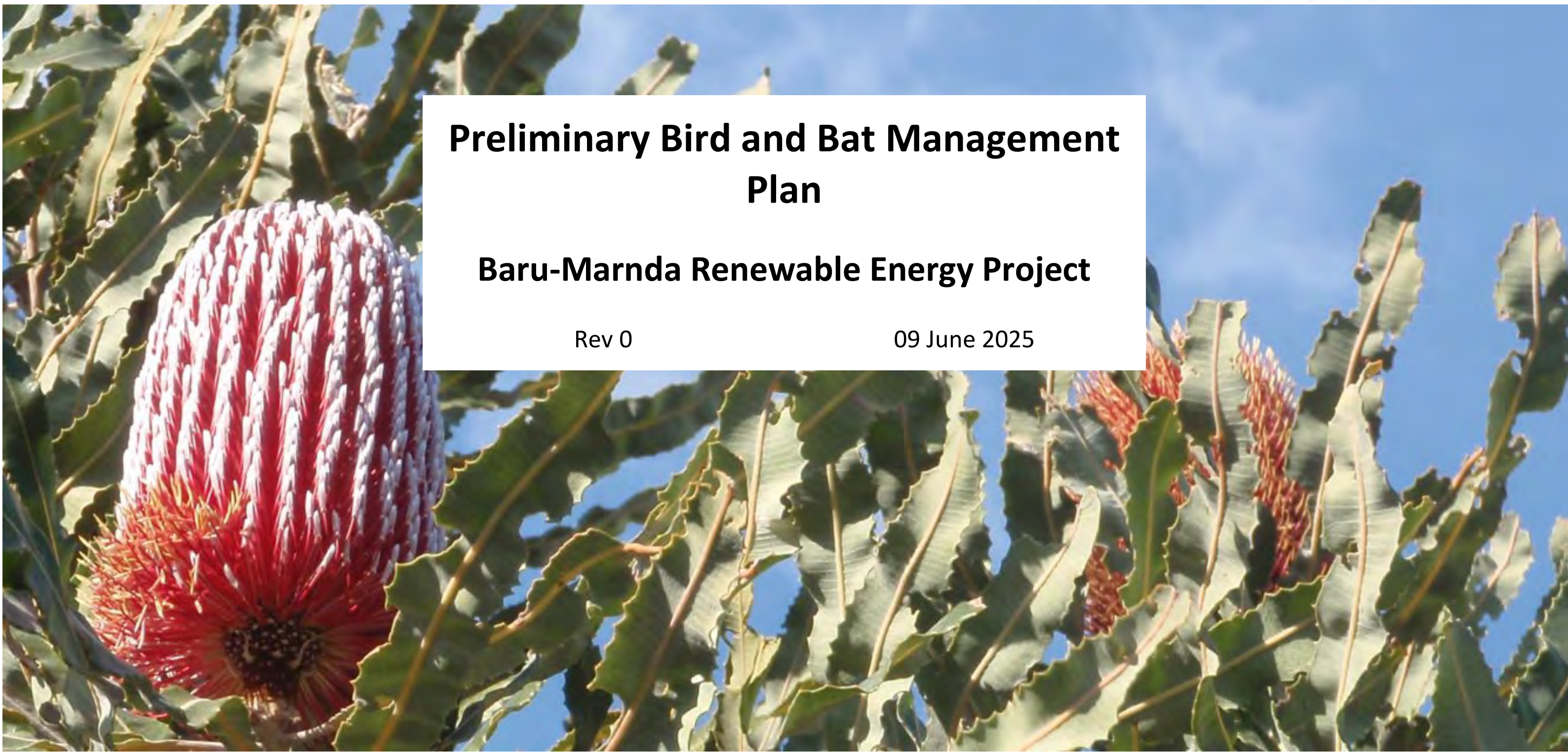
COTERRA ENVIRONMENT

Preliminary Bird and Bat Management Plan

Baru-Marnda Renewable Energy Project

Rev 0 09 June 2025



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Report Version:	Rev 0	
Date:	09 June 2025	

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Glossary

Term	Definition
Baru	**Generic term for all spinifex species***
BC Act	*Biodiversity Conservation Act 2016*
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Jinbi	**Small permanent spring***
Km	Kilometres
Muji	**Caves, overhangs***
MW	Megawatts
Ngurra	**Ground***
NT Act	*Native Title Act 1993*
YAC	Yindjibarndi Aboriginal Corporation
YEC	Yindjibarndi Energy Corporation Pty Ltd

**Yindjibarndi words and phrases taken from Greening Australia (2016)*

COTERRA ENVIRONMENT

1 Introduction

Yindjibarndi Energy Corporation Pty Ltd (YEC) is proposing to develop the Baru-Marnda Renewable Energy Project (the proposal), approximately 50 kilometres (km) south of Karratha, Western Australia on Yindjibarndi Ngurra (ground; country) (Figure 1). The Baru-Marnda Renewable Energy Project will comprise wind and solar energy generation facilities of up to 1,000 and 500 Megawatts ac (MWac) respectively, with options for energy storage, and associated hardware and infrastructure.

Recognising the potential for the Baru-Marnda Renewable Energy Project to impact bird and bat species which are afforded protection at the state and federal levels, environmental approvals are currently being sought under Part IV of the *Environmental Protection Act 1986* (EP Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), respectively. To support and inform these assessments, and to detail how YEC propose to avoid and minimise these potential impacts, YEC have prepared a dedicated Preliminary Bird and Bat Management Plan (BBMP) for implementation during the project's construction and ongoing operations. This Preliminary BBMP has been prepared utilising all site-specific ecological data available at the time of writing, and will be updated to reflect further ecological data as this becomes available, as part of YEC's adaptive management approach.

1.1 Yindjibarndi Energy Corporation

Yindjibarndi Energy Corporation is a partnership between Yindjibarndi Aboriginal Corporation (YAC) and renewable energy company ACEN Corporation. YEC was formed as a partnership to develop, own and operate large scale renewable energy projects on Yindjibarndi Ngurra (land; country) in Western Australia's Pilbara region.

YAC is a Registered Native Title Body Corporate (RNTBC) of the Yindjibarndi people and the institution appointed by the federal court to represent Yindjibarndi rights and interests under the *Native Title Act 1993* (NT Act). Operating under YAC is the Yindjibarndi Wealth Trust, which 100% owns Yiyangu Pty Ltd. Through Yiyangu Pty Ltd as an equity owner of YEC, and as the primary tenure holders of the proposal, the Yindjibarndi people will receive long term revenue from the Baru-Marnda Renewable Energy Project.

ACEN Corporation is the listed energy platform of the Ayala Group. The company has approximately 4,400 MWac of attributable capacity from owned facilities in the Philippines, Australia, Vietnam, Indonesia and India, with a renewable share of 98%, which is among the highest in the region. In Australia, ACEN Corporation has more than 1 GW capacity in construction and more than 8 GW in the development pipeline. ACEN Corporation's renewable energy assets include solar, wind, battery, and pumped hydro storage projects across Australia.

Further information on YEC, YAC, and ACEN corporation can be found on the YEC website at https://yindjibarndienergy.com.au/.

1.2 The Baru-Marnda Renewable Energy Project

Up to 1000 MWac of wind energy generating infrastructure is proposed to be installed as part of the Baru-Marnda Renewable Energy Project, across up to 143 wind turbines. A portion of these turbines are currently proposed within areas which have been identified as optional solar array areas. Four potential solar array areas have been identified, however no more than two of these optional areas will be implemented. Where any two solar array areas are implemented, no wind turbines will be installed within these same areas.

At this stage of the project's design, a reference wind turbine is being utilised which assumes a hub height of 150 m, a rotor diameter of 172 m, and a blade tip clearance above ground level of 64 m. These dimensions and further environmentally relevant specifications are listed in Table 1-1 and illustrated in Plate 1-1.

Table 1-1: Reference turbine specifications

Subject	Value
Hub height	150 m
Rotor diameter	172 m
Blade tip clearance above ground level	64 m
Cut-in wind speed	3m/s
Cut-out wind speed	25m/s
Roter sweep area	23,235 m^2
Recyclability rate	86%
Carbon footprint	6.4Gco2E/KWh

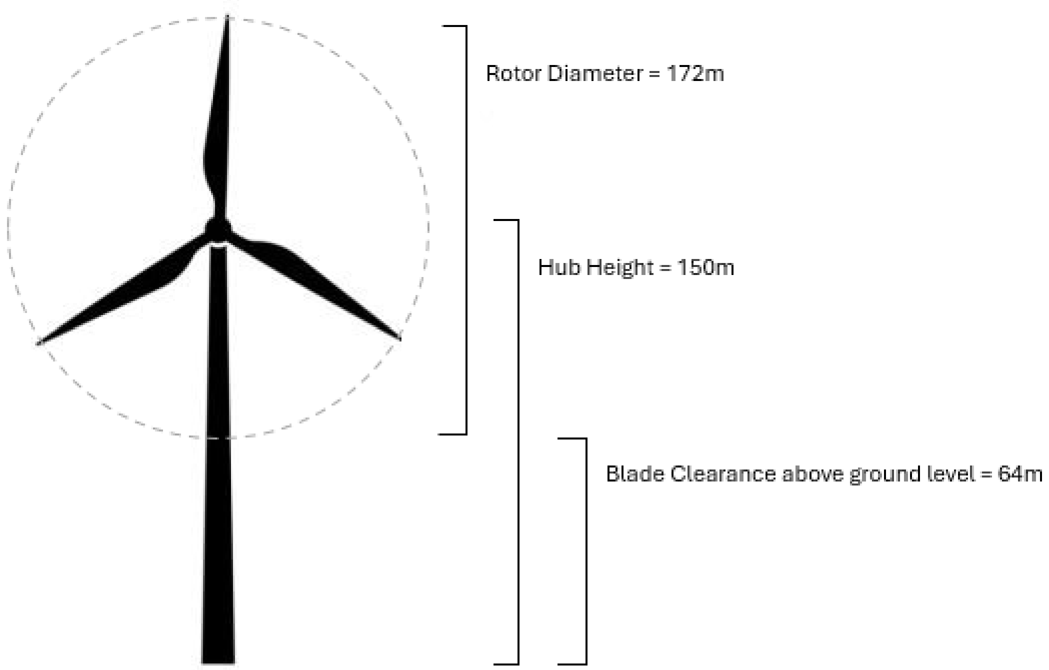


Plate 1-1: Reference turbine dimensions

1.3 Bird and Bat Management Plan

The overall aim of this Preliminary BBMP is to provide a framework for the ongoing monitoring and management of potential impacts on bird and bat species resulting from the Baru-Marnda Renewable Energy Project's construction and operation, particularly associated with the wind energy generation component of the project. Project design and management actions which have been described within this BBMP will be pursued by YEC with the objective of avoiding and minimising environmental impacts to the fullest extent practicable, and to achieve the following environmental outcomes:

- An improved understanding of site utilisation by aerial fauna prior to, during and following the project's construction
- Identification of impact triggers and associated response actions
- A reduction in environmental impacts associated with the project, which may have otherwise occurred without the BBMP's implementation.

This Preliminary BBMP has been prepared with due regard to the following policies and guidance:

- Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024a) *Environmental Management Plan Guidelines*
- DCCEEW (2024b) *Draft Onshore Wind Farm Guidance*
- Environmental Protection Authority (EPA) (2024) *Instructions: How to prepare Environmental management plans*

All commitments proposed within this Preliminary BBMP have been designed to adhere to the SMART principles, in that they are:

- Specific
- Measurable
- Achievable
- Relevant
- Timebound.

2 Existing Environment

2.1 Desktop Assessment: Preliminary Site Characterisation

The Baru-Marnda Renewable Energy Project is located within the Pilbara bioregion and predominately the Chichester (PIL01) subregion, as identified within the Interim Biogeographical Regionalisation for Australia (IBRA) version 7 (Thackway and Cresswell 1995).

The coastal towns of the Pilbara region are humid with a typical wet season from December to February. Inland, the towns can experience extreme high temperatures and dry conditions for extended periods. The region is prone to cyclones from November to April each year.

