding habitat.

Weed monitoring

A weed monitoring program will be implemented to qualitatively track weed management activities required for the Project.

As per step 2 of the weed control procedure, prior to any clearing and grubbing, the BCSF Environmental Manager or weed control contractor will undertake a site inspection to map weed species and gather baseline data prior to construction commencing. This inspection will serve as a basis for future monitoring and should ideally be completed before spring (around August). The BCSF Environmental Manager or weed control contractor will prepare a weed inspection report following the weed inspection to inform bush regeneration work. This report will include detailed mapping of weed occurrences and a clear weed management methodology for all located weed species. The report will consider factors such as proximity to aquatic environments, proximity to ecologically sensitive areas, weed density and timing of year to assess appropriate treatment.

It is recommended that the occurrence and extent and density of priority weeds within the study area are mapped once annually and continue throughout the duration of construction works. Each monitoring event will be undertaken by the BCSF Environmental Manager or weed control contractor, covering the entire study area mapping priority weeds, with environment weeds also noted. A report will be prepared following each monitoring event including mapping of priority weeds, photographs to aid identification and comparison over time, and recommending specific control measures. Each report will also include an assessment against the following performance criteria:

- Evidence of implementation of appropriate control measures for priority weeds
- No incidences of new weed infestations within the Project footprint and in the area immediately surrounding the Project footprint.

Pathogen management

Myrtle Rust and Phytophthora have not been identified within the Project footprint. The hygiene and inspection requirements detailed in the weed control procedure will mitigate the risk of introduction to the Project footprint via soiled vehicles or machinery.

Any suspected incidences of Myrtle Rust on host plants identified during construction are to be verified by an ecologist or the Environment Manager. If the potential presence of Phytophthora is

identified, access to the area and ground disturbance to the area should be restricted until presence/absence is confirmed. Testing of soils is to be undertaken to confirm the presence or absence of Phytophthora. The NSW Plant Disease Diagnostic Service at the Royal Botanic Garden provides a range of services to assist in the identification and management of Phytophthora.

If confirmed, access should be restricted to host plants or infected areas and cleaning of equipment or plant potentially in contact with these be undertaken. Advice from DPE regarding the most practical hygiene and or disposal management measures may be required if pathogens are identified during the Project. An ongoing management strategy should then be developed.

Appendix H Unexpected threatened species finds procedure

Purpose

This procedure details the actions to be taken when a threatened flora and fauna species / EEC is expectantly encountered during construction activities.

Scope

This procedure is applicable to all activities conducted by personnel that have the potential to come into contact with threatened species.

Where threatened fauna is unexpectedly encountered that requires handling or rescue refer to the Fauna Rescue and Release Procedure (Appendix E).

Induction/Training

Where required, personnel will be inducted on the identification of potential threatened species / threatened ecological communities occurring on site and the relevant actions for them with regards to this procedure during Project Induction, Site Inductions and regular Toolbox Talks.

Procedure

The BCSF Environmental Manger is responsible for implementing this procedure.

Threatened species / EEC is unexpectedly encountered during clearing/construction activities

- **STOP ALL WORK** in the vicinity of the find.
- Immediately notify the BCSF Environmental Manger who will notify the Project Ecologist, Project Manager and BCSF Representative. The BCSF Representative will then contact the relevant agencies as required.

Assessment of impact

An assessment is to be undertaken by the BCSF Environmental Manger and the Project Ecologist or appropriate specialist to identify the plant or animal to species level and the likely impact to the threatened species/ TEC and appropriate management options, such as relocation measures, developed in consultation with BCSF.

Approvals

Obtain any relevant license, permits or approvals required if the threatened species/ TEC is likely to be significantly impacted.

Recommencement of works

Threatened species / EEC is unexpectedly encountered during clearing/construction activities

Construction works may recommence once the BCSF Environmental Manager has

- Obtained approvals as required, and
- Confirmed that all corrective actions and additional mitigation measures have been implemented.
- Ensured that the threatened species / TEC is included in subsequent Sensitive Area Plans, Project Inductions and Toolbox Talks

Provided information to BCSF to enable update of ecological monitoring and/or biodiversity offset requirements.

Appendix I Vehicle hygiene register

Table 10-1 Sample vehicle hygiene register

Date	Time in	Vehicle type	Destination	Driver name	Driver contact no.	Driver registration	Entrance wash (Y/N)	Exit wash (Y/N)	Time out	Inspection staff initials

Appendix J Baseline Plot Data from BDAR

J.1 Biometric plot data

BAM Site Field Survey									
Project:	Blind Ck SF	Plot Identifier	1	Pic 20x20	on tablet	Pic 20x50			
Survey date:	24/11/2020		Compass Orientation (head of 20x20 plot)				35		
Recorders	bnoel breid		PCT:	1100					
GPS Easting	726918	GPS Northing	6103730		Datum		Zone	55	
Landform			Soils			Drainage & Slope			
Morphology			Soil Texture			Slope			
LandF Element			Soil Colour			Aspect			
LandF Pattern			Soil Depth			Drainage			
Microrelief			Geology			Watercourses			
Plot Disturbance									
	Severity	Age	Observational Evidence						
Clearing	1								
Cultivation	2								
Soil erosion	0								
Firewood	1								
Grazing	1								
Fire Damage	0								
Storm Damage	1								
Weediness	1								
Other									
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)									
Additional information									
Current land use									
grazing									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot									

