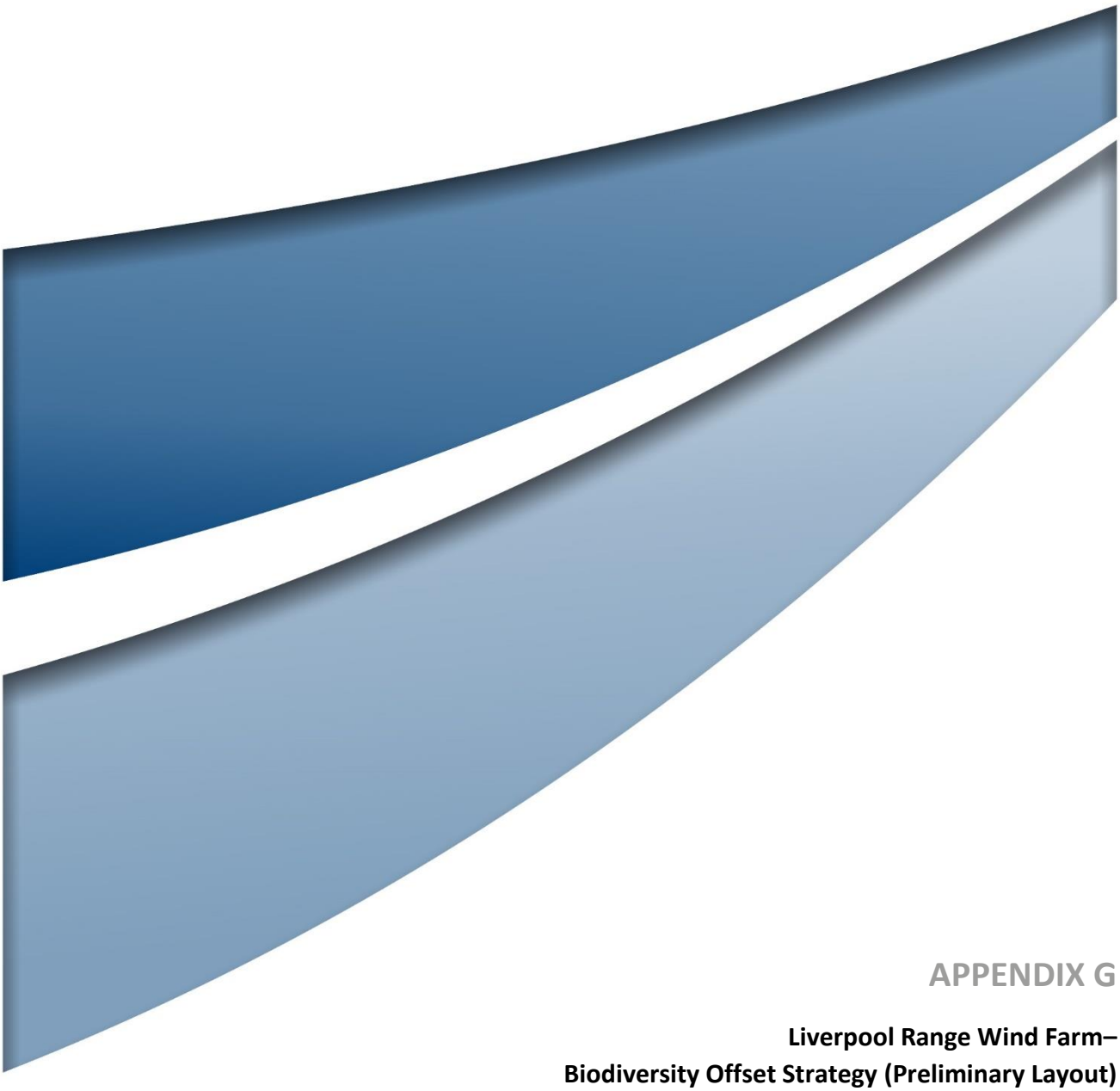


APPENDIX G

Liverpool Range Wind Farm–
Biodiversity Offset Strategy (Preliminary Layout)

LIVERPOOL RANGE WIND FARM

Biodiversity Offset Strategy (Preliminary Layout)

PUBLIC ENVIRONMENT REPORT
(EPBC 2022/09416)

March 2024

renewables

Liverpool Range Wind Farm

Document Title: Liverpool Range Wind Farm Biodiversity Offset Strategy
Version: FINAL
Revision: 1
Date: 25 March 2024

Document History and Status

Revision	Date	Description	By	Review	Approved
1	25 March 2024	Final	M Stafford	B Wallach / A Blundell	M Stafford

Tilt Renewables Australia Pty Ltd as trustee for the Liverpool Range Wind Farm Project Trust

GPO Box 16080
Collins Street West
Melbourne
Victoria, 8007
Australia

Phone: 1300 660 623
tiltrenewables.com

Contents

1.0 Introduction

Tilt Renewables Australia Pty Ltd as trustee for the Liverpool Range Wind Farm Project Trust (the Proponent) is developing the Liverpool Range Wind Farm (LRWF) project (the Project), located approximately 6 kilometres (km) east of the township of Coolah, New South Wales (NSW) and extending across the Warrumbungle, Upper Hunter and Mid-Western Local Government Areas (LGAs). The Project is located within, and forms a key component of, the Central-West Orana (CWO) Renewable Energy Zone (REZ) declared under the *Electricity Infrastructure Investment Act 2020* (NSW) (see **Figure 1**).

The Project was authorised in 2018 under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Following a detailed layout review and optimisation process, and consultation with local communities and relevant government authorities, the Proponent is proposing a series of changes to the layout and design to take advantage of recent developments in wind turbine technology that will enable the construction of the Project with fewer turbines. The Proponent has lodged an application to modify Development Consent SSD-6696 under the EP&A Act, and is seeking approval under the EPBC Act for these proposed changes. These proposed changes and background to the relevant environmental approvals are briefly summarised in the following sub-sections.

1.1 NSW Development Consent Process and Modification Application

The Project was authorised under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) under State Significant Development Consent SSD-6696 (Development Consent), which was granted on 27 March 2018 by a delegate of the Minister for Planning (Approved Project). The Development Consent allows for, amongst other things, up to 267 turbines with a maximum blade tip height of 165 m above ground level (AGL) and clearance of up to 200.85 ha of White-Box-Yellow Box-Blakely's Red Gum Woodland endangered ecological community listed under the NSW *Biodiversity Conservation Act* (BC Act) (NSW Box Gum Woodland EEC), and up to 10.37 ha of EPBC Act listed White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community (Commonwealth Box Gum Woodland CEEC). The Project was originally developed by Epuron Pty Ltd and was acquired by Tilt Renewables in March 2019. It is worth noting that while the Approved Project had an impact threshold of 200.85 of NSW Box Gum Woodland EEC, this Threatened Ecological Community (TEC) is now listed as a Critically Endangered Ecological Community (CEEC).

An application to modify the Development Consent (Mod-1 Application) was submitted to the Department of Planning and Environment (now referred to as the Department of Planning, Housing and Infrastructure [DPHI]) in February 2021 under Section 4.55(2) of the EP&A Act. The key changes proposed at the time were a reduction in the number of wind turbines to 220, an increase in the maximum blade tip height to 250 m above ground level (AGL), increase to the native vegetation/habitat clearance limits, and amendments to the associated infrastructure (including substations, internal and external transmission lines, site access and ancillary infrastructure) (the Mod-1 Project).

Following public exhibition of the Mod-1 Project in September 2022 and review of submissions received, further consultation with agencies and further design optimisation, an amendment to the Mod-1 Application (Amendment 1) was lodged with DPE as part of the Response to Submissions (RTS) phase

of the Mod-1 Application. The changes proposed by Amendment 1 include a further reduction in the number of turbines to 185, reduction to the maximum blade tip height to 215 m AGL, removal and relocation of multiple turbines to avoid or minimise environmental impacts, further infrastructure amendments, and updates to the estimated clearance of vegetation/habitat (RTS Project).

During the assessment process for the Mod-1 Application, in response to government agency and community submissions received, and following further design optimisation work, Tilt Renewables has prepared a further amendment to the Mod-1 Application to include a temporary workforce accommodation facility (TWA Facility) within the Proposed Action Area approximately 3 km east of Coolah township (Amendment 2).

The Mod-1 Application, including Amendment 1 and Amendment 2, are currently under assessment by DPHI.

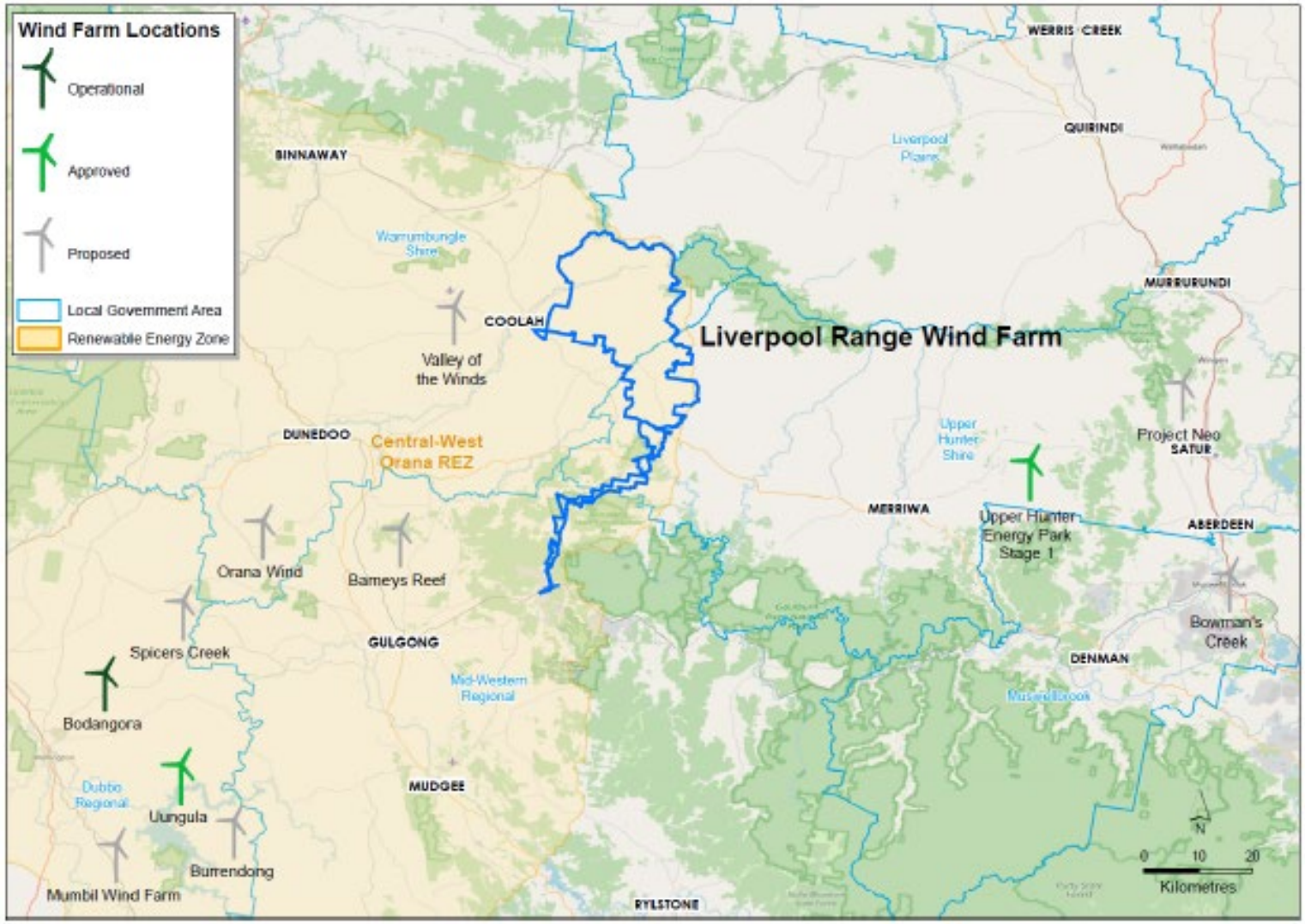
1.2 Commonwealth Approval Background

The Project was originally approved subject to conditions (EPBC 2014/7136) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), on 29 June 2018 (Original EPBC Approval). The Project was re-referred under the EPBC Act (EPBC 2022/09416) in November 2022 to enable the changes proposed to the Approved Project as part of the Mod-1 Application to be assessed under the EPBC Act (Referred Action). On 30 March 2023 the delegate of the Minister for Environment determined the Referred Action to be a controlled action with the relevant controlling provisions being listed threatened species and communities and listed migratory species. On the same date, the delegate of the Minister for Environment determined that the Referred Action would be assessed by way Public Environment Report (PER) and on 14 July 2023 issued Project-specific Public Environment Report Guidelines (PER Guidelines) to inform the preparation of the PER. A variation to the Referred Action was lodged with DCCEEW on 23 January 2024 to ensure the Proposed Action is consistent with the Mod-1 Application (Amendment 1 and 2) as described above.

This Biodiversity Offset Strategy (Offset Strategy) has been prepared in accordance with the PER Guidelines and forms a key part of the PER to be assessed and determined under the EPBC Act. An extract of the PER Guidelines related to this Offset Strategy is provided in **Section 2.1.**

This Offset Strategy is based on the preliminary layout and design of the Proposed Action and reflects all the proposed changes for which the Proponent is currently seeking approval under both the NSW EP&A Act and Commonwealth EPBC Act.

Figure 1: Project Location - Proposed Action



1.3 Purpose

In accordance with Section 7 of the PER Guidelines, this Offset Strategy provides a detailed outline of the proposed offsetting strategy for all relevant matters of national environmental significance (MNES) for which a residual significant impact is likely. This Offset Strategy outlines the anticipated offset liability for each relevant MNES, demonstrates how the offset liability can be satisfied, and specifies the expected timeframe for legal security and retirement of the required offsets.

The structure of this Offset Strategy is presented in **Table 1** below.

Table 1: Report Structure

Section	Purpose / Content
Section 1.0	This section
Section 2.0	Outlines the regulatory offset obligations as set out within the PER Guidelines, EP&A Act, EPBC Act
Section 3.0	Provides a summary of the Proposed Action
Section 4.0	Details the: • estimated pre-construction biodiversity offset credit calculations to offset unavoidable impacts to MNES **(Section 4.0)** • process for confirmation of final credit obligations **(Section 4.3)**
Section 5.0	Sets out the proposed offset strategy including: • identification of land-based and Fund-based offsetting options (**Section 5.1, 5.2, and 5.3**) • retirement of credits and relevant notifications (**Section 5.4**).
Section 6.0	Provides a summary of the land-based offsets secured to meet the estimated offset requirement under both the EP&A and EPBC Act.
Appendices	Contain the following documentation: • Detailed biodiversity calculations and mapping • Preliminary layout plan of the Proposed Action • Maps of land-based offset secured to-date • Report setting out the Proponent's draft proposal to deliver additional measures to conserve Box Gum Woodland CEEC

1.4 Approach

This Offset Strategy has been prepared considering:

- The latest preliminary layout and design of the Proposed Action;
- Requirements of the PER Guidelines and expected requirements under the EP&A Act and EPBC Act, considering existing Development Consent conditions and existing EPBC Approval conditions;

- Relevant Commonwealth and New South Wales legislative offset frameworks and policies;
- Like-for-like biodiversity credit liabilities calculated in accordance with the Biodiversity Assessment Method (BAM) under the NSW Biodiversity Offsets Scheme (BOS) and in accordance with the NSW Biodiversity Conservation Regulation 2017 and *Biodiversity Conservation Act 2016* (BC Act);
- Reviewing options to satisfy credit obligations in accordance with Clauses 6.2 and 6.6A of the NSW Biodiversity Conservation Regulation 2017;
- All available approaches to identify and secure land-based offsets; and
- Review of available biodiversity credits on the public credit market, that match the requirements of the Proposed Action.

This Offset Strategy has been prepared by the Proponent, together with suitably qualified experts as outlined within **Table 2.**

Table 2: Suitably Qualified Experts

Technical Area	Suitably Qualified Expert	Input Provided
Offset Strategy	Wedgetail Project Consulting Pty Ltd Adam Blundell Principal Ecologist BAM accredited Assessor Offsets Scheme Broker	Provide expert advice and review of the document, in particular **Section 5.0.** Preparation of the information and maps related to proposed land-based offset opportunities (**Section 6.0 and Appendix B**), and preparation of Technical Brief related to additional mitigation measures for Box Gum Woodland CEEC (**Appendix C**)
Biodiversity Calculations	Umwelt (Australia) Pty Ltd Bill Wallach Principal Ecologist Accredited BAM Assessor	Preparation of the Biodiversity Development Assessment Report and BAM – Credit Calculator assessment, with associated BAM credit requirements contained in Appendix D of the Public Environment Report (PER), and summarised here in this Preliminary Offset Strategy in **Section 4.0.**

2.0 Regulatory Obligations

2.1 Obligations under the Commonwealth EPBC Act

This Offset Strategy has been prepared to meet the requirements of the PER Guidelines, with reference to the expected biodiversity offset obligations related to the latest infrastructure layout and design and indicative development footprint as detailed in the Mod-1 Application (including Amendment 1 and Amendment 2). It is noted that an updated biodiversity offset credit obligation will be specified on any amended Development Consent granted as part of the Mod-1 Application under the EP&A Act and likewise on any approval granted as part of the Public Environment Report process under the EPBC Act.

The PER guidelines states that significant residual impacts must be offset in accordance with either the *EPBC Act Environmental Offsets Policy 2012*[1] and *Offsets assessment guide* (OAG)[2], or other endorsed offset framework.

As the NSW BAM and Biodiversity Offset Scheme (BOS) have been endorsed by the Commonwealth, DCCEEW has confirmed that the offsetting outcomes achieved through the BAM will be accepted for the purposes of the EPBC Act, provided that they are 'like-for-like' in relation to listed threatened species and communities as defined for the purposes of the EPBC Act.

The PER Guidelines set out specific requirements that the PER must address in relation to biodiversity offsets. These requirements (as set out in Table 7.1 of the PER Guidelines) and where they are addressed in this Offset Strategy report are summarised in **Table 3** below.

Table 3: PER Guideline Requirements

	Requirement	Where addressed
	Table 7.1 EPBC Act Environmental Offsets checklist	
a.	Details of how the environmental offset/s meets the requirements of the Department's EPBC Act Environmental Offsets Policy (2012), including the Offsets assessment guide (2012), available at: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.	DCCEEW has confirmed that the offsetting outcomes achieved through the BAM will be accepted for the purposes of the EPBC Act, provided that they are 'like-for-like' in relation to listed threatened species and communities as defined for the purposes of the EPBC Act. All required offsets for MNES are expected to be satisfied by land-based 'like for like offset (see **Section 6.0**)
b.	details of the proposed environmental offsets for residual significant impacts on each of the above listed threatened species and their habitat.	**Section 4.2**
c.	details of the appropriate offset area (including a map to clearly define the location and boundaries)	**Section 6.0** and **Appendix B**

[1] https://www.dcceew.gov.au/sites/default/files/documents/offsets-policy_2.pdf

[2] https://www.dcceew.gov.au/sites/default/files/documents/offsets-how-use.pdf

	Requirement	Where addressed
	to compensate for the residual significant impact on each of the above listed threatened species and their habitat.	
d.	information about how the proposed offset/s area provides connectivity with other relevant habitats and biodiversity corridors.	**Section 6.0**
e.	the mechanism used to deliver the offset, and justification and supporting evidence used to inform inputs of any associated calculations for offset requirements.	**Section 5.0**
f.	evidence that the relevant MNES, and/or their habitat, is present in the potential offset area/s.	**Section 6.0** and **Appendix B**
g.	details of the mechanism to legally secure the environmental offset/s to provide enduring protection for the offset area/s against development incompatible with conservation.	**Section 5.0**
h.	Directly contribute to the ongoing viability of the relevant protected matters to deliver an overall conservation outcome that improves or maintains the viability of the protected matter in the region, as compared to what is likely to have occurred under the status quo, i.e., if neither the action nor the offset had taken place;	**Section 4.4** and **Section 5.0**
i.	Compensate for the impacts over the entire duration of the proposed action (should impacts be in perpetuity, the offsets must also be delivered in perpetuity).	**Section 5.0**
j.	The PER must also provide and clearly justify the scores entered into the Offset assessment guide.	Bilateral agreement applies, and BOS is an endorsed offsetting mechanism as described in **Section 4.0**

It is noted that the existing EPBC Approval (EPBC 2014/7136) contains conditions that set clearance limits on Commonwealth Box Gum Woodland EEC (now a CEEC), regent honeyeater habitat, and swift parrot habitat. The existing EPBC Approval also contains conditions requiring an offset strategy to be prepared, approved and implemented as detailed in **Table 4** below.