At a landscape scale, land systems of the Pilbara were classified and mapped by Vreeswyk et al. (2004) according to similarities in landform, soil, vegetation, geology and geomorphology. Land systems which intersect the development envelope are described in Table 2-1 and illustrated in Figure 2.

The development envelope's topography is diverse. Generally, the development envelope is dominated by undulating hills and valleys, intersected with flat, low relief creek lines and floodplains. Smoother terrain is present at lower elevations in the north west, north east and southern boundaries of the development envelope.

Table 2-1: Land Systems mapped within the development envelope

Land System	Description
Boolaloo System	Granite hills, domes, tor fields and sandy plains supporting spinifex grasslands with scattered shrubs
Boolgeda System	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands
Capricorn System	Rugged sandstone hills, ridges, stony foot slopes and interfluves supporting low acacia shrublands or hard spinifex grasslands with scattered shrubs
Macroy System	Stony plains and occasional tor fields based on granite supporting hard and soft spinifex shrubby grasslands
River System	Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex
Rocklea System	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands with scattered shrubs
Wona System	Basalt upland gilgai plains supporting Roebourne Plains grass and Mitchell grass tussock grasslands, minor hard spinifex grasslands or annual grasslands/herb fields

2.2 Site Specific Assessments

To-date, the following studies have been undertaken within and beyond the development envelope to understand the existing environment as it pertains to bird and bat fauna (Table 2-2). The spatial coverage of these surveys, and the associated monitoring points is illustrated in (Figure 3). The methodologies and results of these surveys are provided at Appendix 1 and Appendix 2.

Table 2-2: Terrestrial fauna surveys undertaken to-date

Responsible Party	Type of Study	Dates of Study	Coverage of Study
Bamford Consulting Ecologists	Level 1 (Basic) Survey	6^{th} and 7^{th} December 2023	Jinbi Project Area, outside of the development envelope
RPS Group	Level 1 (Basic) Survey	29^{th} September to 1^{st} October 2024	Site Access Route
Bamford Consulting Ecologists	Level 1 (Basic) Survey	16^{th} July 2024, 6^{th} to 8^{th} August 2024	36,810 ha, including the main infrastructure development envelope
	Bird and Bat Site Utilisation Survey	16^{th} July 2024, 6^{th} to 8^{th} August 2024	
	Bird and Bat Site Utilisation Survey	27th September to 1^{st} October 2024	
	Bird and Bat Site Utilisation Survey	11^{th} to 14^{th} November 2024, 22^{nd} December 2024	
	Bird and Bat Site Utilisation Survey	9^{th} to 13^{th} March 2025	

Data collected from Audio Recording Units (ARUs) distributed throughout the development envelope between July and December as a component of the site utilisation surveys were provided to Supersensory Technologies Pty Ltd, who provided an independent analysis of acoustic recordings and assessment on collision risk to bat species. The associated report (Supersensory Technologies 2025) is provided as an appendix to Bamford Consulting Ecologists (2025).

In addition to the above, YEC has committed to undertaking a further series of bird and bat utilisation surveys over the wet and dry seasons of 2025, to better understand the presence, behaviour and risk of impact to aerial fauna across those portions of the development envelope potentially subject to wind turbines installation.

2.2.1 Fauna habitat

As a component of the level 1 fauna survey undertaken by Bamford Consulting Ecologists, Vegetation and Substrate Associations (VSAs) were identified and mapped across the development envelope as a means of considering fauna habitat values at a broad scale. While informed by vegetation community mapping undertaken by Mattiske Consulting (2025) and RPS Group (2025) (Figure 4), VSAs provide a greater level of fauna habitat information than vegetation communities alone by also considering general geological units, soils, other substrates and landforms (Bamford Consulting Ecologists 2025).

Five VSAs were identified within the development envelope, each of which generally correspond to a vegetation community defined by Mattiske Consulting (2025) and RPS Group (2025). These are (Table 2-3):

Table 2-3: Vegetation Substrate Associations (Bamford 2025)

VSA No.	Description	Most similar vegetation community (Mattiske 2025; RPS 2025) (Figure 4)
VSA 1	Open hummock grassland on rocky basalt hills, plateaux and plains. This grassland is broadly distributed mostly across the higher slopes	G1

VSA No.	Description	Most similar vegetation community (Mattiske 2025; RPS 2025) (Figure 4)
VSA 2	Low and sparse shrubland over sparse hummock grasslands on stony plains and granite tor fields. This shrubland type lies on the lower areas in the north of the development envelope and is interspersed with fields of large boulders.	S1
VSA 3	Open woodland along ephemeral drainage channels incised into rocky creek lines. This vegetation dominates the creek lines in both the northern and southern catchment areas and is interspersed with permanent and ephemeral pools.	C1
VSA 4	Grassland with low isolated shrubs over friable cracking clay on basalt upland gilgai plains and flats. This grassland type is limited to the flats in the south of the development envelope.	G2
VSA 5	Low open woodland and isolated shrubs on sandstone hilltops. This woodland is confined to a band of higher ground and small patches that lies across the southern half of the development envelope with some small areas in the north-west. Corresponds roughly to the Capricorn Land System	W1

In addition to the VSAs identified within the development envelope, two small caves were also identified to the south-east of the Rio Tinto rail access line. Upon inspection, however, the caves' morphology was not considered to be appropriate as roosting habitat for listed bat fauna.

2.2.2 Site Utilisation

To-date, 81 bird species and eight bat species have been recorded within the development envelope (Bamford Consulting Ecologists 2025; RPS Group 2025). Generally, it was observed that particular landscape features including drainage lines, springs and rocky gorges are likely to support species that would not otherwise be present within the development envelope (Bamford Consulting Ecologists 2025). For example, the majority of bird observations made during vantage point surveys were taken along creek lines, and it was considered that water sources can affect the abundance and movement pattern of a range of fauna species. Further, ducks, cormorants, herons, dotterels and other birds associated with water were present frequently along creek lines (Bamford Consulting Ecologists 2025). Thickets and dense vegetation along drainage lines were also where most species such as the Purple-backed Fairy-wren and honeyeaters were observed (Bamford Consulting Ecologists 2025).

For these reasons it is reasonable to infer that creek line vegetation communities (C1-C6; VSA 3), and in particular those vegetation communities with permanent or semi-permanent water bodies (C2, C3 and C4), are likely to represent the greatest value fauna habitat within the development envelope.

In terms of conservation significant aerial fauna, three bird and two bat species listed under either the *Biodiversity Conservation Act 2016* (BC Act) or the EPBC Act, or as Priority fauna species by the Department of Biodiversity Conservation and Attractions (DBCA) are considered to have the potential to be either regular visitors or residents of the development envelope (Bamford Consulting Ecologists 2025). These species are:

- Fork-tailed Swift (*Apus pacificus*) – regular visitor – listed as Migratory under the BC Act and EPBC Act
- Grey Falcon (*Falco hypoleucos*) – regular visitor or possible resident – listed as Vulnerable under the BC Act and EPBC Act
- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) – regular visitor – listed as Vulnerable under the BC Act and EPBC Act

- Ghost Bat (*Macroderma gigas*) – regular visitor - listed as Vulnerable under the BC Act and EPBC Act
- Peregrine Falcon (*Falco peregrinus*) – regular visitor – listed as Specially Protected – Otherwise in Need of Special Protection under the BC Act.

In addition to the above, eleven wader species (including 10 migratory species) are known to also use inland wetlands, however these are usually broad lakes and estuaries with extensive shallows, rather than the narrow drainage lines and pools present within the development envelope. While these species are therefore considered to be vagrants only (Bamford Consulting Ecologists 2025), extremely irregular and unpredictable flocks passing through the project area cannot be ruled out, and so consideration has been given to the monitoring and impact mitigation approaches toward these species, in sections 4 and 5 of this plan.

Utilisation of the site by the five aforementioned conservation significant fauna species is discussed individually in the following sections.

2.2.2.1 Fork-tailed Swift

A moderate sized swift and aerial insectivore, this species often forages along the edge of low pressure systems in flocks of ten to 1,000 birds (DCCEEW 2023a; Higgins 1999). The Fork-tailed Swift breeds in Siberia (April to July) and spends the non-breeding season (October to mid-April) in Australia. Being aerial, it is effectively independent of terrestrial ecosystems when in Australia.

The Fork-tailed Swift is a largely aerial species of unpredictable occurrence in Western Australia. There are scattered records from the south coast, widespread in coastal and subcoastal areas between Augusta and Carnarvon, scattered along the coast from south-west Pilbara to the north and east Kimberley region. Sparsely scattered inland records, especially in the Wheatbelt, but more common in the north and north-west Gascoyne Region, north through much of the Pilbara Region, and the south and east Kimberley (DCCEEW 2023; Higgins 1999). Aerial, usually flying from as low as one metre to more than 300 m above the ground.

Within the development envelope, three sightings were made of the species in March 2025. Seven individuals were observed in total, including four birds at once during one sighting. All sightings were made at Vantage Point (VP)04 and VP10 (Figure 3), where birds were flying between 20 m and 40 m. The species was not observed during any other survey undertaken to-date.

2.2.2.2 Grey Falcon

The Grey Falcon is a moderately sized (400 to 500 g) diurnal (active during the day) predator that favours pigeons, parrots and other birds as prey, however may also take invertebrates, reptiles and small mammals (Bamford Consulting Ecologists 2025).

This species occurs at low densities across arid and semi-arid Australia, predominately in areas where annual rainfall is less than 500 mm (TSSC 2020). Throughout its extensive range, the Grey Falcon typically favours wooded ephemeral or permanent drainage lines interspersed with Acacia scrub (Bamford Consulting Ecologists 2025; TSSC 2020). While the species is resident and sedentary when seasonal conditions are favourable and when breeding, generally it is known to be highly nomadic across its range.

When breeding, the species exclusively uses the nests of other raptors. Nests in tall trees are favoured, however they have also been known to utilise nests in man-made structures, such as telecommunication towers (Bamford Consulting Ecologists 2025; TSSC 2020).

Within the development envelope, suitable habitat for the species was observed in the form of tall trees along creek lines interspersed with Acacia scrub, particularly in the south east of the development envelope (Bamford Consulting Ecologists 2025). This is considered likely to correspond to the C1 and C6 vegetation communities (VSA 3), in this area (Figure 4; Figure 5). To date, direct observations have been made of the Grey Falcon through opportunistic sightings on the 8th of August 2024 and March 2025, and during dedicated VP surveys on the 29th and 30th of September 2024, 1st of October 2024, and 10th and 13th March 2025.

In terms of VP surveys, an adult pair was observed over VPs 04 and 08, and individuals were seen at VPs 08 and 10. Opportunistic observations were made primarily around the Ngurrawaana community. Flight heights were estimated to be between 30 and 160 m for all observations. Observed flight lines of the Grey Falcon are illustrated in Figure 6.

While an adult pair was observed at the end of the known breeding season for the species (June to November) and may have bred, the only record of a possible juvenile was in March 2025 (VP 10).

All sightings of the species were confined to the southern half of the development envelope, and only following heavy rainfall (Bamford Consulting Ecologists 2025).

2.2.2.3 Pilbara Leaf-nosed Bat

The Pilbara Leaf-nosed Bat (also referred to as the Pilbara Diamond-faced Bat), is a small (8 to 11 g) nocturnal, insectivorous bat endemic to the Pilbara region of Western Australia. While the species is native to much of northern Australia, the isolated Pilbara population represents a slightly divergent form, and is afforded a separate conservation status (TSSC 2016a).

While records of the species have been made in a variety of habitat types, recent data show that areas of complex vegetation structures, particularly with semi-permanent or permanent surface water features, are preferred as foraging habitat for the species (Bat Call WA 2021).

Underground, diurnal roosts for the species which provide warm, humid microclimates are considered critical for the survival of the Pilbara Leaf-nosed Bat, given the species' inability to maintain heat and water balance (TSSC 2016a; Bat Call WA 2021). As of 2021, there were only 48 confirmed permanent diurnal roosts known for the species (Bat Call WA 2021).

