



Hills of Gold Wind Farm Pty Ltd



Co-Developed by Clean Energy
Partners Pty Limited

Development Management by:



Hills of Gold Wind Farm

Response to Request for Additional
Information

25 March 2022

Project No.: 0550690

Document details	
Document title	Hills of Gold Wind Farm
Document subtitle	Response to Request for Additional Information
Project No.	0550690
Date	25 March 2022
Version	1.0
Author	Amanda Antcliff, Catherine Timbrell
Client Name	Hills of Gold Wind Farm Pty Ltd

Document history

Version	Revision	Author	Reviewed by	ERM approval to issue		Comments
				Name	Date	
Draft	00	Amanda Antcliff, Catherine Timbrell	Murray Curtis	Murray Curtis	22.03.22	
Final	00	Amanda Antcliff, Catherine Timbrell	Murray Curtis	Murray Curtis	25.03.22	

Signature Page

25 March 2022

Hills of Gold Wind Farm

Response to Request for Additional Information



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1. INTRODUCTION

1.1 Overview

Hills of Gold Wind Farm Pty Ltd (the 'Proponent') is proposing to construct and operate the Hills of Gold Wind Farm and associated ancillary infrastructure (the 'Project'), located on the ridgeline between Hanging Rock and Crawney Pass in the Northern Tablelands region of New South Wales (NSW).

Approval for the Project is sought under the State Significant Development (SSD) provisions (Division 4.7) of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the Project is declared to be State Significant Development (SSD) under the State Environmental Planning Policy (Planning Systems) 2021 (former SEPP State and Regional Development 2011).

In support of the SSD application, an Environmental Impact Statement (EIS) (ERM, 2020) was prepared for the Project in accordance with the requirements of the then *Environmental Planning and Assessment Regulation 2000* (now *Environmental Planning and Assessment Regulation 2021*). The EIS was publicly exhibited between 2 December 2020 and 29 January 2021 by the NSW Department of Planning, Industry and Environment (DPIE) (now Department of Planning and Environment, DPE).

In response to submissions received from regulatory and community stakeholders and further engagement, a Submissions Report and Amendment Report were subsequently submitted on 10th January 2022. The Project is currently in the assessment phase.

1.2 Request for Information

A request for additional information (RFI) was made by DPE on 9 February 2022 seeking the following additional information:

- **Transport:** further justification on why a private road through Crown Reserve 85916 for Public Recreation is appropriate and necessary when alternative transport route options are available and considering the process required to secure access to this land.
- **Visual:**
 - status of agreements with the landowners of sensitive receivers where impacts are inconsistent with the Visual Performance Objectives outlined in the Wind Energy Visual Assessment Bulletin (DPE, 2016); and
 - mitigation proposed (including consideration of removing turbines) in instances where a landowner agreement cannot be reached.
- **Biodiversity:** justification for the placement of wind turbines immediately adjacent to Ben Halls Gap Nature reserve, have regard to:
 - potential barrier effects, displacement of home ranges and disruption to movement of mobile species;
 - advice from Biodiversity, Conservation and Science Directorate (BCS) and National Parks and Wildlife Service (NPWS) on the updated Biodiversity Development Assessment Report; and
 - input from a bat ecologist and other relevant experts.
- **Aviation hazards, bushfire risk and telecommunications:** NPWS comments on aviation hazards, bushfire risk and telecommunications impacts on fire fighting and other NPWS aerial activities.

Further, a RFI dated 11 October 2021 and subsequent engagement with DPE sought the following additional information relating to **Visual**:

- *detailed assessment and consideration of visual impacts of the Project on properties within the vicinity of the Project for which:*
 - dwellings are approved but yet to be constructed or are under construction;
 - a development application has been lodged, but a determination is yet to be made; and
 - there are existing dwelling entitlements on the land.

As outlined in the NSW Government Wind Energy Framework the assessment should include the consideration of existing dwelling entitlements on land within the vicinity of the wind energy project. Please ensure you identify and assess any other lots in proximity to the Project site with dwelling entitlements in your Response to Submissions/Amendment Report'. A copy of the RFI and attachments is provided in **Appendix A**.

1.3 Consultation Update

The Proponent remains committed to ongoing engagement and consultation with key stakeholders and the local community. Recent consultation has included:

- 7 February 2022: Quarterly Project newsletter sent via email to a list of 340 subscribers, and distributed in hardcopy to all local addresses.
- 14-18 February 2022: A week-long series of consultation events in Nundle and surrounds, which involved three morning information hubs in partnership with a local business. Evening information hubs were also held in Nundle, Hanging Rock and Timor during this week. In person meetings with neighbours and local businesses were conducted throughout the week. A series of factsheets highlighting the Project updates were distributed at these events.
- 15 February 2022: Meeting held with senior Upper Hunter Shire Council staff to provide an update on the Amendment Report and Submissions Report.
- 15 February 2022: Site visit held for around 40 local community members, providing an opportunity to see the Project site and ask questions of the Project team.
- 17 February 2022: A round table event was held in Tamworth to provide an overview of the Project and gave an opportunity for attendees to ask questions of the Proponent. The event was attended by approximately 30 representatives of the local business chamber, local employment agencies, community groups and business owners.
- 17 February 2022: Community Consultative Committee meeting in Nundle.
- 22 February 2022: Teleconference call with BCS, NPWS, Biosis, ENGIE and Someva to discuss proposed actions to respond to RFI and discussion on email sent outlining these.
- 23 February 2022: Meeting with the Nungaroo Aboriginal Land Council in Quirindi to discuss the Project and organise a cultural walk over with Aboriginal elders in Nundle and Hanging Rock.
- 23 February 2022: Meeting with the Gomeroi Applicant and NTS Corp to discuss further opportunities for Project involvement and collaboration.
- 24 February 2022: Meeting with Kevin Anderson MP's senior advisor to provide a Project update and hear feedback received by My Anderson's office.
- 24 February 2022: The Proponents presented a Project update to Tamworth Regional Council at a council workshop in Tamworth.
- 28 February 2022: A meeting was held with Upper Hunter Shire Council, providing a Project overview and key update to Councillors and senior Council staff.
- 2 March 2022: Meeting between the Proponent, NPWS, ERM and Aviation Projects to discuss NPWS concerns relating to aerial operations and bushfire management issues within the adjacent Ben Halls Gap Nature Reserve.

- 3 March 2022: Meeting between the Proponent, NPWS, and DNV to discuss NPWS concerns relating to potential telecommunications impacts to NPWS operations within the adjacent Ben Halls Gap Nature Reserve.
- 8 March 2022: Meeting between the Proponent, DPE and ERM to discuss site access route options.
- 11 March 2022: Workshop with BCS including NPWS, Biosis, ENGIE and Someva to discuss updated Bird and Bat Adaptive Management Plan (BBAMP) triggers, surveys and mitigation and analysis on barrier movements of species. Information shared prior for discussion.
- 15 March 2022: Discussion with NPWS on proposed Wild Dog and Aerial Baiting program mitigations considered in the RFI response for feedback.
- 20-25 March 2022: Call outs and emails to local business offering in-person consultation for the next consultation week taking place the week of 4-8 April.

1.4 Report Structure

The structure of this report is:

- Chapter 1: Introduction
- Chapter 2: Transport response
- Chapter 3: Visual response
- Chapter 4: Biodiversity response
- Chapter 5: NPWS Aviation and Bushfire response
- Chapter 6: NPWS Telecommunications response
- Chapter 7: Dwelling Entitlement Response
- Appendices:
 - Appendix A: RFI Requests
 - Appendix B: Recreational Opportunities Analysis
 - Appendix C: Biosis Response
 - Appendix D: Updated BDAR
 - Appendix E: Aviation Projects Letter response
 - Appendix F: DNV Letter response
 - Appendix G: Updated Mitigation and Management Measures
 - Appendix H: ERM Dwelling Entitlement Assessment

2. TRANSPORT RESPONSE

2.1 DPE Request

Transport: further justification on why a private road through Crown Reserve 85916 for Public Recreation is appropriate and necessary when alternative transport route options are available and considering the process required to secure access to this land.

2.2 Response

2.2.1 Overview

The EIS proposed two transport routes from Nundle for use by the Project to access to Project Area:

- Preferred Route: Barry Road and Morrisons Gap Road, including the construction of a bypass of Devils Elbow; and
- Alternate Route: Crawney Road, Head of Peel Road and Kirks Road, which included:
 - optionality for up to 20% of light and heavy vehicles; and
 - optionality for over size / over mass (OSOM) vehicles.

Preliminary design and road upgrade information for both routes was assessed in the EIS.

Following the exhibition of the EIS and with consideration of submissions from the community and regulators, including DPE and Tamworth Regional Council (TRC), the Head of Peel Road alternate route option was removed from the Project, with all traffic to access the Project Area via Barry Road, Devils Elbow bypass road and Morrisons Gap Road. The Amendment Report (ERM, 2021a) assessed an optimised design for Devils Elbow bypass road.

The Submissions Report (Table 5-1, DPIE_10) (ERM, 2021b) provides an analysis of up to six (6) site access options considered by the Project during the preliminary design phase of the Project, including the Barry Road, Devils Elbow and Morrisons Gap Road option and the Head of Peel Road option. The consideration of the six site access options included site visits and design analysis by Siemens-Gamesa's (experienced turbine manufacturer and installer) civil engineering team to determine the viability and constructability of each route option to enable turbine component delivery with a focus on minimising public road modifications required, optimising road geometry and minimising grade, and minimising total earthworks required.

As detailed in the Submissions Report (Table 5-1, DPIE_10) (ERM, 2021b), the analysis concluded that Barry Road, Devils Elbow bypass road and Morrisons Gap Road presented as the most practical route based on the following:

- majority of access is defined over existing public roads;
- the shortest length of new access road construction required;
- frequently used by forestry trucks;
- lowest existing natural ground slopes of all access options;
- lowest designed maximum slope of all access options; and
- lowest total earthworks and gravel importation required of all viable options.

2.2.2 *Comparative Analysis*

In response to DPE's current request for information relating to the construction of Devils Elbow bypass road (being a private road) through Crown Reserve 85916 for Public Recreation, a comparative analysis of Devils Elbow and Head of Peel Road (as the alternate route presented in the EIS) has been undertaken to reassess whether to reintroduce Head of Peel Road as an alternate access route. This comparative analysis considers the potential environmental and social impacts of each access route, as presented in **Table 2-1**.

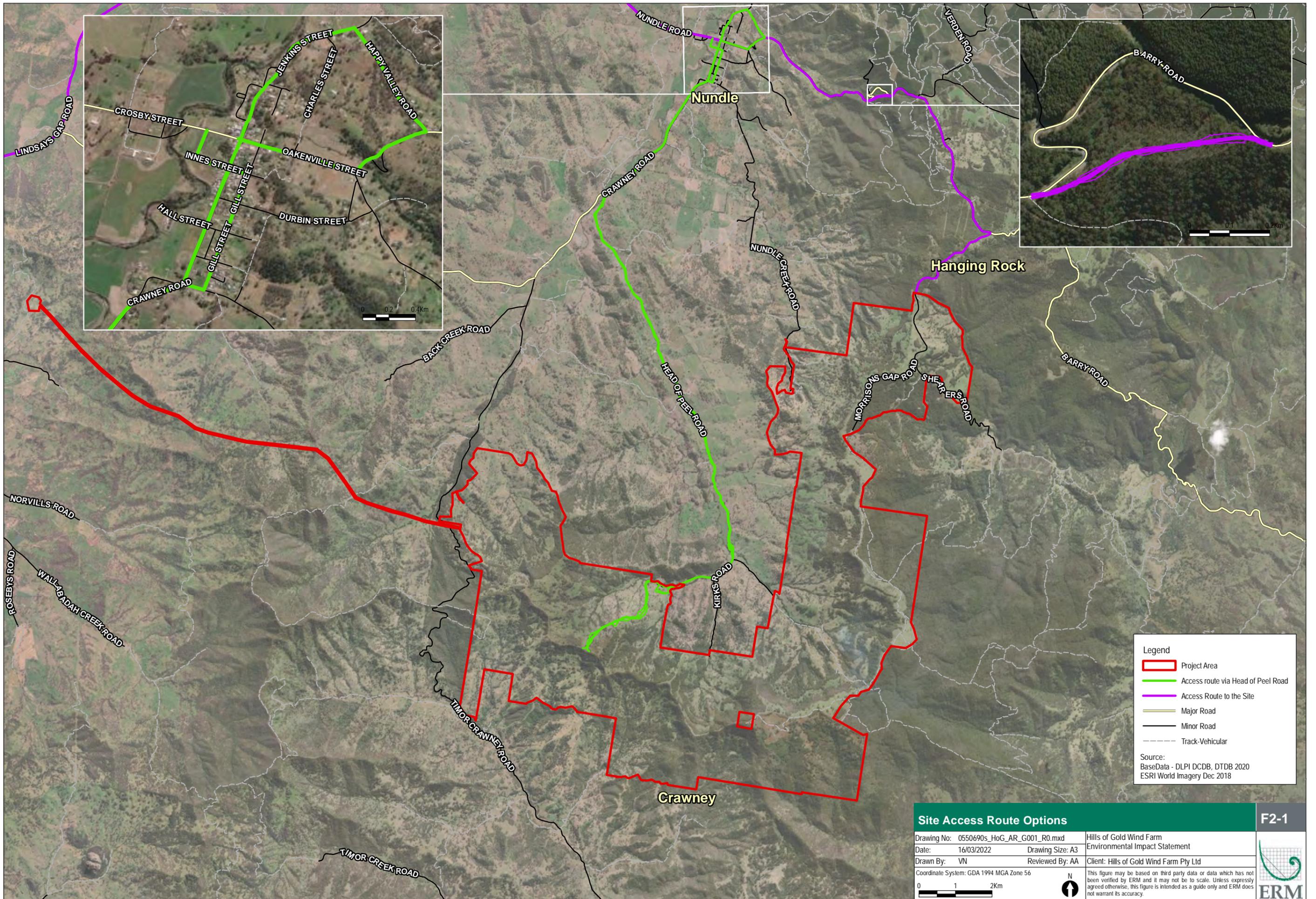
Table 2-1: Comparative Analysis – Devils Elbow Bypass Road and Head of Peel Road Site Access Routes

Aspect	Devils Elbow Bypass Road (Optimised Design in Amendment Report)	Devils Elbow Bypass Road (Preliminary Design in EIS)	Head of Peel Road (Preliminary Design in EIS)
Civil considerations, Traffic and Transport			
Civil Considerations	<ul style="list-style-type: none"> ■ 615 m length new access ■ 17,000 m³ estimated total earthworks ■ 1,107 m³ estimated gravel importation ■ 24.5 m maximum width of batters 	<ul style="list-style-type: none"> ■ 615 m length new access ■ 100,000 m³ estimated total earthworks ■ 1,107 m³ estimated gravel importation ■ 62 m maximum width of batters 	<ul style="list-style-type: none"> ■ 16.8 km upgrade length ■ 2,414,993 m³ estimated total earthworks ■ 30,240 m³ estimated gravel importation ■ 165 m maximum width of batters
Traffic Generation (assessed in EIS)	<ul style="list-style-type: none"> ■ 100% heavy and light vehicle ■ 100% OSOM 		<ul style="list-style-type: none"> ■ Option for 20% heavy and light vehicle ■ Option for 100% OSOM
Suitability of transport route	<ul style="list-style-type: none"> ■ Single pass through Nundle along Oakenvile Street to Barry Road, refer Figure 2-1. ■ Construction of Devils Elbow bypass road. ■ Barry Road onto Morrisons Gap Road requires modifications for swept paths, all within road reserve. ■ Morrisons Gap Road is gravel for the entirety and will be made suitable for all weather travel. 		<ul style="list-style-type: none"> ■ OSOM vehicles travelling this route would require either a double pass through Nundle or passing through residential areas of Nundle, refer Figure 2-1. ■ General upgrades to the Head of Peel Road required including road widening to a width of 5.5 m. Significant work on bridges, causeways and upgrading roads, horizontal and vertical curves. ■ An alternative through Nundle for the blades (Herring St, Innes St to Gill St, Point St and Crawney Road) would require intersection upgrades, additional hardstand, modifications to drainage structures and use of private land (refer Figure 2-1).
Benefits	<ul style="list-style-type: none"> ■ Possible public benefit for NSW Forestry Corporation, NSW Rural Fire Service (RFS), NSW National Parks and Wildlife Service (NPWS) in use of Devils Elbow bypass road following construction. ■ Better quality Morrisons Gap Road for RFS, NPWS, landowners and others. ■ Opportunity for further enhancement to public recreation as outlined in Section 2.2.3 below. 		<ul style="list-style-type: none"> ■ Better quality Head of Peel Road for landowners and others. ■ Better secondary access for the Project.

Aspect	Devils Elbow Bypass Road (Optimised Design in Amendment Report)	Devils Elbow Bypass Road (Preliminary Design in EIS)	Head of Peel Road (Preliminary Design in EIS)
Biodiversity , refer Figure 2-2			
Temporary disturbance footprint (estimated)	0.48 ha* <i>*Does not exclude any existing distance footprint as existing track (pedestrian only) is minor.</i>	1.99 ha* <i>*Does not exclude any existing distance footprint as existing track (pedestrian only) is minor.</i>	50.4 ha** <i>**Excludes existing road disturbance footprint of an assumed average width of 5 m along the length of the road.</i>
Permanent disturbance footprint (estimated)	0.44 ha* <i>*Does not exclude any existing distance footprint as existing track (pedestrian only) is minor.</i>	1.0 ha* <i>*Does not exclude any existing distance footprint as existing track (pedestrian only) is minor.</i>	14.75 ha** <i>**Excludes existing road disturbance footprint of an assumed average width of 5 m along the length of the road.</i>
Native vegetation impacts	0.79 ha	2.51 ha	2.83 ha
Species credit habitat impacted	0 ha	0 ha	2.75 ha
Species impacted	Nil	Nil	Eastern Cave Bat, Koala, Large Bent-winged Bat, Large-eared Pied Bat, Little Bent-winged Bat
Credit offset (species)	Nil	Nil	147
Credit offset (vegetation)	46	126	114

Aspect	Deviils Elbow Bypass Road (Optimised Design in Amendment Report)	Deviils Elbow Bypass Road (Preliminary Design in EIS)	Head of Peel Road (Preliminary Design in EIS)
Heritage			
<p>Historic heritage impacts</p>	<ul style="list-style-type: none"> ■ Devils Elbow bypass road is located within the LEP listed Black Snake Gold Mine (I134) listing. Black Snake Gold Mine's listing: <ul style="list-style-type: none"> ■ covers 436.9 ha; ■ includes over 20 (but likely many more) locations of historical diggings and is in no means concentrated in the location of the 615 m length of proposed road, refer Figure 2-3; ■ an extensive informal track network has been in use across the heritage item since the 1870's, possibly earlier (based on aerial photography, refer Figure 2-4); and ■ approximately 35 – 40% of the Black Snake Gold Mine listed area is under logging forest/plantation which would have had, and continues to have, direct and indirect impacts. ■ Project Impacts: <ul style="list-style-type: none"> ■ 615 m new access; and ■ 0.48 ha temporary and 0.44 ha permanent disturbance (optimised design). ■ Addendum Statement of Heritage Impact (SoHI) conclusion: no adverse indirect impacts through removal of secondary growth vegetation and minor cut and fill activities on the listed heritage values of Black Snake Gold Mine (LEP I134). ■ Recommendations: further geophysical investigation and archaeological assessment, refer Section 2.2.3 below. ■ Opportunities to enhance heritage include interpretation signage, fit for purpose walking track / mountain bike track, refer Section 2.2.3 below. 		<ul style="list-style-type: none"> ■ Requires OSOM vehicles to do a loop through the main streets of Nundle. ■ LEP Listed St Peter's Church (I269) - Indirect impact, blade swept path will overlap LEP heritage curtilage at south-eastern corner of the site. Works will result in the removal of 1 tree although it is not a historic planting associated with the establishment of the church. ■ LEP Listed Nundle Shire Offices (I271) - Indirect impact, blade swept path will overlap LEP heritage curtilage at south-eastern corner of the site. Temporary overhang of blades only. <p>Refer Figure 2-3.</p>

Aspect	Devils Elbow Bypass Road (Optimised Design in Amendment Report)	Devils Elbow Bypass Road (Preliminary Design in EIS)	Head of Peel Road (Preliminary Design in EIS)
Aboriginal heritage	One (1) artefact scatter: <ul style="list-style-type: none"> ■ HoG AFT4 artefact scatter: low significance, total loss of value as a result of the Project. 		Three (3) artefact sites and one (1) Potential archaeological Deposit (PAD): <ul style="list-style-type: none"> ■ HoG AFT2 artefact scatter: low significance, partial loss of value as a result of the Project. ■ HoG IF2 isolated artefact: low significance, total loss of value as a result of the Project. ■ HoG AFT3: artefact scatter: moderate significance, partial loss of value as a result of the Project. ■ Peel River / Woodleys Creek PAD: moderate significance, partial loss of value as a result of the Project. Refer Figure 2-5 .
Waterways			
Waterway impacts	Nil		<ul style="list-style-type: none"> ■ For access of OSOM vehicles, upgrades to causeways and a bridge will be required at 13 locations along Head of Peel Road, including: <ul style="list-style-type: none"> ■ Woodleys Creek at two locations, ■ the Peel River; ■ Wardens Brook; and ■ nine unnamed tributaries of the Peel River. ■ A number of WaterNSW water quality monitoring sites and the Pearly Gates gauging station (WaterNSW ref: 419906) are located where culvert and bridge upgrades activities are proposed to facilitate heavy vehicle movements. Namely: <ul style="list-style-type: none"> ■ the Peel River along Head of Peel Road; ■ Woodleys Creek & Talbots Creek along Kirks Road; ■ Woodleys Road; and ■ Wardens Brook.

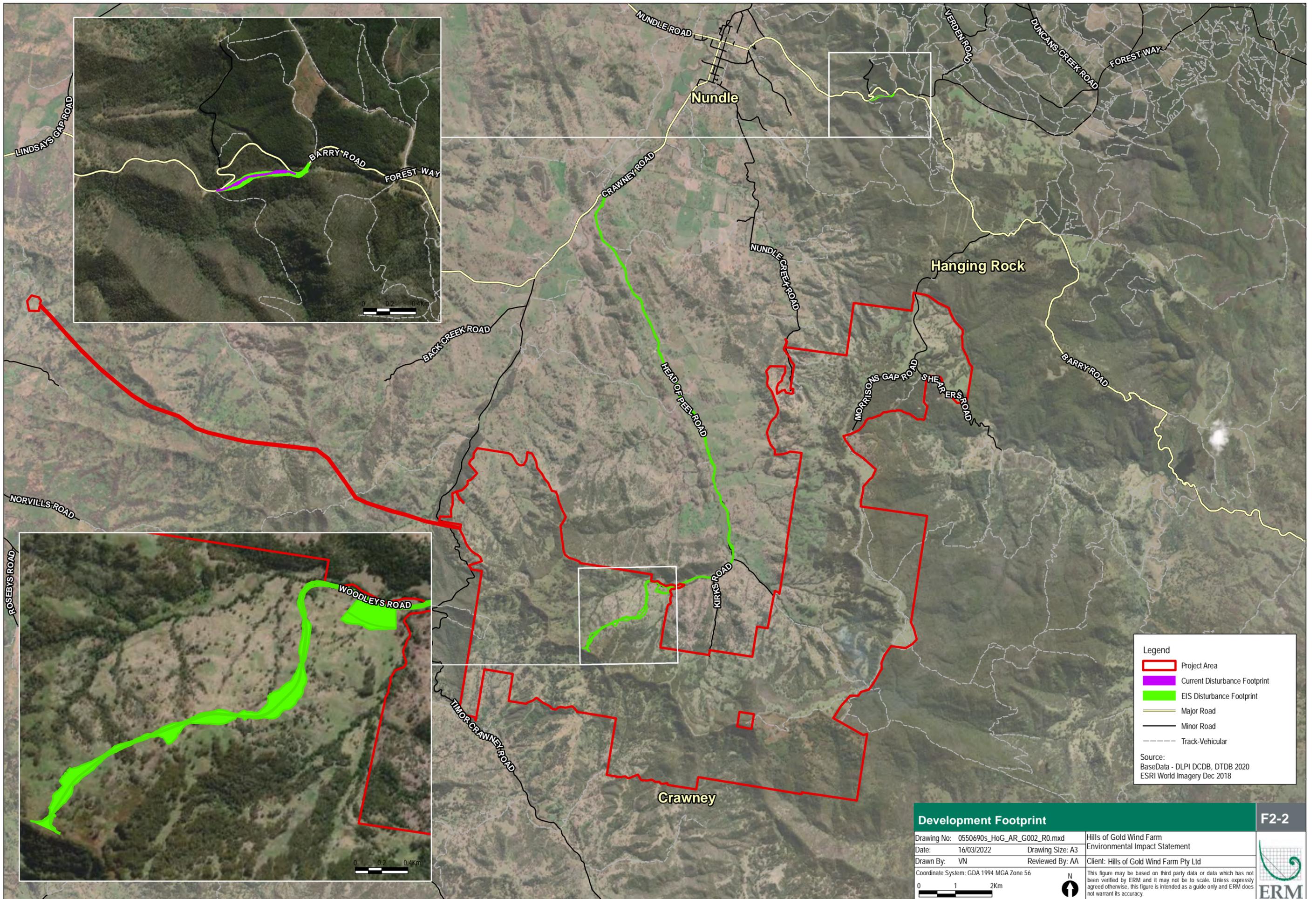


Legend

- Project Area
- Access route via Head of Peel Road
- Access Route to the Site
- Major Road
- Minor Road
- Track-Vehicular

Source:
 BaseData - DLPI DCDB, DTDB 2020
 ESRI World Imagery Dec 2018

Site Access Route Options		F2-1
Drawing No: 0550690s_HoG_AR_G001_R0.mxd	Hills of Gold Wind Farm	
Date: 16/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Hills of Gold Wind Farm Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56		
0 1 2Km	N ↑	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

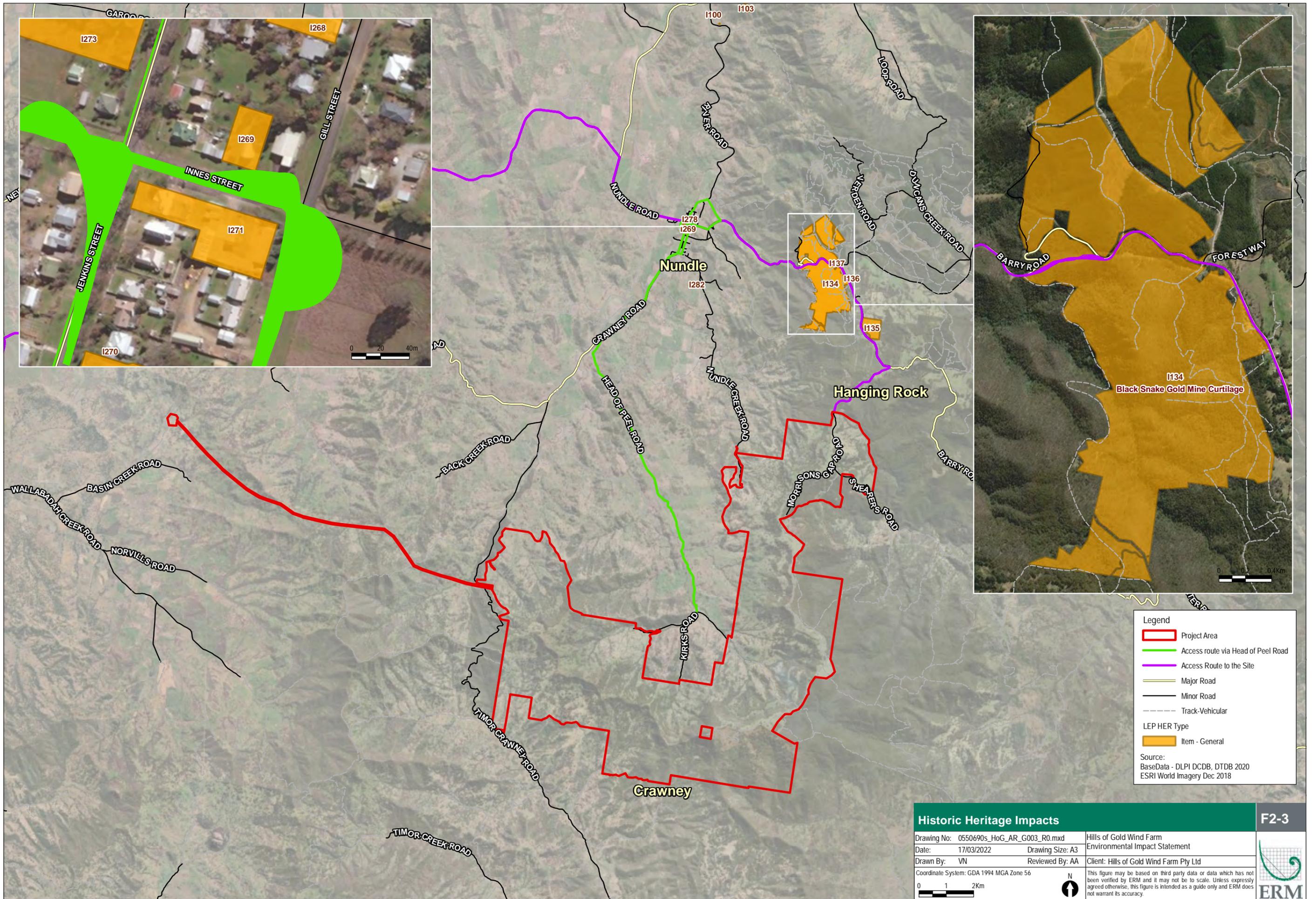


Legend

- Project Area
- Current Disturbance Footprint
- EIS Disturbance Footprint
- Major Road
- Minor Road
- Track-Vehicular

Source:
 BaseData - DLPI DCDB, DTDB 2020
 ESRI World Imagery Dec 2018

Development Footprint		F2-2
Drawing No: 0550690s_HoG_AR_G002_R0.mxd	Hills of Gold Wind Farm	
Date: 16/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Hills of Gold Wind Farm Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56		
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1</div> <div style="margin-right: 5px;">2Km</div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">N</div> <div style="font-size: 20px;">↑</div> </div>	<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>



Legend

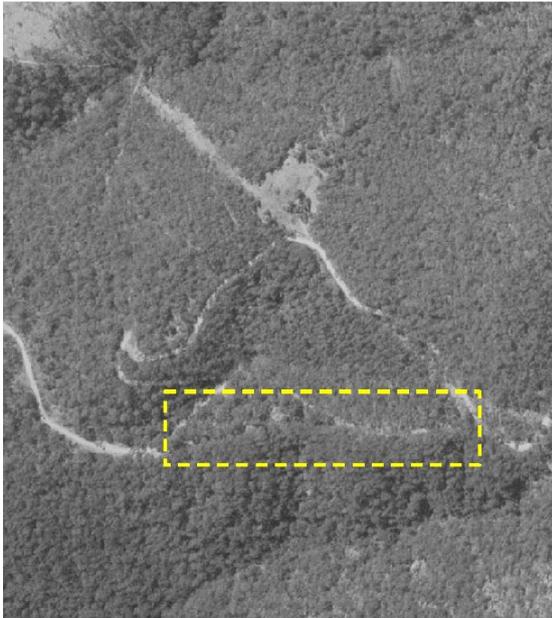
- Project Area
- Access route via Head of Peel Road
- Access Route to the Site
- Major Road
- Minor Road
- Track-Vehicular

LEP HER Type

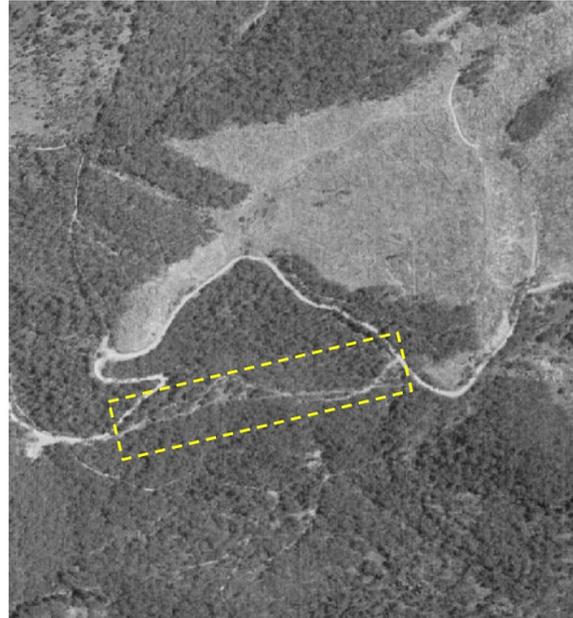
- Item - General

Source:
 BaseData - DLPI DCDB, DTDB 2020
 ESRI World Imagery Dec 2018

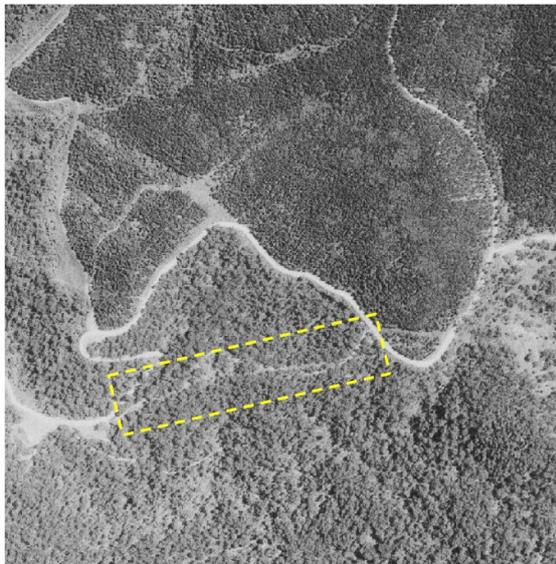
Historic Heritage Impacts		F2-3
Drawing No: 0550690s_HoG_AR_G003_R0.mxd	Hills of Gold Wind Farm	
Date: 17/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Hills of Gold Wind Farm Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
0 1 2Km 		



Photograph 3.3 Run 5N frame 5200, Date: 30/08/1967



Photograph 3.4 Run 4N Frame 5007 Date: 13/11/1970

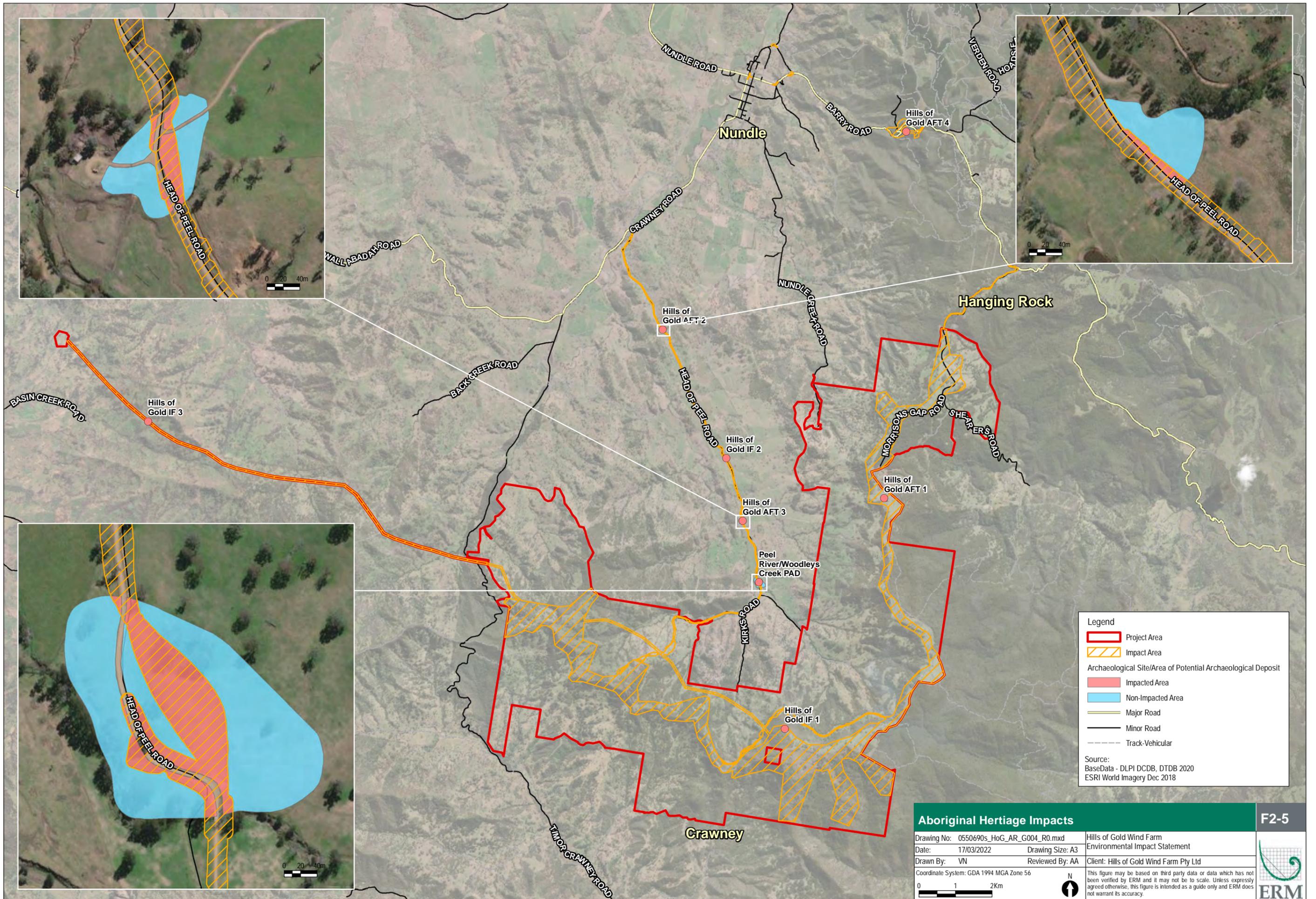


Photograph 3.5 Run 8 Frame 83, Date 10/11/1983



Photograph 3.6 Run 13 Frame 10, Date: 11/03/1990

Figure 2-4: Extensive Informal Track Network at Devils Elbow Bypass Road



Legend

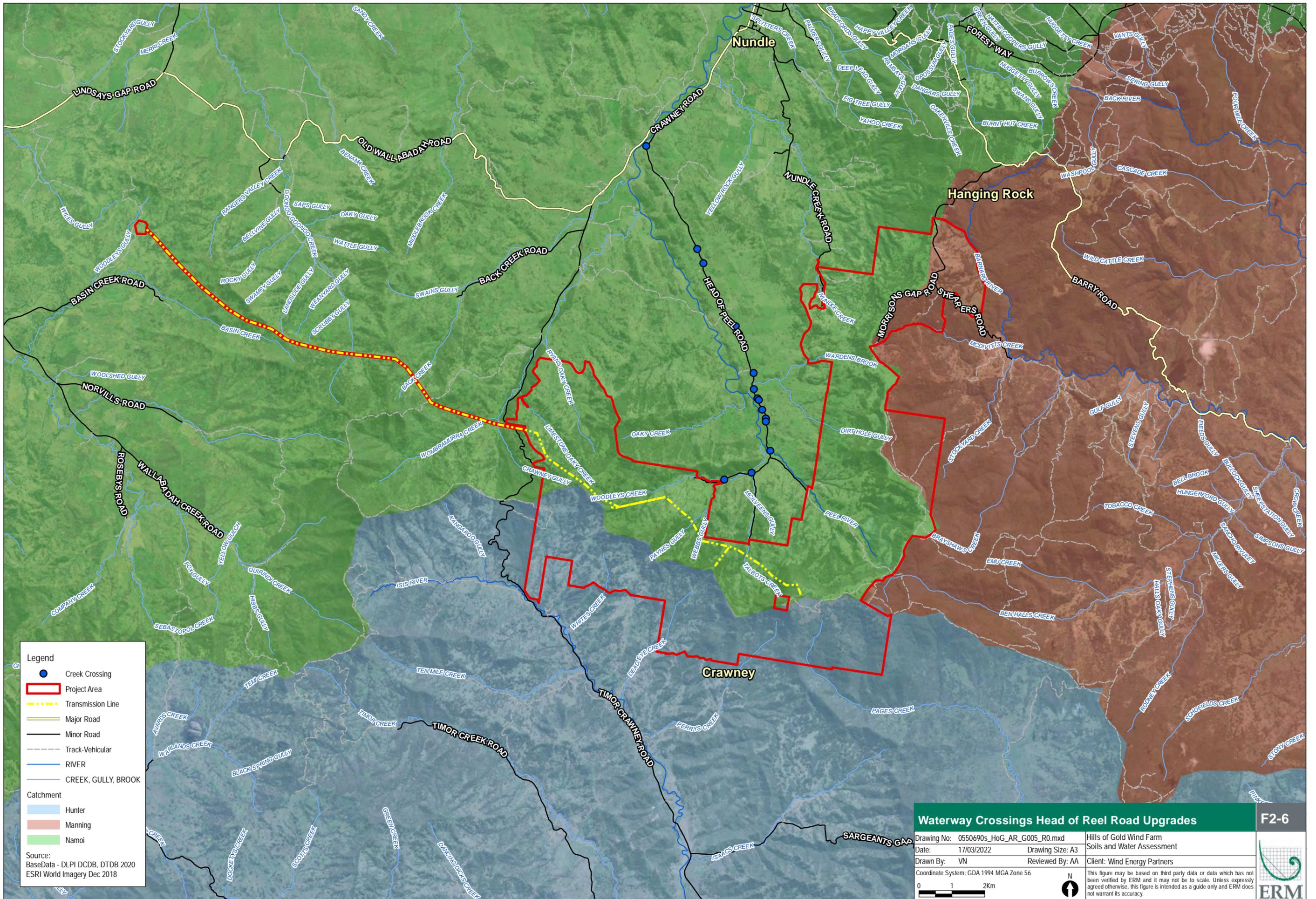
- Project Area
- Impact Area
- Archaeological Site/Area of Potential Archaeological Deposit
- Impacted Area
- Non-Impacted Area
- Major Road
- Minor Road
- Track-Vehicular

Source:
 BaseData - DLPI DCDB, DTDB 2020
 ESRI World Imagery Dec 2018

Aboriginal Heritage Impacts

Drawing No: 0550690s_HoG_AR_G004_R0.mxd	Hills of Gold Wind Farm
Date: 17/03/2022	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA
Client: Hills of Gold Wind Farm Pty Ltd	
Coordinate System: GDA 1994 MGA Zone 56	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.





Legend

- Creek Crossing
- Project Area
- Transmission Line
- Major Road
- Minor Road
- Track-Vehicular
- RIVER
- CREEK, GULLY, BROOK

Catchment

- Hunter
- Manning
- Namoi

Source:
BaseData - DLPI DCDB, DTDB 2020
ESRI World Imagery Dec 2018

Waterway Crossings Head of Reel Road Upgrades		F2-6
Drawing No: 0550690s_HoG_AR_G005_R0.mxd	Hills of Gold Wind Farm	
Date: 17/03/2022	Drawing Size: A3	Soils and Water Assessment
Drawn By: VN	Reviewed By: AA	Client: Wind Energy Partners
Coordinate System: GDA 1994 MGA Zone 56		
<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>		

2.2.3 Statement of Heritage Impact Recommendations

As noted above, the Addendum SoHI presented in the Amendment Report concluded **no adverse indirect impacts** through removal of secondary growth vegetation and minor cut and fill activities on the listed heritage values of Black Snake Gold Mine (LEP I134) resulting from the construction of the Devils Elbow bypass road. The Addendum SoHI recommended further geophysical investigation and archaeological assessment and identified opportunities for heritage enhancements including interpretation signage, fit for purpose walking track / mountain bike track.

Further discussions with Tamworth Regional Council (TRC) have been ongoing relating to the Project's impacts on the listed heritage values of Black Snake Gold Mine (LEP I134) resulting from the construction of the Devils Elbow bypass road.

The Proponent has implemented the recommendations from the Addendum SoHI as agreed with TRC and commits to continue to engage with TRC regarding the outcomes and findings. This includes:

Opportunities to Enhance Heritage Values of Black Snake Gold Mine

The Proponent engaged TRC Tourism Pty Ltd to undertake a 'Recreational Opportunities Analysis' for Devils Elbow. This analysis, completed in March 2022 and provided in **Appendix B**, supports ERM's preliminary heritage assessment (2021) that the site has 'potential for improved access and recreational opportunities...arising from the construction and subsequent rehabilitation of the proposed temporary haulage road'.¹

The TRC Tourism Pty Ltd study identified Devil's Elbow at Barry Road as a site of 'significant potential to improve recreational opportunities and safety':

The development of the Black Snake Gold Mine site will enhance and contribute to the presentation of the gold mining history in the Nundle and Hanging Rock area and increase understanding and recreational opportunities for locals, school groups and visitors alike...The addition of interpretive information about the history and stories of the site will enhance the heritage value of this locally significant heritage listed site.²

Specifically, the study identified:

- the potential for the area to link into the National Trail route, which is one of Australia's premier long distance trekking route and is used by walkers, cyclists, and horse riders. Barry Road, between the intersection with Forest Way and Nundle, forms part of the Ebor to Aberdeen section of the Trail. The proposed bypass road across the Devils Elbow site would present a safe alternate route/bypass of hairpin bends for National Trail users, allowing for access and egress to Barry Road at either end; and
- the addition of interpretive information about the history and stories of the site will enhance the heritage value of this locally listed heritage site. Including Gomerioi culture and stories into this interpretation would further enhance visitor understanding and appreciation of the area;
- the location was also identified as a possible National Trail rest stop and potential opportunities for trail users to explore the mining heritage of the site.
- setting up parking and access at the site in the existing small roadside pull over area as you approach the hairpin turn. There is sufficient area for 16 vehicles and further formalising the area would improve safety;
- improvement of local walking tracks and creating additional tracks to connect with the current track network to avoid the need to walk along the road; and
- cultural and historic heritage interpretation works can be done through signage and implementing an industrial heritage management plan.

¹ TRC Tourism Pty. Ltd., (2022) Devil's Elbow Recreational Opportunities Analysis Report. Prepared for Hills of Gold Wind Farm Pty Ltd, p1.

² Ibid, p20.

The Proponent continues to engage with TRC regarding Council's consideration of the implementation of the local heritage-focused initiatives identified in the TRC Tourism Pty Ltd study as appropriate public recreation enhancement opportunities and mitigation measures for the construction of the bypass route at Devils Elbow.

Geophysical Assessment

Further geophysical investigations relating to the potential impacts of the optimised Devils Elbow bypass road on potential subsurface voids relating to abandoned mine workings from the Black Snake Gold Mine have been undertaken by Tetra Tech Coffey Pty Ltd (Coffey) in February 2022. This was recommended in the Addendum SOHI ERM 2021 and requested by TRC during ongoing engagement with Council in November and December 2021.

The additional geophysical investigation by Coffey in February 2022 employed an electrical resistivity testing and seismic refraction methodology to assess potential for subsurface voids relating to abandoned mine workings, and to highlight other possible anomalies that may indicate the presence of archaeological features.

The assessment identified areas of resistivity anomalies under the proposed Devils Elbow bypass road. The report notes that whilst it is possible that the anomalies identified are the result of natural processes and unrelated to the Black Snake Gold Mine, the discrete nature of the resistivity anomalies, their high resistivity values and the proximity of known abandoned mine shafts indicates the anomalies are likely to be abandoned mine workings. The outcomes of the assessment will be considered in further design and construction of the bypass road by the Proponent such that the expected void locations are in areas of fill, reducing the risk of removing earth support.

Recommendations from the geophysics investigation remain largely the same, and results are generally consistent with those from the first report that engineering solutions remain with methods to avoid direct impact, if necessary during detailed design and construction.

The Proponent continues to engage with TRC regarding the outcomes of the geophysical assessment and can provide greater definition on the start and direction of tunnels within the investigation area presented in **Figure 2-7**.



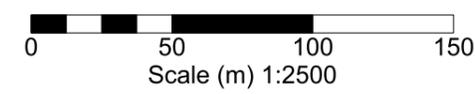
LEGEND

-  Township
-  Project Site
-  ERI Acquisition Footprint
-  ERI & LSR Acquisition Footprint
-  Area of Interest (Plan View)
-  Area of Interest (Section View)

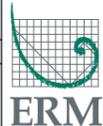
GEODETTIC PARAMETERS

Geodetic Datum: GDA1994
 Coordinate System: MAP GRID of AUSTRALIA 1994
 Projection: Universal Transverse Mercator (UTM) Zone 56
 Semi Major Axis: 6378137.0m
 Inverse Flattening (1/f): 298.257222101
 Central Meridian: 153°00'00 East
 Reference Latitude: 00°00'00 North
 Scale Factor at CM: 0.9996
 False Easting: 500,000m
 False Northing: 10,000,000m

revision	no.	description	drawn	approved	date
	01	PRELIMINARY	RM	SS	18-03-2022



drawn	RM
approved	SS
date	18-03-2022
scale	1:2500
original	A3

Devils Elbow Proposed Bypass Road Additional Geophysical Investigation		F2-7
Drawing No: 0550690s_HoG_C002_R0.cdr	Hills of Gold Wind Farm	
Date: 23/03/2022	Drawing size: A3	
Drawn by: VN	Reviewed by: AA	
		<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>

2.2.4 *Summation*

In summary, avoiding the Head of the Peel Road removes impacts to:

- seventeen (17) landholdings along Head of Peel Road and within Nundle residential and business areas;
- reduces potential Aboriginal cultural heritage impacts to three (3) artefact sites and one (1) Potential Archaeological Deposit (PAD);;
- reduces native vegetation impacts by approximately 3.5 ha (along Head of the Peel Road);
- reduces the overall road works required;
- reduces overall disturbance footprint significantly;
- removes the need for nine causeway creek crossings; and
- reduces the number of OSOM movements through residential areas in Nundle.

The Devils Elbow bypass road will be safe, practical, constructible and represents the lowest environmental impact of all route options considered.

3. VISUAL RESPONSE

3.1 DPE Request

Visual:

- *status of agreements with the landowners of sensitive receivers where impacts are inconsistent with the Visual Performance Objectives outlined in the Wind Energy Visual Assessment Bulletin (DPE, 2016); and*
- *mitigation proposed (including consideration of removing turbines) in instances where a landowner agreement cannot be reached.*

3.2 Response

The Hills of Gold Landscape Visual Impact Assessment (LVIA) (Moir LA, 2020), and the LVIA Addendum (2021) are consistent with the 'Visual Performance Objectives' outlined in Table 2 of the *Wind Energy: Visual Assessment Bulletin* (DPE, 2016).

In Chapter 6.2 of the LVIA Addendum 'Additional Dwelling Assessments - Identified by DPIE', Moir LA further assessed sensitive receivers identified by DPE, including receivers identified in the LVIA to have a moderate or high visual impact within 4,550 m of the Project.

Following the exhibition of the EIS, the Proponent re-assessed locations of all turbines in proximity to sensitive receivers that were identified by DPE. The Proponent removed two (2) WTGs contributing to visual impact at NAD69 and revised the layout from 70 turbines to 65 (refer Amendment Report).

Table 4, Section 6.3 of the LVIA Addendum 'Summary of Additional Dwelling Assessment' provides a summary of the findings of additional dwelling assessments as identified by DPE in relation to the updated 65 turbine Project Layout. This table provides revised proposed mitigations for these sensitive receivers identified by DPE. The Proponent committed to these recommended mitigation measures in the Amendment Report (refer Appendix C 'Updated Mitigation and Management Measures').

The Proponent has also undertaken further assessment of the effectiveness of screen planting (specifically at NAD05 as an example) in Figure 19 in the LVIA Addendum. Section 5.3 of the LVIA Addendum makes recommendations for screen planting. Table 4 in Section 6.3 of the LVIA Addendum provides a revised visual impact rating based on the revised 65 turbine layout with proposed mitigations implemented at sensitive receivers identified by DPE.

As part of preparing this RFI response, the Proponent undertook further assessment to determine whether turbines WP58, WP59, WP60 and WP63 could be re-sited. However terrain, internal wake effects and biodiversity in the area constrains any significant movement available at these locations that could further reduce impact.