It is expected that any approval granted for the Proposed Action under the EPBC Act will include the following variations to the existing conditions:

- Updates to the vegetation/habitat clearance limits to align with the Proposed Action
- Confirmation that the final biodiversity offset credit liabilities are to be calculated in accordance with the *Biodiversity Assessment Method* under the *NSW Biodiversity Offsets*

Scheme

- Required offsets are to be delivered prior to the impact occurring, or stages thereof

Table 4: Requirements of the Existing EPBC Approval (2014/7136)

Requirement	Where addressed / Commitment
Condition 5	
To mitigate the impacts of the action on the Regent Honeyeater, Swift Parrot and *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* ecological community, the person taking the action must submit an Offset Strategy for the written approval of the Minister.	An updated version of this Offset Strategy will be submitted to the Minister, once detailed design has progressed.
The Offset Strategy must: a. Include maps of the final disturbance area and the total area (ha) of *White Box-Yellow Box-Blakely's Red Gum* Grassy *Woodland and Derived Native Grassland* ecological community, Regent Honeyeater habitat and Swift Parrot habitat to be cleared.	Detailed maps are provided in the BDAR contained in Appendix D of the Public Environment Report**.** These will be updated in the revised Offset Strategy once detailed design has progressed.
b. In accordance with the EPBC Act Offset Policy, or other Commonwealth endorsed policy, calculate offset requirements needed to compensate for the loss of: i. *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* ecological community ii. Regent Honeyeater habitat iii. Swift Parrot habitat.	**Section 4.0** sets out the details of the estimated impact to MNES and the corresponding credit obligations to offset the impacts. These calculations are based on the preliminary layout and design of the Proposed Action as assessed in the BDAR (Umwelt, 2023)
c. Propose an offset package that identifies direct offset sites and meets the EPBC Act Offset Policy, or other Commonwealth endorsed policy.	Provided in **Section 5.0**
d. Propose measures for the long-term protection and management of direct offset sites.	Provided in **Section 5.0**
The Offset Strategy must be approved prior to the submission of the Biodiversity Offset Management Plan (required by Condition 7), and must be implemented.	The Proponent commits to ensuring this Offset Strategy is approved prior to the submission of the Biodiversity Offset Management Plan. The Proponent also commits to implementing the Offset Strategy.

2.2 Obligations under the NSW EP&A Act

The existing Development Consent contains conditions that require the biodiversity offset credit liability to be calculated in accordance with the *Framework for Biodiversity Assessment* (FBA) under the NSW *Biodiversity Offset Policy for Major Projects,* and the relevant offset credits to be retired within two years of the commencement of construction. The relevant conditions are set out in **Table 5** below.

Since the Development Consent was granted in 2018, several changes in legislation have occurred which have implications for the calculation of the biodiversity offset credit liability and the timing within which the required offset credits must be retired. It is expected that any approval that may be granted for the Mod-1 Application will include the following changes to biodiversity offset related conditions of the Development Consent:

- Updates to the vegetation/habitat clearance limits
- Confirmation that the final biodiversity offset credit liabilities are to be calculated in accordance with the *Biodiversity Assessment Method* under the *NSW Biodiversity Offsets Scheme (which is the approved assessment framework for Mod-1)*
- Requirement that relevant biodiversity offset credit liabilities are to be retired prior to the impact occurring, or stages thereof, as required under Section 7.14(4) of the *Biodiversity Conservation Act 2016*.

Table 5: Biodiversity Offset Development Consent Conditions

Requirement	Where addressed / Commitment
Schedule 3 Condition 19	
Prior to the commencement of construction, the Proponent must: • update the baseline mapping of the vegetation and key habitat within the final disturbance area; and • calculate the biodiversity offset credit liabilities for the development in accordance with the *Framework for Biodiversity Assessment* under the *NSW Biodiversity Offset Policy for Major Projects*, in consultation with OEH, and to the satisfaction of the Secretary.	The estimated credit obligations set out in **Section 4.0** has been prepared to meet the requirements of the anticipated changes to Schedule 3 Condition 19 of the Development Consent.
Schedule 3 Condition 20	
Within two years of the commencement of construction, unless the Secretary agrees otherwise, the Proponent must retire the required biodiversity credits, to the satisfaction of OEH. The retirement of the credits must be carried out in accordance with the *NSW Biodiversity Offsets*	Generally consistent with the requirements of the original EPBC Approval, the Development Consent currently requires the retirement of credits within 2 years of the commencement of construction. However, it is expected that this condition of the Development Consent will be updated by DPHI to require retirement of relevant biodiversity offset credits prior to the impact occurring, or

Requirement	Where addressed / Commitment
Policy for Major Projects, and can be achieved by: • acquiring or retiring 'biodiversity credits' within the meaning of the *Biodiversity Conservation Act 2016;* • making payments into an offset fund that has been established by the NSW Government; or • providing suitable supplementary measures. *Note: Following repeal of the TSC Act on 25 August 2017, credits created under that Act are taken to be 'biodiversity credits' under the Biodiversity Conservation Act 2016, in accordance with clause 22 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017.*	stages thereof, in accordance with Section 7.14(4) of the *Biodiversity Conservation Act 2016*. As BAM is the approved biodiversity assessment framework for the Mod-1 Application, any offset obligation associated with the Proposed Action will be required to satisfy its liability using BAM as per the NSW Biodiversity Offset Scheme (BOS).

3.0 The Proposed Action

As detailed in the PER, the Proposed Action will include construction, operation and decommissioning activities associated with the following key components:

- **Wind Turbines:** up to 185 wind turbines with a maximum blade tip height of 215 metres, including an adjacent hardstand area for lift cranes and a material laydown;
- **Collector Substations:** up to seven collection substations that step-up the voltage of the reticulation cabling (typically 33 kV) to the transmission line voltage (anticipated to be 330 kV). The collector substations are comprised of multiple components including transformers, circuit breakers, bus bars, and gantries, and are anticipated to occupy a 3D envelope approximately 70 m long x 60 m wide x 9 m high. The steel gantries that support the incoming/outgoing power lines are anticipated to be approximately 25 m high.

  In the event the Proposed Action connects into the CWO REZ transmission line the southern collector substation located off Rotherwood Road, Cassilis will convert to a connection substation, and the external transmission line to Ulan and associated connection substation/switchyard at Ulan would no longer be required;
- **Connection Substation (also referred to as Switchyard):** a single 330 kV connection substation located at the southern end of the Proposed Action Area at Ulan, to facilitate connection into the existing Transgrid 330 kV Wellington - Wollar transmission line. Similar to substations, switching stations typically contain bus bars, circuit breakers and steel gantries. The switching station is anticipated to occupy a 3D envelope approximately 150 m long x 100 m wide x 9 m high. Steel gantries that support the power lines are anticipated to be approximately 25 m high.

  In the event the Proposed Action connects into the CWO REZ transmission line the external transmission line to Ulan and associated connection substation/switchyard at Ulan would no longer be required;
- **Internal Transmission Line:** overhead powerline of up to 330 kV, supported by poles or towers and located within a 60 m wide easement, that extends from the northwest of the Project site to the southern-most collector substation proposed near Rotherwood Road, Cassilis. The supporting poles are anticipated to be of a steel construction with an indicative height of approximately 30 - 50 m, generally located at intervals of approximately 300 m wherever practicable. Steel towers may need to be used, particularly in complex terrain, as they allow for longer spans and reduced number of supporting structures. Steel poles and towers are anticipated to have an indicative height of approximately 40-50 m;
- **External Transmission Line:** overhead powerline of up to 330 kV, supported by poles or towers and located within a 60 m wide easement, that extends from the southern-most collector substation proposed near Rotherwood Road, Cassilis south to the connection substation proposed at Ulan. The anticipated tower or pole design is as described above for the Internal Transmission Line.

  Approval is also being sought to connect the Proposed Action into the CWO REZ transmission

line (and remove the external transmission line connection to Ulan) in circumstances where the delivery timeframe for the CWO REZ transmission line aligns with the Liverpool Range Wind Farm project;

- **Reticulation cabling:** underground electrical reticulation cabling, and potentially some overhead powerlines, that provide an electrical connection between the wind turbines and the collector substations. Reticulation cabling is typically rated at 33 kV. Typically, underground reticulation cabling is buried in one or more trenches adjacent to access track batters;
- **Access Tracks:** access tracks, typically with a trafficable width of 5.5-6 m, to provide access from the public road network to wind farm and transmission line infrastructure and meteorological masts, and include required cut/fill batters and drainage infrastructure;
- **Site Access Points:** provision of the following site access points off public roads:
    - up to 34 site access points from nearby public roads to facilitate construction and ongoing maintenance of the wind farm components located north of the Golden Highway;
    - up to 40 site access points from nearby public roads to facilitate construction and ongoing maintenance of the proposed External Transmission Line located south of the Golden Highway;
- **Operation and Maintenance (O&M) Facilities:** up to three O&M facilities incorporating a control room, maintenance and equipment storage facilities. The O&M facility is used to store spare parts and other equipment used for ongoing maintenance of the wind farm, as well as Supervisory Control and Data Acquisition (SCADA) equipment to monitor and control the electrical performance of the wind farm. The O&M facility is anticipated to occupy a 3D envelope approximately 45 m long x 30 m wide x 15 m high;
- **Temporary Construction Compound/Laydown Area/Concrete Batch Plants:** Up to 10 temporary construction facilities, including temporary concrete batching plants, rock crushing equipment, temporary laydown facilities, and construction compounds, of which nine are located within the Wind Farm Site and one located off Cliffdale Road, Turill within the External Transmission Line Site;
- **Temporary Workforce Accommodation Facility (TWA Facility):** an ancillary Project-specific TWA Facility to accommodate a peak of approximately 550 construction staff over a four-year period. The TWA Facility would be approximately 6 ha in area and would be comprised of prefabricated accommodation building modules, kitchen and dining facilities, administrative and maintenance buildings, recreational facilities and wastewater treatment facilities. Upon completion of construction of the Project, the TWA Facility will be decommissioned, and the site rehabilitated in accordance with the relevant landholder's requirements;
- **Public Road Upgrades/Repairs:** upgrades/repairs to the relevant public roads, intersections and associated structures, in proximity to the Proposed Action required for construction and delivery, installation and maintenance of wind turbines, transmission lines, and related infrastructure, in accordance with upgrade/repair standards as agreed with relevant roads authorities;

- **Permanent Wind Monitoring Masts (Met Masts):** up to 10 permanent Power Curve Validation (PCV) met masts to the final hub height, and associated access tracks;
- **Temporary Site Calibration Met Masts:** up to 10 temporary site calibration met masts to the final hub height, to be located at a subset of the turbine locations and removed prior to erection of each relevant turbine; and
- **Subdivision of Land:** subdivision of land within the Proposed Action Area to create new separate lots for the connection and collector substations, and associated ancillary facilities.

The Proposed Action will occur across three key phases: construction (including commissioning), operations/maintenance, and decommissioning. The Proposed Action may be constructed in stages and is expected to have an operational life of 25-30 years.

Preliminary indicative layout plans of the Proposed Action are provided in **Appendix A.** Final pre-construction layout plans will be prepared in accordance with the relevant conditions of the Development Consent and EPBC Approval that may be granted for the Proposed Action, once construction contractors have been appointed and detailed design progresses. Final as-built layout plans will be submitted to the relevant authorities for approval where required, and will be made available on the Liverpool Range Wind Farm website (https://www.tiltrenewables.com/assets-and-projects/liverpool-range-wind-farm/).

The layout will continue to be refined through the detailed design and construction stages. It is noted that micro-siting of the wind turbines and ancillary infrastructure is permitted under the conditions of the Development Consent and EPBC Approval.

4.0 Credit Calculations

This section provides a summary of the estimated impacts and biodiversity credit requirements associated with the preliminary layout for the wind farm, external transmission line and public road upgrade components of the Proposed Action.[3] The Biodiversity Development Assessment Report (Umwelt 2023) for the Proposed Action (see Appendix D of the Public Environment Report), details the complete biodiversity assessment and associated credit liabilities for the Proposed Action. The calculations have been undertaken by Umwelt Pty Ltd, using the BAM, based on the latest preliminary layout of the Proposed Action that has been submitted as part of the Mod-1 Application (Amendment 1 and Amendment 2) and PER (see **Appendix A**).

4.1 Ecosystem and Species Credit Calculations

Table 6 and **Table 7** below presents the impact areas and ecosystem and species credit obligations respectively requirements associated with the Proposed Action. Similarly, ecosystem-credit and species-credit requirements are presented separately. These credit summary tables are not specific to MNES, these are provided in the subsequent sections.

The full details of these calculations including mapping are set out in the BDAR contained in Appendix D of the Public Environment Report.

Table 6: Estimated Ecosystem Credit Requirements (Proposed Action - Preliminary Layout)

Veg. Zone	Plant Community Type (PCT)	Area within Indicative Development Footprints (ha)				Total Credits
	Condition Class	Wind Farm	External Transmission Line	Public Road Upgrades	Total Combined Indicative Development Footprints	Required
1	PCT 84 – River Oak - Rough-barked Apple - red gum - box riparian tall woodland (wetland) of the Brigalow Belt South Bioregion and Nandewar Bioregion - *Moderate/Good*	7.9	-	1.6	**9.5**	**146**
2	PCT 281 – Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion - *Moderate/Good* [1,2]	0.7	12.0	0.7	**13.4**	**427**

[3] The biodiversity offset credit calculations set out in this Section 4.0 relate to the entire Proposed Action which is comprised of the wind farm, external transmission line and public road upgrades. Section 6.0 of this Offset Strategy provides details on progress made to-date on securing required biodiversity offsets for the wind farm and public road upgrades only. As detailed in Section 3.0 the Proponent is planning to connect the wind farm into the CWO REZ transmission line which is subject to separate approvals under the EP&A Act and EPBC Act, and the associated impacts to native vegetation/habitat are being separately assessed by EnergyCo as the Infrastructure Planner for the CWO REZ. The Proponent is therefore not currently seeking to satisfy credit requirements associated with the approved external transmission line and connection point at Ulan.

4	PCT 479 – Narrow-leaved Ironbark-Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion - *Moderate/Good*	-	19.1	0.7	**19.8**	**397**
5	PCT 481 – Rough-barked Apple - Blakely's Red Gum - Narrow-leaved Stringybark +/- Grey Gum sandstone riparian grass fern open forest on in the southern Brigalow Belt South Bioregion and Upper Hunter region - *Moderate/Good*	-	12.7	-	**12.7**	**256**
6	PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley - *Moderate/Good* [1, 2]	10.5	5.7	-	**16.2**	**570**
7	PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley – *Low* [1]	205.4	51.4	10.0	**266.9**	**7,643**
8	PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley - *Exotic*	319.5	2.8	73.0	**395.3**	**6,040**
9	PCT 488 – Silvertop Stringybark - Yellow Box +/- Nortons Box grassy woodland on basalt hills mainly on northern aspects of the Liverpool Range, Brigalow Belt South Bioregion - *Moderate/Good* [3, 4]	59.5	-	-	**59.5**	**2,105**
10	PCT 488 – Silvertop Stringybark - Yellow Box +/- Nortons Box grassy woodland on basalt hills mainly on northern aspects of the Liverpool Range, Brigalow Belt South Bioregion - *Moderate/Good-Shrubby*	0.5	-	-	**0.5**	**11**
11	PCT 488 – Silvertop Stringybark - Yellow Box +/- Nortons Box grassy woodland on basalt hills mainly on northern aspects of the Liverpool Range, Brigalow Belt South Bioregion – *Low* [3]	198.4	1.3	5.7	**205.4**	**5,172**
12	PCT 488 – Silvertop Stringybark - Yellow Box +/- Nortons Box grassy woodland on basalt hills mainly on northern aspects of the Liverpool Range, Brigalow Belt South Bioregion - *Exotic*	360.3	-	13.1	**373.4**	**58**
13	PCT 490 – Silvertop Stringybark - Forest Ribbon Gum very tall moist open forest on basalt plateau on the Liverpool Range, Brigalow Belt South Bioregion - *Moderate/Good*	15.2	-	-	**15.2**	**447**

14	PCT 495 – Brittle Gum - Silvertop Stringybark grassy open forest of the Liverpool Range, Brigalow Belt South Bioregion - *Moderate/Good*	23.7	-	-	**23.7**	**415**
15	PCT 1661 – Narrow-leaved Ironbark-Black Pine - Sifton Bush heathy open forest on sandstone ranges of the upper Hunter and Sydney Basin - *Moderate/Good*	-	55.0	0.3	**55.3**	**1,173**
16	PCT 1675 – Scribbly Gum - Narrow-leaved Ironbark - Bossiaea rhombifolia heathy open forest on sandstone ranges of the Sydney Basin - *Moderate/Good*	-	31.4	0.4	**31.9**	**587**
17	PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley – DNG[1]	101.1	26.6	0.2	**127.9**	**2,251**
18	PCT 1661 – Narrow-leaved Ironbark-Black Pine - Sifton Bush heathy open forest on sandstone ranges of the upper Hunter and Sydney Basin - DNG	-	2.5	-	**2.5**	**28**
-	Nil (incl. roads, tracks and waterbodies)	13.3	7.1	76.4	**96.8**	**-**
-	Category 1 – Exempt Land	52.6	13.3	2.6	**68.5**	**-**
Total		**1,368.6**	**240.9**	**184.8**	**1,794.3[5]**	**27,726**

[1] *Associated with NSW Box Gum Woodland CEEC (BC Act)*

[2] *Associated with Commonwealth Box Gum Woodland CEEC (EPBC Act)*

[3] *Partly associated with NSW Box Gum Woodland CEEC (BC Act)*

[4] *Partly associated with Commonwealth Box Gum Woodland CEEC (EPBC Act)*

[5] *The discrepancy with the 1,794.1 ha of total impacts referenced elsewhere is due to rounding*

Table 7: Estimated Species-Credit Requirements (Proposed Action - Preliminary Layout)

Species	Area within Indicative Development Footprints (ha)				Total
	Wind Farm (ha)	External Transmission Line (ha)	Public Road Upgrades (ha)	Total Combined Indicative Development Footprints (ha)	Credits Required
Ausfeld's wattle	0	10.5	0	10.5	**268**
Glossy black-cockatoo	0	2.0	0	2	**38**
Large-eared pied-bat	90.6	14.1	2.0	106.7	**4,839**
Southern greater glider	19.3	0	0	19.3	**692**
Square-tailed kite	0	1.5	0	1.5	**26**
Squirrel glider	50.7	65.2	0.2	116.1	**2,772**
Eastern cave bat	92.3	14.1	2.0	108.4	**4,895**
Silky swainson-pea	0	17.5	0	17.5	**359**
Total	**252.9**	**124.9**	**4.20**	**382.0**	**13,889**

4.2 Estimated Impacts to Matters of National Environmental Significance (MNES)

Table 8 below provides a summary of the estimated impacts and offset obligations for all relevant MNES anticipated to be impacted by the Proposed Action. The credit calculations for threatened ecological communities, ecosystem credits, and species credits presented in **Table 8** are discussed in further detail in the sub-sections below.