The geology in the development envelope is not considered to lend itself to the formation of such large, deep caves (Bamford Consulting Ecologists 2025). While some small caves have been identified within the development envelope (Figure 5), none of these is considered suitable for use as roosting habitat for the species (Bamford Consulting Ecologists 2025).

Between August and December 2024, three recordings were captured of the Pilbara Leaf-nosed Bat on ARUs within the development envelope, which are detailed below in Table 2-4. This is despite the survey involving 338 recording nights, which collectively captured 176,624 WAV sound files. The two ARUs which recorded the species (ARU 16 and 26) were each located within creek lines in the eastern half of the development envelope, which is consistent with known preferred habitats for the species, which includes creek lines, gullies, and flooded gorges that contain vegetation with complex vertical structure (Bamford Consulting Ecologists 2025; Bat Call WA 2021a).

Based on the timing of recordings (the closest to sunrise/sunset being at 03:20:23; three hours and 21 minutes prior to sunrise), there is potential for the roost site used by the recorded individual to be up to 102 km away, based on a commuting speed of 8.5 m/s (Bat Call WA 2021). Males of the species have been known to move up to 170 km (Bat Call WA 2021).

Table 2-4: Acoustic records of Pilbara Leaf-nosed Bats detected along creek lines within the development envelope

ARU Ref	Date	No. Passes	Earliest Pass	Latest Pass	Sunset	Sunrise
ARU16	7-Aug-24	2	01:18:02	03:20:23	17:56	06:41
	14-Aug-24	1	02:16:26	02:16:26	17:59	06:36
ARU26	31-Aug-24	1	00:51:13	00:51:13	18:04	06:23

2.2.2.4 Ghost Bat

The Ghost Bat is a large (130 to 175 g), nocturnal, predatory bat native to northern Australia from the Pilbara region of Western Australia to the central Queensland coastal and hinterland regions (Bat Call WA 2021). The species is predominately an ambush predator, capturing prey such as small mammals, birds, reptiles, frogs and large insects through attacks launched from perches in vegetation (Bamford Consulting Ecologists 2025; Bat Call WA 2021b).

During day time, the Ghost Bat may roost in caves, rock crevices and old mines. In contrast, permanent roost sites are generally deep natural caves or disused mines with a relative stable temperature of 23°−28°C and a moderate to high relative humidity of 50 to 100 % (TSSC 2016).

No observations of the Ghost Bat within the development envelope have been made to-date, nor have any recordings of the species been collected on ARUs distributed throughout the development envelope. Further, the geology of the project area is not considered to be conducive to the formation of caves appropriate for long-term shelter for the species (Bamford Consulting Ecologists 2025).

Notwithstanding, utilisation of the site by small numbers Ghost Bats for foraging or transiting purposes has not been ruled out, and targeted efforts to record the species within the development envelope are ongoing (section 4).

2.2.2.5 Peregrine Falcon

A globally distributed species, the Peregrine Falcon is a predominately diurnal predator of birds. The species occurs in a variety of habitats, but is usually reliant on cliff faces or tall trees for nesting (Debus 2019).

No individuals have been seen within the development envelope to-date, nor are there any records available of the species within 40 km of the development envelope. It is noted that if any breeding activity was occurring within the survey area, then individuals would have been seen during the bird and bat utilisation surveys (Bamford Consulting Ecologists 2025). Notwithstanding, breeding habitat within the development envelope was considered to be limited (Bamford Consulting Ecologists 2025).

3 Impact Risk Assessment

Potential impacts from wind farms on bird and bat species have been identified to include (Reid and Baker 2024):

- Collision

  Where birds and bats in flight collide with and/or experience barotrauma from turbine structures resulting in injury or death

- Displacement and barrier effects

  Where birds and bats incur additional flight distances to circumnavigate a wind farm or avoid wind farms in preference to favoured habitats

- Disturbance

  Where, in response to a wind farm, broader changes occur to the behaviour and/or reproductive success of birds and bats

- Habitat loss and/or degradation

  Where wind farms necessitate the clearing of habitat

- Indirect

  Where wind farms cause changes in the availability of particular habitats or prey abundances

Of the above, the primary environmental concern arising from wind farm developments in Australia and overseas is considered to be the mortality of bird and bat species from collision with turbines (DEWHA 2009). The focus of this BBMP therefore, including the impact risk assessment and associated mitigation and adaptive management measures, is on collision risk over other potential impacts to bird and bat fauna.

3.1 National Impact Risk Considerations

In 2009, through *EPBC Act Policy Statement 2.3: Wind Farm Industry*, the then Department of the Environment, Water, Heritage and the Arts (DEWHA; now DCCEEW) identified the following groups to be most at risk of mortality from collision with turbines:

- Waterbirds that are listed threatened species, listed migratory species, and/or part of the ecological character of a Ramsar wetland
- Seabirds that are listed threatened species, listed migratory species and/or part of the ecological character of a Ramsar wetland – in the case of coastal and offshore wind farms
- Listed migratory species and listed threatened species that migrate within Australia – where wind farms are situated on migration routes, and
- Species that are at risk of extinction, that is, species that are listed as endangered or critically endangered, and in particular certain species of bats and birds – where wind farms are situated on a site they frequent.

No species which meets any of the above criteria is considered to be a resident or regular visitor of the development envelope. Further, the proposal is not located in a coastal environment, nor is it located in proximity to any Ramsar wetland or known migration route.

Most recently at a national level, an ecological risk assessment was undertaken for 1128 bird and 81 bat taxa to identify which taxa are at a high risk from negative interactions with onshore wind farms in Australia (Reid and Baker 2024). The study was undertaken on behalf of DCCEEW and considered risk to each species as being a function of productivity (based on conservation status and generation time), and susceptibility (based on flight height, flight manoeuvrability and habitat specialisation). While the complete results of the assessment remain to be published, the following conclusions were noted:

- Queensland has the greatest number of at-risk bird and bat taxa,
- Queensland has the greatest number of 'high-risk' bat species, whereas Tasmania has the greatest proportion of 'high risk' bird species
- The three highest risk bird species are:
  - Eastern Pink Cockatoo (*Cacatua leadbeateri leadbeateri*)
  - Australian Palm Cockatoo (*Probosciger aterrimus macgillivrayi*)
  - Baudin's Black-Cockatoo (*Zanda baudinii*)

  None of these species occurs within or in proximity to the development envelope
- The three highest risk bat species are:
  - Southern Bent-winged Bat (*Miniopterus orianae bassanii*)
  - Grey-headed Flying-fox (*Pteropus poliocephalus*)
  - Northern Coastal Free-tailed Bat (*Ozimps cobourgianus*)

  None of these species occurs within or in proximity to the development envelope.

Considering the proposal is located in Western Australia, and that none of the six identified highest risk species is known to occur within or in proximity to the development envelope, the potential for fauna collisions resulting from the proposal appear unlikely to be considered significant at a national level.

The above notwithstanding, it is recognised that impact risk assessments undertaken at a national level do not consider site and species-specific factors such as habitat and habitat features, targeted survey results, local patterns of biodiversity, or ecosystem processes. To address this, a discussion of collision risk against each species identified in section 2.2.2 is provided in section 3.3.

3.2 Collision Risk Modelling

Collision Risk Modelling (CRM) is a tool used to predict the number of bird collisions that may be caused by a wind farm development over a period of time (Band *et al.* 2007). Utilisation of the tool provides a means of quantifying potential impacts on particular species, and it is recommended for the assessment of potential impacts on Threatened species listed under the EPBC Act by DCCEEW (DCCEEW 2024b). While many models are available, most require input parameters describing species-specific information on biometrics, flight characteristics and expected amount of flight activity, and turbine-specific information on blade size, blade pitch, rotor rotation period and the anticipated proportion of time that turbines will be operational (Christie & Urquhart 2015).

In terms of species-specific information, this is typically collected by undertaking point-count surveys (Band *et al.* 2007). However, in many circumstances it may impractical or inappropriate to conduct surveys for the presence of a particular taxon. This may be the case when a taxon rarely uses the area or its abundance is so low in a particular area that the survey effort required to determine the absence would not be feasible or cost effective, which is recognised in the (then) Department of the Environment, Water, Heritage and the Arts (DEWHA; now DCCEEW)'s *Survey Guidelines for Australia's Threatened Birds* (2010). In addition, CRM can only be applied to diurnal species since it is not feasible to sample nocturnal birds and bats in a manner that would provide suitable data for CRM.

In the context of the Baru-Marnda Renewable Energy Project, only three of the five previously identified fauna species have been recorded within the development envelope to-date, and two of these are diurnal species, being the Fork-tailed Swift and Grey Falcon. The Fork-tailed Swift was observed on three separate occasions within the development envelope in March 2025 (Bamford Consulting Ecologists 2025) which is within their known migratory period for northern Australia. None of the seven individual swifts was estimated to be within the height of the turbines. Observations of Grey Falcons were made on 14 occasions within the development envelope to-date (Bamford Consulting Ecologists 2025). However, like many bird species in the Pilbara, the Grey Falcon is highly erratic in its movements and does not stay for long at any location unless breeding (Bamford Consulting Ecologists 2025). This may mean that the species' ongoing presence within the development envelope and collision risk cannot be accurately modelled utilising baseline observational data.

For these reasons, no CRM is proposed for the identified fauna at this stage. Rather, a precautionary approach has been taken to considering collision risk based on an accurate evaluation of the habitat characteristics of the development envelope and the importance of habitat sites, as recommended in *Survey Guidelines for Australia's Threatened Birds* (2010). This is supplemented by known behavioural traits of each species, observations made through site utilisations surveys within the development envelope, and with consideration to the proposed development layout.

It is understood that DCCEEW is currently in the process of developing a Collision Risk Assessment Framework to predict the risk of collision for EPBC Act-listed bird and bat species by onshore (and offshore) wind farm developments. Utilisation of this framework, once complete, may inform the refinement of adaptive management actions that can be employed by YEC to further mitigate potential collision impacts associated with the proposal.

3.3 Species-specific Impact Risk Assessment

3.3.1 Fork-tailed Swift

Fork-tailed Swifts were observed on three occasions during March 2025. The sightings occurred in the central south of the Marnda project area and over open grassland with scattered trees (VSAs 1 and 5). The species may be present only between October and April during its seasonal migration in Australia, but may occur at any location across the development footprint during this time. While the number of birds was low, they are known to occur in large flocks throughout their range in Australia. Despite the seven swifts all being recorded below RSP, they are known to fly at height regularly, and therefore the species is considered to be at risk of potential collision with wind turbines.

3.3.2 Grey Falcon

Grey Falcons have been observed flying within the development envelope on 14 occasions to-date, a little over half of which were at rotor swept height. The species may utilise the development envelope for breeding, however no breeding activity has been observed to-date.

The above notwithstanding, it is noted that the area in which all Grey Falcons were observed was in the south east of the development envelope, including around the Ngurrawaana community, where wooded creek lines which are considered to be the species' preferred habitat are present (Bamford Consulting Ecologists 2025). Therefore, the species' collision risk may be spatially limited to wind turbines proposed around this area.

As noted in section 3.2, the species is known to be highly erratic in its movements, not staying for long at any location unless breeding (Bamford Consulting Ecologists 2025). Recognising also that all observations were following an influx of large numbers of birds known to be prey for the species (Bamford Consulting Ecologists 2025), it may be the case that if not a temporary presence, the number of observed Grey Falcons within the development may be greater than what is typical during more adverse climactic conditions, such as during long, dry periods. Due to the lack of wind farms in Grey Falcon range, there is no information on their awareness of turbines and avoidance behaviours. While the Peregrine Falcon would be a reasonable surrogate to suggest avoidance, which is indicated to be high ((Windpower Monthly 2018), it also has behavioural similarities to the Brown Falcon, but that species has been recovered in carcass monitoring programmes at a high rate of occurrence in Australia. It is to be acknowledged that the Brown Falcon is common across Australia and therefore has a far higher presence in wind farms than either Peregrines or Grey Falcons.

Based on the above, Grey Falcons are considered to be at-risk of collision with wind turbines within the development envelope. However, this risk of impact is not considered to be spatially uniform, nor at a consistent level within and between years.