FUNCTION

Function attributes for		1						
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)				
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos
	Tree (TG)	2			5m	70%	37.0%	4447
	Shrub (SG)	2			15m	20%		4448
	Forb (FG)	7			25m	10%		4449
	Grass & grasslike (GG)	8			35m	60%		4450
	Fern (EG)	1			45m	25%		4451
	Other (OG)	0		Bare ground cover	5m	0%		3.6%
	TOTAL	20			15m	5%		
BAM Attribute (20x20m plot)		25m			10%			
Count of cover abundance (native vascular plants)	Stratum	Sum			35m	1%		
	Tree (TG)	30.1		Cryptogam cover	45m	2%	0.0%	
	Shrub (SG)	2.1			5m	0%		
	Forb (FG)	1.2			15m	0%		
	Grass & grasslike (GG)	4.8			25m	0%		
	Fern (EG)	50		Rock Cover	35m	0%		
	Other (OG)	0			45m	0%		
	TOTAL Native	88.2			5m	0%	0.0%	
	TOTAL 'HTE'	0.2			15m	0%		
BAM Attribute (20 x 50m plot) Tree Stem Counts		25m			0%			
DBH (cm)	Euc	Non Euc	Hollows	35m	0%			
				45m	0%			

0.1%=63x63cm

0.5%=1.4x1.4m

1%=2x2m

5%=4x5m

25%=10x10m

COMPOSITION & STRUCTURE

Species recorded for	1
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Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status	BCA Status
brac popu	<i>Brachychiton populneus</i>	Kurrajong	Malvaceae	0.1	1		Tree (TG)	No		
euca pauc	<i>Eucalyptus pauciflora</i>	White Sally	Myrtaceae	30	9		Tree (TG)	No		
rubu parv	<i>Rubus parvifolius</i>	Native Raspberry	Rosaceae	2	250		Shrub (SG)	No		
sola chen	<i>Solanum chenopodinum</i>		Solanaceae	0.1	10		Shrub (SG)	No		
aust scab	<i>Austrostipa scabra</i>	Speargrass	Poaceae	0.1	10		Grass & grasslike (GG)	No		
elym scab	<i>Elymus scaber</i>	Common Wheatgrass	Poaceae	0.1	40		Grass & grasslike (GG)	No		
erag brow	<i>Eragrostis brownii</i>	Brown's Lovegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No		
impe cyli	<i>Imperata cylindrica</i>	Blady Grass	Poaceae	0.1	50		Grass & grasslike (GG)	No		
loma long	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Lomandraceae	4	10		Grass & grasslike (GG)	No		
loma mult mult	<i>Lomandra multiflora sub</i>	Many-flowered Mat-rush	Lomandraceae	0.2	20		Grass & grasslike (GG)	No		
poa sieb	<i>Poa sieberiana</i>	Snowgrass	Poaceae	0.1	20		Grass & grasslike (GG)	No		
them tria	<i>Themeda triandra</i>		Poaceae	0.1	10		Grass & grasslike (GG)	No		
cras sieb	<i>Crassula sieberiana</i>	Australian Stonecrop	Crassulaceae	0.1	5		Forb (FG)	No		
dian revo	<i>Dianella revoluta</i>	Blueberry Lily	Phormiaceae	0.1	2		Forb (FG)	No		
eina nuta	<i>Einadia nutans</i>	Climbing Saltbush	Chenopodiaceae	0.1	8		Forb (FG)	No		
euch spha	<i>Euchiton sphaericus</i>	Star Cudweed	Asteraceae	0.1	2		Forb (FG)	No		
hydr laxi	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	Apiaceae	0.5	500		Forb (FG)	No		
oxal pere	<i>Oxalis perennans</i>		Oxalidaceae	0.2	100		Forb (FG)	No		
sene quad	<i>Senecio quadridentatus</i>	Cotton Fireweed	Asteraceae	0.1	4		Forb (FG)	No		
pter escu	<i>Pteridium esculentum</i>	Bracken	Dennstaedtiaceae	50	5000		Fern (EG)	No		
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.2	200	*		HTE		
aira	<i>Aira spp.</i>	A Hairgrass	Poaceae	0.1	20	*		No		
brom madr	<i>Bromus madritensis</i>	Madrid Brome	Poaceae	3	1000	*		No		
cony bona	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No		
cyno echi	<i>Cynosurus echinatus</i>	Rough Dog's Tail	Poaceae	0.2	50	*		No		
hypo glab	<i>Hypochaeris glabra</i>	Smooth Catsear	Asteraceae	0.1	10	*		No		
lact serr	<i>Lactuca serriola</i>	Prickly Lettuce	Asteraceae	0.1	2	*		No		
lepi afri	<i>Lepidium africanum</i>	Common Peppergrass	Brassicaceae	0.1	1	*		No		
nass tric	<i>Nassella trichotoma</i>	Serrated Tussock	Poaceae	0.3	10	*		No		
paro bras	<i>Paronychia brasiliensis</i>	Chilean Whitlow Wort, Brazilian	Caryophyllaceae	0.1	5	*		No		
petr nant	<i>Petrorhagia nanteuillii</i>	Proliferous Pink	Caryophyllaceae	0.1	300	*		No		
sonc	<i>Sonchus spp.</i>	Sowthistle	Asteraceae	0.1	2	*		No		
stel medi	<i>Stellaria media</i>	Common Chickweed	Caryophyllaceae	0.1	5	*		No		
trif arve	<i>Trifolium arvense</i>	Haresfoot Clover	Fabaceae (Fab)	0.1	8	*		No		
trif camp	<i>Trifolium campestre</i>	Hop Clover	Fabaceae (Fab)	0.1	10	*		No		
trif glom	<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae (Fab)	0.1	5	*		No		
trif subt	<i>Trifolium subterraneum</i>	Subterranean Clover	Fabaceae (Fab)	0.1	5	*		No		
vulp	<i>Vulpia spp.</i>	Rat's-tail Fescue	Poaceae	3	1000	*		No		
tara offi	<i>Taraxacum officinale</i>	Dandelion	Asteraceae	0.1	50	*		No		