Table 8: Summary of Estimated Impacts to MNES and Credit Calculation (Preliminary Layout – Proposed Action)

MNES	Brigalow Belt South – Liverpool Range IBRA Bioregion		Brigalow Belt South - Pilliga IBRA Bioregion		Sydney Basin - Kerrabee IBRA Bioregion		Total Area (ha)	Total credits
	Area (ha)	Credits	Area (ha)	Credits	Area (ha)	Credits		
Threatened Ecological Community								
White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands CEEC (EPBC Act)	13.4	427	16.2	570	2.0	71	**31.6**	**1,068**
Species (Species-credits)								
Large-eared pied-bat	92.6	4,336	0.6	23	13.5	480	**106.7**	**4,839**
Greater glider	19.3	692	-	-	-	-	**19.3**	**692**
Glossy black-cockatoo	-	-	0.3	8	1.7	30	**2.0**	**38**
Species (Ecosystem-credits)								
Regent Honeyeater	469.1	12,954	97.4	2,650	37.4	1,123	**603.9**	**16,727**
Gang-gang Cockatoo	0.7	8	2.2	84	10.5	335	**13.4**	**427**
South-eastern Glossy Black-cockatoo	83.1	2,517	0.6	14	-	-	**83.7**	**2,531**
Painted Honeyeater	492.8	13,369	97.4	2,650	37.4	1,123	**627.6**	**17,142**
White-throated Needletail	320.3	8,687	77.7	1,726	65.2	1,293	**463.2**	**11,706**
Swift Parrot	283.1	7,587	5.3	153	14.1	390	**302.5**	**8,130**
Superb Parrot	7.2	122	5.2	116	10.5	335	**22.9**	**573**
Spotted-tail Quoll	90.3	2,639	47.2	1,069	56.4	1,156	**193.9**	**4,864**

MNES	Brigalow Belt South – Liverpool Range IBRA Bioregion		Brigalow Belt South - Pilliga IBRA Bioregion		Sydney Basin - Kerrabee IBRA Bioregion		Total Area (ha)	Total credits
	Area (ha)	Credits	Area (ha)	Credits	Area (ha)	Credits		
Corben's Long-eared Bat	65.9	2,216	45.0	985	45.9	821	**156.8**	**4,022**
Yellow-bellied Glider	15.2	447	-	-	-	-	**15.2**	**447**
Koala	501.5	13,702	135.8	3,557	83.3	1,944	**720.6**	**19,203**
Grey-headed Flying-fox	289.6	7,701	8.3	185	14.1	390	**312.0**	**8,276**

4.2.1 Credit Calculation for MNES (Threatened Ecological Communities)

Table 9 below presents a summary of credits generated that align with the BC Act and EPBC Act listed CEECs, as the CEEC boundaries are not entirely consistent with the vegetation zones. The proportion of each vegetation zone that conforms with the CEECs was used to calculate the number of credits generated by the CEECs. The full details are set out in the BDAR contained in Appendix D of the Public Environment Report.

Within the BAM – Credit Calculator, it is not possible to differentiate between the extent of vegetation zones which are identified as the BC Act listed CEEC and EPBC Act listed CEEC, or vice versa. In fact, the BAM – Credit Calculator only allows for the BC Act listed CEEC to be selected. In which case, the BAM – Credit Calculator assessment has been finalised and submitted identifying Vegetation Zones 2, 6 and 9 as being the BC Act listed CEEC. Umwelt has then used these vegetation zones as proxies to determine the credit requirement specifically relating to the EPBC Act listed CEEC. Specifically, the area of impact and credit requirement was used to determine a ratio of credits per hectare, which we then applied to the area of impact identified for the EPBC Act listed CEEC to identify its specific credit requirement.

It is important to note that the total proportional number of CEEC credits under the BC Act and/or EPBC Act are not in addition to those credits identified in **Table 6**. Of the total number of credits required for impact to Vegetation Zones 2, 6 and 9, **Table 9** presents the amount of credits that must align with both the BC Act and EPBC Act listed CEECs.

The full details of these calculations including mapping are set out in the BDAR contained in Appendix D of the Public Environment Report.

Table 9: Residual MNES (TECs) impacts requiring offset – PER IBRA – Subregion

Parameter	White box – yellow box – Blakely's red gum grassy woodlands and derived native grasslands CEEC (EPBC Act)		
	PCT281 – VZ 2	PCT483 – VZ 6	PCT488 – VZ 9
Brigalow Belt South – Liverpool Range			
Total Area of Vegetation Zone (ha)	0.7	15.5	58.9
Total Credits	8	539	2,091
Total Area of CEEC (ha)	0.7	15.5	2.0
Proportion of Vegetation Zone that is CEEC (per cent)[1]	100	100	3
Number of CEEC Credits per Vegetation Zone[1]	**8**	**539**	**71**
Brigalow Belt South – Pilliga			
Total Area of Vegetation Zone (ha)	2.2	0.5	-
Total Credits	84	27	-
Total Area of CEEC (ha)	2.2	0.5	-
Proportion of Vegetation Zone that is CEEC (per cent)[1]	100	100	-
Number of CEEC Credits per Vegetation Zone[1]	**84**	**27**	**-**
Sydney Basin – Kerrabee			
Total Area of Vegetation Zone (ha)	10.5	0.2	-
Total Credits	335	4	-
Total Area of CEEC (ha)	10.5	0.2	-
Proportion of Vegetation Zone that is CEEC (per cent)[1]	100	100	-
Number of CEEC Credits per Vegetation Zone[1]	**335**	**4**	**-**
Total credits	**427**	**570**	**71**

[1] *Rounded to the nearest whole number.*

4.2.2 Credit Calculation for MNES (Species-Credit Species)

Table 10 presents total residual offset liability relating to the direct impacts of the Proposed Action on MNES species-credit species, including the applicable IBRA Subregion within which the estimated impact is anticipated to occur.

Only three species presented in the table below are MNES, being large-eared pied-bat, greater glider and glossy-black cockatoo. Therefore, this Offset Strategy specifically only relates to the offset liability for these three species. The remaining five species-credit species being impacted by the Proposed Action are presented in the table below, however their offset liability will solely be satisfied through the state offsetting mechanism.

Table 10: Residual MNES (Species) impacts requiring offset – Per IBRA – Subregion

MNES Species-credit	MNES	Brigalow Belt South – Liverpool Range IBRA Bioregion		Brigalow Belt South – Pilliga IBRA Bioregion		Sydney Basin – Kerrabee IBRA Bioregion		Total Area (ha)	Total credits
		Area (ha)	Credits	Area (ha)	Credit	Area (ha)	Credits		
Large-eared pied-bat	✓	92.6	4,336	0.6	23	13.5	480	**106.7**	**4,839**
Greater glider	✓	19.3	692	-	-	-	-	**19.3**	**692**
Glossy black-cockatoo	✓	-	-	0.3	8	1.7	30	**2.0**	**38**
Ausfeld's wattle	×	-	-	-	-	10.5	268	**10.5**	**268**
Silky swainson-pea	×	-	-	17.5	359	-	-	**17.5**	**359**
Square-tailed kite	×	-	-	-	-	1.5	26	**1.5**	**26**
Squirrel glider	×	73.8	1,674	13.2	349	29.2	749	**116.2**	**2,772**
Eastern cave-bat	×	94.2	4,392	0.6	23	13.5	480	**108.3**	**4,895**

4.2.3 Credit Calculation for MNES (Ecosystem-credit Species)

In addition to those credit liabilities presented above for species-credit species that are MNES, the Proposed Action will also have residual direct impacts on MNES species that are not species-credit species. These remaining 12 species are ecosystem-credit species. While these species do not have their own offset liability under the NSW BAM, they do still have an offset liability. For MNES ecosystem-credit species, their offsets will be satisfied by the Proposed Action in the form of retirement of ecosystem-credits (i.e. PCTs) that are associated with the particular MNES species. In other words, impacts to MNES ecosystem-credit species will be offset through the process of retiring ecosystem-credit species that are associated with the particular species. The offset liability for MNES ecosystem-credit species is presented below in **Table 11**. This offset liability is derived from the total ecosystem credits of PCTs (applicable vegetation zones only) associated with the particular MNES species. Each ecosystem-credit species has a unique association with PCTs, as per the Threatened Biodiversity Database Collection profile. The combination of associated PCTs and applicable vegetation zones is consistent with the process of identification of suitable habitat used in the assessments of significance prepared as part of the PER. The applicable vegetation zones (VZ) for each MNES ecosystem-credit species are presented below in **Table 11**.

Large-eared pied bat and greater glider are not included in this analysis as their entire offset liability relates to the credit obligation for species-credit species as presented above in **Table 10.**

Table 11: Credit Calculation for Ecosystem-credit Species EPBC Listed Species – Per IBRA Subregion

MNES Ecosystem-credit	Brigalow Belt South – Liverpool Range IBRA Bioregion		Brigalow Belt South - Pilliga IBRA Bioregion		Sydney Basin - Kerrabee IBRA Bioregion		Total Area (ha)	Total credits
	Area (ha)	Credits	Area (ha)	Credit	Area (ha)	Credits		
Regent Honeyeater (VZs 1, 2, 4, 5, 6, 7, 9, 10 and 11)	469.1	12,954	97.4	2,650	37.4	1,123	**603.9**	**16,727**
Gang-gang Cockatoo (VZ 2)	0.7	8	2.2	84	10.5	335	**13.4**	**427**
South-eastern Glossy Black-cockatoo (VZs 9, 10 and 14)	83.1	2,517	0.6	14	-	-	**83.7**	**2,531**
Painted Honeyeater (VZs 1, 2, 4, 5, 6, 7, 9, 10, 11 and 14)	492.8	13,369	97.4	2,650	37.4	1,123	**627.6**	**17,142**
White-throated Needletail (VZs 1, 2, 4, 5, 6, 9, 10, 11, 13, 14, 15 and 16)	320.3	8,687	77.7	1,726	65.2	1,293	**463.2**	**11,706**
Swift Parrot (VZs 2, 9, 10, 11 and 14)	283.1	7,587	5.3	153	14.1	390	**302.5**	**8,130**
Superb Parrot (VZs 1 and 2)	7.2	122	5.2	116	10.5	335	**22.9**	**573**
Spotted-tail Quoll (VZs 1, 2, 9, 10, 14, 15 and 16)	90.3	2,639	47.2	1,069	56.4	1,156	**193.9**	**4,864**
Corben's Long-eared Bat (VZs 1, 9, 10, 15 and 16)	65.9	2,216	45.0	985	45.9	821	**156.8**	**4,022**

MNES Ecosystem-credit	Brigalow Belt South – Liverpool Range IBRA Bioregion		Brigalow Belt South - Pilliga IBRA Bioregion		Sydney Basin - Kerrabee IBRA Bioregion		Total Area (ha)	Total credits
	Area (ha)	Credits	Area (ha)	Credit	Area (ha)	Credits		
Yellow-bellied Glider (VZ 13)	15.2	447	-	-	-	-	**15.2**	**447**
Koala (VZs 2, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15 and 16)	501.5	13,702	135.8	3,557	83.3	1,944	**720.6**	**19,203**
Grey-headed Flying-fox (VZs 1, 2, 9, 10, 11 and 14)	289.6	7,701	8.3	185	14.1	390	**312.0**	**8,276**

4.3 Progressive Confirmation of Credit Obligations

As the Proposed Action progresses through detailed design, construction and into operations there may be a requirement to make further revisions to the impact areas and offset credit liabilities detailed in this Preliminary Offset Strategy as more detail becomes known. **Table 12** below provides a summary of the key project development milestones where updates to the calculations of impacts to MNES and associated offset liabilities may be required.

As the Proposed Action progresses towards construction, refinements will be made to the layout and the extent of impacts to native vegetation and habitat. The final offset credit obligation will be calculated based on the extent of impacts associated with the final infrastructure layout (including any subsequent amendments) and submitted for approval prior to commencement of construction in accordance with Condition 19 (b) of the Development Consent and Condition 5 of the EPBC Approval, to DPHI and DCCEEW respectively.

Prior to the commencement of operations of the Proposed Action, the Proponent will submit to the NSW Planning Secretary detailed plans of the final layout of the Proposed Action in accordance with Schedule 2 Condition 10 of the Development Consent. If impacts to protected matters from the completed layout are more than those proposed in the final layout, the Proponent will submit for approval by the Minister, an updated version of the Offset Strategy to compensate for impact to protected matters from the Proposed Action. The Proponent will not commence operation unless the Minister has approved the updated version of the Offset Strategy in writing, if required.

Table 12: Project Development Milestones and Updates to Offset Credit Liabilities

Project Development Milestone	Credit Estimation Requirements
Preliminary Layout	Used as the basis for the biodiversity credit obligation set out in this Offset Strategy (Preliminary Layout).
Pre-construction Layout	Once a construction contractor has been engaged and detailed design progresses, updates to this Preliminary Offset Strategy may be required. The revised Offset Strategy (Pre-construction Layout) will be submitted for approval under both NSW EP&A Act and Commonwealth EPBC Act, prior to commencement of construction, which will contain all changes to the calculations of impacts to MNES and total offset credit obligations.
Final/as-built Layout	Once construction has been completed, updated calculations of impacts to MNES and total offset credit obligations will be made based on the final as-built construction footprint. Where required, all changes will be captured in the Offset Strategy (Final/As-built) that will be submitted to both NSW EP&A Act and Commonwealth EPBC Act.

4.4 Additional and Appropriate Measures (Serious and Irreversible Impacts)

Section 7.16(3) of the NSW BC Act states that the Minister for Planning is "required to determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is to be granted", if an SAII is considered likely. The Proponent is committing to additional and appropriate measures to directly minimise impacts to the NSW Box Gum Woodland CEEC. Further detail is provided below.

The Proponent has developed a draft proposal to deliver additional and appropriate mitigation measures in the form of conserving Low and Moderate-good condition formations of Box Gum Woodland CEEC into perpetuity at a Biodiversity Stewardship Agreement (BSA) site being established by the Proponent. The Proponent proposes to secure within the BSA site an additional area of Low and Moderate-good condition Box Gum Woodland CEEC at a 1:1 ratio of conserved vegetation to impacted vegetation (SAII Measures). The mechanism to conserve in perpetuity the additional areas of Box Gum Woodland CEEC will be via the generation and retirement of relevant ecosystem credits from a BSA site that will be registered on title as required under the BC Act (SAII Credits). Further details of the Proponent's draft proposal are provided in **Appendix C.**

The proposed SAII Measures are equivalent in area to that of the Low and Moderate-good condition Box Gum Woodland CEEC being impacted by the wind farm and public road upgrades. Based on the latest preliminary infrastructure layout this equates to approximately 231 hectares of impact to NSW Box Gum Woodland CEEC of which 13.9 ha of impact is to Commonwealth Box Gum Woodland CEEC. NSW BCS and DPHI have been actively consulted on this proposal and are generally supportive of its implementation.

While these additional and appropriate measures will be delivered at a BSA site, the areas of additional and appropriate measure sites must not allow for the SAII Credits to be traded on the NSW biodiversity credit market, or used to fulfil the credit obligation of the Proposed Action.

Instead, the Proponent proposes to retire the required SAII Credits at agreed milestones throughout the construction program with evidence of retirement provided to the NSW consent authority. Similarly, evidence of retirement of the SAII Credits associated with the additional areas of Commonwealth Box Gum Woodland CEEC to be conserved will be provided to DCCEEW.

5.0 Offset Strategy

Under the NSW BOS there are three options, two land-based and one fund-based, available to satisfy credit obligations in accordance with the Development Consent conditions, as follows:

- **Option 1:** creating new Biodiversity Stewardship Agreement (BSA) sites (also referred to as offset sites);
- **Option 2:** purchasing credits on the open market that have been generated through existing offset sites; and/or
- **Option 3:** paying into the Biodiversity Conservation Fund (the Fund) administered by the NSW Biodiversity Conservation Trust (BCT) or the recently announced NSW Biodiversity Credits Supply Fund.

The majority of the credits for the Proposed Action are anticipated to be secured through the land-based options, primarily through Option 1 and secondarily through Option 2. Option 3, paying into the Fund, is anticipated to be used as a 'last resort' where particular credit types and quantities cannot be secured in the first instance by way of Option 1 or Option 2.

The Proponent has gone through extensive efforts to strategically offset the Proposed Action through the first two options available to them. Particular effort has also been allocated to identifying suitable properties for the purpose of satisfying Option 1, not just for the purpose of credit liabilities but also to strive for additional strategic biodiversity outcomes over and beyond compliance requirements. This includes, but is not limited to, improving habitat connectivity between existing nearby conservation areas.

The three offsetting options are explained in more detail in the following sub-sections, and where applicable, further information is provided where the Proponent has made material progress in securing the required biodiversity offset credits in accordance with the relevant option.

5.1 Biodiversity Stewardship Agreement Sites (Option 1)

In order to create a new BSA site and generate both ecosystem credits and species credits that can be retired against the Proposed Action to satisfy the credit obligation, the below process will need to be followed.

The process from consultant engagement through to the Biodiversity Conservation Trust (BCT) sign off, takes approximately 12 months, subject to any targeted seasonal survey requirements for specific threatened species.

The steps required in establishing a BSA site are as follows:

Step 1: Site Identification

- Identify a property – land is identified via desktop searches for land for sale. Once land has been identified it is then assessed via desktop analysis to ensure it is:
    - Located in the correct IBRA-Subregion to satisfy the Development Consent conditions, and
    - Located in an area likely to support the correct PCTs.

- A site inspection is undertaken to confirm the correct PCTs (including whether they will address both BC Act and EPBC Act requirements) are present onsite.
- Confirm the landowner (meets the fit and proper person test) and property (meets the eligibility criteria) are eligible, in accordance with the Biodiversity Stewardship Agreement application October 2018 (or most recent version).

Step 2: Biodiversity Assessment

Once a property has been identified and deemed suitable in accordance with step 1 above and secured the following steps will be undertaken.

- Engagement of an accredited assessor to apply the BAM to the property in order to generate biodiversity credits. The Accredited Assessor will complete a Biodiversity Stewardship Site Assessment Report (BSSAR), including the completion of a Total Fund Deposit (TFD)4 worksheet and required management plans, that will all be lodged to the BCT in order for the land owners to be able to enter into a Biodiversity Stewardship Agreement (BSA).
- The BCT reviews all lodged documentation. Any changes required will be completed by the accredited assessor, after which the BCT will approve the documentation.

Step 3: Finalisation of Agreement and Retirement of Credits

Following the steps 1 and 2 detailed above the following will be undertaken:

- The landowner enters into a BSA with the BCT. The landowner is now referred to as the Credit Owner. The BSA is registered on the land title once it is signed by the Minister and the landowner.
- Once credits have been generated, the Credit Owner can retire those credits against their credit obligation for their project, or sell the credits on the open market
- To retire credits to a Project, the Credit Owner and Project Owner must complete the "Application to retire biodiversity credits" form, and pay the required credit retirement fee.
- The Credit Owner must pay the entire Total Fund Deposit (TFD) obligation before BCT will retire the credits. The TFD amount varies according to the extent of management activities required for the offset site.
- Once credits have been retired, proof of retirement will be provided to DPE in accordance with the requirements set out in **Section 5.4.**

It is important to note that the retirement of the credits (steps 2-3) will not be undertaken until confirmation of the final credit obligation has been determined as described in **Section 4.3.**

5.2 Credit Purchases on the Open Market (Option 2)

Any shortfall in ecosystem credits and species credits, not generated on new offset sites (as per Option 1 above) will be satisfied where possible from the open credit market. It is noted that any credits purchased on the market for MNES will need to be like-for-like.

[4] Further information about the Total Fund Deposit (TFD) can be accessed from DPE's website: Total Fund Deposit and discount rate | NSW Environment and Heritage

There are three main pathways to purchase credits from the market, as follows:

- **Pathway 1 (Purchase credits available on the open market):** this pathway would require Tilt Renewables to purchase credits available from existing offset sites at a price negotiated directly with the Credit Owner. Available credits are published on the publicly-available BOS Credit Supply Register (Biodiversity Offsets Scheme public registers | NSW Environment and Heritage).
- **Pathway 2 (Partnership arrangement with existing landholder):** this pathway involves the establishment of a new offset site (similar to Option 1 above), but does not require outright purchase of the property. Under this pathway, Tilt Renewables would pay the up-front costs to complete the required biodiversity surveys, legal costs, and formal registration with BCT to establish the offset site. The existing landholder would become the Credit Owner and retain ownership and management obligations for the offset site. Tilt Renewables would negotiate a credit price with the Credit Owner.