3.3.3 Pilbara Leaf-nosed Bat

Almost all productive and semi productive habitats are known to be utilised by the Pilbara Leaf-nosed Bat, however Bat Call (2021) states that the Pilbara Leaf-nosed Bat is most commonly encountered over small pools of water in rocky gullies and gorges, and at cave or mine adit entrances. This is consistent with the location of all three recordings of the species within the development envelope, which were within creek line vegetation (Bamford Consulting Ecologists 2025). Bat Call (2021b) goes on to state that only three-layer, complex vegetation structures associated with watercourses could be considered high quality foraging habitat for the species, which would align with the C1-6 vegetation communities, and VSA 3. No wind turbines are proposed within or in proximity to these areas (section 5).

Few data have been collected on the typical flight heights of the Pilbara Leaf-nosed Bat. However, Supersensory Technologies (2025) considered the species to have a 'Low' likelihood of high-altitude flight (>50 m), based on the accumulated casual field observations of Dr Kyle Armstrong.

The above notwithstanding, the small number of recordings made within the development envelope (3 from 338 recording nights), and the absence of suitable roost sites, suggest that the Pilbara Leaf-nosed Bat may only infrequently visit the site (Bamford Consulting Ecologists 2025). When individuals are utilising the site, this is likely to be limited to more densely vegetated creek line corridors only, away from proposed wind turbines. On this basis, the risk of Pilbara Leaf-nosed Bats colliding with wind turbines is considered to be low. This is supported by the collision risk category assigned to the species by Supersensory Technologies (2025), which was also 'low'.

3.3.4 Ghost Bat

Approved conservation advice for the species (TSSC 2016b) distinguishes between two foraging strategies employed by the Ghost Bat. These include perching in vegetation to ambush passing prey, and gleaning surfaces such as the ground while in flight. In terms of the former strategy, Bat Call WA (2021b) elaborates on this behaviour by stating that the species typically utilises vantage points in trees, and that gullies or gorge systems which open out into plains or riparian lines provide the best foraging opportunities. Considering the Ghost Bat may only utilise the site for foraging or transiting purposes, it is likely that only creek lines within the development envelope (vegetation communities C1-6; Figure 4, VSA 3; Figure 5) would be utilised for this purpose. No wind turbines are proposed within or in proximity to creek line vegetation (section 5).

Limited studies have been undertaken into the typical flight heights of the Ghost Bat, however Bat Call WA (2021b), Armstrong & Anstee (2000) and Mckenzie & Bullen (2009) each note that the species often flies at about fence height. Indeed, collision with fences (especially those with barbed wire) is recognised as a moderate threat to the species at a national level, whereas potential collision with wind turbines is not (Bat Call 2021b). Given this, and the species' known foraging strategy of gleaning the ground for prey while in flight, it is reasonable to consider that the species is unlikely to regularly fly at heights sufficient to collide with turbines (>64 m).

Recognising also that no observations of the species have been made within the development envelope, that no suitable roosting habitat is present within the development envelope, and that suitable habitat for the species is known to be present in the adjacent Millstream Chichester National Park (Bamford Consulting Ecologists 2025), the likelihood and consequence of Ghost Bats colliding with wind turbines are both considered to be low. This is supported by the collision risk category assigned to the species by Supersensory Technologies (2025), which was also 'low'.

3.3.5 Peregrine Falcon

The Peregrine Falcon is distributed throughout Australia and globally. The species is known to soar to great heights to search for prey (Australian Museum 2019), and it is likely that this includes activity at rotor swept height. Despite this, there are only two records of blade strike of Peregrine Falcons recorded from Victorian wind farms (Lumsden *et al.* 2019). Further, Peregrine Falcons have been observed to utilise nest boxes mounted to wind turbines in Germany with no recorded bird deaths (Windpower Monthly 2018), suggesting the species is capable of behavioural modification such that turbines may not represent a collision risk.

The above notwithstanding, noting the absence of records of the species from the development envelope and surrounding area, the paucity of preferred habitat within the development envelope, and the species' global distribution, the potential likelihood and consequence of Peregrine Falcons colliding with wind turbines are both considered to be low.

4 Monitoring

To evaluate the efficacy of the proposed mitigation and adaptive management approach (section 5), and to detect potential long-term changes to species' utilisation of the development envelope, YEC proposes to implement a long-term site utilisation monitoring programme prior to, during and post-construction. Generally, the programme will be undertaken in accordance with a BACI monitoring framework, in that data collected will reflect the state of the environment Before and After the proposal, and utilising Control and Impact study sites. A provisional monitoring period of two years following commencement of the operational phase is proposed, with possibility for extension depending on the monitoring results. While monitoring methodologies will largely be consistent with those employed in site utilisation surveys undertaken to-date (Appendix 1), further principals and considerations for the proposed monitoring programme include:

- Consider the use of acoustic lures in conjunction with the deployment of ARUs as a means of detecting Ghost Bats
- The pursuit of an adaptive monitoring approach, whereby methodologies reflect the results of previous surveys (for example, the monitoring of creek line vegetation for birds and the deployment of ARUSs, based on the majority of fauna being observed in these locations to-date)
- Investigate methodologies for the detection of large flocks of water birds, including nocturnal movements
- A survey approach which takes into account the sporadic occurrence of Grey Falcons within the development envelope, including (for example):
    - Targeted nest surveys following the detection of Grey Falcon pairs during the breeding season (June to November)
    - Training of on-site staff in the identification of conservation-significant bird and bat fauna, including Grey Falcons
    - Carcass searches which target specific turbines following the detection of Grey Falcons, and/or following substantial rainfall events or influxes of prey bird species

As additional data become available, it is anticipated that the monitoring programme will be refined in consultation with key stakeholders including the Department of Water and Environmental Regulation (DWER)/EPA, DBCA and DCCEEW.

5 Mitigation

By far the most significant measure to avoid or mitigate any negative impacts on birds and bats is the appropriate siting of wind farms and associated infrastructure. This overarching approach is communicated in all relevant draft and finalised federal guidance published to-date, including:

- DEWHA (2009). *EPBC Act Policy Statement 2.3: Wind Farm Industry*
- DCCEEW (2024). *Onshore Wind Farm Guidance: Best practice approaches when seeking approval under Australia's national environmental law.*
- Reid and Baker (2024). *Impacts on Birds and Bats from onshore wind farms in Australia: an ecological risk assessment*

In recognition of the importance of avoidance and appropriate siting of turbine infrastructure, YEC has pursued a project design which seeks to limit to the fullest extent practicable the proximity of wind turbines to known values for bird and bat fauna. This includes:

- No wind turbine being proposed within creek line vegetation, which is favoured habitat for the Grey Falcon, Pilbara Leaf-nosed Bat, and Ghost Bat
- The implementation of a minimum buffer distance of 60 m between proposed wind turbines and creek line vegetation
- A mean buffer distance of 600 m between proposed wind turbines and the nearest creek line vegetation
- Buffer distances between proposed wind turbines and creek lines which are supplemented by additional, vertical clearances (turbines are predominately sited at the top of hills, away from creek lines)
- A minimum buffer distance of 2,899 m between the nearest proposed wind turbine and Ngurrawaana community, which is known to be frequented by the Grey Falcon
- A minimum buffer distance of 428 m between the nearest proposed wind turbine and any recorded cave

In addition to the above avoidance measures, and in accordance with YEC's precautionary approach to the mitigation of potential environmental impacts, consideration has also been given to the potential for light emissions from wind turbines to serve as an attractant for some fauna (DCCEEW 2023b), which could by extension increase collision risk. To address this, YEC is committed to pursuing a design which adheres to the dark sky lighting principles, in that all lighting to be employed on and around proposed wind turbines will be:

- **Useful** - Light will only be used if it is needed. All light will have a clear purpose
- **Targeted** - Light will be directed to fall only where it is needed. Shielding will be used where appropriate and lighting will be carefully aimed to target the direction of the light beam so that it points downward and does not spill beyond where it is needed
- **Low Level** - Light will be no brighter than necessary. The lowest light level required will be used.
- **Controlled** - Light will only be used when it is needed. Controls will be used such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed
- **Warm-coloured** – Warmer colour lights will be used where possible. Usage of shorter wavelength (blue-violet) light will be limited to the least amount needed.

6 Adaptive Management

Adaptive management is a systematic approach to improving environmental results and management practices during project implementation through the application of learning from monitoring of outcomes and management actions (EPA 2024). Adaptive management is particularly useful when facing uncertainty, allowing for iterative refinement of the management approach. This is particularly relevant in the context of the Baru-Marnda Renewable Energy Project and wind energy projects more generally, where potential behavioural responses to wind energy infrastructure by particular fauna taxa represents one such uncertainty, which cannot be addressed through baseline surveys alone.

Adaptive management generally requires an impact threshold (also referred to as a 'trigger') to be met for adaptive management actions to be initiated (DCCEEW 2024b). These impact thresholds should be species specific and quantitative, with transparent and measurable outcomes, capable of accurate measurement, and ecologically justified. Based on the impact risk assessment conducted for identified species in section 3.3, and with consideration to the utilisation of the site by these species, the following impact thresholds are proposed:

- Grey Falcons are confirmed to be actively breeding within the development envelope
- One or more individuals of an EPBC Act or BC Act listed species is confirmed to have collided with wind turbine infrastructure.

Where one of the above impact thresholds is met during either the construction or operation phases of the proposal, the following four steps of the adaptive management cycle will be implemented (Department of the Environment 2016):

- **Plan** – Management measures proposed to be implemented will be documented
- **Do** – Management measures will be implemented
- **Check** – Outcomes will be monitored
- **Review** – Management measures will be reviewed based on monitoring results

Where possible, management measures will be designed to directly correspond with and address the nature of the impact threshold met. For example, management measures to address potential impacts on birds may not be appropriate to address impacts on bats. Similarly, the proposed monitoring approach will be specifically tailored to the management response, so that its efficacy can be effectively evaluated.

Depending on the nature of the impact threshold met, YEC considers that a broad range of management measures is available to be implemented so as to further mitigate potential impacts, as appropriate. Though not exhaustive, these potential management measures could include (but are not limited to):

- Seek external guidance and advice

  Where appropriate, YEC will seek expert advice from subject matter experts and key stakeholders on appropriate management measures which could be implemented to address potential impacts. This may include DBCA, DCCEEW or DWER, suitably qualified zoologists and/or engineers, as well as YAC and the Ngurrawaana community.

- Temporary avoidance areas

  Where new or newly identified environmental values are recorded within the development envelope (such as active Grey Falcon breeding locations), the establishment of temporary avoidance areas may be an appropriate means of mitigating the potential for adverse impacts. This may be particularly relevant during the construction phase of the project when human activity within the development envelope will be greatest.

- Monitoring program review

A review of the monitoring programme may be appropriate where data indicate that particular locations within the development represent greater risk to bird and bat fauna, or where particular fauna taxa are identified to be at greater risk. This could include an intensification of particular survey techniques, the undertaking of targeted surveys, reprioritisation of those areas subject to survey effort, and/or the development of a strategy for monitoring the potential for large numbers of migrant waders and water birds to predict potential flights through the development envelope.

- Bird and/or bat detection systems

  Automatic Detection Systems (ADSs) can be deployed to detect incoming birds or bats using a detection and classification process (often involving use of radar) which may trigger a specific reaction (such as deterring the bird or bat, and/or limiting specific turbine operations). Systems should ideally be considered for all at-risk species.

- Acoustic and/or visual deterrents

  Deterrents typically involve the installation of devices that emit audible and/or visual stimuli constantly, intermittently, or when triggered by a detection system. Alternatively passive deterrents can include coloured turbine blades or blade-mounted whistles. Limited data are available on the efficacy of deterrents as a means of reducing collision risk, however some limited success has been had in Norway where one turbine blade was painted black (May et al. 2020). It is noted that some deterrent systems are available for specific turbine models, such as the Vestas Bat Protection System.

- Scheduling

  Scheduling involves coordinating some construction, operational and/or decommissioning activities in a particular manner so as to minimise potential impacts during ecologically sensitive times of the day or year. This may include during active breeding by Grey Falcons, for example.