BAM Site Field Survey								
Project:	Blind Ck	Plot Identifier	2	Pic 20x20	on tablet	Pic 20x50		
Survey date:	24/11/2020		Compass Orientation (head of 20x20 plot)				135	
Recorders	bnoel breid		PCT:	1100				
GPS Easting	726254	GPS Northing	6103081		Datum		Zone	55
Landform			Soils			Drainage & Slope		
Morphology			Soil Texture			Slope		
LandF Element			Soil Colour			Aspect		
LandF Pattern			Soil Depth			Drainage		
Microrelief			Geology			Watercourses		
Plot Disturbance								
	Severity	Age	Observational Evidence					
Clearing	2							
Cultivation	1							
Soil erosion	0							
Firewood	1							
Grazing	1							
Fire Damage	0							
Storm Damage	1							
Weediness	2							
Other								
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)								
Additional information								
Current land use								
Age class of trees (DBH range) , Condition of Vegetation, Hollows								
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)								
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)								
Dominant Species outside Plot								

FUNCTION

Function attributes for		2
BAM Attribute (20x20m plot)		
Count of Native Richness	Stratum	Sum
	Tree (TG)	1
	Shrub (SG)	5
	Forb (FG)	8
	Grass & grasslike (GG)	7
	Fern (EG)	1
	Other (OG)	1
	TOTAL	23
BAM Attribute (20x20m plot)		
Count of cover abundance (native vascular plants)	Stratum	Sum
	Tree (TG)	30
	Shrub (SG)	0.8
	Forb (FG)	1
	Grass & grasslike (GG)	1.2
	Fern (EG)	3
	Other (OG)	0.1
	TOTAL Native	36.1
	TOTAL 'HTE'	0.6

BAM Attribute (20 x 50m plot) Tree Stem Counts			
DBH (cm)	Euc	Non Euc	Hollows
>80	1	0	
50-79	5	0	
30-49	6	2	
20-29	2	0	
10-19	1	0	
5-9	0	0	
<5	0	0	N/A
Length of logs (m)		37	

0.1%=63x63cm
0.5%=1.4x1.4m
1%=2x2m
5%=4x5m
25%=10x10m

BAM Attributes (1 x 1m Plots)				
Litter Cover	Tape length	% cover	Average %	Photos
	5m	90%	46.0%	4452
	15m	80%		4453
	25m	15%		4454
	35m	40%		4455
	45m	5%		4456
Bare ground cover	5m	5%		5.4%
	15m	0%		
	25m	0%		
	35m	2%		
	45m	20%		
Cryptogam cover	5m	0%	0.2%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	1%		
Rock Cover	5m	0%	0.0%	
	15m	0%		
	25m	0%		
	35m	0%		
	45m	0%		