The following process to purchase, transfer and retire nominated offset credits will be undertaken:

i. Identify (including determining how/if the credits meet the BC Act and/or EPBC Act credit requirements) and negotiate a purchase price for the credits with the Credit Owner.

ii. Credit Owner will complete the "Application to transfer biodiversity offset scheme credits" form and pay the prescribed credit transfer fee (as outlined above in section 4.1.3).

iii. Purchaser pays agreed credit price to Credit Owner prior to credits being transferred

iv. Credit Owner must pay TFD obligation before BCT will transfer credits to purchaser

v. Once the credits have been transferred, the "Application to retire biodiversity credits" form must be lodged, and the prescribed fee paid.

vi. Once credits have been retired, proof of retirement will be provided to DPHI in accordance with the requirements set out in **Section 5.4.**

It is noted that the credit transfer process (steps ii-vi) will not be undertaken until confirmation of the final credits has been undertaken as described in **Section 5.4.**

5.3 Payment into the Biodiversity Conservation Fund (Option 3)

In the event that the Proponent is unable to secure the biodiversity credits required to meet the credit obligation of the Proposed Action under Option 1 or Option 2 pathways (as described above in **Sections 5.1** and **5.2**) the outstanding biodiversity (ecosystem and species) credits will be satisfied by making a payment into the Biodiversity Conservation Fund (Fund).

The process for paying into the Fund is as follows:

i. The Proponent will complete the application for payment into the Fund for an offset obligation in NSW form and lodge it with the Biodiversity Conservation Trust.

ii. BCT reviews the application and provides a reference number (3 - 5 business days).

iii. BCT advises in writing whether the application has been approved and if so, provides payment details (payment term is seven days)

iv. The Proponent will submit Recipient Created Tax Invoice or requests an invoice from the BCT

(3 - 5 business days).

v. The Proponent will make the payment into the Fund.

vi. BCT confirms receipt of payment and issues a certificate under section 6.33 of the BC Act.

The certificate issued by the BCT will be used by the Proponent to demonstrate to the Department and the Planning Secretary that the relevant offset obligation has been met, furthermore copies of any BSAs may be provided if required/requested.

5.4 Retirement of Credits and Notification

The Proponent will retire the like-for-like biodiversity credits and/or make payment into the Fund, as required in the approved Offset Strategy (as revised from time to time) (see **Section 4.3**). While the existing Development Consent and EPBC Approval allow for offsets to be retired within two (2) years of the commencement of the Proposed Action, it is anticipated that any amendment to the Development Consent and any approval granted under the EPBC Act for the Proposed Action will require the retirement of credits prior to the impact occurring to the relevant native vegetation/habitat.

The Proponent is aware of this material change in the timing, and has therefore made significant early progress to secure a large majority of the credits required to meet its offset obligations, in accordance with this Preliminary Offset Strategy. Progress made by the Proponent to-date is summarised in **Section 6.0** below.

The Proponent will continue to implement this Preliminary Offset Strategy. and make all reasonable efforts to secure and retire the required credits in an orderly, timely, cost-effective and compliant manner.

Within 20 business days of completing the formal retirement of credits, the Proponent will provide DPHI and DCCEEW with evidence of when and how the required biodiversity credits were retired.

6.0 Implementation of the Offset Strategy

The Proponent has made substantial progress to secure over 90% of both the ecosystem and species credits required to meet the credit obligation for the wind farm and public road upgrade aspects of the Proposed Action, in accordance with this Preliminary Offset Strategy.[5]

In particular the Proponent has secured the eight land-based offsets, either through establishing new BSA sites (Option 1) or through purchase of credits on the credit market (Options 2a and 2b). To-date the Proponent has not made payments into the Fund to retire credits against the Proposed Action.

Together, the eight land-based offsets are expected to make a significant contribution to the credit liability for all relevant MNES impacted by the wind farm and public road upgrade components of the Proposed Action, as detailed in **Table 13** below.[6]

A summary of the key characteristics of the land-based offsets that have been secured to-date is provided in **Table 14.** A detailed breakdown of the anticipated generation of ecosystem credits and species credits for the secured land-based offset opportunities is provided in **Table 15.**

Table 13: Progress of Land-based Offsets Secured for Relevant MNES (Wind Farm and Public Road Upgrades Components Only)

MNES	Total Credit Liability (Wind Farm and Public Road Upgrades Only)		Estimated Total Credit Liability Expected to be Satisfied at 8 x BSA Sites		
	Total Area of Impact (ha)	Total Credit Liability	Combined Total Area of Associated PCTs within 8 x BSA Sites (ha)	Total Credits Expected to be Generated at 8 x BSA Sites	Proportion of Total Credit Liability Expected to be Achieved (8 x BSA Sites)
Threatened Ecological Community					
White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands CEEC (EPBC Act)	13.9	**470**	845	**3,423**	Greater than 100%

[5] The Proponent is planning to connect the wind farm into the CWO REZ transmission line project and in doing so the Proponent will avoid impacts native vegetation/habitat along the approved transmission line alignment between the wind farm and the approved connection point at Ulan. The CWO REZ transmission line project is subject to separate approvals under the EP&A Act and EPBC Act, and the associated impacts to native vegetation/habitat are being separately assessed by EnergyCo as the Infrastructure Planner for the CWO REZ.

[6] The credit calculations presented in this table are derived from the total credits calculated for the entire Proposed Action as detailed in Section 4.0 reduced on a credit/hectare basis for the public road upgrades and wind farm components of the Proposed Action (i.e. excludes the external transmission line component down to Ulan, which is currently not likely to be constructed).

MNES	Total Credit Liability (Wind Farm and Public Road Upgrades Only)		Estimated Total Credit Liability Expected to be Satisfied at 8 x BSA Sites		
	Total Area of Impact (ha)	Total Credit Liability	Combined Total Area of Associated PCTs within 8 x BSA Sites (ha)	Total Credits Expected to be Generated at 8 x BSA Sites	Proportion of Total Credit Liability Expected to be Achieved (8 x BSA Sites)
MNES Species-credit					
Large-eared pied-bat	92.6	**4,337**	1,016	**3,987**	92%
Greater glider	19.3	**692**	140	**692**	100%
Glossy black-cockatoo	0	0	0	N/A	N/A
MNES Ecosystem Credits					
Regent Honeyeater (VZs 1, 2, 4, 6, 7, 9, 10, 11)	498.0	**13,819**	4,395	**17,799**	Greater than 100%
Gang-gang Cockatoo (VZ 2)	1.4	**35**	2,413	**9,774**	Greater than 100%
South-eastern Glossy Black-cockatoo (VZs 9, 10 and 14)	83.8	**2,533**	4,073	**16,495**	Greater than 100%
Painted Honeyeater (VZs 1, 2, 4, 6, 7, 9, 10, 11 and 14)	521.8	**14,234**	2,830	**11,460**	91%
White-throated Needletail (VZs 1, 2, 4, 6, 9, 10, 11, 13, 14, 15 and 16)	322.3	**8,652**	4,820	**19,521**	Greater than 100%
Swift Parrot (VZs 2, 9, 10, 11 and 14)	285.7	**7,655**	2,165	**8,769**	Greater than 100%
Superb Parrot (VZs 1 and 2)	10.9	**180**	1,948	**7,889**	Greater than 100%
Spotted-tail Quoll (VZs 1, 2, 9, 10, 14, 15 and 16)	95.5	**2,729**	4,685	**18,974**	Greater than 100%
Corben's Long-eared Bat (VZs 1, 9, 10, 15 and 16)	70.3	**2,279**	3,439	**13,930**	Greater than 100%

MNES	Total Credit Liability (Wind Farm and Public Road Upgrades Only)		Estimated Total Credit Liability Expected to be Satisfied at 8 x BSA Sites		
	Total Area of Impact (ha)	Total Credit Liability	Combined Total Area of Associated PCTs within 8 x BSA Sites (ha)	Total Credits Expected to be Generated at 8 x BSA Sites	Proportion of Total Credit Liability Expected to be Achieved (8 x BSA Sites)
Yellow-bellied Glider (VZ 13)	15.2	**447**	1,628	**6,594**	Greater than 100%
Koala (VZs 2, 4, 6, 7, 9, 10, 11, 13, 14, 15, 16)	528.2	**14,550**	4,820	**19,521**	Greater than 100%
Grey-headed Flying-fox (VZs 1, 2, 9, 10, 11 and 14)	295.1	**7,800**	4,432	**17,948**	Greater than 100%

The Proponent will continue to implement this Preliminary Offset Strategy to secure all remaining offsets prior to the impact occurring, and will continue to prioritise land-based offsets (Options 1 and 2) in the first instance and rely on payments into the Fund (Option 3) as a last resort.

Table 14: Proposed Land-based Offsets (current as of March 2024)

Site Name	Land-based Opportunity Type	Location/Features	Estimated Credit Generation and % of Credit Liability for Wind Farm and Public Road Upgrades
'Nangarah' BSA Site **See Figure 1 in Appendix B**	Establish new BSA site	• **Location:** Barraba, NSW (Tamworth Regional Council LGA) (Peel IBRA sub-region). • **Area:** ~3,000 ha. • **Key features:** Located in a mapped important habitat area for Regent Honeyeater (one of only two in NSW) and supports Box Gum Woodland CEEC, and the following threatened species, Squirrel Glider, Bluegrass, Border Thick-tailed Gecko, Grey-crowned Babbler, Speckled Warbler, Dusky Woodswallow, Diamond Firetail, Black-chinned Honeyeater and Brown Treecreeper. • **Connectivity:** Nestled between Linton Nature Reserve and Woodsreef State Conservation Area, effectively creating a continuous biodiversity corridor spanning east – west nearly 20 km between the two areas into perpetuity.	~38% of the total ecosystem credit liability ~100% of total Box Gum Woodland CEEC credit liability (BC Act) Species credits expected to be generated (credit types and quantities will be confirmed once targeted surveys have been completed): • Large-eared Pied Bat (92% of credit liability) • Squirrel Glider (100% of credit liability) • Eastern Cave Bat (91% of credit liability)

'Glenleigh' BSA Site **See Figure 2 in Appendix B**	Establish new BSA site	• **Location:** Scotts Creek, NSW (Upper Hunter LGA) (Tomalla IBRA sub- region). • **Area**: ~465 ha. • **Key features**: Supports the Box Gum Woodland CEEC, and the following threatened species, Bluegrass, Squirrel Glider, and breeding Koalas recently recorded during BSA surveys. • **Connectivity:** Glenleigh is a central portion of woodland / forest vegetation that extends to the west, north and northeast. The conservation of Glenleigh ensures the connectivity to the adjoining large, vegetated areas is protected in perpetuity.	~ 8% of the total ecosystem credit liability ~Used to offset both Western Slopes Grassy Woodland and New England Grassy Woodland offset trading groups. Species credits expected to be generated (credit types and quantities will be confirmed once targeted surveys have been completed) for Squirrel Glider (71% of credit liability)
'Ups and Downs' BSA Site **See Figure 3 in Appendix B**	Establish new BSA site	• **Location:** Timor, NSW (Tomalla IBRA sub-region). • **Area:** ~2,200 ha. • **Key features:** Supports Box Gum Woodland CEEC and is adjacent to an existing Wallabadah Conservation Area. • **Connectivity:** Ups and Downs is connected via extensive vegetation corridors travelling south to Glenleigh and is adjacent to the existing Wallabadah Conservation Area to the north.	~ 31% of the total ecosystem credit liability ~ Used to offset Western Slopes Grassy Woodland, New England Grassy Woodland and New England Dry Sclerophyll Forest offset trading groups. Species credits expected to be generated (credit types and quantities will be confirmed once targeted surveys have been completed): • Large-eared Pied Bat; • Koala; and • Squirrel Glider.

'Brodie' BSA Site **See Figure 4 in Appendix B**	Establish new BSA site	• **Location:** Coolah, NSW (Liverpool Range IBRA sub- region). • **Area:** ~350 ha. • **Key features:** located within the Proposed Action Area adjacent to Coolah Tops National Park, effectively extending the biodiversity corridor, into perpetuity. • **Connectivity:** The Brodie BSA site is directly connected to the Coolah Tops National Park to the north and to southern linking vegetation through private land.	~ 5% of the total ecosystem credit liability Used to offset New England Grassy Woodland and Eastern Riverine Forests offset trading groups. Species credits expected to be generated (credit types and quantities will be confirmed once targeted surveys have been completed) for southern greater glider (22% of credit liability)
'Wesley' BSA Site **See Figure 5 in Appendix B**	Establish new BSA site	• **Location:** Coolah, NSW (Liverpool Range IBRA sub- region). • **Area:** ~130 ha. • **Key features:** located within the Proposed Action Area • **Connectivity:** Minimal connection through the landscape	~ 2% of the total ecosystem credit liability Used to offset Western Slopes Grassy Woodland offset trading groups.
'Stanley Station' BSA Site **See Figure 6 in Appendix B**	Credit purchase	• **Location:** Merriwa, NSW (Liverpool Range IBRA sub-region) • **Area:** 480.5ha • **Key features:** Supports Box Gum Woodland CEEC and both BC Act and EPBC Act levels. • **Connectivity:** Poorly linked in the	~ 11% of the total ecosystem credit liability ~24% of total Box Gum Woodland CEEC credit requirements (BC Act and EPBC Act). Used to offset Western Slopes Grassy Woodland, and Eastern Riverine Forests offset trading groups. 100% of Commonwealth Box Gum Woodland CEEC credit liability

		landscape, however is part of a woodland structured corridor running north-south through grazing properties.	
'Mumbil' BSA Site **See Figure 7 in Appendix B**	Credit purchase	• **Location:** Mumbil NSW (Inland Slopes IBRA Sub-region) • **Area:** 534 ha • **Key features:** Supports Box Gum Woodland CEEC and the Squirrel Glider and breeding pairs of the Superb Parrot. • **Connectivity:** Poorly connected in the landscape, adjoins another woodland structure property to the southwest. Will improve habitat connectivity in the landscape.	~ 9% of the total ecosystem credit liability Used to offset Western Slopes Grassy Woodland and Western Slopes Dry Sclerophyll Forest offset trading groups. Species credits expected to be generated (credit types and quantities will be confirmed once targeted surveys have been completed) for Squirrel Glider and Superb Parrot
'Jerrong' BSA Site **See Figure 8 in Appendix B**	Credit Purchase	• **Location:** Jerrong NSW (South Eastern Highlands IBRA Sub-region) • **Area:** 213 ha • **Key features:** Supports Squirrel Glider • **Connectivity:** Some connectivity to nearby reserves, including Blue Mountains Nature Reserve to the east, Wiaborough Nature Reserve to the south and Abercrombie Nature Reserve to the west.	78% of total Squirrel Glider species credit liability

Table 15: Land-based Offset Opportunities – Indicative Credit Generation (Wind Farm and Public Road Upgrades only)

Veg Zone	PCTs	Offset Trading Group	Total Credits Required (Wind Farm and Public Road Upgrades Only)	Stanley Station (Credit Purchase)		Mumbil (Credit Purchase)		Glenleigh (New BSA Site - Purchase)		Brodie (New BSA Site - Partnership)		Nangarah (New BSA Site - Purchase)		Ups and Downs (New BSA Site - Purchase)		Wesley (New BSA Site - Partnership)		Jerrong (Credit Purchase)		Total Credit Generation	Proportion of Credit Liability Satisfied
				Credits	% of Obl	Credits	% of Obl	Credits	% of Obl	Credits	% of Obl	Credits	% of Obl	Credits	% of Obl	Credits	% of Obl	Credits	% of Obl		
1	84	Eastern Riverine Forests less than 50%	**146**	**71**	49%			**0**	0%	**9**	6%	**0**	0%	**124**	85%					***204***	**140%**
2	281	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC (EPBC)	**45**	**35**	78%															***35***	**78%**
4	479	Western Slopes Dry Sclerophyll Forests less than 50%	**14**			**15**	107%													***15***	**107%**
6, 7,17	483	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC	**8,321**									**8,702**	105%							***8,702***	**105%**
8	483	Western Slopes Grassy Woodlands greater than or equal to 90%	**5,997**	**2,365**	39%	**1,989**	33%	**908**	15%					**550**	9%	**421**	7%			***6,233***	**104%**
9, 10, 11, 12	488	New England Grassy Woodlands greater than or equal to 50% and less than 70%	**7,313**					**437**	6%	**1,091**	15%			**6,131**	84%					***7,659***	**105%**

13	490	New England Grassy Woodlands less than 50%	**447**					**447**	100%										***447***	**100%**
14	495	New England Dry Sclerophyll Forests less than 50%	**415**											**218**	53%					***218***	**53%**
15	1661	Western Slopes Dry Sclerophyll Forests greater than or equal to 50% and less than 70%	**6**			**10**	157%			**1**	16%									***11***	**173%**
16	1675	South Coast Sands Dry Sclerophyll Forests less than 50%	**7**																	***0***	**0%**
5,18	481, 1661	N/A	**0**																	***0***	**N/A**
TOTAL			**22,711**	**2,471**	11%	**2,014**	9%	**1,792**	8%	**1,101**	5%	**8,702**	38%	**7,023**	**31%**	**421**	2%			***23,524***	**104%**
Large-eared Pied Bat			**4,337**									3,987	92%							***3,987***	**92%**
Southern Greater Glider			**692**							149	22%							***543***	***78%***	***692***	**100%**
Squirrel Glider			**1,169**					831	71%			7,028	601%							***7,859***	**672%**
Eastern Cave bat			**4,392**									3,987	91%							***3,987***	**91%**
TOTAL			**10,590**	0	0%	0	0%	831	8%	149	1%	15,002	142%	0	0%	0	0%			***16,525***	**156%**

Acronyms, Abbreviations and Definitions

BAM	Biodiversity Assessment Method, means the biodiversity assessment method established under the *Biodiversity Conservation Act 2016* (NSW) for the purpose of assessing the impact of actions on threatened species and threatened ecological communities, and their habitats
BC Act	*Biodiversity Conservation Act 2016*
Fund	Biodiversity Conservation Fund
BCT	Biodiversity Conservation Trust
Box Gum Woodland	means *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland* and *Derived Native Grassland* ecological community, listed as critically endangered under the EPBC Act
BSA	Biodiversity Stewardship Agreement
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically Endangered Ecological Community
Development Consent	The Development Consent SSD 6696 granted under the EP&A Act for up to 267 wind turbines with a maximum tip height of 165 m above ground level (AGL)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
EPBC Approval	EPBC 2014/7136 granted for the Approved Action under the EPBC Act
ha	hectares
Like-for-like biodiversity credits	means like-for-like ecosystem credits and like-for-like species credits.
Like-for-like ecosystem credits	has the meaning given under the BC Act
Like-for-like species credits	has the meaning given under the BC Act
Minister	means the Australian Government Minister administering the EPBC Act including any delegate thereof
MNES	Matters of National Environmental Significance
Offset Strategy	This Biodiversity Offset Strategy that has been prepared for the Proposed Action in accordance with the Project-specific PER Guidelines and based on the preliminary infrastructure layout for which approval is sought under the EP&A Act and EPBC Act
PER	Public Environment Report which contains Information about the Proposed Action and its relevant impacts in accordance with the Project-specific PER Guidelines
PER Guidelines	The Project-specific guidelines issued to the Proponent on 14 July 2023 to guide the preparation of the Public Environment Report (PER)

PCTs	Plant Community Types
the Project	the Liverpool Range Wind Farm project
Proposed Action	the proposed construction, operation, and maintenance of a wind farm, external transmission line, public road upgrades, temporary workforce accommodation facility and ancillary infrastructure, located between Coolah and Cassilis townships, New South Wales
Protected matter/s	means a matter protected under a controlling provision in Part 3 of the EPBC Act upon which the Proposed Action has the potential to have a significant impact, those being listed threatened species and communities (section 18 & section 18A) and listed migratory species (sections 20 & 20A)
Retire/retired	means change the status of a like-for-like biodiversity credit such that the like-for-like biodiversity credit can no longer be bought or sold
SSD	State Significant Development
TFD	Total Fund Deposit