7 Reporting

Records of implementation of this Preliminary BBMP will be included in reports to be provisioned to DWER and/or DCCEEW, as requested. These reports will foreseeably include:

- Methodologies and results of the proposed monitoring programme, including any observed changes to utilisation of the development envelope by bird and bat fauna post-construction
- Notifications of any impact thresholds which may have been met
- The outcomes of any consultation with subject matter experts and/or stakeholders on the implementation adaptive management measures
- The nature of the adaptive management measures implemented
- Records on the efficacy of any adaptive management measures implemented.

8 References

Armstrong, K. N., & Anstee, S. D. (2000). *The ghost bat in the Pilbara: 100 years on*. Australian Mammalogy 22, 93-101

Australian Museum (2019). *Peregrine Falcon.* Available online via: https://australian.museum/learn/animals/birds/peregrine-falcon/

Bamford Consulting Ecologists (2025). *Yindjibarndi Renewable Energy Project Fauna Assessment Report: Baru and Marnda Wind Farms.* Report prepared for Yindjibarndi Energy Corporation Pty Ltd.

Band, W., Madders, M. & Whitfield, D.P. (2007). *Developing field and analytical methods to assess avian collision risk at wind farms.*

Bat Call WA (2021a). *A review of Pilbara leaf-nosed bat ecology, threats and survey requirements.* Prepared for the Department of Agriculture, Water and Environment.

Bat Call WA (2021b). *A review of ghost bat ecology, threats and survey requirements.* Prepared for the Department of Agriculture, Water and Environment.

Christie, D. & Urquhart, B. (2015). *A refinement of the Band spreadsheet for wind turbine collision risk.*

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023a). Apus pacificus *in Species Profile and Threats Database.* Available at: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=678

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023b). *National Light Pollution Guidelines for Wildlife.* Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024a). *Environmental Management Plan Guidelines.* DCCEEW, Canberra.

Department of Climate Change, Energy, the Environment and Water (DCCEEW (2024b). *Draft Onshore Wind Farm Guidance: Best practice approaches when seeking approval under Australia's national environmental law.* DCCEEW, Canberra.

Department of the Environment (DoE) (2016). *Outcomes-based conditions guidance.* Commonwealth of Australia.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2009). *EPBC Act Policy Statement 2.3: Wind Farm Industry*. Commonwealth of Australia.

Environmental Protection Authority (EPA) (2024). *Instructions: How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans*. EPA, Western Australia.

Greening Australia (2016). *Yindjibarndi Ethnobiological Survey.* Prepared for Yindjibarndi Aboriginal Corporation.

Higgins, P. J. (Ed.). (1999). *Handbook of Australian, New Zealand and Antarctic Birds. Volume 4: Parrots to Dollarbird* (Vol. 4). Oxford University Press.

Lumsden, L. F., Moloney, P., & Smales, I. (2019). *Developing a science-based approach to defining key species of birds and bats of concern for wind farm developments in Victoria*. Arthur Rylah Institute for Environmental Research Technical Report Series No. 301. Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Mattiske Consulting (2025). *Baru-Marnda Renewable Energy Project: Detailed Flora and Vegetation Assessment Report.* Report prepared for Yindjibarndi Energy Corporation Pty Ltd.

May R, Nygård T, Falkdalen U, Åström J, Hamre Ø, Stokke BG (2020). *Paint it black: Efficacy of increased wind-turbine rotor blade visibility to reduce avian fatalities.*

McKenzie, N. L., & Bullen, R. D. (2009). *The echolocation calls, habitat relationships, foraging niches and communities of Pilbara microbats*. Records of the Western Australian Museum Supplement 78, 123-155

Reid, K and Baker, GB (2024). *Impacts on Birds and Bats from onshore wind farms in Australia: an ecological risk assessment.* Department of Climate Change, Energy, the Environment and Water, Canberra.

RPS Group (2025). *Baru-Marnda Renewable Energy Project: Flora, Vegetation and Fauna Assessment.* Prepared for Yindjibarndi Energy Corporation Pty Ltd.

Supersensory Technologies Pty Ltd (2025). *Acoustic analysis and bat call identification from Baru Wind Farm: 2024. Prepared for Bamford Consulting Ecologists Pty Ltd.*

Thackway, R, and ID Cresswell (1995). *An Interim Biogeographic Regionalisation for Australia: a framework for setting priorities in the national reserves system cooperative program.* Australian Nature Conservation Agency, Canberra.

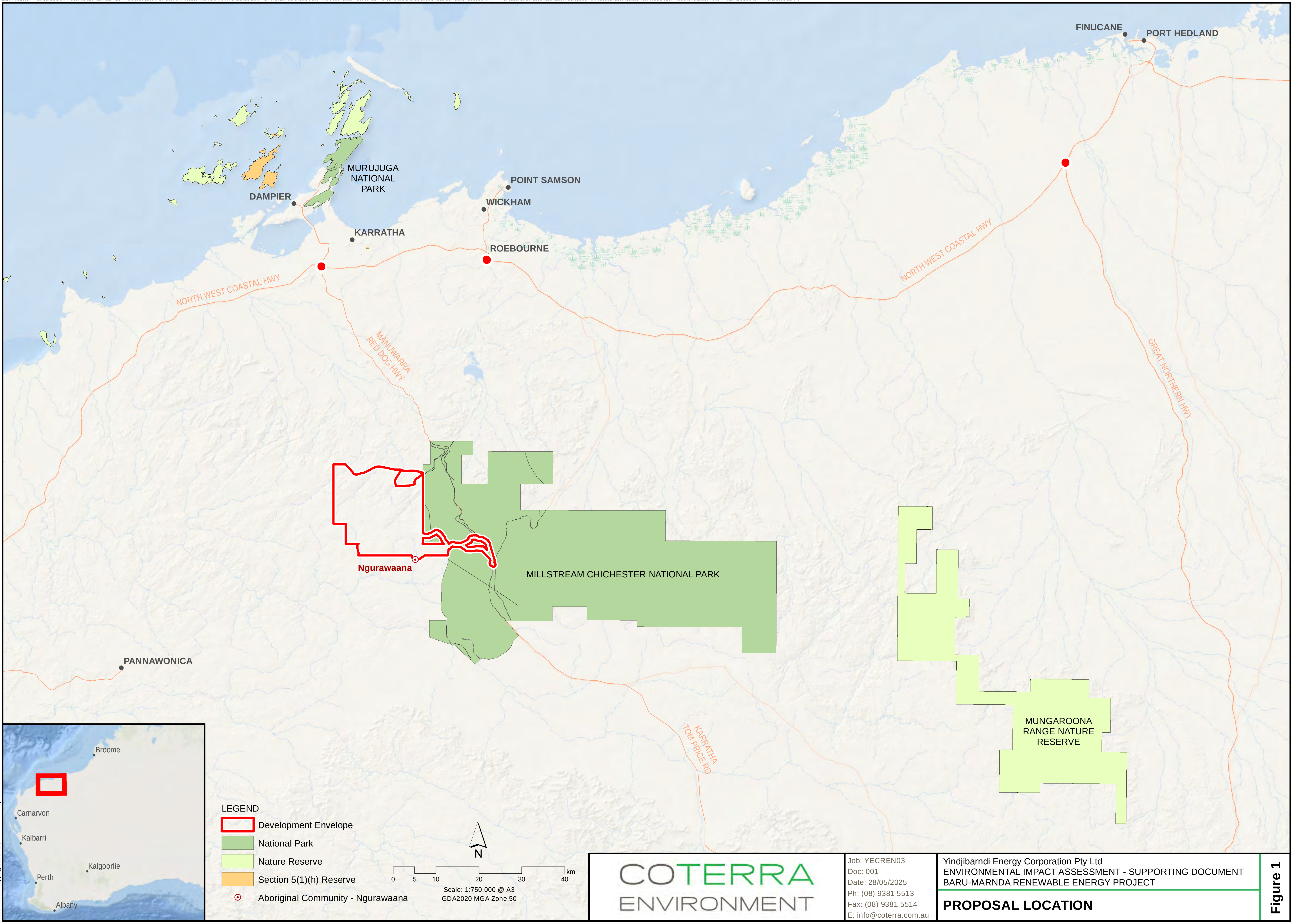
Threatened Species Scientific Committee (TSSC) (2016a). *Conservation Advice:* Rhinonicteris aurantia *(Pilbara form) Pilbara Leaf-nosed Bat.* Canberra: Department of the Environment.

Threatened Species Scientific Committee (TSSC) (2016b). *Conservation Advice:* Macroderma gigas *ghost bat.* Canberra: Department of the Environment.

Threatened Species Scientific Committee (TSSC) (2020). *Conservation Advice* Falco hypoleucos *Grey Falcon.* Canberra: Department of Agriculture, Water and the Environment.

Windpower Monthly (2018). *Safe havens for protected birds?.* Article available online via: https://www.windpowermonthly.com/article/1489017/safe-havens-protected-birds

Figures



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BARU-MARNDA RENEWABLE ENERGY PROJECT

PROPOSAL LOCATION

Figure 1

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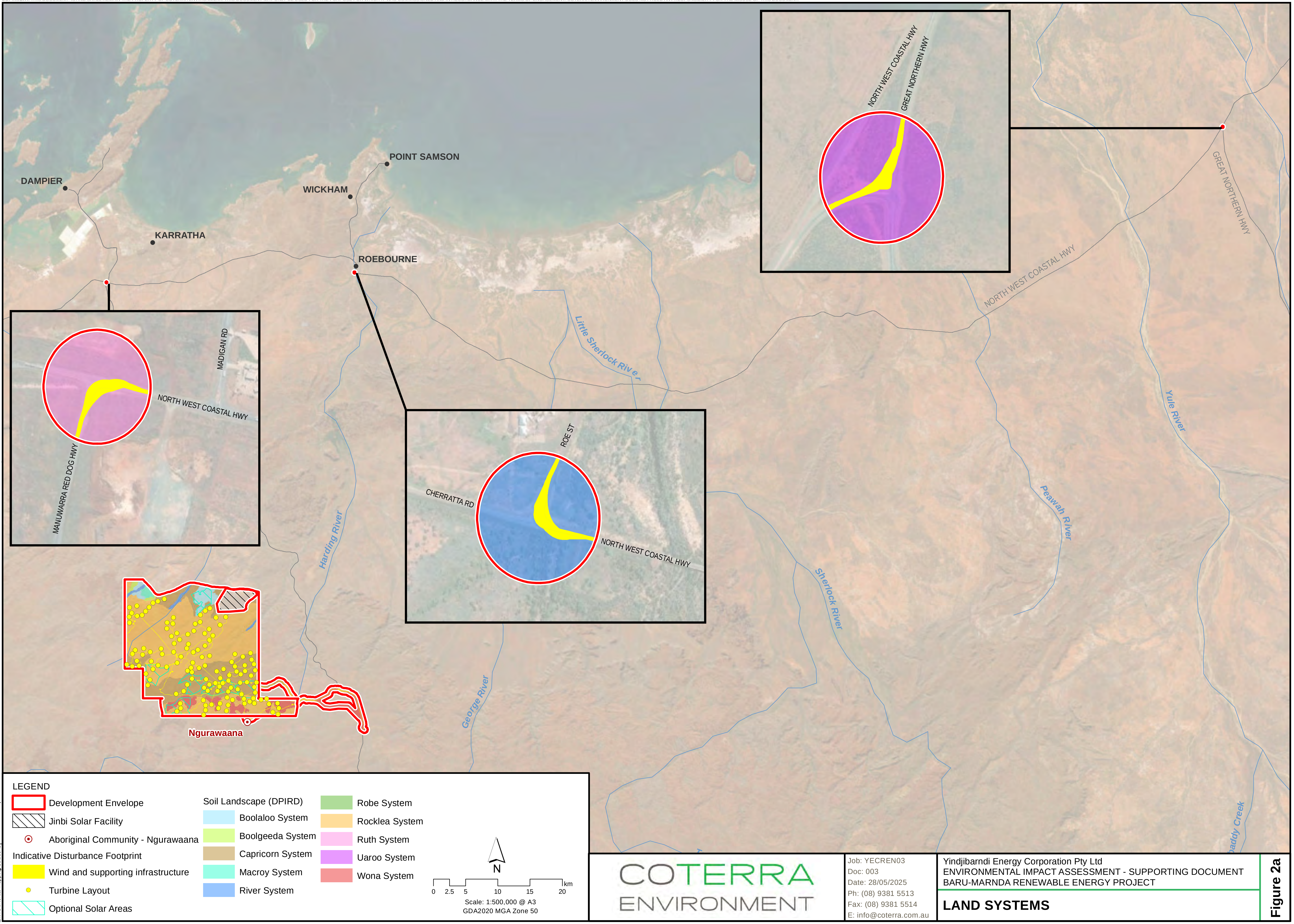