COMPOSITION & STRUCTURE

Species recorded for 2									
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
euca pauc	<i>Eucalyptus pauciflora</i>	White Sally	Myrtaceae	30	10		Tree (TG)	No	
astr humi	<i>Astroloma humifusum</i>	Native Cranberry	Ericaceae	0.1	5		Shrub (SG)	No	
bank marg	<i>Banksia marginata</i>	Silver Banksia	Proteaceae	0.2	2		Shrub (SG)	No	
lept poly	<i>Leptospermum polygafoi</i>		Myrtaceae	0.2	5		Shrub (SG)	No	
rubu parv	<i>Rubus parvifolius</i>	Native Raspberry	Rosaceae	0.2	20		Shrub (SG)	No	
sola chen	<i>Solanum chenopodinum</i>		Solanaceae	0.1	2		Shrub (SG)	No	
glyc clan	<i>Glycine clandestina</i>	Twining glycine	Fabaceae (Fab	0.1	2		Other (OG)	No	
dich crin	<i>Dichelachne crinita</i>	Longhair Plumegrass	Poaceae	0.1	1		Grass & grasslike (GG)	No	
elym scab	<i>Elymus scaber</i>	Common Wheatgrass	Poaceae	0.2	100		Grass & grasslike (GG)	No	
erag brow	<i>Eragrostis brownii</i>	Brown's Lovegrass	Poaceae	0.1	4		Grass & grasslike (GG)	No	
impe cyli	<i>Imperata cylindrica</i>	Blady Grass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
loma long	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Lomandraceae	0.5	20		Grass & grasslike (GG)	No	
poa sieb cyan	<i>Poa sieberiana</i> var. <i>cyana</i>		Poaceae	0.1	30		Grass & grasslike (GG)	No	
poa sieb sieb	<i>Poa sieberiana</i> var. <i>sieberiana</i>	Snowgrass	Poaceae	0.1	20		Grass & grasslike (GG)	No	
cras sieb	<i>Crassula sieberiana</i>	Australian Stonecrop	Crassulaceae	0.1	20		Forb (FG)	No	
eina nuta	<i>Einadia nutans</i>	Climbing Saltbush	Chenopodiaceae	0.1	4		Forb (FG)	No	
euch japo	<i>Euchiton japonicus</i>		Asteraceae	0.1	2		Forb (FG)	No	
euch spha	<i>Euchiton sphaericus</i>	Star Cudweed	Asteraceae	0.1	20		Forb (FG)	No	
hydr laxi	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	Apiaceae	0.2	500		Forb (FG)	No	
oxal pere	<i>Oxalis perennans</i>		Oxalidaceae	0.1	20		Forb (FG)	No	
sene quad	<i>Senecio quadridentatus</i>	Cotton Fireweed	Asteraceae	0.2	5		Forb (FG)	No	
wahl comm	<i>Wahlenbergia communis</i>	Tufted Bluebell	Campanulaceae	0.1	4		Forb (FG)	No	
pter escu	<i>Pteridium esculentum</i>	Bracken	Dennstaedtiaceae	3	300		Fern (EG)	No	
acet vulg	<i>Acetosella vulgaris</i>	Sheep Sorrel	Polygonaceae	0.1	50	*		HTE	
aira	<i>Aira spp.</i>	A Hairgrass	Poaceae	0.1	5	*		No	
briz maxi	<i>Briza maxima</i>	Quaking Grass	Poaceae	0.1	2	*		No	
briz mino	<i>Briza minor</i>	Shivery Grass	Poaceae	0.1	3	*		No	
brom dian	<i>Bromus diandrus</i>	Great Brome	Poaceae	0.5	50	*		HTE	
brom madr	<i>Bromus madritensis</i>	Madrid Brome	Poaceae	0.3	40	*		No	
cony bona	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	Asteraceae	0.1	5	*		No	
cyno echi	<i>Cynosurus echinatus</i>	Rough Dog's Tail	Poaceae	0.5	500	*		No	
gamo purp	<i>Gamochaeta purpurea</i>	Purple Cudweed	Asteraceae	0.1	4	*		No	
holc lana	<i>Holcus lanatus</i>	Yorkshire Fog	Poaceae	0.1	2	*		No	
hord lepo	<i>Hordeum leporinum</i>	Barley Grass	Poaceae	0.1	10	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	0.1	30	*		No	
nass tric	<i>Nassella trichotoma</i>	Serrated Tussock	Poaceae	0.2	3	*		No	
onop illy	<i>Onopordum illyricum subsp. illyricum</i>	Illyrian Thistle	Asteraceae	0.1	2	*		No	
tara offi	<i>Taraxacum officinale</i>	Dandelion	Asteraceae	0.1	30	*		No	
trif arve	<i>Trifolium arvense</i>	Haresfoot Clover	Fabaceae (Fab	0.1	20	*		No	
trif glom	<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae (Fab	0.1	20	*		No	
trif subt	<i>Trifolium subterraneum</i>	Subterranean Clover	Fabaceae (Fab	0.1	4	*		No	
vulp	<i>Vulpia spp.</i>	Rat's-tail Fescue	Poaceae	0.3	300	*		No	

BAM Site Field Survey							
Project:	Blind Ck	Plot Identifier	5	Pic 20x20		Pic 20x50	
Survey date:	25/11/2020	Compass Orientation (head of 20x20 plot)				75	
Recorders	bnoel breid	PCT:	1110	wetland			
GPS Easting	724151	GPS Northing	6104870	Datum	GDA94	Zone	55
Landform		Soils		Drainage & Slope			
Morphology		Soil Texture		Slope			
LandF Element		Soil Colour		Aspect			
LandF Pattern		Soil Depth		Drainage			
Microrelief		Geology		Watercourses			
Plot Disturbance							
	Severity	Age	Observational Evidence				
Clearing	3						
Cultivation	3						
Soil erosion	0						
Firewood	0						
Grazing	1						
Fire Damage	0						
Storm Damage	0						
Weediness	3						
Other							
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)							
Additional information							
Current land use							
wetland cropped							
Age class of trees (DBH range) , Condition of Vegetation, Hollows							
Disturbances (i.e. fire, grazing,ferals, clearing, logging, soil degradation, pollution, weeds, dieback)							
cropping							
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)							
Dominant Species outside Plot							