Appendix A: Preliminary Layout Plans

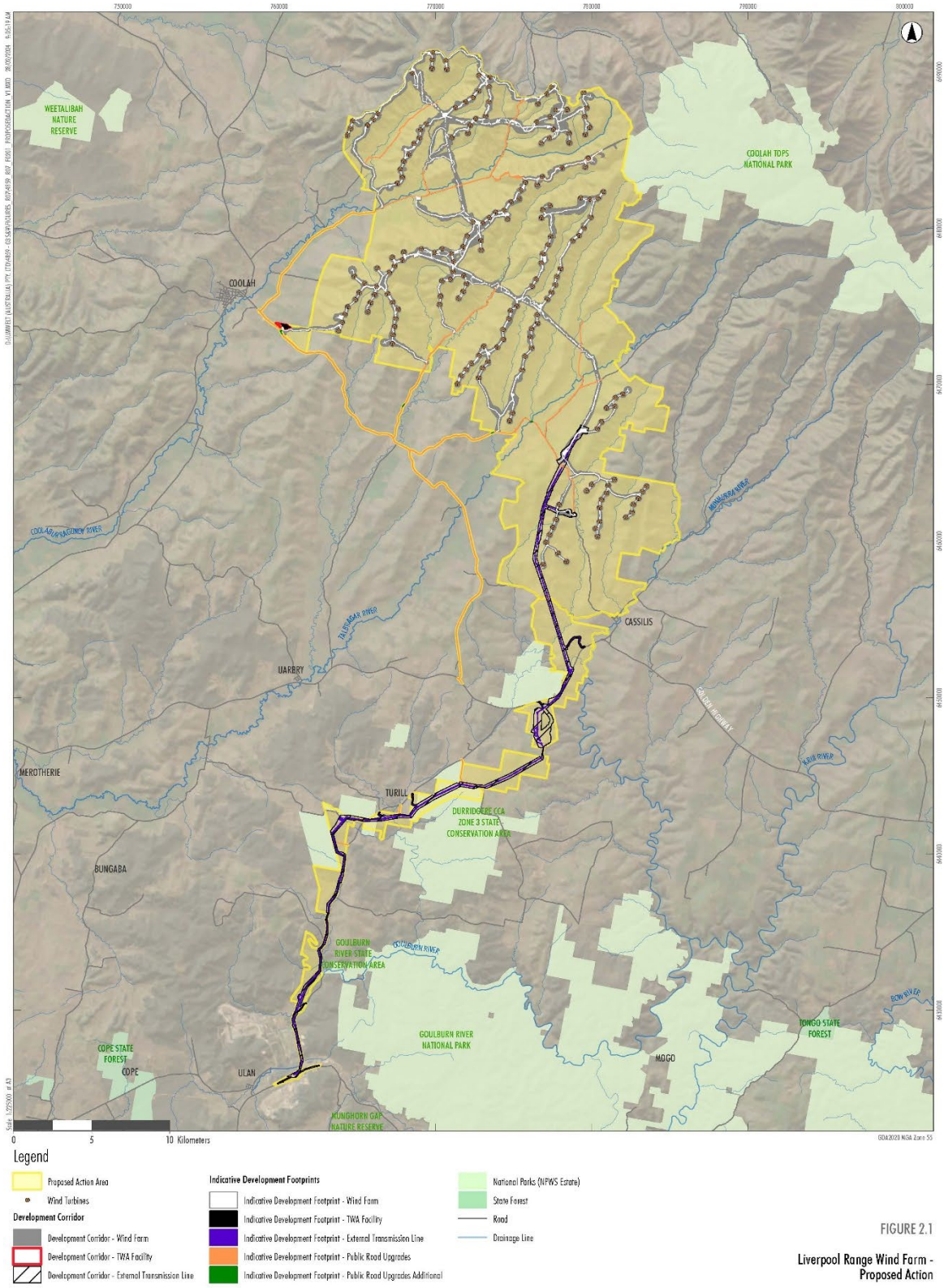
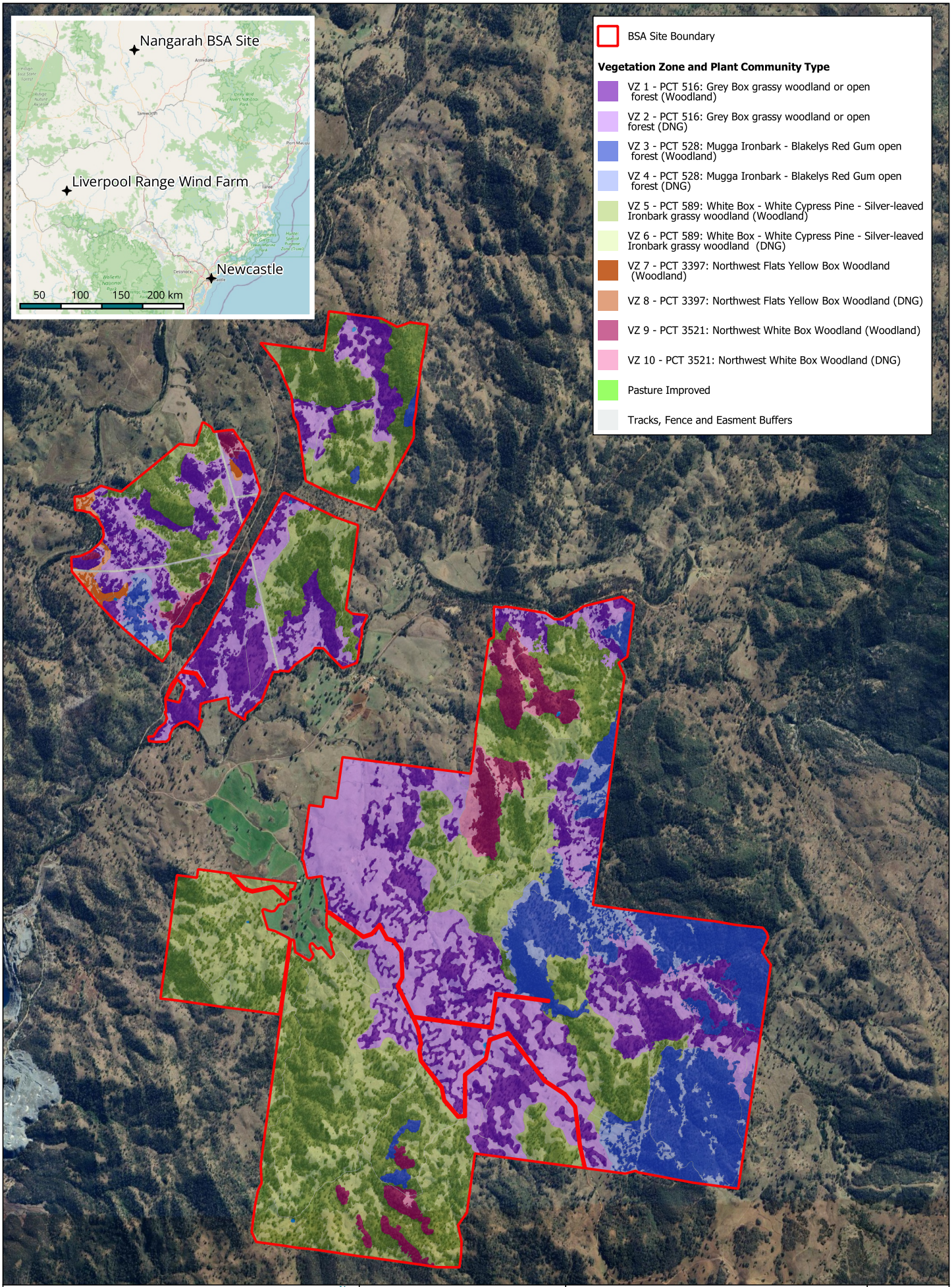


FIGURE 2.1

Liverpool Range Wind Farm - Proposed Action

Image Source: ESRI Basemap (2022) Data source: NSW DSFI (2022)

Appendix B: Land-based Offset Sites Secured



0.5 1 1.5 2 2.5 km

N

DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

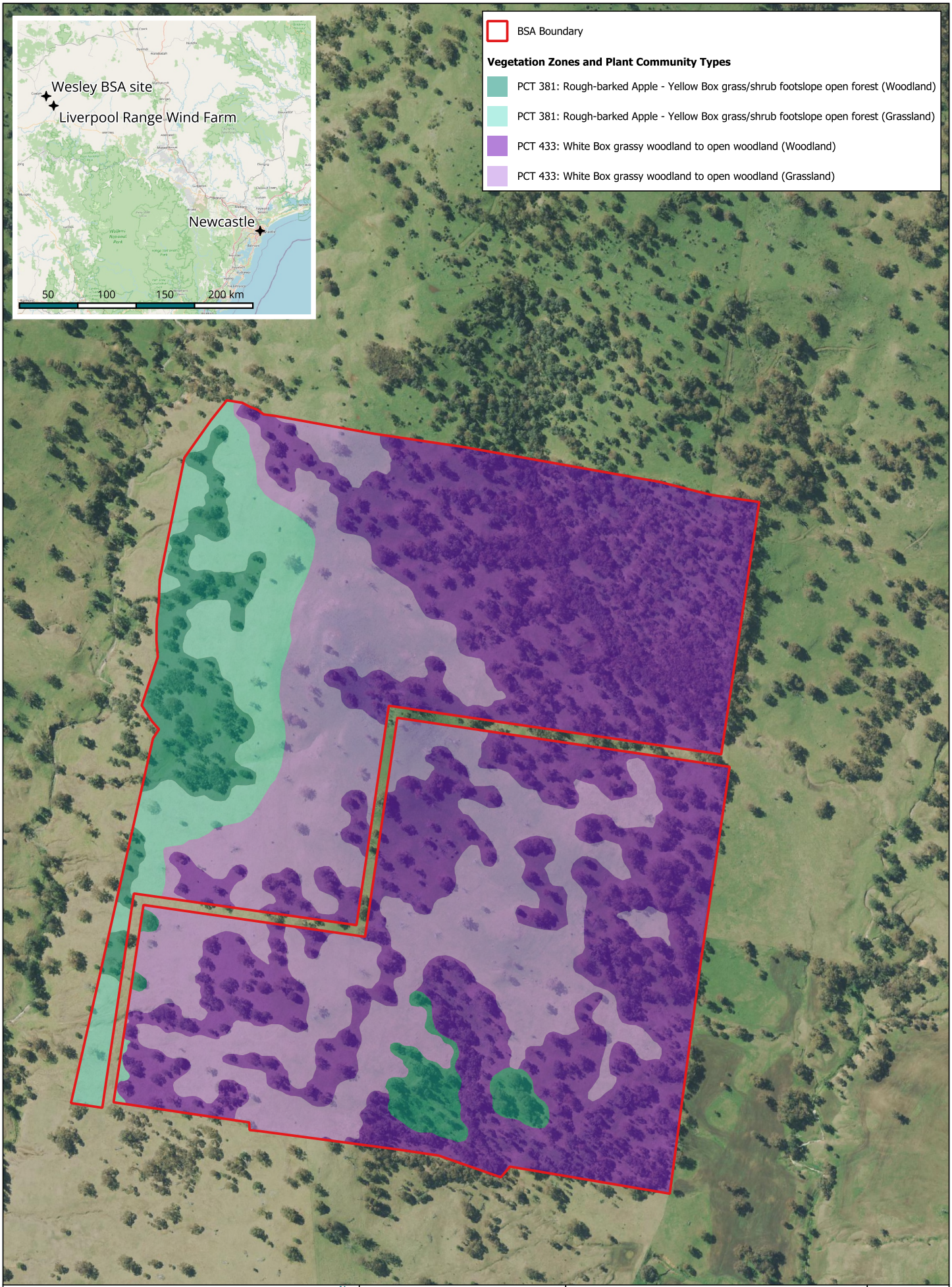
EPSG:28356, GDA94 / MGA zone 56
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL
PROJECT CONSULTING PTY LTD

Nangarah BSA site
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Nangarah BSA Site
Linton Road, Woodsreef

1



100 200 300 400 500 m

N

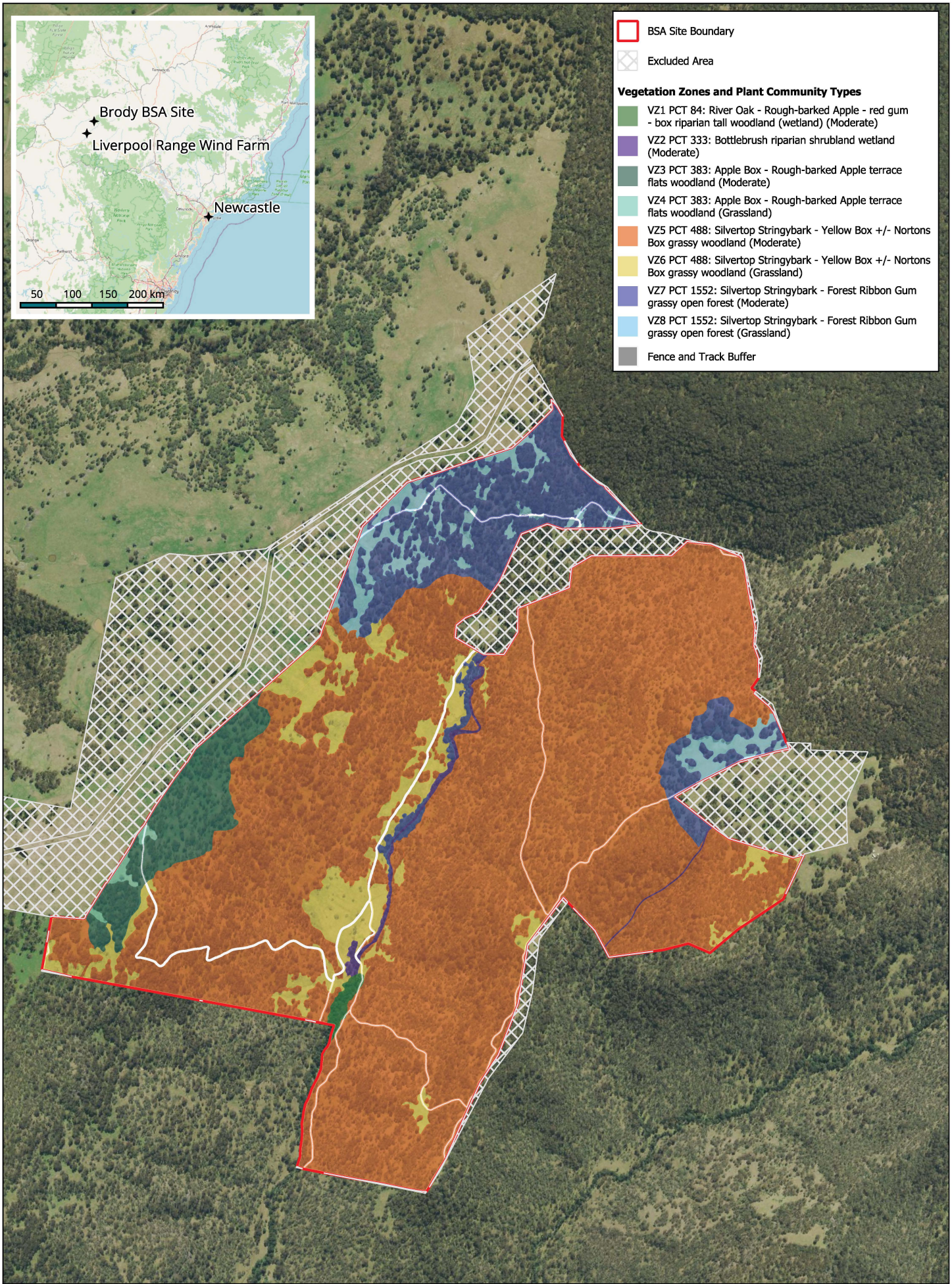
DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

EPSG:28356, GDA94 / MGA zone 56
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL
PROJECT CONSULTING PTY LTD

Wesley BSA site
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Wesley BSA Site
Vinegaroy Road, Coolah



250 500 750 1,000 m

N

DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

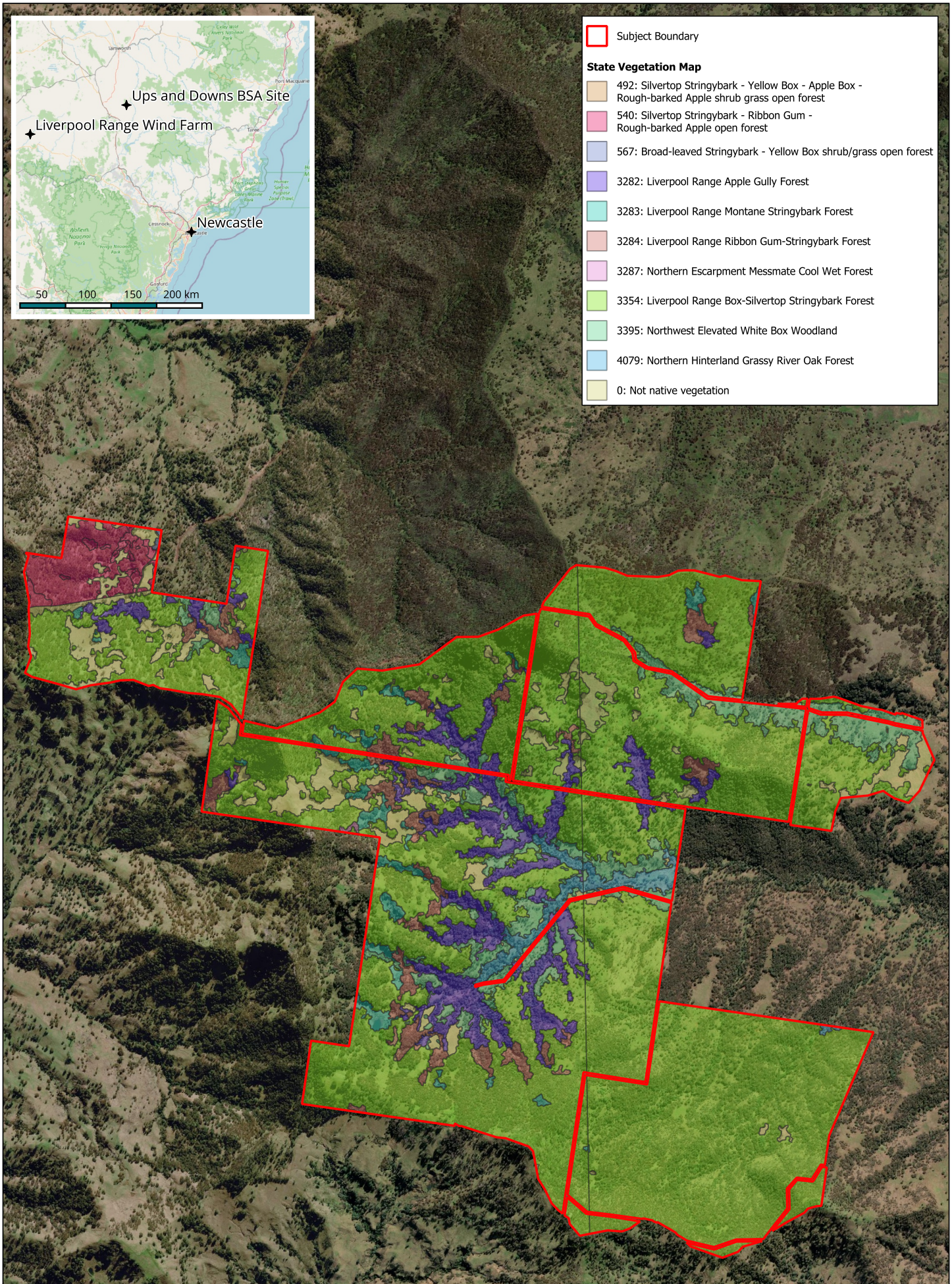
EPSG:28355, GDA94 / MGA zone 55
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL
PROJECT CONSULTING PTY LTD

Brody BSA Site
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Brody BSA Site
Cluffs Road, Coolah NSW