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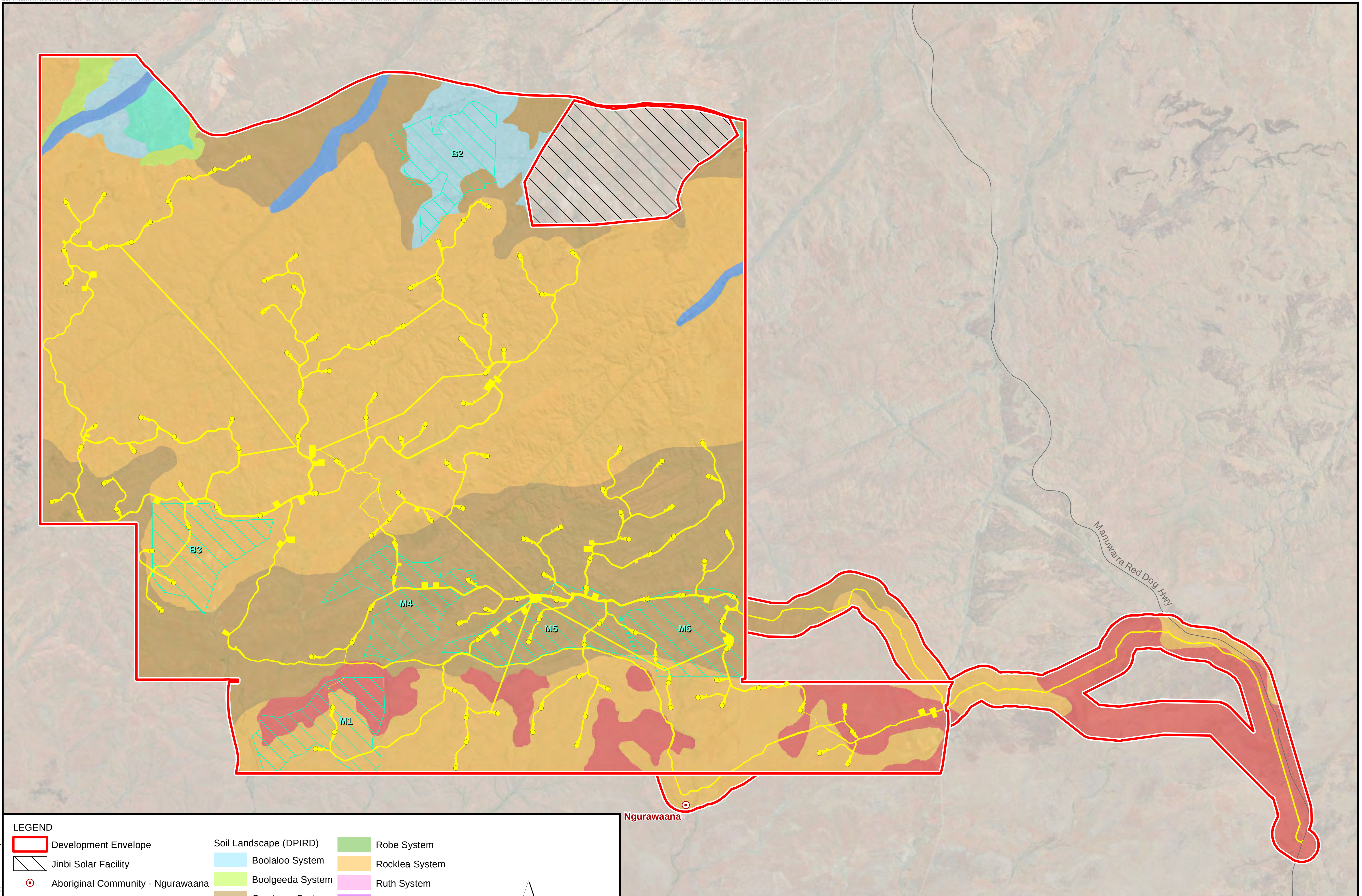

LEGEND

- Development Envelope
- Jinbi Solar Facility
- Aboriginal Community - Ngurawaana

Indicative Disturbance Footprint

- Wind and supporting infrastructure
- Turbine Layout
- Optional Solar Areas

Soil Landscape (DPIRD)

- Boolaloo System
- Boolgeeda System
- Capricorn System
- Macroy System
- River System
- Robe System
- Rocklea System
- Ruth System
- Uaroo System
- Wona System

N

0 0.5 1 2 3 4 km

Scale: 1:100,000 @ A3
GDA2020 MGA Zone 50

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LAND SYSTEMS

Figure 2b

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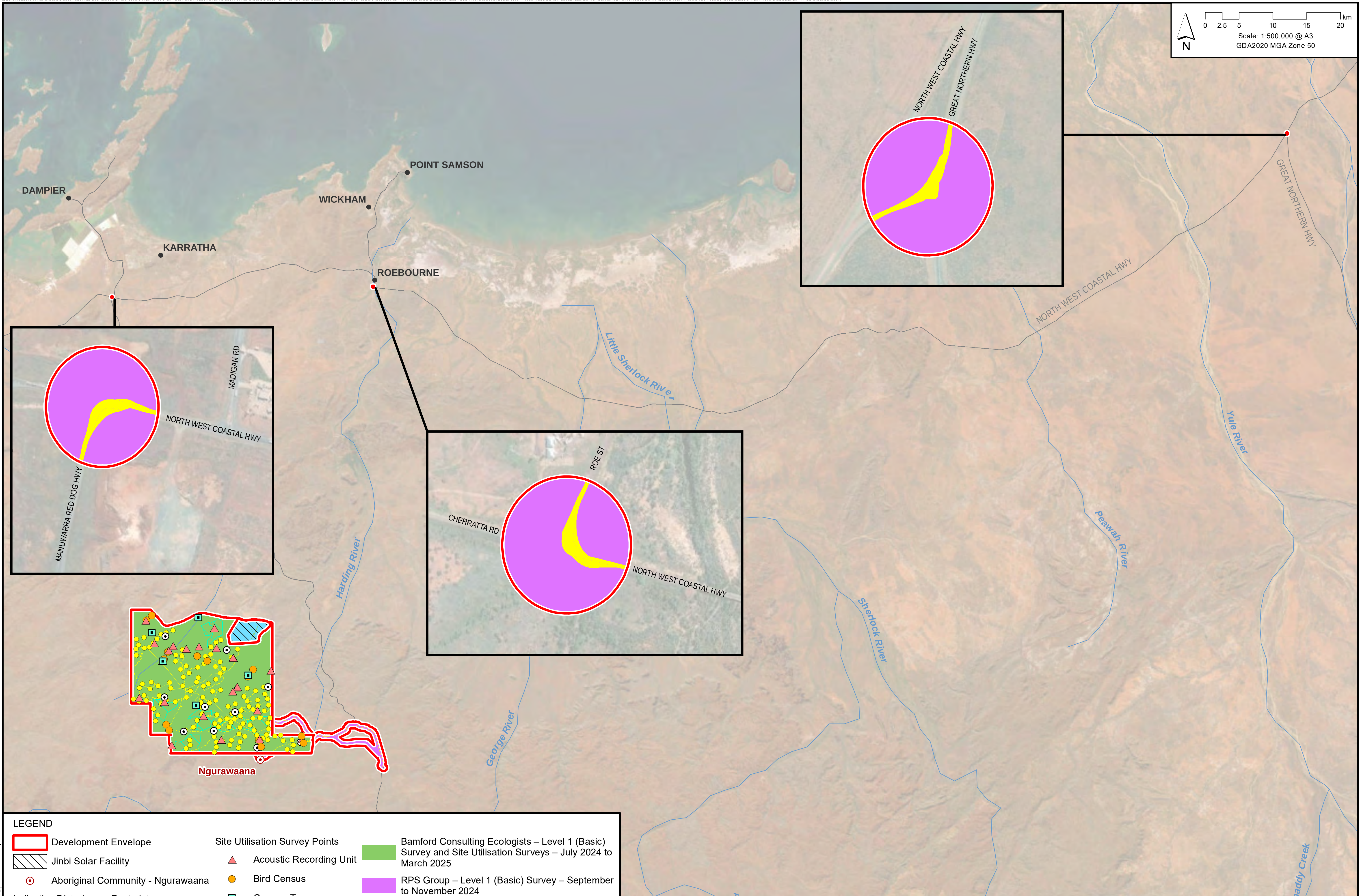

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SPATIAL COVERAGE OF TERRESTRIAL FAUNA STUDIES UNDERTAKEN TO-DATE

Figure 3a

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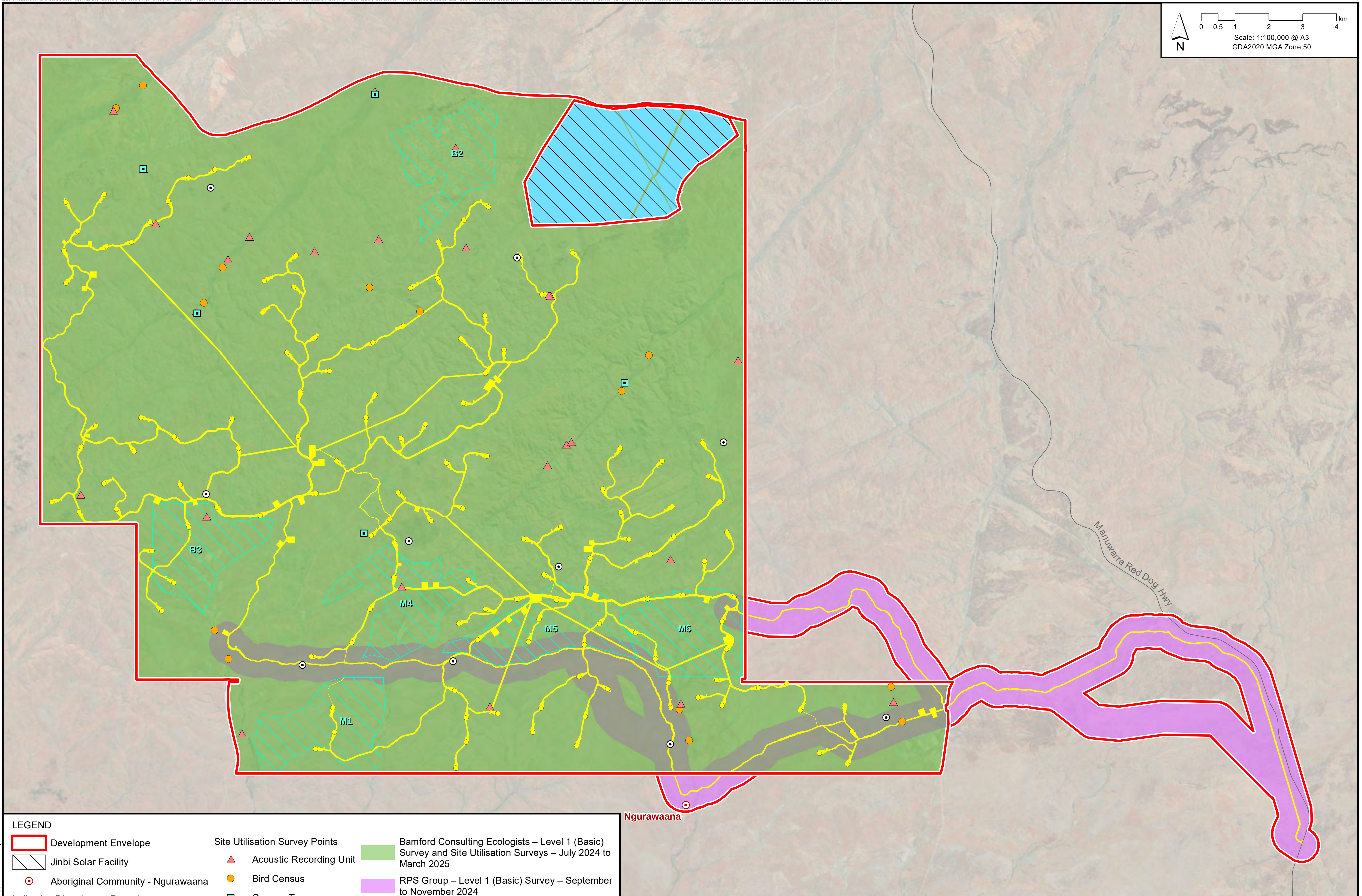