FUNCTION

Function attributes for			5						
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)					
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos	
	Tree (TG)	0			5m	0%			7018
	Shrub (SG)	0			15m	0%			7019
	Forb (FG)	0			25m	15%			7020
	Grass & grasslike (GG)	2			35m	5%			7021
	Fern (EG)	0			45m	1%			7022
	Other (OG)	0		Bare ground cover	5m	10%	10.2%		
	TOTAL	2			15m	20%			
BAM Attribute (20x20m plot)					25m	5%			
Count of cover abundance (native vascular plants)	Stratum	Sum			35m	15%			
	Tree (TG)	0		Cryptogam cover	45m	1%	0.0%		
	Shrub (SG)	0			5m	0%			
	Forb (FG)	0			15m	0%			
	Grass & grasslike (GG)	0.1			25m	0%			
	Fern (EG)	0		Rock Cover	35m	0%	0.0%		
	Other (OG)	0			45m	0%			
	TOTAL Native	0.1			5m	0%			
	TOTAL 'HTE'	0			15m	0%			

BAM Attribute (20 x 50m plot) Tree Stem Counts			
&	Euc	Non Euc	Hollows
>80	0	0	0
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

0.1%=63x63cm

0.5%=1.4x1.4m

1%=2x2m

5%=4x5m

25%=10x10m

eurasian skylark

brown quail

black winged stilts

masked lapwing

COMPOSITION & STRUCTURE

Species recorded for			5						
Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threa	EPBC Status
sper rubr	<i>Spergularia rubra</i>	Sandspurry	Caryophyllace	40	1000	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	60	10000	*		No	
chlo trun	<i>Chloris truncata</i>	Windmill Grass	Poaceae	0.1	20		Grass & grass	No	
phal	<i>Phalaris spp.</i>		Poaceae	0.1	1	*		No	
trif vesi	<i>Trifolium vesiculosum</i>		Fabaceae (Fab	0.1	5	*		No	

BAM Site Field Survey									
Project:	Blind Ck	Plot Identifier	7	Pic 20x20	on tablet	Pic 20x50			
Survey date:	25/11/2020		Compass Orientation (head of 20x20 plot)				105		
Recorders	bnoel breid		PCT:						
GPS Easting	725217	GPS Northing	6102807		Datum		Zone	55	
Landform			Soils			Drainage & Slope			
Morphology			Soil Texture			Slope			
LandF Element			Soil Colour			Aspect			
LandF Pattern			Soil Depth			Drainage			
Microrelief			Geology			Watercourses			
Plot Disturbance									
	Severity	Age	Observational Evidence						
Clearing	3								
Cultivation	3								
Soil erosion	1		near creekline						
Firewood	0								
Grazing	1								
Fire Damage	0								
Storm Damage	0								
Weediness	3								
Other									
Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)									
Additional information									
Current land use									
Age class of trees (DBH range) , Condition of Vegetation, Hollows									
Disturbances (i.e. fire, grazing, ferals, clearing, logging, soil degradation, pollution, weeds, dieback)									
Significant and threatened species and communities (Note pop. size/area, structure, repro status, habit, habitat, threats, photos)									
Dominant Species outside Plot		cassinia longifolia							

FUNCTION

Function attributes for		7						
BAM Attribute (20x20m plot)				BAM Attributes (1 x 1m Plots)				
Count of Native Richness	Stratum	Sum		Litter Cover	Tape length	% cover	Average %	Photos
	Tree (TG)	0			5m	0%	0.6%	7045
	Shrub (SG)	0			15m	0%		7046
	Forb (FG)	2			25m	1%		7047
	Grass & grasslike (GG)	1			35m	1%		7048
	Fern (EG)	0			45m	1%		7049
	Other (OG)	0		Bare ground cover	5m	0%	0.0%	
	TOTAL	3			15m	0%		
BAM Attribute (20x20m plot)					25m	0%		
Count of cover abundance (native vascular plants)	Stratum	Sum			35m	0%		
	Tree (TG)	0		Cryptogam cover	45m	0%	0.0%	
	Shrub (SG)	0			5m	0%		
	Forb (FG)	0.2			15m	0%		
	Grass & grasslike (GG)	0			25m	0%		
	Fern (EG)	0			35m	0%	0.0%	
	Other (OG)	0			45m	0%		
	TOTAL Native	0.2			5m	0%		
	TOTAL 'HTE'	0		15m	0%			

BAM Attribute (20 x 50m plot) Tree Stem Counts			
&	Euc	Non Euc	Hollows
>80	0	0	0
50-79			
30-49			
20-29			
10-19			
5-9			
<5			N/A
Length of logs (m)		0	