3



0.5 1 1.5 2 2.5 km

N

DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

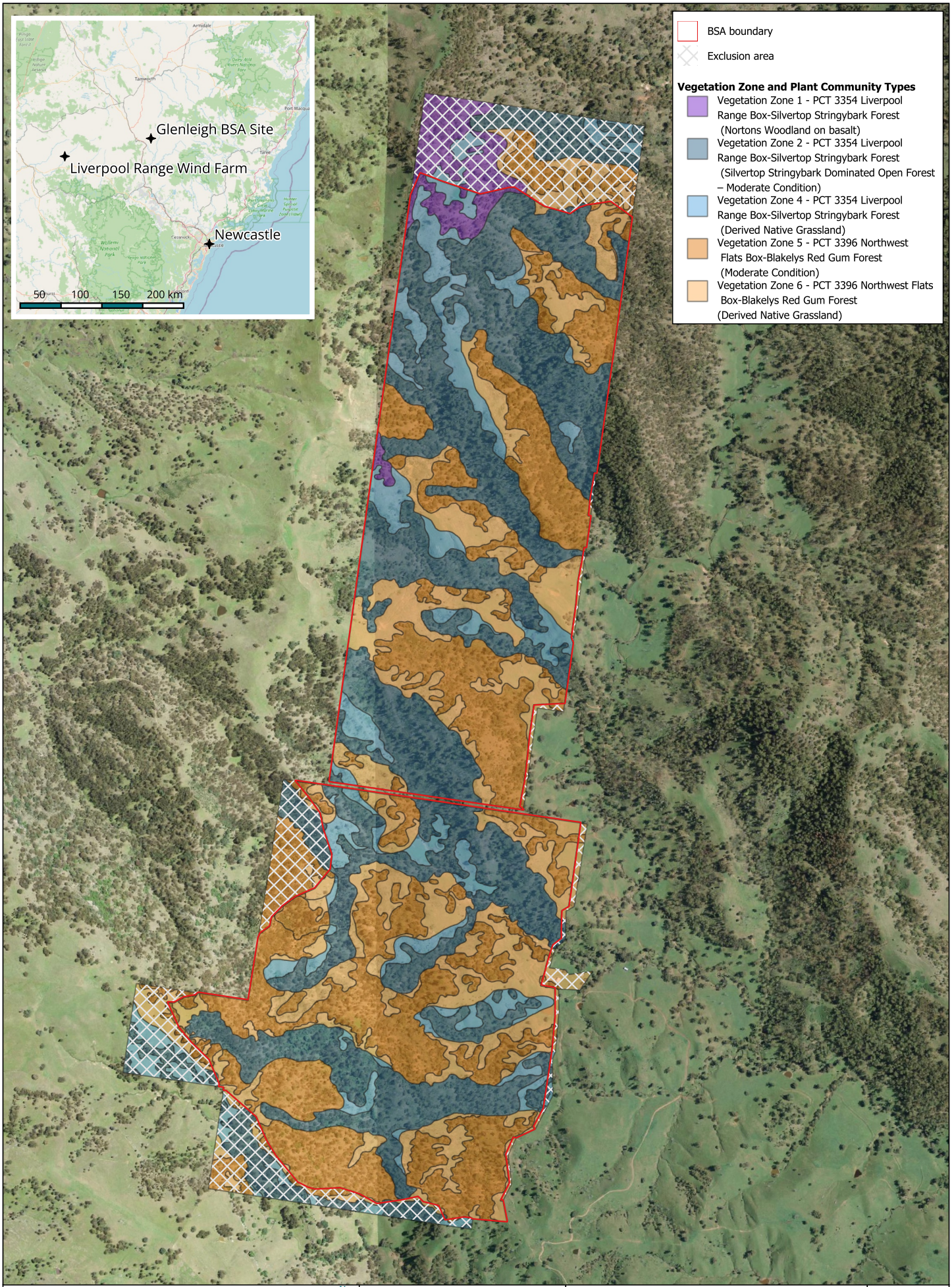
EPSG:28356, GDA94 / MGA zone 56
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL
PROJECT CONSULTING PTY LTD

Ups and Downs
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Ups and Downs BSA Site
Timor Creek Road, Timor

4



250 500 750 1,000 m

N

DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

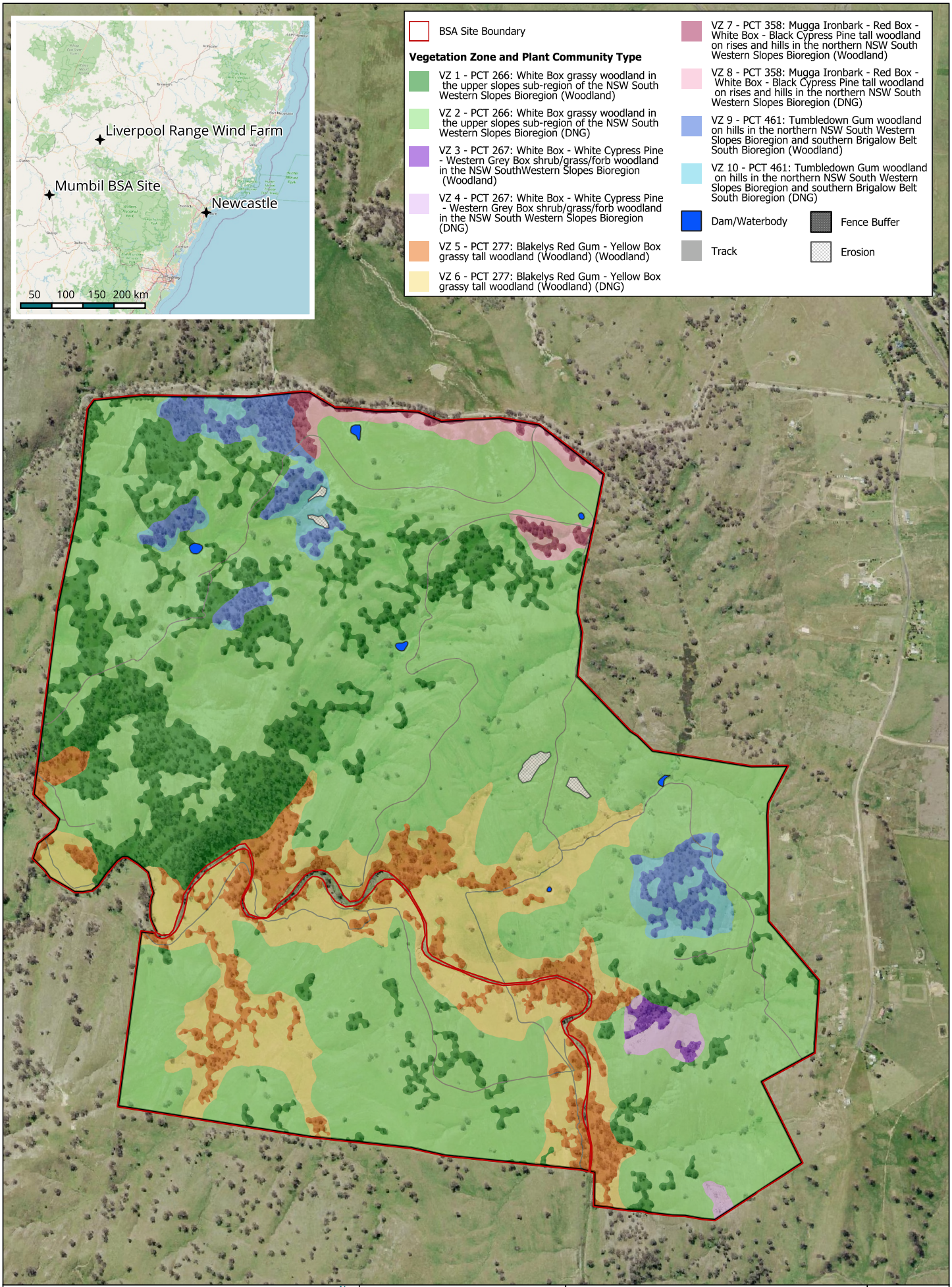
EPSG:28356, GDA94 / MGA zone 56
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL
PROJECT CONSULTING PTY LTD

Glenleigh BSA Site
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Glenleigh BSA Site
Scotts Creek Road, Scotts Creek

5



250 500 750 1,000 m

N

DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

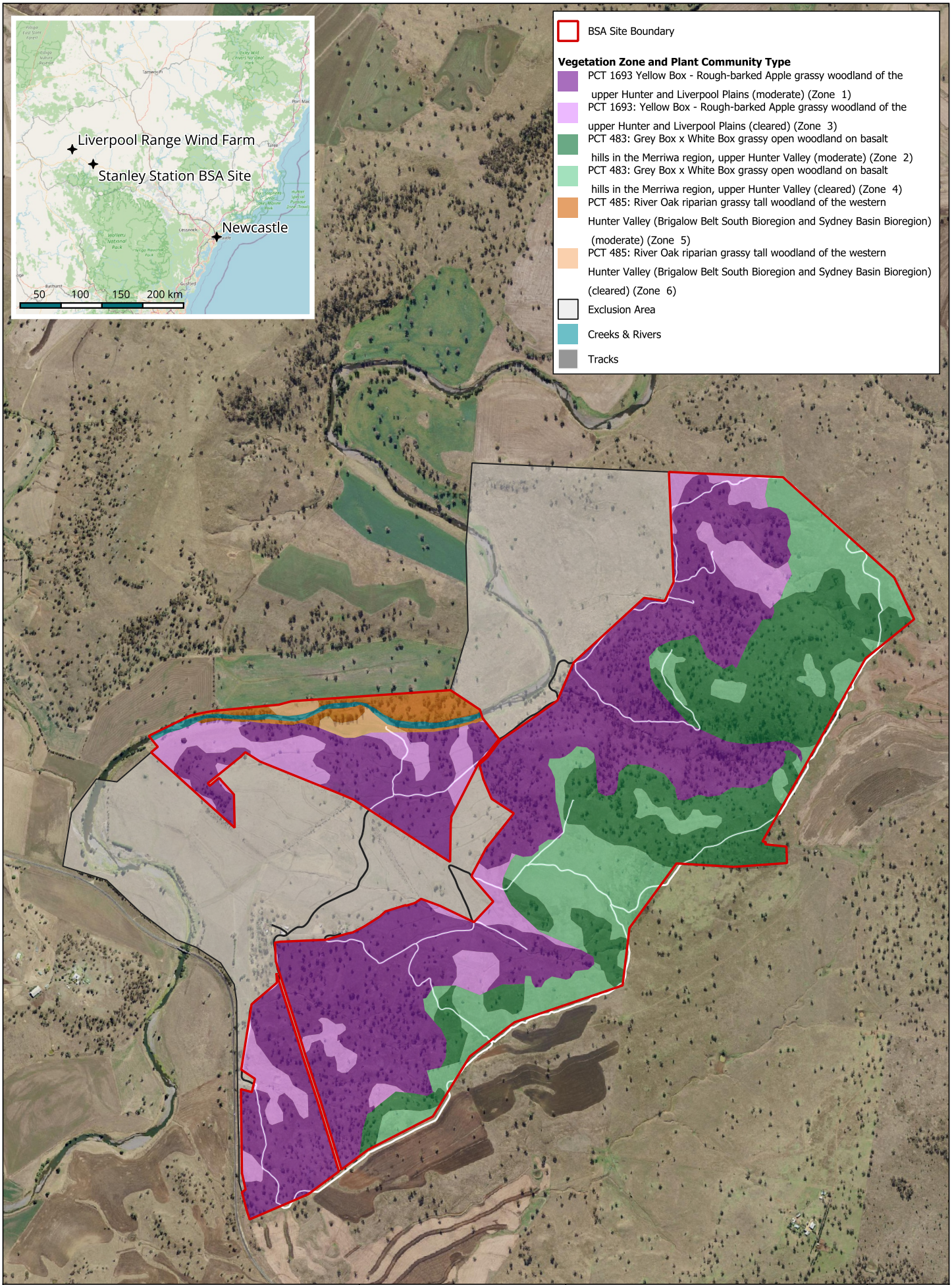
EPSG:28356, GDA94 / MGA zone 56
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL
PROJECT CONSULTING PTY LTD

Mumbil BSA Site
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Mumbil BSA Site
Neurea Road Mumbil

6



250 500 750 1,000 m

N

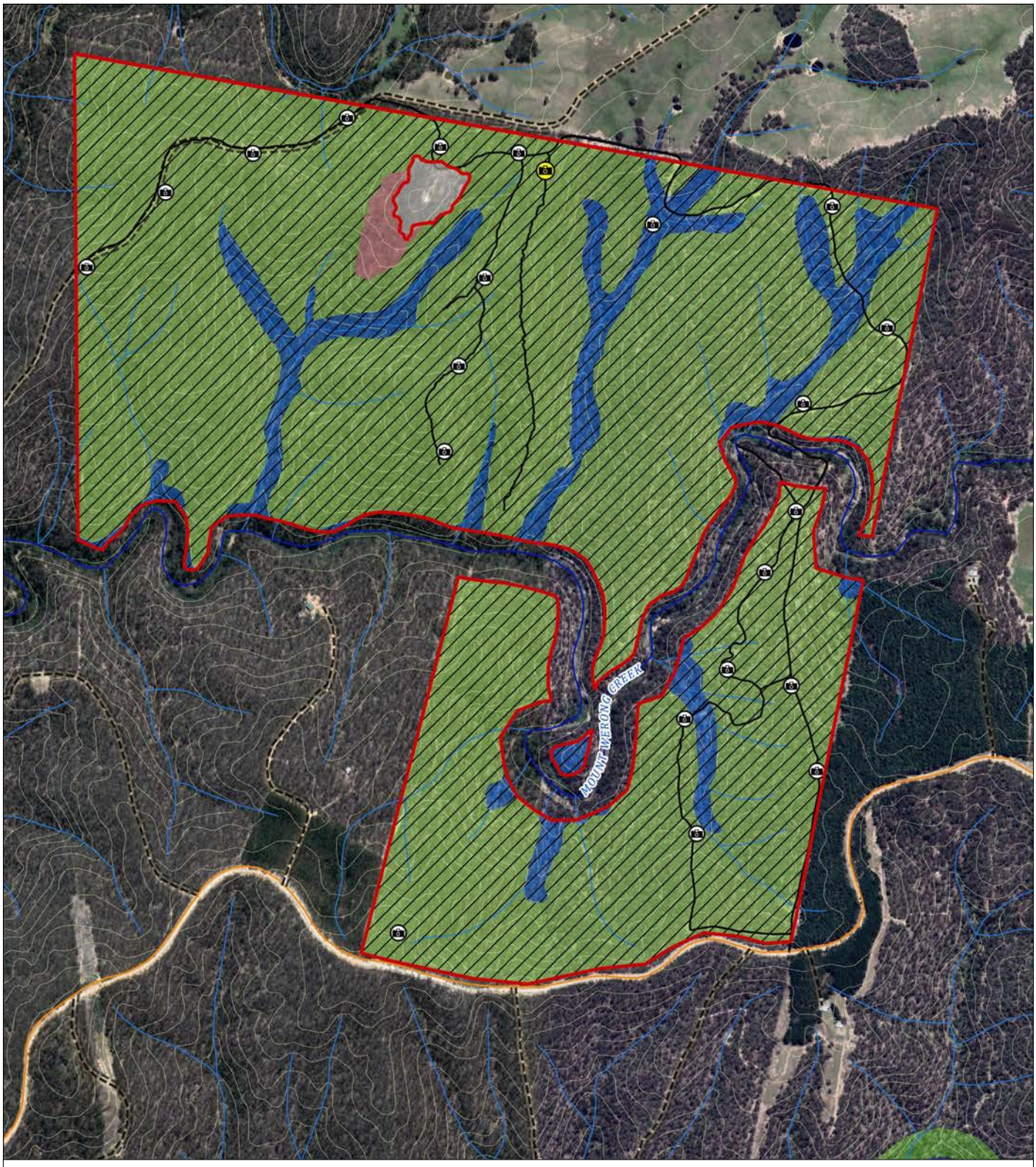
DATE DRAWN: 08.03.2024
DRAWN BY: Keryn Dowling

EPSG:28356, GDA94 / MGA zone 56
Map data ©2015 Google
© State of New South Wales (Spatial Services, DCS).

WEDGETAIL PROJECT CONSULTING

Stanley Station BSA Site
Plant Community Types

Tilt Renewables Australia Pty Ltd as trustee for
Liverpool Range Wind Farm Project Trust
Stanley Station BSA Site
7500 Golden Highway, Merriwa NSW 2329



Vegetation Zones and Plant Community Types

- Vegetation Zone 1 - PCT 731: Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion (Mod/Good)
- Vegetation Zone 2 - PCT 1093: Red stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands (Mod/Good)
- Vegetation Zone 3 - PCT 1151: Silvertop Ash - Broad-leaved Peppermint dry shrub forest of the South Eastern Highlands Bioregion (Mod/Good)
- Track

250 500 750 1,000

metres

Created by: KBlundell
Date: 11/11/2022

WEDGETAIL PROJECT CONSULTING PTY LTD

https://wedgetail.com.au

Legend

- Site Boundary
- Excluded Area
- NPWS Reserve
- Remote Camera Location
- Squirrel Glider Present
- Squirrel Glider Polygon
- Tracks
- Contours (10m)
- Major watercourse
- Minor watercourse
- Local Road
- Track-Vehicular

Jerrong BSA Site Squirrel Glider Polygon

Figure: 8

Tilt Renewables Australia Pty Ltd as trustee for Liverpool Range Wind Farm Project Trust 'Jerrong' property
The Glen Road, Jerrong

N

Appendix C: SAII Additional and Appropriate Mitigation Measures

WEDGETAIL
PROJECT CONSULTING

SAII Additional and Appropriate Mitigation Measures

Liverpool Range Wind Farm, New South Wales

March 2024

SAII Additional and Appropriate Mitigation Measures: Box Gum Woodland CEEC

Liverpool Range Wind Farm, New South Wales

REPORT PREPARED FOR:

TILT RENEWABLES AUSTRALIA PTY LTD AS TRUSTEE FOR LIVERPOOL RANGE WIND FARM PROJECT TRUST

REPORT PREPARED BY:

WEDGETAIL PROJECT CONSULTING PTY LTD
PO Box 234
Cardiff, NSW 2285

ABN: 93 640 388 683

File Ref: LRWF_SAII Report_20240308

Version Control

Rev. No.	Revision Date	Author / Position	Reviewer	Details
Rev 1	8 March 2024	Adam Blundell Principal Ecologist (Wedgetail)	Matt Stafford Project Manager LRWF (Tilt)	Final

Executive Summary

Wedgetail Project Consulting Pty Ltd (Wedgetail) has been engaged by Tilt Renewables Australia Pty Ltd (the Proponent) to develop recommended mitigation measures to reduce the risk of serious and irreversible impacts (SAII) to Box Gum Woodland Critically Endangered Ecological Community (CEEC) listed as a SAII entity under the NSW *Biodiversity Conservation Act 2016* (BC Act) as a result of the development of the Liverpool Range Wind Farm (LRWF) project. This report sets out recommended mitigation measures that will result in the conservation of additional areas of Box Gum Woodland CEEC that are commensurate in condition and area to the impacts, into perpetuity.

Proposed SAII Measures

Consistent with advice received from the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) the Proponent proposes to conserve into perpetuity a 1:1 ratio of conserved vegetation to the Low and Moderate-Good condition Box Gum Woodland CEEC impacted by the LRWF project (SAII Measures). The proposed wind farm and public road upgrades components of the LRWF project are estimated to impact approximately 231.4 ha of Box Gum Woodland CEEC, of which 217.5 ha is related to Low condition vegetation and 13.9 ha is related to Moderate-Good condition vegetation.

The mechanism to deliver the SAII Measures is proposed to be through the generation and retirement of relevant ecosystem credits from a registered Biodiversity Stewardship Agreement (BSA) site (SAII Credits). The SAII Credits cannot be traded on the credit market or retired against the LRWF project, and will simply be retired in accordance with the BC Act. To maximise the opportunities to reduce impacts whilst balancing the need to deliver SAII Measures in a timely manner, it is recommended that the Proponent retire the relevant SAII Credits in a staged manner upon completion of ground disturbing works for each major milestone at the LRWF site (e.g. completion of each turbine cluster). Forming part of the BSA site, the conserved vegetation would be subject to the required standard yearly active management actions specified in the Biodiversity Stewardship Site Assessment Report (BSSAR) for the relevant management zones within which the relevant vegetation zones are located. As the BSA is registered on the land title, the conserved vegetation would be protected into perpetuity.

Determining commensurate vegetation to be conserved

To ensure that the condition of the vegetation to be conserved is commensurate with the condition of the vegetation proposed to be impacted it is recommended that the Proponent generate the required ecosystem credits that are aligned with the Box Gum Woodland CEEC in accordance with the vegetation integrity (VI) score ranges developed by Umwelt Pty Ltd for the LRWF project. The VI score ranges developed by Umwelt Pty Ltd for the Low and Moderate-Good condition Box Gum Woodland CEEC are presented in the table below.