4. BIODIVERSITY RESPONSE

4.1 DPE Request

Biodiversity: justification for the placement of wind turbines immediately adjacent to Ben Halls Gap Nature Reserve, have regard to:

- potential barrier effects, displacement of home ranges and disruption to movement of mobile species;
- advice from Biodiversity, Conservation and Science Directorate (BCS) and National Parks and Wildlife Service (NPWS) on the updated Biodiversity Development Assessment Report (refer Sections 5 and 6); and
- input from a bat ecologist and other relevant experts.

4.2 Response

4.2.1 Overview

Biosis has prepared a letter response to the RFI received from DPE on 9 February 2022 which is provided in **Appendix C**. The letter includes outcomes of consultation and updated mitigation measures which have been included in the Biodiversity Development Assessment Report (BDAR) as a result of consultation and the RFI. This is summarised in **Table 4-1** below.

Consultation with BCS and NPWS has included emails, phone calls, and a workshop held on 11 March 2022. In the workshop, the proposed Bird and Bat Adaptive Management Plan (BBAMP) framework was discussed, including triggers, additional surveys, specific mitigation measures, and further analysis on barrier movements of species. Wild dog and fox baiting programs was a key theme raised by NPWS, which has been addressed through further commitments and updates to the BDAR.

Formal advice was provided by BCS on the 22 March 2022 in line with the discussion points of the workshop, which is attached in **Appendix A**. **Table 4-2** provides a summary of the comments and responses from the Proponent.

The updated BDAR is provided in **Appendix D**.

Table 4-1: Response to BCS and NPWS Comments

Item / Agency	Remaining comments / concerns	Response / BDAR updates
BCS_1	Not all components of the BAM assessment were included in the BDAR ie No % cleared for PCTs provided	Noted. No further action required
BCS_2	The methodology used to determine non-native vegetation must be clearly articulated, however was considered adequate	Noted. No further action required
BCS_3	The selection of PCTs has not been adequately justified, and further justification should be provided in the BDAR for the selection of all PCTs	Further justification on why PCTs were selected has been provided. Refer to additional comparison tables providing “Similar PCTs” and “Justification of Best Fit” included for each PCT in Appendix B.
BCS_4	Inclusion of vegetation plots located outside the Project footprint must be justified	Additional justification on the comparison between plots outside of the footprint in relation to the impacted vegetation zones has been added. Additional justification provided in Section 4.1.4 and Table 21.
BCS_5	Separate BOAMs cases are needed for each IBRA subregion. BOAMs cases be split between IBRA sub-regions, with separate cases for each subregion	The BAM-C for the Project has been updated and split by IBRA region/subregion. A small number of species previously assessed as not relevant to the Project, but not detailed in Table 31 and Appendix C are now included.
BCS_6	Vegetation condition classes be reviewed to ensure that they accurately reflect vegetation integrity scores	More information around the use of benchmark data artificially increasing VI scores, and how this relates to the ground-validated condition states used to determine vegetation zones has been provided. Additional justification provided in Section 4.2.4.
BCS_7	Permanent and temporary impacts for each vegetation category is adequate	Noted. No further action required
BCS_8	Ecosystem species have been included in discussions regarding species credit species	Noted. No further action required

Item / Agency	Remaining comments / concerns	Response / BDAR updates
BCS_9	<p>Inconsistencies exist between the field data and the data in the BAM calculator. Explanations be provided for differences in plot data between spreadsheets</p>	<p>Spreadsheet 1 (as referred to in the RFI document) is an Arup document and Biosis cannot comment on the accuracy of the data included. Since January 2021 Biosis has completed a QA on the floristic plot data and has updated any inconsistencies and/or errors that may have occurred prior to that date. This has included minor adjustments to the location of some BAM plot points that were inaccurately located due to GPS error in the field, for example to move the point back under the canopy of the vegetation patch the plot occurred within.</p> <p>Further to the above, discrepancies have now been noted in the large tree count data in Biosis' BAM plot data. The error has been traced back to an issue with the GIS data processing model either creating duplicate values or summing values for >80cm DBH or 50-79cm DBH, depending on the way the data was captured in the field. These issues have now been corrected, without changing the VI scores for any vegetation zones where this error had occurred.</p> <p>Updated data include in the BAM-C and Appendix H</p>
BCS_10	<p>All SAIL have been adequately addressed. No further action necessary</p>	<p>Noted. No further action required</p>
BCS_11	<p>The potential impact to fauna relating to turbine placement has not been adequately addressed.</p> <p>Discussion regarding the potential for the displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns is required.</p> <p>Justification be provided for the distance between turbines along ridge lines.</p>	<p>Additional justification and assessment provided in Section 5.4.2 (Table 44) 8.3.4 and 8.3.5.</p> <p>Section 5.4.2 (Table 44) addresses animal behaviour including forage flight characteristics.</p> <p>Section 8.3.3 "Turbine risk assessment" has been updated to consider the barriers to movement and potential collision with turbine blades on a turbine by turbine basis. Table 67 "Qualitative risk assessment for turbines for full 70 turbine layout" provides barrier effect risk.</p> <p>Section 8.3.4 "Barrier Effect Risk Assessment" and Section 8.3.5 "Summary of collision risks and indirect impacts" have been updated with specific regard to potential barrier impacts to threatened species and non-threatened at risk species, and the risks associated with displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns. Table 70 provides an updated qualitative risk assessment for potential barrier effect impacts to birds and bats within identified turbine clusters.</p> <p>It has been concluded that "All known or predicted bird and bat species within the subject land have low or negligible risk associated with barrier effects or avoidance behaviour resulting from aerial fauna flying near/within the zone of disturbance or from habitat sterilisation surrounding the operational wind turbines". However, where</p>

Item / Agency	Remaining comments / concerns	Response / BDAR updates
		<p>individual spacing and potential zone of disturbance overlap or become in close proximity to each other, this represents identified turbines clusters that may have a slight increase in an inherent risk associated with barrier effects or altered flight behaviour in that area.</p> <p>Additional assessments were undertaken with additional technical input from Biosis' acknowledged avian and microbat ecologist and highly experienced wind farm ecologist Ian Smales and Mark Venosta (see Section 1.9.2 for credentials).</p>
BCS_12	<p>Prescribed impacts relating to wind farms have not been adequately addressed.</p> <p>Options to compensate for unavoidable prescribed impacts, the decision pathway and justification for suggested credit numbers or other compensatory actions, should be clearly documented.</p>	<p>Additional justification and information around residual prescribed impacts and compensatory measures has been provided in Section 8.3.5 "Summary of collision risks and indirect impacts" and 8.10.2 "Bird and Bat Adaptive Management Plan (BBAMP)".</p>
BCS_13	<p>Direct impacts on cave bat roosts needs to be clarified. Additional input be sought from an acknowledged bat ecologist</p> <p>Monitoring of bats take place prior to construction adjacent to geological features with high bat activity at "fly-out" times to determine if further investigation if warranted to identify potential roost sit.</p>	<p>Additional considerations included in Section 5.4.2 Microbats (at the end of section) based on input from highly experienced wind farm ecologist and Biosis' senior microbat ecologist Mark Venosta (see Section 1.9.2 for credentials).</p> <p>Additional monitoring of bat activity near geological features that may potentially provide roost habitat has been included in Section 8.10.1.</p>
BCS_14	<p>Indirect impacts on microbats have not been adequately addressed. Full details of trigger points and mitigation measures be addressed and presented prior to a final determination of the Project rather than in a post-consent BBAMP.</p> <p>Data from ongoing bird and bat monitoring surveys be provided to DPE annually as well as made publicly available on the Project's website.</p>	<p>Additional justification and information provided in Section 8.10.2, which includes detailed commitments made by the Proponent to a mitigation strategy, to be finalised during the preparation of the BBAMP, and includes trigger points and proposed mitigation measures. Section 8.10.2, contains an overview of the proposed BBAMP, and includes the following:</p> <ul style="list-style-type: none"> ■ Framework and objectives ■ Baseline information ■ Trigger-level and unacceptable impacts for further investigation and adaptive management ■ Monitor and report on the effectiveness of impacts and trigger levels ■ Operational mitigation measures ■ Residual prescribed impacts and compensatory measures ■ Compliance management and summary ■ Monitoring and adaptive management triggers for barrier effect impacts

Item / Agency	Remaining comments / concerns	Response / BDAR updates
BCS_15	<p>Additional assessment of a locally important population of the Greater Glider has been provided.</p> <p>No significant impact is likely on the local population of Greater Glider.</p> <p>No further action necessary.</p>	<p>Noted, but refer to point 18.</p>
BCS_16	<p>Species polygons for some species credit species are unacceptable.</p> <p>Species polygons for Powerful, Barking and Masked Owls are to be reconfigured.</p> <p>Species polygon for Koala, Eastern Pygmy Possum and Squirrel Glider are to be reconfigured to include all suitable habitat.</p>	<p>Additional information has been provided in Section 5.5.</p> <p>Habitat polygons have been developed based on a combination of targeted field surveys, ground-validated habitat assessments, and species' habitat requirements based on published literature and the TBDC. Preparing species polygons on this manner was undertaken to ensure the use information available for each species, such as PCT associations, habitat parameters where they can be justified based on BioNet or published, peer-reviewed literature, habitat assessments, and targeted surveys, to ensure species polygons are as accurate and meaningful as possible. The approach was undertaken considering Section 6.1.1.2 of the BAM, which specifies that:</p> <p style="text-align: center;"><i>'An assessor may use additional information about a threatened species, in BioNet (e.g. the profile of a threatened species) or published, peer reviewed literature, when assessing the habitat suitability of a site'</i></p> <p>Koala, Eastern Pygmy Possum, and Squirrel Glider species polygons, were developed are based on a combination of on-ground fauna habitat assessment undertaken across the entire wind farm corridor, and the results of targeted surveys undertaken for all three of these species, with reference to BioNet and literature. Owl species polygons were developed using a combination of the Large Forest Owl Recovery Plan (DEC 2006), BioNet and peer reviewed literature.</p>
BCS_17	<p>Stewardship sites should consider proximity to turbine influence.</p>	<p>Acknowledged and included in Section 9.1.3.</p>
BCS_18	<p>Additional information is required for Matters of National Environmental Significance</p> <p>A credit requirement for the Greater Glider should be calculated under advice from the Commonwealth Department of Agriculture, Water and the Environment.</p>	<p>No further guidance has been provided on this issue, other than the Project is not expected to have a significant impact to this species (Item 15). As such no species specific offsets are considered necessary, and any offsetting of impacts to the species' habitat will be included with the Project's ecosystem credit offsets and establishment of local Biodiversity Stewardship Sites.</p>

Item / Agency	Remaining comments / concerns	Response / BDAR updates
BCS_19	<p>It is unknown how the proposed adaptive management will mitigate impacts once the turbines are constructed. What options are there for the proposed adaptive management measures once the turbines are in place?</p> <p>A key question is whether a moderate level of risk to threatened species acceptable adjacent to high quality habitat on national park? For these reasons and for potential impacts on NPWS operations, NPWS recommends the removal from the proposal of all turbines adjacent to Ben Halls Gap Nature Reserve.</p>	<p>Additional justification and information provided in Section 8.10.2, which includes detailed commitments made by the Proponent to a mitigation strategy, to be finalised during the preparation of the BBAMP, and includes trigger points and proposed mitigation measures to reduce potential operation impacts associated with the turbines, with particular consideration of turbines adjacent to the Nature Reserve.</p> <p>Section 8.3.3 “Turbine risk assessment” has been updated to consider the barriers to movement and potential collision with turbine blades on a turbine by turbine basis. Table 67 “Qualitative risk assessment for turbines for full 70 turbine layout” provides barrier effect risk. Section 8.3.4 “Barrier Effect Risk Assessment” and Section 8.3.5 “Summary of collision risks and indirect impacts” have been updated with specific regard to potential barrier impacts to threatened species and the risks associated with displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns. Table 70 provides an updated qualitative risk assessment for potential barrier effect impacts to birds and bats within identified turbine clusters. Each of these assessments gives particular consideration of turbines adjacent to the Nature Reserve.</p>
NPWS_20	<p>BDAR Tables 56 & 59 regarding potential impacts of blade-strike on local populations of several species, lists the risk as moderate but describes impacts as short term. Given that the potential risks of collision will exist for the duration of the Project’s operation, the impacts are likely to be ongoing and hardly short term.</p>	<p>Terminology used in tables in Section 8.3.1 and 8.3.2 have been updated.</p>
NPWS_21	<p>Proposed ongoing monitoring of impacts and adaptive management is commended. However it’s difficult to understand how adaptive management can be implemented once the turbines are constructed -- there is little indication of what this might comprise “after the event” and after its impact.</p>	<p>Additional justification and information provided in Section 8.10.2 and information relating to Items, 14 and 19 of this table.</p>
NPWS_22	<p>BDAR’s mitigation measures include “appropriate setbacks” required from NP estate “where practical”, which have not been clearly identified and do not appear to be in place for the turbines immediately adjacent to Ben Halls Gap Nature Reserve (BHGNR). Also the 30m “minimum safe distance” from nearest vegetation canopy to mitigate blade-strike risks to protected fauna appears inadequate, and inconsistent with the above and other considerations including precedents set for other windfarms which involved more extensive setbacks.</p>	<p>Additional justification for turbine placement along the ridgeline adjacent to Ben Halls Gap Nature Reserve is provided in Section 7.1.1. Details are provided around the different considerations resulting in the current placement of the turbines including wind energy generation, minimisation of biodiversity impacts, residual impacts and potential increases to impacts resulting from changes to layout in that location.</p>

Item / Agency	Remaining comments / concerns	Response / BDAR updates
NPWS_23	Proponent would be willing to consider a contribution to wild dog/fox baiting programs if required, and this is both welcomed and recommended.	Additional proposed mitigation measures and information provided in Section 8.9 “Mitigation and Managing Impacts”, Table 82, B11 as well as Section 8.10.1 “Biodiversity Management Plan”. The Proponent has committed to ongoing consultation and participation with NPWS and Local Land Services (LLS) on their annual vertebrate pest baiting programs including a financial contribution capped at \$5k per annum to cover any additional costs of aerial baiting programs as a result of rotary aircraft (as opposed to fixed wing) being required to improve safe operating practice.
NPWS_24	Impacts to Sphagnum Moss and potential TEC listing. Inappropriate fire regimes are regarded as a key threatening process, which has implications for turbines’ potential to impact NPWS and other aerial fire management operations.	Additional information provided in Section 4.3.3, Section 8.5 and Section 8.9 including, that the bushfire strategy developed for the Project will include measures to minimise risk of bushfire to the Sphagnum Moss TEC, and includes: <ul style="list-style-type: none"> ■ Increase the accessibility of the ridgeline to fire fighters and improve strategic fire advantages that already exist. ■ Access to water will be maintained such that existing water resources will remain available at all times to support firefighting activities. ■ Extension of the strategic fire zone from BHGMR. ■ Upgrades to the access road network to RFS fire trail standards ■ Increased water storage Further information is updated in Projects commitments for bushfire responses provided in the RFI.

Table 4-2 Additional Information Provided in Updated BDAR

Item	Summary of Agency comments	Response / BDAR updates
1	<p>The BBAMP framework could be improved by including objectives to avoid and mitigate impacts to biodiversity during the operation of the wind farm. Where impacts cannot be avoided or mitigated, offsets for these residual impacts will be required.</p>	<p>Updates have been provided throughout Section 8.10.2.</p>
2	<p>Biodiversity credit quanta for bird and bat strikes be reviewed and fully justified:</p> <ul style="list-style-type: none"> ■ Credit quanta should be calculated according to the conservation status of the individual species impacted ■ Calculation of credits should be done every twelve months as part of the annual review ■ Offsets should be calculated based on the maximum estimated number of fatalities for the preceding twelve months 	<p>Additional detail has been provided in Section 8.10.2. in terms of credit generation, the commitment has been made for “the amount of credits required to be offset would be calculated by the number of actual and modelled impacts in the preceding 12 months, accounting for scavenger impacts, to individual species in a given year, multiplied by the biodiversity risk weighting (BRW) for the relevant species”. This method is commensurate with the Equation 3 (Section 10.1.3) of the BAM for calculating species credit requirements for species assessed by a count of the number of individuals (albeit flora individuals), which is aligned with the calculation of offsets required for impacts to individual bird and bat strikes.</p> <p>This differs from the approach put forward by BCS, however Biosis believes it captures the relevance of a current threatened listing for a species, and is in accordance with the expectations of BAM implementation for prescribed impacts (Section 8.6 of the BAM).</p>
3	<p>Actual strike rates be used as triggers rather than percentages of individual species’ populations.</p> <p>Additional triggers for corrective action are identified which are focused on actual strikes rates which have been extrapolated and analysed during annual reporting.</p> <p>A detailed monitoring plan will need to be provided to BSC for endorsement should percentage of population number triggers be pursued.</p>	<p>These suggestions have been noted and updated throughout Section 8.10.2, however Biosis has maintained the option for calculation of impacts (and associated triggers) at the population scale, as if this can be determined in consultation with BCS, it will provide more ecologically meaningful targets and ongoing assessment of impacts.</p>
4	<p>More detail be included on how turbine risk ratings are to be determined</p>	<p>Updates have been provided throughout Section 8.10.2 with links to relevant section of the BDAR to which this refers Section 8.3.3 Turbine risk assessment.</p>
5	<p>The Tier 1 alert for non-threatened ‘at-risk’ species and low risk species should be changed to a trigger of two or more carcasses, feather spots or injured individuals of a single species found under or close to a wind turbine during any mortality search or incidentally by wind farm personnel.</p> <p>The Tier 2 impact trigger for all non-threatened species should be more than four carcasses, feather spots, or injured individuals of a single species are found under or close to a wind turbine within a two-month cycle.</p>	<p>These suggestions have been noted and updated in Section 8.10.2</p>

Item	Summary of Agency comments	Response / BDAR updates
6	Lists of threatened and non-threatened at-risk species be included in the BBMAP framework.	Updates have been provided throughout Section 8.10.2 with links to relevant tables within the BDAR Table 61 and Table 65.
7	Mitigation implementation protocols be included in the BBAMP framework.	Updates have been provided throughout Section 8.10.2.
8	Monitoring of all turbines following their commissioning be conducted over twelve months, ensuring all seasons are covered. Monthly carcass searches of turbines should be conducted for the first five years of operation, using trained dogs for at least the first two years. The monitoring program be reviewed at two years.	Updates have been provided in Section 8.10.2, including monthly monitoring for the first six months following commissioning of turbines, however must include the first spring/summer season following commissioning of turbines, and therefore may be extended in duration, including follow up pulse searches.
9	The BBAMP framework should include clear links between tiers, triggers, and actions	Updates have been provided throughout Section 8.10.2.

4.2.2 Updated Mitigation and Management Measures

In response to BCS and NPWS advice, the Proponent has made additional commitments to manage impacts to National Park estate, disturbance from weeds, pests and pathogens, as well as measures in relation to the BBAMP framework.

■ Impacts to National Park estate (Reference ID: B9)

- An appropriate buffer will be maintained to National Park estate where practicable;
- Implementing vegetated buffers between the access tracks and wind turbine pads and the National Park estate is to be considered during detailed design. The selection of areas of buffer plantings and species to be planted will be carried out in consultation with the Area Manager, Barrington Tops National Parks and Wildlife Service;
- The Erosion and Sediment Control Plan will include specific actions to identify sensitive receptors associated with the National Park estate, including waterways and the adjacent Sphagnum Moss TEC;
- The bushfire strategy developed for the development will include measures to minimise risk of bushfire to the Sphagnum Moss TEC and includes:
 - Increase the accessibility of the ridgeline to fire fighters and improve strategic fire advantages that already exist;
 - Access to water will be maintained such that existing water resources will remain available at all times to support firefighting activities;
 - Extension of the strategic fire zone from BHGNR;
 - Upgrades to the access road network to RFS fire trail standards; and
 - Increased water storage.

■ Disturbance from weeds, pests and pathogens (Reference ID: B11)

Management measures would be prepared and implemented to avoid and minimise the environmental risks associated with weeds, pests and pathogens. As a minimum, these would include:

- Completion of a site weed assessment and development of a Weed Management Plan, as a sub-plan to the EMS;
- Implementation of appropriate weed control and weed disposal in accordance with Biosecurity protocols;
- Any soil or other materials imported to the site for use in restoration or rehabilitation would be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks;
- Appropriate disposal of any weed material;
- Implementation of appropriate hygiene protocols where there are potential or known pathogen risks including procedures detailing the management of pathogens such as chytrid fungus;
- Commitment to ongoing consultation and participation with NPWS and LLS on their annual vertebrate pest baiting programs including a financial contribution capped at \$5k per annum to cover any additional costs of aerial baiting programs as a result of rotary aircraft (as opposed to fixed wing) being required to improve safe operating practice; and
- Encouraging landowners adjoining the BHGNR to coordinate baiting programs to improve the effectiveness of ground-based strategies.

■ **Bird and Bat Adaptive Management Plan Framework**

Table 4-3 below provides mitigation measures in relation to the BBAMP framework. These measures are subject to further development throughout the preparation of the BBAMP.

Table 4-3 Additional Mitigation Measures for the BBAMP

Type	Mitigation considerations and response
General	<ul style="list-style-type: none"> ■ Ongoing reassessment of species risk levels and thus relevant trigger-levels. ■ Review of the monitoring program every two years. ■ Incorporate any operation mitigation measures developed during the preparation of the BMP relating to monitoring of relevant geological features at 'fly-out' times to determine if/where further mitigation may be warranted. ■ Encourage habitat use offsite through establishment of BSAs and associated habitat restoration in the area proximal (>200m) to the wind farm and likely to be utilised by the local population of birds and bats. ■ Minimising availability of raptor perches on infrastructure within close proximity to turbines and overhead powerlines. ■ Prompt animal carcass removal within the 200m of a turbine (within 24 hrs of discovery) to minimise raptor scavenging opportunities and reviewed annually. ■ Participation on local (site based) and co-ordinated (LLS and NPWS) feral animal control programs, ie rabbits, wild dogs and foxes, and in line with carcass removal protocols. ■ Investigation of potential deterrents or evolving technologies, such as: <ul style="list-style-type: none"> - Avoiding or limiting the use of artificial lighting (synchronising flashing red light if required) on turbines and other infrastructure within close proximity to turbines; - Consider novel deterrent techniques related to blade visibility; - Ultrasonic technologies. - Consideration of radar (or optical sensor) or live camera technologies for automatic, reactive and temporary curtailment of turbines for moderate risk turbines, turbine cluster (WP 28-43) or as required (Tier 1 and Tier 2 alerts) adjacent to Ben Halls Gap Nature Reserve; - Use of 'acoustic lighthouse' to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour (as detailed in Boycott et al 2021). ■ Annual reporting to include triggers relating to the re-assessment of the mitigation strategy to be implemented over the following year of operation where tier 1 and/or tier 2 and 3 triggers have occurred <ul style="list-style-type: none"> - Additional triggers will be developed that consider the actual/extrapolated impacts to bird and bat species calculated across the preceding year, and include associated mitigation measures and potential additional offsets for the following year of operation.
Tier 1 Alert mitigation and response	<p>Initiate rapid assessment framework for tier 1 alerts within the BBAMP to identify the most effective mitigation measures to be implemented, including but not limited to:</p> <ul style="list-style-type: none"> ■ Increased monitoring of a relevant turbine(s) for a seven day period following a tier 1 alert to determine a one off event, or a potential ongoing event. ■ Investigate the use of 'acoustic lighthouse' to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour. ■ Consideration of mobile radar installation for a minimum 7 day period for automatic, reactive and temporary curtailment of turbines relating to a tier 1 alert for medium to large threatened and non-threatened at risk bird species. ■ In the case of at risk species or threatened species nesting within 200m of a turbine, the nesting event will be allowed to occur, with increased monitoring, potential for temporary curtailment in line with tier 2 and tier 3 recommendations until removal of the nest following the breeding event can be undertaken. Any mitigation is to be consistent with Project approval conditions.

Type	Mitigation considerations and response
<p>Tier 2 and 3 mitigation and response</p>	<p>Initiate rapid assessment framework for tier 2 and tier 3 triggers within the BBAMP to identify the most effective mitigation measures to be implemented.</p> <ul style="list-style-type: none"> ■ Cease operation temporarily of a turbine(s) relevant to a trigger event during the rapid investigation. ■ Increased daily carcass searches for 14 days following discovery of a tier 2 or tier 3 trigger, to be undertaken within the subsequent four weeks of the trigger event by suitable trained ecologist, environmental advisor and/or detector dog services. <p>Pending an investigation into tier 2 and tier 3 impacts being detected, the following may be required in consultation with the Proponent, suitably qualified ecologists, wind farm subject matter experts and DPE:</p> <ul style="list-style-type: none"> ■ Temporary turbine shut down during periods of low visibility. ■ Low wind speed turbine curtailment, that being blades remain feathered and do not rotate during periods of the day and/or night when wind speeds are below either those at which turbines generate electricity, or can be shown to be conducive to higher levels of microbat activity, likely to be 0 to 4 meters per second, on a temporary or permanent basis. ■ Seasonal curtailment of individual turbines, for example at night during microbat breeding season ie between November and March.

5. NPWS AVIATION AND BUSHFIRE RESPONSE

5.1 NPWS Request

The NPWS advice contained in the RFI sought additional information relating to aviation and bushfire impacts, as presented in **Table 5-1**.

Table 5-1 NPWS Request for Further Information

Issue	Remaining comments / concerns
Impacts on NPWS aerial operations	<p><i>Impacts on fire management operations are outlined below.</i></p> <p><i>As discussed with the Proponent, NPWS also uses both fixed wing and helicopter operations for aerial baiting of wild dogs and foxes. These operations provide significant benefits to a range of fauna species due to release from predation pressures. Wild dog predation on nearby livestock is also a serious concern of local landholders.</i></p> <p><i>Unlike potential impacts on fire operations, impacts on helicopter based baiting programs are not likely to be significant, and are able to be modified. However fixed wing aircraft are increasingly being used due to lower cost and efficiency of delivery. Our baiting transects may require modification or reduction due to the presence of turbines. It was discussed during meetings that the Proponent would be willing to consider a contribution to wild dog/fox baiting programs if required, and this is both welcomed and recommended.</i></p>
Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest TEC – new info	<p><i>Commonwealth now considering listing this TEC under EPBC Act.</i></p> <p><i>Inappropriate fire regimes are regarded as a key threatening process, which has implications for turbines' potential to impact NPWS and other aerial fire management operations. NPWS previous concerns focussed on sediment and erosion control risks to this TEC; latest considerations now include fire management due to Commonwealth assessment now in progress.</i></p> <p><i>See further info below.</i></p>
BRA Key Responses/Actions	<p><i>BRA and recommended actions are generally welcomed by NPWS. Cooperative bushfire risk management with national park neighbours and RFS is encouraged and will continue. However, the issues below remain unresolved.</i></p>
Impacts on NPWS aerial operations	<p><i>As previously advised, NPWS uses aircraft to support hazard reduction burning, firefighting and for aerial baiting of feral predators. The western boundary of the BHGMR, and access/fire trails immediately adjoining this boundary – the access trail between WP37 to WP46, and in fact continuing north – comprise a strategically and tactically important north-south fire control line. During fire operations, support of ground crews by water bombing aircraft, particularly rounding up any spot-over fires along the control line, is often critical to fire operations. This can make the difference between controlling a fire or losing control of it. Section 5.1 of the BRA acknowledges the strategic value of fire control lines on the ridgelines here. Turbines WP40 - 43 are of particular concern, being immediately on potential control lines adjacent to the park. While turbines will not directly impinge on BHGNP airspace:</i></p> <p><i>a) It is the airspace along the ridgetop and trails/fire control lines immediately adjacent to the park which is of strategic value and which will be impacted to a certain degree.</i></p> <p><i>b) BHGMR airspace will be indirectly affected by the suggested safe buffer space between aircraft and turbines, as per below.</i></p> <p><i>The removal of WP1 is welcomed for both avifauna and aerial operations impact. Agreed that fire operations for Crawney Pass NR are unlikely to be affected, however impacts to operations adjacent to BHGMR remain our key concern. The quoted aviation buffers from turbines of 600 m for fixed wing, and 300 m for helicopters have significant potential to impact the range of NPWS aerial operations, and particularly on the needs outlined above.</i></p> <p><i>Until impacts on aerial operations are clear and fully mitigated, as above NPWS recommends the removal from the proposal of all turbines adjacent to Ben Halls Gap Nature Reserve.</i></p>

Issue	Remaining comments / concerns
-	<i>The Response to Submissions quotes RFS as having no comment on the development in the AIA and suggesting that “windfarms will be treated as any other potential hazard to aircraft operations”. We can only assume that this view is one based on a landscape-wide general perspective. It both contrasts with other RFS input and information in the BRA, and neglects the strategic role these ridgeline trails have and site-specific potential impacts.</i>
Site Access	<p><i>Constructing and maintaining access roads to RFS fire trail standards is welcomed. Reference also made to installing RFS-standard fire trail signs to assist emergency services (including NPWS) navigation on-site, as per BRA Appendix B.</i></p> <p><i>Note that NPWS is a fire authority under the Rural Fires Act and alongside RFS may be actively involved in assisting firefighting in the area, not necessarily limited to the national park estate.</i></p> <p><i>While acting as incident (fire) controller, NPWS should be also included in the proposed protocols identifying authorities that have the right to request turbine shut down during aerial bushfire operations.</i></p> <p><i>Ongoing access and site familiarisation/induction for emergency services including NPWS (BRA 5.1) is welcomed.</i></p>
Ignition sources	<i>The recognition of plant and equipment as ignition risks is welcomed. Proponent should adopt protocols to curtail various operations (especially grinding, welding, slashing) at appropriate bushfire danger rating thresholds and not just on TOBAN days.</i>
Fire regimes as a threat to TEC.	<i>As above, fire management has recently been identified as increasingly important to the BHG Sphagnum Moss Cool Temperate Rainforest TEC. See BDAR response above and the info below for context.</i>
Windfarm’s full time personnel	<i>The Proponent should be encouraged to have staff trained in basic firefighting (e.g. as RFS volunteers) if possible and provide onsite resources to help with bushfire management as well as structural fires. This would be of benefit to the development, environment and neighbours.</i>

The issues identified above were further discussed in a meeting held on 2 March 2022 between the Proponent, NPWS, ERM and Aviation Projects. In particular, the comments above and discussions from NPWS during the meetings formed two key themes relating to the focus on the placement of WTGs adjacent to the Ben Halls Gap Nature Reserve and Crawney Pass National Park, including:

- the regulatory separation distances between aircraft and WTGs during operations (i.e. buffer space between aircraft and turbines); and
- potential for location of WTGs to impinge on aerial firefighting operations.

5.2 Response

Aviation Projects (2022) addresses the NPWS advice in a letter dated 7 March 2022 (refer *Appendix E*). The letter includes an overview of recent changes to the Civil Aviation Safety Regulations (1998) (CASR), which has resulted in the following key changes:

- aerial work operations engaged in firefighting and aerial spraying do not have to comply with CASR 91.267 ‘Minimum height rules—other areas (i.e. 600 m lateral separation distance for fixed wing and 300 m lateral separation distance for helicopters no longer apply);
- lateral separation distance for civil aircraft amended to 300 m for both fixed and rotary wing aircraft;
- NPWS aircraft operations now classed as an ‘aerial work’ operation which falls under CASR Part 138 (aerial work) (effectively meaning a pilot must ‘see and avoid’ any obstacle); and
- new requirement for Safety Management Systems for Air Operators Certificate holders under CASR Part 138 (aerial work).

A case study from Waubra Wind Farm was cited in the letter to demonstrate that aerial firefighting operations can be successfully conducted at low level in the vicinity of wind farms.

The Aviation Projects letter was forwarded to NPWS on 8 March 2022. A response from NPWS was received on 17 March 2022. Copies of the correspondence from NPWS is provided in **Appendix E**. Based on the advice from NPWS, additional mitigation and management measures relating to aerial operations have been committed to as detailed in Section 5.2.1 below.

Further, a Bushfire Risk Assessment (BRA) (ERM, 2021c) has been prepared to consider bushfire risk in the vicinity of the Project. The BRA includes management and mitigation measures to ensure all practicable steps are taken to prevent the occurrence and spread of wildfire to adjoining lands during all Project phases. The BRA was updated to incorporate submissions from the EIS exhibition with the updated version provided as Appendix K to the Hills of Gold Amendment Report (ERM, 2021a).

Chapter 6 of the BRA details a range of complementary mitigation strategies. In particular, a commitment has been made to prepare an Emergency Management and Operations Plan (EMOP) in consultation with NSW RFS and NPWS. The EMOP will consider Australian Standard/ISO 31000 Risk management principles and guidelines and Australian Standard 3745: Planning for emergencies in facilities.

With respect to fire management and the Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest TEC, the BRA addresses the following:

- Section 6.2 of the BRA identifies the strategic fire advantage zone (SFAZ) along the ridgeline which is used as a strategic containment line. The section identifies:
 - An existing SFAZ has already been established within the adjacent National Park as currently mapped on the Ben Halls Gap National Park Fire Management Strategy (dated 2005). This will be extended along the eastern side of the access road to provide a larger, more accessible area to back burn down the slope in the event of a major fire within the adjacent National Park. This area will be maintained (within the bounds of the Project Area only) with an overall reduced fuel load.
 - This may also present an opportunity (in co-ordination with the NSW RFS and NSW NPWS) to explore additional options and integrate Indigenous land and fire management practices.
- Section 6.5 of the BRA identifies access roads and the road network. All access roads will be upgraded to provide sufficient width and other dimensions to ensure safe unobstructed access and allow firefighting crews to operate equipment around the vehicle. Dead-end roads should be avoided. However, where they are present, they will incorporate a sufficient turn-around area to minimise the need for vehicles to make multipoint turns. As a minimum, and to enable access for RFS all roads will be maintained to the minimum standards as outlined within the NSW RFS Fire Trail Standards and the NSW RFS Fire Trail Design, Construction and Maintenance Manual (refer to Appendix B of the bushfire report).
- Section 6.6 of the BRA discusses water storage and notes water supply should be designed to provide filling points for fire tanker units near the wind farm entrance and at the O&M Compounds. A minimum combined storage of 50,000 litres is recommended for the site, based on refilling an approximate of six tanker units (4,000 litres) twice each. Noting that the final requirement will be confirmed by NSW RFS prior to the commencement of construction.

Further consideration is provided in the biodiversity response (refer Section 4.2).

5.2.1 Updated Mitigation and Management Measures

In response to NPWS advice, the Proponent makes the following additional commitments relating to aerial operations and bushfire management and firefighting:

■ Aerial Operations

- impact turbines (~13) will be placed in the “Y” position in the case of emergency (ie bushfire), at the direction of the responding agency (incident controller); and
- the Proponent will provide a cost contribution of up to \$5,000 per annum to NPWS to offset increased aerial baiting operations resulting from the use of rotary aircraft where fixed wing aircraft would have been suitable. The amount is to be negotiated with NPWS noting the annual difference in cost incurred from adjusting for the presence of turbines.

■ Enhanced Rapid Fire Support

- all Project vehicles will contain a fire extinguisher and a citizens band radio;
- each WTG will contain a fire extinguisher in the base of the tower and in the nacelle;
- all buildings will contain portable fire extinguishers, which will undergo inspection on a six monthly basis;
- onsite staff will be trained to support basic firefighting (i.e. RFS volunteer equivalent), including annual ‘refresher’ training;
- provision of three (3) firefighting trailer units to be generally located at the temporary site compound with 1000 L of storage during Project construction and operations;
- access to landowners’ dams and bores will be provided as alternative sources of water for firefighting;
- onsite water carts for dust suppression will double as a water source support firefighting, as needed;
- strategic buoy wall damn will be stored for use during local firefighting activities (capacity to be agreed with NPWS and NSW Rural Fire service (RFS));
- the temporary construction site compound will contain two (2) x water tanks (approx. 50,000 L total capacity) to supply the needs of the compound, with at a minimum, each tank maintained at 50% capacity by water tankers. The water tanks will be fitted with outlets allowing fire trucks to connect to the tanks; and
- the permanent O&M facility will include two (2) x water tanks (approx. 45,000 L total capacity), with at a minimum, each tank maintained at 50% capacity by water tankers and rainwater. The water tanks will be fitted with outlets allowing fire trucks to connect to the tanks.

■ Cooperative Bushfire Management Arrangements

It is recognised that a cooperative approach to engaging major stakeholders will increase the effectiveness of bushfire prevention, mitigation and management of the wind farm during both construction and operation. To foster a cooperative approach to bushfire management, the following has been committed:

- continued and ongoing local RFS / NPWS familiarisation of the property including location of firefighting equipment;
- bushfire communications protocol will be prepared and implemented between permanent onsite Project staff and NPWS / RFS staff. This includes notifying NPWS / RFS staff if for whatever reason, there are any proposed activities likely to cause sparks or fire during a total fire ban or other appropriate bushfire danger rating thresholds;

- monitoring the scheduling/completion of bushfire mitigation works and bushfire awareness programs;
- discussion and resolution of issues regarding access, fire-fighter safety, roads and water supplies;
- identification of areas in which collaboration/assistance may be required from local fire services to reduce fire risk across the landscape;
- identification and discussion of safety and environmental restrictions and safeguards;
- NSW RFS / NPWS will be provided with coordinates of the final wind turbine layout and identification information for individual wind turbine sites for their internal response planning; and
- the Proponent commits to assist the RFS / NPWS and emergency services in the event of a fire occurring in the vicinity of the site.

■ Fire Drills and Fire Prevention Inspections

The local RFS / NPWS would be invited on an as-needs basis to assist in the running of fire drills during construction and operation. Greater attention to awareness and readiness will be given at start of the Fire Danger Period and prior to the bushfire risk increasing.

During construction, the site nominated HS&E officer would be responsible for arranging fire drills at least every 6 months or more frequently if warranted. These operations would test and measure:

- site preparedness for fire emergencies including but not limited to the availability and location of suitable fire-fighting agents, access and egress and fire warden training. Fire extinguishers will also be provided in construction and operations vehicles;
- the site emergency evacuation procedures, including staff awareness of emergency protocols; and
- consultation and communication protocols with emergency services.

■ Environmental Induction

All employees, contractors and staff working onsite will undergo induction training covering all procedures and protocols which will be included in a Bushfire Emergency Management and Operations Plan. The site induction provides an introduction to bushfire risks and preventative controls as well as emergency procedures.

Staff and contractors undertaking major construction or maintenance work will undertake daily tool-box meetings, which will include, but not be limited to:

- a review of daily fire risk rating and predicted weather including maximum predicted temperature and wind speeds;
- emergency communication protocol;
- recent bushfire events on or in the vicinity of the site; and
- specific bushfire risks relevant to the day's activities and any restrictions based on the Fire Danger Ratings.

■ Storage and Maintenance of flammable materials

- during construction, flammable materials will be stored at the laydown area only;
- a manifest (and safety data sheets) must be prepared for any battery, diesel or other dangerous goods storage/handling, including the class identification, quantity, type (bulk or packaged) and location. Appropriate material (including absorbent, neutralisers, equipment and personal protective equipment) for the clean-up of spills is to be provided and available on site at all times; and
- the manifest must be maintained and made available to emergency crews as per NSW Work Health and Safety Regulation 2017.

6. NPWS TELECOMMUNICATIONS RESPONSE

6.1 NPWS Request

The NPWS advice contained in the RFI (DPE, 2022) sought additional information relating to telecommunications impacts on NPWS and other VHF radio communications, as presented in **Table 6-1**.

Table 6-1 NPWS Request for Further Information

Issue	Remaining comments / concerns
Potential EMR impacts on existing agency operational radio communications	<p><i>The potential for EMR [electromagnetic radiation] impacts on NPWS and other VHF radio communications in this remote area remains unknown. This is important since there are no other effective operational communications available for emergency services and NPWS WHS [work health and safety] considerations in this landscape. It's not yet understood how any interference to VHF radio comm's that might eventuate would be "considered in the planning stages" and "manageable". If EMR interference from the turbines becomes an issue, it may be difficult to fix in retrospect. Creating ineffective radio comm's in this area is not an option if we are to ensure public, environmental and staff safety.</i></p>

A meeting between the Proponent, NPWS, and DNV was held on 3 March 2022 to discuss the NPWS's concerns and seek further information about the radio communication systems used by NPWS in the area around the Project.

From this discussion, DNV understands that NPWS's comments focus on the potential for the Project to interfere with the use of their mobile radio communications system in the Ben Halls Gap Nature Reserve, which is adjacent to the eastern boundary of the Project. The NPWS particularly expressed concerns about the potential for electromagnetic interference (EMI) caused by electromagnetic emissions or 'noise' produced by turbines at the Project to impact on mobile radio signals transmitted and received by the base stations and remote users. Another issue raised was the potential for the Project to interfere with mobile radio signals through either electromagnetic emissions or the physical presence of turbines.

6.2 Response

The above outcomes were considered in a letter dated 21 March 2022 by DNV. The below section provides a summary of this letter response, which can be found in full at **Appendix F**.

6.2.1 Interference Caused by the Physical Presence of Wind Turbines

Previous advice received from the operators of mobile radio systems similar to those used by NPWS, including state government emergency services organisations, has generally indicated that they do not expect wind farms to interfere with their communications. Several operators have also confirmed that they have not previously experienced noticeable interference to their mobile radio systems in the presence of operating wind farms. The potential impacts of the physical environment on the performance of a mobile radio system are usually mitigated by designing the system such that alternative base stations are available at the edges of the coverage areas and in other areas of low signal strength.

6.2.2 Potential Impacts Due to Signal Obstruction or Diffraction

Signals between the Mt Helen NPWS base station located to the southwest of the Project Area and mobile units used in the Ben Halls Gap Nature Reserve may pass through the Project in the vicinity of turbines. Therefore, there is potential for the Project to cause obstruction or diffraction of mobile radio signals transmitted or received by the Mt Helen base station.

To better understand the potential for impact to signals to and from the Mt Helen base station, DNV identified the areas in and around the Ben Halls Gap Nature Reserve where there is an unobstructed signal line of sight for each of the NPWS base stations, where it was found:

- areas close to the southwestern boundary and small areas in the centre of the reserve and on the southern and western boundaries have unobstructed lines of sight to the Mt Helen base station;
- areas along most vehicular tracks and in the south and far east of the reserve have unobstructed lines of sight to the Mt Barrington and Mt Myra base stations, but no clear line of sight to Mt Helen; and
- there is a large area in the northern part of the reserve that does not have a clear line of sight for signals to or from any of three identified base stations.

These findings are further illustrated in Figure 1 of the DNV letter (2022, **Appendix F**). Figure 2 of the DNV letter illustrates base stations which would have a direct signal line of sight at the minimum distance above a mobile unit antenna at a height of 1.5 m. Results suggest that the Mt Barrington and Mt Myra base stations, which would not be affected by signal obstruction or diffraction caused by the Project, may be more likely to be servicing the parts of the reserve where a signal from the Mt Helen base station could be intercepted by turbines. The results of the DNV analysis are indicative only, and the actual base stations servicing each part of the reserve would need to be confirmed through onsite signal strength measurements.

6.2.3 *Potential Impacts Due to Signal Reflection or Scattering or Near-Field Effects*

DNV has reviewed the proposed turbine locations for the Project with respect to the NPWS base stations and Ben Halls Gap Nature Reserve, to determine the potential for interference through reflection or scattering of signals or near-field effects, in which DNV found:

- all proposed turbine locations are at least 28 km from the identified NPWS towers, which is well beyond the distances at which reflection, scattering, or near-field effects are expected to cause interference to the signals received or transmitted by those base stations; and
- 13 turbines are located within 500 m of the western boundary of the reserve and may therefore have potential to interfere with signals transmitted or received by mobile units in this area (see mitigations proposed in 6.2.6).

Overall, DNV found that the potential for turbines at the Project to interfere with the NPWS mobile radio system through reflection or scattering of the signals may be low.

6.2.4 *Interference Caused by Electromagnetic Emissions from Wind Turbines*

Given the nature of modern wind farm and wind turbine design, DNV considered it very unlikely that electromagnetic emissions from the Project will cause interference to NPWS radiocommunications.

6.2.5 *Potential Impacts of Electromagnetic Emissions from Turbines*

Electromagnetic emissions produced by electrical equipment, such as wind turbines, include both electromagnetic fields and electromagnetic radiation. These emissions *theoretically* have the potential to interfere with radiocommunications equipment or other forms of electronic circuitry. Despite the large numbers of wind turbines currently installed, DNV is not aware of any cases where EMI impacts have been caused by electromagnetic emissions from wind farms.

Wind turbines are typically constructed in accordance with standards that are recognised electromagnetic compatibility regulations in Australia, and the nature of turbine design means that any emissions are likely to be counteracted or shielded. DNV therefore considered it unlikely that electromagnetic emissions from the Project will have an adverse effect on NPWS radiocommunications in the Ben Halls Gap Nature Reserve and surrounding area.

6.2.6 Updated Mitigation and Management Measures

The Proponent has committed to undertaking pre-construction measurements of the existing mobile radio signal coverage in the Ben Halls Gap Nature Reserve in consultation with NPWS. Corresponding measurements will then be taken once the Project is constructed and operational to determine whether the Project has a material adverse impact on the performance of the mobile radio system.

If it is found that the Project does caused material interference to the mobile radio system used by NPWS, the Proponent commits to implementing mitigation to return the system performance to at least pre-construction levels. Appropriate mitigation options will be identified in consultation with NPWS, depending on the nature of the interference and the aspects of the system that are affected, but may include:

- providing higher powered hand-held and vehicle-based mobile units;
- increasing the signal strength from the affected base station or an alternative base station; and
- installing a signal repeater or additional base station at an appropriate location.

If an additional base station or repeater is required to resolve issues, it may be possible for this to be installed at the Project Area on infrastructure already associated with the Project such as a meteorological mast used for power performance measurements.

7. DWELLING ASSESSMENT

DPE has requested further information relating to potential Project related impacts on allotments with existing dwelling entitlements. A dwelling entitlement assessment has been completed and is summarised in this section. The dwelling entitlement assessment can be found in full in **Appendix H**.

7.1 DPE Request

The following RFI have been made by DPE relating to dwelling entitlements in proximity to the Project:

- **RFI dated 11 October 2021:** *‘Visual – detailed assessment and consideration of visual impacts of the Project on properties within the vicinity of the project for which:*
 - dwellings are approved but yet to be constructed or are under construction;
 - a development application has been lodged, but a determination is yet to be made; and
 - there are existing dwelling entitlements on the land.’

Detailed assessments of dwellings approved but yet to be constructed and where development applications have been lodged but a determination is yet to be made were incorporated into the Submissions Report and are thus not considered further in this report.

This report provides a considered response to potential visual impacts of the Project on properties that may have dwelling entitlements.

- **Additional RFI (undated):** *‘The Department is aware of dwelling entitlements on Lots 67 & 107 DP755349 adjoining the Project site.*

As outlined in the NSW Government Wind Energy Framework - <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/wind-energy-guideline-for-state-significant-wind-energy-development-2016-12.pdf> the assessment should include the consideration of existing dwelling entitlements on land within the vicinity of the wind energy project.

Please ensure you identify and assess any other lots in proximity to the Project site with dwelling entitlements in your Response to Submissions/Amendment Report’.

This Dwelling Entitlement Assessment (refer **Appendix H**) considers the abovementioned allotments, as well as other allotments within 3 km of a proposed turbine that may have dwelling entitlement.

7.2 Identification of Dwelling Entitlement Allotments

The criteria used to identify allotments is summarised in **Table 7-1**. This does not take into account any merit based considerations and development constraints as discussed in Section 5 of the Dwelling Entitlement Assessment (refer **Appendix H**).

Table 7-1: Dwelling Entitlement Identification Criteria

Local Environmental Plan	Minimum Lot Size Applied as per LEP Minimum Lot Size Mapping	Zoning	Distance to turbine
Tamworth LEP 2011	200 ha	RU1 Primary Production	3 km
Upper Hunter LEP 2013	40 ha, or 400 ha, subject to minimum lot size mapping.	RU1 Primary Production RU4 Primary Production Small Lots	3 km

7.3 Key Assessment Outcomes

The assessment found potentially 20 lots within 3 km of the Project that have dwelling entitlements. In summary, the visual and noise assessments undertaken on the 20 lots identified with potential dwelling entitlements indicate that:

- The majority of lots assessed have the potential for siting a dwelling with little to no visibility of the Project and where the ZVI identified large portions of the lot with potential views to the Project, vegetation visible on aerial imagery is likely to reduce views to the Project. All lots with potential dwelling entitlements have the opportunity to consider the layout of the wind farm and select areas of the lot, dwelling orientation and existing vegetation screening to minimise visual impact.
- 15 of the 20 lots assessed were identified as being outside of the 35 dB contour and therefore fully achieve the noise criteria.
- Based on these assessment outcomes, the Project is unlikely to impact on the ability of a landholder to develop a dwelling on any of those 15 lots.
- Of the five lots identified as potentially being partially affected by noise, those lots are constrained in other ways unrelated to the Project which may affect whether planning approval would be given to any future planning application. It is noted that these five allotments are owned by two landowners, with which the Proponent is currently in landowner agreement negotiations.

APPENDIX A ADDITIONAL REQUEST FOR INFORMATION



Mr Jamie Chivers
Managing Director
Hills of Gold Wind Farm Pty Limited

09/02/2022

Via email: jamie.c@someva.com.au

Dear Mr Chivers

**Hills of Gold Wind Farm (SSD 9679)
Request for additional information**

I refer to the Submissions Report and Amendment Report for the Hills of Gold Wind Farm (SSD 9679). While the Department notes that the project design has been amended to reduce environmental impacts, the Department still has concerns about potential impacts on transport, visual amenity and biodiversity.

As such, the Department requests that you provide additional information on the matters below:

- **Transport** – further justification on why a private haulage road through Crown Reserve 85916 for Public Recreation is appropriate and necessary when alternative transport route options are available and considering the process required to secure access to this land;
- **Visual** –
 - status of agreements with the landowners of sensitive receivers where impacts are inconsistent with the Visual Performance Objectives outlined in the *Wind Energy Visual Assessment Bulletin (DPE 2016)*;
 - mitigation proposed (including consideration of removing turbines) in instances where a landowner agreement cannot be reached; and
- **Biodiversity** –
 - justification for the placement of wind turbines immediately adjacent to Ben Halls Gap Nature Reserve, having regard to:
 - potential barrier effects, displacement of home ranges and disruption to movement patterns of mobile species;
 - advice from Biodiversity, Conservation and Science Directorate and National Parks and Wildlife Service on the updated Biodiversity Development Assessment Report; and
 - input from a bat ecologist and other relevant experts.

Please provide the information, or notify us that the information will not be provided, by **Friday 25 March 2022**. If you cannot meet this deadline, please provide and commit to an alternative timeframe for providing this information.

If you have any questions, please contact Anthony Ko on 8217 2022 or at anthony.ko@planning.nsw.gov.au.

Yours sincerely,

A handwritten signature in blue ink, appearing to be 'NB', with a horizontal line extending to the right.

Nicole Brewer
Director
Energy Assessments



Department of Planning and Environment

Our ref: DOC22/56339

Your ref: SSD-9679

Anthony Ko
Team Leader Energy Resource Assessment
Planning & Assessment Group
Department of Planning and Environment
anthony.ko@planning.gov.nsw.au

Dear Anthony

Hills of Gold Wind Farm – Response to Submissions

Thank you for your e-mail dated 12 January 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the department inviting comments on the Response to Submissions (RTS) for the Hills of Gold Wind Farm.

Many of the issues raised by BCS in our submission of 4 February 2021 have been addressed; however, concerns remain around several issues, particularly the proximity of the development to the high biodiversity values of adjoining Ben Halls Gap Nature Reserve and nearby national park estate, the ability of the proponent to mitigate blade strike given the high levels of species diversity and densities, and the lack of ability to apply large buffers to turbines due to landform constraints. BCS recommends that the proponent be requested to provide, prior to project determination, a statement of commitments outlining blade strike trigger points and associated mitigation measures.

BCS notes that the proponent proposes to stage the construction of the project and that a detailed Staging Plan will be prepared and submitted in advance of construction. The intention is that prior to works commencing the biodiversity offset requirements associated with each stage will be confirmed and secured through the legal mechanisms required by the NSW Biodiversity Offset Scheme and the EPBC Act Offsets Policy. We further note the commitment that the project impacts will remain within the “worst-case” scenario assessed as part of the updated Biodiversity Development Assessment Report (BDAR). BCS requests that the Staging Plan and supporting credit obligation calculations be provided to us for review and verification. BCS welcomes the opportunity to discuss the mechanisms of how this may be achieved and conditioned.