0.1%=63x63cm

0.5%=1.4x1.4m

1%=2x2m

5%=4x5m

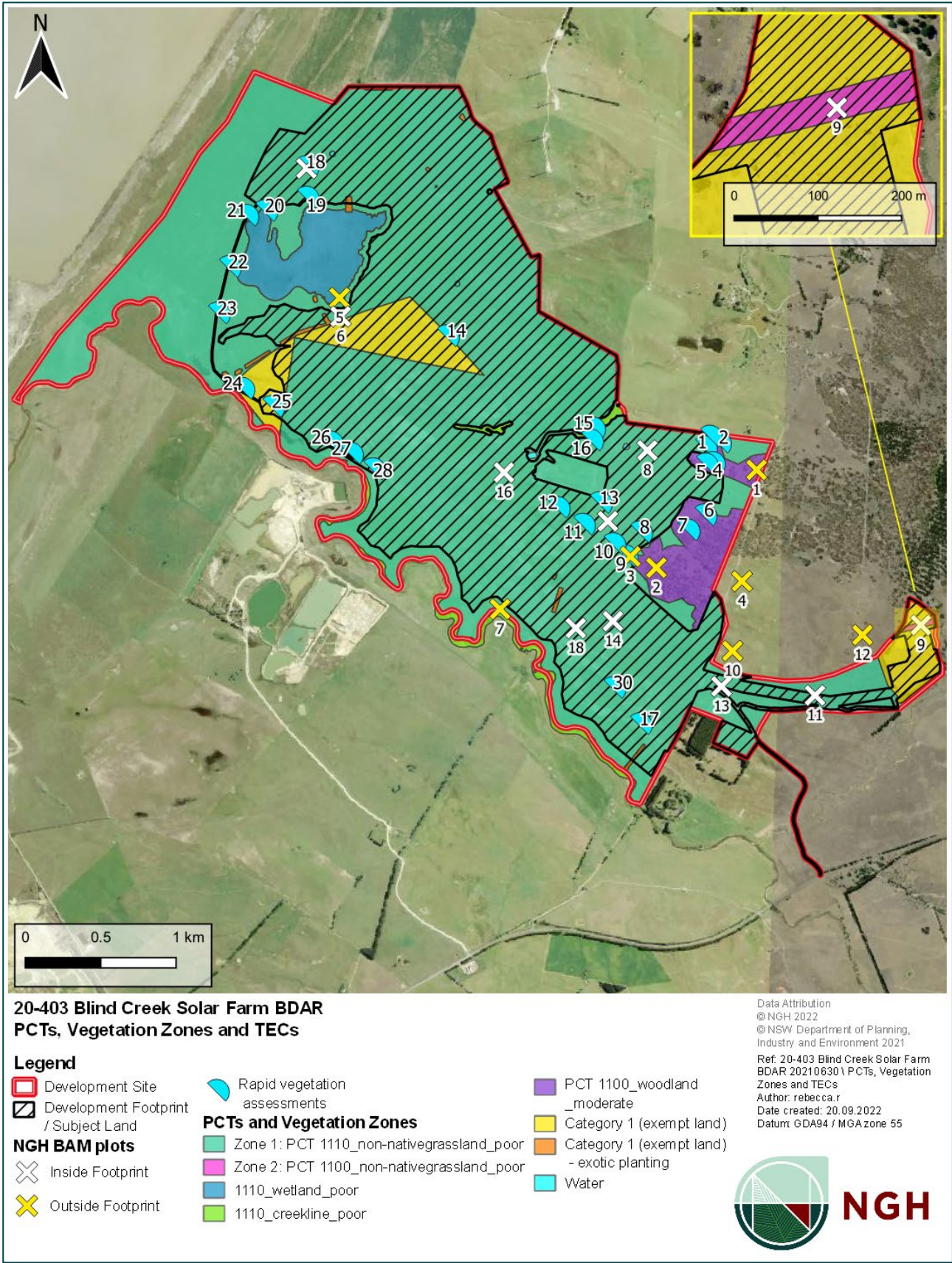
25%=10x10m

COMPOSITION & STRUCTURE

Species recorded for	7
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Abbreviation	Scientific Name	Common Name	Family	% Cover	Abundance	Exotic	Growth Form	High Threat?	EPBC Status
erod crin	<i>Erodium crinitum</i>	Blue Crowfoot	Geraniaceae	0.1	4		Forb (FG)	No	
rume tena	<i>Rumex tenax</i>	Shiny Dock	Polygonaceae	0.1	1		Forb (FG)	No	
tara offi	<i>Taraxacum officinale</i>	Dandelion	Asteraceae	0.1	10	*		No	
hirs inca	<i>Hirschfeldia incana</i>	Buchan Weed	Brassicaceae	2	200	*		No	
brom hord	<i>Bromus hordeaceus</i>	Soft Brome	Poaceae	0.1	30	*		No	
brom madr	<i>Bromus madritensis</i>	Madrid Brome	Poaceae	60	10000	*		No	
chon junc	<i>Chondrilla juncea</i>	Skeleton Weed	Asteraceae	0.1	1	*		No	
echi vulg	<i>Echium vulgare</i>	Viper's Bugloss	Boraginaceae	40	5000	*		No	
lepi afri	<i>Lepidium africanum</i>	Common Peppergrass	Brassicaceae	0.1	1	*		No	
loli pere	<i>Lolium perenne</i>	Perennial Ryegrass	Poaceae	1	5000	*		No	
onop illy illy	<i>Onopordum illyricum subsp.</i>	Illyrian Thistle	Asteraceae	0.2	20	*		No	
trif arve	<i>Trifolium arvense</i>	Haresfoot Clover	Fabaceae (Fab)	0.1	10	*		No	
trif glom	<i>Trifolium glomeratum</i>	Clustered Clover	Fabaceae (Fab)	30	10000	*		No	
trif vesi	<i>Trifolium vesiculosum</i>		Fabaceae (Fab)	3	50	*		No	
vulp	<i>Vulpia spp.</i>	Rat's-tail Fescue	Poaceae	0.5	1000	*		No	
	#N/A	#N/A	#N/A			#N/A		FALSE	#N/A