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SPATIAL COVERAGE OF TERRESTRIAL FAUNA STUDIES UNDERTAKEN TO-DATE

Figure 3b

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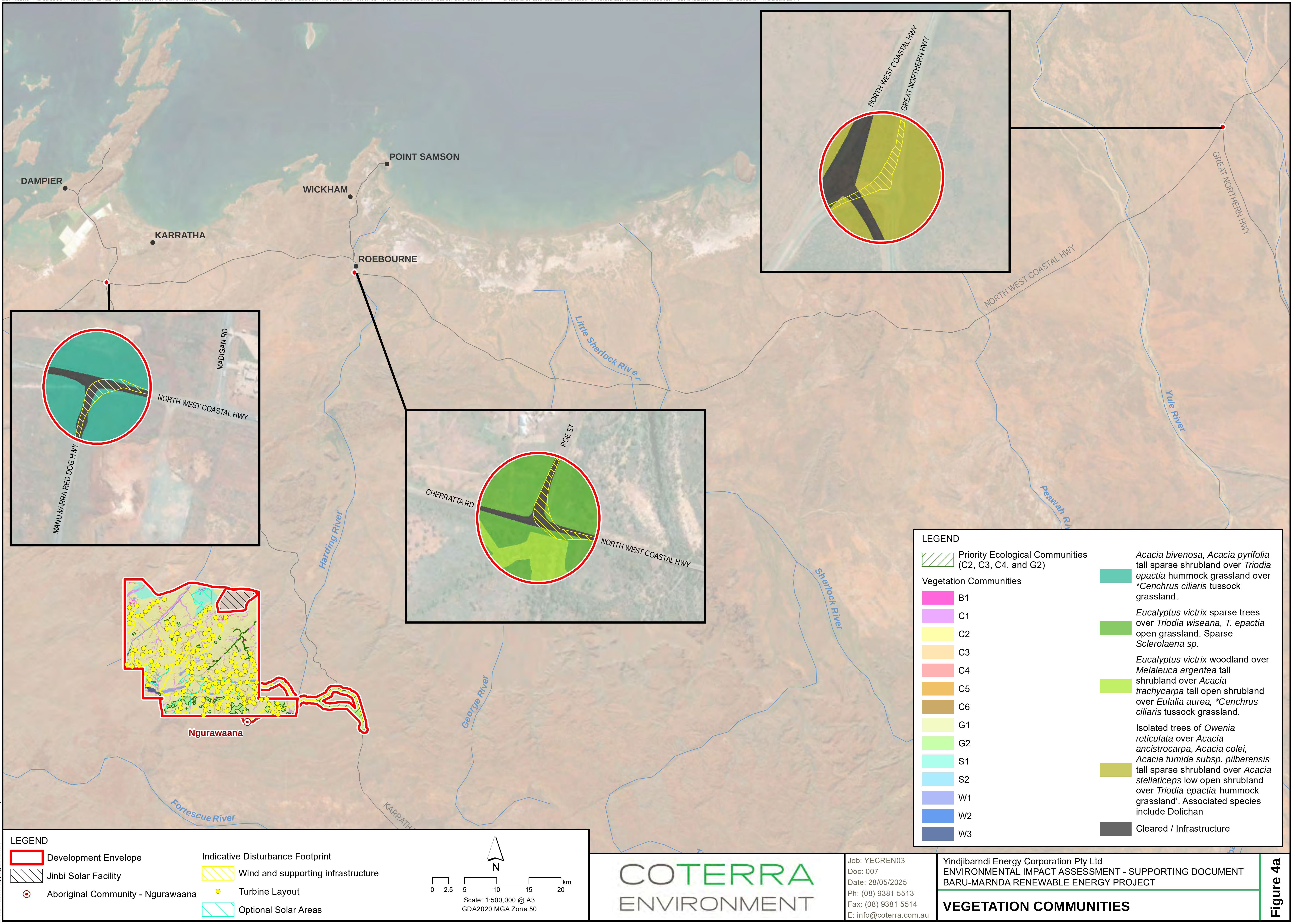

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VEGETATION COMMUNITIES

Figure 4a

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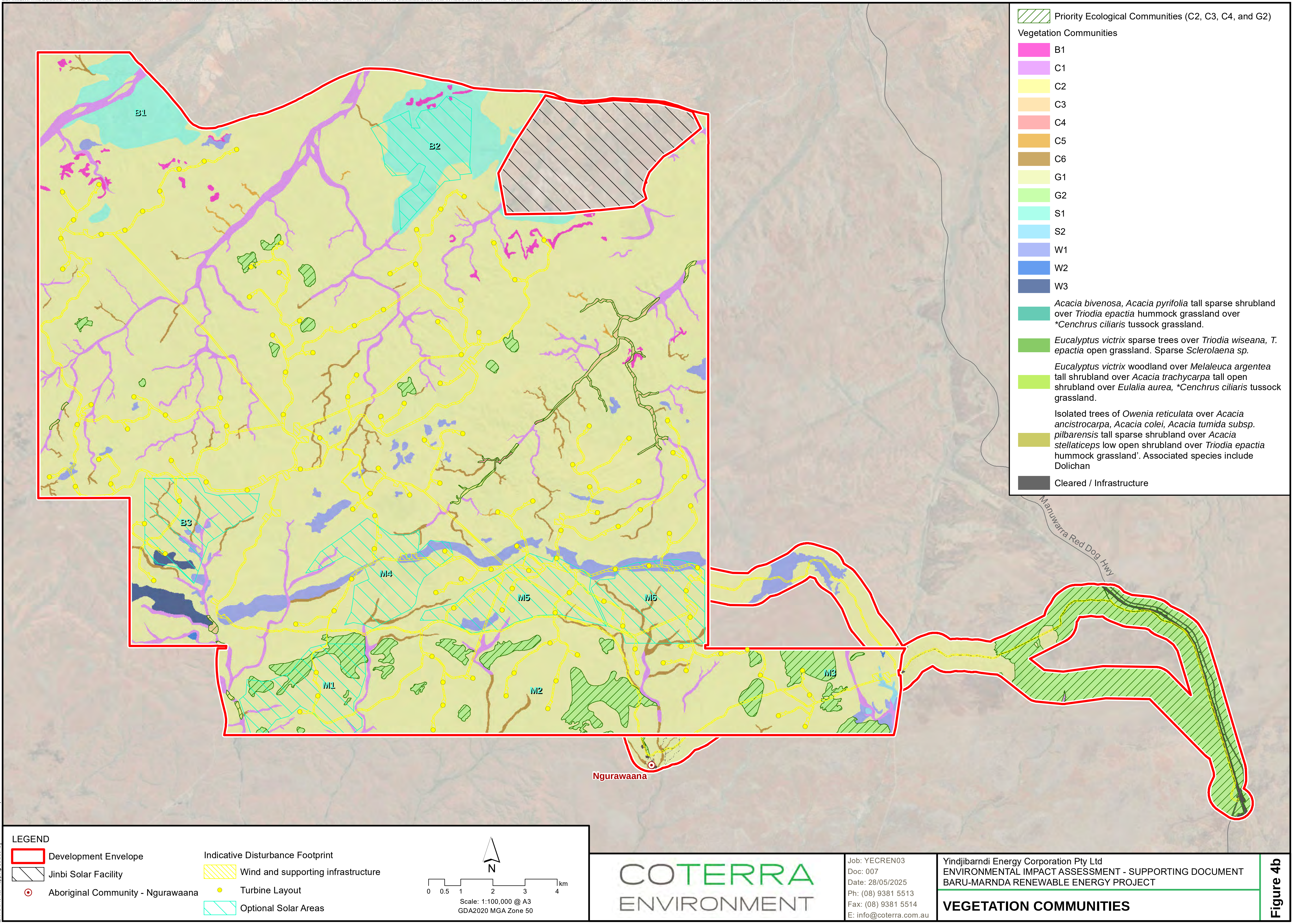

B1
B2
B3
M1
M2
M3
M4
M5
M6
Ngurawaana
Manuwarra Red Dog Hwy
Priority Ecological Communities (C2, C3, C4, and G2)
Vegetation Communities
B1
C1
C2
C3
C4
C5
C6
G1
G2
S1
S2
W1
W2
W3
Acacia bivenosa, Acacia pyrifolia tall sparse shrubland over Triodia epactia hummock grassland over *Cenchrus ciliaris tussock grassland.
Eucalyptus victrix sparse trees over Triodia wiseana, T. epactia open grassland. Sparse Sclerolaena sp.
Eucalyptus victrix woodland over Melaleuca argentea tall shrubland over Acacia trachycarpa tall open shrubland over Eulalia aurea, *Cenchrus ciliaris tussock grassland.
Isolated trees of Owenia reticulata over Acacia ancistrocarpa, Acacia colei, Acacia tumida subsp. pilbarensis tall sparse shrubland over Acacia stellaticeps low open shrubland over Triodia epactia hummock grassland'. Associated species include Dolichan
Cleared / Infrastructure
LEGEND
Development Envelope
Jinbi Solar Facility
Aboriginal Community - Ngurawaana
Indicative Disturbance Footprint
Wind and supporting infrastructure
Turbine Layout
Optional Solar Areas
N
0 0.5 1 2 3 4 km
Scale: 1:100,000 @ A3
GDA2020 MGA Zone 50
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VEGETATION COMMUNITIES
Figure 4b
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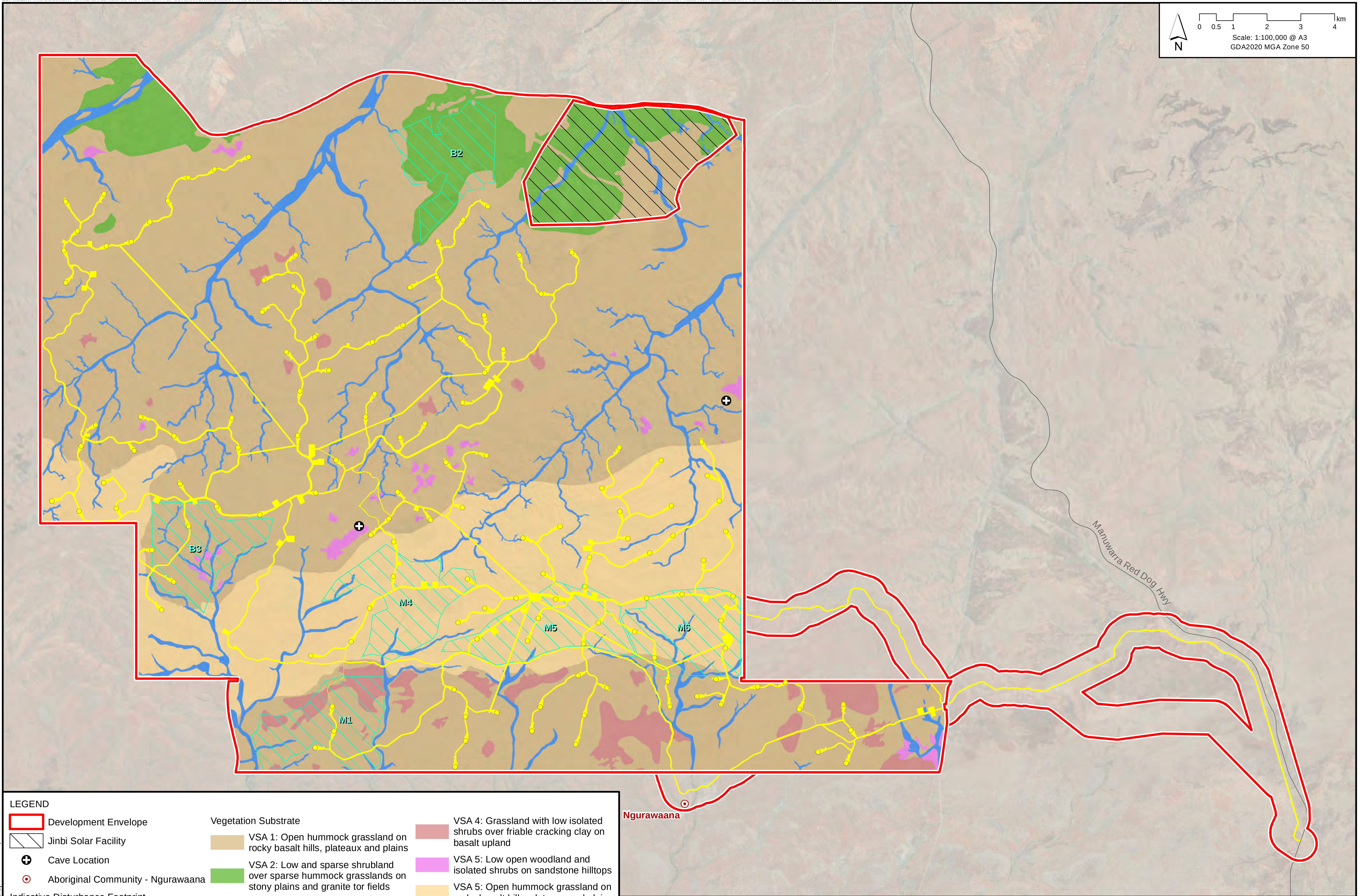