Recommendations and comments on the RTS are provided in **Attachment A** and detailed comments are provided in **Attachment B**.

If you require any further information regarding this matter, please contact David Geering, Senior Conservation Planning Officer, via david.geering@environment.nsw.gov.au or (02) 6883 5335.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Sarah Carr'.

Sarah Carr
Director North West
Biodiversity, Conservation & Science Directorate

1 February 2022

Enclosure: Attachments A and B

BCS's recommendations and comments

Hills of Gold Wind Farm – Response To Submissions

BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BBAMP	Bird and Bat Adaptive Management Plan
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCS	Biodiversity, Conservation and Science Directorate
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
CEEC	Critically Endangered Ecological Community
DNG	Derived Native Grassland
DPE	Department of Planning and Environment
EEC	Endangered Ecological Community
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
IBRA	Interim Biogeographic Regionalisation for Australia
LLS Act	<i>Local Land Services Act 2013</i>
MNES	Matters of National Environmental Significance
PCT	Plant Community Type
SAII	Serious and Irreversible Impacts
TEC	Threatened Ecological Community
TBDC	Threatened Biodiversity Data Collection
VIS	Vegetation Information System

- 1.1 The advice regarding the BAM assessment is for the assessor's information only and requires no further action for this project.
- 2.1 The assessor should note BCS advice regarding the separate assessment of exotic vegetation and areas which are excluded from further assessment under the BAM, as a consequence of the provisions within the Local Land Services Act 2013, for future assessments.
- 3.1 Justification should be provided in the BDAR for the selection of all PCTs.
- 4.1 Where vegetation plots are not located in the project footprint, justification must be provided, including evidence that the plot is in the correct PCT and vegetation zone, and that the plot data is consistent with other plot data collected in that vegetation zone.
- 5.1 The BOAMs cases be split between IBRA sub-regions, with separate cases for each sub-region.
- 5.2 Where benchmark data is used, the benchmark data for the relevant IBRA must be used.
- 5.3 Lists of candidate threatened species be reviewed to determine whether any additional species need to be assessed.
- 5.4 Biodiversity credits be recalculated for each IBRA sub-region.
- 6.1 Vegetation condition classes be reviewed to ensure that they accurately reflect vegetation integrity scores.
- 6.2 Biodiversity values that are influenced by vegetation condition and integrity (e.g. candidate threatened species, allocation of PCTs to threatened ecological communities) be reviewed and the BDAR updated accordingly.

- 6.3 All spatial data and maps are to be updated to accurately identify vegetation condition classes and vegetation zones.
- 7.1 The information provided regarding permanent and temporary impacts is adequate and no further action necessary.
- 8.1 Discussion regarding species credit species and ecosystem credits have been differentiated. No further action necessary
- 9.1 All plot data be checked for accuracy.
- 9.2 Explanations be provided for differences in plot data between spreadsheets.
- 9.3 Ensure accurate data is entered into BOAMs.
- 10.1 All SAIL have been adequately addressed. No further action necessary
- 11.1 Discussion regarding the potential for the displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns is required.
- 11.2 Justification be provided for the distance between turbines along ridge lines.
- 12.1 Options to compensate for unavoidable prescribed impacts, the decision pathway and justification for suggested credit numbers or other compensatory actions, should be clearly documented.
- 13.1 Additional input be sought from a bat ecologist regarding the report presented in Appendix F of the BDAR and the potential for smaller scale bat roosts in the vicinity of the development footprint.
- 13.2 Monitoring of bats take place prior to construction adjacent to geological features with high bat activity at “fly-out” times to determine whether further investigation of potential roost sites is required.
- 14.1 Full details of trigger points and mitigation measures be addressed and presented prior to a final determination of the project rather than in a post-consent BBAMP.
- 14.2 Data from ongoing bird and bat monitoring surveys be provided to DPE annually as well as made publicly available on the project’s website.
- 15.1 No significant impact is likely on the local population of Greater Glider. No further action necessary.
- 16.1 The species polygon for Sooty Owls is acceptable.
- 16.2 Species polygons for Powerful, Barking and Masked Owls be reconfigured to include any suitable habitat containing trees with hollows with an entrance greater than 20cm in diameter. A buffer of 100 m may be applied to individual hollow-bearing trees.
- 16.3 The species polygon for Koala, Eastern Pygmy Possum and Squirrel Glider be reconfigured to include all suitable habitat.
- 17.1 Stewardship sites be located sufficiently remote from the influence of the turbines.
- 18.1 The BDAR should address all Matters of National Environmental Significance with clear justification as to why any species have been ruled out.
- 18.2 A credit requirement for the Greater Glider should be calculated under advice from the Commonwealth Department of Agriculture, Water and the Environment.

BCS's detailed comments

Hills of Gold Wind Farm – RTS

1 Not all components of the BAM assessment were included in the BDAR

A checklist indicating compliance with Appendix 10 of the Biodiversity Assessment Method (BAM) (2017) was not provided in the exhibited BDAR. Table 11 of the updated Biodiversity Development Assessment Report (BDAR) provides a summary of where the required information for a BDAR is located.

Table 11 indicates that the estimates of percent cleared of each Plant Community Type (PCT) is available in Appendix H; however, Appendix H does not contain estimates of percent cleared for PCTs, rather plot data.

The percent cleared value is defined as the percentage of a PCT that has been cleared as a proportion of its pre-1750 extent, as identified in the BioNet Vegetation Classification. This information may have been best provided in the detailed PCT description (Appendix B).

Comment

1.1 This advice is for the assessor's information only and requires no further action for this project.

2 The methodology used to determine non-native vegetation must be clearly articulated

Section 4.2.1 of the updated BDAR describes the method used to identify and map non-native vegetation. The details provided on this method is considered adequate.

This issue has been resolved.

BCS notes the method detailing how non-native vegetation has been identified and mapped has been combined in Section 4.2.1 with detail on the method used to apply land categorisation, under the *Local Land Services Act 2013* (LLS Act), within the site.

The assessor should note that areas of exotic vegetation and areas which are excluded from further assessment under the BAM i.e. Category 1 Land, should be assessed and delineated separately within a BDAR. This is because the two categories are assignable according to different criteria i.e. exotic vegetation is mapped according to the dominance of weed species and the absence of native vegetation cover, whereas areas which are not subject to assessment under the BAM, as a consequence of the provisions within the LLS Act, are assigned according to land use information and history.

This advice is for the assessor's information only and requires no further action for this project.

Comment

2.1 The assessor should note BCS advice regarding the separate assessment of exotic vegetation and areas which are excluded from further assessment under the BAM, as a consequence of the provisions within the Local Land Services Act 2013, for future assessments.

3 The selection of PCTs has not been adequately justified

Section 4.1.3 describes the method for mapping PCTs within the site and condition metrics assigned to vegetation zones. BCS advise that the detail provided on this method and condition metrics are considered adequate.

BCS note that while Appendix B has been updated to include justification for PCT selection, the justification of PCT selection does not clearly articulate why a given PCT was determined to be the 'PCT of best fit' and the most accurate representation of vegetation within the site. Limited analysis and demonstration of comparative equivalence between site context and PCT attributes has been provided i.e. soil types, landscape position, existing mapping or attributes recorded in the field data sheets.

For example, the justification for the selection of PCT 507 states that: "*PCT was found to support a common occurrence of Eucalyptus stellulata within the canopy with an understorey of native shrubs and groundcovers. The PCT was found to represent an open forest with a mid-dense crown cover, at high elevation undulating plateaux, on a basalt-derived heavy soils.*".

The above excerpt from Appendix B provides an adequate description of the PCT within the subject lands; however, the excerpt does not articulate any justification on why the assessor considered PCT 507 to represent the 'PCT of best fit' for this vegetation type within the subject land.

It would be beneficial if each justification provided a short-list of candidate PCTs, based on the key diagnostic features collected through the field survey and comparative PCT selection tools used, i.e. the VIS vegetation diagnostic tool, with a final justification describing why the selected PCT was the best fit for the site.

Recommendation

3.1 Justification should be provided in the BDAR for the selection of all PCTs.

4 Inclusion of vegetation plots located outside the project footprint must be justified

In BCS's original submission it was stated: "*Where vegetation plots are not located in the project footprint, justification must be provided, including evidence that the plot is in the correct PCT and vegetation zone, and that the plot data is consistent with other plot data collected in that vegetation zone.*"

Section 4.1.4 within the updated BDAR provides a statement describing the rationale behind why certain plots are located outside of the development footprint: "*During the planning and implementation of the field survey, BAM plots have been located as much as possible within the development footprint. Due to the multiple revisions to the development footprint, there are some instances where plots are no longer located within the final development footprint assessed in the Updated BDAR. Where BAM plots have not been located within the development footprint, they have been located within a contiguous and/or representative patch of vegetation suitable for collection of data commensurate within the impacted vegetation zone. This allows the vegetation integrity scores to be included in the BAM-Calculator to be consistent with the area impacted in the development footprint*".

From review of the statement above, BCS understands the rationale behind some plots being located outside of the project footprint. However, this does not preclude the need for evidence to be provided for BCS to verify that all plots outside the subject land are adequately representative of impacted vegetation. This should include, but not be limited to, a table listing:

- each plot located outside of the subject land
- justification, referencing appropriate evidence, to demonstrate each plots representativeness of its equivalent vegetation zone within the subject land and consistency with other plots collected within the same vegetation zone; and
- a distance between the plot and the nearest area of vegetation within the subject land the plot is representing and reference to an informing map.

Recommendation

4.1 Where vegetation plots are not located in the project footprint, justification must be provided, including evidence that the plot is in the correct PCT and vegetation zone, and that the plot data is consistent with other plot data collected in that vegetation zone.

5 Separate BOAMs cases are needed for each IBRA subregion

The BAM (section 5.2.1) requires that, for linear-shaped proposals, the assessor must assess the habitat suitability for each IBRA subregion separately. This is important as the IBRA bioregions and IBRA subregions inform:

- Identification of PCTs and benchmarks
- Habitat suitability for threatened species

For linear projects, BCS expects that the accredited assessor will submit a separate Biodiversity Offsets and Agreement Management System (BOAMS) case for each IBRA subregion.

The revised BDAR identifies that the assessment area intersects four IBRA subregions, as shown in Table 12 of the report.

Table 12 IBRA region and sub-regions in which the subject land is located

IBRA Region	IBRA Sub-region	Extent (ha)	% Assessment area
New England Tablelands	Walcha Plateau	59,71	19%
Nandewar	Peel	13,655	44%
NSW North Coast	Tomalla	3,183	10%
Sydney Basin	Hunter	8,586	27%

The accredited assessor has concluded that the majority of the project is located within the Nandewar bioregion and Peel sub-region. Two BOAMS cases have been submitted:

- Case 00020780 – Nandewar IBRA, Peel subregion (containing 45 vegetation zones)
- Case 00021863 - Sydney Basin IBRA, Hunter subregion (containing two vegetation zones).

Using GIS, BSC has calculated that Walcha Plateau and Tomalla contain fifteen and twenty vegetation zones respectively. Peel has twenty-four vegetation zones. While there is considerable overlap with the vegetation zones located in each IBRA sub-region, there are zones that are found in one sub-region and not the other two (for example zones 526 moderate and 526 high are only in Walcha Plateau sub-region).

In addition, the accredited assessor has used benchmark data for vegetation zones where no BAM plots have been done. Some vegetation zones are in more than one IBRA, and benchmark data is different for each IBRA. For example, PCT 486 has vegetation zones in both Nandewar and NSW North Coast IBRAs that will be impacted by the project. Benchmarks for the two IBRAs differ. However, the accredited assessor has only used the Nandewar benchmark in BOAMs.

Recommendations

- 5.1 The BOAMs cases be split between IBRA sub-regions, with separate cases for each sub-region.
- 5.2 Where benchmark data is used, the benchmark data for the relevant IBRA must be used.
- 5.3 Lists of candidate threatened species be reviewed to determine whether any additional species need to be assessed.
- 5.4 Biodiversity credits be recalculated for each IBRA sub-region.

6 Vegetation zone conditions should be reviewed

In reviewing the BOAMs case, BCS notes that some condition classes do not reflect the vegetation integrity score for the vegetation zone.

Accurate condition classes for vegetation zones are important because development should be located in areas of no or low value native vegetation. If areas with high vegetation integrity scores are being mapped as low condition with development focussed in these areas, there will be high biodiversity impacts.

Vegetation integrity also has implications for threatened species habitat identification and allocation of vegetation zones to threatened ecological communities.

For example, PCT 540 has three condition classes: high, moderate and low. The low condition class should have the lowest vegetation integrity score. However, the condition classes for PCT 540 are:

PCT 540 condition class	Vegetation integrity score
High	80.3
Moderate	86.1
Low	95.9

Of the forty vegetation zones listed in Table 18 of the revised BDAR, nineteen of these use PCT benchmark data rather than data from BAM plots. Using benchmark data means that vegetation integrity scores for these zones are automatically assigned as high in the BAM-C (e.g. a VIS score of 99.9).

Of the zones that use benchmark data, four are classed as high condition, five as moderate and seven as low. Three zones are derived native grasslands that used benchmark data for groundcover but no shrub or tree canopy was recorded. Table 17 provides an overview of criteria used to assign vegetation condition class but there is no detailed explanation of how the high, medium and low conditions were decided for sites where benchmark data was used. As benchmark data was used it is assumed that plots were not used to refine these condition classes.

Recommendations

- 6.1 Vegetation condition classes be reviewed to ensure that they accurately reflect vegetation integrity scores.
- 6.2 Biodiversity values that are influenced by vegetation condition and integrity (e.g. candidate threatened species, allocation of PCTs to threatened ecological communities) be reviewed and the BDAR updated accordingly.
- 6.3 All spatial data and maps are updated to accurately identify vegetation condition classes and vegetation zones.

7 Permanent and temporary impacts for each vegetation category is adequate

In BCS's original comment it was recommended that a table be created that states the permanent and temporary impacts for each vegetation category: exotic grassland, planted vegetation, cleared land and each PCT in order to clearly reconcile impacts across the development footprint.

Additional information has been provided in Table 21, a breakdown of the area of each condition class of vegetation, and Table 22, which provides a summary of the PCTs, vegetation zones, condition, extent, integrity score and associated TECs for the development footprint. Biodiversity Risk Ratings have been added to the table in accordance with Appendix 10 of the BAM.

BCS advise that the information provided is adequate.

Comment

7.1 The information provided regarding permanent and temporary impacts is adequate and no further action is required.

8 Ecosystem species have been included in discussions regarding species credit species

Table 28 (previously Table 21 in the original BDAR) has been updated in the amended BDAR. Biodiversity Risk Ratings have been added to the table in accordance with Appendix 10 of the BAM.

This issue has been resolved.

Comment

8.1 Discussion regarding species credit species and ecosystem credits have been differentiated. No further action necessary

9 Inconsistencies exist between the field data and the data in the BAM calculator

BCS obtained three sets of plot data from the proponent:

1. HoGWindFarm_raw_plot_data.xlsx sent on 21 January 2021 (Spreadsheet #1)
2. Hills.of.Gold.WF.BAMplot.data_20210916_BCS.xlsx sent on 21 January 2022 (Spreadsheet #2)
3. 34963_HoGWF_AppHb-Plot data summary_20220124.xlsx sent on 27 January 2022 (Spreadsheet #3)

We note that the data in BOAMs follows that provided in spreadsheet #3 provided on 27 January 2022, and matches the data presented in Appendix H of the BDAR. BCS has not done a full comparison of this spreadsheet with BOAMs but assumes that the data has been directly uploaded to BOAMs and as such should match the spreadsheet.

Spreadsheet #3 does not entirely match with spreadsheets #1 and #2. For example, comparing the first plot (plot 1 HoG_Mar_13) of spreadsheet #3 with spreadsheet #1, there are inconsistencies, e.g.:

Item	Spreadsheet #1	Spreadsheet #3
Northing	6509750	6509746.22
Comp Forbs	5	4
Comp fern	0	1
StrucForbs	2.7	2.6
StrucFerns	0.0	0.1
Funlittercover	5.1	4.0

Spreadsheet #2 did not provide all data, only including the zone function data for trees, trees with hollows and length of logs. Other composition and structure data was not provided in this spreadsheet as it was in the other two spreadsheets.

However, there are differences between spreadsheet #2 and spreadsheet #3. Some examples are provided in the table below:

Examples of differences in large tree counts between spreadsheets #2 and #3

Plot number	Spreadsheet #2	Spreadsheet #3
30	4	8
34	12	24
35	10	20

Examples of differences in large tree counts between spreadsheet #1, #2 and #3

Plot number	(Spreadsheet #1)	Spreadsheet #2	Spreadsheet #3
17	1	16	16

The information provided and entries in BOAMs should be checked, with explanations provided outlining the differences in the data sets.

Recommendations

- 9.1 All plot data should be checked for accuracy.
- 9.2 Explanations be provided for differences in plot data between spreadsheets.
- 9.3 Ensure accurate data is entered into BOAMs.

10 Serious and Irreversible Impacts (SAIL) have not been addressed

The consent authority is responsible for deciding whether an impact to listed entities is likely to be serious and irreversible. Assessments undertaken in accordance with Section 10.2 of the BAM for potential SAIL entities is provided in Appendix E of the updated BDAR.

SAIL to cave dwelling microbats and their potential breeding habitat have been avoided through removal and relocation of specific turbines from the project footprint (see Issue 11).

Overall design refinements undertaken since the exhibited BDAR have resulted in a material reduction of impact to Box Gum Woodland CEEC from 13.3 hectares to 6.07 hectares. Approximately 41 % of the remaining impacts to Box Gum Woodland (2.47 hectares) as a result of the project will occur on areas of Derived Native Grassland (DNG) or that have been assessed as occurring in Low condition. Accordingly, the Project is not considered likely to reduce the extent of the Box Gum Woodland Critically Endangered Ecological Community (CEEC) at the national, bioregional or local scales, and the Project will not lead to a reduction in the geographic distribution of Box Gum Woodland.

Recommendation

- 10.1 All SAIL have been adequately addressed. No further action necessary

11 The potential impact to fauna relating to turbine placement has not been adequately addressed

The proposal now consists of up to 65 turbines operating over an approximate linear distance of 30 kilometres along ridgelines. The BDAR addresses the potential impacts of blade strike but fails to address the potential impacts of barriers to movement. The section in Table 64, for example, that should specifically refer to this issue refers to Sections 8.3.1, 8.3.2 and Appendix D of the BDAR (the Collision Risk Model Report). While loss of habitat connectivity is mentioned, none of these

specifically address this issue other than in the context of blade strike. There is no discussion regarding the potential for the displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns. The latter may be important for large forest owls, and potentially tree-roosting microbats, that may include the more fragmented habitat to the west of the ridgeline as foraging habitat.

The section on habitat connectivity in Section 8.5 of the updated BDAR suggests that the removal of five turbines from the project will mitigate impacts of wind turbine placement to habitat connectivity. It is noted that removing four of these turbines will reduce the incursion of the development into native vegetation (see Figure 1 of the BDAR) but has done little to reduce potential barrier impacts.

BCS has concerns about the spatial arrangement of turbines along ridge lines and recommends that the proponent justify the distances between turbines in relation to potential barrier effects.

Recommendations

- 11.1 Discussion regarding the potential for the displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns is required.
- 11.2 Justification be provided for the distance between turbines along ridge lines.

12 Prescribed impacts relating to wind farms have not been adequately addressed

Section 8.5 of the updated BDAR discusses prescribed impacts. Of particular relevance to this project is the impact of the project on connectivity of threatened entities (see Issue 9) and the assessment of impacts of wind turbine strike on protected fauna (see Issue 14).

BCS's submission of 4 February 2021 recommended that the proponent options to compensate for unavoidable prescribed impacts, and the decision pathway and justification for suggested credit numbers or other compensatory actions, be clearly documented in the BDAR.

The Submissions Report suggests that the Biodiversity Offsets Strategy will "*provide further options to ensure that unavoidable impacts are fully offset as required by the NSW Biodiversity Offset Scheme and the EPBC Act Offsets Policy to ensure no net loss to biodiversity*". It further states that "*This is expected to provide further options to compensate for unavoidable impacts*".

The BDAR and the Submission Report both fail to provide a quantifiable credit requirement for unavoidable prescribed impacts.

Recommendation

- 12.1 Options to compensate for unavoidable prescribed impacts, the decision pathway and justification for suggested credit numbers or other compensatory actions, should be clearly documented.

13 Direct impacts on cave bat roosts needs to be clarified

It is noted that the cave bat roost polygons have been modified based on expert advice regarding the presence of geological features of significance within the study area and in the broader landscape. This change has resulted in a significant reduction in the area of these polygons.

BCS acknowledges that, based on the information provided, that significant areas previously mapped as microbat roost habitat are unlikely to contain significant roosts. While it appears that there are unlikely to be habitat features to accommodate a large colony in the immediate area, the report provided in Appendix F of the BDAR states that there is high potential for features that might support smaller roosting sites across the landscape. Collectively, these features may support large numbers of bats, which is supported by the data collected by the microbat acoustic surveys.

BCS recommends that input by an acknowledged bat ecologist be sought to substantiate the findings of the geomorphology and geology report particularly in relation to the potential for small scale roosts to occur within or adjacent the development footprint.

BCS notes that 3 turbines (WP 23, WP, 27, WP 31) creating a high risk of impact and 1 turbine (WP 01) creating a moderate risk of impact have been removed. Two additional turbines (WP 50 and WP 2) with either high or moderate risk to impact have been relocated to create a greater buffer to mapped habitat. It is stated that *“As a result of additional surveys and project amendments to remove turbines from updated mapping habitat, the project will not result in any direct impacts to cave bat roosts, nor will any project infrastructure occur within cave bat roosting habitat buffers”*. *The project will not result in any direct impacts to cave bat roosts, nor will any project infrastructure occur within cave bat roosting habitat buffers”*.

BCS suggests that this may apply to larger scale roost sites but may not account for minor roosts that has the potential to account for a significant number of bats.

It is noted that several mitigation measures are proposed to minimise direct disturbance to cave-dwelling bats including:

- Disturbance to roosting microbats as a result of ground vibration during the breeding season (November to February) or winter torpor season (May to September) will be avoided and minimised as far as practicable; and
- Monitoring of the presence of microbats within the habitat feature(s) near WP 50 will be undertaken prior to vibration-causing construction activities where required works coincide with breeding/torpor periods.

BCS acknowledges that it is difficult to mitigate direct impacts on features that may contain smaller roosts, but recommends that where turbines are located in areas with high bat activity at “fly-out” times, additional monitoring occurs to determine when further investigation is warranted to identify the presence of potential roost sites.

A precautionary approach should be taken in regard to construction adjacent to geological features, unless it has been demonstrated that the site has no potential to contain microbat roost sites.

Recommendations

- 13.1 Additional input be sought from a bat ecologist regarding the report presented in Appendix F of the BDAR and the potential for smaller scale bat roosts to be present in the vicinity of the development footprint.
- 13.2 Monitoring of bats take place prior to construction adjacent to geological features with high bat activity at “fly-out” times to determine if further investigation if warranted to identify potential roost sites.

14 Indirect impacts on microbats have not been adequately addressed

Nineteen out of the total twenty-eight species of microbats recorded during the field surveys were recorded by acoustic detectors mounted at approximately 60 meters elevation on met masts, and thus within the expected rotor swept area. Eight of these species are *Biodiversity Conservation Act 2016* (BC Act) and or *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed threatened species. While it is acknowledged that there is a general trend for reduced activity levels with increased elevation with ground detectors, the risk assessment for the potential for turbine strike impacts for microbats indicates that the risk to nine species of bat is confirmed to be moderate. Table 57 of the BDAR suggests that the collision risk of two microbat species is “possible”, all others being regarded as “unlikely” or “rare”. Possible is defined as “repeated loss of individuals” while unlikely is defined as “repeated loss of small number”.

While the Bird and Bat Adaptive Management Plan (BBAMP) has yet to be developed, the impact trigger for a threatened species is generally defined as “a threatened bird/bat species (or

recognisable parts thereof) listed under the EPBC Act or BC Act is found dead or injured under or close to a wind turbine during any mortality search or incidentally by wind farm personnel". An unacceptable impact, where population numbers are not known, is generally regarded as "more than three carcasses found of one threatened species over a two-month period".

An impact trigger for non-threatened species is defined as "any two successive monthly carcass searches, two or more bird or bat carcasses (or parts thereof) of a non-threatened species", with an unacceptable impact being "more than four carcasses of one non-threatened species are found during both formal and incidental carcass searches in a two-month period".

Even where the collision risk is considered "unlikely" there is potential for impact triggers, and unacceptable impacts, to occur. This potential is increased greatly for species where the collision risk is "possible". Nine species are subject to a moderate risk of impact from turbine strike.

BCS notes the diversity and high density of microbat fauna on the development site and has ongoing concerns regarding the ability of the proponent to mitigate blade strike. Twenty-eight turbines have been assessed as representing a moderate risk of impact to threatened species.

BCS notes the proposal to conduct intensive carcass monitoring for the first six months of operation, and for moderate risk turbines increased frequencies of bird and bat monitoring/mortality surveys for at least months 7 to 18 of operation. No indication is provided as to what "intensive monitoring" or "increased frequencies" entail. BCS recommend monthly carcass searches of turbines for the first five years of operation, ideally with the first two years utilising dogs to provide meaningful data on the impact of blade strike on microbat species.

BCS also strongly recommends that details of trigger points and mitigation measures be addressed and presented prior to a final determination of the project, rather than in a post-consent BBAMP as suggested. This should include but not limited to commitments on the low wind speed operational curtailment strategies, a list of mitigation options that would be applied should certain triggers be realised, and commitments regarding worst-case scenarios of when turbine/s may need to be either temporarily or permanently shut down.

BCS also recommends that should the project be approved, reporting of data from ongoing bird and bat monitoring surveys be provided to DPE as well as made publicly available on the project's website.

Recommendations

- 14.1 Full details of trigger points and mitigation measures be addressed and presented prior to a final determination of the project rather than in a post-consent BBAMP.
- 14.2 Data from ongoing bird and bat monitoring surveys be provided to DPE annually as well as made publicly available on the project's website.

15 Additional assessment of a locally important population of the Greater Glider has been provided

The Greater Glider was identified as one of four species listed as threatened under the EPBC Act occurring in the study area. It is a requirement of the EPBC Act that an assessment is carried out to determine whether there will be a significant impact on these species. One of the significant impact criteria is the possibility that the development will "reduce the area of occupancy of an important population".

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

The Ben Halls Gap National Park Plan of Management states that the park contains one of the highest recorded densities of the Greater Glider. This is reflected by the relatively high number of individuals recorded in the study area. The site is also at the western limit of the species range. On this basis, further justification was required for the decision that the local population should not be considered an important population of the species as defined by the Matters of National Environmental Significance.

Section 8.8.5 of the MNES Significant Impact Assessment and Table 72 of the updated BDAR includes an updated EPBC Act significant impact assessment for Greater Glider and provides evidence this population does not constitute an important population.

Table 72 suggests that Ben Halls Gap National Park is not at the limit of the species range but does not indicate where this limit is. Greater Glider records in Bionet clearly show Ben Halls Gap as the western limit of the contiguous range of the species although there are additional records to the south-west along the spur of the range that takes in Crawny Pass and Walladah National Parks. Two isolated populations occur at Coolah Tops and Mount Kaputar.

BCS is of the view that the local population could be considered an 'important population' given its location and the high densities present.

The EPBC Act significant impact assessment states that "*preclearance assessments would be undertaken and clearing of hollow-bearing trees would be supervised by an ecologist, and any Greater Gliders utilising the habitat being removed from the Development Footprint would be captured and relocated. Due to the large areas of suitable habitat nearby (i.e. within the reserve system), it is likely that displaced individuals would be successfully relocated, assuring that the local population would not decrease in numbers as a result of the proposed works*". BCS has reservations regarding the potential success of such actions given the habitat is likely already fully occupied. Relocated gliders are likely to vacate the area to return to their former home range, or be attacked by resident gliders and forced out, within the first week.

While the development could be regarded as impacting an important population and will decrease the area of occupancy of this population, the development is unlikely to have a significant impact on the population. The loss of 37.45 hectares of habitat within the development footprint would not significantly reduce the local population size or decrease the viability of the local population due to the extent of adjoining habitat and the high population density.

BCS considers that no further action is required for this issue.

Recommendation

15.1 No significant impact is likely on the local population of Greater Glider. No further action necessary

16 Species polygons for some species credit species are unacceptable

The original assessment for large forest owls was unable to meet the 90% probability requirement outlined in the Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft November 2004 to exclude the species presence.

The approach to mapping species credit polygons for large forest owls in the updated BDAR is to assume presence in areas of habitat suitability. The modelling of habitat suitability determined that potential large forest owl breeding habitat was restricted to wetter forested gullies/drainage lines. The lack of sheltered gullies, along with existing disturbances associated with clearing and agricultural land use and highly edge-affected patches of vegetation, rendered much of the site unsuitable for owl breeding.

While the above approach is acceptable for Sooty Owl, the Threatened Biodiversity Profile Data Collection (TBDC) indicates that Powerful, Barking and Masked Owls are all able to breed and forage in very small patches of vegetation. These species are not restricted to sheltered gullies and all suitable habitat, as indicated in the TBDC, should be regarded as potential breeding habitat. As

large forest owls require large hollows in which to breed, BCS suggests that the species polygon for breeding owls should therefore include any suitable habitat containing trees with hollows with an entrance greater than 20cm in diameter. A buffer of 100 m may be applied to individual hollow-bearing trees.

It is noted that the species polygon for Koala, Pygmy Possum, Squirrel Glider has been refined based on parameters not included in the TBDC. Where no habitat constraints are provided in the TBDC the species polygon should include all suitable habitat.

Comment

16.1 The species polygon for Sooty Owls is acceptable.

Recommendations

16.2 Species polygons for Powerful, Barking and Masked Owls be reconfigured to include any suitable habitat containing trees with hollows with an entrance greater than 20cm in diameter. A buffer of 100 m may be applied to individual hollow-bearing trees.

16.3 The species polygon for Koala, Eastern Pygmy Possum, Squirrel Glider be reconfigured to include all suitable habitat.

17 Stewardship sites should consider proximity to turbine influence

A Biodiversity Offset Strategy has been developed which outlines the three broad options available for securing the offsets required for the project. This includes identifying a number of properties that may be suitable as Biodiversity Stewardship Sites. BCS recommends that any stewardship sites be located sufficiently remote from the influence of the turbines.

BCS supports the establishment of biodiversity stewardship sites where these secure landscape connectivity with existing reserves.

Recommendation

17.1 Stewardship sites be located sufficiently remote from the influence of the turbines.

18 Additional information is required for Matters of National Environmental Significance

The Commonwealth determined the project was a controlled action under section 75 of the EPBC Act and that there was likely to be significant impacts to the five threatened entities. A further eight species were identified as having some potential risk of significant impacts. Further information was requested by the Commonwealth to determine the extent of potential impacts associated with the transport route road upgrades for twenty-four threatened entities.

Section 6.2 of the BDAR states that “*Based on the results of the desktop investigations, field surveys and the likelihood of occurrence assessments (contained in the EPBC assessment prepared by Arup), significant impact assessments were found to be required for the EPBC Act listed species and TECs that are known to occur or have a ‘high’ likelihood of occurrence, as listed below*”. These being:

- White Box-Yellow Box-Blakely's Red Gum Grassy TEC Woodland and Derived Native Grassland (critically endangered).
- Booroolong Frog *Litoria booroolongensis* (Endangered).
- Large-eared Pied Bat *Chalinolobus dwyeri* (Vulnerable)
- Spotted-tailed Quoll *Dasyurus maculatus* (Endangered).
- Greater Glider *Petauroides volans* (Vulnerable).
- Koala *Phascolarctos cinereus* (Vulnerable).

Section 8.8 of the updated BDAR states “*The following sections describe the significant impact assessment for all MNES species known or considered likely to occur in the development footprint*” and addresses the six entities listed above. The BDAR provides no detail as to why impacts on other entities listed by the Commonwealth were not considered significant. Justification for why species have been ruled out is required.

The residual adverse impact likely to occur for each EPBC Act threatened entity must be identified. Credit requirements have been calculated for those species also listed in the BC Act however no offset requirements have been presented for those species listed only in the EPBC Act. A credit requirement for the Greater Glider should be calculated under advice from the Commonwealth Department of Agriculture, Water and the Environment.

Recommendation

- 18.1 The BDAR should address all Matters of National Environmental Significance with clear justification as to why any species have been ruled out.
- 18.2 A credit requirement for the Greater Glider should be calculated under advice from the Commonwealth Department of Agriculture, Water and the Environment.

Hills of Gold Windfarm proposal

-- NPWS reply to updated BDAR and Bushfire Risk Assessment and proponent's Response to Submissions



1) BDAR & environmental considerations:

Reference ¹	Issue	Source/s	Remaining comments/concerns
NPWS_1 & 9, EES_8 & 9a	Potential for blade-strike impacts on avifauna.	s5.4.2, 7.2, 8.3.1, 8.3.2,	<p>The removal of two turbines adjacent to national park estate is welcomed, but the remaining adjacent turbines remain of concern, given that the Ben Halls Gap Nature Reserve (BHGNR) comprises significant habitat, especially for species reliant on tree hollows and higher quality habitat.</p> <p>Seven of the eight threatened bat species and four bird species (two threatened) are described as likely to suffer moderate impact from the proposal, including at the local population level.</p> <p>28 turbines are described as posing a “Moderate Risk” to local threatened bird and bat species.</p> <p>This needs further mitigation as it is unknown how the proposed adaptive management will mitigate impacts once the turbines are constructed. What options are there for the proposed adaptive management measures once the turbines are in place?</p> <p>A key question is whether a moderate level of risk to threatened species acceptable adjacent to high quality habitat on national park? For these reasons and for potential impacts on NPWS operations, NPWS recommends the removal from the proposal of all turbines adjacent to Ben Halls Gap Nature Reserve.</p>
	temporal extent of impacts	8.3.1, 8.3.2	BDAR Tables 56 & 59 regarding potential impacts of blade-strike on local populations of several species, lists the risk as moderate but describes impacts as short term. Given that the potential risks of collision will exist for the duration of the project's operation, the impacts are likely to be ongoing and hardly short term.
as above	Adaptive management proposed	as above	Proposed ongoing monitoring of impacts and adaptive management is commended. However it's difficult to understand how adaptive management can be implemented once the turbines are constructed -- there is little indication of what this might comprise “after the event” and after its impact.

¹ From NPWS & BCD Submission Responses

Reference ¹	Issue	Source/s	Remaining comments/concerns
as above	Appropriate setbacks from NP boundaries	s8.9	BDAR's mitigation measures include "appropriate setbacks" required from NP estate " <i>where practical</i> ", which have not been clearly identified and do not appear to be in place for the turbines immediately adjacent to BHGNR. Also the 30m "minimum safe distance" from nearest vegetation canopy to mitigate blade-strike risks to protected fauna appears inadequate, and inconsistent with the above and other considerations including precedents set for other other windfarms which involved more extensive set-backs.
NPWS_2	Impacts on NPWS aerial operations	Aviation Impact Assessment, 3.7	<p>Impacts on fire management operations are outlined below.</p> <p>As discussed with the proponent, NPWS also uses both fixed wing and helicopter operations for aerial baiting of wild dogs and foxes. These operations provide significant benefits to a range of fauna species due to release from predation pressures. Wild dog predation on nearby livestock is also a serious concern of local landholders.</p> <p>Unlike potential impacts on fire operations, impacts on helicopter based baiting programs are not likely to be significant, and are able to be modified. However fixed wing aircraft are increasingly being used due to lower cost and efficiency of delivery. Our baiting transects may require modification or reduction due to the presence of turbines. It was discussed during meetings that the proponent would be willing to consider a contribution to wild dog/fox baiting programs if required, and this is both welcomed and recommended.</p>
Other	Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest TEC – new info.	s4.3.3, s6	<p>Commonwealth now considering listing this TEC under EPBC Act.</p> <p>Inappropriate fire regimes are regarded as a key threatening process, which has implications for turbines' potential to impact NPWS and other aerial fire management operations.</p> <p>NPWS previous concerns focussed on sediment and erosion control risks to this TEC; latest considerations now include fire management due to Commonwealth assessment now in progress.</p> <p>See further info below.</p>
other	Reduction in turbine numbers	7.1	Reduction in turbine numbers generally is welcomed. However only one has been removed from adjacent to the BHGNR. Further reduction along this boundary recommended as above.

2) Bushfire Risk Assessment (BRA) & Aviation Impact Assessment:

Reference	Issue	Source/s	Remaining comments/concerns
General	BRA Key Responses/Actions		<p>BRA and recommended actions are generally welcomed by NPWS. Cooperative bushfire risk management with national park neighbours and RFS is encouraged and will continue.</p> <p>However, the issues below remain unresolved.</p>
NPWS_2	Impacts on NPWS aerial operations	BRA Table 2.2, Aviation Impact Assessment, 3.7	<p>As previously advised, NPWS uses aircraft to support hazard reduction burning, firefighting and for aerial baiting of feral predators. The western boundary of the BHGMR, and access/fire trails immediately adjoining this boundary – the access trail between WP37 to WP46, and in fact continuing north – comprise a strategically and tactically important north-south fire control line. During fire operations, support of ground crews by water bombing aircraft, particularly rounding up any spot-over fires along the control line, is often critical to fire operations. This can make the difference between controlling a fire or losing control of it.</p> <p>Section 5.1 of the BRA acknowledges the strategic value of fire control lines on the ridgelines here. Turbines WP40 - 43 are of particular concern, being immediately on potential control lines adjacent to the park. While turbines will not directly impinge on BHGMR airspace:</p> <ul style="list-style-type: none"> a) it is the airspace along the ridgetop and trails/fire control lines immediately adjacent to the park which is of strategic value and which will be impacted to a certain degree. b) BHGMR airspace will be indirectly affected by the suggested safe buffer space between aircraft and turbines, as per below. <p>The removal of WP1 is welcomed for both avifauna and aerial operations impact. Agreed that fire operations for Crawney Pass NR are unlikely to be affected, however impacts to operations adjacent to BHGMR remain our key concern.</p> <p>The quoted aviation buffers from turbines of 600 m for fixed wing, and 300 m for helicopters have significant potential to impact the range of NPWS aerial operations, and particularly on the needs outlined above.</p> <p>Until impacts on aerial operations are clear and fully mitigated, as above NPWS recommends the removal from the proposal of all turbines adjacent to Ben Halls Gap Nature Reserve.</p>
		Response to Submissions	<p>The Response to Submissions quotes RFS as having no comment on the development in the AIA and suggesting that “<i>windfarms will be treated as any other potential hazard to aircraft operations</i>”. We can only assume that this view is one based on a landscape-wide general</p>

Reference	Issue	Source/s	Remaining comments/concerns
			perspective. It both contrasts with other RFS input and information in the BRA, and neglects the strategic role these ridgeline trails have and site-specific potential impacts.
	Site Access	BRA 3.1, 5.1	Constructing and maintaining access roads to RFS fire trail standards is welcomed. Reference also made to installing RFS-standard fire trail signs to assist emergency services (including NPWS) navigation on-site, as per BRA Appendix B.
		6.4	Note that NPWS is a fire authority under the Rural Fires Act and alongside RFS may be actively involved in assisting firefighting in the area, not necessarily limited to the national park estate. While acting as incident (fire) controller, NPWS should be also included in the proposed protocols identifying authorities that have the right to request turbine shut down during aerial bushfire operations. Ongoing access and site familiarisation/induction for emergency services including NPWS (BRA 5.1) is welcomed.
	Ignition sources	5.2 6.7	The recognition of plant and equipment as ignition risks is welcomed. Proponent should adopt protocols to curtail various operations (especially grinding, welding, slashing) at appropriate bushfire danger rating thresholds and not just on TOBAN days.
	Potential EMR impacts on existing agency operational radio communications	5.4	The potential for EMR impacts on NPWS and other VHF radio communications in this remote area remains unknown. This is important since there are no other effective operational communications available for emergency services and NPWS WHS considerations in this landscape. It's not yet understood how any interference to VHF radio comm's that might eventuate would be "considered in the planning stages" and "manageable". If EMR interference from the turbines becomes an issue, it may be difficult to fix in retrospect. Creating ineffective radio comm's in this area is not an option if we are to ensure public, environmental and staff safety.
	Fire regimes as a threat to TEC.		As above, fire management has recently been identified as increasingly important to the BHG Sphagnum Moss Cool Temperate Rainforest TEC. See BDAR response above and the info below for context.
	Windfarm's full time personnel	6.	The proponent should be encouraged to have staff trained in basic firefighting (e.g. as RFS volunteers) if possible and provide onsite resources to help with bushfire management as well as structural fires. This would be of benefit to the development, environment and neighbours.

3) Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest TEC – latest updates:

Previous concerns raised in relation to this TEC focussed on the importance of sedimentation and erosion control. However recent assessments by Australian Government agencies are considering listing this community also at a Commonwealth level, with inappropriate fire regimes now also seen as a key threat.

Hence, any development activity that restricts the ability for NPWS, or others, to respond quickly and effectively to wildfires within Ben Halls Gap Nature Reserve and surrounds, should be avoided to reduce the threat to the Ben Halls Gap Threatened Ecological Community. Any restrictions on our ability to suppress wildfires via the use of aircraft, either via helicopters or fixed wing aircraft should be very carefully considered in the Hills of Gold Wind Farm proposal.

The protection of the Ben Halls Gap Nature Reserve Sphagnum Moss Cool Temperate Rainforest from any fire is critical, as impacts from inappropriate fire regimes including fire frequency, intensity, seasonality, and scale is listed as a key threat to the community (see [here](#)). Approximately 50% of the ecological community was burnt in December 2019 – January 2020 with the remainder of the extent likely to have been affected (e.g., through increased sedimentation and solar radiation) by burning of adjacent and nearby vegetation communities in the Ben Halls Gap area.

The 2019/20 bushfires had catastrophic impacts on Australia’s wildlife and ecological communities. Many ecological communities which were not listed as threatened prior to the bushfires may now be eligible for inclusion on the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) list of threatened ecological communities.

In response to this, the Australian Government Minister for the Environment included several fire-affected ecological communities on the Finalised Priority Assessment List, including the Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest. The Commonwealth Threatened Species Scientific Committee is undertaking assessments of these nominated ecological communities to determine their eligibility for listing and preparing Conservation Advice for each ecological community. They are due to provide their recommendations on the first seven of these to the Minister by 30 April 2022 (see [here](#)).

The Draft (Commonwealth) Conservation [Advice](#), lists Inappropriate fire regimes (including fires which cause decline in biota) as an ongoing, extreme threat to the whole extent of the rainforest community at Ben Halls Gap.



Our ref: DOC22/217827
Your ref: SSD-9679

Mr Jamie Chivers
Managing Director
Someva Renewables
jamie.c@someva.com.au

Dear Mr Chivers

Hills of Gold wind farm – Bird and bat adaptive management plan framework

Thank you for the e-mail dated 10 March 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment (DPE) inviting comments on the bird and bat adaptive management plan (BBAMP) framework for the proposed Hills of Gold wind farm.

BCS has reviewed the BBAMP framework following our meeting with you on 11 March 2022.

Our recommendations are provided in **Attachment A** and detailed comments are provided in **Attachment B**. If you require any further information regarding this matter, please contact Liz Mazzer, Senior Conservation Planning Officer, via liz.mazzer@environment.nsw.gov.au or (02) 6883 5325.

Yours sincerely

Samantha Wynn
Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

22 March 2022

Attachment A – BCS Recommendations

Attachment B – BCS Detailed Comments

Cc: Anthony Ko, Planning and Assessment Group, Anthony.ko@planning.nsw.gov.au

BCS's recommendations

Hills of Gold Wind Farm – BBAMP Framework

- 1.1 The BBAMP framework could be improved by including objectives to avoid and mitigate impacts to biodiversity during the operation of the wind farm. Where impacts cannot be avoided or mitigated, offsets for these residual impacts will be required.
- 2.1 Biodiversity credit quanta for bird and bat strikes be reviewed and fully justified.
- 2.2 Credit quanta should be calculated according to the conservation status of the individual species impacted.
- 2.3 Calculation of credits should be done every twelve months as part of the annual review.
- 2.4 Offsets should be calculated based on the maximum estimated number of fatalities for the preceding twelve months.
- 3.1 Actual strike rates be used as triggers rather than percentages of individual species' populations.
- 3.2 Additional triggers for corrective action are identified which are focused on actual strikes rates which have been extrapolated and analysed during annual reporting.
- 3.3 A detailed monitoring plan will need to be provided to BSC for endorsement should percentage of population number triggers be pursued.
- 4.1 More detail be included on how turbine risk ratings are to be determined.
- 5.1 The Tier 1 alert for non-threatened 'at-risk' species and low risk species should be changed to a trigger of two or more carcasses, feather spots or injured individuals of a single species found under or close to a wind turbine during any mortality search or incidentally by wind farm personnel.
- 5.2 The Tier 2 impact trigger for all non-threatened species should be more than four carcasses, feather spots, or injured individuals of a single species are found under or close to a wind turbine within a two-month cycle.
- 6.1 Lists of threatened and non-threatened at-risk species be included in the BBAMP framework.
- 7.1 Mitigation implementation protocols be included in the BBAMP framework.
- 7.2 Trials of additional deterrent technologies be considered in the BBAMP framework.
- 8.1 Monitoring of all turbines following their commissioning be conducted over twelve months, ensuring all seasons are covered.
- 8.2 Monthly carcass searches of turbines should be conducted for the first five years of operation, using trained dogs for at least the first two years.
- 8.3 The BBAMP framework should incorporate monitoring of bats prior to construction adjacent to geological features with high bat activity at "fly-out" times to determine if further investigation if warranted to identify potential roost sites.
- 8.4 The monitoring program be reviewed at two years.

9.1 The BBAMP framework should include clear links between tiers, triggers, and actions.

BCS detailed comments

Hills of Gold Wind Farm - BBAMP Framework

1. The BBAMP framework could be improved by additions to the document's overall objectives

The objectives listed in the BBAMP framework is to:

- provide an effective monitoring program and strategy to manage and mitigate operational issues relating to bird and bat impacts for the wind farm,
- monitor and assess for impacts considered uncertain at the time of approval; and
- prescribe additional compensatory measures if required.

BCS considers that these are steps to address the likely impacts of the wind farm on birds and bats. However, the overall objective of the BBAMP framework should be to avoid and mitigate impacts to biodiversity during the operation of the wind farm. Where impacts cannot be avoided or mitigated, offsets for these residual impacts will be required.

An important aspect to guide the objectives of the framework would also be to provide certainty to the consent authority and stakeholders that a plan has been put forward to minimise biodiversity impacts and address the residual prescribed impacts of the project which cannot be comprehensively captured or quantified prior to an approval being granted.

BCS suggest that these additional objectives are included within the BBAMP framework.

Recommendation

- 1.1 The BBAMP framework could be improved by including objectives to avoid and mitigate impacts to biodiversity during the operation of the wind farm. Where impacts cannot be avoided or mitigated, offsets for these residual impacts will be required.

2 Offsetting quanta should be reviewed and appropriately justified

BCS considers that the current offset quantum proposed (one species credit per threatened species collision fatality or injury) may not be commensurate with the actual impact per strike that could occur.

Section 8.6.4 of the *Biodiversity Assessment Method 2020* requires that the approach to calculating any proposed offsets must be documented in the BDAR, with justification to demonstrate that the offset quantum proposed will be commensurate to the impact which occurs. BCS recommends the proposed credit quantum within the BBAMP framework be reviewed and fully justified by the accredited assessor.

BCS suggests that, as species of different conservation status may receive residual prescribed impacts from the project, credit quanta should be calculated according to the conservation status of individual species that may be struck, for example:

- For a vulnerable species - a one-off retirement of 10 credits for each individual struck.
- For an endangered species – a one-off retirement 15 credits for each individual struck.
- For a critically endangered species – a one-off retirement of 20 credits for each individual struck.

BCS supports the proponent's proposal to calculate credit quanta on a twelve-monthly basis as part of the project's annual review. The proponent should note that BCS's advice to the consent authority will be that reporting requirements for annual reviews will include demonstration that the preceding twelve months of strikes have been retired under the Biodiversity Offsets Scheme.

The monitoring section of the BBAMP framework states:

"It is likely (but uncertain at present) that carcasses of bats and small birds will be scavenged quickly within the subject land. Carcass persistence trials will be undertaken during the course of the operational monitoring, and prior to its commencement, particularly to inform analyses required to extrapolate from numbers of carcasses detected to estimate total number of collisions."

BCS agree and are supportive of the proponent's approach to conduct annual carcass persistence trials to estimate the actual total number of collisions occurring during the operation of the windfarm.

The proponent should note it is BCS expectation that offsetting of strikes should not simply be calculated for the individuals which have been found during carcass surveys. Offsetting should be calculated based on the maximum estimated number of fatalities in the preceding twelve months, extrapolated from data collected and analysed during carcass persistence trials.

Recommendations

- 2.1 Biodiversity credit quanta for bird and bat strikes be reviewed and fully justified.
 - 2.2 Credit quanta should be calculated according to the conservation status of the individual species impacted.
 - 2.3 Calculation of credits should be done every twelve months as part of the annual review.
 - 2.4 Offsets should be calculated based on the maximum estimated number of fatalities for the preceding twelve months.
- 3 Performance measures and triggers for corrective action should adhere to SMART principles

BCS has concerns regarding the use of a percentage of population numbers as an impact trigger for Tier 2 and Tier 3 impacts. For example, the BBAMP framework identifies a trigger for a Tier 2 impact as:

"Where population numbers are known; Any impact that is likely to reduce the total species' population by more than 1% over a two year period."

Without a clearer definition on the scale of how populations will be defined (local, regional, state, country-wide or international) this trigger would not be specific enough to meet the requirements detailed in Section 2.7 of the *BAM Operational Manual Stage 2* for all performance criteria to adhere to SMART (Specific, Measurable, Achievable, Realistic, Timebound) principles.

Additionally, to inform a specific, measurable and realistic trigger for corrective action, contemporary population parameters for each species struck would need to be provided with a high degree of confidence. BCS has concerns regarding the extensive amount of data collection and survey which would be required to determine this to an acceptable degree of confidence.

If percentage of population numbers are to be pursued, a detailed monitoring plan for each target species adopting the SMART principles will need to be provided to BCS for review and

endorsement. BCS will also need to be satisfied with any final population estimates and conclusions as a result of the monitoring before adopting this trigger over actual strike rates.

The National Parks and Wildlife Service have advised that they are supportive of survey and monitoring on National Parks estate if this is required.

BCS is supportive of using actual strike rates as triggers for corrective action i.e. *“Any impact where more than three carcasses, feather spots; or injured individuals (likely caused as a result of turbine collision) of a single species are found under or close to (<120 metres from) a wind turbine within a two month cycle”*.

However it should be noted, as per Recommendation 2.5, it is BCS’s expectation that triggers should also be inclusive of actual strike, calculated based on the maximum estimated number of fatalities in the preceding twelve months and extrapolated from data collected and analysed during carcass persistence trials.

Including extrapolated data into triggers for corrective action may require additional triggers to be identified which are only triggered once annual data extrapolation have been collected and analysed. These triggers could inform annual planning for the following twelve-month period to adaptively manage strike numbers. This will also be important to determine residual prescribed impact offset quantification, as per Recommendation 2.5.

Recommendations

- 3.1 Actual strike rates be used as triggers rather than percentages of individual species’ populations.
- 3.2 Additional triggers for corrective action are identified which are focused on actual strikes rates which have been extrapolated and analysed during annual reporting.
- 3.3 A detailed monitoring plan will need to be provided to BSC for endorsement should percentage of population number triggers be pursued.

4 Turbine risk assessment needs more detail

The BBAMP framework identifies that risk ratings will be applied to each individual turbine for the project. It would be beneficial for the BBAMP framework if the process of determining risk ratings for individual turbines is more clearly defined.

For example, the BBAMP framework could include an explanation of how turbine risk will be assessed, mapped, and monitored based on a risk matrix. The risk matrix could also be included in the BBAMP framework.

Recommendation

- 4.1 More detail be included on how turbine risk ratings are to be determined.