J.2 Location of plots



Appendix K Planting specification for Zone 2

K.1 Planting strategy

The aim of the plantings in management zone 2 is to plant breeding habitat for the White-fronted Chat.

In order to establish breeding habitat for the WFC within 2 years, this strategy relies on:

- Planting would be undertaken by an experienced landscape or bush regeneration contractor in consultation with local nurseries.
- Planting commences as soon as possible in the construction process.
- Use of quality seasoned tube stock / long stem tube stock.
- Maintenance (watering and protection from stock and other herbivores) during establishment.

K.2 Planting areas

Planting would be undertaken in management zone 2, as shown in Figure 6-1.

Plantings will:

- Be planted in dense clumps spaced no more than 5 m apart.
- Be planted approximately 5m apart for trees and shrubs and 1 - 3m apart for grasses (alternating planting of shrubs and grasses), with each row staggered.
- Be set-back 5m from perimeter fencing, allowing sufficient space for plants to mature.

K.3 Plant selection

Plantings will:

- Be indigenous species known to be associated with either PCT 1100 or 1110 (which occur within the Development Site, see Table 10-2), or are species recommended by BCS for planting.
- Be mixed and offset to produce a heterogeneous mix of plantings.

Table 10-2 Recommended species list for planting

Species	Maximum separation distance for planting (m)
Snow Gum (<i>Eucalyptus pauciflora</i>)	5
Silver Wattle (<i>Acacia dealbata</i>)	5
Kangaroo thorn/Hedge Wattle (<i>Acacia paradoxa</i>).	5
Sweet Bursaria (<i>Bursaria spinosa</i>).	5
Small-fruited Hakea (<i>Hakea microcarpa</i>).	5
Tea-tree species (<i>Leptospermum</i> spp.) <i>continentale</i> , <i>polygalifolium</i> , <i>lanigerum</i>	5
Common Woodruff (<i>Asperula conferta</i>).	1
Spiny-headed Mat-rush (<i>Lomandra longifolia</i>)	3
Tussock (<i>Poa labillardierei</i>).	3
Tall Sedge (<i>Carex appressa</i>).	3
Knob Sedge (<i>Carex inversa</i>).	3
Matgrass (<i>Hemarthria uncinata</i>).	3
Kidney Weed (<i>Dichondra repens</i>)	1
Kangaroo Grass (<i>Themeda australis</i>)	3

K.4 Planting methods

K.4.1 Establishment

- Planting would be undertaken by an experienced landscape or bush regeneration contractor.
- Planting would be undertaken as soon as practical or prior to construction as it will take time for the plants to establish and provide effective breeding habitat.
- Tubestock should be sourced as early as possible, refer to K.4.2 below.
- Weed control will be undertaken in the sites proposed for planting:
 - If mechanical, manually clear an area 1m buffer from the planting to minimise encroachment during establishment.
 - For more intensive infestations of weeds (in accordance with the weed and pathogen management procedure (Appendix G)), the use of selective herbicides may be warranted to prevent seed set and promote weed control. The advice of an ecologist and agronomist will be sought to advise on the control of weed infestations. 10% non-native groundcover is the target requiring corrective action.
 - Monitoring of weed infestations will occur as part of the routine environmental inspections to determine effectiveness of management controls. The presence of any weeds and the necessary management actions will be noted on the Environmental Inspection Checklist.
 - Herbicide application will only be administered by authorised personnel with ChemCert accreditation – AQF 3 in accordance with SafeWork requirements.
 - Herbicides will only be applied in accordance label instructions for that product.
 - A Herbicide Application Record will be completed, and public notifications made in accordance with relevant legislation, where pesticides are to be used in areas that could be accessed by members of the public.
 - Only herbicides registered for use near water may be used near any waterways.
 - Weed control of Scotch Thistle and other weeds in proximity to Scotch thistle will be avoided during WFC breeding season (September to March), given the assumption that it is WFC breeding habitat.
- Water spear / high pressure hose is recommended to drill hole for planting if long stem tube stock is used. These provide deep and soaking watering for establishment. Holes will not be substantially deeper than the tube stock used or else a cavity may result beneath the planting.
- Water crystals and fertiliser (specific to native plants) would be used unless long stem tube stock are used.
- Tree guards will be used to protect plants (creating a microclimate to reduce water loss and making follow up maintenance easier).

K.4.2 Planting timing and need for irrigation

Planting would occur in autumn following sufficient rainfall. While planting in autumn is generally the best time, if sufficient rainfall has not occurred irrigation will be installed, or weekly hand watering is to be undertaken until the plantings provide effective breeding habitat.