Vegetation Integrity Score Ranges – Box Gum Woodland CEEC (Umwelt, 2023)

Box Gum Woodland CEEC Condition Class (Vegetation Zones)	Vegetation Integrity Score Ranges (LRWF impact site)
Low (VZ 7 and 11)	- Between **48.7** and **64.4** (Brigalow belt – Liverpool Range) - Between **58.6** and **62.8** (Brigalow Belt South – Pilliga)
Moderate-Good (VZ 2, 6 and 9)	- Between **51.3** and **89.3** (Brigalow belt – Liverpool Range) - Between **54.9** and **87.0** (Brigalow Belt South – Pilliga)

To determine the quantum of SAII Credits required to be retired, the average credits generated from the relevant vegetation zones at the BSA site that meet the VI score ranges listed in the table above will be calculated and then extrapolated to match the area of actual impact to Low and Moderate-Good condition Box Gum Woodland CEEC at the LRWF impact site.

Proposed Location to Implement SAII Measures

It is recommended that the SAII Measures are implemented at the proposed Nangarah BSA site, located near Barraba approximately 80 km north of Tamworth within the Peel IBRA subregion. The Nangarah BSA site satisfies the relevant trading rules under the BOS to generate and retire credits against the LRWF project. The Nangarah BSA site is a highly suitable location to deliver the SAII Measures as the Proponent has secured land tenure and has full control over how SAII Credits can be generated within the BSA site. There is a mix of vegetation classes with evidence of natural regeneration and there are substantial areas of Plant Community Type (PCT) 589 which is aligned to and of equal or better condition than the Low and Moderate-Good condition Box Gum Woodland CEEC that is anticipated to be impacted at the LRWF impact site.

It is recommended that the SAII Credits are generated from within Vegetation Zones (VZ) 5 and 6 at the Nangarah BSA site, as they meet the relevant 'like for like' VI score ranges listed in the table above. Based on the estimated 217.5 ha of impact to Low condition and 13.9 ha of impact to Moderate-Good condition Box Gum Woodland CEEC a total of 500 ecosystem credits would need to be retired from the Nangarah BSA site to achieve a 1:1 area ratio of conserved vegetation to impacted vegetation. Of these, 457 credits would be generated and retired from within Vegetation Zone 6 (VI score of 49.9), and 43 credits would be generated and retired from within Vegetation Zone 5 (VI score of 91.7).

Ultimately, the SAII Measures and implementation framework set out in this report provide a robust method for the Proponent to conserve into perpetuity additional areas of Box Gum Woodland CEEC that will be subject to standard yearly active management activities that are geared towards improving condition over time. In addition to the offsets required under the NSW Biodiversity Offset Scheme (BOS), implementation of the proposed SAII Measures is expected to reduce the risk of serious and irreversible impacts to Box Gum Woodland CEEC associated with the development of the Liverpool Range Wind Farm project.

Contents

Figures

Tables

1. INTRODUCTION

Wedgetail Project Consulting Pty Ltd (Wedgetail) has been engaged by Tilt Renewables Australia Pty Ltd (the Proponent) to provide ecological advice in relation to additional and appropriate mitigation measures to reduce the risk of serious and irreversible impacts (SAII) to the Box Gum Woodland Critically Endangered Ecological Community (Box Gum Woodland CEEC) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) proposed to be impacted by the development of the Liverpool Range Wind Farm (LRWF) project. The LRWF project is located approximately 5 km east of Coolah, New South Wales (NSW) within the Central-West Orana Renewable Energy Zone (CWO REZ).

This report sets out the recommended additional and appropriate mitigation measures and implementation framework that will result in additional areas of Box Gum Woodland CEEC to be conserved in perpetuity that are commensurate in condition and area with the vegetation proposed to be impacted. The recommendations made in this report have been developed to meet the objective of reducing the risk of SAII to Box Gum Woodland CEEC whilst providing opportunities for the Proponent to further minimise estimated impacts throughout the detailed design and construction phases.

The recommendations set out in this report have been prepared in consultation with the NSW Department of Planning, Housing, and Infrastructure (DPHI) and the Biodiversity, Conservation and Science (BCS) Unit within the NSW Department of Climate Change, Energy, the Environment, and Water (DCCEEW), and in accordance with relevant guidelines and legislation including the Biodiversity Assessment Method (2020), Biodiversity Offset Scheme (BOS), and the BC Act.

2. BACKGROUND

The Proponent is currently progressing an application to modify State Significant Development Consent SSD-6696 that was granted for the LRWF project in March 2018 to, amongst other things, increase the generation capacity using fewer and larger turbines and to improve the constructability of the LRWF project (Mod-1 Application). The LRWF project is one of the most advanced projects within the Central-West Orana Renewable Energy Zone (CWO REZ), and the Proponent is working closely with EnergyCo and the Network Operator to connect the project into the CWO transmission line project and progress the LRWF project towards construction. The Proponent is targeting commencement of construction in the first half of 2025.

The Proponent has engaged Umwelt Pty Ltd to undertake biodiversity surveys and prepare the Biodiversity Development Assessment Report (BDAR) in support of the Mod-1 Application for the LRWF project. The most recent version of the BDAR dated August 2023 was lodged with DPHI as part of the Response to Submissions (RTS) phase of the Mod-1 Application. The BDAR provides a comprehensive biodiversity assessment and details the estimated impacts to Box Gum Woodland CEEC, including the vegetation integrity (VI) scores, and offset obligations under the NSW Biodiversity Offset Scheme (BOS). The BDAR contains a detailed assessment of the impacts associated with the LRWF project and the risk of serious and irreversible impacts (SAII) to all relevant SAII entities including the Box Gum Woodland CEEC. It is noted that the consent authority must take those impacts into consideration and determine whether there are any additional and appropriate measures that will minimise those impacts if approval is to be granted.

Wedgetail has been engaged by the Proponent to undertake biodiversity surveys and prepare Biodiversity Stewardship Site Agreement Reports (BSSARs) for multiple properties that will be used to offset unavoidable impacts to native vegetation/habitat associated with the LRWF project, including the proposed Nangarah BSA site located near Barraba, NSW which is particularly relevant to this report.

On 15 September 2023 DPHI issued to the Proponent a request for additional information to quantify the additional and appropriate mitigation measures proposed for the Box Gum Woodland CEEC SAII entity. The Proponent, with the support of Wedgetail, has consulted closely with DPHI and BCS to develop a comprehensive proposal to deliver fair and reasonable SAII Measures. **Table 1** below summarises the consultation undertaken to-date with DPHI and BCS specifically on SAII matters insofar as they relate to the LRWF project, and the key outcomes of that consultation.

Table 1: Summary of Consultation on SAII Matters

Agency and Method/Activity	Date	Key Advice/Outcomes
BCS Agency Submission to Mod-1 Application	14 October 2022	BCS recommends that the Proponent revise the development footprint to reduce the risk of SAII to Box Gum Woodland CEEC. No guidance on recommended SAII mitigation measures was provided.
DPHI Request for Additional Information	15 September 2023	DPHI requested additional information to quantify SAII mitigation measures. No guidance on recommended SAII mitigation measures was provided.
BCS Agency Submission to RTS/Amendment 1	1 November 2023	BCS acknowledges the Proponent's effort to reduce impacts to biodiversity, particularly box gum woodland. No guidance on recommended SAII mitigation measures was provided.
Proponent-initiated meeting with DPHI and BCS	15 December 2023	Proponent presented a draft proposal of SAII mitigation measures at the proposed Nangarah BSA site involving approximately 50 ha of land to be set-aside for active restoration.
BCS written response on SAII Measures	19 January 2024	BCS request set-aside of land within Nangarah BSA site at 1:1 ratio of impact to Low and Moderate-Good condition Box Gum Woodland CEEC.
Proponent-initiated meeting with BCS	21 February 2024	Proponent sought clarification of multiple matters set out in BCS advice dated 19 January 2024, including condition class definition, and implementation of SAII mitigation measures such as management obligations, credit retirement method and timing, and species credit implications. These are discussed in further detail in this report.
Proponent-initiated meeting with DPHI	23 February 2024	Proponent briefed DPHI on the outcomes and outstanding matters from the meeting held with BCS on 21 February 2024.

3. ESTIMATED IMPACTS TO BOX GUM WOODLAND CEEC

The BDAR prepared by Umwelt Pty Ltd dated August 2023 assessed estimated impacts to Box Gum Woodland CEEC and associated offset obligations as a result of the infrastructure layout proposed in the Mod-1 Application. The LRWF project is intending to connect into the CWO REZ transmission line project, and therefore the external transmission line between the wind farm and the original connection point at Ulan approved under the Development Consent is not likely to be constructed. Consequently, all associated impacts associated with the approved external transmission line are no longer expected to apply. As such the proposed SAII mitigation measures set out in this report are targeted at reducing the risk of SAII to Box Gum Woodland CEEC associated with the estimated impacts of the wind farm and public road upgrades components only. The proposed SAII mitigation measures do not consider the estimated impacts associated with the approved external transmission line.

In light of the above, the wind farm and public road upgrades components of the LRWF project are estimated to impact a total of 332.6 ha to *all condition classes* (i.e. Derived Native Grassland [DNG], Low and Moderate-Good) of Box Gum Woodland CEEC broken down as follows:

- 321.7 ha associated with the wind farm (equivalent to 75% of total estimated impacts to Box Gum Woodland CEEC)
- 10.9 ha associated with public road upgrades (equivalent to 3% of total estimated impacts to Box Gum Woodland CEEC)

The remaining 22% of estimated impacts to Box Gum Woodland CEEC are related to the approved external transmission line alignment between the wind farm and the approved connection point at Ulan. As noted above, the approved external transmission line is unlikely to be constructed, and the proposed additional and appropriate mitigation measures have been developed accordingly.

As highlighted further below, it is understood that BCS has requested that the Proponent implement additional and appropriate mitigation measures that conserve into perpetuity additional areas at a 1:1 ratio of impacted Low and Moderate-Good condition Box Gum Woodland CEEC. In light of this, Umwelt Pty Ltd has identified that Low and Moderate-Good condition Box Gum Woodland CEEC occurs within Vegetation Zones 2, 6, 7, 9 (partially), and 11 (partially) at the LRWF impact site. The total estimated impact to Low and Moderate-Good condition Box Gum Woodland CEEC associated with the wind farm and public road upgrades is **231.4 ha**, which is comprised of the following breakdown of impacts:

- Low condition Box Gum Woodland CEEC: **217.5 ha**
- Moderate-Good condition Box Gum Woodland CEEC: **13.9 ha**

A detailed breakdown of impacts to each plant community type (PCT) aligned with Box Gum Woodland assigned a low or Moderate-Good condition class is provided in **Table 2.**

Table 2: Summary of Impacts Associated with LRWF Project (Umwelt, 2023)

Vegetation Zone	PCT aligned with Box Gum Woodland CEEC	Condition Class	Impact Area (ha)		Total Impact Area (ha)
			Wind Farm	Public Road Upgrades	
VZ2	*PCT 281 – Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion*	**Moderate-Good**	0.7	0.7	**1.4**
VZ6	*PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley*	**Moderate-Good**	10.5	0.0	**10.5**
VZ7	*PCT 483 – Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley*	**Low**	205.4	10.0	**215.4**
VZ9	*PCT 488 – Silvertop Stringybark – Yellow Box +/- Nortons Box grassy woodland on basalt hills mainly on northern aspects of the Liverpool Range, Brigalow Belt South Bioregion*	**Moderate-Good**	2.0	0.0	**2.0**
VZ11	*PCT 488 – Silvertop Stringybark – Yellow Box +/- Nortons Box grassy woodland on basalt hills mainly on northern aspects of the Liverpool Range, Brigalow Belt South Bioregion*	**Low**	2.1	0.0	**2.1**
TOTAL (ha)			**220.7**	**10.7**	**231.4**

4. KEY CONSIDERATIONS FOR THE DEVELOPMENT OF SAII MITIGATION MEASURES

4.1 BCS ADVICE ON SAII MITIGATION MEASURES

As noted in **Table 1** above, on 15 December 2023 the Proponent presented a proposal to set aside approximately 50 ha of land within the proposed Nangarah BSA site to reduce the risk of SAII to Box Gum Woodland CEEC associated with the development of the LRWF project.

Following the meeting held on 15 December 2023, BCS provided written advice dated 19 January 2024, which stated the following:

> '*…additional and appropriate measures proposed should be commensurate to the residual impact of the project on this CEEC. For proposed land-based conservation sites, this would represent a 1:1 ratio of conserved vegetation to impacted vegetation*'

> *'…additional and appropriate measures for SAII on Box Gum Woodland should include an area equivalent to that of the low and Moderate-Good condition Box Gum Woodland being impacted – approximately 215 hectares'*[1]
>
> *'….[BCS is] supportive of additional and appropriate measures sites being secured as part of a Biodiversity Stewardship Site (BSA). However, areas identified as additional and appropriate measure sites must not allow for credits relevant to the SAII entity to be traded on the biodiversity credit market, or used to fulfil the credit obligation of the project.*'
>
> *'…credits should be immediately retired when generated and evidence of retirement should be provided to the consent authority. This does not affect other areas of the BSA that are unrelated to the additional and appropriate measures proposed, nor credits generated on additional and appropriate measure sites which are not part of the relevant SAII entity.'*

Following a detailed review of BCS' advice dated 19 January 2024, several critical matters were identified and discussed at the follow-up meeting with BCS held on 20 February 2024. These are discussed in turn below.

4.2 CONSERVATION OF COMMENSURATE AREAS OF IMPACTED BOX GUM WOODLAND CEEC

BCS' advice dated 19 January 2024 requested that the Proponent set-aside land at a 1:1 ratio of conserved vegetation to impacted vegetation represents a significant increase (approximately 330% increase) compared to the Proponent's proposal presented on 15 December 2023.

This significant increase in area would in effect remove a substantial number of ecosystem credits from the Nangarah BSA site that could be retired against the LRWF project and in-turn require the Proponent to make this shortfall up by securing additional land-based opportunities elsewhere to offset impacts associated with the LRWF project, at significant cost.

Notwithstanding this, the Proponent has advised that it is committed to deliver SAII mitigation measures at a BSA site equivalent to 1:1 ratio of conserved vegetation to impacted Low and Moderate-Good condition Box Gum Woodland CEEC, on the understanding that standard active management actions required under the Biodiversity Stewardship Agreement (BSA) would apply and that no active restoration management activities (ARMA) would be required (discussed further in **Section 5.2.7**). The Proponent proposes to implement the SAII mitigation measures at the Nangarah BSA site which is currently being established to generate credits to be retired against the LRWF project (see **Section 5.2.1).**

4.3 CONDITION CLASS AND VEGETATION INTEGRITY (VI) SCORES

Implementation of the BCS' recommendation that the Proponent set aside an area equivalent to that of the Low and Moderate-Good condition Box Gum Woodland CEEC being impacted is problematic as the condition class labels (i.e. 'Low' and 'Moderate-Good') are subjective in nature and are used

[1] The reference in BCS' correspondence to 215 ha of impact to Low and Moderate-Good condition Box Gum Woodland CEEC was based on a preliminary assessment undertaken by the Proponent of the estimated impacts associated with the proposed wind farm and public road upgrade works. It excludes the impacts associated with the external transmission line alignment between the wind farm and the approved connection point at Ulan as the LRWF project is planning to connect into the CWO REZ transmission line project. The Proponent has since undertaken a more detailed assessment of the estimated impacts associated with the wind farm and public road upgrades which indicates approximately 231 ha of impact to Low and Moderate-good condition Box Gum Woodland CEEC (see Table 2). It is noted that the actual area of impact to Box Gum Woodland CEEC associated with the wind farm and public road upgrades will be more accurately determined during the detailed design and construction phases of the LRWF project.

in an inconsistent manner by different accredited Biodiversity Assessment Method (BAM) assessors. Despite applying the BAM consistently, assessors can label similar condition vegetation differently.

To address this issue, it is recommended that a more robust and objective metric is used, whereby the conserved vegetation must meet the Vegetation Integrity (VI) score ranges prepared by Umwelt Pty Ltd in accordance with the BAM (2020) for Low and Moderate-Good Box Gum Woodland CEEC at the LRWF impact site. The VI scores set out in the BDAR dated August 2023 corresponding to Low and Moderate-Good condition Box Gum Woodland CEEC are as follows (see also **Table 3):**

- **'Low' condition:** VI scores range between **53.6** and **63.6**
- **"Moderate-Good' condition:** VI scores range between **63.6** and **81.5**

The corresponding VI scores identified by Wedgetail Pty Ltd for Box Gum Woodland CEEC within the target areas at the Nangarah BSA site equivalent to the Low and Moderate-Good condition class identified at the LRWF impact site by Umwelt Pty Ltd are presented in **Table 3** below.

As can be seen from **Table 3** below, the VI scores for the Woodland Moderate to Good vegetation zones at the Nangarah BSA site generally correspond with the Moderate-Good vegetation zones at the LRWF impact size, with the VI scores of the Woodland Moderate to Good on the BSA site being higher than those at the LRWF impact site.

Ultimately, using VI score ranges is the most objective method to determine equivalent condition classes between the LRWF impact site and the BSA site, and that the identified vegetation zones at the Nangarah BSA site are of a commensurate condition and quantity of Box Gum Woodland CEEC that is anticipated to be impacted at the LRWF impact site. It is therefore recommended that the Proponent adopt this approach.

4.4 RISK OF DISPROPORTIONATE AREAS BEING CONSERVED AND MAXIMISING OPPORTUNITIES TO FURTHER MINIMISE IMPACTS

In its advice dated 19 January 2024 BCS requests that the Proponent sets aside a specific area of land within the Nangarah BSA site for SAII mitigation measures. However, implementation of this would be problematic as it creates a risk that the area of land and the condition of the vegetation to be conserved is not commensurate with the actual impacts associated with the LRWF project. As the LRWF project proceeds through the post-approval phase, it will be subject to further detailed design once a balance of plant (BOP) contractor has been awarded to construct the project, which will continue throughout the construction phase. The detailed design process provides significant opportunities for the BOP contractor to further reduce impacts to Box Gum Woodland CEEC, as has been demonstrated by other Tilt Renewables projects such as for the Rye Park Wind Farm.

To develop SAII mitigation measures at this stage that require a specific area of land to be set aside within the BSA site would need to be based on the preliminary design work and biodiversity assessments that have been completed to-date. Determining the specific area of land to be set aside within the BSA site at this early stage may therefore result in delivering SAII mitigation measures that are not commensurate with and materially different to the areas and condition of Box Gum Woodland CEEC that are actually impacted through the construction phase.

The SAII mitigation measures and associated implementation framework presented in the following sections have been developed to specifically address the shortcomings of linking SAII mitigation measures to a specific area within the BSA site, while still ensuring a total area of Box Gum Woodland CEEC is conserved that is commensurate with the impacted area.

WEDGETAIL PROJECT CONSULTING

Table 3: Vegetation Integrity Scores and Areas - Box Gum Woodland CEEC

Impact Site - Liverpool Range Wind Farm (Umwelt, 2023)					SAII Measures Location - Nangarah BSA Site (Wedgetail, 2024)						
PCTs aligned with Box Gum Woodland CEEC (Low and Moderate-Good condition)	**Vegetation Zone and Condition Class**	**Impact Area (ha)**	**VI Score**	**Hollow bearing tree**	**PCTs aligned with Box Gum Woodland CEEC (equivalent to Low and Moderate-Good condition)**	**Vegetation Zone and Condition Class**	**Available Area of Vegetation (ha)**	**VI Score**	**Hollow bearing tree**	**Credits generate per ha per veg zone**	**Estimated Credits to be retired to achieve 1:1 ratio of area of conserved vegetation to impacted vegetation**
281	2 – Moderate Good	**1.4**	**63.3**	Yes	**589**	5 - Woodland – Moderate Good	**830.61**	**91.7**	Yes	3.1	43
483	6 – Moderate Good	**10.5**	**81.5**	Yes							
488	9 – Moderate Good	**2.0**	**72.1**	Yes							
483	7 - Low Condition	**215.4**	**53.6**	Yes	**589**	6 - DNG - Moderate	**484.02**	**49.9**	Yes	2.1	457
488	11 - Low Condition	**2.1**	**63.6**	Yes							
TOTAL		**231.4**									

5. PROPOSED SAII MEASURES AND IMPLEMENTATION FRAMEWORK

Following a detailed review of BCS' advice dated 19 January 2024 and the additional considerations detailed above, it is recommended that the Proponent implement the SAII mitigation measures and implementation framework described below to ensure they are delivered in a timely and effective manner that reduces the risk of SAII to Box Gum Woodland CEEC and conserves the SAII entity in perpetuity.