5 Impact triggers require adjustment

As stated in the BCS reply to the response to submissions (dated 1 February 2022) the impact trigger for a threatened species is generally defined as *“a threatened bird/bat species (or recognisable parts thereof) listed under the EPBC Act or BC Act is found dead or injured under or close to a wind turbine during any mortality search or incidentally by wind farm personnel”*. The tier 1 alert for threatened species in the *General investigation and monitoring triggers for bird and bat strike table* of the BBAMP framework is consistent with this definition.

An unacceptable impact where population numbers are not known, is generally regarded as “*more than three carcasses found of one threatened species over a two-month period*”. The Tier 3 trigger for unacceptable impacts is consistent with this definition.

An impact trigger for non-threatened species is defined as “*any two successive monthly carcass searches, two or more bird or bat carcasses (or parts thereof) of a non-threatened species*”. The Tier 1 alert for non-threatened ‘at-risk’ species and low risk species should both be changed to a trigger of two or more carcasses, feather spots or injured individuals of a single species found under or close to a wind turbine during any mortality search or incidentally by wind farm personnel.

An unacceptable impact for non-threatened species is generally regarded as “*more than four carcasses of one non-threatened species are found during both formal and incidental carcass searches in a two-month period*”. The tier two impact is generally consistent with this for non-threatened ‘at-risk’ species, although the trigger only includes carcasses and not feather spots or injured individuals. However, this trigger should also apply to low risk species. BCS considers that, if four or more individuals of a single species are impacted over a two-month period, that species should be considered ‘at-risk’.

Recommendations

- 5.1 The Tier 1 alert for non-threatened ‘at-risk’ species and low risk species should be changed to a trigger of two or more carcasses, feather spots or injured individuals of a single species found under or close to a wind turbine during any mortality search or incidentally by wind farm personnel.
- 5.2 The Tier 2 impact trigger for all non-threatened species should be more than four carcasses, feather spots, or injured individuals of a single species are found under or close to a wind turbine within a two-month cycle.

6 Lists of species should be included

The BBAMP framework includes a table of general investigation and monitoring triggers for bird and bat strike. This table contains three types of species; threatened, non-threatened ‘at-risk’, and low risk species.

While it is understood that these species are included in the Biodiversity Development Assessment Report for the project, the lists of threatened and non-threatened at-risk species should be included with the BBAMP framework as an appendix.

Recommendation

- 6.1 Lists of threatened and non-threatened at-risk species be included in the BBAMP framework.

7 Mitigation implementation protocols and trials of alternative technologies should be considered

The proponent should note that all mitigation measures identified in the BBAMP framework document will need to have an implementation protocol embedded within the final BAMMP.

If there are any mitigation measures or triggers for corrective action, or other key factors of the framework document, which will not be committed to by the proponent, these aspects should be either identified as not currently committed to, or removed from the framework document. This will assist the consent authority, members of the public and other stakeholders in understanding the full scope of potential operational impacts which may occur because of the project.

As well as the potential deterrents and evolving technologies listed in the mitigation measures, the BBAMP framework should consider trials of other novel deterrent techniques, such as:

- *Use of ‘acoustic lighthouse’ to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour (See Boycott et al 2021)*
- *Paint it black: Efficacy of increased wind turbine rotor blade visibility to reduce avian fatalities (See Roel et al 2020)*
- Installation of avian sensor technology (either radar or optical sensor) around clusters of high-risk turbines to guide targeted, temporary and timely turbine curtailments
- Research other novel strike mitigation techniques and technologies

If found to be effective, there is potential for deterrent techniques to be used in place of having to shut down or curtail turbines.

BCS supports the proponent’s proposal in shutting down turbines that have triggered impacts while alternative technologies are investigated and sourced.

Recommendations

7.1 Mitigation implementation protocols be included in the BBAMP framework.

7.2 Trials of additional deterrent technologies be considered in the BBAMP framework.

8 Monitoring duration and intensity should be modified

BCS are supportive of intensive surveys following commissioning of turbines. However, monitoring monthly for the first six months will only cover at maximum two seasons of strike impacts. This intensive monitoring of all turbines should be done over a minimum of twelve months, ensuring that all seasons are covered.

As stated in our reply to the response to submissions (dated 1 February 2022), BCS recommend monthly carcass searches of turbines for the first five years of operation, ideally with the first two years utilising trained detection dogs to provide meaningful data on the impact of blade strike on all species .

The proponent should note that the use of detection dogs for carcass surveys has been shown in contemporary literature to have a much higher rate of detection than using human survey teams alone, especially for small bodied species such as microbats and passerine birds. The use of trained detection dogs would likely benefit the Hills of Gold project by providing a refined understanding of strike rates and thereby reducing the margin for sampling error and associated confidence interval needing to be applied to estimate the upper maximum of fatalities over a 12 month period (See recommendation 2.5 above).

In addition, the BCS response of 1 February 2022 recommended that monitoring of bats take place prior to construction adjacent to geological features with high bat activity at “fly-out” times to determine if further investigation if warranted to identify potential roost sites. This should be incorporated in the BBAMP framework.

The monitoring schedule should be reviewed after two years of monitoring to determine whether changes are needed.

Recommendations

- 8.1 Monitoring of all turbines following their commissioning be conducted over at least twelve months, ensuring all seasons are covered.
- 8.2 Monthly carcass searches of turbines should be conducted for the first five years of operation, using trained dogs for at least the first two years.
- 8.3 The BBAMP framework should incorporate monitoring of bats prior to construction adjacent to geological features with high bat activity at “fly-out” times to determine if further investigation is warranted to identify potential roost sites.
- 8.4 The monitoring program be reviewed at two years.

9 Mitigation measures should be connected to triggers

For readability and clarity for both stakeholders and the consent authority BCS suggest a clear link should be established between tiers, triggers, and mitigation measures. This could be achieved by incorporating the mitigation measures detailed in page 5 of the BBAMP framework as actions against relevant triggers within the table, *General investigation and monitoring triggers for bird and bat strike*.

Recommendation

- 9.1 The BBAMP framework should include clear links between tiers, triggers, and actions.



Mr Jamie Chivers
Managing Director
Hills of Gold Wind Farm Pty Limited

11 October 2021

Via email: jamie.c@someva.com.au

**Hills of Gold Wind Farm (SSD 9679)
Request for Information**

Dear Mr Chivers

I refer to the proposed Hills of Gold Wind Farm (SSD 9679).

Further to our letter dated 11 February 2021 requesting a response to submissions received during the public exhibition of the Environmental Impact Statement, and as discussed in recent meetings, the Department has concerns about the potential impacts of the project based on the information provided to date.

The Department requests that you provide additional information on the matters below:

- **Visual** – detailed assessment and consideration of visual impacts of the project on properties within the vicinity of the project for which:
 - dwellings are approved but yet to be constructed or are under construction;
 - a development application has been lodged, but a determination is yet to be made;
 - there are existing dwelling entitlements on the land;
- **Traffic and Transport**
 - clarify and assess the proposed vehicle access route and site access points (including consultation with the relevant roads authorities and potentially impacted residences);
 - provide a schedule of all proposed road works and upgrades; and
 - provide a detailed analysis of alternative route options and justification for the preferred option;
- **Biodiversity** – additional biodiversity assessment, including an updated Biodiversity Development Assessment Report (BDAR), with consideration of comments provided by the Biodiversity Conservation and Science directorate of the Department, including matters relating to National Parks and Wildlife Service's Estate;
- **Noise** – use worst-case traffic numbers in the traffic noise assessment and identify the dwellings predicted to experience exceedances of the Road Noise Policy criteria;
- **Aviation** – provide a lighting plan that identifies which wind turbines would have obstacle lighting installed and operating;
- **Soil and Water** – demonstrate that the proposed disturbance footprint includes an appropriate allowance for constructability, implementation of erosion and sediment controls, and is informed by geotechnical data collected on site; and
- **Consultation**
 - provide evidence of consultation undertaken with relevant government agencies, councils and the public regarding the matters outlined above, including any proposed amendments to the project; and
 - clarify the status of neighbour agreements.

Any changes to the project should be documented in an Amendment Report, which should provide a revised project description clearly outlining all development proposed for the project along with any supporting revised environmental assessment documents. Where necessary to respond to submissions, the Submissions Report can reference content provided in the Amendment Report.

Please note that Schedule 1.2 of the *Environmental Planning and Assessment Amendment (Major Projects) Regulation 2021* commenced on 1 October 2021. The Submissions Report and Amendment Report must be prepared having regard to the *State Significant Development Guidelines*.

If you have any questions, please contact Anthony Ko on 8217 2022 or anthony.ko@planning.nsw.gov.au.

Yours sincerely

A handwritten signature in blue ink, appearing to be 'Nicole Brewer', with a horizontal line extending to the right.

Nicole Brewer
Director
Energy Assessments

APPENDIX B RECREATIONAL OPPORTUNITIES ANALYSIS



RECREATIONAL OPPORTUNITIES ANALYSIS FOR DEVILS ELBOW

Prepared for Hills of Gold Windfarm Pty Ltd

March 2022





The Devil’s Elbow Recreational Opportunities Analysis report was prepared by TRC Tourism for Hills of Gold Windfarm Pty Ltd.

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ACKNOWLEDGEMENT

We acknowledge the Indigenous peoples of the lands, waters and communities we work together with. We pay our respects to their cultures; and to their Elders – past, present and emerging.

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Report Name	Version	Date submitted
Devil’s Elbow Recreational Opportunities Analysis Draft Report	V1	9 March 2022
Devil’s Elbow Recreational Opportunities Analysis Report	V2	17 March 2022
Devil’s Elbow Recreational Opportunities Analysis Report	V3	18 March 2022

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1 INTRODUCTION

Hills of Gold Windfarm Pty Ltd is proposing to construct and operate a wind farm on the ridgeline between Hanging Rock and Crawney Pass in the Northern Tablelands of NSW.

To facilitate the project components will need to be transported to the site from the Port of Newcastle.

Oversized components will require several road upgrades and amendments to facilitate their access to the site. One of these amendments will be on Barry Road five kilometres south-east of the local town of Nundle. Barry Road includes a set of bends known as the “Devil’s Elbow” and these are too steep and tight to facilitate the transport of the large turbine components.

The proponents are proposing to construct a permanent haul road which bypasses “Devil’s Elbow” to allow for movement of these large components. This will be used during construction with minimal use after this.

The proposed route of the road passes through part of Lot 440 DP 822503 which is a large area of Crown Reserve 85916 for Public Recreation. Crown reserves are land set aside on behalf of the community for a wide range of public purposes including environmental and heritage protection, recreation and sport, open space, community halls, special events and government services. This Crown Reserve is managed by Tamworth Regional Council.

Part of the lot is listed as an item of local heritage value in the Tamworth Local Environmental Plan known as the “Black Snake Gold Mine”.

The Department of Planning and Environment has sought further justification on why a temporary haul road through Crown Reserve 85916 for Public Recreation is appropriate and necessary when alternative transport route options are available and considering the process required to secure access to this land.

The report details existing visitor use of the region as a whole, the local area and the site itself including an interest in mining heritage. It identifies the potential for improved access and recreational opportunities to the site arising from the construction and subsequent rehabilitation of the proposed haulage road.

Providing for improved access and opportunities at the site would add an additional attraction in the local area which could increase length of stay and add to the range of experiences for visitors by complementing existing attractions. These are further assessed in this report.

2 EXISTING SITE RECREATION ACTIVITY

The existing Crown Reserve is regrowth eucalypt forest previously disturbed by historic mining activity and containing a number of informal vehicle tracks.

The proposed route of the haulage road approximately follows the route of some of these tracks for approximately 600 metres and will require additional earthworks to smooth the road alignment.

There is an informal roadside pull off area just to the west of the site below the harpin bends on Barry Road. From here a steep track runs down to Morgan's Gully and this accesses many of the heritage mine workings of the Black Snake Gold Mine.

Local anecdotal advice is that the area is currently used by bushwalkers and fossickers accessing the site by 4WD vehicle. The site reveals the main trail accessing Morgan's Gully has occasional 4WD use while other trails on the site have little evidence of vehicle use.

While the Morgan's Gully trail is accessed directly from the existing roadside pull off area, other trails on the site are accessed directly off Barry Road, with the top trail no longer accessible because of the safety barrier at that location.

The existing trails in the immediate area appear to be stable in useable condition, although the steeper sections of the Morgan's Gully trail need some maintenance. This trail accesses a private property and may also have a fire management function.

DEVIL'S ELBOW



2.1 Local area attractions

Hanging Rock is a spectacular lookout at an elevation of 1,100m overlooking the Nundle Valley. It is two kilometres further along Barry Road and Hanging Rock Lookout Road from the site.

The historic village of Hanging Rock is three kilometres along Barry Road from the site. It has a population of around 100 residents.

Sheba Dam, south of the village, has picnic and barbecue facilities in a bush setting abundant with trees, birds, lizards, wallabies and pademelons. There is also a 1.2 km bush walk.

Nundle State Forest has access for 4WD, mountain biking, fishing and hunting. It contains Ponderosa Park, a picnic area with retained conifers, barbeques and toilets. The forest is subject to closure during harvesting activities. Ponderosa Park is 10 kms from the site along Forest Way.

The National Trail¹ is Australia's premier long distance trekking route stretching 5,330 kms from Cooktown to Healsville in Victoria. Hanging Rock is in the Ebor to Aberdeen section of the trail. The trail passes through Ponderosa Park, along Forest Way and then west along Barry Road to Nundle. It passes through Devil's Elbow. There are no accurate records of how many people use the trail or individual sections of the trail.

Local anecdotal advice is that there may be 20 to 30 recreational vehicles (or about 40 to 75 people) in the general Hanging Rock area on a weekend day. Few of these would currently stop at Devil's Elbow, although keen fossickers access the Morgan's Gully trails from the site.

A further 12 kms along Barry Road and Morrison's Gap Road is Arc-en-Ciel Trout Farm and café. The trout farm was established in the mid-eighties and now produces about 10% of NSW's trout. There are tours where visitors learn about farming trout from fingerlings to harvest size and visitors can purchase some of the award-winning products from the farm shop to take home.

¹ Previously known as the Bicentennial National Trail



MORGANS GULLY

3 EXISTING REGIONAL VISITATION

3.1 Regional overview

The Tamworth Local Government Area is in the New England region of NSW and covers a diverse economy fuelled by a growing population of around 62,500 residents². It is the major centre for a catchment area which includes the towns of Manilla, Barraba, Nundle and Kootingal, along with another 17 hamlets that offer an attractive lifestyle underpinned by a strong regional economy.

The area is on the New England Highway, a major route between Sydney and Brisbane. Qantas and Link Airways provide daily flights from the Tamworth Regional Airport to Sydney and Brisbane, along with daily train and bus services.

The *Tamworth Regional Blueprint 100* outlines a vision and strategy to increase the current growth rate for the Tamworth Region from 1 to 2%, to reach a population of 100,000 people by 2041.

The region showcases rich heritage and a place for adventuring in the great outdoors and soaking up the natural beauty of the surrounding environment. Tourism is a significant economic driver with attractions including festivals, sporting events, restaurants, museums, and galleries within the city and surrounding rural destinations. The internationally recognised Tamworth Country Music Festival is held in January each year and attracts over 50,000 people, generating significant economic benefit to the region.³

² <https://profile.id.com.au/tamworth/population-estimate>

³ 'Tamworth Tomorrow 2016-2021', accessed via <https://www.tamworth.nsw.gov.au/work/doing-business-here/economic-development>

Nundle & Hanging Rock

Nundle is a scenic 50-minute drive into the "Hills of Gold" from Tamworth.

Both Nundle and Hanging Rock are popular destinations for visitors year-round.

Nundle is a quaint and thriving little village. This pretty town is surrounded by undulating hills and tree lined streets. The town is a 4hr 30min drive (400km) from Sydney via the New England Highway and just under an hour from Tamworth. Tourism, as well as sheep, cattle and wheat are the economic mainstays of this little village which today has a population of around 500 residents⁴. It is an old gold mining town situated amidst some genuinely spectacular scenery between the towering slopes of the Great Dividing Range and the Peel River which is popular with anglers, as is Chaffey Dam.

Hanging Rock is at a higher altitude and has a far different climate to the rest of the region. Snow is common in the winter months and the summers are warm and comfortable.

⁴ https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/SSC13043

Gold and Precious Gems Mining History

Established in the 1850s after the discovery of gold at Hanging Rock, the villages flourished during the gold rush era with thousands of miners calling the area home. Today, fossickers are still drawn to the area to try their luck. The ruins of old mine workings and equipment are scattered across the valley floor and up the mountainsides. Traces of gold are still found in the sand and gravel at the river's edge along with a variety of gemstones including zircons, sapphires and other semi-precious stones.

Many visitors come to Nundle to fossick or pan for gold and sapphires in the Peel River. People are attracted to various popular sites such as:

- Swamp Creek Camping Reserve
- Hanging Rock Lookout
- Forest Way Fossicking Site

Fossickers Way

Weaving north through the Tamworth, North West and New England regions, the Fossickers Way is a 379 kilometre scenic and tourist drive that provides an accessible and varied itinerary with a diversity of experiences linked via good quality sealed roads and highways. Beginning near Nundle, it heads north through Tamworth, Manilla, Barraba, Bingara, Warialda, Inverell, Glen Innes and Emmaville, before finishing up near the Queensland border at Tenterfield. The route offers fantastic nature and outdoor experiences, weaving past world-class national parks and providing ample opportunity for hiking, horse riding, biking, boating, fishing, camping, birdwatching and, of course, fossicking. With a range of fossicking sites on offer, from privately run properties perfect for beginners and families, to off-the-beaten-track locations suitable for more experienced prospectors, the Fossickers Way has something for everyone.

Key Attractions

Nundle Gold Mining Museum
Nundle Woollen Mill
Odgers and McClelland
Post Office
Sacs on Jenkins
The Peel Inn
Machina Coffee and Donuts
Nundle Craft Inc
Nundle Playground
Volcania Art Glass
Gem and Mineral Collection
Nundle Visitor Information Centre
Riverside Walk
Nundle Sport & Recreation Club
Ratters Flat Antiques
Nundle Pony Club Inc
Cottage On The Hill Patchwork Store
DAG Sheep Station
Hanging Rock Bird Watching Walking Tour
Chaffey Dam
Sheba Dam
Arc-en-Ciel Trout Farm
Great fishing



SHEBA DAM

3.2 Local attractions

Nundle Visitor Information Centre

The Nundle Visitor Information Centre is an accredited centre in the Tamworth region. The centre offers a wide selection of guides, maps and itineraries on Nundle and the surrounding area. The friendly staff provide advice about where to stay and eat, and what to do during a visit to the area.

Mount Misery Gold Mine Museum

Visitors can explore the history of the colonial gold rush at the Mount Misery Gold Mine Museum and Cafe. Reef gold was first discovered at Nundle in 1852; alluvial gold may have been discovered as early as 1849. Most of the old mines are situated either near the hamlet of Bowling Alley Point, or between Nundle village and Hanging Rock village. The Mount Misery Gold Mine Museum features a 150 metre underground mine tunnel and is packed with mining and gold rush memorabilia.

The Museum provides an authentic taste of the life and trials of the pioneers to the gold fields above Nundle. It includes historic gold panning and mining equipment plus newspaper extracts from the gold rush era, which allow visitors to learn more about the local characters and events occurring in Nundle during the time. Visitors can hire gold panning equipment and try to strike it rich in Nundle. Guided tours of the Mount Misery Gold Mine Museum can be arranged for individuals, groups or schools.

Gil Bennet Gem and Mineral Collection

The Gil Bennet Gem and Mineral Collection is the work of Tamworth local, the late Gilmore (Gil) Thomas Bennett who spent years collecting the unique selection of fine stone and rock. The rocks, gems and minerals on display represent the finest specimens of his extensive collection assembled over more than 20 years. It is acknowledged as one of the finest collections in the world featuring some 1,554 specimens from all over Australia.

Nundle Woollen Mill

The award-winning Nundle Woollen Mill which welcomes over 30,000 visitors each year is a must-visit attraction. One of the last spinning mills still operating in Australia, it provides a wonderful insight into a very significant but little known-about period of Australia's history – that of wool processing which formed the basis of Australia's textile industry. The Mill also conserves industrial heritage and traditional skills and contributes significantly to the survival and on-going sustainability of the historic village of Nundle. Home to working antique machines and providing a chance to reconnect with Australia's wool heritage, the Mill runs guided tours daily during the week and by appointment on weekends.

Peel Inn

The Peel Inn has been an institution in Nundle since the gold rush days. It has been operated by locals Robert and Margret Schofield for 40 years, and now their sons Drew and Nathan as well as Rebecca (Nathan's partner). The pub has been a friendly place for locals and visitors for as long as anyone can remember, and it also offers accommodation, a wonderful restaurant and a beautiful beer garden for visitors to relax in.

The DAG Sheep Station

The DAG Sheep Station is located on 70 acres in the 'Hills of Gold' just outside Nundle. Originally part of 'Wombramurra Station' the DAG still retains the station's original historic woolshed, worker's cottages, shearers quarters and mess hall. It is only open for booked functions as a venue for events, school group camps and retreats and accommodates large groups.

Boutique Shopping

Stroll down Jenkins Street in Nundle for the ultimate boutique shopping experience. Check out local institutions like Odgers & McClelland Exchange Stores, Stormcrow Studio, Jenkins Street Antiques and Fine China and Sacs on Jenkins.

3.3 Events

Nundle and Hanging Rock are well known across the Tamworth region (and beyond) for their bursting-at-the-seams annual events calendar, which each see the villages swell with visitors. Both towns are known for their quintessential, authentic country hospitality and the range of crowd-drawing, quirky events that demonstrate the strong community spirit and pro-active nature of the villages. From Tamworth Country Music Festival events at Nundle, to the Nundle Country Picnic, Nundle Go For Gold Chinese Easter Festival, The Great Nundle Dog Race, Hats Off to Country, Nundle CWA Art Show, the Nundle Campdraft and the Tour de Rocque, there is an event to spark interest for a wide range of visitors.

Nundle Go For Gold Chinese Easter Festival

Chinese migrants were among those who sought their fortune, and the annual festival celebrates their contribution to Nundle's heritage.

Great Nundle Dog Race

The Great Nundle Dog Race is one of the highlights on the annual calendar. Held every year on the first Sunday in May, it began as a bet being waged between two farmers arguing over whose dog was the fastest. Fast forward to today; the event includes more than 20 events for dogs of all types and is a really fun day out for the family!

Nundle Country Picnic

The Nundle Country Picnic is held annually. Food, fashion and music entertain visitors who enjoy spending an afternoon relaxing in the lush gardens of Nundle Woollen Mill grounds. The event showcases local farmers, producers and how they get their product to plate, with local caterers and business owners catering for the event and serving a two course brunch consisting of a gourmet picnic box filled with scrumptious, locally sourced food. Nundle Woollen Mill and local boutique Sacs on Jenkins showcase new season fashions on offer in a parade featuring local models and local musicians entertain visitors.

Tour de Rocque

Hanging Rock holds the 'Tour de Rocque', which is organised to raise money for the Westpac Rescue Helicopter and takes place in early November each year. The ride starts from the Peel River bridge at Bowling Alley Point, and takes riders up to Sheba Dam, a 600 m elevation over a distance of 22 km. There is also the 'King of the Rock' fun-run, which starts at Nundle Recreation Ground, and also finishes at Sheba Dam.

3.4 Regional Tourism Visitor Data

Key statistics⁵

For the Tamworth Regional Council area, in 2019/20, there were:

- A total of 1,580,543 visitor nights.
 - » 1, 103,061 domestic visitor nights accounted for 50.6% of the total visitor nights
 - » 477,382 international visitor nights, accounted for 21.9% of the total visitor nights.
- 600,484 domestic daytrips
- Total tourism and hospitality sales in Tamworth Regional Council was \$208.3m
- Total value added was \$108.3 million.

In the 5 years to 2019/20:

- International visitors to Tamworth Regional Council were more likely to be visiting on Holiday, accounting for 45.8% of all visitors. There was an average of 12,543 international visitors to Tamworth Regional Council. Average length stay for international visitors was 31.3 days, higher than the average for New South Wales.
- Visiting Friends and Relatives accounted for 30.6% of visitors, with an average length of stay of 13.8 days.

In 2020, tourism's contribution to employment was 4.6% overall. 990 people were directly employed in tourism and hospitality in the Tamworth region, with a further 370 indirectly employed.

The domestic overnight visitor stays an average of 2 nights spending \$384 during their stay. Over 14,000 international visitors stay an average of 26 nights (pre-Covid19 and spend \$1,257) per trip.

There is scope to expand the business event sector and leverage it to promote local tourism products, increase average length of visitor stay and encourage repeat visitation. The strengthening of wider tourism opportunities and opening avenues to expand tourism experiences is essential to support the goal of growing the population to 100,000, as identified in Blueprint 100. This positioning provides the opportunity to add value and generate synergies between initiatives targeting international students, business events, investment and leisure markets.⁶

Anecdotal evidence from Destination Tamworth is that they are seeing a lot of families travelling and visitation has increased around 10% month on month. A large majority of travellers are from Newcastle area and Sydney. Sydney has not been a strong tourism market for them previously as Tamworth is just a little too far for a weekend trip. What they are witnessing now is visitors coming and staying 3 or 4 nights and using Tamworth as their base to do day trips⁷.

⁵ <https://economy.id.com.au/tamworth>,
<https://www.tra.gov.au/regional/local-government-area-profiles/local-government-area-profiles>

⁶ Quotation Brief, Destination Management Plan, Tamworth Regional Council

⁷ Source: email from Destination Tamworth

Destination Management Planning

Destination Tamworth is currently the tourism division of Tamworth Regional Council. It exercises the functions of tourism marketing and development for the Tamworth region and has a focus on growing the visitor economy. The operation of the Tamworth Visitor Information Centre sits within Destination Tamworth and incorporates the Country Music Wax Museum, the National Guitar Museum and the Big Golden Guitar. Destination Tamworth works closely with the Destination Country & Outback network and Destination NSW.

Currently there is no Tamworth Region Destination Management Plan (DMP). The DMP that covers all the Destination Network Country and Outback is currently used as a guiding document from which an annual marketing and communications plan is developed to guide the annual activities.

3.5 Local Industry Bodies

Nundle Business Tourism and Marketing Group Inc

Nundle Business Tourism and Marketing Group Inc (NBTMG Inc) is a collaborative group of individuals and business owners who come together bi-monthly to plan marketing activities for the communities of Nundle and Hanging Rock. NBTMG Inc funds the website nundle.com.au, Nundle district brochure, steers Nundle branding, and promotes Nundle and surrounds in the media, including Instagram and Facebook (@NundleNSW), and caravan and camping shows.

Nundle BTMG Inc formed as a partnership with Destination Tamworth to generate marketing and promotional activity for the community of Nundle. Not all local businesses are members and anecdotal evidence is membership is declining.

The Nundle BTMG Inc. offers both products and services collectively that are available in the village of Nundle and the surrounds.

Nundle Events and Groups

Nundle Events & Groups is a boutique destination management and event company providing a detailed and personalised service tailoring itinerary, day visit packages, corporate events, special occasions and family event to suit a variety of needs and budgets.



EXISTING TRAIL

4 POTENTIAL FOR NEW PUBLIC RECREATIONAL FACILITIES AT DEVIL'S ELBOW

There is an existing pattern of tourism and recreational use of the site, the local area and the wider region. This visitation includes a focus on the gold mining heritage of the region as well as outdoor activities such as bush walking, mountain biking and nature appreciation.

There is low use of the Devil's Elbow site which is unsurprising as the site is not promoted or signposted. Despite this the trails are used by keen fossickers to access old mines and areas along the creeks suitable for panning.

The site is managed by Tamworth Regional Council. Their Manager Legal and Property has advised that any proposal for new recreational facilities in the Reserve would be subject to Council consideration and approval.

While current use is at low levels, the heritage attractions and fossicking potential at the site are potentially of interest to a range of visitors and this use could be increased if further facilities were developed on the site and it was included as an attraction in marketing.

4.1 Parking and access

The small roadside pull off area is close to the lower hairpin bend however sightlines for accessing this area are reasonable considering the low-speed nature of the road at this point. There is sufficient area here to park at least 16 vehicles and provide for vehicles to exit on to Barry Road in a forward direction. Given the relatively short stay nature of a visit to the site this number is considered adequate for the foreseeable future.

Further formalising this area would improve safety of access and egress.



LOWER CARPARK

4.2 Walking tracks

The 4WD trail accessing Morgan's Gully provides a good walking or mountain biking route except for the initial steep section which needs some maintenance to stabilise the surface. It passes through a pleasant forest and Morgan's Gully is an attractive rocky creek. Nearby there is evidence of historic mining activity.

About 800m along the track this meets another trail which traverses back to the Devil's Elbow site further up the slope, passing by some mine shafts and crossing Morgan's Gully above the main trail. Old sign posting at this location suggests the area was once promoted as a visitor destination.

These trails have potential to form a loop trail of about two kilometres length and an easy to moderate difficulty, suitable for a wide range of users.

The trails within the Devil's Elbow site are accessed directly off Barry Road, with the lower trail requiring walkers to pass along the roadside for about 100m before they can access the trail. The other accessible point is just above the bends and again this requires users to walk on the road verge from the nearest safe pull off area. The trail access at the top of the site is behind the safety barrier but also currently requires users to walk on the road verge from the nearest parking location.

The lower and upper sections of the trails are very steep however the central sections, including access to the heritage mine shaft (and other mine workings) are more moderate grades.



OLD SIGNAGE ON TRAILS

There is potential to construct a short (approx. 50m) length of walking/mountain biking trail to link from the existing 4WD trail at the lower pull off area to the internal trail to allow access to the site without the need to walk along the road verge. This would improve visitor amenity and safety.

Similarly there is potential to extend a trail at the upper end of the site on the southern side of Barry Road to provide a safe connection to the roadside pull off area just uphill of the site.

Some sections of the existing trails are very steep. While we understand the haul road will have a maximum gradient in short sections of 25%, trails for walking or mountain biking (i.e. without steps) are preferably limited to 10% with only short sections exceeding this. Trails for horses should also be generally limited to 10% with a maximum of 15%. Beyond this gradient most riders would need to dismount.

Given the formation for the haul road will “even out” the existing slope it should be possible to incorporate a trail limited to 10% gradient. This trail would need to be a total of 1,500m in length to cover the 600m length from the bottom to the top of the site.

In addition the creation of a loop trail based on the Morgan’s Gully trails would provide another walking and cycling experience and provide further access and interpretive opportunities at mining heritage sites.

4.3 Safety management

Council currently manage the site and there is an existing pattern of use albeit minor. There are existing risks associated with this use.

Good signage with appropriate warnings about the hazards in the area and advice about how visitors can keep themselves safe would mitigate any liability Council may have as managers of the site.

Installation of safety fencing and blocking of shaft entrances, planned as part of an industrial heritage conservation program consistent with the Burra Charter would also reduce risks for visitors.

While the mine workings to the south of Barry Road near Morgan’s Gully are in very steep country, the existing trails provide good access to some of these.

In addition, the single mineshaft entrance between Barry Road and the proposed haul road could provide a safely accessed and simply managed experience of the local heritage for less adventurous and active visitors who wish to have an easy introduction to the mining heritage of the area.

4.4 Interpretation

Advice from ERM⁸ to Hills of Gold Windfarm Pty Ltd is that construction of the haul road through the site will have no direct or indirect impact on the heritage values of the LEP listed Black Snake Gold Mine.

They further advise there are opportunities to enhance the heritage values of the listed site by providing for safe access and interpretation of the story of the site and its heritage values.

In their work ERM found there is local knowledge of the site’s history and artefacts as well as a desire amongst local people to access the site and to present the site to visitors.

Preliminary discussions with the Gomeroi Native Title Claim Group indicate an interest in the inclusion of their culture and stories into any interpretive material in the local area.

⁸ ERM, Hills of Gold Windfarm - Historic Heritage Assessment, Nov 2020 and ERM, Hills of Gold Windfarm -

Devil’s Elbow Section - Statement of Heritage Impact Addendum Report, Sept 2021

4.5 National Trail

Barry Road between the intersection with Forest Way and Nundle is the route of the National Trail.

The National Trail is used by walkers, cyclists, horse riders, pack animals and horse drawn vehicles. The existing section of Barry Road at Devil's Elbow is potentially risky for many of these users given their slow speed and the use of the road for logging trucks and other heavy vehicles.

It may be possible to provide a bypass to the hairpin bends by providing for National Trail users of the proposed haul road across the Devil's Elbow site. This could include a rest stop shared with local site users and provide trail users with an opportunity to explore the mining heritage at the site.

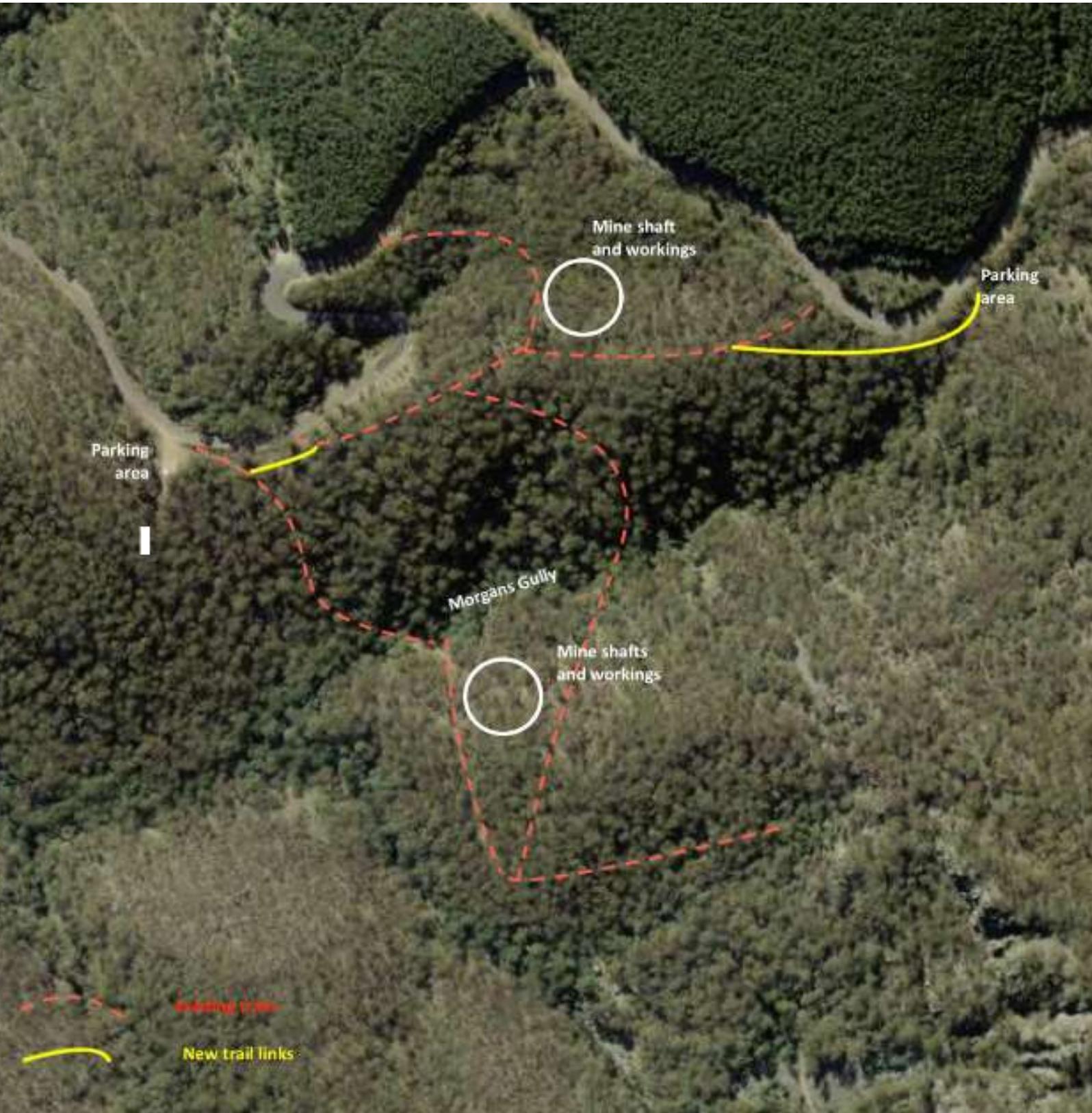
National Trail users could avoid the hairpin bends on Barry Road by following a new route designed to accommodate their needs and providing safe access and egress to Barry Road at either end.

4.6 Management of heritage values

All interventions including track construction, safety infrastructure and interpretation at identified heritage sites should be planned as part of an industrial heritage conservation program consistent with the Burra Charter.



Plan of Devil's Elbow site with indicative trail links



5 POTENTIAL RECREATIONAL AND TOURISM OPPORTUNITIES FOR THE HILLS OF GOLD WINDFARM

A review of available literature by the University of Newcastle⁹ concluded there is little academic evidence that wind farms had negative impacts on tourism in rural localities and that adventure tourism, eco-tourism and educational tourism incorporating wind farm infrastructure are emerging as key opportunities for rural localities.

The report also noted that stakeholder concerns about turbine placement, visibility and noise must be taken seriously and avoid direct impacts on iconic tourism assets.

There are numerous examples around Australia and elsewhere of windfarms being considered visitor attractions by local tourism authorities and visits to them promoted as part of a local visit.

Some examples include:

- Crookwell, NSW: the first grid connected wind farm in Australia has a viewing platform with interpretive material about the installation, promoted by Upper Lachlan Tourist Association.
- Woolnorth, Tasmania: Woolnorth tours run an exclusive access 2.5 hour tour viewing the turbines, Cape Grim and including morning tea and their visitor centre. There are options for a helicopter overview of the site. Pricing is \$90pp.
- Cape Bridgewater, Victoria: Traveller.com.au lists Cape Bridgewater on their top six reasons to visit Portland, describing the wind farm as beautiful, an other worldly sci-fi landscape.
- Lake Bonney, South Australia: Wattle Range Council promote a wind farm tourist drive.
- Te Apiti, Manawatu, New Zealand: The wind farm has a lookout and interpretive material as is promoted by Manawatu Tourism.

- Woodlawn, Lake George, NSW: the wind farm is the setting for the annual “Run with the Wind” event.

TRC completed a Strategic Directions Discussion Paper¹⁰ which led to the establishment of a renewable energy trail through the ACT and surrounding NSW. As part of that work TRC reviewed other renewable energy trails globally and found:

- Most trails are self-drive or vehicle based
- All trails have websites that provide information about the location of the trail and the types of attractions along the trail
- Effective websites provide detailed information and case studies and downloadable information for student access
- Most trails promote to a range of visitor types and demographics
- Strong links to school curricula partially delivered with education partners and partly on site are popular and encourage school and general visitation
- Hosted tours enhance the visitor experience and all sites reviewed with very good or excellent ratings had tours
- Collaboration and co-ordination between industry and government are critical to build community understanding and acceptance, the relationship between sites and the benefits of renewable energy to the community
- Responsibility for the trail is most effective when it is managed and coordinated by one entity
- Trail marketing activities benefit from central coordination as there are significant risks if

⁹ Shannon, B. 2021. *Wind energy and tourism: Industry impacts and opportunities for ‘wind farm tourism’*. Unpublished report compiled for C7EVEN Communications.

Callaghan, NSW: School of Humanities and Social Science. The University of Newcastle

¹⁰ TRC Tourism, SERREE Renewable Energy Trail, Strategic Directions Discussion Paper, Nov 2015

coordinated efforts and stakeholder partnering does not occur

- The availability of tours and public access at sites needs to be made clear for casual visitors who pull over at the site
- Landholder support for tours is essential to ensure an enjoyable experience for visitors.

5.1 Hills of Gold Wind Farm site opportunities

The proposed location of the wind turbines is an attractive ridgeline on the Great Dividing Range with open pastoral areas interspersed with forest pockets. Forested slopes drop away to the valleys below providing spectacular distant views. It is an appealing area for a drive especially considering the cool contrast to the adjacent Tamworth and Nundle region.

There are certainly opportunities to combine the existing attractions of mining heritage, bird watching, and nature study and the trout farm tours with new wind farm and Aboriginal heritage experiences for visitors. These could combine to make an interesting and enjoyable day tour product utilising the trout farm for a lunch stop.

A value-added product such as a day tour has the greatest capacity to maximise benefit and yield from these new initiatives while also allowing for independent visitation to the sites individually.

A preliminary review of the site and other local attractions suggests a number of opportunities for the Hills of Gold site:

- Work with the local businesses and Destination Tamworth to coordinate and integrate wind farm initiatives with the local area offering and events calendar
- Partnering with Arc-en-Ciel Trout Hatchery, a significant tourism destination within the development area
- Partnering with the local Aboriginal community to create tours that include both renewable energy and Aboriginal cultural themes
- Painting of turbines to create an “art attraction” at the site. Similar mega scale art on silos is a significant driver of tourism in other locations such as Victoria’s Wimmera Mallee region and this includes augmented reality apps to bring the art to life and provide place sensitive interpretation of the sites.



WIND FARM LOCALITY

6 CONCLUSION

There is significant potential to improve recreational opportunities and safety at Crown Reserve 85916 for Public Recreation at the Devil's Elbow site on Barry Road near Nundle.

Enhancements to walking tracks on the site would improve accessibility and safety and provide new recreational opportunities in the recreation reserve. Careful design would also allow for mountain bike use and provide an alternate, safer off-road route for National Trail users to bypass the bends at Devil's Elbow.

Subject to investments in access and parking infrastructure, walking tracks and protection works at accessible mining shafts and other heritage infrastructure the visitor experience would be significantly improved to provide new opportunities for a wide range of visitors to the area.

The addition of interpretive information about the history and stories of the site will enhance the heritage value of this locally significant heritage listed site. Including Gomeroi culture and stories into this interpretation would further enhance visitor understanding and appreciation of the area.

The development of the Black Snake Gold Mine site will enhance and contribute to the presentation of the gold mining history in the Nundle and Hanging Rock area and increase understanding and recreational opportunities for locals, school groups and visitors alike.

This development would add a new visitor attraction to the existing offer in the Nundle and Hanging Rock area.

Combining existing visitor opportunities and the new Devil's Elbow facility with tourism initiatives at the proposed Hills of Gold Windfarm site will provide a package of attractions likely to enhance visitation to the local area.

Appendix: Tourism sources consulted:

https://issuu.com/adventuresgroup/docs/fw_001-024_visitorsguide_final_for

<https://www.visitnsw.com/destinations/country-nsw/tamworth-area/nundle>

<https://nundle.com.au/>

<https://www.destinationtamworth.com.au/travel-information/visitor-guide/>

<https://www.destinationtamworth.com.au/explore-the-region/nundle-and-hanging-rock/>

<https://www.visitnsw.com/destinations/country-nsw/tamworth-area/nundle/attractions/nundle-fossicking>

<https://www.smh.com.au/lifestyle/nundle-20080414-gdkq6f.html>

<https://economy.id.com.au/tamworth/tourism-visitor-summary>

<https://www.goldmineguesthouse.com/nundle-local-area/>

https://en.wikipedia.org/wiki/Hanging_Rock,_New_South_Wales

<https://www.traveller.com.au/nundle-new-south-wales-travel-guide-and-things-to-do-130wk7>



www.trctourism.com

APPENDIX C BIOSIS BIODIVERSITY RESPONSE

24 March 2022

Meredith Anderson
 Development Manager, Asset Development
 Hills of Gold Wind Farm Pty Ltd

Dear Meredith

Re: Hills of Gold Wind Farm - Response to request for additional information
Project no. 34963

The purpose of the letter is to detail responses, consultation and additional mitigation that has been included and support the Biodiversity Development Assessment Report (BDAR) update following the *Hills of Gold Wind Farm (SSD 9679) Request for additional information* (RFI) received from Department of Planning and Environment (DPE), Biodiversity Conservation Service (BCS) and National Parks and Wildlife Service (NPWS) on the 9 February 2022 and 22 March 2022.

Following the RFI, consultation was undertaken with both BCS and NPWS to discuss various aspects of the matters raised and to gain a better understanding of the expectations as well as to engage and develop a suitable pathway forward. A summary of the consultation relating to biodiversity matters is listed below;

Table 1 – Summary of Consultation

Consultation	Dates	Discussion points and outcomes
BCS	Wed 23 February	<ul style="list-style-type: none"> An email of proposed actions to the RFI was provided prior to meeting and discussed on call with BCS and NPWS. The project team included ENGIE, Someva and Biosis. Clarifications were discussed on the RFI and proposed approach to managing outcomes. Discussions supporting a proposed workshop on BBAMP triggers and potential mitigations.
	Friday 11 March	<ul style="list-style-type: none"> A draft of the proposed BBAMP framework was provided prior to the workshop for review and discussion. Workshop was undertaken relating to the proposed BBAMP framework including triggers, additional surveys, specific mitigations and further analysis on barrier movements of species. Formal advice was provided by BCS in line with the discussion points on the 22 March 2022
NPWS	Wed 23rd February	<ul style="list-style-type: none"> Email of proposed actions to the RFI relating to NPWS responses was provided prior to meeting and discussed on call with BCS and NPWS.

Consultation	Dates	Discussion points and outcomes
		<ul style="list-style-type: none"> • Clarifications on the RFI and proposed approach to managing discussed particular in relation to barrier effects, specific mitigation and feral pest control.
	Friday 11 March	<ul style="list-style-type: none"> • A draft of the proposed BBAMP framework was provided prior to the workshop for review and discussion. • Workshop was undertaken relating to the proposed BBAMP framework including triggers, additional surveys, specific mitigations and further analysis on barrier movements of species. • Conversation on wild dog baiting.
	Monday 15 March	<ul style="list-style-type: none"> • Someva undertook a call to Anthony Signor regarding Wild Dog and Fox baiting programs. Discussion on further commitments and updates provided in the BDAR.