The installation of irrigation would improve the success of the plantings, reducing replacement of mortalities.

Where irrigation is used, temporary polypipe, moveable water tanks and moveable pumps would be used to irrigate the plantings during establishment. This will allow more frequent lower intensity watering and have safety benefits for access, when compared to hand watering. No additional water sources or quantities are required.

K.4.3 Planting monitoring and maintenance

- Weed control will be undertaken around plantings, as required to ensure they are not outcompeted by surrounding vegetation, as detailed above in Section K.4.1.
 - Only herbicides registered for use near water may be used near any waterways.
- Replace tree guards as required and remove once plants have outgrown them.
- Replace dead plants to achieve an overall 90% success rate for the life of the Project.

K.4.4 Works schedule

This schedule of work guides the timing and outcomes of the plantings. This table will be modified based on alterations to Project phases and climatic conditions.

Project Phase	Planting Work	Preferred Season	Performance Criteria	Measure and Monitor	Variation
Preconstruction	Source / order tube stock	As soon as possible, noting the planting timing predicted	Sufficient numbers ordered	Check to ensure order is on track	-
Preconstruction	Weed control (herbicide) and mulch	End of summer	1m buffer around planting sites targeted	Grass cover dead by autumn	Second control session if required
Preconstruction	Plant tube stock	Early Spring	Sufficient numbers planted	Climatic conditions, area covered, watering, ensure the plant location and spacing are aligned with the planting schedule above.	Install irrigation or hand water if rainfall is not sufficient
Construction	Maintain plantings (watering, follow up weed control)	Fortnightly for first 8 months, then reduced as required	Plants alive	Mortality and soil moisture	Reduce watering if heavy rain fall or irrigated
Construction and life of the Project	Replace dead plants	As required (note as substantial lead time is required, order surplus quantities)	90% success	Mortality and soil moisture	-

K.4.5 Planting monitoring program

Monitor	Establishment (first 12 months after planting)			Two years post planting			Three years' post construction			Six years post construction to decommissioning		
	Timing	Action	Responsibility	Timing	Action	Responsibility	Timing	Action	Responsibility	Timing	Action	Responsibility
Watering	Weekly	Regular hand weekly watering where <30mm of rain has occurred in that month, unless irrigated	Blind Creek Environmental Manager – landscape / maintenance contractor	Weekly	Water when rainfall less than 10mm/month unless irrigated	Blind Creek Environmental Manager – landscape / maintenance contractor	Monthly	Water when rainfall less than 10mm/month	Blind Creek Environmental Manager – landscape / maintenance contractor	Monthly	Water when rainfall less than 10mm/month	Blind Creek Environmental Manager – landscape / maintenance contractor
	Weekly	For sections with temporary irrigation, check all drippers operational and water once per week	Blind Creek Environmental Manager – landscape / maintenance contractor	Monthly	For sections with temporary irrigation, check all drippers operational and water once per month	Blind Creek Environmental Manager – landscape / maintenance contractor	Monthly	For sections with temporary irrigation, check all drippers operational and water once per month	Blind Creek Environmental Manager – landscape / maintenance contractor	Remove drippers once established.		
Weeds	Monthly	Spot spray or manually remove weeds within 1.5 m of planting	Blind Creek Environmental Manager – landscape / maintenance contractor	Monthly	Spot spray or manually remove weeds within 1.5 m of planting	Blind Creek Environmental Manager – landscape / maintenance contractor	Quarterly	Spot spray or manually remove weeds within 1.5 m of planting	Blind Creek Environmental Manager – landscape / maintenance contractor	Every six months	Spot spray or manually remove weeds within 1.5 m of planting	Blind Creek Environmental Manager – landscape / maintenance contractor
Mortality	Monthly	Supplementary planting to occur in areas where plantings have died (not to occur during summer) to achieve a 90% success rate over 5 years.	Blind Creek Environmental Manager – landscape / maintenance contractor	Quarterly	Supplementary planting to occur in areas where plantings have failed to effectively screen views (not in summer)	Blind Creek Environmental Manager – landscape / maintenance contractor	Annually in summer	Supplementary planting to occur in areas where plantings have failed to effectively screen views (not to occur during summer)	Blind Creek Environmental Manager – landscape / maintenance contractor	Annually in summer	Supplementary planting to occur in areas where plantings have failed to effectively screen views (not to occur during summer)	Blind Creek Environmental Manager – landscape / maintenance contractor
Reporting	Monthly	Report on success of watering, weeding, mortalities, supplementary. Suggest changes as required	Blind Creek Environmental Manager – landscape / maintenance contractor	Quarterly	Report on success of watering, weeding, mortalities, supplementary. Suggest changes as required	Blind Creek Environmental Manager – landscape / maintenance contractor	Annually	Report on success of watering, weeding, mortalities, supplementary. Suggest changes as required	Blind Creek Environmental Manager – landscape / maintenance contractor	Annually	Report on success of watering, weeding, mortalities, supplementary. Suggest changes as required	Blind Creek Environmental Manager – landscape / maintenance contractor