LEGEND

- Development Envelope
- Jinbi Solar Facility
- Cave Location
- Aboriginal Community - Ngurawaana

Indicative Disturbance Footprint

- Wind and supporting infrastructure
- Turbine Layout
- Optional Solar

Vegetation Substrate

- VSA 1: Open hummock grassland on rocky basalt hills, plateaux and plains
- VSA 2: Low and sparse shrubland over sparse hummock grasslands on stony plains and granite tor fields
- VSA 3: Open woodland along ephemeral drainage channels
- VSA 4: Grassland with low isolated shrubs over friable cracking clay on basalt upland
- VSA 5: Low open woodland and isolated shrubs on sandstone hilltops
- VSA 5: Open hummock grassland on rocky basalt hills, plateaux and plains

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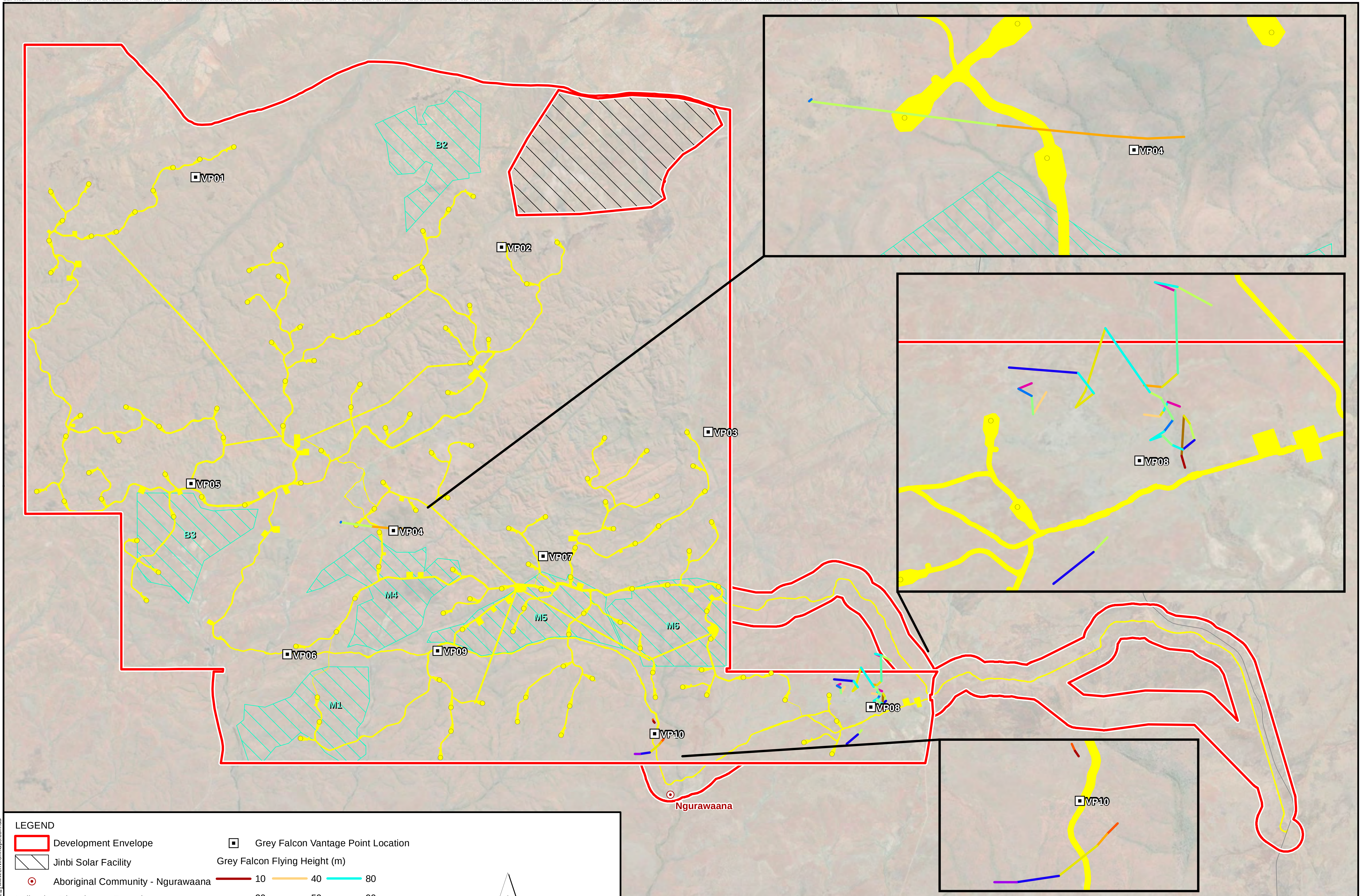
Yindjibarndi Energy Corporation Pty Ltd
ENVIRONMENTAL IMPACT ASSESSMENT - SUPPORTING DOCUMENT
BARU-MARNDA RENEWABLE ENERGY PROJECT

VEGETATION SUBSTRATE ASSOCIATIONS

Figure 5

ENVIRONMAPS Environmental Mapping Solutions | t: 0406 590 006 | www.environmaps.com.au

C:\GIS\Jobs\CoTerra\YECREN03 - Baru-Marnda Renewable Energy Prj, EIA\SD\Figures\YECREN03_F10 Vegetation Substrate Associations_250529.mxd



LEGEND

Development Envelope

Jinbi Solar Facility

Aboriginal Community - Ngurawaana

Indicative Disturbance Footprint

Wind and supporting infrastructure

Optional Solar Areas

Turbine Layout

Grey Falcon Vantage Point Location

Grey Falcon Flying Height (m)

10, 20, 30, 35, 40, 50, 60, 70, 75, 80, 90, 100, 120, 150

N

0 0.5 1 2 3 4 km

Scale: 1:100,000 @ A3

GDA2020 MGA Zone 50

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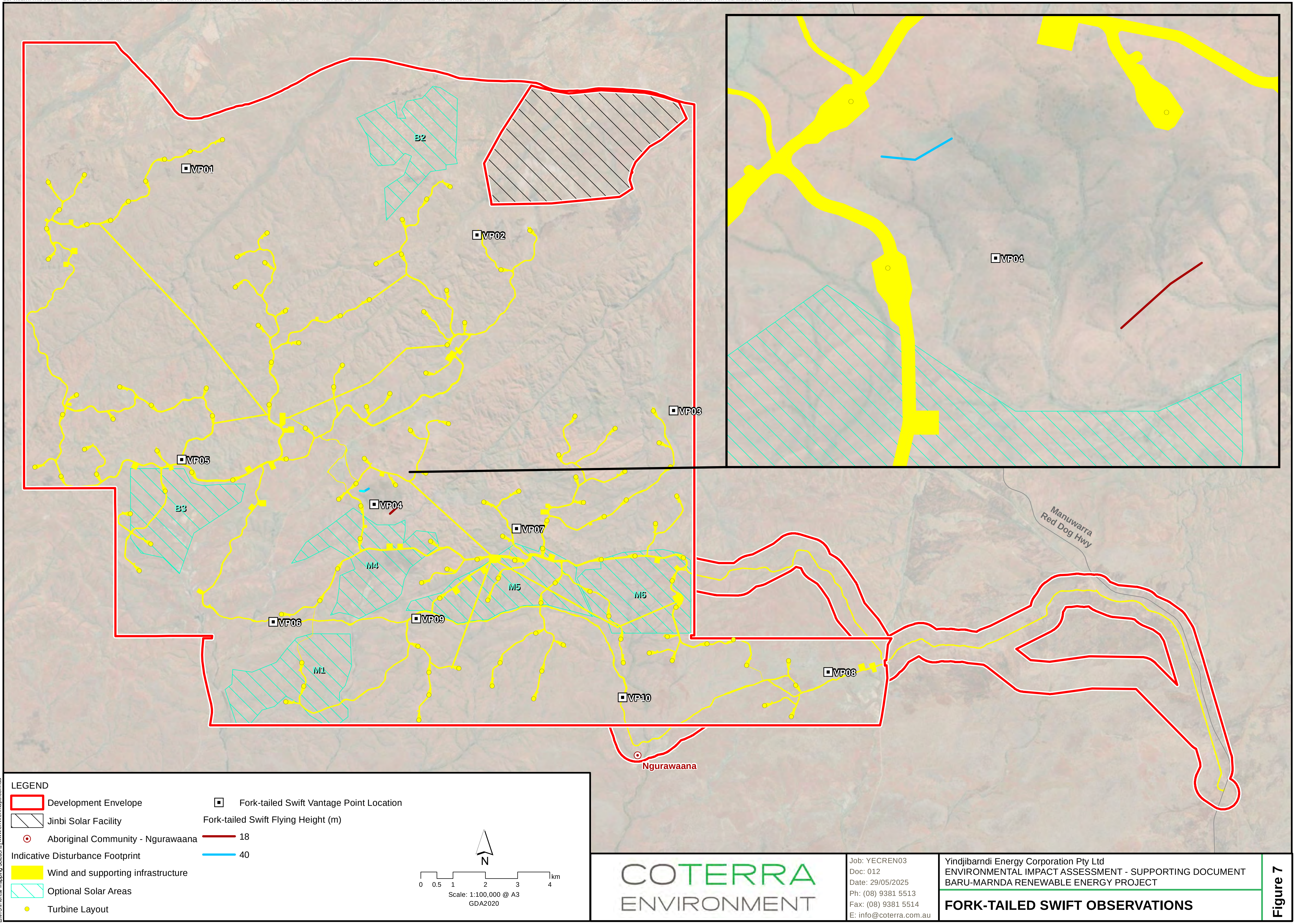
BARU-MARNDA RENEWABLE ENERGY PROJECT

GREY FALCON OBSERVATIONS

Figure 6



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FORK-TAILED SWIFT OBSERVATIONS

Figure 7

C:\GIS\Jobs\CoTerra\YECREN03 - Baru-Marnda Renewable Energy Prj, EIASD\Figures\YECREN03_F12 Fork-tailed Swift Observations_250528.mxd

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Appendix 1 Bamford Consulting Ecologists (2025). Baru-Marnda Renewable Energy Project: Fauna Assessment Report

Appendix 2 RPS Group (2025). Baru-Marnda Renewable Energy Project: Flora, Vegetation and Fauna Assessment.