We have undertaken a review of the responses provided by DPE, BCS and NPWS on the BDAR with the following update and responses relating to the relevant sections of the BDAR as detailed in the tables below:

- Table 2 - Summarises the additional information provided and responses to the sections within the BDAR, following the RFI on the 9 February 2022 and following consultation on the 22 February 2022.
- Table 3 - Summarises the additional information provided and responses to the sections of the Bird and Bat Adaptive Management Plan (BBAMP) Framework following the workshop on the 11 March 2022 and formal request on the 22 March 2022.
- Table 4 -Additional mitigation measures following consultation and RFI in relation to the BBAMP framework only, which are to be developed further during the development of BBAMP prior to commissioning.
- Table 5 - Updated mitigation measures following consultation and RFI, particularly in relation to bushfire management and feral animal control

Table 2 - Summarises the additional information provided within the BDAR

Item	Agency	Summary of Agency comments	How / where addressed
1	BCS	Not all components of the BAM assessment were included in the BDAR ie No % cleared for PCTs provided	Noted. No further action required
2	BCS	The methodology used to determine non-native vegetation must be clearly articulated, however was considered adequate	Noted. No further action required
3	BCS	The selection of PCTs has not been adequately justified, and further justification should be provided in the BDAR for the selection of all PCTs.	Further justification on why PCTs were selected has been provided. Refer to additional comparison tables providing “Similar PCTs” and “Justification of Best Fit” included for each PCT in Appendix B.
4	BCS	Inclusion of vegetation plots located outside the project footprint must be justified	Additional justification on the comparison between plots outside of the footprint in relation to the impacted vegetation zones has been added. Additional justification provided in Section 4.1.4 and Table 21.
5	BCS	Separate BOAMs cases are needed for each IBRA subregion. BOAMs cases be split between IBRA sub-regions, with separate cases for each subregion.	The BAM-C for the project has been updated and split by IBRA region/subregion. A small number of species previously assessed as not relevant to the project, but not detailed in Table 31 and Appendix C are now included.
6	BCS	Vegetation condition classes be reviewed to ensure that they accurately reflect vegetation integrity scores.	More information around the use of benchmark data artificially increasing VI scores, and how this relates to the ground-validated condition states used to determine vegetation zones has been provided. Additional justification provided in Section 4.2.4.
7	BCS	Permanent and temporary impacts for each vegetation category is adequate	Noted. No further action required
8	BCS	Ecosystem species have been included in discussions regarding species credit species	Noted. No further action required
9	BCS	Inconsistencies exist between the field data and the data in the BAM calculator. Explanations be provided for differences in plot data between spreadsheets	Spreadsheet 1 (as referred to in the RFI document) is an Arup document and Biosis cannot comment on the accuracy of the data included. Since January 2021 Biosis has completed a QA on the floristic plot data and has updated any inconsistencies and/or errors that may have occurred prior to

Item	Agency	Summary of Agency comments	How / where addressed
			<p>that date. This has included minor adjustments to the location of some BAM plot points that were inaccurately located due to GPS error in the field, for example to move the point back under the canopy of the vegetation patch the plot occurred within.</p> <p>Further to the above, discrepancies have now been noted in the large tree count data in Biosis' BAM plot data. The error has been traced back to an issue with the GIS data processing model either creating duplicate values or summing values for >80cm DBH or 50-79cm DBH, depending on the way the data was captured in the field. These issues have now been corrected, without changing the VI scores for any vegetation zones where this error had occurred.</p> <p>Updated data include in the BAM-C and Appendix H</p>
10	BCS	All SAIL have been adequately addressed. No further action necessary	Noted. No further action required
11	BCS	<p>The potential impact to fauna relating to turbine placement has not been adequately addressed.</p> <p>Discussion regarding the potential for the displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns is required.</p> <p>Justification be provided for the distance between turbines along ridge lines.</p>	<p>Additional justification and assessment provided in Section 5.4.2 (Table 44) 8.3.4 and 8.3.5.</p> <p>Section 5.4.2 (Table 44) addresses animal behaviour including forage flight characteristics.</p> <p>Section 8.3.3 "Turbine risk assessment" has been updated to consider the barriers to movement and potential collision with turbine blades on a turbine by turbine basis. Table 67 "Qualitative risk assessment for turbines for full 70 turbine layout" provides barrier effect risk.</p> <p>Section 8.3.4 "Barrier Effect Risk Assessment" and Section 8.3.5 "Summary of collision risks and indirect impacts" have been updated with specific regard to potential barrier impacts to threatened species and non-threatened at risk species, and the risks associated with displacement of home ranges, or the sterilisation of suitable habitat through fauna avoiding turbines, thus disrupting movement patterns. Table 70 provides an updated qualitative risk assessment for potential barrier effect impacts to birds and bats within identified turbine clusters.</p> <p>It has been concluded that "All known or predicted bird and bat species within the subject land have low or negligible risk associated with barrier</p>

Item	Agency	Summary of Agency comments	How / where addressed
			<p>effects or avoidance behaviour resulting from aerial fauna flying near/within the zone of disturbance or from habitat sterilisation surrounding the operational wind turbines". However, where individual spacing and potential zone of disturbance overlap or become in close proximity to each other, this represents identified turbines clusters that may have a slight increase in an inherent risk associated with barrier effects or altered flight behaviour in that area.</p> <p>Additional assessments were undertaken with additional technical input from Biosis' acknowledged avian and microbat ecologist and highly experienced wind farm ecologist Ian Smales and Mark Venosta (see Section 1.9.2 for credentials).</p>
12	BCS	<p>Prescribed impacts relating to wind farms have not been adequately addressed</p> <p>Options to compensate for unavoidable prescribed impacts, the decision pathway and justification for suggested credit numbers or other compensatory actions, should be clearly documented</p>	<p>Additional justification and information around residual prescribed impacts and compensatory measures has been provided in Section 8.3.5 "Summary of collision risks and indirect impacts" and 8.10.2 "Bird and Bat Adaptive Management Plan (BBAMP)".</p>
13	BCS	<p>Direct impacts on cave bat roosts needs to be clarified</p> <p>Additional input be sought from an acknowledged bat ecologist</p> <p>Monitoring of bats take place prior to construction adjacent to geological features with high bat activity at "fly-out" times to determine if further investigation if warranted to identify potential roost sit</p>	<p>Additional considerations included in Section 5.4.2 Microbats (at the end of section) based on input from highly experienced wind farm ecologist and Biosis' senior microbat ecologist Mark Venosta (see Section 1.9.2 for credentials).</p> <p>Additional monitoring of bat activity near geological features that may potentially provide roost habitat has been included in Section 8.10.1.</p>

Item	Agency	Summary of Agency comments	How / where addressed
14	BCS	<p>Indirect impacts on microbats have not been adequately addressed. Full details of trigger points and mitigation measures be addressed and presented prior to a final determination of the project rather than in a post-consent BBAMP.</p> <p>Data from ongoing bird and bat monitoring surveys be provided to DPIE annually as well as made publicly available on the project's website.</p>	<p>Additional justification and information provided in Section 8.10.2, which includes detailed commitments made by the proponent to a mitigation strategy, to be finalised during the preparation of the BBAMP, and includes trigger points and proposed mitigation measures. Section 8.10.2, contains an overview of the proposed BBAMP, and includes the following:</p> <ul style="list-style-type: none"> • Framework and objectives • Baseline information • Trigger-level and unacceptable impacts for further investigation and adaptive management • Monitor and report on the effectiveness of impacts and trigger levels • Operational mitigation measures • Residual prescribed impacts and compensatory measures • Compliance management and summary • Monitoring and adaptive management triggers for barrier effect impacts
15	BCS	<p>Additional assessment of a locally important population of the Greater Glider has been provided.</p> <p>No significant impact is likely on the local population of Greater Glider. No further action necessary</p>	<p>Noted, but refer to point 18.</p>
16	BCS	<p>Species polygons for some species credit species are unacceptable</p> <p>Species polygons for Powerful, Barking and Masked Owls are to be reconfigured</p> <p>Species polygon for Koala, Eastern Pygmy Possum, Squirrel Glider are to be reconfigured to include all suitable habitat.</p>	<p>Additional information has been provided in Section 5.5.</p> <p>Habitat polygons have been developed based on a combination of targeted field surveys, ground-validated habitat assessments, and species' habitat requirements based on published literature and the TBDC.</p> <p>Preparing species polygons on this manner was undertaken to ensure the use information available for each species, such as PCT associations, habitat parameters where they can be justified based on BioNet or published, peer-reviewed literature, habitat assessments, and targeted surveys, to ensure species polygons are as accurate and meaningful as possible. The approach was undertaken considering Section 6.1.1.2 of the BAM, which specifies that:</p> <p><i>'An assessor may use additional information about a threatened species, in</i></p>

Item	Agency	Summary of Agency comments	How / where addressed
			<p><i>BioNet (e.g. the profile of a threatened species) or published, peer reviewed literature, when assessing the habitat suitability of a site'</i></p> <p>Koala, Eastern Pygmy Possum, and Squirrel Glider species polygons, were developed are based on a combination of on-ground fauna habitat assessment undertaken across the entire wind farm corridor, and the results of targeted surveys undertaken for all three of these species, with reference to BioNet and literature. Owl species polygons were developed using a combination of the Large Forest Owl Recovery Plan (DEC 2006), BioNet and peer reviewed literature.</p>
17	BCS	Stewardship sites should consider proximity to turbine influence	Acknowledged and included in Section 9.1.3.
18	BCS	<p>Additional information is required for Matters of National Environmental Significance</p> <p>A credit requirement for the Greater Glider should be calculated under advice from the Commonwealth Department of Agriculture, Water and the Environment.</p>	<p>No further guidance has been provided on this issue, other than the project is not expected to have a significant impact to this species (Item15). As such no species specific offsets are considered necessary, and any offsetting of impacts to the species' habitat will be included with the project's ecosystem credit offsets and establishment of local Biodiversity Stewardship Sites.</p>
19	NPWS	<p>It is unknown how the proposed adaptive management will mitigate impacts once the turbines are constructed. What options are there for the proposed adaptive management measures once the turbines are in place? A key question is whether a moderate level of risk to threatened species acceptable adjacent to high quality habitat on national park? For these reasons and for potential impacts on NPWS operations, NPWS recommends the removal from the proposal of all turbines adjacent to Ben Halls Gap Nature Reserve.</p>	<p>Additional justification and information provided in Section 8.10.2, which includes detailed commitments made by the proponent to a mitigation strategy, to be finalised during the preparation of the BBAMP, and includes trigger points and proposed mitigation measures to reduce potential operation impacts associated with the turbines, with particular consideration of turbines adjacent to the Nature Reserve.</p> <p>Section 8.3.3 "Turbine risk assessment" has been updated to consider the barriers to movement and potential collision with turbine blades on a turbine by turbine basis. Table 67 "Qualitative risk assessment for turbines for full 70 turbine layout" provides barrier effect risk. Section 8.3.4 "Barrier Effect Risk Assessment" and Section 8.3.5 "Summary of collision risks and indirect impacts" have been updated with specific regard to potential barrier impacts to threatened species and the risks associated with displacement of home ranges, or the sterilisation of suitable habitat</p>

Item	Agency	Summary of Agency comments	How / where addressed
			<p>through fauna avoiding turbines, thus disrupting movement patterns. Table 70 provides an updated qualitative risk assessment for potential barrier effect impacts to birds and bats within identified turbine clusters. Each of these assessments gives particular consideration of turbines adjacent to the Nature Reserve.</p>
20	NPWS	<p>BDAR Tables 56 & 59 regarding potential impacts of blade-strike on local populations of several species, lists the risk as moderate but describes impacts as short term. Given that the potential risks of collision will exist for the duration of the project's operation, the impacts are likely to be ongoing and hardly short term.</p>	<p>Terminology used in tables in Section 8.3.1 and 8.3.2 have been updated.</p>
21	NPWS	<p>Proposed ongoing monitoring of impacts and adaptive management is commended. However it's difficult to understand how adaptive management can be implemented once the turbines are constructed -- there is little indication of what this might comprise "after the event" and after its impact.</p>	<p>Additional justification and information provided in Section 8.10.2 and information relating to Items, 14 and 19 of this table.</p>
22	NPWS	<p>BDAR's mitigation measures include "appropriate setbacks" required from NP estate "where practical", which have not been clearly identified and do not appear to be in place for the turbines immediately adjacent to BHGMR. Also the 30m "minimum safe distance" from nearest vegetation canopy to mitigate blade-strike risks to protected fauna appears inadequate, and inconsistent with the above and other considerations including precedents set for other windfarms which involved more extensive set-backs.</p>	<p>Additional justification for turbine placement along the ridgeline adjacent to Ben Halls Gap Nature Reserve is provided in Section 7.1.1. Details are provided around the different considerations resulting in the current placement of the turbines including wind energy generation, minimisation of biodiversity impacts, residual impacts and potential increases to impacts resulting from changes to layout in that location.</p>
23	NPWS	<p>Proponent would be willing to consider a contribution to wild dog/fox baiting programs if required, and this is both welcomed and recommended.</p>	<p>Additional proposed mitigation measures and information provided in Section 8.9 "Mitigation and Managing Impacts", Table 82, B11 as well as Section 8.10.1 "Biodiversity Management Plan". The proponent has committed to ongoing consultation and participation with NPWS and LLS on their annual vertebrate pest baiting programs including a financial contribution capped at \$5k per annum to cover any additional costs of aerial baiting programs as a result of rotary aircraft (as opposed to fixed wing) being required to improve safe operating practice.</p>

Item	Agency	Summary of Agency comments	How / where addressed
24	NPWS	Impacts to Sphagnum Moss and potential TEC listing. Inappropriate fire regimes are regarded as a key threatening process, which has implications for turbines' potential to impact NPWS and other aerial fire management operations.	<p>Additional information provided in Section 4.3.3, Section 8.5 and Section 8.9 including, that the bushfire strategy developed for the project will include measures to minimise risk of bushfire to the Sphagnum Moss TEC, and includes</p> <ul style="list-style-type: none"> • Increase the accessibility of the ridgeline to fire fighters and improve strategic fire advantages that already exist. • Access to water will be maintained such that existing water resources will remain available at all times to support firefighting activities. • Extension of the strategic fire zone from NHPNR • Upgrades to the access road network to RFS fire trail standards • Increased water storage <p>Further information is updated in projects commitments for bushfire responses provided in the RFI.</p>

Table 3 - Summarises the additional information provided for the BBAMP framework

Item	Agency	Summary of Agency comments	How / where addressed
1	BCS	The BBAMP framework could be improved by including objectives to avoid and mitigate impacts to biodiversity during the operation of the wind farm. Where impacts cannot be avoided or mitigated, offsets for these residual impacts will be required.	Updates have been provided throughout Section 8.10.2
2	BCS	<p>Biodiversity credit quanta for bird and bat strikes be reviewed and fully justified:</p> <ul style="list-style-type: none"> • Credit quanta should be calculated according to the conservation status of the individual species impacted • Calculation of credits should be done every twelve months as part of the annual review • Offsets should be calculated based on the maximum estimated number of fatalities for the preceding twelve months 	Additional detail has been provided in Section 8.10.2. in terms of credit generation, the commitment has been made for “the amount of credits required to be offset would be calculated by the number of actual and modelled impacts in the preceding 12 months, accounting for scavenger impacts, to individual species in a given year, multiplied by the biodiversity risk weighting (BRW) for the relevant species”. This method is commensurate with the Equation 3 (Section 10.1.3) of the BAM for calculating species credit requirements for species assessed by a count of the number of individuals (albeit flora individuals), which is aligned with the

Item	Agency	Summary of Agency comments	How / where addressed
			calculation of offsets required for impacts to individual bird and bat strikes. This differs from the approach put forward by BCS, however Biosis believes it captures the relevance of a current threatened listing for a species, and is in accordance with the expectations of BAM implementation for prescribed impacts (Section 8.6 of the BAM)
3	BCS	Actual strike rates be used as triggers rather than percentages of individual species' populations. Additional triggers for corrective action are identified which are focused on actual strikes rates which have been extrapolated and analysed during annual reporting. A detailed monitoring plan will need to be provided to BSC for endorsement should percentage of population number triggers be pursued.	These suggestions have been noted and updated throughout Section 8.10.2, however Biosis has maintained the option for calculation of impacts (and associated triggers) at the population scale, as if this can be determined in consultation with BCS, it will provide more ecologically meaningful targets and ongoing assessment of impacts.
4	BCS	More detail be included on how turbine risk ratings are to be determined	Updates have been provided throughout Section 8.10.2 with links to relevant section of the BDAR to which this refers Section 8.3.3 Turbine risk assessment
5	BCS	The Tier 1 alert for non-threatened 'at-risk' species and low risk species should be changed to a trigger of two or more carcasses, feather spots or injured individuals of a single species found under or close to a wind turbine during any mortality search or incidentally by wind farm personnel. The Tier 2 impact trigger for all non-threatened species should be more than four carcasses, feather spots, or injured individuals of a single species are found under or close to a wind turbine within a two-month cycle.	These suggestions have been noted and updated in Section 8.10.2
6	BCS	Lists of threatened and non-threatened at-risk species be included in the BBMAP framework.	Updates have been provided throughout Section 8.10.2 with links to relevant tables within the BDAR Table 61 and Table 65
7	BCS	Mitigation implementation protocols be included in the BBAMP framework.	Updates have been provided throughout Section 8.10.2
8	BCS	Monitoring of all turbines following their commissioning be conducted over twelve months, ensuring all seasons are covered.	Updates have been provided in Section 8.10.2, including monthly monitoring for the first six months following commissioning of turbines,

Item	Agency	Summary of Agency comments	How / where addressed
		<p>Monthly carcass searches of turbines should be conducted for the first five years of operation, using trained dogs for at least the first two years. The monitoring program be reviewed at two years.</p>	<p>however must include the first spring/summer season following commissioning of turbines, and therefore may be extended in duration, including follow up pulse searches.</p>
9	BCS	<p>The BBAMP framework should include clear links between tiers, triggers, and actions</p>	<p>Updates have been provided throughout Section 8.10.2</p>

Table 4 - Additional mitigation measures following consultation and RFI for the BBAMP

Type	Mitigation considerations and response
<p>General</p>	<ul style="list-style-type: none"> • Ongoing reassessment of species risk levels and thus relevant trigger-levels. • Review of the monitoring program every two years. • Incorporate any operation mitigation measures developed during the preparation of the BMP relating to monitoring of relevant geological features at 'fly-out' times to determine if/where further mitigation may be warranted. • Encourage habitat use offsite through establishment of BSAs and associated habitat restoration in the area proximal (>200m) to the wind farm and likely to be utilised by the local population of birds and bats. • Minimising availability of raptor perches on infrastructure within close proximity to turbines and overhead powerlines. • Prompt animal carcass removal within the 200m of a turbine (within 24 hrs of discovery) to minimise raptor scavenging opportunities and reviewed annually. • Participation on local (site based) and co-ordinated (LLS and NPWS) feral animal control programs, ie rabbits, wild dogs and foxes, and in line with carcass removal protocols. • Investigation of potential deterrents or evolving technologies, such as: <ul style="list-style-type: none"> – Avoiding or limiting the use of artificial lighting (synchronising flashing red light if required) on turbines and other infrastructure within close proximity to turbines. – Consider novel deterrent techniques related to blade visibility. – Ultrasonic technologies. – Consideration of radar (or optical sensor) or live camera technologies for automatic, reactive and temporary curtailment of turbines for moderate risk turbines, turbine cluster (WP 28-43) or as required (Tier 1 and Tier 2 alerts) adjacent to Ben Halls Gap Nature Reserve. – Use of 'acoustic lighthouse' to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour (as detailed in Boycott et al 2021). • Annual reporting to include triggers relating to the re-assessment of the mitigation strategy to be implemented over the following year of operation where tier 1 and/or tier 2 and 3 triggers have occurred. <ul style="list-style-type: none"> – Additional triggers will be developed that consider the actual/extrapolated impacts to bird and bat species calculated across the preceding year, and include associated mitigation measures and potential additional offsets for the following year of operation.
<p>Tier 1 Alert mitigation and response</p>	<p>Initiate rapid assessment framework for tier 1 alerts within the BBAMP to identify the most effective mitigation measures to be implemented, including but not limited to</p> <ul style="list-style-type: none"> • Increased monitoring of a relevant turbine(s) for a seven day period following a tier 1 alert to determine a one off event, or a potential ongoing event.

Type	Mitigation considerations and response
	<ul style="list-style-type: none"> Investigate the use of 'acoustic lighthouse' to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour. Consideration of mobile radar installation for a minimum 7 day period for automatic, reactive and temporary curtailment of turbines relating to a tier 1 alert for medium to large threatened and non-threatened at risk bird species. In the case of at risk species or threatened species nesting within 200m of a turbine, the nesting event will be allowed to occur, with increased monitoring, potential for temporary curtailment in line with tier 2 and tier 3 recommendations until removal of the nest following the breeding event can be undertaken. Any mitigation is to be consistent with project approval conditions.
Tier 2 and 3 mitigation and response	<p>Initiate rapid assessment framework for tier 2 and tier 3 triggers within the BBAMP to identify the most effective mitigation measures to be implemented.</p> <ul style="list-style-type: none"> Cease operation temporarily of a turbine(s) relevant to a trigger event during the rapid investigation. Increased daily carcass searches for 14 days following discovery of a tier 2 or tier 3 trigger, to be undertaken within the subsequent four weeks of the trigger event by suitable trained ecologist, environmental advisor and/or detector dog services. <p>Pending an investigation into tier 2 and tier 3 impacts being detected, the following may be required in consultation with the Proponent, suitably qualified ecologists, wind farm subject matter experts and DPIE;</p> <ul style="list-style-type: none"> Temporary turbine shut down during periods of low visibility. Low wind speed turbine curtailment, that being blades remain feathered and do not rotate during periods of the day and/or night when wind speeds are below either those at which turbines generate electricity, or can be shown to be conducive to higher levels of microbat activity, likely to be 0 to 4 meters per second, on a temporary or permanent basis. Seasonal curtailment of individual turbines, for example at night during microbat breeding season ie between November and March.

Table 5 – Updated mitigation measures following consultation and RFI (reference to table 82 in the BDAR)

ID	Impact	Updated mitigation measures
B9	Impacts to National Park estate	<p>An appropriate buffer will be maintained to National Park estate where practicable.</p> <p>Implementing vegetated buffers between the access tracks and wind turbine pads and the National Park estate is to be considered during detailed design. The selection of areas of buffer plantings and species to be planted will be carried out in consultation with the Area Manager, Barrington Tops National Parks and Wildlife Service.</p>

ID	Impact	Updated mitigation measures
		<p>The Erosion and Sediment Control Plan will include specific actions to identify sensitive receptors associated with the National Park estate, including waterways and the adjacent Sphagnum Moss TEC</p> <p>The bushfire strategy developed for the development will include measures to minimise risk of bushfire to the Sphagnum Moss TEC and includes</p> <ul style="list-style-type: none"> • Increase the accessibility of the ridgeline to fire fighters and improve strategic fire advantages that already exist. • Access to water will be maintained such that existing water resources will remain available at all times to support firefighting activities. • Extension of the strategic fire zone from NHPNR • Upgrades to the access road network to RFS fire trail standards • Increased water storage
B11	Disturbance from weeds, pests and pathogens	<p>Management measures would be prepared and implemented to avoid and minimise the environmental risks associated with weeds, pests and pathogens. As a minimum, these would include:</p> <ul style="list-style-type: none"> • Completion of a site weed assessment and development of a Weed Management Plan, as a sub-plan to the EMS. • Implementation of appropriate weed control and weed disposal in accordance with Biosecurity protocols. • Any soil or other materials imported to the site for use in restoration or rehabilitation would be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks. • Appropriate disposal of any weed material. • Implementation of appropriate hygiene protocols where there are potential or known pathogen risks including procedures detailing the management of pathogens such as chytrid fungus. • Commitment to ongoing consultation and participation with NPWS and LLS on their annual vertebrate pest baiting programs including a financial contribution capped at \$5k per annum to cover any additional costs of aerial baiting programs as a result of rotary aircraft (as opposed to fixed wing) being required to improve safe operating practice. • Encouraging landowners adjoining the BHGMR to coordinate baiting programs to improve the effectiveness of ground-based strategies.

Please contact me to discuss any elements of the above further.

Yours sincerely

A handwritten signature in black ink that reads "Cawh".

Callan Wharfe
Senior Ecologist and Offset Lead

APPENDIX D UPDATED BDAR

Provided as separate file

APPENDIX E AVIATION PROJECTS RESPONSE

APPENDIX E.1 AVIATION IMPACT ASSESSMENT FOLLOW UP



Jamie Chivers
Someva Renewables
38 Young Street
Sydney, NSW
2000

By email: jamie.c@someva.com.au

Our ref: 100505-04

Dear Jamie,

Re: Hills of Gold Wind Farm – AIA Response to Hills of Gold Aerial Firefighting (NPWS) meeting held on 02 March 2022

1.1. Background

Aviation Projects produced an Aviation Impact Assessment (AIA) for the Hills of Gold Wind Farm (version 1.1 dated 16 November 2020). Various agencies were consulted during the preparation of the AIA.

Submissions from Airservices Australia and Department of Defence did not raise any unanticipated issues.

The National Parks and Wildlife Service (NPWS) commented on fixed and rotary wing aerial operations and expressed concern about the proximity of wind turbines to park boundaries.

The Civil Aviation Safety Authority's (CASA) submission, published on the relevant page of the NSW Department of Planning, Industry and Environment Major Projects portal, comments on various aspects of the assessment.

A written letter of advice and response was supplied to ERM on 08 June 2021 (file: 100505-02) which specifically addressed the issues raised by these aviation stakeholders.

Issues identified in a subsequent Request for Information (RFI) from Department of Planning and Environment (DPW), in which NPWS expressed concern over the placement of WTGs adjacent to the Ben Halls Gap Nature Reserve (BHGNR) and Cranney Pass National Park (CPNP), were discussed at a follow up meeting held on 02 March 2022.

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1.2. Scope

The scope of work is to provide Someva/ERM with further understanding and respond to the issues raised by NPWS at the 02 March 2022 meeting (which followed on from the RFI; refer Table 1).

Table 1 – Hills of Gold Request for Further Information

<i>Reference</i>	<i>Issue</i>	<i>Source/s</i>	<i>Remaining comments/concerns</i>
NPWS_2	Impacts on NPWS aerial operations	Aviation Impact Assessment, 3.7	<p>Impacts on fire management operations are outlined below.</p> <p>As discussed with the proponent, NPWS also uses both fixed wing and helicopter operations for aerial baiting of wild dogs and foxes. These operations provide significant benefits to a range of fauna species due to release from predation pressures. Wild dog predation on nearby livestock is also a serious concern of local landholders.</p> <p>Unlike potential impacts on fire operations, impacts on helicopter based baiting programs are not likely to be significant, and are able to be modified. However fixed wing aircraft are increasingly being used due to lower cost and efficiency of delivery. Our baiting transects may require modification or reduction due to the presence of turbines. It was discussed during meetings that the proponent would be willing to consider a contribution to wild dog/fox baiting programs if required, and this is both welcomed and recommended.</p>
Other	Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest TEC – new info.	s4.3.3, s6	<p>Commonwealth now considering listing this TEC under EPBC Act.</p> <p>Inappropriate fire regimes are regarded as a key threatening process, which has implications for turbines' potential to impact NPWS and other aerial fire management operations. NPWS previous concerns focussed on sediment and erosion control risks to this TEC; latest considerations now include fire management due to Commonwealth assessment now in progress.</p> <p>See further info below.</p>
NPWS_2	Impacts on NPWS aerial operations	BRA Table 2.2, Aviation Impact Assessment,	<p>As previously advised, NPWS uses aircraft to support hazard reduction burning, firefighting and for aerial baiting of feral predators. The western boundary of the BHGMR, and access/fire trails immediately adjoining this boundary – the access trail between WP37 to WP46, and in fact continuing north – comprise a strategically and tactically important north-south fire control line. During fire</p>

Reference	Issue	Source/s	Remaining comments/concerns
		3.7	<p>operations, support of ground crews by water bombing aircraft, particularly rounding up any spot-over fires along the control line, is often critical to fire operations. This can make the difference between controlling a fire or losing control of it. Section 5.1 of the BRA acknowledges the strategic value of fire control lines on the ridgelines here. Turbines WP40 - 43 are of particular concern, being immediately on potential control lines adjacent to the park. While turbines will not directly impinge on BHGMR airspace:</p> <p>a) it is the airspace along the ridgetop and trails/fire control lines immediately adjacent to the park which is of strategic value and which will be impacted to a certain degree.</p> <p>b) BHGMR airspace will be indirectly affected by the suggested safe buffer space between aircraft and turbines, as per below.</p> <p>The removal of WP1 is welcomed for both avifauna and aerial operations impact. Agreed that fire operations for Crawney Pass NR are unlikely to be affected, however impacts to operations adjacent to BHGMR remain our key concern. The quoted aviation buffers from turbines of 600 m for fixed wing, and 300 m for helicopters have significant potential to impact the range of NPWS aerial operations, and particularly on the needs outlined above. Until impacts on aerial operations are clear and fully mitigated, as above NPWS recommends the removal from the proposal of all turbines adjacent to Ben Halls Gap Nature Reserve.</p>
		Response to Submissions	<p>The Response to Submissions quotes RFS as having no comment on the development in the AIA and suggesting that “windfarms will be treated as any other potential hazard to aircraft operations”. We can only assume that this view is one based on a landscape-wide general perspective. It both contrasts with other RFS input and information in the BRA, and neglects the strategic role these ridgeline trails have and site-specific potential impacts.</p>

For the purposes of this letter of advice, two themes emerged from the meeting (which are reflected in the RFI Table 1):

1. Regulatory separation distances between aircraft and WTGs during operations. This is described as the 'buffer space between aircraft and turbines', and
2. A high-level non-specific view that the location of WTGs could impinge on aerial firefighting operations in the adjacent Ben Halls Gap Nature Reserve (BHGNR) and Crawney Pass National Park (CPNP).

This letter of advice will address these two points and consolidate the relevant regulations and industry practice standards relevant to NPWS aerial operations in the vicinity of WTGs.

Figure 1 shows the proposed Hills of Gold WF, including site boundary and WTG locations in relation to both BHGNR and CPNP.

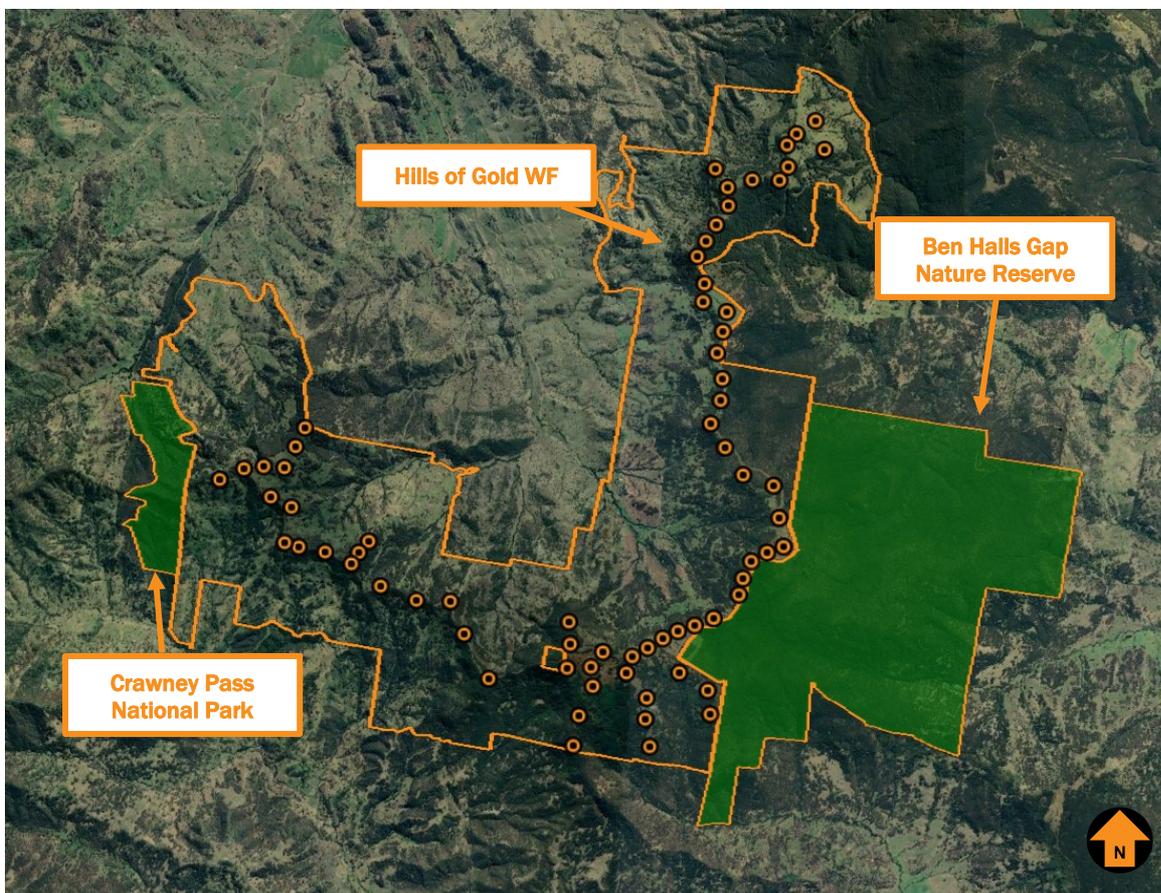


Figure 1 Hills of Gold WF in relation to Ben Halls Gap Nature Reserve and Crawney Pass National Park

1.3. Part 91 Manual of Standards - Flight Rules

On 02 December 2021, the Civil Aviation Safety Authority (CASA) released a new suite of operating regulations. Civil Aviation Safety Regulations (1998) (CASR) Parts 91 (general operating), Part 119 (AOC certification), Part 121 (large air transport), Part 133 (rotorcraft air transport), Part 135 (small air transport) and Part 138 (aerial work) were released.

CASR Part 91 covers 'general operating flight rules for civil aircraft'. The minimum height rule specifies:

91.267 Minimum height rules—other areas

(1) This regulation applies if an aircraft is flown other than over a populous area or a public gathering.

*Note: This regulation does not apply to certain medical transport operations in a rotorcraft and certain **aerial work operations**: see regulations 133.167 and **138.275**.*

(2) The pilot in command of an aircraft for a flight contravenes this subregulation if, during the flight:

*(a) the aircraft is flown **below 500 ft** above the highest feature or obstacle within a horizontal radius of **300 m** of the point on the ground or water immediately below the aircraft; and*

(b) none of the circumstances mentioned in subregulation (3) applies.

NPWS had suggested that a key issue was maintaining the required lateral separation from WTGs during aircraft operations. It is important to note that the separation distances are specific to operations at or above 500 ft above ground level (AGL) rather than low level operations that are conducted in support of NPWS activities.

Further, the lateral separation distances were changed in December 2021 as follows:

1. The 600 m separation for fixed wing and 300 m for helicopters no longer applies, and for civil aircraft, these separation distances specified in CASR 91.267 have changed to 300 m for both fixed and rotary wing aircraft
2. NPWS aircraft operations are classed as an 'aerial work' operation which falls under CASR Part 138. Whilst NPWS does have to comply in general with CASR Part 91, CASR Part 91 gives relief for aerial work operators from certain CASR Part 91 rules; one example of which is the 300 m (previous 600 m) 'buffer distance' as not being applicable to this type of Emergency Services Operation (ESO) or other aerial work such as agricultural spraying.

1.4. Requirement for Safety Management Systems (SMS) for Air Operators Certificate (AOC) holders – Risk Management

As a part of the CASA rule implementation in 2021, certain aerial work providers (that hold an AOC) require an SMS which can be configured and customised to each operator's unique hazards and threats.

CASR Part 138 requirements are specified as:

138.145 Safety management system requirements

The safety management system must include the following matters:

(a) a statement of the operator's safety policy and objectives, including details of the following:

- (i) the management commitment to, and responsibility for, safety;*
- (ii) the safety accountabilities of managers (including key personnel);*
- (iii) the appointment of safety management personnel;*
- (iv) coordination of an emergency response plan;*
- (v) safety management system documentation;*

(b) a safety risk management process, including:

- (i) hazard identification processes; and*
- (ii) safety risk assessment and mitigation processes;*

(c) a safety assurance system, including details of processes for:

- (i) safety performance monitoring and measurement; and*
- (ii) management of change; and*
- (iii) continuous improvement of the safety management system;*

(d) a safety training and promotion system, including details of the following:

- (i) safety management system training and education;*
- (ii) safety management system safety communication.*

A safety management system (SMS) is a businesslike approach to safety. A systematic, precise and proactive process for managing safety risks.

1.5. Aerial application operations

Aerial application operations including such activities as fertiliser, pest and crop spraying are generally conducted under day Visual Flight Flights (VFR) below 500 ft AGL; usually between 6.5 ft (2 m) and 100 ft (30.5 m) AGL.

Due to the nature of the operations conducted, aerial agriculture pilots are subject to rigorous training and assessment requirements to obtain and maintain their licence to operate under these conditions.

The Aerial Application Association of Australia (AAAA) has a formal risk management program (which is recommended for use by its members) to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained.

1.6. Aerial firefighting

Aerial firefighting operations (firebombing in particular) are conducted under Day VFR, sometimes below 500 ft AGL. Under certain conditions visibility may be reduced/limited by smoke/haze.

Most aerial firefighting organisations have the requirement (as outlined in Paragraph 1.4) for formal risk management programs to assess the risks associated with their operations and implement applicable treatments to ensure an acceptable level of safety can be maintained. For example, pilots require specific training and approvals, additional equipment is installed in the aircraft, and special procedures are developed.

The Australasian Fire and Emergency Services Council (AFAC) has developed a national position on wind farms, their development, and operations in relation to bushfire prevention, preparedness, response and recovery, set out in the document titled *Wind Farms and Bushfire Operations*, version 3.0, dated 25 October 2018.

Of specific interest in this document is the section extracted from under the 'Response' heading, copied below:

Wind farm operators should be responsible for ensuring that the relevant emergency protocols and plans are properly executed in an emergency event. During an emergency, operators need to react quickly to ensure they can assist and intervene in accordance with their planned procedures.

The developer or operator should ensure that:

- *liaison with the relevant fire and land management agencies is ongoing and effective*
- *access is available to the wind farm site by emergency services response for on-ground firefighting operations*
- *wind turbines are shut down immediately during emergency operations – where possible, blades should be stopped in the 'Y' or 'rabbit ear' position, as this positioning allows for the maximum airspace for aircraft to manoeuvre underneath the blades and removes one of the blades as a potential obstacle.*

Aerial personnel should assess risks posed by aerial obstacles, wake turbulence and moving blades in accordance with routine procedures.

By way of example, some images of aerial firefighting operations being conducted at low level in the vicinity of Waubra Wind Farm in January 2018 are provided at Figure 2 and Figure 3 (images courtesy of The Courier, Jeremy Bannister).

While each circumstance will be different in terms of aircraft and operator capabilities, prevailing winds, temperature, other weather conditions as applicable, visibility, turbulence and fire characteristics, the images clearly show that aerial firefighting can successfully be conducted in the vicinity of a wind farm.



Figure 2 Erickson Air Crane



Figure 3 Hercules Large Air Tanker

1.7. Worldwide accidents involving wind farms

Worldwide since aviation accident statistics have been recorded, there have been a total of 4 aviation accidents involving a wind farm (i.e. where WTGs were erected). To provide some perspective on the likelihood of a VFR aircraft colliding with a WTG, a summary of the 4 accidents and the relevant factors applicable to this assessment is incorporated in the Aviation Impact Assessment.

Based on the statistics set out in the Global Wind Energy Council (GWEC) report 2016, there were 341,320 WTGs operating around the world at the end of 2016. In 2019, approximately 60.4 GW of wind power had been installed worldwide.

Based on the Australia's Clean Energy Council statistics there were 102 wind farms in Australia at the end of 2019. Aviation Projects has researched public sources of information, accessible via the world wide web, regarding aviation safety occurrences associated with wind farms. Occurrence information published by Australia, Canada, Europe (Belgium, Denmark, France, Germany, Norway, Sweden and The Netherlands), New Zealand, the United Kingdom and the United States of America was reviewed.

The 4 recorded aviation accidents involving a wind farm are summarised as follows:

- One accident, which resulted in 2 fatalities, occurred in Palm Springs in 2001. This accident involved a wind farm but was not caused by the wind farm. The cause of the accident was the inflight separation of the majority of the right canard and all of the right elevator resulting from a failure of the builder to balance the elevators per the kit manufacturer's instructions. The accident occurred above a wind farm, and the aircraft struck a WTG on its descent and therefore the cause of the accident was not attributable to the wind farm and not applicable to this AIA.
- Two accidents involving collision with a WTG were during the day, as follows:
 - One accident occurred in Melle, Germany in 2017 as the result of a collision with a WTG mounted on a steel lattice tower at a very low altitude during the day with good visibility and no cloud. The accident resulted in one fatality. If the tower was solid and painted white, as is standard on contemporary wind farms, then it more than likely would have been more visible than if it were to be equipped with an obstacle light which in all likelihood would not have been operating during daylight with good visibility conditions.
 - One accident occurred in Plouguin, France in 2008 when the pilot decided to descend below cloud in an attempt to find the destination aerodrome. The aircraft was flying in conditions of significantly reduced horizontal visibility in fog where the top of the WTGs were obscured by cloud. The WTGs became visible too late for avoidance manoeuvring and the aircraft made contact with two WTGs. The aircraft was damaged but landed safely. No fatalities were recorded.
 - In both of the above cases, it is difficult to conclude that obstacle lighting would have prevented the accidents.
- One fatal accident, near Highmore, South Dakota in 2014 occurred at night in Instrument Meteorological Conditions (IMC).

There is one other accident mentioned in a database compiled by an anti-wind farm lobby group (wind-watch.org), which suggests a Cessna 182 collided with a WTG near Baraboo, Wisconsin, on 29 July 2000. The NTSB database

records details of an accident involving a Cessna 182 that occurred on 28 July 2000 in the same area. For this particular accident, NTSB found that the probable cause of the accident was VFR flight into IMC encountered by the pilot and exceeding the design limits of the aircraft. A factor was flight to a destination alternate not performed by the pilot. No mention in the NTSB database is made of WTGs or a wind farm.

1.8. Summary

Aerial work operations engaged in fire fighting and aerial spraying do not have to comply with CASR 91.267 'Minimum height rules—other areas'; and the 300 m lateral limit (previously 600 m for fixed wing aircraft) do not apply. NPWS operations are conducted under Part 138 - 'Aerial Work' and essentially the onus is on the pilot to 'see and avoid' any obstacle.

Comprehensive safety management systems are not only a regulatory requirement but are essential and used everyday to ensure safe operations when operating aircraft around obstacles. Operations around WTGs are common practice and when conducted with thorough obstacle information and risk analysis is proven a safe and effective method for aerial operations including ESO.

If you wish to clarify or discuss of the contents of this correspondence, please contact me on 0417 631 681.

Kind regards



Keith Tonkin

Managing Director

07 March 2022

APPENDIX E.2 NPWS RESPONSE

Amanda Antcliff

From: Anthony Signor <Anthony.Signor@environment.nsw.gov.au>
Sent: Thursday, 17 March 2022 6:37 PM
To: Tim Mead
Cc: Anthony Ko; ANDERSON Meredith (ENGIE in Australia); Amanda Antcliff <Amanda.Antcliff@erm.com>; Jamie Chivers <jamie.c@someva.com.au>; Joanne Woodhouse <joanne.woodhouse@erm.com>; Grant Simpson; Richard Colbourne
Subject: FW: Hills of Gold Aerial Firefighting

Hi Tim / All,

Thanks for the recent meeting and follow up email. As requested, I've collated some further info and advice from Grant Simpson, NPWS Director Flight Operations/Chief Pilot as follows, with Grant's email further below.

BACKGROUND/NPWS AERIAL OPERATIONS:

Typical NPWS fire-fighting aerial support comprises the use of either NPWS or contracted, rotary or fixed wing aircraft as described below. NPWS operates a fleet of five helicopters and two fixed wing aircraft. Numerous contracts are also issued annually for aircraft use in park operations. Services include: water bucket bushfire suppression, aerial incendiary operations for hazard reduction and fire-fighting, other fire operations, external sling loads and hoist operations, feral animal baiting and shooting operations, low level surveys, flood disaster assistance, weed spraying, etc.

NB: The ridge-top fire trails along which turbines are located, comprise strategic access and fire control line options, including the N-S oriented trail adjacent to the W boundary of the BHG NR and adjoining State Forest. While this area is high altitude, lessening the frequency and often intensity of fires, those that do occur are usually in drought conditions and adverse weather and can burn intensely. The presence of cool temperate rainforest TEC means fire regimes are a key threat to local natural values.

Hence effective fire management is important here, and will also serve to protect adjoining assets including the wind farm itself.

NPWS also has KPI targets for hazard reduction burning operations and has in the last 10 years typically conducted more than 70% of all NSW hazard reduction each year – more than all other agencies combined. The last hazard reduction burn at BHG NR was in May 2018, but the area was extensively affected by the 2019/20 bushfire season.

NPWS use of aircraft here – typical fire operations:

- Helicopter water bucketing of fire control line “spot-overs” – either during back burning operations or direct attack along the control line. Generally (but not always) coordinated with and by ground crews on the fire-line. Also bucketing of “hot-spots” in locations inaccessible by ground-based appliances.
- Light to medium lift helicopters (typically AS350 “Squirrel” to BK117 or Bell212) with a water bucket suspended from a long line up to 45m long and carrying from 500L up to 1500L of water.
- At lower fire intensities, direct attack of approaching fire line to slow its progress. This is also the typical use for fixed wing aircraft (e.g. Air Tractor AT802 or larger), which can sometimes knock the fire's flank down, especially with use of fire retardant.
- Note that in all these operations the pilot tends to be heavily “task focussed”, hence additional close hazards add exponentially to the risks.
- Aircraft support can also be critical in the outcome of any potential vehicle entrapment of fire crews if things go horribly wrong and fire appliances are over-run by fire.

Aerial baiting:

- Conducted at least once/year for wild dog and fox control, delivering “1080” injected fresh meat or manufactured baits at a rate of up to 40 baits/km of transect. This is conducted mainly to reduce stock predation on neighbouring farmlands, but also has a benefit in easing predation pressure on fauna, including threatened species. Usually coordinated with LLS-driven landscape wide program in collaboration with other landholders – locally each autumn.
- Either rotary or fixed wing aircraft are used. Helicopter delivery provides more flexibility/agility for location and arrangement of bait runs, but fixed wing delivery is more efficient/lower cost.
- Requirements for baiting exist under our legislated general biosecurity obligations, NPWS policies, and as part of the recovery efforts following the 2019/20 bushfire season.

POTENTIAL IMPACTS OF THE PROPOSED ADJOINING TURBINES – FIRE FIGHTING:

Advice discussed with Grant Simpson, NPWS Director Flight Operations (see also Grant’s email below):

With blades stationary in Y position:

- Operational CASA guidelines for NPWS operations provides approval to operate to within 100m of these types of structures in a fire situation. Some pilot discretion can be allowed in emergency situations, but the absolute minimum safe distance for helicopters to operate would be 50 to 100m.
- Actual safe buffer distances as discussed will vary depending on conditions on the day – wind, smoke/visibility, position of sun etc.
- Hence, even with turbine blades stopped in ideal conditions, the likely impact of turbines is to close to rotary aircraft a radius of about 100m from each turbine.
- For our use of fixed wing aircraft, the operational safe buffer is likely to be no less than 200m.

With blades rotating:

- Aside from the moving blades, key issue is turbulence, especially down-wind of the turbine. Even up-wind, the above buffers would need to be significantly expanded.
- Turbulence affecting light aircraft downwind of rotating turbines is likely to occur no less than 5x turbine rotor diameter (RD) -- ie. approx 800m from the turbine, with a height/width equal to 2x RD or 160m. (See below). The threshold where this is a safety issue is largely unknown, but it’s suggested that a minimum safe distance due to downwind turbulence might be 3x RD or more = approx. 480m. See Grant’s email below.
- Operations adjacent, even upwind, would need to allow for potential wind-shifts to ensure a safe buffer, either from rotating blades, or to ensure aircraft don’t find themselves in downwind turbulence.

From “To70” Aviation Consultancy website:

- *The jury is still out as to what is a safe distance for aircraft to avoid turbulence from wind turbines in operation. Conservative estimates currently prescribe up to six times the turbine’s diameter....*
- *Wind turbines placed close to the point of a turn in an approach flight path might block critical visibility for the pilot during a manoeuvre close to the ground.*

Hence where turbines are operational, due to the risk of turbulence, safe operating buffers for NPWS aerial operations might be close to the original/previous CASA recommended buffer of 600m. Given the spacing of the turbines, this may completely close the airspace along the entire length of the ridgeline and for a distance of 600m at least downwind.

Hence for either fire-fighting purposes or hazard reduction burning and other emergency response situations, the turbines would need to be stopped in the Y position at the request of the incident controller, which in many cases will be NPWS.

POTENTIAL IMPACTS OF THE PROPOSED ADJOINING TURBINES – OTHER OPERATIONS:

It is not yet clear whether the proponent might be willing to temporarily shut down individual or several turbines for non-fire related aircraft purposes. However there is greater flexibility in modifying or supplementing these operations, with the greatest need being in our annual aerial baiting.

Location of bait run lines can be adjusted to ensure a safe operating distance, but this is likely to mean that the more efficient fixed wing aircraft is less of an option. The concept/option discussed may mitigate impacts if the proponent could contribute to the difference in costs resulting from such adjustments.

This is difficult to quantify precisely on the information I have at hand, but as a rough indication, aircraft costs might be in the order of \$2000/hour, and the transects across this reserve would usually be baited in well less than a day's flying. Hence the annual difference in costs incurred from adjusting for the presence of turbines here would be a proportion of the day's flight costs.

Alternatively if bait runs need to be altered to too great an extent, a proponent contribution to alternate or supplementary wild dog control methods such as contracted trapping might sufficiently mitigate the impacts on any curtailed aerial baiting operation.

Happy to take your call to discuss this further, or we can do so in the next scheduled meeting.

Regards,



Anthony Signor

Area Manager, Barrington Tops
Hunter Central Coast Branch
NSW National Parks & Wildlife Service

59 Church Street,
Gloucester NSW 2422
T 02 6538 5301

M 0429 144 873

W nationalparks.nsw.gov.au

NPWS acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and show our respect for elders past, present and emerging.

From: Rosalie Brooke <Rosalie.Brooke@environment.nsw.gov.au>
Sent: Wednesday, 9 March 2022 14:33
To: Anthony Signor <Anthony.Signor@environment.nsw.gov.au>
Cc: Richard Colbourne <Richard.Colbourne@environment.nsw.gov.au>
Subject: FW: Hills of Gold Aerial Firefighting

Hi Anthony

Please see below comments from our chief pilot regarding the affect of the wind turbines on potential fire operations.

If you have any further questions or wish to discuss further please feel free to reach out.

Thanks

Rosalie Brooke

A/Manager, Flight Business Services - **NSW National Parks and Wildlife Service**
0472 821 157

From: Grant Simpson <Grant.Simpson@environment.nsw.gov.au>
Sent: Wednesday, 9 March 2022 2:21 PM
To: Rosalie Brooke <Rosalie.Brooke@environment.nsw.gov.au>
Subject: RE: Hills of Gold Aerial Firefighting

Hi Rosalie,

I'm happy for you to pass some info back to Sigi. From a piloting point of view, down stream of a wind turbine is not a nice area to operate in and should be avoided. Considering the operations that would be conducted in the vicinity of this fire trail (slow hovering/bucket work) it could create quite a difficult operating environment during a Westerly wind. I doubt the fixed wing would want to operate parallel to any of that fire trail. Most of the documentation suggests operating above minimum altitudes (500ft etc) and does not take in to account low level flights.

CASA have an Advisory Circular out for this circumstance - [ac-139-e-05-v1-0](#)

2.1.6.5 Planning authorities should consider wake vortices when assessing the location of wind turbines in proximity to an aerodrome, any airstrip and associated circuit patterns. The risk to the safety of air navigation from wind turbine turbulence should be mitigated to OBSTACLES (WIND FARMS) OUTSIDE THE VICINITY OF A CASA CERTIFIED AERODROME RESTRICTED DRAFT / UNCONTROLLED WHEN PRINTED AC 139.E-05 v1.0 January 2021 Page 9 an acceptable level of safety particularly during critical phases of flight such as landing and taking off.

Bear in mind that information in the quoted study is for wind turbines with blades of less than 30m. There has been little investigation or research on bigger turbine bladed installations.

Figure 2: The cylindrical region downwind the rotor should be avoided. Its size is 5RD (downwind) by 2RD (vertical). Coloured helices indicate wake vortices and decay.

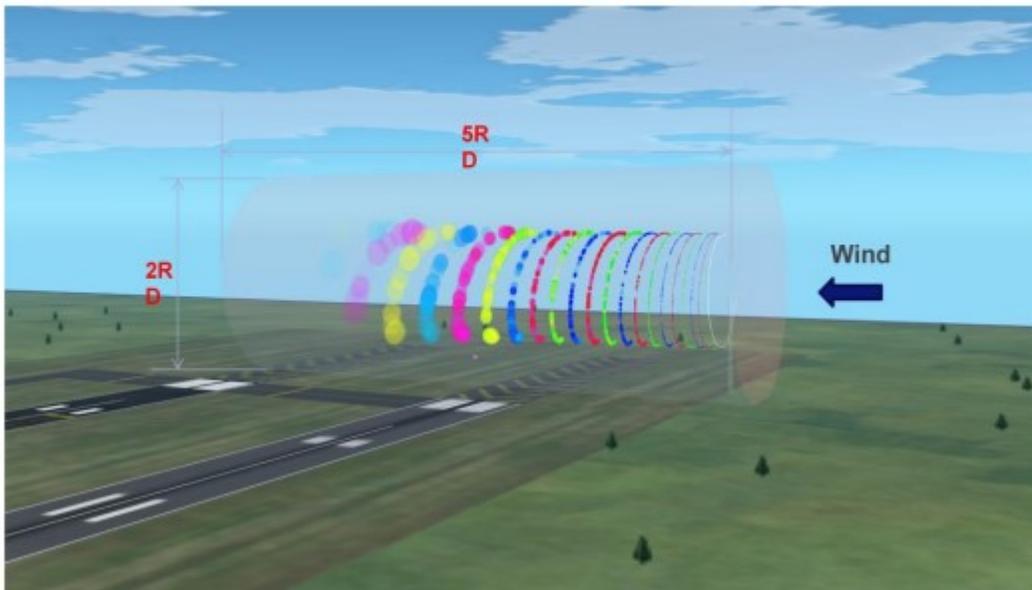


Figure 1 p34 <http://publicapps.caa.co.uk/docs/33/CAP764%20Issue6%20FINAL%20Feb.pdf>

Kind regards

Grant Simpson

Director Flight/Chief Pilot - ParkAir
Fire and Incident Operations Branch
NSW National Parks and Wildlife Service
Hangar 609 Tower Road, Bankstown Airport

PO Box 250, Milperra NSW 2214
T 02 8713 4923 M 0436 649 380
W nationalparks.nsw.gov.au

From: Rosalie Brooke <Rosalie.Brooke@environment.nsw.gov.au>
Sent: Wednesday, 9 March 2022 12:26 PM
To: Grant Simpson <Grant.Simpson@environment.nsw.gov.au>
Subject: FW: Hills of Gold Aerial Firefighting

Hi Grant

As discussed. Can you please look at this and let me know what you think?

Thanks

Rosalie Brooke

A/Manager, Flight Business Services - **NSW National Parks and Wildlife Service**
0472 821 157

From: Anthony Signor <Anthony.Signor@environment.nsw.gov.au>
Sent: Wednesday, 9 March 2022 11:37 AM
To: Rosalie Brooke <Rosalie.Brooke@environment.nsw.gov.au>
Cc: Richard Colbourne <Richard.Colbourne@environment.nsw.gov.au>
Subject: FW: Hills of Gold Aerial Firefighting

Hi Rosalie,

Attached as discussed is the latest reply from the developers re impacts on our aerial operations at Ben Halls Gap NR. Also a couple of maps that depict the reserve in relation to the turbine locations. These are about 200m high from ground to blade tip, and spaced around 300 to 500m apart.

Our concerns are several, but this particular issue regards the practical implications of these turbines on a strategic N-S oriented fire control line.

Any advice much appreciated.

Regards,



Anthony Signor

Area Manager, Barrington Tops
Hunter Central Coast Branch
NSW National Parks & Wildlife Service

59 Church Street,
Gloucester NSW 2422
T 02 6538 5301
M 0429 144 873
W nationalparks.nsw.gov.au

NPWS acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and show our respect for elders past, present and emerging.

From: Anthony Signor
Sent: Wednesday, 9 March 2022 09:55
To: Richard Colbourne <Richard.Colbourne@environment.nsw.gov.au>
Subject: FW: Hills of Gold Aerial Firefighting

Hi Richard

Thanks for joining the meeting last week. Attached response CFYI. Any feedback appreciated. Who would be the best contact at FIOB or ParkAir to provide specific advice?



Anthony Signor

Area Manager, Barrington Tops
Hunter Central Coast Branch
NSW National Parks & Wildlife Service

59 Church Street,
Gloucester NSW 2422
T 02 6538 5301
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NPWS acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and show our respect for elders past, present and emerging.

From: Tim Mead <Tim.M@someva.com.au>
Sent: Tuesday, 8 March 2022 18:11
To: Anthony Signor <Anthony.Signor@environment.nsw.gov.au>
Cc: ANDERSON Meredith (ENGIE in Australia) <meredith.anderson@engie.com>; Amanda Antcliff <Amanda.Antcliff@erm.com>; Jamie Chivers <jamie.c@someva.com.au>; Joanne Woodhouse <joanne.woodhouse@erm.com>
Subject: RE: Hills of Gold Aerial Firefighting

Hi Anthony,

Thank you for your time last week to discuss NPWS concerns relating to aerial operations in proximity to proposed turbines. Out of that meeting we took an action to procure a further letter from Aviation Projects to address some technical aviation matters raised in the meeting. Please find attached that further information as requested.

With the time constraints of submitting our response to DPIE's RFI by no later than **25 March 2022**, it is our intention that this letter is generally complete for submission to DPIE. However, we are of course available for any further discussions as required on this letter with NPWS. We note there were other agreed actions in that meeting:

- NPWS to discuss with Park Air their views internally on safe operating distances to turbines.
- HOGWF to discuss fire capability commitments and rapid response of onsite staff, and make further commitments within RFI response where possible.
- Proposed to reconvene in 2 weeks to discuss feedback from NPWS Parks Air on safe operating distances to turbines

Please let us know if you would like us to arrange a further meeting to discuss Park Air's feedback, perhaps next week?

Regards,
Tim



Tim Mead
Development Director

Mobile: 0419 900 277
www.somevarenewables.com.au
Someva Pty Limited
38 Young St
Sydney NSW 2000

Someva Renewables proudly acknowledges that our office is located on the country of the Gadigal People of the Dharug Nation as well as the work. We pay our respects to Elders past, present and emerging and value working with First Nations groups on renewable energy projects.