5.1 PROPOSED SAII MEASURES

The Proponent proposes to conserve in perpetuity additional areas of Box Gum Woodland CEEC equivalent to the quantum of Low and Moderate-Good condition class impacted at the LRWF site, in accordance with the implementation framework presented further below (SAII Measures). The mechanism to conserve in perpetuity the additional areas of Box Gum Woodland CEEC will be via the retirement of the required quantity and type of ecosystem credits generated from relevant vegetation zones within a BSA site that will be registered on title as required under the BC Act (SAII Credits).

Forming part of the BSA site, the conserved vegetation would be subject to the required standard yearly active management actions specified in the Biodiversity Stewardship Site Assessment Report (BSSAR) for the relevant management zones within which the relevant vegetation zones where the ecosystem credits have been generated are located.

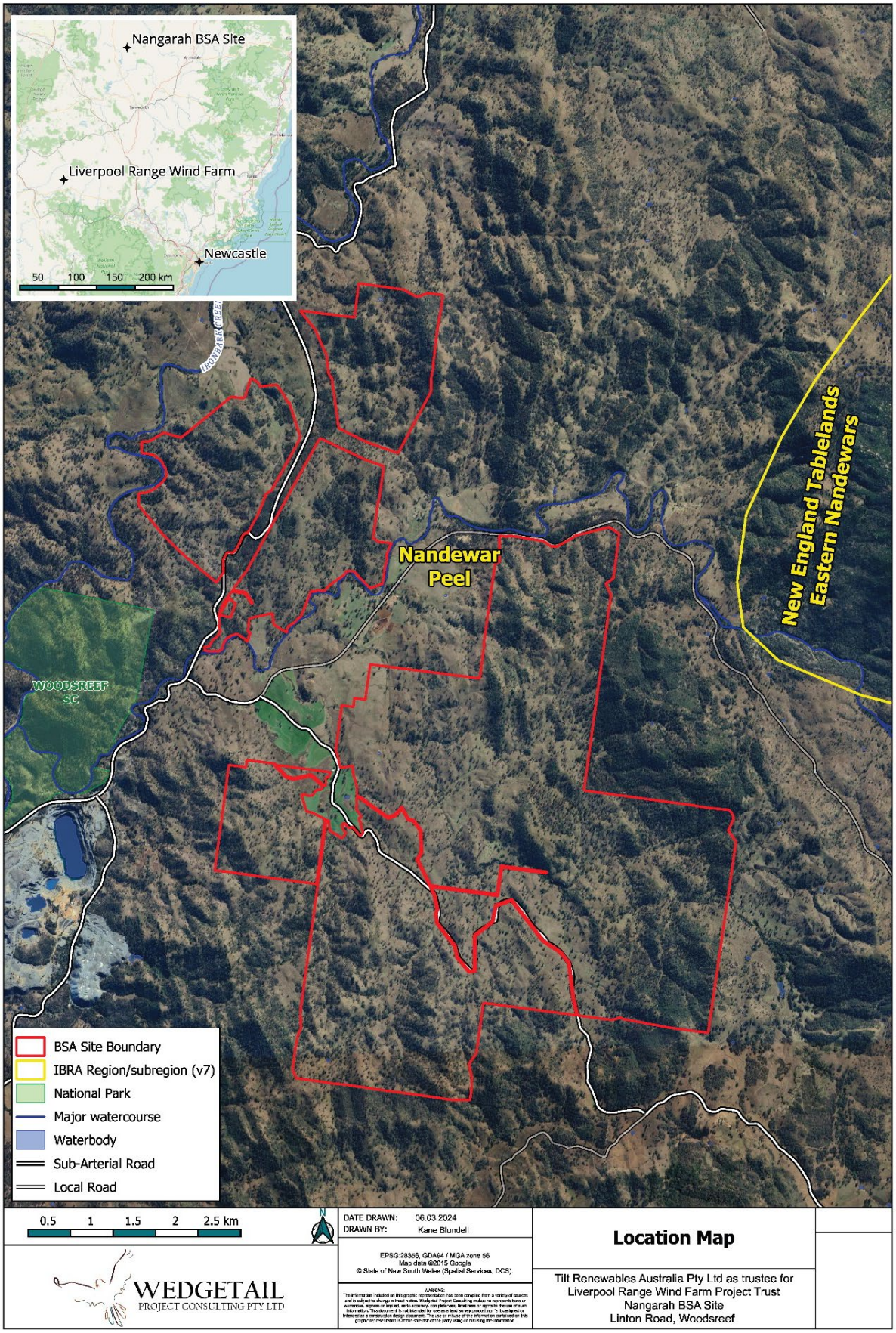
5.2 SAII IMPLEMENTATION FRAMEWORK

The SAII implementation framework described below sets out clear parameters to ensure additional areas of Box Gum Woodland CEEC are conserved in perpetuity that are equivalent to the Low and Moderate-Good condition class impacted at the LRWF site. The key aspects of the implementation framework are discussed in further detail below.

5.2.1 Intended Location to Implement SAII Measures

The SAII Credits will be generated from a BSA site that is under the Proponent's control. While the Proponent is establishing new BSA sites at various locations to offset unavoidable impacts associated with the LRWF project, it is intended that the SAII Credits will be generated from the proposed Nangarah BSA site, located near Barraba approximately 80 km north of Tamworth within the Peel IBRA subregion. The Nangarah BSA site satisfies the relevant trading rules under the BOS to generate and retire credits against the LRWF project as it is located within the same or adjoining IBRA subregions or a subregion that is within 100 km of the outer edge of the impacted site. The relevant IBRA sub-regions that adjoin the Liverpool Range and Piliga IBRA sub-regions (i.e. the two IBRA sub-regions within which the LRWF project is located) include: Liverpool Plains, Peel, Hunter, Kerrabee, Inland Slopes, Talbragar Valley, Bogan-Macquarie, Castlereagh-Barwon and Piliga Outwash. The location of the Nangarah BSA site is shown in **Figure 1** below.

Figure 1: Location of the Nangarah BSA Site - SAII Measures



The Nangarah BSA site is a highly suitable location to deliver the SAII Measures as the Proponent has secured land tenure and has full control over how SAII Credits can be generated within the BSA site. In addition, there is a mix of vegetation classes with evidence of natural regeneration and there are substantial areas of Box Gum Woodland CEEC of equivalent condition to the Low and Moderate-Good condition vegetation anticipated to be impacted at the LRWF impact site.

The Proponent has been consulting closely with the NSW Biodiversity Credit Supply Taskforce to undertake the necessary biodiversity surveys to inform the preparation of the BSSAR for the Nangarah BSA site. The Proponent intends to lodge the BSSAR in late March 2024 and expects approval and registration of the BSA site by third quarter of 2024.

5.2.2 Determining Equivalent Condition Classes

To ensure that the equivalent condition classes of Low and Moderate-Good condition Box Gum Woodland CEEC are conserved at the BSA site, it is recommended that the corresponding vegetation integrity score ranges set out in **Table 4** should apply.

Table 4: Applicable Vegetation Integrity Scores - Box Gum Woodland CEEC (Umwelt, 2023)

Box Gum Woodland Condition Class (Umwelt, 2023)	Vegetation Integrity Score Ranges
Low (VZ 7 and 11)	- Between **48.7** and **64.4** (Brigalow belt – Liverpool Range) - Between **58.6** and **62.8** (Brigalow Belt South – Pilliga)
Moderate-Good (VZ 2, 6 and 9)	- Between **51.3** and **89.3** (Brigalow belt – Liverpool Range) - Between **54.9** and **87.0** (Brigalow Belt South – Pilliga)

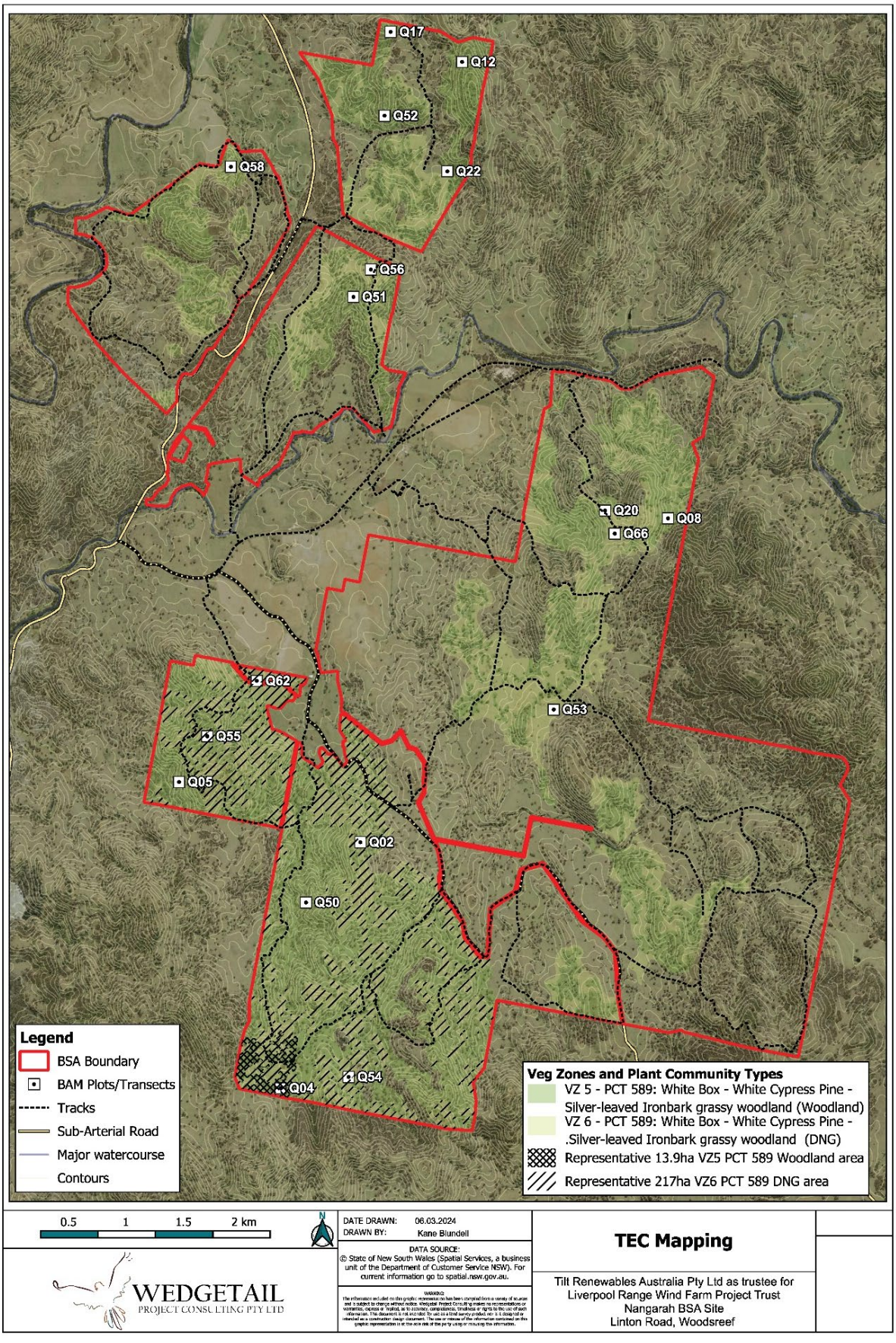
5.2.3 SAII Credit Generation

The Proponent will generate at the BSA site the required ecosystem credits that are aligned with the Box Gum Woodland CEEC in accordance with the applicable vegetation integrity scores listed in **Table 4.** The quantity of ecosystem credits to be generated will be calculated according to the area of actual impact to Box Gum Woodland CEEC at the LRWF site.

The Proponent intends to generate the required ecosystem credits at the Nangarah BSA site. Wedgetail has completed all required biodiversity surveys under the BAM 2020 for the Nangarah BSA site, and has prepared detailed vegetation mapping to support the BSSAR. The vegetation mapping confirms that PCT 589 (Vegetations Zones 5 and 6) meet the equivalent Low and Moderate-Good condition Box Gum Woodland CEEC thresholds (see **Figure 2** below).

As shown in **Figure 2** the vegetation mapping confirms that Vegetation Zones 5 and 6 (generally located in the south-western portion of the Nangarah BSA site) can generate the approximately 500 credits expected to be required to deliver a 1:1 ratio of additional conserved vegetation to the Low and Moderate-Good condition Box Gum Woodland CEEC impacted by the wind farm and public road upgrade components of the LRWF project (see also **Table 3** above).

Figure 2: Box Gum Woodland CEEC Mapping (PCT 589) - Nangarah BSA Site



5.2.4 Calculation of SAII Credits to be Retired

To determine the quantum of SAII Credits required to be retired, the average credits generated from the relevant vegetation zones from the BSA site will be calculated and then extrapolated to match the area of actual impact to Box Gum Woodland CEEC at the LRWF impact site, as follows:

- **Step 1:** Determine the areas of impact to Low and Moderate-Good condition Box Gum Woodland CEEC at the LRWF impact site (A). Note this would be done in a staged manner as discussed in **Section 5.2.5**)
- **Step 2:** Select the relevant vegetation zones at the BSA site that correspond to the Vegetation Integrity (VI) score ranges for Low and Moderate-Good condition Box Gum Woodland CEEC at the LRWF impact site, as specified in **Table 4**.
- **Step 3:** calculate the average credits per hectare generated within the relevant vegetation zones at the BSA site (B)
- **Step 4:** multiply the area of impact to the specific condition class of Box Gum Woodland CEEC at the LRWF impact site (A) by the average credits per hectare for the corresponding condition class of Box Gum Woodland CEEC generated within the relevant vegetation zones (B)

The following is an example of how the total number of SAII Credits to be retired would be calculated at the Nangarah BSA site:

- Step 1: based on the current preliminary design a total of 217.5 ha of Low condition and 13.9 ha of Moderate-Good condition Box Gum Woodland CEEC is estimated to be impacted within the wind farm and the public road upgrades at the LRWF site.
- Step 2: Vegetation Zone 6 (DNG Moderate) has a VI score of 49.9 and meets the relevant VI score range corresponding to Low condition Box Gum Woodland CEEC. Vegetation Zone 5 (Woodland Moderate-Good) has a VI score of 91.7 and meets the relevant VI score range corresponding to Moderate condition Box Gum Woodland CEEC.
- Step 3: Vegetation Zone 6 (DNG Moderate) generates an average of 2.1 credits per hectare. Vegetation Zone 5 (Woodland Moderate-Good) generates an average of 3.1 credits per hectare.
- Step 4: A total of 500 SAII Credits would need to be retired, calculated as follows:

2.1 credits / ha x 217.5 ha = 457 credits

3.1 credits / ha x 13.9 ha = 43 credits

457 credits + 43 credits = 500 credits

Based on this example, a total of 457 ecosystem credits aligned with Low condition Box Gum Woodland CEEC would be generated and retired from within Vegetation Zone 6 (PCT 589) and 43 ecosystem credits aligned with Moderate-Good condition Box Gum Woodland CEEC would be generated and retired from within Vegetation Zone 5 (PCT 589) at the Nangarah BSA site.

As shown in **Table 3** above, the Nangarah BSA site alone is expected to generate well in excess of the approximately 500 credits aligned with the Box Gum Woodland CEEC expected to be required to achieve a 1:1 ratio of area of conserved vegetation to impacted vegetation.

5.2.5 Staged Retirement of SAII Credits

As outlined in **Section 4.4** above, as the LRWF project progresses through the detailed design and construction phases there will be more opportunities for the Proponent to work with the BOP contractor to evaluate whether further reductions to impacts to Box Gum Woodland CEEC can be achieved. The Proponent is committed to avoid and minimise impacts to native vegetation and habitat as far as practicable in the first instance, followed by offsetting to compensate for unavoidable impacts.

To maximise the opportunity to reduce impacts whilst balancing the need to deliver SAII Measures in a timely manner, it is recommended that the Proponent retire the relevant SAII Credits in a staged manner upon completion of ground disturbing works for each major milestone at the LRWF site. Because the SAII Credits will be generated from specific vegetation zones that are located in management zones within the BSA site, the Proponent can withhold the SAII Credits until the actual impact areas have been accurately calculated.

It is recommended that the Proponent retain the maximum number of SAII Credits aside at commencement of construction of the LRWF project and progressively retire them as the construction fronts progress through the impact site and the actual impact areas to the Low and Moderate-Good condition Box Gum Woodland CEEC have been more accurately calculated. The SAII Credits should then be retired in accordance with the BC Act at the completion of key milestones in the construction program. The Proponent has advised that whilst the construction methodology will be determined by the BOP contractor in due course, the key milestones in the construction program are likely to be similar to those presented in **Table 5.**

Table 5: Indicative Construction Milestones - LRWF project

Construction Milestone	Indicative Completion Timeframe
Completion of public road upgrades (southern portion)	~6 months after commencement of construction
Completion of turbine clusters F and D and associated ancillary works	~24 months after commencement of construction
Completion of public road upgrades (northern portion)	~36 months after commencement of construction
Completion of turbine clusters A, B and C and associated ancillary works	~48 months after commencement of construction

5.2.6 Retirement of species credits

It is understood that species credits that are associated with the Box Gum Woodland CEEC SAII entity that are generated within the areas where SAII Credits are generated cannot be traded freely on the credit market or retired against the LRWF project.

Wedgetail has completed a review of the NSW Threatened Species Scientific Committee's Final Determination to list White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and

Riverina Bioregions as a Critically Endangered Ecological Community in Part 1 of Schedule 2 of the BC Act.

From this review, Wedgetail understands that squirrel glider, large-eared pied bat and eastern cave bat are not associated with the listing of the Box Gum Woodland CEEC, and as such species credits for these three species that are generated within the same vegetation zones as SAII Credits at the BSA site are permitted be traded freely on the credit market or retired against the LRWF project. At the Nangarah BSA site, significant quantities of species credits for squirrel glider, large-eared pied bat and eastern cave bat are expected to be generated and will be required for the LRWF project to meet its large credit obligation for these species. It is critical to the feasibility and timely delivery of the LRWF project that these species credits are able to be retired against the LRWF project.

5.2.7 Standard Active Management Actions

As the additional areas of Box Gum Woodland CEEC to be conserved will be located within the BSA site, those additional areas will be subject to the standard active management actions specified for the relevant management zones within the BSSAR. No active restoration management activities are proposed to be implemented. In particular, the Nangarah BSA site there is evidence of substantial regeneration within the areas of equivalent Low condition Box Gum Woodland CEEC. The standard active management actions specified in the BSSAR are expected to involve the following:

- Wildlife friendly fencing
- Feral animal control
- Weed control
- Ecoburns when considered appropriate to improve biodiversity value
- Monitoring

6. CONCLUSION

The additional and appropriate measures and implementation framework presented in this report provide a robust method to conserve additional areas of Box Gum Woodland CEEC into perpetuity and have been developed to meet the objective of reducing the risk of serious and irreversible impacts to the SAII entity resulting from the development of the Liverpool Range Wind Farm (LRWF) project. The Proponent intends to deliver the SAII Measures via the retirement of credits generated at the proposed Nangarah BSA site which has substantial areas of vegetation equivalent to the Low and Moderate-Good condition Box Gum Woodland CEEC that is expected to be impacted at the LRWF impact site.

The proposed SAII Measures and implementation framework have been developed to achieve BCS' request for a 1:1 ratio of conserved vegetation to impacted vegetation in a timely manner that affords the Proponent appropriate opportunities through the detailed design and construction phases to further reduce impacts to Box Gum Woodland CEEC, while remaining accountable and transparent. A key factor in achieving this accountability will be the requirement for the Proponent to hold the maximum number of SAII Credits aside at commencement of construction of the LRWF project, which would then be progressively retired at the end of each key milestone in the construction program (e.g. completion of each turbine cluster).