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-----Original Appointment-----

From: Tim Mead **On Behalf Of** Jamie Chivers

Sent: Wednesday, 2 March 2022 9:58 AM

To: Amanda Antcliff

Subject: FW: Hills of Gold Aerial Firefighting

When: Wednesday, 2 March 2022 12:00 PM-1:00 PM (UTC+10:00) Canberra, Melbourne, Sydney.

Where: Microsoft Teams Meeting

-----Original Appointment-----

From: Jamie Chivers <jamie.c@someva.com.au>

Sent: Tuesday, 22 February 2022 8:32 PM

To: Jamie Chivers; Anthony Signor; Keith Tonkin; Craig Abela; Tim Mead; Liam Edgeworth; Joanne Woodhouse

Cc: ANDERSON Meredith (ENGIE in Australia)

Subject: Hills of Gold Aerial Firefighting

When: Wednesday, 2 March 2022 12:00 PM-1:00 PM (UTC+10:00) Canberra, Melbourne, Sydney.

Where: Microsoft Teams Meeting

Hi Anthony

As discussed we have invited Keith and Craig from Aviation projects to better understand the current way you would operate aircraft in the area. If you could please share this meeting invite with the person you mentioned who runs the water bombing fleet with NPWS that would be great.

Thanks,

Jamie

Key issues below for discussion.

NPWS_2	Impacts on NPWS aerial operations	Aviation Impact Assessment, 3.7	<p>Impacts on fire management operations are outlined below.</p> <p>As discussed with the proponent, NPWS also uses both fire and aerial baiting of wild dogs and foxes. These operations protect native fauna species due to release from predation pressures. Vandalism is also a serious concern of local landholders.</p> <p>Unlike potential impacts on fire operations, impacts on hunting are not likely to be significant, and are able to be modified. Hunting is increasingly being used due to lower cost and efficiency (compared to baiting) and require modification or reduction due to the presence of wind turbines. Meetings that the proponent would be willing to consider if required, and this is both welcomed and recommended.</p>
Other	Ben Halls Gap Sphagnum Moss Cool Temperate Rainforest TEC – new info.	s4.3.3, s6	<p>Commonwealth now considering listing this TEC under EPBC Act.</p> <p>Inappropriate fire regimes are regarded as a key threat to the TEC. Turbines' potential to impact NPWS and other aerial fire management operations is a concern.</p> <p>NPWS previous concerns focussed on sediment and erosion. Current considerations now include fire management due to Commonwealth progress.</p> <p>See further info below.</p>
NPWS_2	Impacts on NPWS aerial operations	BRA Table 2.2, Aviation Impact Assessment, 3.7	<p>As previously advised, NPWS uses aircraft to support hazardous operations for aerial baiting of feral predators. The western boundary immediately adjoining this boundary – the access trail between the park and the ridge – comprise a strategically and tactically important line. During fire operations, support of ground crews by wind turbines rounding up any spot-over fires along the control line, is critical. Wind turbines can make the difference between controlling a fire or losing it.</p> <p>Section 5.1 of the BRA acknowledges the strategic value of the park here. Turbines WP40 - 43 are of particular concern, being located on lines adjacent to the park. While turbines will not directly impact the park, they will impact the park in the following ways:</p> <ul style="list-style-type: none"> a) it is the airspace along the ridgetop and trails/fire lines to the park which is of strategic value and which b) BHGMR airspace will be indirectly affected by the presence of turbines between aircraft and turbines, as per below. <p>The removal of WP1 is welcomed for both avifauna and a fire operations for Crawney Pass NR are unlikely to be affected. Turbines adjacent to BHGMR remain our key concern.</p> <p>The quoted aviation buffers from turbines of 600 m for fire operations have significant potential to impact the range of NPWS aerial operations. The needs outlined above.</p> <p>Until impacts on aerial operations are clear and fully mitigated, the removal from the proposal of all turbines adjacent to the park is recommended.</p>
		Response to Submissions	<p>The Response to Submissions quotes RFS as having no concerns and suggesting that "windfarms will be treated as any other operations". We can only assume that this view is one based on a narrow perspective. It both contrasts with other RFS input and in the strategic role these ridgetop trails have and site-specific</p>

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APPENDIX F DNV TELECOMMUNICATIONS RESPONSE



Meredith Anderson
Hills of Gold Wind Farm Pty Ltd
Level 33, Rialto South Tower
525 Collins Street
Melbourne Vic 3000
Australia

DNV Energy Systems
Project Development & Analytics
Level 12, 350 Queen Street
Melbourne Vic 3000
Australia
Tel: +61 3 8615 1515

Date: 23 March 2022
Our reference: 10343321-AUMEL-L-01-C

Re: Potential for the proposed Hills of Gold Wind Farm to interfere with radiocommunications equipment operated by the NSW National Parks and Wild Service

Dear Meredith,

Hills of Gold Wind Farm Pty Ltd (the Proponent) has asked DNV Australia Pty Limited (DNV) to provide advice regarding the potential electromagnetic interference (EMI) impacts of the proposed Hills of Gold Wind Farm (the Project) on radiocommunication equipment operated by the NSW National Parks and Wildlife Service (NPWS) in the area surrounding the Project. This letter provides an overview of the concerns raised by the NPWS, the potential for the Project to impact on mobile radio systems such as those used by the NPWS, and possible mitigation measures that could be implemented if interference to these systems is experienced after the Project is constructed.

BACKGROUND TO CONCERNS RAISED BY THE NPWS

Review of relevant documents and NPWS submissions

An EMI assessment for the Project has previously been conducted by another consultant, as reported in reference [1]. In that assessment, radiocommunication licences associated with towers located within a 50 km radius of the proposed Project site boundaries (described as the Study Area) were identified from the Australian Communication and Media Authority (ACMA) Register of Radiocommunications Licences (RRL) database. The EMI assessment report does not specifically identify any NPWS radiocommunication licences or equipment within the Study Area, but makes the following general observation regarding the potential for the Project to interfere with mobile radio systems such as those used by the NPWS:

"There are a number of Private Mobile base station sites in the Study Area but all are set back in excess of 1km from turbines and therefore no impact to coverage is expected."

Following public exhibition of the Environmental Impact Statement for the Project in late 2020, which included the EMI assessment report as an appendix, the NPWS raised the following concerns regarding the potential for the Project to interfere with the operation of their mobile radio systems:

"The assessment of potential electromagnetic interference on radio transmissions... fails to consider any impacts on NPWS... VHF radio communications in the area. While the potential might be slight, this needs to be assessed. If approved, the development consent should provide for the Proponent to rectify any issues should they arise. Any impacts in this regard will be a key safety issue for NPWS and emergency services personnel working in this remote area."

DNV Headquarters, Veritasveien 1, P.O.Box 300, 1322 Høvik, Norway. Tel: +47 67 57 99 00. www.dnv.com

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The Proponent provided a response to this submission in January 2022, which referred to the findings of the EMI assessment and noted that:

"A commitment has been made to conduct a pre-construction assessment to establish a baseline reception strength for comparison with any complaints relating to post-construction reception strength. It also notes that in the event of reception being adversely impacted by the presence of the project, the proponent will implement reasonable and feasible measures to reduce impacts as soon as possible."

A further submission in relation to the potential EMI impacts of the Project was made by the NPWS in February 2022, as follows:

"The potential for EMR [electromagnetic radiation] impacts on NPWS and other VHF radio communications in this remote area remains unknown. This is important since there are no other effective operational communications available for emergency services and NPWS WHS [work health and safety] considerations in this landscape.

It's not yet understood how any interference to VHF radio comms that might eventuate would be "considered in the planning stages" and "manageable". If EMR interference from the turbines becomes an issue, it may be difficult to fix in retrospect. Creating ineffective radio comms in this area is not an option if we are to ensure public, environmental and staff safety."

Subsequent discussions with the NPWS

A meeting between the Proponent, the NPWS, and DNV was held on 3 March 2022 to discuss the NPWS's concerns and seek further information about the radiocommunication systems used by the NPWS in the area around the Project.

From this discussion, DNV understands that the NPWS's concerns centre around the potential for the Project to interfere with the use of their mobile radio communications system in the Ben Halls Gap Nature Reserve, which is adjacent to the eastern boundary of the Project. This mobile radio system is used for communications between NPWS staff working in the field, and between remote staff and a fixed operational base, particularly during emergency situations such as bushfires. The NPWS advised that three mobile radio base stations currently service the Ben Halls Gap Nature Reserve, although the existing signal coverage from these base stations is limited by the impacts of local terrain in some parts in the reserve and can also be affected by the presence of trees.

The NPWS particularly expressed concerns about the potential for EMI caused by electromagnetic emissions or 'noise' produced by turbines at the Project to impact on mobile radio signals transmitted and received by the base stations and remote users. DNV understands from the NPWS that any material interference caused by the Project could critically impede communications in parts of the reserve, such as gullies, where the signal coverage from the base stations is already marginal. The potential for the Project to interfere with mobile radio signals through either electromagnetic emissions or the physical presence of turbines was discussed during the meeting with the NPWS and is considered further in this letter.

Given the terrain at the Ben Halls Gap Nature Reserve and in the surrounding area, and the conditions under which the existing mobile radio system is typically used, the NPWS believes that suitable options for alternative technologies to replace the existing system are limited. However, the NPWS noted that the communications used in this area are likely to be switched over to the Government Radio Network (GRN) operated by the NSW Telco Authority sometime within the next 5 to 10 years. In preparation for the transition from the NPWS mobile radio system to the GRN, the NPWS will be undertaking baseline

measurements of the existing signal coverage. The NPWS has indicated that it may be possible to complete the planned signal strength measurements before the Project is constructed, so that the results could later be used to evaluate the impacts of the Project on their mobile radio system.

NPWS RADIOCOMMUNICATIONS IN THE VICINITY OF THE PROJECT

DNV understands that the mobile radio communications system currently used by the NPWS in the vicinity of the Project operates as an analogue duplex system (meaning that signals are simultaneously transmitted in one frequency and received on a different frequency) in the VHF frequency band (30 MHz to 300 MHz). The system consists of portable hand-held and vehicle-based mobile units that connect to a permanent base station or repeater that is located on a tower in elevated terrain and receives and transmits signals from and to the mobile units. Operation of the system depends on the mobile unit being within the signal coverage area for at least one base station or repeater. Advice received from the NPWS suggests that, in the area around the Project, signals for their mobile radio system may be transmitted and received up to approximately 50-60 km from the base station, depending on the local terrain and line of sight from the base station to the mobile unit.

The NPWS has provided the locations, antenna heights, and operating frequencies of the three base stations used to provide mobile radio coverage in the Ben Halls Gap Nature Reserve. For the purposes of this review, DNV has obtained further information about the equipment used at these base stations from the ACMA RRL database [2]. Details about the proposed Project were provided by the Proponent, and the locations of the Ben Halls Gap Nature Reserve boundaries and roads and tracks in and around the reserve were obtained from publicly available sources [3, 4]. The distances and directions of the three mobile radio base stations from the centre of the reserve, together with the proposed Project boundary and turbine locations, are shown in Figure 1.

POTENTIAL FOR THE PROJECT TO INTERFERE WITH NPWS EQUIPMENT

There are two mechanisms by which wind turbines can theoretically interfere with radiocommunication signals:

1. through the physical presence of the turbines degrading or disrupting the signals, which can cause material impacts in some cases
2. through electromagnetic emissions produced by the turbines interacting with the signals or equipment, which is generally not expected to be an issue.

The potential for the Project to impact on the mobile radio communication system used by the NPWS in the Ben Halls Gap Nature Reserve through these mechanisms is discussed further below.

Interference caused by the physical presence of wind turbines

The main way that the Project could interfere with NPWS mobile radio signals is through the physical presence of the turbines causing obstruction, diffraction, or reflection or scattering of the signals, or near-field effects. However, DNV notes that previous advice received from the operators of mobile radio systems similar to those used by the NPWS, including state government emergency services organisations, has generally indicated that they do not expect wind farms to interfere with their communications. Several operators have also confirmed that they have not previously experienced noticeable interference to their mobile radio systems in the presence of operating wind farms.

Mobile telephony systems used for mobile radio communications are typically designed to operate in a range of environments and are generally not affected by the presence of wind turbines any more than other obstructions or potential sources of signal reflection or scattering such as terrain, vegetation, and

other large structures. This type of interference is more likely to be a problem at the edges of the coverage area for the base station, or in other locations where the signal coverage is already marginal. In practice, the potential impacts of the physical environment on the performance of a mobile radio system are usually mitigated by designing the system such that alternative base stations are available at the edges of the coverage areas and in other areas of low signal strength [5].

Potential impacts due to signal obstruction or diffraction

Signal obstruction or diffraction from wind turbines can only occur when the turbines are within, or very close to, the line-of-sight path between the transmitting and receiving antennas. As shown in Figure 1, signals between the Mt Helen NPWS base station located to the southwest of the Project site and mobile units used in the Ben Halls Gap Nature Reserve may pass through the Project in the vicinity of turbines. Therefore, there is potential for turbines at the Project to cause obstruction or diffraction of mobile radio signals transmitted or received by the Mt Helen base station.

To better understand the potential for impact to signals to and from the Mt Helen base station, DNV has identified the areas in and around the Ben Halls Gap Nature Reserve where there is an unobstructed signal line of sight for each of the NPWS base stations. The results of this modelling for a mobile unit antenna height of 1.5 m above ground level, taking into account terrain obstructions, the curvature of the earth, and the effects of atmospheric refraction, are presented in Figure 1. Other potential signal obstructions such as vegetation or existing structures have not been considered in the modelling. From Figure 1:

- areas close to the southwestern boundary and small areas in the centre of the reserve and on the southern and western boundaries have unobstructed lines of sight to the Mt Helen base station
- areas along most vehicular tracks and in the south and far east of the reserve have unobstructed lines of sight to the Mt Barrington and Mt Myra base stations, but no clear line of sight to Mt Helen
- there is a large area in the northern part of the reserve that does not have a clear line of sight for signals to or from any of the three identified base stations.

Under normal conditions, DNV expects that most of the mobile radio communications used by the NPWS within the Ben Halls Gap Nature Reserve would be to and from vehicle-based units located on or very close to access tracks within the reserve. As noted above, most of the vehicular tracks shown in Figure 1 have a clear line of sight to either the Mt Barrington or Mt Myra base stations (or both) and so mobile radio communications in these areas are unlikely to be affected by signal obstruction or diffraction from turbines at the Project. However, DNV notes that information regarding the tracks shown in Figure 1 has been obtained from publicly available sources, and there may be other tracks used by the NPWS within the reserve. Additionally, in an emergency situation or during particular management or maintenance operations in the reserve, it is possible that vehicle-based and hand-held mobile units could be used in more remote areas of the reserve away from vehicular tracks.

Since signals from the Mt Helen base station to the northern part of the Ben Halls Gap Nature Reserve are more likely to be intercepted by turbines at the Project, and hence experience interference, DNV has also attempted to determine which base stations are potentially more likely to be servicing that area. For each location in and around the reserve, Figure 2 shows the base station that would have a direct signal line of sight at the minimum distance above a mobile unit antenna at a height of 1.5 m, considering terrain obstructions, earth curvature, and atmospheric refraction. Although this analysis does not explicitly consider the line of sight for signals transmitted from a mobile unit to the base station, the overall conclusions are expected to be similar regardless of the signal direction. At most locations across the reserve, including the northern region, the direct signal line of sight from the Mt Barrington and Mt

Myra base stations is closer to the mobile unit antenna height than the line of sight for signals from the Mt Helen base station. These results suggest that the Mt Barrington and Mt Myra base stations, which would not be affected by signal obstruction or diffraction caused by the Project, may be more likely to be servicing the parts of the reserve where a signal from the Mt Helen base station could be intercepted by turbines. Although signals to and from the Mt Barrington and Mt Myra base stations may potentially experience interference caused by reflection or scattering from the turbines, as discussed further below, these impacts are expected to be minimal. Nevertheless, DNV notes that the modelling does not consider the potential effects of signal diffraction over or around terrain obstructions or signal attenuation with distance, which could result in a stronger signal being received from or transmitted to a base station for which the mobile unit is further below the direct line of sight. The results of this analysis are indicative only, and the actual base stations servicing each part of the reserve would need to be confirmed through on-site signal strength measurements.

Potential impacts due to signal reflection or scattering or near-field effects

Interference caused by reflection or scattering can occur when the signal produced by the transmitting antenna is reflected, scattered, or re-radiated by an intervening object into the corresponding receiver antenna. If the reflected or scattered signal is sufficiently strong that the ratio of the direct signal to the indirect signal is lower than the required carrier-to-interference (C/I) ratio, the signal quality and system performance can be degraded. This type of interference is most likely to be an issue in situations where the line of sight from the transmitter to the receiver is obstructed by terrain, causing a reduction in the strength of the direct signal, but the path for the reflected or scattered signal is relatively clear [5].

Signal reflection or scattering from wind turbines is only likely to be a problem for mobile radio systems if the turbines are located close to the transmitting or receiving antenna, and can be avoided by keeping turbines clear of a zone around the base station tower or locations where a mobile unit would be used. The size of this zone and the extent to which a turbine may cause interference through reflection or scattering depends on a range of factors including the location of the turbine relative to the transmitter and receiver, the physical characteristics of the turbine, the properties of the antenna, the frequency of the signal, and the minimum required CI ratio for the system [1, 6]. Reference [5] provides general guidance regarding the potential for interference with mobile radio systems, and suggests that a clearance of 500 m from the transmitter (whether a fixed base station or a mobile unit) is sufficient to avoid significant impacts to the associated signals. Other references recommend that turbines be kept outside of clearance zones ranging from 200 m to 1200 m from the base station to avoid interference to mobile radio signals caused by reflection or scattering [7].

Similarly, the potential for interference to radiocommunication signals caused by near-field effects can generally be avoided by keeping turbines clear of the near-field zone for the transmitting or receiving antenna. Within the near-field zone, local inductive and capacitive effects are significant and it is difficult to predict the potential impacts of other objects on the transmitted or received signal. Reference [6] presents an equation for estimating the radius of the near-field zone based on the properties of the transmitting or receiving antenna. From the operating frequencies provided by the NPWS and the corresponding antenna gains recorded in the ACMA RRL database, DNV has determined that the near-field zone for each of the NPWS base stations extends to approximately 2 m from the tower location.

DNV has reviewed the proposed turbine locations for the Project with respect to the NPWS base stations and Ben Halls Gap Nature Reserve, to determine the potential for interference through reflection or scattering of signals or near-field effects.

- All proposed turbine locations are at least 28 km from the identified NPWS towers, which is well beyond the distances at which reflection, scattering, or near-field effects are expected to cause interference to the signals received or transmitted by those base stations.
- 13 turbines are located within 500 m of the western boundary of the reserve and may therefore have potential to interfere with signals transmitted or received by mobile units in this area.

Interference to mobile radio communications caused by signal reflection or scattering is greatest when the turbine is located between the transmitter and the receiver and re-transmits the signal onward to the receiver (called forward scatter) [5], and so signals from the Mt Helen base station are expected to be most susceptible to impacts. Signals that have been reflected or scattered from a turbine back towards the transmitting antenna (called backscatter) may potentially interfere with the direct signal at a receiver located between the transmitter and the turbine, but the impacts are usually expected to be less significant than for forward scatter interference. Although Figure 1 shows that the line of sight for signals from the Mt Helen base station to most parts of the reserve within 500 m of the proposed turbine locations is obstructed by terrain, Figure 2 suggests that these areas may be able to receive a less-obstructed alternative signal from the Mt Barrington or Mt Myra base stations. Therefore, the overall potential for turbines at the Project to interfere with the NPWS mobile radio system through reflection or scattering of the signals may be low.

Interference caused by electromagnetic emissions from wind turbines

Electromagnetic emissions produced by electrical equipment such as wind turbines include both electromagnetic fields (EMF) and electromagnetic radiation (EMR). These emissions theoretically have the potential to interfere with radiocommunications equipment or other forms of electronic circuitry. However, given the nature of modern wind farm and wind turbine design, it is considered very unlikely that electromagnetic emissions from the Project will cause interference to NPWS radiocommunications.

Electromagnetic fields and electromagnetic radiation

EMF is a physical field produced by a moving electric charge that consists of both an electric field component and a magnetic field component. The strength of the electric field is proportional to the voltage of the EMF source, while the strength of the magnetic field is proportional to the current. Both the electric field strength and the magnetic field strength decrease rapidly as the distance from the source increases. Electric fields are effectively shielded by earthed conductive materials, and to a lesser extent by other opaque objects, but magnetic fields are able to pass through most common materials without attenuation. However, for both electric and magnetic fields, the presence of an opposing field of equal magnitude will act to cancel the original field and produce a net field strength of zero. In practice, this can be achieved by using adjacent wires carrying electricity with opposing voltages or phases and opposing currents. EMF associated with the generation, distribution, and use of electricity is classified as extremely low frequency (ELF) EMF.

EMR describes the propagation of electric and magnetic energy through space, far from the original source, in the form of electromagnetic waves. All electrical equipment produces EMR, although the amount of power radiated depends on the characteristics of the source. For some equipment, such as transmitting antennas used in telecommunication systems, EMR is intentional and necessary for the operation of that equipment. In most cases, however, EMR is an undesired effect and is limited by design to comply with mandatory standards. The power radiated by transmission lines, wiring, and many other electrical components operating normally at 50 Hz is so small that these sources are not typically classified as radiating systems.

Potential impacts of electromagnetic emissions from turbines

Modern wind turbines are typically designed, constructed, and operated in accordance with international and local standards and accepted industry practices, which limit both EMF and EMR. IEC standard 61400-1 for wind turbine design cites several other standards that are relevant to the electromagnetic compatibility (EMC) of wind turbines, including both immunity to and emission of EMR [8]. With respect to electromagnetic emissions, wind turbines certified to IEC standard 61400-1 must comply with the requirements of IEC standard 61000-6-4, which are intended "*to ensure that disturbances generated by apparatus operating normally... do not exceed a level that could prevent other apparatus from operating as intended*" [9]. Wind turbines also contain sensitive electronic components that may themselves be affected by electromagnetic emissions, which provides further incentive for turbine manufacturers to control EMF and EMR at the source.

EMF strengths associated with wind farms are generally considered low. The electric fields produced by cabling in the tower of a wind turbine will be shielded by the tower itself, which is earthed, but electric fields produced in the nacelle may not be completely shielded. However, voltages used in the nacelle are typically low, which corresponds to low electric field strengths. Additionally, the cables for the three phases of power are located in close proximity and balanced such that the resulting electric fields will tend to cancel each other out, even when high voltages are used. Similarly, the use of adjacent wires carrying currents flowing in opposite directions causes the magnetic fields generated by those currents to cancel out. Other electrical components used in wind farms are typical of similar equipment used in other installations and do not pose a unique risk of EMF. Scientific studies have found that the EMF associated with operating wind farms is indistinguishable from background levels at distances of around 2 m to 3 m from the wind turbines [10, 11].

Common sources of EMR in wind turbines include switch mode power supplies, microprocessors, and variable speed drives. These types of components are widely used in other devices in homes, offices, and industrial environments, and are designed to meet standards that limit their emissions. In wind turbines, these components are typically housed inside metal panels, which absorb the emitted energy and provide a shielding effect, and are located within the wind turbine tower or other metallic components such as the hub, which provides further shielding.

Field measurements of EMR from operating wind turbines were conducted by DNV in 1992, in response to concerns regarding the potential EMI impacts of a proposed wind farm on nearby telecommunication systems [12]. Measurements were carried out at various locations relative to the turbines, and across all frequencies of interest for EMC purposes. The study found that EMR from the turbines was only detectable when the measurement equipment was located inside the wind turbine tower. These emissions were attributed to the switch mode power supplies within the turbine control unit. When measurements were taken outside the tower, with the tower door shut, no emissions were detected. These results demonstrated that, rather than amplifying electromagnetic emissions, the earthed tubular steel construction of the turbine tower behaves as a shield for both EMF and EMR. Although newer turbines contain additional components with the potential to cause EMR, EMC standards designed to control such emissions have also evolved, and it is expected that the conclusions of this study will be broadly applicable to any wind turbine with a tubular steel tower whose components are built to the applicable standards. In a more recent study into the potential EMI impacts of a proposed wind farm on a radar test facility, theoretical calculations predicted that the electromagnetic emissions from 191 turbines at a distance of 3 miles (4.8 km) would be considerably less than the limits specified by IEC 61000-6-4 [9], even under worst case conditions, and that the emissions from an individual turbine would be almost undetectable in practice [13].



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Despite the large numbers of wind turbines currently installed, DNV is not aware of any cases where EMI impacts have been caused by electromagnetic emissions from wind farms. Given that wind turbines are typically constructed in accordance with standards that are recognised EMC regulations in Australia, and the nature of turbine design means that any emissions are likely to be counteracted or shielded, DNV considers it unlikely that electromagnetic emissions from the Project will have an adverse effect on NPWS radiocommunications in the Ben Halls Gap Nature Reserve and surrounding area.

POTENTIAL MITIGATION OPTIONS IF INTERFERENCE IS EXPERIENCED

DNV understands that the Proponent has committed to undertaking pre-construction measurements of the existing mobile radio signal coverage in the Ben Halls Gap Nature Reserve in cooperation with the NPWS. These measurements may be conducted as part of the NPWS's preparations for transitioning their radiocommunications to the GRN, or may be instigated by the Proponent. Corresponding measurements can then be taken once the Project is constructed and operational, to determine whether the Project has a material adverse impact on the performance of the mobile radio system.

If it is found that the Project does cause material interference to the mobile radio system used by the NPWS, DNV understands that the Proponent has committed to implementing mitigation to return the system performance to at least pre-construction levels. Appropriate mitigation options would need to be identified in consultation with the NPWS, depending on the nature of the interference and the aspects of the system that are affected, but may include:

- providing higher powered hand-held and vehicle-based mobile units
- increasing the signal strength from the affected base station or an alternative base station
- installing a signal repeater or additional base station at an appropriate location.

If an additional base station or repeater is required to resolve issues, it may be possible for this to be installed at the Project site on infrastructure already associated with the Project such as a meteorological mast used for power performance measurements.

Sincerely
for DNV Australia Pty Limited

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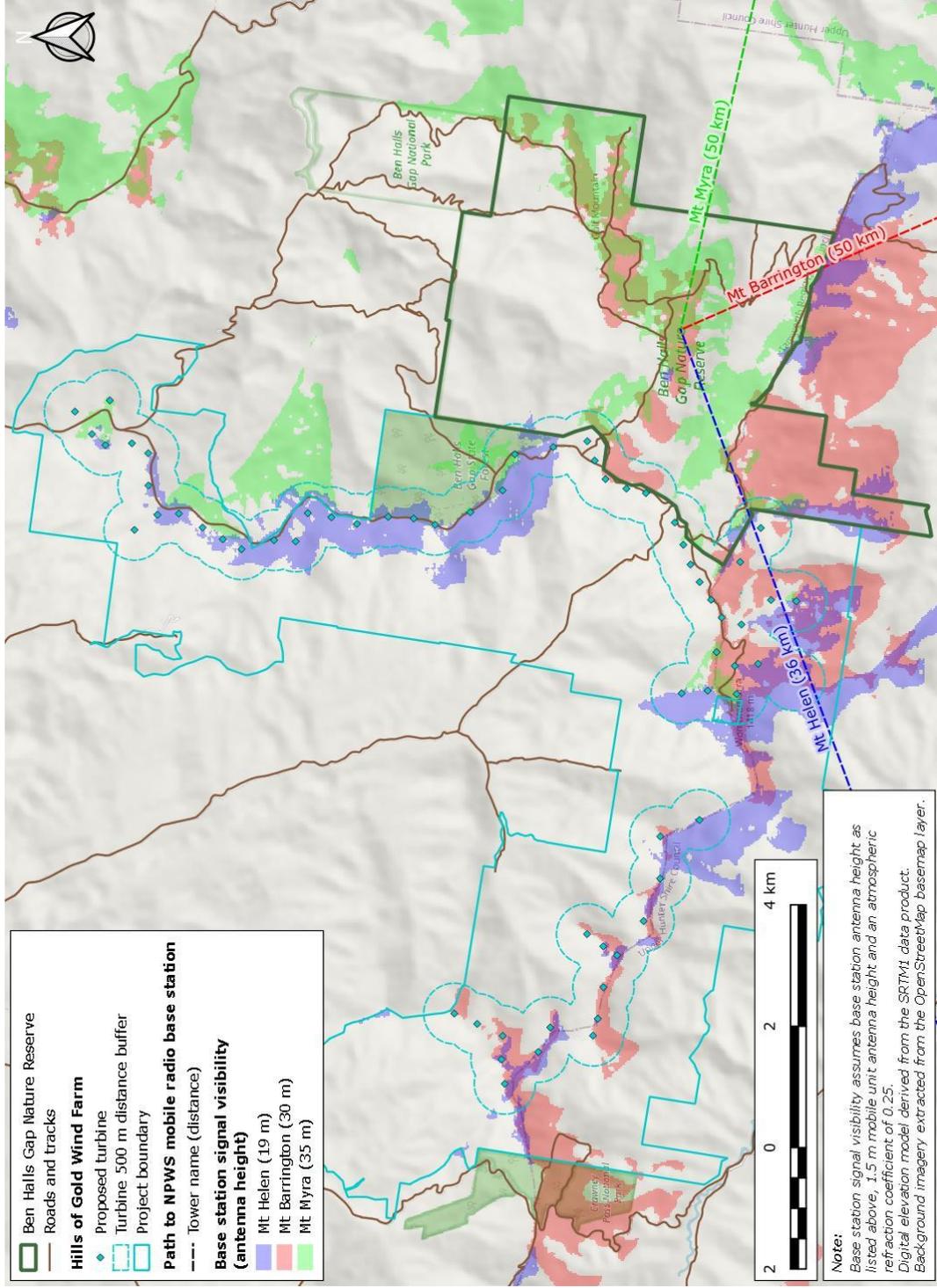


Figure 1 Map showing the relative locations of the Project, Ben Halls Gap Nature Reserve, and NPWS mobile radio base stations, and the areas with an unobstructed signal line of sight to and from each base station

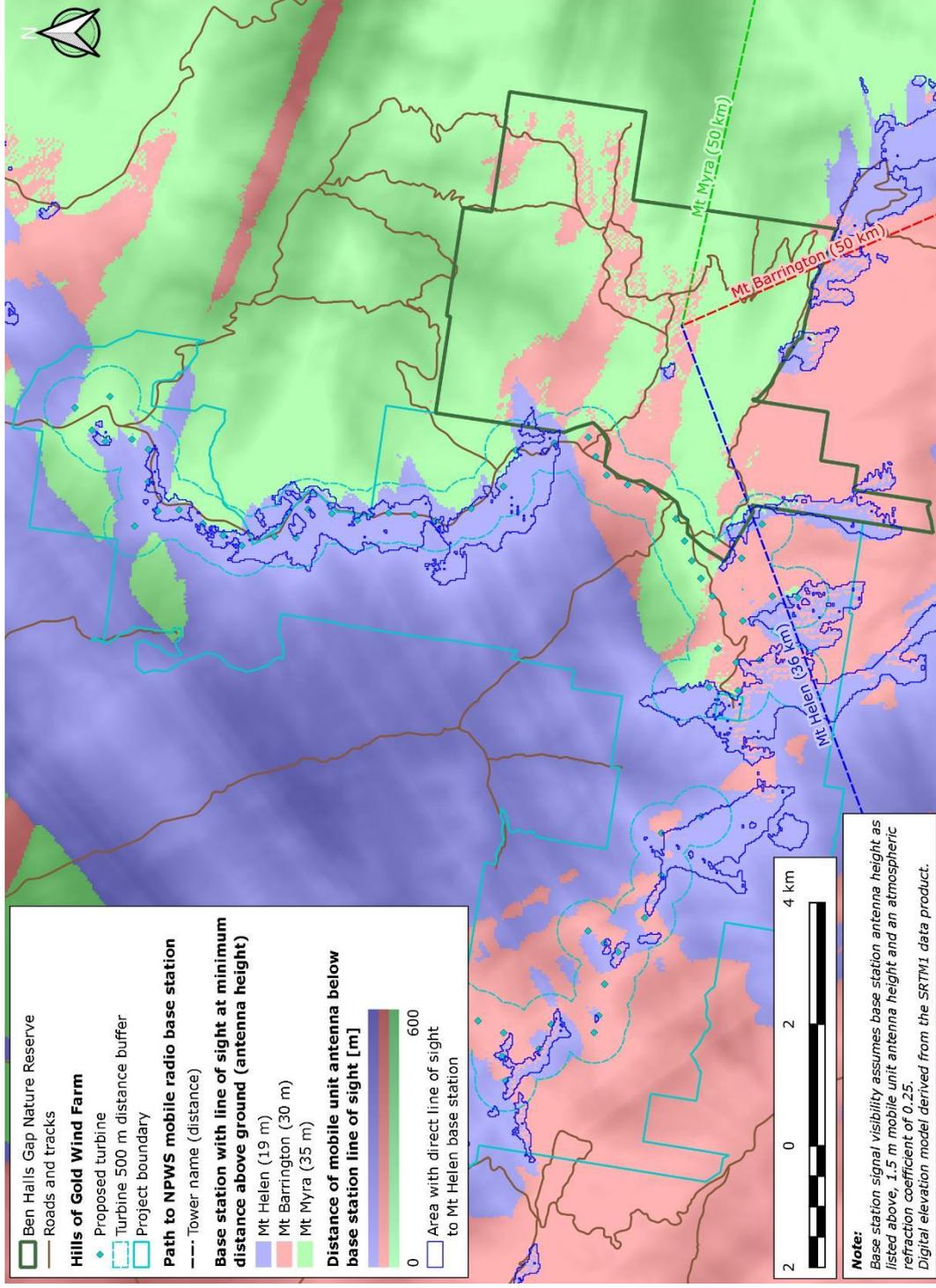


Figure 2 Map of the area around the Project and the Ben Halls Gap Nature Reserve, showing the NPWS mobile radio base station with direct signal line of sight at the minimum distance above ground at each location

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APPENDIX G UPDATED MITIGATION AND MANAGEMENT MEASURES

G1. UPDATED MITIGATION AND MANAGEMENT MEASURES

Environmental Aspect	Mitigation Measure	Responsibility	Stage
General	<ul style="list-style-type: none"> ■ The Project will be designed and constructed in a manner as to minimise or mitigate harm to the environment as a result of the Project construction, operation or decommissioning through the implementation of all reasonable and feasible mitigation measures. 	Proponent and Construction Contractor	Construction, Operation and Decommissioning
	<p><u>Environmental Management Strategy</u></p> <p>An Environmental Management Strategy (EMS) will be developed to guide proposed activities associated with the construction, operation and decommissioning and rehabilitation of the Project. The EMS will:</p> <ul style="list-style-type: none"> ■ Provide the strategic framework for environmental management of the Project; ■ Identify statutory approvals required to be obtained for the Project; ■ Define the roles, responsibilities, authority and accountability of all key personnel involved in environmental management for the Project; ■ Describe stakeholder and community engagement measures to be implemented, including: <ul style="list-style-type: none"> - measures to inform the local community and relevant stakeholder regarding the environmental performance of the Project; - procedures for the receipt handling, response and recoding of complaints; - dispute resolution procedures; - non-compliance response procedures; and - and emergency response procedures; ■ Include management plans as detailed below; and ■ Include a plan depicting any monitoring to be carried out. 	Proponent and Construction Contractor	Construction, Operation and Decommissioning
Biodiversity	<p><u>Biodiversity Management Plan</u></p> <p>A Biodiversity Management Plan will be prepared for the Project, in consultation with BCS and for approval by DPE, including an unexpected finds procedure. The procedure will describe the process for identifying, dealing with, and managing any unexpected threatened flora species found during the construction process. The Biodiversity Management Plan will include:</p> <ul style="list-style-type: none"> ■ A Biodiversity Offset Strategy that will be prepared and implemented in accordance with the requirements of the BC Act and the EPBC Act Offsets Policy; ■ A Bird and Bat Adaptive Management Plan (BBAMP) that will be prepared for the Project in consultation with BCS and for approval by DPE prior to the commissioning of any WTGs (detailed further below); and 	Proponent and Construction Contractor	Construction, Operation and Decommissioning

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ A Weed Management Plan will be prepared and implemented as part of the EMS to implement weed control and weed disposal in accordance with Biosecurity protocols. <p>As identified in the BDAR and RTS, other matters that will be incorporated into the Biodiversity Management Plan include:</p> <ul style="list-style-type: none"> ■ Weed management and frog hygiene requirements in consultation with NPWS and EES; ■ Plans for the Development Footprint and adjoining area showing updated and current extent of native vegetation, flora and fauna habitat, threatened species and threatened ecological communities and measures to minimise impacts to these features; ■ Plans showing areas to be cleared and areas to be protected, including exclusion zones and protected habitat features, and areas for native vegetation rehabilitation or re-establishment. This will be key to minimising impacts to Koala and Spotted-tailed Quoll; ■ Mapping and identification of individual tree hollows and termite mounds and measures to minimise impacts to these features; ■ Protocols for communicating biodiversity features to the design team during any turbine micro-siting and design refinements to minimise and avoid impacts; ■ Pre-clearing protocols, including pre-clearing inspections, establishment of exclusion zones and on-ground identification of specific habitat features to be retained and/ or relocated; ■ Vegetation clearing protocols, including staged habitat removal (including of Wombats, Koalas, and other fauna) and any specified seasonal limits on clearing activities; ■ Protocols for the salvage and relocation of woody debris, tree hollows and bush rock; ■ Requirements for temporary fencing to minimise the risk of fauna injury / mortality due to vehicle strike or entrapment in deep excavations; ■ Proposed temporary measures for maintaining habitat connectivity for Koala and other fauna during construction; ■ Fauna handling and unexpected threatened species finds procedures; ■ Rehabilitation, revegetation, reuse of soils and other habitat management actions; ■ Weed, pest and pathogen management requirements; ■ Monitoring during construction and post-construction; and ■ Adaptive management measures to be applied if monitoring indicates unexpected adverse impacts. 		
	<p><u>Biodiversity mitigation measures for the Project include:</u></p> <ul style="list-style-type: none"> ■ The Proponent will implement reasonable and feasible measures to further minimise the clearing of native vegetation within the Development Footprint; 	Proponent and Construction Contractor	Pre-construction, Construction, Operation and Decommissioning

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ A pre-construction clearing survey is to be carried out to confirm the presence/absence of threatened flora within lands that have not been surveyed within and adjacent to the Development Footprint to ensure compliance with worst case assessment undertaken; ■ Continuing to assess biodiversity impacts on detailed final design; and ■ Rehabilitation of all areas subject to temporary clearing within the Development Footprint. 		
	<p><u>Impacts to native vegetation, threatened ecological communities and habitat for threatened species</u> ID: B5 Project Component: Entire development footprint</p> <ul style="list-style-type: none"> ■ Opportunities to further minimise impacts to native vegetation will continue to be explored during the detailed design. This will include measures to minimise the construction footprint and clearing requirements with a particular focus on the protection of hollow bearing trees and fauna movement corridors. <p>Upon final design and an understanding of detailed impact, a Biodiversity Management Plan would be prepared and implemented. The Biodiversity Management Plan will address terrestrial and aquatic matters by including:</p> <ul style="list-style-type: none"> ■ Plans for the development footprint and adjoining area showing updated and current extents of native vegetation, flora and fauna habitat, threatened species and threatened ecological communities and measures to minimise impacts to these features; ■ Plans showing areas to be cleared and areas to be protected, including exclusion zones and protected habitat features, and areas for native vegetation rehabilitation or re-establishment. This will be key to minimising impacts to Koala and Spotted-tailed Quoll; ■ Mapping and identification of individual tree hollows and termite mounds and measures to minimise impacts to these features; ■ Protocols for communicating biodiversity features to the design team during any turbine micro-siting and design refinements to minimise and avoid impacts; ■ Pre-clearing protocols, including pre-clearing inspections, establishment of exclusion zones and on-ground identification of specific habitat features to be retained and/ or relocated; ■ Vegetation clearing protocols, including staged habitat removal (including of wombats, Koala, and other fauna) and any specified seasonal limits on clearing activities; ■ Maintaining areas of habitat connectivity for as long as is practicable through or around the construction area; ■ Maintaining isolated paddock trees within the development footprint where possible to provide refuge to locally occurring fauna species (incl. Koala); 	<p>Construction Contractor</p>	<p>Pre-construction / construction</p>

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ Protocols for the salvage and relocation of woody debris, tree hollows and bush rock; ■ Requirements for temporary deterrent fencing, signage and/or requirements to modify driver behaviour and regular visual inspections to minimise the risk of fauna injury / mortality (particularly Koala and Spotted Tailed Quoll) due to vehicle strike or entrapment in deep excavations, with details to be developed during the preparation of the BMP; ■ Opportunity for egress to any species that may become trapped in any open excavation in the form of graded exits or tools to support climbing out; ■ Fauna handling and unexpected threatened species finds procedures; ■ Procedures detailing the management of pathogens such as chytrid fungus; ■ Rehabilitation, revegetation, reuse of soils and other habitat management actions; ■ Limit construction and operational traffic speed limits to minimise the potential for vehicle strike, and include sufficient signage on potential presence of threatened fauna species; ■ Ensure construction and operation personnel are educated on the presence of fauna such as Koala and Spotted-tailed Quoll in the locality, how to manage potential interactions, and to be aware of the potential for vehicle strikes when driving through the sites (particularly after dark); ■ Weed, pest and pathogen management requirements; ■ Monitoring during construction and post-construction; ■ Adaptive management measures to be applied if monitoring indicates unexpected adverse impacts; and ■ Establishment of Biodiversity Stewardship sites on neighbouring properties. <p>Operational measures to minimise the ongoing impact of the project to threatened fauna will be implemented as part of an operational component of the Biodiversity Management Plan, and will include:</p> <ul style="list-style-type: none"> ■ Revegetation with Koala feed tree species where appropriate; ■ Design of operational fencing layout to ensure fauna (incl Koala and Spotted-tailed Quoll) can continue to move through the landscape, and if they enter the wind farm are able to self-relocate back into surrounding landscape by providing egress opportunities. Ensure fauna are prevented from accessing higher traffic areas or other potentially hazardous area, and are funnelled towards areas of potential habitat rather than towards the operational wind farm, or into dead-ends and bottle-necks; ■ Installation of glider poles for glider species in areas where the width of the transmission line easement exceeds minimum requirements for species movement; and ■ Establishment of Biodiversity Stewardship sites on neighbouring properties. 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p><u>Impacts to National Park estate</u> ID: B9 Project component: Wind farm corridor An appropriate buffer will be maintained to National Park estate where practicable. Implementing vegetated buffers between the access tracks and wind turbine pads and the National Park estate is to be considered during detailed design. The selection of areas of buffer plantings and species to be planted will be carried out in consultation with the Area Manager, Barrington Tops National Parks and Wildlife Service. The Erosion and Sediment Control Plan will include specific actions to identify sensitive receptors associated with the National Park estate, including waterways and the adjacent Sphagnum Moss TEC. The bushfire strategy developed for the development will include measures to minimise risk of bushfire to the Sphagnum Moss TEC and includes:</p> <ul style="list-style-type: none"> ■ Increase the accessibility of the ridgeline to fire fighters and improve strategic fire advantages that already exist; ■ Access to water will be maintained such that existing water resources will remain available at all times to support firefighting activities; ■ Extension of the strategic fire zone from BHGNR; ■ Upgrades to the access road network to RFS fire trail standards; and <p>Increased water storage.</p>	Proponent	Pre-construction
	<p><u>Disturbance from weeds, pests and pathogens</u> ID: B11 Management measures would be prepared and implemented to avoid and minimise the environmental risks associated with weeds, pests and pathogens. As a minimum, these would include:</p> <ul style="list-style-type: none"> ■ Completion of a site weed assessment and development of a Weed Management Plan, as a sub-plan to the EMS; ■ Implementation of appropriate weed control and weed disposal in accordance with Biosecurity protocols; ■ Any soil or other materials imported to the site for use in restoration or rehabilitation would be certified free from weeds and pathogens or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks; ■ Appropriate disposal of any weed material; ■ Implementation of appropriate hygiene protocols where there are potential or known pathogen risks including procedures detailing the management of pathogens such as chytrid fungus; 	Proponent and Construction Contractor	Construction, Operation and Decommissioning

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ Commitment to ongoing consultation and participation with NPWS and LLS on their annual vertebrate pest baiting programs including a financial contribution capped at \$5k per annum to cover any additional costs of aerial baiting programs as a result of rotary aircraft (as opposed to fixed wing) being required to improve safe operating practice; and ■ Encouraging landowners adjoining the BHGNR to coordinate baiting programs to improve the effectiveness of ground-based strategies. 		
	<p><u>Impacts of wind turbine strikes on protected animals</u> ID: B13 Project Component: Wind farm corridor</p> <p>Operational management measures specific to the wind turbines will be implemented. These are described in Section 8.9.1 of the updated BDAR in Appendix D of the RTS.</p> <p>Bird and bat activity within the site is generally concentrated around areas of vegetation. A minimum safe distance of 30 m will be maintained from the turbine blade tip to the adjacent tree canopy to minimise any risk of bird or bat strike.</p> <p>Additional surveys for large forest owls (equating to that required for a 90% probability of detection) will be conducted, or an expert report be obtained, to confirm the presence or absence of large forest owls.</p>	Pre-construction, post-construction	Proponent
	<p><u>Impacts to water quality and hydrology</u> ID: B16 Project Component: Entire development footprint</p> <p>The Biodiversity Management Plan will include:</p> <ul style="list-style-type: none"> ■ Measures for the management and monitoring of surface water quality and hydrology during construction, as applicable to the protection of biodiversity values; ■ Any requirements for the management of potential acid sulphate soils or contaminated lands during construction so as to minimise impacts to terrestrial and aquatic habitats; and ■ Construction surface water quality monitoring to minimise impacts to surface water quality including to prevent indirect impacts to waterways potentially supporting Booroolong Frog surrounding the development footprint, waterways that traverse the National Park estate and the location of the Sphagnum Moss TEC in Ben Halls Gap Nature Reserve. 	Construction and operation	Contractor/Proponent
	<p><u>Fauna injury / mortality</u> ID: B19 Project Component: Entire development footprint</p>	Construction	Contractor

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>The Biodiversity Management Plan will include the following to minimise and manage any risk of fauna injury mortality during construction:</p> <ul style="list-style-type: none"> ■ Strategies for fauna management during construction including any identification roles, responsibilities and contingency measures such as temporary stop works and engagement of fauna specialist; ■ Requirements for temporary deterrent fencing, signage and/or requirements to modify driver behaviour and regular visual inspections to minimise the risk of fauna injury / mortality (particularly Koala and Spotted Tailed Quoll) due to vehicle strike or entrapment in deep excavations, with details to be developed during the preparation of the BMP; ■ Opportunity for egress to any species that may become trapped in any open excavation in the form of graded exits or tools to support climbing out; and ■ Pre-clearing protocols, including pre-clearing inspections, establishment of exclusion zones and on-ground identification of specific habitat features to be retained and/ or relocated. <p>For example, occupation surveys for wombat burrows, application of exclusion measures / deterrents prior to vegetation clearing / earthworks, works undertaken in presence of spotter / catcher.</p> <ul style="list-style-type: none"> ■ Protocols for fauna handling and management of adverse incidents; and ■ Fauna monitoring and management protocol including identification and reporting of fauna mortalities to the relevant Biodiversity Conservation Division office. 		
	<p><u>Impacts to habitat connectivity</u> ID: B20 Project Component: Entire development footprint</p> <p>The following opportunities will be fully explored as a part of the detailed design:</p> <ul style="list-style-type: none"> ■ Opportunities to further minimise the disturbance footprint and clearing within important movement corridors for fauna; ■ Opportunities for post-works restoration of habitat connectivity within important movement corridors for fauna; ■ Areas subject to temporary disturbance will be rehabilitated using a native species planting schedule as much as practical considering any operational and safety constraints; and ■ The total area exposed and cleared at any one time will be minimised and planned to allow for fauna movement during construction and periods of temporary disturbance. 	Proponent	Pre-construction
	<p><u>Impacts to habitat connectivity</u> ID: B21</p>	Proponent	Post-construction

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>Project Component: Transmission line</p> <p>The following measures be implemented post-construction to minimise impacts to flora and fauna within the transmission line easement:</p> <ul style="list-style-type: none"> ■ Promotion of the growth of vegetation under the transmission line to the maximum allowable height to maintain habitat connectivity for fauna; ■ Management of understorey vegetation in easements to maintain composition and quality and to prevent weed invasion; and ■ Installation of glider poles for glider species in areas where the width of the transmission line easement exceeds minimum requirements for species movement. 		
	<p><u>Operational turbine specific mitigation measures</u></p> <ul style="list-style-type: none"> ■ Mitigation measures for all turbines to ensure impacts associated with bird and bat blade strike are minimised: <ul style="list-style-type: none"> – development of a Bird and Bat Adaptive Management Plan (BBAMP) in conjunction with BCS to be implemented throughout life of Project; – intensive monitoring period for the first six months of operation to be outlined in the BBAMP, followed by regular bird and bat monitoring/mortality surveys for the life of the wind farm at frequencies based on the findings of each survey period and adaptive management strategy detailed in the BBAMP. The use of detection dogs during carcass surveys will be investigated and employed if found to be suitable and appropriate; – investigation into the need for, and effectiveness of, appropriate low wind speed operational curtailment strategies, that may include measures such as prevention of blade rotation prior to electricity generation cut-in speeds, and/or increased night time cut-in speeds; – research into the bat and bird deterrent systems and associated reduction of impacts, to establish whether implementation at the Project would be effective and practicable with the goal of integrating into BBAMP for re-evaluating turbine risk levels if proven effective; – regular ongoing maintenance of rotor blades to improve ultrasonic bounce-back enabling microbat avoidance; – installation of lighting schemes that minimise insect attraction to turbines within rotor swept height; – commitment to provision of data from ongoing bird and bat monitoring surveys and effectiveness of BBAMP to specialist research entities who are prepared to enter into appropriate agreements with the Project; and – frequency of bird and bat monitoring/mortality surveys will be developed in consultation with, and in accordance with, any BCS requirements, as part of the 	<p>Proponent and Construction Contractor</p>	<p>Operation</p>

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>preparation and development of the BBAMP. Ongoing and potential timing amendments to monitoring will include inspections and reporting continued for the life of the wind farm, at intervals determined by the results of previous monitoring and in accordance with the BBAMP;</p> <ul style="list-style-type: none"> ■ Turbines proximal to microbat roosting/breeding habitat - WP50: <ul style="list-style-type: none"> - disturbance to roosting microbats as a result of ground vibration during breeding season (November to February) or winter torpor season (May to September) will be avoided and minimised as far as practicable; - additional low wind speed seasonal curtailment strategy with increased night-time cut-in speeds will be implemented; and - increased frequencies of bird and bat monitoring/mortality surveys for at least months 7-30 of operation. Following which, the results will determine the frequency with which surveys will be ongoing and detailed in the BBAMP; ■ Additional mitigation measures for moderate risk turbines: <ul style="list-style-type: none"> - increased frequencies of bird and bat monitoring/mortality surveys for at least months 7-18 of operation. Following which the results will determine the frequency with which surveys will be ongoing, and the requirement of any adaptive management strategies; and - potential implementation of seasonal low wind speed curtailment strategies dependent on the results of ongoing monitoring. 		
	<p>Bird and Bat Adaptive Management Plan <i>Note: These measures are subject to further development throughout the preparation of the BBAMP.</i></p> <p><u>General</u></p> <ul style="list-style-type: none"> ■ Ongoing reassessment of species risk levels and thus relevant trigger-levels. ■ Review of the monitoring program every two years. ■ Incorporate any operation mitigation measures developed during the preparation of the BMP relating to monitoring of relevant geological features at 'fly-out' times to determine if/where further mitigation may be warranted. ■ Encourage habitat use offsite through establishment of BSAs and associated habitat restoration in the area proximal (>200m) to the wind farm and likely to be utilised by the local population of birds and bats. ■ Minimising availability of raptor perches on infrastructure within close proximity to turbines and overhead powerlines. ■ Prompt animal carcass removal within the 200m of a turbine (within 24 hrs of discovery) to minimise raptor scavenging opportunities and reviewed annually. 	<p>Proponent and Construction Contractor</p>	<p>Construction, Operation and Decommissioning</p>

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ Participation on local (site based) and co-ordinated (LLS and NPWS) feral animal control programs, ie rabbits, wild dogs and foxes, and in line with carcass removal protocols. ■ Investigation of potential deterrents or evolving technologies, such as: <ul style="list-style-type: none"> - Avoiding or limiting the use of artificial lighting (synchronising flashing red light if required) on turbines and other infrastructure within close proximity to turbines; - Consider novel deterrent techniques related to blade visibility; - Ultrasonic technologies. - Consideration of radar (or optical sensor) or live camera technologies for automatic, reactive and temporary curtailment of turbines for moderate risk turbines, turbine cluster (WP 28-43) or as required (Tier 1 and Tier 2 alerts) adjacent to Ben Halls Gap Nature Reserve; - Use of 'acoustic lighthouse' to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour (as detailed in Boycott et al 2021). ■ Annual reporting to include triggers relating to the re-assessment of the mitigation strategy to be implemented over the following year of operation where tier 1 and/or tier 2 and 3 triggers have occurred <ul style="list-style-type: none"> - Additional triggers will be developed that consider the actual/extrapolated impacts to bird and bat species calculated across the preceding year, and include associated mitigation measures and potential additional offsets for the following year of operation. <p><u>Tier 1 Alert mitigation and response</u> Initiate rapid assessment framework for tier 1 alerts within the BBAMP to identify the most effective mitigation measures to be implemented, including but not limited to:</p> <ul style="list-style-type: none"> ■ Increased monitoring of a relevant turbine(s) for a seven day period following a tier 1 alert to determine a one off event, or a potential ongoing event. ■ Investigate the use of 'acoustic lighthouse' to deter avian activity by broadcasting, for example, audible frequencies of 4 – 6 kHz in front of turbine towers to encourage avoidance behaviour. ■ Consideration of mobile radar installation for a minimum 7 day period for automatic, reactive and temporary curtailment of turbines relating to a tier 1 alert for medium to large threatened and non-threatened at risk bird species. ■ In the case of at risk species or threatened species nesting within 200m of a turbine, the nesting event will be allowed to occur, with increased monitoring, potential for temporary curtailment in line with tier 2 and tier 3 recommendations until removal of the nest 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>following the breeding event can be undertaken. Any mitigation is to be consistent with Project approval conditions.</p> <p><u>Tier 2 and 3 mitigation and response</u> Initiate rapid assessment framework for tier 2 and tier 3 triggers within the BBAMP to identify the most effective mitigation measures to be implemented.</p> <ul style="list-style-type: none"> ■ Cease operation temporarily of a turbine(s) relevant to a trigger event during the rapid investigation. ■ Increased daily carcass searches for 14 days following discovery of a tier 2 or tier 3 trigger, to be undertaken within the subsequent four weeks of the trigger event by suitable trained ecologist, environmental advisor and/or detector dog services. <p>Pending an investigation into tier 2 and tier 3 impacts being detected, the following may be required in consultation with the Proponent, suitably qualified ecologists, wind farm subject matter experts and DPE:</p> <ul style="list-style-type: none"> ■ Temporary turbine shut down during periods of low visibility. ■ Low wind speed turbine curtailment, that being blades remain feathered and do not rotate during periods of the day and/or night when wind speeds are below either those at which turbines generate electricity, or can be shown to be conducive to higher levels of microbat activity, likely to be 0 to 4 meters per second, on a temporary or permanent basis. ■ Seasonal curtailment of individual turbines, for example at night during microbat breeding season ie between November and March. 		
Noise	<p><u>Noise Management Plan and Mitigation Measures</u> A Noise Management Plan will be prepared and implemented incorporating the mitigation and management measures outlined below:</p> <ul style="list-style-type: none"> ■ Construction works will be restricted to the hours between 7am and 6pm Monday to Friday, and between 8am and 1pm on Saturdays. No construction activities will be undertaken on Sundays or NSW public holidays; ■ Works carried outside of these hours will only entail: <ul style="list-style-type: none"> - works that do not cause noise emissions above 35 dB(A) at any nearby dwellings not located on the site; or - the delivery of materials as requested by Police or other authorities for safety reasons; or - emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or - works where the Proponent demonstrates and justifies a need to operate outside the recommended standard hours, in agreement with DPE; 	Proponent and Construction Contractor	Construction and Operation

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ If any other works are required outside of the specified hours, they will only be carried out with the prior consent of the relevant authority: <ul style="list-style-type: none"> - fixed noise sources, such as crushing and concrete batching plant, will be located at the maximum practicable distance to the nearest dwellings, and where practicable, use existing topography to block line of sight between the fixed noise source and the dwelling; - given the range of factors associated with both the generation and control of blasting, in the event that blasting is necessary, a monitoring regime will be implemented to ensure compliance with the blasting criteria detailed in the Noise and Vibration Impact Assessment; and - a curtailment regime will be implemented during Project operations in order to ensure the noise from the wind farm can practically achieve the noise criteria at all dwellings and under all wind speeds. The curtailment regime involves operating selected turbines in a noise reduced mode at the wind speeds where the predictions indicate that the criteria will be exceeded, as detailed in the NVIA; ■ An updated noise assessment will be provided for the final layout and turbine model, prior to construction. This final assessment will detail the noise levels at residences and the curtailment strategy (wind speeds directions and noise reduced mode for each turbine) to ensure the criteria are achieved. It will also incorporate a method of reporting to demonstrate that the modes have been implemented; and ■ Operational noise monitoring will be undertaken as required to confirm compliance with project noise limits at relevant receivers. 		
Landscape and Visual	<ul style="list-style-type: none"> ■ Screen Planting will be implemented where non-associated residences are subject to a high level of visual impact, as an option proposed to assist in mitigating views of turbines from residential properties. Where road upgrades are expected to require the removal of vegetation close to or on private property, the relevant landowners will also be offered suitable landscape screening to offset any increased visual exposure. In order to achieve visual screening planting between the intrusive element and the homestead, tree planting could be undertaken in consultation with the relevant landowners to ensure that desirable views are not inadvertently eroded or lost in the effort to mitigate views of the turbines; ■ In addition to the screen planting requirements contained in the LVIA (2020), the following items will be considered when undertaking screen planting: <ul style="list-style-type: none"> - screen planting to be undertaken post construction of the Project; - use of 50 / 75 litre tree stock to ensure plants establish; - plant evergreen tree species that reach a minimum height required to sufficiently screen turbines (tree species selection is to undertaken in discussion with the 	Proponent	Operation

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>landowner and local wholesale nursery and / or landscape contractor to suit local conditions); and</p> <ul style="list-style-type: none"> - provide tree trunk protection to prevent damage to plant stock due to animals; ■ Supplementary Planting will be implemented where turbines are located close to the non-associated dwelling or where existing intervening vegetation is thin (particularly for areas surrounding the Project Area to the north along Morrisons Gap Road). Supplementary planting in keeping with the existing landscape character would further reduce potential visibility and ensure longevity of the intervening vegetation; ■ The Proponent will apply visual screening measures for any associated dwellings through agreement with the relevant owner(s) of associated residences; ■ Where possible a recessive colour palette is to be used for associated infrastructure which blends into the existing landscape, including the use of subtle colours and a low reflectivity surface treatment on power poles to ensure that glint is minimised; ■ The turbines will have a matte white finish and consist of three blades which is consistent with the current turbine models being considered; and ■ Avoid the use of any unnecessary lighting, signage on fences, logos etc. 		
	<p><u>Night lighting</u></p> <p>The following principles will be incorporated into lighting design during the detailed design phase of the switching station, substation, O&M Facility and any other structures requiring lighting. If design principles are incorporated into the night lighting for Ancillary Infrastructure, it is likely there will be no visual impacts resulting from night lighting of Ancillary Structures.</p> <ul style="list-style-type: none"> ■ Control the level of lighting: <ul style="list-style-type: none"> - only use lighting for areas that require lighting ie. paths, building entry points; - reduce the duration of lighting - consider the use of sensors to activate lighting and timers to switch off lighting; and - switch off lighting when not required; ■ Lighting design: <ul style="list-style-type: none"> - use the lowest intensity required for the job; - use energy efficient bulbs and warm colours; - direct light downwards; - ensure lights are not directed at reflective surfaces; - use non-reflective dark coloured surfaces to reduce reflection of lighting; - keep lights close to the ground and / or directed downward; and - use light shield fittings to avoid light spill; 	Proponent	Pre-construction, Operation

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ The O&M Building and any other structures are to be painted in a dark, non-reflective paint to reduce reflectivity from lighting and remain sympathetic to the surrounding landscape; and ■ Aviation night lighting: <ul style="list-style-type: none"> - If aviation night lighting is required by the Planning Authority, - lighting of the 28 turbines with low intensity 200 candela lights in accordance with the night lighting plan accepted by CASA; - operation of night lights only when notified to be required by CASA; and - installation of night lighting shields. 		
Traffic	<p>Traffic Management Plan and mitigation measures</p> <p>A detailed Traffic Management Plan will be prepared prior to construction in consultation with Transport for NSW, Tamworth Regional Council, and other relevant roads authorities associated with the Project, to the satisfaction of the Secretary of DPE. The Traffic Management Plan will incorporate management and mitigation measures for construction of the Project to minimise traffic safety impacts of the Project and disruptions to local road users during construction. This will include, but is not limited to:</p> <ul style="list-style-type: none"> ■ temporary traffic controls, noise considerations and speed limits; ■ community notification; ■ Emergency Response Plan in consultation with the local emergency services; ■ a driver's code of conduct that addresses: <ul style="list-style-type: none"> - travelling speed; - procedures to ensure drivers to and from the development implement safe driving practices and adhere to designated transport routes; - parking restrictions; - in-vehicle monitoring system (IVMS) to vehicles travelling to and from site; ■ operational traffic management; and ■ a detailed program to monitor and report on the effectiveness of these measures and the code of conduct. <p><u>Implementation of carpooling for the construction workforce</u></p> <ul style="list-style-type: none"> ■ Carpooling is expected to be an effective way of reducing traffic for this Project given that most workers are forecast to be travelling from Tamworth to the Project Area where there are common origins and destinations, and the distances make it financially beneficial. <p><u>Dedicated construction carpark:</u></p>	Proponent and Construction Contractor	Construction, Operation and Decommissioning

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ The Proponent will create a dedicated construction staff carpark immediately outside the Nundle town centre, in consultation with Tamworth Regional Council. This will enable the introduction of the proposed temporary parking restrictions without reducing the benefits of accessing local content for the Project. This carpark could also assist the introduction of a shuttle service for peak hour "last mile" site access to reduce traffic through Nundle, on Barry Road and Morrison's Gap Road, if practicable; and ■ The location of this carpark is proposed to be within walking distance to the village of Nundle to ensure the township benefits from increased demand for local content services. 		
	<p><u>Voluntary temporary parking restrictions</u></p> <ul style="list-style-type: none"> ■ In the Traffic Management Plan a Code of Conduct will include temporary parking restrictions for construction workers on streets within Nundle providing key services to tourists and local residents in order to preserve the current amenity; ■ The location of these restrictions will be determined in consultation with the Nundle Business and Tourism Marketing Group and Tamworth Regional Council, but should consider the services accessed by tourists and local community on Jenkins Street; and ■ The nominal times for parking restrictions in these locations will be 8:00am to 5:00pm Monday to Friday, subject to further consultation. 		
	<p><u>Minimising conflict with school buses routes and times</u></p> <ul style="list-style-type: none"> ■ Special consideration will be given to travelling outside school peaks where practicable. This will be for the route through Nundle and the Muswellbrook route that travels adjacent to Muswellbrook High School as well as identified school bus routes to be confirmed in the Traffic Management Plan; and ■ Nominally the hours to be avoided for heavy vehicles in these areas are 8:00am to 9:30am and 2:30pm to 4:00pm. 		
	<p><u>Use and introduction of additional laybys to minimise disruption to local traffic</u></p> <ul style="list-style-type: none"> ■ Additional laybys, one along Lindsay Gap Road and another on Morrisons Gap Road, to make a total of five proposed laybys on the transport route for the Project, have been proposed to allow for passing of slower OSOM movements; and ■ Consultation with Nundle Business and Tourism Marketing Group raised concerns impacting tourist traffic entering Nundle. These measures should support reduced impact. 		
	<p><u>Ensuring road and pedestrian safety</u></p> <ul style="list-style-type: none"> ■ Within Nundle, the Proponent will provide a pedestrian crossing on the corner of Oakenville Street and Jenkins Street, subject to further consultation with and approval from Tamworth Regional Council. It is noted that there are existing pedestrian refuges at 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>this location and a pedestrian crossing at this location will not meet the normal TfNSW warrants required for pedestrian crossings;</p> <ul style="list-style-type: none"> ■ Vehicle escorts will be provided for all permanent residents during significant construction activities such as concrete pours along Morrisons Gap and Barry roads; ■ Local resident call up protocols for all heavy vehicles entering Morrisons Gap Road will be prepared; and ■ A project vehicle speed limit will be implemented along Morrisons Gap Road for OSOM traffic and In-Vehicle Monitoring system (IVMS) of project vehicles traveling to and from site to monitor speed. <p><u>Public road modifications and dilapidation</u></p> <ul style="list-style-type: none"> ■ An extensive list of public road modifications are proposed as part of the Project in the RJA Transport Route Assessment (Appendix I). These have also been summarised in Table 6.1 of the Traffic and Transport Addendum (Appendix H); ■ Road modifications will be undertaken to ensure sufficient space for oversized vehicles passage, including intersection widening, trimming and removal of vegetation, removable signs and infrastructure, and the relocation of overhead wires; ■ Any assets that the Proponent determines need upgrading as part of the Project, will be upgraded in accordance with the Austroads design requirements. Dilapidation surveys, road usage fees, and/or performance bonds for remedial works have been offered by the Proponent through Offer Letters sent to Tamworth Regional Council and Muswellbrook Shire Council; ■ Further minor road upgrades are also proposed in Muswellbrook LGA based on selection of the final preferred route as outlined in the updated TTPP report (Appendix H). All works are expected to be carried out within the current width of the road reserve and will not require any additional clearing. A revised Letter of Offer relating to the use of council roads and assets for the Project is provided in Appendix F of the TIA Addendum (Appendix H), and is also detailed in Appendix G of the Submissions Report; ■ The Proponent will conduct further assessment of Muswellbrook Shire Council owned road assets as based on final equipment dimensions and transport contractor selection. Structural assessments will be undertaken as required, and further consultation with Muswellbrook Shire Council will occur in this regard; ■ Any removal of signage, repositioning of light poles and temporary changes along the OSOM route and damage caused as a direct result of the OSOM movements will be made good as agreed with the local authority. A dilapidation survey will be undertaken along the route prior to and at completion of OSOM movements; ■ Dilapidation reports covering the pavement, drainage and bridge structures will be undertaken in consultation with TfNSW and local Councils for the proposed transport 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>routes before and after construction. Regular inspections and consultation with local Councils and the Proponent will be carried out;</p> <ul style="list-style-type: none"> ■ The Proponent will seal Morrisons Gap Road following the completion of construction and deploy dust suppression measures such as polymers to prevent dust generation from traffic traveling to or from the Project Area during construction; ■ A rumble grid will be used to shake dust off vehicles. A rumble grid may also be implemented with Forestry subject to further consultation. Onsite dust suppression using water trucks will be carried out, and vehicles may also be washed down on exit of site if required; ■ The Proponent will repair or pay the costs of any damage to public infrastructure caused by the Project where required; ■ The Proponent will: <ul style="list-style-type: none"> – undertake a utilities search as part of detailed design for the project after the transport and logistics contractor is engaged and the turbine technology is selected; – take steps to avoid impacts to City of Newcastle’s stormwater infrastructure as much as practicable; – undertake a site inspection with the City of Newcastle’s engineers prior to any works being undertaken on public roads in the Newcastle LGA; – obtain Section 138 permits from the relevant Road Authority for any road modifications required on public roads, as necessary; and – provide 48 hrs notice to the relevant Road Authority prior to any works being undertaken on public roads; ■ The Proponent will provide an electronic copy of a dilapidation report prepared by a suitably qualified person for both pre and post works to be submitted to City of Newcastle prior to the commencement of any works on City of Newcastle’s public roads, unless otherwise agreed with City of Newcastle; ■ The Proponent will construct hardstand where boundary fencing is being relocated between TfNSW and City of Newcastle land; ■ The proposed hardstands will not involve any changes to the line marking on the road so that the existing arrangement of travel lanes remains the same. Where roads are significantly widened and do not possess edge lines, edge/centre lines will be provided; ■ No Stopping restrictions will be provided along the proposed hardstands to prevent vehicle parking on these areas for the duration of their required use; and ■ For removable / sleeved signposts security head bolts will be used to affix posts. <p><u>Traffic management system for managing OSOM vehicles</u></p> <ul style="list-style-type: none"> ■ The Traffic Management Plan will include a requirement to provide escorts for the majority of OSOM loads along Morrisons Gap Road, including police escorts for the 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>higher risk OSOM loads, to ensure residents along Shearers Road and Morrisons Gap Road have safe passage. The Traffic Management Plan Driver's Code of Conduct will also include a requirement that all vehicles regularly accessing the Project Area during construction are required to have In-Vehicle Monitoring Systems installed;</p> <ul style="list-style-type: none"> ■ It is proposed that before the transportation of 'live' loads that a trial run of each of the routes will be completed using simulated loads that have the same height width and length of the Project OSOM loads. Once the route is demonstrated to be safe for transportation, then the transport of the loads could commence; ■ The Proponent will provide UHF radios (given mobile phone reception can be intermittent) to residents along Morrisons Gap Road and Shearers Road to communicate any emergency or travel plans to site staff along with a protocol for reaching the site manager; ■ Prior to OSOM component deliveries commencing on the Project, community information sessions will be held to provide information about the types of components that will be delivered to the Project Area. These will create opportunities to explain the Project and update the community on Project delivery schedules; ■ Communication of the latest delivery schedules including expected component types, days and times and duration of deliveries will be provided to the local community (refer Section 6.10 of Appendix H for further detail); ■ Consultation was undertaken with businesses within Muswellbrook Shire Council based on the OSOM route proposed and input from Muswellbrook Shire Council. The Project will include these businesses (as listed in Table 6.2 of Appendix H) in communication protocols; ■ A communications protocols will be developed to allow communication between the NSW Forestry Corporation trucks and the Project trucks. The Project will maintain communication with NSW Forestry Corporation to coordinate the movement of oversized and over mass vehicles; ■ The Project will consult with TfNSW Regional Infrastructure prior to OSOM transportation commencing; ■ The Proponent will engage with local authorities and businesses in relation to traffic movements and the avoidance of peak commute times. This will be addressed in the Traffic Control Plan (TCP) to be prepared prior to OSOM transportation commencing; and ■ The Belford to Golden Highway project is likely to be the most significant impact on the Project. As part of the Traffic Management Plan, the Project will maintain communications with TfNSW project managers to identify potential impacts. This will include notification of the times when trucks will be travelling through the construction sites. 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p><u>Approvals</u></p> <ul style="list-style-type: none"> ■ Relevant permits will be obtained for over-mass and over-sized vehicles from the National Heavy Vehicle Regulator; ■ An application shall be lodged by the Proponent and consent obtained from the relevant Road Authority for all works within the road reserve pursuant to Section 138 of the Roads Act 1993 (NSW); ■ The proposed widening of George Street will require the prior consent of TfNSW before any approval granted by the City of Newcastle; ■ TfNSW approval of a Road Occupancy Licence (NSW Transport Management Centre) and Works Authorisation Deed agreement will be sought as works involve their assets (e.g. median, traffic signals) for all roads in the Newcastle LGA except for Selwyn Street and George Street; and ■ The oversized and over mass routes in the Newcastle Local Government Area are only to be used during the night time, unless otherwise agreed with City of Newcastle. Travel restrictions will be formalised within transport permits, as required for the Project. 		

Environmental Aspect		Mitigation Measure	Responsibility	Stage
Hazards and Risks	Aviation	<ul style="list-style-type: none"> ■ The Proponent will enter into a commercial agreement with Airservices Australia to amend flight procedures for Scone Airport as detailed in Section 13.1.4 of the Project EIS; ■ 'As constructed' details of wind turbine and wind monitoring tower coordinates and elevations will be provided to Airservices Australia, using the following email address: vod@airservicesaustralia.com; ■ The rotor blades, nacelles and towers of the wind turbines will be painted in matt white; ■ Marking the temporary and permanent wind monitoring towers will be undertaken according to the requirements set out in Manual of Standards (MOS) 139 Chapter 8 Division 10 (as modified by the guidance in NASF Guideline D); ■ Prior to the construction of any wind turbines or meteorological monitoring masts, the Proponent will provide relevant details to CASA, Airservices Australia, Defence, NSW Regional Airspace and Procedures Advisory Committee, and any relevant landowners or local aerial agricultural or firefighting operators. Information will include; co-ordinates, final heights, confirmation of compliance with any OLS and aviation hazard light; ■ Wind Monitoring Towers of approximately 155m AGL will be marked to some extent, depending on the proximity to the surrounding turbines. If the Wind Monitoring Towers are to be installed before the turbines, then they will incorporate a medium intensity red obstacle light at night. The obstacle lights may be removed when wind turbines are erected in the vicinity of the Wind Monitoring Towers; ■ Obstacle lighting, if required, will be implemented in accordance with the requirements of CASA, including compatibility with night vision devices. Following ongoing consultation with the project, CASA have approved the use of steady low intensity lighting (200 candela) rather than medium intensity. Obstacle lights will be set to 'steady' to reduce the visual impact on neighbouring properties. Night lighting will be installed in accordance with the Obstacle Lighting Plan and will be operated when requested by CASA; ■ On commencement of the installation of the first turbine or 155m high Wind Monitoring Tower if preceding the turbines, Airservices Australia will be requested to publish a NOTAM advising pilots that construction of tall structures is imminent. Details will be reported to the Airservices Australia Vertical Obstacle Database (VOD); ■ The location and height of wind turbines and wind monitoring towers will be provided to landowners so that, the landowner may provide the aerial application pilot with all relevant information. This information, and a description of the infrastructure, will be provided in suitable GIS format to all fire authorities and emergency services in suitable GIS format on an ongoing basis through the construction phase; ■ Operational guidelines regarding water-bombing setbacks from WTGs will be developed and distributed to fire authorities; and 	Proponent	Prior to Construction

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ Consultation will be undertaken with relevant aviation operators and Scone Airport to ensure that all stakeholders fully understand the extent of the impact of proposed changes. ■ impact turbines (~13) (refer to Section 5.3 of Response for Additional Information dated 25 March 2022) will be placed in the “Y” position in the case of emergency (ie bushfire), at the direction of the responding agency (incident controller); and ■ the Proponent will provide a cost contribution of up to \$5,000 per annum to NPWS to offset increased aerial baiting operations resulting from the use of rotary aircraft where fixed wing aircraft would have been suitable. The amount is to be negotiated with NPWS noting the annual difference in cost incurred from adjusting for the presence of turbines. 		
Telecommunications	<ul style="list-style-type: none"> ■ A pre-construction assessment of TV and radio reception will be undertaken to establish a base line of reception strength for comparison with any complaints relating to reception post-construction and to assist with determining whether any reception interference issues were pre-existing. The assessment will be carried out at a representative sample of dwellings in the vicinity of the Project Area; ■ In the event that reception impacts are experienced, the Proponent will implement reasonable measures to return the system performance to at least pre-construction levels as soon as practicable; ■ Appropriate mitigation options will be identified in consultation with NPWS, depending on the nature of the interference and the aspects of the system that are affected, but may include: <ul style="list-style-type: none"> – providing higher powered hand-held and vehicle-based mobile units; – increasing the signal strength from the affected base station or an alternative base station; and – installing a signal repeater or additional base station at an appropriate location. ■ If an additional base station or repeater is required to resolve issues, it may be possible for this to be installed at the Project Area on infrastructure already associated with the Project such as a meteorological mast used for power performance measurements. 	Proponent	Prior to Construction
Human Health / EMF	<ul style="list-style-type: none"> ■ Detailed design will consider the prudent avoidance and incorporation of significant setbacks between residential dwellings and project components as discussed in Section 13.3.5 of the EIS. 	Proponent	Prior to Construction
Bushfire	<p><u>Bushfire Emergency Management and Operations Plan</u></p> <ul style="list-style-type: none"> ■ A Bushfire Emergency Management and Operations Plan (BEMOP) will be prepared that will detail procedures, processes and mitigations to manage potential fires on site during construction, operation and decommissioning, in consultation with the RFS and NPWS, and as outlined in Sections 6.3 – 6.7 of the Bushfire Assessment (ERM, 2021). 	Proponent and Contractors	Construction and Operation

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>The BEMOP will include cooperative bushfire management arrangements as reported in section 5.2.1 of the Response to Request for Additional Information, and outlined below.</p> <ul style="list-style-type: none"> ■ The bush fire risk management strategies – table 13.11, as reported in section 13.4 of the EIS shall be implemented. The BEMOP will include a detailed site plan identifying, using GPS coordinates, each turbine tower location. A copy of the plan shall be stored at the NSW RFS Liverpool Range District office; ■ As reported in section 5.2.1 of the Response to Request for Additional Information, all employees, contractors and staff working on site will undergo induction training covering all procedures and protocols which will be included in the BEMOP. The site induction provides an introduction to bushfire risks and preventative controls as well as emergency procedures. <p><u>Cooperative Bushfire Management Arrangements</u></p> <ul style="list-style-type: none"> ■ Continued and ongoing local RFS / NPWS familiarisation of the property including location of firefighting equipment; ■ Bushfire communications protocol will be prepared and implemented between permanent onsite Project staff and NPWS / RFS staff. This includes notifying NPWS / RFS staff if for whatever reason, there are any proposed activities likely to cause sparks or fire during a total fire ban or other appropriate bushfire danger rating thresholds; ■ Monitoring the scheduling/completion of bushfire mitigation works and bushfire awareness programs; ■ Discussion and resolution of issues regarding access, fire-fighter safety, roads and water supplies; ■ Identification of areas in which collaboration/assistance may be required from local fire services to reduce fire risk across the landscape; ■ Identification and discussion of safety and environmental restrictions and safeguards; ■ NSW RFS / NPWS will be provided with coordinates of the final wind turbine layout and identification information for individual wind turbine sites for their internal response planning; and ■ The proponent commits to assist the RFS / NPWS and emergency services in the event of a fire occurring in the vicinity of the site. <p><u>Enhanced Rapid Fire Support</u></p> <ul style="list-style-type: none"> ■ All WTGs will be made of non-combustible construction materials; ■ All poles will be either concrete or galvanised steel poles and the maintenance of the transmission line easement including, reduced fuel loads beneath transmission lines, will be the responsibility of the asset owner. For the safe operation of the transmission line, 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>certain activities will be restricted within the easement such as planting and growing trees, construction of buildings, or erection of antennae or masts;</p> <ul style="list-style-type: none"> ■ Operational guidelines regarding water-bombing setbacks from WTGs will be developed and distributed to fire authorities; ■ The Proponent will work with NPWS to ensure that alternative water supplies are made available during construction for fire-fighting activities. This will also be built into the Construction Management Plan; ■ Final turbine layout maps will be issued to NSW RFS ahead of construction for their internal response planning; ■ All Project vehicles will contain a fire extinguisher and a citizens band radio; ■ Each WTG will contain a fire extinguisher in the base of the tower and in the nacelle; ■ All buildings will contain portable fire extinguishers, which will undergo inspection on a six monthly basis; ■ On-site staff will be trained to support basic firefighting (i.e. RFS volunteer equivalent), including annual 'refresher' training; ■ Provision of three (3) firefighting trailer units to be generally located at the temporary site compound with 1000 L of storage during Project construction and operations; ■ Access to landowners' dams and bores will be provided as alternative sources of water for fire fighting; ■ Onsite water carts for dust suppression will double as a water source support firefighting, as needed; ■ Strategic buoy wall damn will be stored for use during local fire fighting activities (capacity to be agreed with NPWS and NSW Rural Fire service (RFS)); ■ The temporary construction site compound will contain two (2) x water tanks (approx. 50,000 L total capacity) to supply the needs of the compound, with at a minimum, each tank maintained at 50% capacity by water tankers. The water tanks will be fitted with outlets allowing fire trucks to connect to the tanks; and ■ The permanent O&M facility will include two (2) x water tanks (approx. 45,000 L total capacity), with at a minimum, each tank maintained at 50% capacity by water tankers and rainwater. The water tanks will be fitted with outlets allowing fire trucks to connect to the tanks. <p><u>Asset Protection Zones</u></p> <ul style="list-style-type: none"> ■ A minimum 10 m APZ will be established around each wind monitoring masts. The APZ for WTGs will comprise of the concrete foundation (approx. 25 m in diameter); and ■ An increased APZ of 20 m will be established for the around the O&M buildings, BESS, substation and switching station. This will be increased as required to ensure that these 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<p>assets are located outside of the flame zone. To ensure that significant assets are not at risk of direct flame contact:</p> <ul style="list-style-type: none"> ■ The substation will have minimum 23 m wide APZ to the east and 20 m in all other directions; ■ The switching station will have a minimum 33 m APZ to east and 20 m in all other directions; ■ The BESS will have a 23 m APZ to the west and 20 m in all other directions; ■ O&M Option 1 will require a minimum 20 m wide APZ in all directions; and ■ Compound/O&M Option 2 will have minimum 21 m wide APZ to the south and 20 m in all other directions. <p><u>Fire Drills and Fire Prevention Inspections</u></p> <ul style="list-style-type: none"> ■ The local RFS / NPWS would be invited on an as-needs basis to assist in the running of fire drills during construction and operation. Greater attention to awareness and readiness will be given at start of the Fire Danger Period and prior to the bushfire risk increasing; and ■ During construction, the site nominated HS&E officer would be responsible for arranging fire drills at least every 6 months or more frequently if warranted. <p><u>Storage and Maintenance of flammable materials</u></p> <ul style="list-style-type: none"> ■ During construction, flammable materials will be stored at the laydown area only; ■ A manifest (and safety data sheets) must be prepared for any battery, diesel or other dangerous goods storage/handling, including the class identification, quantity, type (bulk or packaged) and location. Appropriate material (including absorbent, neutralisers, equipment and personal protective equipment) for the clean-up of spills is to be provided and available on site at all times; and ■ The manifest must be maintained and made available to emergency crews as per NSW Work Health and Safety Regulation 2017. 		
Blade Throw	<ul style="list-style-type: none"> ■ WTG components will be manufactured and certified in accordance with the current best practice IEC Standards; ■ WTGs will be equipped with sensors that identify structural fatigue and enable early maintenance and management measures which will also assist in mitigating structural failures such as blade throw risks; and ■ Measures to mitigate ice formation on the wind turbines (e.g. anti-icing or de-icing technologies) and/or control access (e.g. ice risk management plan) will be implemented to reduce the risk of ice impact where necessary and to the extent reasonably practicable. 	Proponent and Contractors	Pre-construction and Operation

Environmental Aspect	Mitigation Measure	Responsibility	Stage
SEPP 33 / Preliminary Hazard Analysis	<ul style="list-style-type: none"> ■ The BESS and other key infrastructure will be installed in as per AS/NZS 5139:2019 or other relevant standards; ■ Relocation of the O&M building as identified in the Preliminary Hazard Analysis will be considered to reduce the potential risk of impact from blade throw, tower collapse or nacelle collapse; ■ Measures to mitigate ice formation on the wind turbines (e.g. anti-icing or de-icing technologies) and/or control access (e.g. ice risk management plan) will be implemented to reduce the risk of ice impact to the extent reasonably practicable; ■ Restricted public access to the construction and operational areas and security will be maintained via surveillance equipment to restrict access throughout the construction and life of the Project; ■ Appropriate safe work procedures will be implemented for the handling of all chemicals, including transfer, storage, spill prevention and clean up requirements; ■ Transportation of dangerous goods will comply with the requirements of the Australian Code for the Transport of Dangerous Goods by Road and Rail (the ADG Code); ■ An Emergency Response Plan for the Project will be prepared and implemented and will address the specific hazards identified in the PHA and ensure emergency response personnel take appropriate precautions to protect themselves and the general public from immediate hazards and escalating events; ■ A separation distance between BESS containers of 3.05m (10 ft) is recommended, based on the requirements of NFPA 855, as additional separation distances are not warranted by the explosion analysis; ■ Forced ventilation will be installed in the BESS containers (minimum 32 air changes per hour is recommended to prevent flammable mixture formation in the container); ■ An alarm will be installed to indicate loss of ventilation flow through the containers; and ■ A CO detector on the ventilation exhaust duct (CO is present whether the gas is ignited or not) will be installed, with shutdown of the BESS charging/ discharging if CO is detected. The HVAC will be kept on, and alarm if HVAC flow stops. 	Proponent and Contractors	Construction, Construction, Operation
Aboriginal Heritage	<p><u>Aboriginal Heritage Management Plan</u></p> <p>An Aboriginal Heritage Management Plan will be prepared in consultation with Heritage NSW and Aboriginal stakeholders. Heritage mitigation measures will include:</p> <ul style="list-style-type: none"> ■ if impacts to identified Aboriginal archaeological sites are unable to be avoided, surface collection or archaeological salvage efforts will be undertaken in accordance with the <i>Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales</i> (DECCW, 2010); 	Proponent and Construction Contractor	Construction

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ all employees, contractors, subcontractors and agents carrying out any development on site will undertake a Project induction (including the distribution of a construction heritage site map) to ensure that they have an understanding of and are aware of the Aboriginal and historic heritage issues affecting the activity; and ■ in the event that works on site reveal either possible human skeletal remains or possible Aboriginal or historical heritage objects, all work will cease and the measures detailed in the Unexpected Finds Protocol will be implemented. 		
Historic Heritage	<ul style="list-style-type: none"> ■ All works will be undertaken in accordance with a Non-Aboriginal Heritage Unexpected Finds Procedure; ■ Further geophysics, engineering assessment and heritage protocols / approvals will be undertaken and obtained during detailed design of the final Devil's Elbow bypass road alignment; ■ Heritage controls, such as possible archaeological monitoring during earthworks in potential anomaly areas, will be contingent on the results of the further geotechnical analysis. Heritage controls and/or mitigation measures will be detailed in the Project's EMS and Heritage Management Plan; ■ Heritage interpretation relating to the transport alignment upgrade will be investigated as a possible community value-add, in terms of development into a unique future heritage interpretation site. This could include interpretative signage, possibly as part of a heritage trail, or potentially expose a section of historical diggings if possible from an engineering solution. This recommendation is subject to local Council and community interest and advice of feasibility; and ■ If backfilling is required, the methodology for this will be developed in consultation with the Proponent, construction contractors, and heritage specialists. Decisions around appropriate methodology will be made based on the type and condition of any findings. 	Proponent and Construction Contractor	Construction
Soils and Water	<p><u>Design Mitigation Measures</u></p> <ul style="list-style-type: none"> ■ During detailed design, turbine and infrastructure locations will be further refined to avoid the adjacent steeper slopes and areas of significant rocky outcrops. In addition, appropriate permanent cut batter slopes will be assessed on an individual basis with reference to cutting ground conditions. Benches will be implemented into areas of higher cut slopes or wherever deemed necessary for stability purposes; ■ During detailed design of earthwork batters there will be a need to incorporate the following design requirements of selected batters following detailed review of onsite conditions: <ul style="list-style-type: none"> - for slopes 2H:1V or shallower, individual vertical batter heights may be up to 10 m; <ul style="list-style-type: none"> ▪ Minimum bench width of 4.5 m; 	Proponent and Construction Contractor	Pre-Construction, Construction

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ▪ The unreinforced slopes will be designed with the following long-term factor of safety ≥ 1.5; ▪ No temporary or permanent surcharges loads may be placed on batter crests; and ▪ Surface rainwater flows will also be diverted away from batter crests and faces; and <p>- if steeper, or relatively high batter slopes are required, then engineering design and support / stabilisation will be required. Permanent soil nailing and shotcrete support will be considered for such cases during detailed design;</p> <ul style="list-style-type: none"> ■ Given the relatively steep and exposed nature of much of the Development Footprint, and assessed high dispersivity/erodibility of site soils, detailed design will assess the need for the use of appropriate cut/fill batter protection and effective site surface water management and drainage techniques to prevent the mobilisation of sediments to natural water courses. This may include vegetation or shotcreting batter faces. Drainage design will aim to direct runoff from all hardstands, access tracks and Project infrastructure to appropriate sediment control facilities such as sediment basins, grassed filter strips or swales to trap sediments and filtered off before being discharged (to appropriate vegetated areas or drainage lines); ■ To minimise the ongoing maintenance any cut and fill slopes, batters will be vegetated with grass as soon as possible following construction, and be protected from overland surface water flows by the construction of appropriate permanent surface drainage measures; ■ Appropriate erosion and sediment controls will be implemented for any exposed soil in stockpiles, temporary works or permanent works such as covering, vegetation or a permanent capping; ■ Runoff from fill batters facing towards the National Park will be retained as sheet flows utilising vegetated filter strips or concentrated in collection drains diverted either via culverts beneath the access tracks to join the northern drainage network or to enhanced sediment controls prior to release. To ensure that flows from the up-gradient catchment reach the Peel River culverts will be installed at key watercourse crossing points confirmed at the detailed design phase; and ■ All waterway crossings will be constructed in accordance with the: <ul style="list-style-type: none"> - <i>Water Guidelines for Controlled Activities on Waterfront Land</i> (DPI, 2012); and - <i>Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings</i> (DPI, 2003). <p><u>Construction Mitigation Measures</u></p> <ul style="list-style-type: none"> ■ During construction, the following measures will be implemented to address potential soil and water impacts: 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> - undertake a further geotechnical study prior to construction commencement including soil characteristics to inform the development of appropriate erosion and sediment controls; - prepare a detailed Soil and Water Management Plan (SWMP) prior to construction commencing, outlining measures for the management and monitoring of surface water quality and hydrology during construction. The plan would also address any requirements for the management of pollutants or contaminated lands during construction so as to minimise impacts to terrestrial and aquatic habitats. The SWMP should be prepared by a suitably qualified person, such as a soil conservationist; - progressive Erosion and Sediment Control Plans (PESCPs) within the SWMP as the Project progresses to address management requirements at individual work sites to be developed by an experienced CPESC; - SWMP & PESCP will be prepared based on 'The Blue Book' (Landcom, 2004) utilising a range of BMPs for the various construction activities and landforms including the adoption of enhanced controls/higher level of protection for activities in sensitive catchments and challenging landforms such as increased capacity of controls, shortening lengths between controls and use of soil binders and other proprietary products; - design and construct the Project to minimise land disturbance and therefore reduce the erosion hazard; - stage construction activities to minimise the duration and extent of land disturbance; - manage topsoil resources to minimise the risk of erosion and sedimentation, and maximise reuse of topsoil during rehabilitation; - divert upslope (clean) stormwater around the disturbed sites and capture sediment-laden run-off from within the disturbed site for diversion to sediment control devices; - installation of geotextile silt fences (with sedimentation basins where appropriate) on all drainage lines from the site which are likely to receive runoff from disturbed areas; - installation of appropriate sediment traps or sediment ponds near waterways to contain surface water contaminated with sediment runoff entering the waterway; - procedures to ensure that steep batters are treated appropriately for sediment control; - a process for overland flow management to prevent the concentration and diversion of water onto steep or erosion prone areas; - rehabilitate the site promptly and progressively as works progress; 		

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> - inspect and maintain erosion and sediment control devices for the duration of the Project construction stage including thorough visual inspections following significant rain events with a requirement for immediate remediation of localised erosion caused by runoff (within specified response times); - avoid land disturbance beyond that identified in the assessment within 20 m of minor streams (first and second order watercourses) and 40 m of third order or higher watercourses; - ensure appropriate procedures are in place for the transport, storage and handling of fuels, oils and other hazardous substances, including availability of spill clean-up kits; - construct required access tracks at any early stage to minimise disturbance during construction; - obtain all necessary water access licences; and - ensure appropriate stormwater, collection, treatment and recycling at the concrete batch plant, in accordance with good practice and any requirements of the NSW Environmental Protection Authority. <p><u>Sensitive Areas Mitigation Measures</u></p> <ul style="list-style-type: none"> ■ Additional measures have been identified to mitigate impacts associated with the identified sensitive location in the adjacent National Park. Measures are to be included in the progressive ESCP to either; <ul style="list-style-type: none"> - direct disturbed runoff away from the catchment area identified to contain the sensitive location, or - process runoff through additional sediment controls (e.g. sumps and/or sediment basins) and discharge at a low, non-erosive velocity. <p><u>Water Quality Monitoring</u></p> <ul style="list-style-type: none"> ■ A monthly water quality monitoring program will be developed in consultation with NPWS for the two sensitive receiving waters. The monitoring program will include trigger parameters that can be measured insitu such as pH and turbidity along with visual observations for hydrocarbons. Monitoring would be undertaken during dry periods and post rainfall; and ■ These measures are to be included in any environmental management plans to be implemented across the site, to protect the identified sensitive locations. 		
Air Quality	<p>The following mitigation measures will be implemented where practicable to minimise air quality impacts:</p> <ul style="list-style-type: none"> ■ Watering roadways or preparing roadways with coarse gravel or other road coverings where required; 	Proponent and Construction Contractor	Construction

Environmental Aspect	Mitigation Measure	Responsibility	Stage
	<ul style="list-style-type: none"> ■ The sealing of Morrisons Gap Road following consultation with the local community and subject to Tamworth Regional Council acceptance; ■ Covering and/or stabilising material loads which may generate dust, such as aggregates, during transport into and within the construction site where practicable; ■ Managing soil stockpiles through stabilisation, light watering or the use of covers; ■ Minimising vegetation clearance, including clearing vegetation in stages, and the stabilisation of cleared areas where practicable; ■ Controlling the speed of dumping from tip trucks; ■ Minimising vehicle movements where practicable; ■ Cleaning and wash of vehicles, plant and equipment; ■ Progressive revegetation and stabilisation of disturbance areas no longer required for construction; ■ Regular inspection and maintenance of all vehicles, plant and equipment to ensure operational efficiency; and ■ Regular monitoring of environmental conditions during construction, such as wind, that may result in dust generation and implementation of control measures as specified above, as relevant. 		
Waste	<p><u>Waste Management Plan</u></p> <ul style="list-style-type: none"> ■ A Waste Management Plan (WMP) will be prepared and will describe the measures to be implemented to classify, manage, reuse, recycle and safely dispose of waste. 	Proponent and Contractors	Construction, Operation and Decommissioning
Socio Economic	<ul style="list-style-type: none"> ■ The Proponent will implement the following key community enhancement and benefits programs: <ul style="list-style-type: none"> - a Voluntary Planning Agreement in the form of a Community Enhancement Fund with Tamworth Regional Council on the terms proposed and Upper Hunter Shire Council on the terms agreed; - a Neighbours Benefits Sharing Program; and - Vegetation Screening Program; and ■ The Proponent will to work closely with local authorities to promote and develop relevant skills/programs in an effort to engage the community in local employment opportunities. 	Proponent	Construction, Operation and Decommissioning

APPENDIX H DWELLING ENTITLEMENT ASSESSMENT



Hills of Gold Wind Farm Pty Ltd



Co-Developed by Clean Energy
Partners Pty Limited

Development Management by:



Hills of Gold Wind Farm

Dwelling Entitlement Assessment

24 March 2022

Project No.: 0550690

Document details	
Document title	Hills of Gold Wind Farm
Document subtitle	Dwelling Entitlement Assessment
Project No.	0550690
Date	24 March 2022
Version	1.0
Author	Amanda Antcliff
Technical Specialists	Ashley Robertson (MLA), Chris Turnbull (Sonus)
Client Name	Hills of Gold Wind Farm Pty Ltd

Document history

Version	Revision	Author	Reviewed by	ERM approval to issue		Comments
				Name	Date	
Draft	00	Amanda Antcliff	Murray Curtis	Murray Curtis	02.03.22	
Final	00	Amanda Antcliff	Murray Curtis	Murray Curtis	24.02.22	

Signature Page

24 March 2022

Hills of Gold Wind Farm

Dwelling Entitlement Assessment



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EXECUTIVE SUMMARY

Hills of Gold Wind Farm Pty Ltd (the 'Proponent') is proposing to construct and operate the Hills of Gold Wind Farm and associated ancillary infrastructure (the 'Project'), located on the ridgeline between Hanging Rock and Crawney Pass in the Northern Tablelands region of New South Wales (NSW).

Approval for the Project is sought under the State Significant Development (SSD) provisions of the Environmental Planning and Assessment Act 1979 (EP&A Act). In support of the SSD application, an Environmental Impact Statement (EIS) was prepared and publicly exhibited between 2 December 2020 and 29 January 2021. In response to submissions received from regulatory and community stakeholders and further engagement, a Submissions Report and Amendment Report were subsequently submitted on 10th January 2022. The Project is currently in the assessment phase.

The Department of Planning and Environment (DPE) has requested further information relating to potential Project related impacts on allotments with existing dwelling entitlements.

In response to this request, an assessment of lots in proximity to proposed turbines for existing dwelling entitlements was undertaken. A total of 20 lots within 3 km of the Project were identified as having a dwelling entitlement. This report sets out the visual and noise impact assessment of the Project to those lots, if a dwelling was to be constructed. The assessment is slightly constrained by not being able to identify a particular location within a given lot that a dwelling would be constructed. The visual and noise impact assessment therefore covered the whole of the lot. Where lots with potential dwelling entitlements were assessed as being potentially impacted by Project related visual or noise impacts, an assessment of merit based considerations or constraints to obtaining planning approval or the development of a dwelling were considered.

The outcomes of the dwelling entitlement assessment are:

- *The desktop visual impact assessment found the majority of lots assessed have the potential for siting a dwelling with little to no visibility of the Project. Where the zone of visual influence identified large portions of lots with potential views to the Project, existing vegetation visible on aerial imagery is likely to reduce views to the Project.*
- *All lots with potential dwelling entitlements have opportunity to consider the layout of the wind farm and select areas of the lot to minimise visual impact. The design of future dwellings could be undertaken with consideration of the potential for visual impact and measures could be included to reduce potential visual impacts, for example:*
 - *orientate the dwelling away from the Project; and*
 - *retain existing vegetation to screen the Project.*
- *The key findings of the desktop noise assessment were:*
 - *15 lots were identified to be outside of the 35 dB contour and therefore fully achieve the noise criteria;*
 - *five (5) lots were identified as being partially inside the 35 dB contour, with part of the lot achieving the noise criteria of 35 dB. These five allotments are owned by two landowners, with which the Proponent is currently in landowner agreement negotiations; and*
 - *no lots were identified as being fully within the 35 dB contour and therefore no lots assessed were identified as not being able to achieve the 35 dB criteria for a dwelling constructed somewhere within the lot.*

The assessment concluded that for the lots where only a portion of the lot achieves the noise criteria, the area outside of the contour provides the opportunity to site a dwelling without any other constraints (ie site the dwelling within that portion of the lot that achieves the criteria).

- *Based on the outcomes of the visual and noise assessments, five (5) allotments were assessed further for key merit based considerations and constraints that may influence the siting or approval of dwellings. This assessment identified the following existing constraints to development on those lots:*
 - *the lots have dense and scattered vegetation throughout with all lots either partially or fully mapped as bushfire prone land, with a number of lots mapped as being completely Vegetation Category 1 bushfire fire prone;*
 - *three of the five lots do not have direct frontage to a public road based on the mapped location of the roads; and*
 - *all five of the lots are mapped as Land and Soil Capability Class 6 and higher, with that class of land largely suitable for grazing, forestry and nature land uses or selective forestry and nature conservation, however one allotment contains Class 4, capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation).*

1. INTRODUCTION

1.1 Overview

Hills of Gold Wind Farm Pty Ltd (the 'Proponent') is proposing to construct and operate the Hills of Gold Wind Farm and associated ancillary infrastructure (the 'Project'), located on the ridgeline between Hanging Rock and Crawney Pass in the Northern Tablelands region of New South Wales (NSW).

Approval for the Project is sought under the State Significant Development (SSD) provisions (Division 4.7) of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as the Project is declared to be State Significant Development (SSD) under the *State Environmental Planning Policy (Planning Systems) 2021* (former SEPP State and Regional Development 2011).

In support of the SSD application, an Environmental Impact Statement (EIS) (ERM, 2020) was prepared for the Project in accordance with the requirements of the then *Environmental Planning and Assessment Regulation 2000* (now Environmental Planning and Assessment Regulation 2021). The EIS was publicly exhibited between 2 December 2020 and 29 January 2021 by the NSW Department of Planning, Industry and Environment (DPIE) (now Department of Planning and Environment, DPE).

In response to submissions received from regulatory and community stakeholders and further engagement, a Submissions Report and Amendment Report were subsequently submitted on 10th January 2022. The Project is currently in the assessment phase.

1.2 Request for Information

The following requests for information (RFI) have been made by DPE relating to dwelling entitlements in proximity to the Project:

- **RFI dated 11 October 2021:** *'Visual – detailed assessment and consideration of visual impacts of the Project on properties within the vicinity of the project for which:*
 - *dwelling are approved but yet to be constructed or are under construction;*
 - *a development application has been lodged, but a determination is yet to be made; and*
 - *there are existing dwelling entitlements on the land.'*

Detailed assessments of dwellings approved but yet to be constructed and where development applications have been lodged but a determination is yet to be made were incorporated into the Submissions Report and are thus not considered further in this report.

This report provides a considered response to potential visual impacts of the Project on properties that may have dwelling entitlements.

- **Additional RFI (undated):** *'The Department is aware of dwelling entitlements on Lots 67 & 107 DP755349 adjoining the project site.'*

As outlined in the NSW Government Wind Energy Framework - <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/wind-energy-guideline-for-state-significant-wind-energy-development-2016-12.pdf> the assessment should include the consideration of existing dwelling entitlements on land within the vicinity of the wind energy project.

Please ensure you identify and assess any other lots in proximity to the project site with dwelling entitlements in your Response to Submissions/Amendment Report'.

This Dwelling Entitlement Assessment considers the abovementioned allotments, as well as other allotments within 3 km of a proposed turbine that may have dwelling entitlement.

1.3 Report Structure

The structure of this report is:

- Chapter 1: Introduction
- Chapter 2: Dwelling entitlement assessment methodology
- Chapter 3: Identification of dwellings with dwelling entitlements based on assessment methodology
- Chapter 4: Assessment of potential Project related visual and noise impacts on the identified dwellings
- Chapter 5: of those allotments assessed in Chapter 4 as potentially being affected by visual or noise impacts as a result of the Project, identification of potential constraints and merit considerations in the siting and approval of a dwelling within the identified allotments, relating to bushfire prone land mapping, land capability mapping, vegetation cover and public road accessibility.
- Chapter 6: Key assessment outcomes.

Technical assessments completed by Moir Landscape Architects (MLA) relating to potential visual impacts and Sonus relating to potential noise impacts are provided in **Appendix A** and **Appendix B** respectively.

2. METHODOLOGY

2.1 Identification of Dwelling Entitlement Allotments

An assessment of lots adjacent to and within proximity to proposed turbines for dwelling entitlements against the relevant Local Environmental Plans (LEPs) has been undertaken. This has been done in the following order:

1. Lots located within 3 km of a proposed turbine.

The Wind Energy Framework requires consideration of “*existing dwelling entitlements on land within the vicinity of the wind energy project*”. The framework does not define the distance from a turbine that is to be used for the assessment.

The Project SEARs require, amongst other things (underline added):

- *a full description of the development, including: ...*
 - *site plans and maps at an adequate scale with dimensions showing: ...*
 - *existing infrastructure, land use, and environmental features in the vicinity of the development, including nearby residences and approved residential developments or subdivisions within 3 km of a proposed turbine, and any other existing, approved or proposed wind farms in the region ...*

In the context of the SEARs requirements, ‘in proximity’ has been considered to be 3 km of the nearest turbine. These lots fall within either the Tamworth local government area or the Upper Hunter local government area.

2. Lots that meet a criterion of the minimum lot size in the relevant current or immediately preceding LEPs as detailed in **Table 2-1**.

It is noted that Clause 4.2B (c) of the Tamworth LEP 2011 states that”

“development consent must not be granted for the erection of a dwelling house on land in a zone to which this clause applies, and on which no dwelling house has been erected, unless the land is:

- (a) a lot that is at least the minimum lot size specified for that lot by the Lot Size Map, or*
- (b) a lot created before this plan commenced and on which the erecting of a dwelling house was permissible under the provisions of Barraba Local Environmental Plan 1990, Manilla Local Environmental Plan 1988, Nundle Local Environmental Plan 2000 or Parry Local Environmental Plan 1987 immediately before that commencement, or*
- (c) a lot created pursuant to clause 11 or 12 of Tamworth Local Environmental Plan 1996 and, if the lot was created pursuant to clause 12 of that Plan, development consent has been granted for the purpose for which it was created, or*
- (d) a lot resulting from a subdivision for which development consent (or equivalent) was granted before this plan commenced and on which the erection of a dwelling house would have been permissible if the plan of subdivision had been registered before that commencement, or*
- (e) an existing holding, or*
- (f) a holding on which the erection of a dwelling was permissible under Barraba Local Environmental Plan 1990, Manilla Local Environmental Plan 1988, Nundle Local Environmental Plan 2000 or Parry Local Environmental Plan 1987 immediately before this plan commenced.”*

Lots within the Tamworth LEP 2011 have been assessed under the Nundle LEP 2000 minimum lot size (ie the predecessor planning instrument) as the zoning history and conditions that applied to a lot at the date of subdivision has not been able to be determined. This approach adds conservatism to the assessment by reducing the minimum lot size from the Tamworth LEP of 800 ha to 200 ha as per the Nundle LEP.

3. Of these lots, the following zones apply, within which a dwelling is permissible under the respective LEPs:
 - a. RU1 Primary Production
 - b. RU4 Primary Production Small Lots
4. Lots with an existing dwelling were removed from the assessment where they have been assessed in the EIS.
5. Lots where there is a Neighbour Agreement in place with the landowner were removed from the assessment.

The criteria used to identify allotments is summarised in **Table 2-1**. This does not take into account any merit based considerations and development constraints as discussed in Section 5 of this report.

Table 2-1: Dwelling Entitlement Identification Criteria

Local Environmental Plan	Minimum Lot Size Applied as per LEP Minimum Lot Size Mapping	Zoning	Distance to turbine
Tamworth LEP 2011	200 ha	RU1 Primary Production	3 km
Upper Hunter LEP 2013	40 ha, or 400 ha, subject to minimum lot size mapping.	RU1 Primary Production RU4 Primary Production Small Lots	3 km

2.2 Impact Assessment

2.2.1 Visual Assessment

MLA undertook a desktop assessment of all identified lots to determine the potential visibility of the Project and determine whether a dwelling could be sited without visual impacts.

A Zone of Visual Influence (ZVI) was prepared to identify the number of potentially visible turbines. Further to the ZVI, a desktop assessment using topographic mapping and aerial imagery was undertaken to assess the topography, vegetation coverage and areas potentially suitable for siting a dwelling.

Commentary was also provided on the potential visibility of the Project across each lot, opportunity to avoid impact through anticipated orientation of dwellings (based on climate and / or desirable views) and the capacity for existing vegetation to screen the Project.

The assessment is provided in Section 4.1.

2.2.2 Noise Assessment

Sonus undertook a desktop assessment of all identified lots to determine the predicted operational noise level of the allotment. Based on the original Noise Impact Assessment by Sonus included within the EIS (Sonus, 2020), the most onerous (lowest noise level) criteria identified was 35 dB(A) for dwellings currently experiencing low background noise levels. For each of the lots, the noise contours were used to determine if the noise levels on the lot are likely to exceed 35dB (A). The lots were then classified in the following way:

- where a lot is fully outside of the 35 dB(A) contour - the lot fully achieves the noise criteria;
- where the 35 dB(A) contour intersects a lot - part of the allotment achieves the criteria; and
- where a lot is fully inside the 35 dB(A) contour – the lot is unlikely to achieve the criteria.

The assessment is provided in Section 4.2.

2.3 Constraints to Potential Dwellings

Where lots with potential dwelling entitlements were assessed as being potentially impacted by Project related visual or noise impacts, an assessment of merit based considerations or constraints to the development of a dwelling were considered.

The intent of minimum lot sizes is to manage rural settlement patterns and maintain access to the resource base for primary industry production.

Whilst minimum lot size requirements as stipulated in the relevant LEP is the first consideration in establishing whether a dwelling entitlement may exist, other keys factors may also influence dwelling entitlements, and / or whether planning approval would be given to any future planning application.

These factors may include whether the land is bushfire prone, the extent of vegetation cover (and thus potential vegetation clearing), accessibility and agricultural land use considerations. Further assessment on these factors has been considered using the methodology described below.

2.3.1 Bushfire Prone Land

Consideration of bushfire prone land mapping for each lot the subject of this dwelling entitlement assessment has been undertaken using NSW bushfire prone land mapping available on the Sharing and Enabling Environmental Data in NSW (SEED) database.

The construction and occupation of dwellings on bushfire prone land must meet the requirements of Planning for Bushfire Protection (NSW RFS 2019).

The applicability of complying development provisions to the approval of rural dwellings located on bushfire prone land are detailed in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (Codes SEPP), Clause 3A.37 (2), which includes a number of development standards that must be met for rural housing development on bushfire prone land to be considered as complying development. The development standards include:

- (a) the development conforms to the specifications and requirements of Planning for Bush Fire Protection that are relevant to the development, and*
- (c) the lot has direct access to a public road or a road vested in or maintained by the council, and*
- (d) the development is located within 200 m of that road, and*
- (e) there is sufficient access designed in accordance with the acceptable solutions identified in Table 7.4a of Planning for Bush Fire Protection, and*
- (f) a reticulated water supply is connected to the lot, or a water supply with a 65 mm metal Storz outlet with a gate or ball valve is provided for fire fighting purposes on the lot (the gate or ball valve, pipes and tank penetrations are to be designed to allow for a full 50 mm inner diameter water flow through the Storz fitting and must be of a metal construction), and*
- (fa) the size of the non-reticulated water supply mentioned in paragraph (f) is—*
 - (i) for a lot with an area no greater than 10,000 m²—10,000 L, and*
 - (ii) for a lot with an area greater than 10,000 m²—20,000 L, and*

- (g) *reticulated or bottled gas on the lot is installed and maintained in accordance with AS/NZS 1596:2014, The storage and handling of LP Gas and the requirements of relevant authorities (metal piping must be used), and*
- (g) *all fixed gas cylinders on the lot are located at least 10 m from flammable materials and are enclosed on the hazard side of the installation, and*
- (h) *any gas cylinders on the lot that are within 10 m of a dwelling house—*
 - (i) *have the release valves directed away from the dwelling house, and*
 - (ii) *have metal connections to and from the cylinders, and*
- (i) *there are no polymer sheathed flexible gas supply lines to gas meters adjacent to the dwelling.*

Where these development standards cannot be met, a dwelling cannot be considered under the complying development provisions of the EP&A Act and a development application is required to be lodged with the local council. Where the siting and nature of the building being proposed does not comply with Planning for Bushfire Protection (NSW RFS 2019), the consent authority (council) refers the application to the NSW Rural Fire Service.

2.3.2 Vegetation

The *Local Land Services Act 2013* and the *Biodiversity Conservation Act 2016* regulate the clearing of native vegetation on rural land in NSW. Clearing of native vegetation in rural areas, including for rural dwellings may be subject to approval. Consideration of the extent of vegetation cover on the allotments the subject of the dwelling assessment has been completed using aerial photography interpretation.

2.3.3 Access

Public road access and distance of a proposed dwelling to a public road, are key considerations in the siting and approval of dwellings in bushfire prone areas, as noted above.

A review of the public road network in proximity to the lots the subject of this assessment was undertaken, noting whether or not the lots had direct public road frontage / access.

2.3.4 Soil and Land Capability and Agricultural Land Considerations

The creation of smaller lots with dwellings in the rural zone can result in the cumulative fragmentation of rural lands reducing the potential for agricultural use and allowing instead lifestyle-orientated uses, which may be incompatible. It may also change the profile of the area and restrict efficient primary production.

The (Office of Environment and Heritage , 2017) established the land and soil capability (LSC) to inform the inherent physical capacity of the land to sustain a range of land uses and management practices in the long-term without degradation to soil, land, air and water resources. The LSC assessment scheme uses biophysical features of the land and soil, including landform position, slope gradient, drainage, climate, soil type and soil characteristics, to derive detailed rating tables for a range of land and soil hazards. These hazards include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and mass movement. The mapping is based on an eight-class system with values ranging between 1 and 8 which represent a decreasing capability of the land to sustain productive agricultural land use. Class 1 represents land capable of sustaining most land uses including those that have a high impact on the soil (e.g., regular cultivation), whilst class 8 represents land that can only sustain very low impact land uses (e.g., nature conservation), as shown in **Table 2-2**.

**Table 2-2: Land and Soil Capability Scheme Classification
(Office of Environment and Heritage , 2012)**

LSC Class	General Definition
Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation).	
1	Extremely high capability land: Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	Very high capability land: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping and cultivation.
3	High capability land: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, gazing, some horticulture, forestry, nature conservation)	
4	Moderate capability land: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	Moderate–low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
Land capable for a limited set of land uses (grazing, forestry and nature)	
6	Low capability land: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation
Land generally incapable of agricultural land use (selective forestry and nature conservation)	
7	Very low capability land: Land has severe limitations that restrict most land uses and generally cannot be overcome. Onsite and offsite impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	Extremely low capability land: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

Biophysical Strategic Agricultural Land (BSAL) is land with high quality soil and water resources capable of sustaining high levels of productivity. BSAL plays a critical role sustaining the State's agricultural industry.

The soil and land capability and BSAL mapping available on SEED was mapped for each lot the subject of the assessment.

3. DWELLING ENTITLEMENT ALLOTMENTS

The lots identified as having dwelling entitlements based on the approach outlined in Section 2.1 are detailed in **Table 3-1**.

Table 3-1: Identified Dwelling Entitlement Allotments

Local Government Area	Lot
Tamworth Regional Council	107//DP755349
Tamworth Regional Council	1//DP409652
Tamworth Regional Council	67//DP755349
Tamworth Regional Council	175//DP755335*
Tamworth Regional Council	1/1139717
Upper Hunter Shire Council	195//DP750922
Upper Hunter Shire Council	181//DP750922
Upper Hunter Shire Council	182//DP750922
Upper Hunter Shire Council	52//DP750922
Upper Hunter Shire Council	2//DP863264
Upper Hunter Shire Council	108//DP755349
Upper Hunter Shire Council	128//DP750935
Upper Hunter Shire Council	2//DP1093344
Upper Hunter Shire Council	103//DP750925
Upper Hunter Shire Council	193//DP750922
Upper Hunter Shire Council	110//DP750925
Upper Hunter Shire Council	111//DP750925
Upper Hunter Shire Council	112//DP750925
Upper Hunter Shire Council	198//DP750922
Upper Hunter Shire Council	162//786649

* It is understood that a development application was granted in 2010 for a dwelling on this allotment. Based on aerial photo interpretation, there is no indication that a dwelling has been constructed, noting it is over five years since granting of the consent.

4. IMPACT ASSESSMENT

4.1 Visual Impact

The outcomes of the desktop assessment of Project related potential visual impacts on the identified dwelling entitlement lots completed by MLA are detailed in **Table 4-1**. A Zone of Visual Influence (ZVI) prepared to identify the number of potentially visible turbines is provided in **Figure 4-1**.

The assessment has been undertaken using desktop assessment alone and has been made without consideration of other factors (ie. access, planning requirements) that may limit the potential for siting a dwelling.

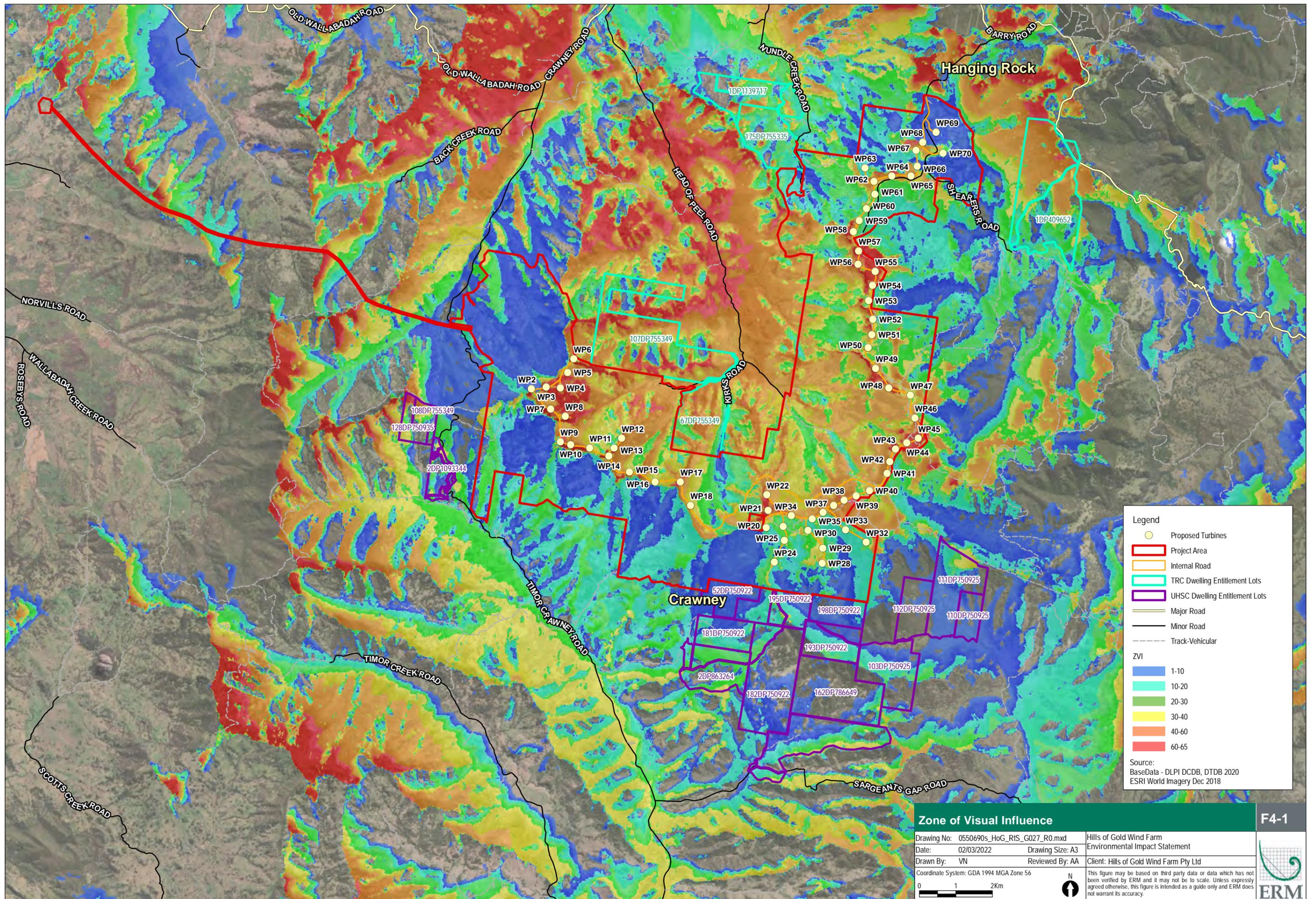
Table 4-1: Identified Dwelling Entitlement Lots – Visual Impact Considerations

Lot	LGA	Summary of Desktop Visual Impact Assessment
107//DP755349 Head of Peel Road Crawney 2338	TRC	The lot is located to the north of the Project. The southern side of ridges within the lot are steep and densely vegetated and therefore less suitable for a dwelling. The northern side of ridges are moderately vegetated and more suitable for a dwelling due to the northerly aspect. The Zone of Visual Influence (ZVI) (refer Figure 4-1) indicates pockets of land on the northern sides of hills would have areas where less than 10 turbines would be visible. Additionally, existing vegetation would be likely to screen views.
1//DP409652 Barry Road, Hanging Rock 2340	TRC	The lot includes a parcel of land to the east and west of Barry Road. Land on the eastern side of Barry Road is moderately vegetated, and has expansive views to the north. No views of the Project are available. Land on the western side of Barry Road is densely vegetated with the exception of an elevated clearing close to the Road. From a visual perspective, a dwelling could be sited on the cleared land and orientated away from the Project as views are expansive (without any other constraints being considered).
67//DP755349 Head of Peel Road, Crawney 2338	TRC	The lot is located to the north of the Project. The ZVI (refer Figure 4-1) indicates the turbines have potential to be visible to the south, east and west of the lot. The lot is moderately vegetated and undulating. It is assumed a dwelling would be orientated to the north (away from the Project) for passive climate control. Existing vegetation could be retained to screen views to the Project from most areas within the lot.
175//DP755335 867 Nundle Creek Road, Nundle 2340	TRC	The ZVI (refer Figure 4-1) indicates areas of land within the lot with no views to the Project. The Project is located towards the east and south of the lot. It is assumed a dwelling would be orientated to the north for views and passive climate control. Existing vegetation on the lot could be retained to assist in screening views to the Project to the east and south.
1/1139717 867 Nundle Creek Road, Nundle 2340	TRC	The ZVI (refer Figure 4-1) indicates areas of cleared, flat land within the lot with no visibility of the Project. Additionally, the Project is located towards the east and south of the lot and it is assumed the dwelling would be orientated to the north (away from the Project) for desirable views across Nundle Creek Valley and passive climate control.
195//DP750922	UHSC	The lot is steep and vegetated which limits areas suitable for siting a dwelling. An area of cleared land located in the south-western corner of the lot may be suitable for a dwelling (without any other constraints being considered). A

Lot	LGA	Summary of Desktop Visual Impact Assessment
461 Mountain View Road, Crawney NSW 2338		dwelling could be sited in this area and orientated west to take advantage of expansive views to vegetated ranges to the west. If existing vegetation was retained to the north, the Project could be sufficiently screened.
181//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	The lot is located to the south of the Project, accessed off Mountain View Road. The lot is densely vegetated. The ZVI (refer Figure 4-1) indicates up to 20 turbines will be visible from most of the lot. The Project could be sufficiently screened from most locations on the lot by existing vegetation.
182//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	The lot is undulating with a moderate coverage of vegetation. The ZVI (refer Figure 4-1) indicates views to the Project would be screened by topography from the majority of the lot. Some areas of the lot will have the potential to view up to 10 turbines, however vegetation could be retained to screen the potentially visible turbines.
52//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	The lot is steep and vegetated which limits areas suitable for siting a dwelling. The ZVI (refer Figure 4-1) indicates the entire lot has the potential to view up to 10 turbines. Existing vegetation could be retained to screen views to the potentially visible turbines.
2//DP863264 Mountain View Road Crawney 2338	UHSC	The lot is steep and vegetated which limits areas suitable for siting a dwelling. Partially cleared land close to access off Mountain View Road may be suitable for siting a dwelling (without any other constraints being considered). Existing vegetation could be retained to screen views to the potentially visible turbines.
108//DP755349 1969 Timor Crawney Road Crawney 2338	UHSC	The lot is steep and densely vegetated which limits areas suitable for siting a dwelling. The ZVI (refer Figure 4-1) indicates areas of the lot which have no views to the Project. It is likely a dwelling would be orientated to the south (away from the Project) to take advantage of expansive views across vegetated ranges. Additionally, if existing vegetation was retained the Project could be sufficiently screened.
128//DP750935 1969 Timor Crawney Road Crawney 2338	UHSC	The lot is steep and moderately to densely vegetated which limits areas suitable for siting a dwelling. The ZVI (refer Figure 4-1) indicates areas within the lot with no views to the Project, however it is likely a dwelling would be sited on cleared land to the east of the lot. A dwelling would likely be orientated to the south (away from the Project) to take advantage of expansive views across vegetated ranges. Additionally, if existing vegetation was retained the Project could be sufficiently screened.
2//DP1093344 1969 Timor Crawney Road Crawney 2338	UHSC	The lot is steep and moderately to densely vegetated which limits areas suitable for siting a dwelling. The ZVI (refer Figure 4-1) indicates areas within the lot within close proximity to Timor Crawney Road which will have no visibility of the Project.

Lot	LGA	Summary of Desktop Visual Impact Assessment
103//DP750925 2260 Pages Creek Road, Pages Creek 2337	UHSC	The lot is located to the south of the Project and is densely vegetated. The northern half of the lot is sloped towards the north. The ZVI (refer Figure 4-1) indicates the northern half of the lot has the potential to view to up to 20 turbines from some areas. The southern half of the lot slopes to the south and no views will be available to the Project due to topography. The Project could be sufficiently screened by a combination of topography and vegetation from this lot.
193//DP750922	UHSC	The lot is steep and densely vegetated which limits areas suitable for siting a dwelling. The ZVI (refer Figure 4-1) indicates area of land with a low number of potentially visible turbines. If existing vegetation was retained the Project could be sufficiently screened from most locations in the lot.
110//DP750925 7000 Hunter Road Barry 2340	UHSC	The lot is moderately vegetated, with some areas of cleared land potentially suitable for siting a dwelling (without any other constraints being considered). The ZVI (refer Figure 4-1) indicates the lot will have views to up to 10 turbines, however if existing vegetation was retained the Project could be sufficiently screened from most locations in the lot.
111//DP750925 7000 Hunter Road Barry 2340	UHSC	The ZVI (refer Figure 4-1) indicates the southern half of the lot will have views to up to 10 turbines. This area is deemed more suitable for a dwelling as there are areas of cleared land. It is likely a dwelling would be sited to take advantage of views to vegetated hills to the south (away from the Project). Additionally, existing vegetation could be retained to screen the Project.
112//DP750925 2260 Pages Creek Road Pages Creek 2337	UHSC	The lot is located to the south of the Project and is densely vegetated. The ZVI (refer Figure 4-1) indicates most areas of the lot will not have any visibility of the Project due to topography. The ZVI shows some vegetated areas of the lot have the potential to view up to 10 turbines. The Project could be sufficiently screened from most locations in the lot by existing vegetation.
198//DP750922 2260 Pages Creek Road Pages Creek 2337	UHSC	The lot is steep and densely vegetated which limits areas suitable for siting a dwelling. The ZVI (refer Figure 4-1) indicates the majority of the lot has the potential to view up to 10 turbines. The Project could be sufficiently screened from most locations in the lot by existing vegetation.
162/786649 329 Sargeants Gap Road. Timor 2338	UHSC	The lot is a large area located to the south of the Project. The ZVI (refer Figure 4-1) indicates the Project will not be visible from the northern portion of the lot. Views to the Project are likely to be available from the southern part of the lot, however dense vegetation would significantly reduce these views. The Project could be sufficiently screened from most locations in the lot by existing vegetation.

The desktop visual impact assessment undertaken for the lots found the majority of lots assessed have the potential for siting a dwelling with little to no visibility of the Project. Where the ZVI (refer **Table 4-1**) identified large portions of the lot with potential views to the Project, vegetation visible on aerial imagery is likely to reduce views to the Project.



Legend

- Proposed Turbines
- Project Area
- Internal Road
- TRC Dwelling Entitlement Lots
- UHSC Dwelling Entitlement Lots
- Major Road
- Minor Road
- Track-Vehicular

ZVI

- 1-10
- 10-20
- 20-30
- 30-40
- 40-60
- 60-65

Source:
BaseData - DLPI DCDB, DTDB 2020
ESRI World Imagery Dec 2018

Zone of Visual Influence		F4-1
Drawing No: 0550690s_HoG_RIS_G027_R0.mxd	Hills of Gold Wind Farm	
Date: 02/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Hills of Gold Wind Farm Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56		
<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>		

4.2 Noise Impact

The outcomes of the desktop assessment of Project related potential noise impacts on the identified dwelling entitlement lots completed by Sonus are detailed in **Table 4-2**. A map showing the predicted noise contours and the identified lots assessed is provided in **Figure 4-2**.

Table 4-2: Identified Dwelling Entitlement Lots – Noise Impact Considerations

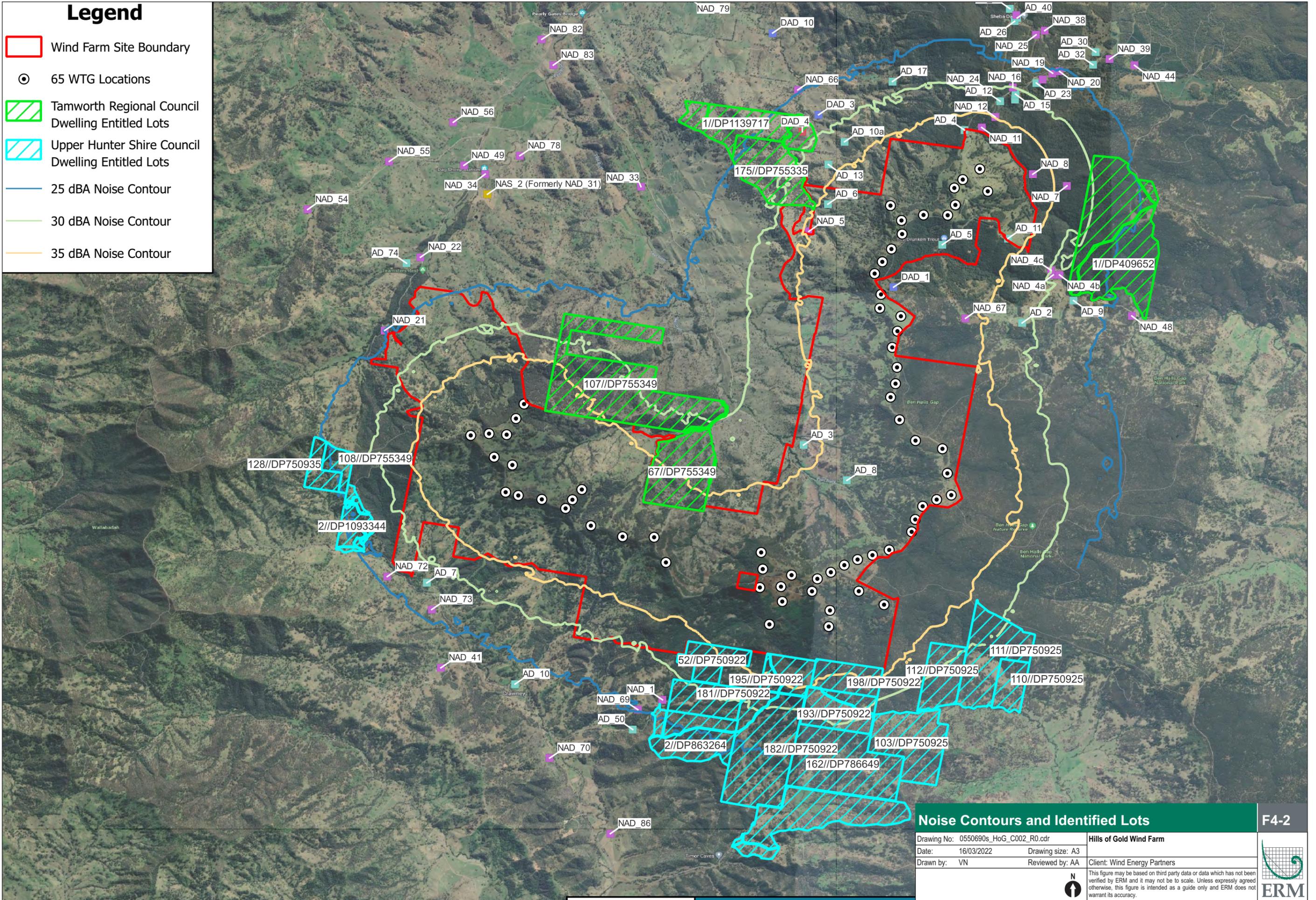
Lot	LGA	Noise Assessment
107//DP755349 Head of Peel Road Crawney 2338	TRC	~85% of the Lot is outside the 35 dB(A) contour. Part of the allotment achieves the criteria.
1//DP409652 Barry Road, Hanging Rock 2340	TRC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
67//DP755349 Head of Peel Road, Crawney 2338	TRC	~60% of the Lot is outside the 35 dB(A) contour. Part of the allotment achieves the criteria
175//DP755335 867 Nundle Creek Road, Nundle 2340	TRC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria
1/1139717 867 Nundle Creek Road, Nundle 2340	TRC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria
195//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	30% of the lot is outside the 35 dB(A) contour Part of the allotment achieves the criteria
181//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
182//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
52//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	~60% of the Lot towards is outside the 35 dB(A) contour. Part of the allotment achieves the criteria
2//DP863264 Mountain View Road Crawney 2338	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
108//DP755349 1969 Timor Crawney Road Crawney 2338	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
128//DP750935	UHSC	100% of the lot is outside the 35 dB(A) contour.

Lot	LGA	Noise Assessment
1969 Timor Crawney Road Crawney 2338		Fully achieves the noise criteria
2//DP1093344 1969 Timor Crawney Road Crawney 2338	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
103//DP750925 2260 Pages Creek Road, Pages Creek 2337	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
193//DP750922	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
110//DP750925 7000 Hunter Road Barry 2340	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
111//DP750925 7000 Hunter Road Barry 2340	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
112//DP750925 2260 Pages Creek Road Pages Creek 2337	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria
198//DP750922 2260 Pages Creek Road Pages Creek 2337	UHSC	~50% of the lot is outside the 35 dB(A) contour Part of the allotment achieves the criteria
162//DP786649 329 Sargeants Gap Road. Timor 2338	UHSC	100% of the lot is outside the 35 dB(A) contour. Fully achieves the noise criteria

A total of five (5) allotments were assessed as potentially being partially affected by noise exceeding 35 dB(A) (shaded in above table). These five allotments are owned by two landowners, with which the Proponent is currently in landowner agreement negotiations. These lots are further considered in Section 5.

Legend

- Wind Farm Site Boundary
- 65 WTG Locations
- Tamworth Regional Council Dwelling Entitled Lots
- Upper Hunter Shire Council Dwelling Entitled Lots
- 25 dBA Noise Contour
- 30 dBA Noise Contour
- 35 dBA Noise Contour



Noise Contours and Identified Lots

Drawing No: 0550690s_HoG_C002_R0.cdr		Hills of Gold Wind Farm	
Date: 16/03/2022	Drawing size: A3	Client: Wind Energy Partners	
Drawn by: VN	Reviewed by: AA	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.	

F4-2



5. CONSTRAINTS TO POTENTIAL DWELLINGS

Whilst minimum lot size requirements as stipulated in the relevant LEP is the first consideration in establishing whether a dwelling entitlement may exist, other key factors also influence dwelling entitlements, and / or whether planning approval would be given to any future planning application. These factors may include whether the land is bushfire prone, the extent of vegetation cover, available access and agricultural land considerations. These have been considered to understand constraints that may apply to dwelling siting and approval of any future dwelling development application.

Where lots with potential dwelling entitlements were assessed as being potentially impacted by Project related visual and/or noise impacts in Section 4 of this report, an assessment of merit based considerations or constraints to the development of a future dwelling were considered, as detailed in this section. This applies to the following allotments which are potentially partially affected by noise impacts, noting visual assessment outcomes identified that there is potential for siting a dwelling with little to no visibility of the Project, and with potential use of orientation and vegetation to screen the Project.

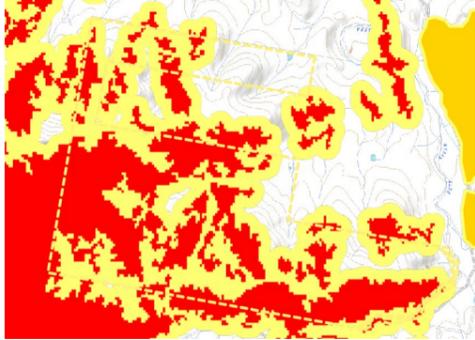
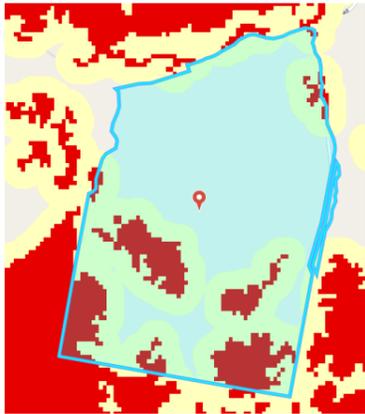
- 107//DP755349, Head of Peel Road Crawney 2338
- 67//DP755349, Head of Peel Road, Crawney 2338
- 195//DP750922, 461 Mountain View Road, Crawney NSW 2338
- 52//DP750922, 461 Mountain View Road, Crawney NSW 2338
- 198//DP750922, 2260 Pages Creek Road Pages Creek 2337

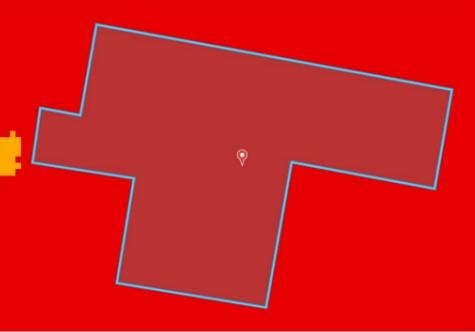
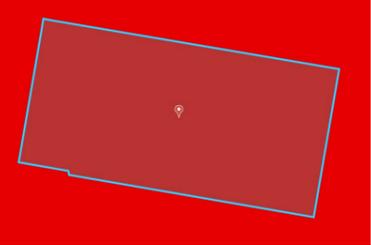
These five allotments are owned by two landowners, with which the Proponent is currently in landowner agreement negotiations.

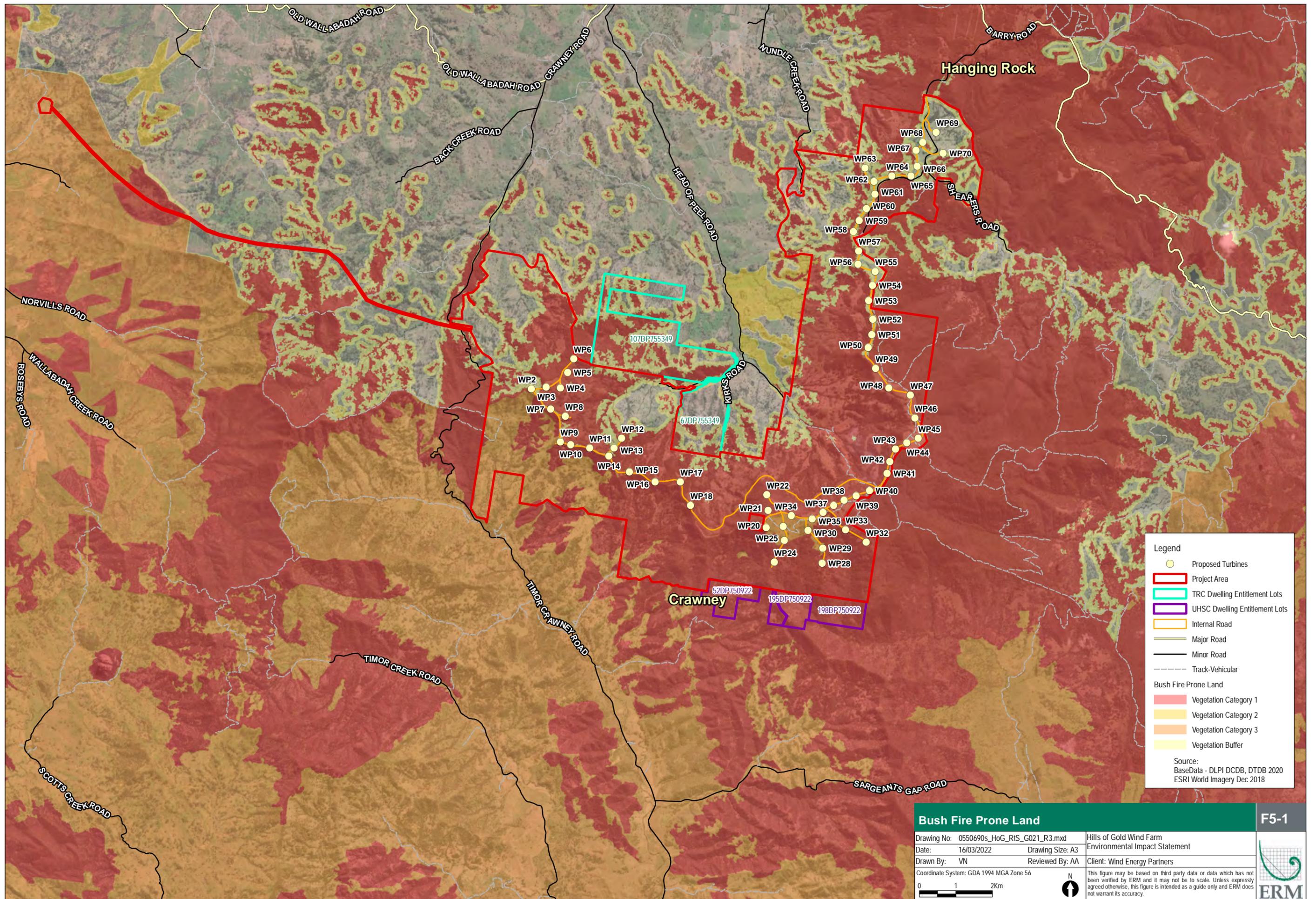
Table 5-1 provides an analysis, for each lot, of these potential constraints. **Figure 5-1**, **Figure 5-2** and **Figure 5-3** provide consolidated mapping of these constraints.

For all other allotments considered in Section 4, visual and / or noise assessments did not identify potential impacts, or the assessment confirmed that the siting of a dwelling could occur and the Project could be effectively screened by existing vegetation. As such, assessment of merit based considerations, or constraints has not been included as it is considered that a potential future dwelling could be sited with minimal Project related impacts.

Table 5-1: Identified Dwelling Entitlement Lots – Development Constraints

Lot	LGA	Lot Size (approx.)	Zoning	Bushfire Prone Land Mapping	Existing Vegetation	Access	Soil and Land Capability
107//DP755349 Head of Peel Road Crawney 2338	TRC	575 ha	RU1 Primary Production	<p>Large portions of the allotment are mapped as Bushfire Prone Land:</p> <ul style="list-style-type: none"> ■ Vegetation Category 1 (ie forest) (red) ■ Vegetation Buffer (100 m buffer to Category 1) (yellow) 	<p>Existing dense vegetation occurs across a large portion of the allotment</p> 	<p>Access is available to a public road. The allotment adjoins Woodleys Road, off Kirks Road, off Head of Peel Road, Crawney.</p>	<p>The allotment is mapped as containing Class 6 and Class 8.</p> 
67//DP755349 Head of Peel Road, Crawney 2338	TRC	243 ha	RU1 Primary Production	<p>Portions of the allotment are mapped as Bushfire Prone Land:</p> <ul style="list-style-type: none"> ■ Vegetation Category 1 (ie forest) (red) ■ Vegetation Buffer (100 m buffer to Category 1) (yellow) 	<p>Vegetation scatters the majority of the allotment, with some areas of dense vegetation.</p> 	<p>Access is available to a public road. The allotment adjoins Woodleys Road and Kirks Road.</p>	<p>The majority of the allotment is mapped as Class 4, with small portions of Class 6 and Class 8.</p> 

Lot	LGA	Lot Size (approx.)	Zoning	Bushfire Prone Land Mapping	Existing Vegetation	Access	Soil and Land Capability
195//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	95 ha	RU1 Primary Production	The allotment is mapped as Vegetation Category 1 Bushfire Prone Land (ie forest) (red) 	The vast majority of the allotment is heavily vegetated, with small areas of scattered vegetated and clearing. 	The allotment does not adjoin a public road. Mountain View Road is the closest public road to the allotment, the mapped location of the road is located over 200 m from the allotment.	The allotment is mapped as Class 7. 
52//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	97 ha	RU1 Primary Production	The allotment is mapped as Vegetation Category 1 Bushfire Prone Land: 	The vast majority of the allotment is heavily vegetated, with small areas of minor clearing. 	The allotment does not adjoin a public road. Mountain View Road is the closest public road to the allotment, the mapped location of the road is located over 200 m from the allotment.	The allotment is mapped as Class 6 and Class 7. 
198//DP750922 2260 Pages Creek Road Pages Creek 2337	UHSC	110 ha	RU1 Primary Production	The allotment is mapped as Vegetation Category 1 Bushfire Prone Land (ie forest) (red). 	The allotment is heavily vegetated. 	The allotment does not adjoin a public road.	The allotment is mapped as Class 7, with minor portions in the north and north east on the allotment boundary mapped as class 6. 



Legend

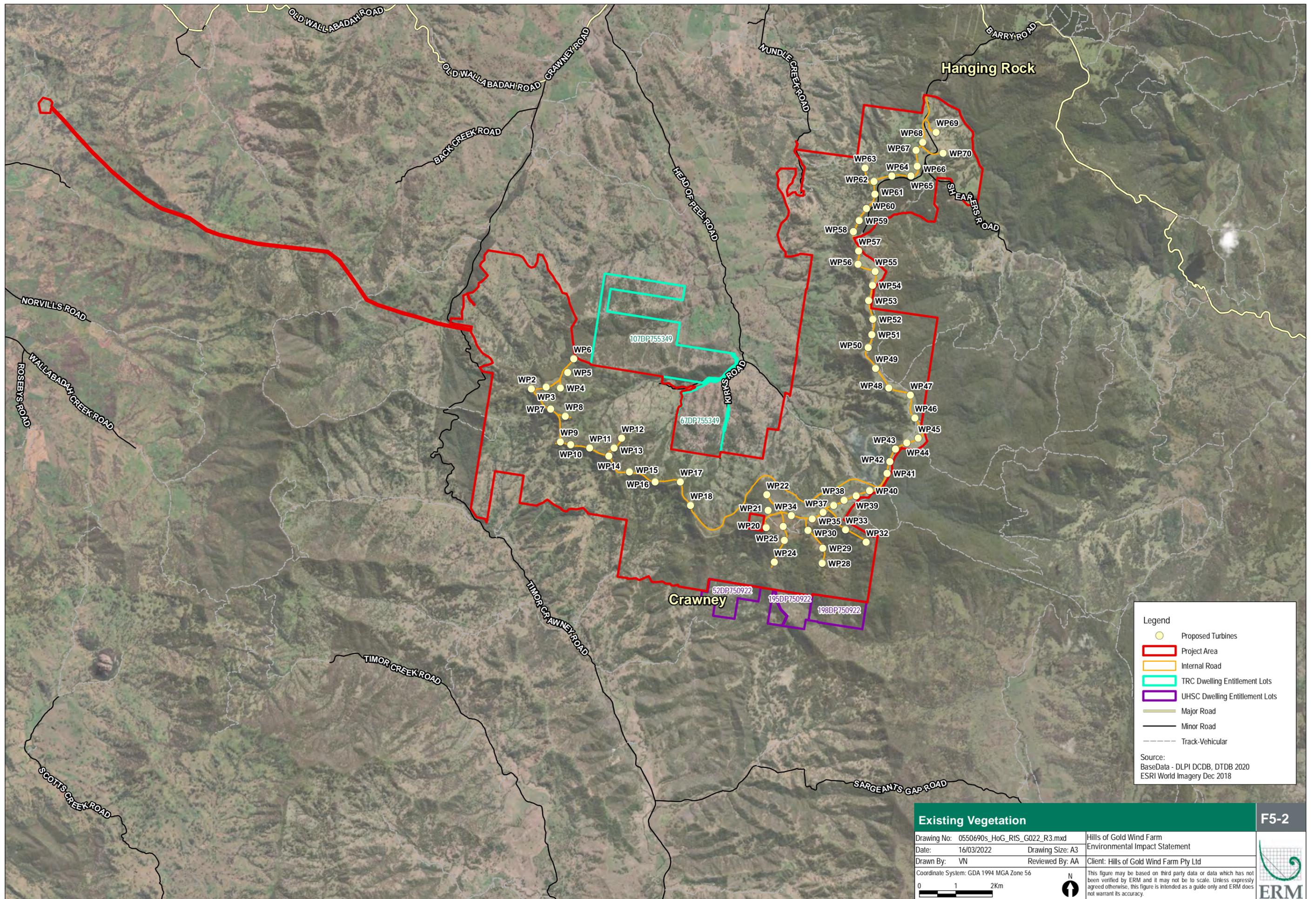
- Proposed Turbines
- Project Area
- TRC Dwelling Entitlement Lots
- UHSC Dwelling Entitlement Lots
- Internal Road
- Major Road
- Minor Road
- Track-Vehicular

Bush Fire Prone Land

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer

Source:
BaseData - DLPI DCDB, DTDB 2020
ESRI World Imagery Dec 2018

Bush Fire Prone Land		F5-1
Drawing No: 0550690s_HoG_RIS_G021_R3.mxd	Hills of Gold Wind Farm	
Date: 16/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Wind Energy Partners
Coordinate System: GDA 1994 MGA Zone 56		
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0 1 2Km</div> <div style="text-align: center;"> N ↑ </div> </div>		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

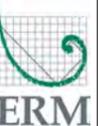


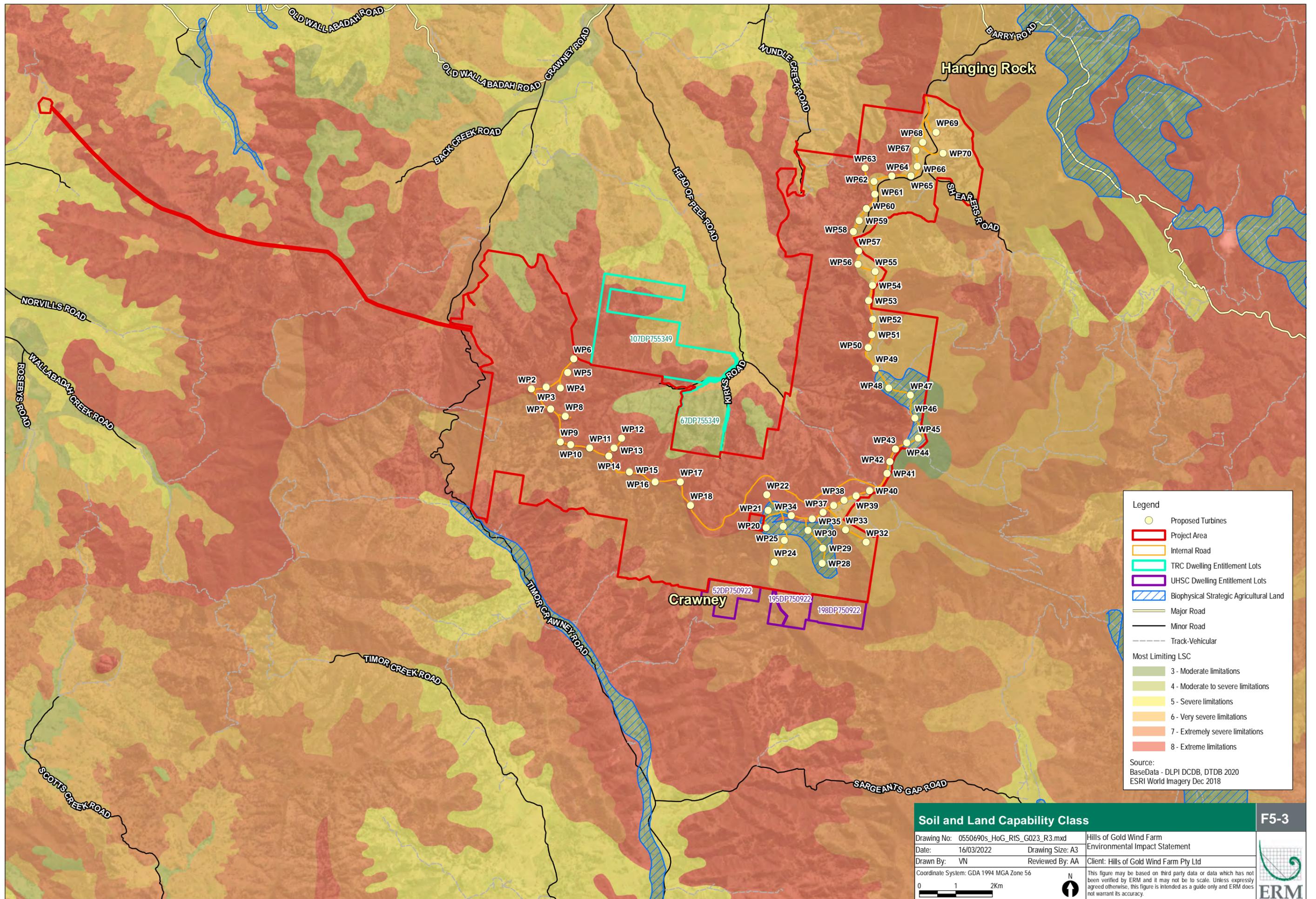
Legend

- Proposed Turbines
- Project Area
- Internal Road
- TRC Dwelling Entitlement Lots
- UHSC Dwelling Entitlement Lots
- Major Road
- Minor Road
- Track-Vehicular

Source:
 BaseData - DLPI DCDB, DTDB 2020
 ESRI World Imagery Dec 2018

Existing Vegetation		F5-2
Drawing No: 0550690s_HoG_RIS_G022_R3.mxd	Hills of Gold Wind Farm	
Date: 16/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Hills of Gold Wind Farm Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
0 1 2Km <div style="display: flex; align-items: center; justify-content: center;"> N </div>		





Legend

- Proposed Turbines
- Project Area
- Internal Road
- TRC Dwelling Entitlement Lots
- UHSC Dwelling Entitlement Lots
- Biophysical Strategic Agricultural Land
- Major Road
- Minor Road
- Track-Vehicular

Most Limiting LSC

- 3 - Moderate limitations
- 4 - Moderate to severe limitations
- 5 - Severe limitations
- 6 - Very severe limitations
- 7 - Extremely severe limitations
- 8 - Extreme limitations

Source:
BaseData - DLPI DCDB, DTDB 2020
ESRI World Imagery Dec 2018

Soil and Land Capability Class		F5-3
Drawing No: 0550690s_HoG_RIS_G023_R3.mxd	Hills of Gold Wind Farm	
Date: 16/03/2022	Drawing Size: A3	Environmental Impact Statement
Drawn By: VN	Reviewed By: AA	Client: Hills of Gold Wind Farm Pty Ltd
Coordinate System: GDA 1994 MGA Zone 56		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1</div> <div style="margin-right: 5px;">2Km</div> <div style="margin-left: 10px;"> N ↑ </div> </div>		

6. KEY ASSESSMENT OUTCOMES

There are potentially 20 lots within 3 km of the Project that have dwelling entitlements. Based on the outcomes of the visual and noise assessments, it is unlikely that Project related visual and noise impacts would prevent the construction of a dwelling on any of those 20 lots.

6.1 Visual impact assessment

The desktop visual impact assessment undertaken for the lots found the majority of lots assessed have the potential for siting a dwelling with little to no visibility of the Project. Where the ZVI (refer **Figure 4-1**) identified large portions of the lot with potential views to the Project, vegetation visible on aerial imagery is likely to reduce views to the Project.

All lots with potential dwelling entitlements have opportunity to consider the layout of the wind farm and select areas of the lot to minimise visual impact. The design of future dwellings could be undertaken with consideration of the potential for visual impact and measures could be included to reduce potential visual impacts, for example:

- orientate the dwelling away from the Project;
- retain existing vegetation to screen the Project; and
- locate sheds to screen views to the Project.

6.2 Noise impact assessment

The key findings of the desktop noise assessment were:

- 15 lots were identified to be outside of the 35 dB contour and therefore fully achieve the noise criteria;
- five (5) lots were identified as being partially inside the 35 dB contour, with part of the lot achieving the noise criteria of 35 dB; and
- no lots were identified as being fully within the 35 dB contour and therefore no lots assessed were identified as not being achieve the 35 dB criteria within the lot.

The assessment concluded that for the lots where only a portion of the lot achieves the noise criteria, the area outside of the contour provides the opportunity to site a dwelling without any other constraints (ie site the dwelling within that portion of the lot that achieves the criteria).

6.3 Further merits based assessment of potentially impacts lots

In addition to dwelling entitlements, consideration in respect of the five (5) potentially impacted lots of key planning matters that may influence the siting or approval of dwellings has identified:

- the lots have dense and/ or scattered vegetation throughout with all lots either partially or fully mapped as bushfire prone land, with a number of lots mapped as being completely Vegetation Category 1 bushfire fire prone;
- three of the five lots do not have direct frontage to a public road; and
- all five of the lots are mapped as Class 6 and higher, with that class land largely suitable for grazing, forestry and nature land uses or selective forestry and nature conservation, however one lot also contains Class 4 , capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation).

6.4 Summation

The visual and noise assessments undertaken on the 20 lots identified with potential dwelling entitlements indicate that:

- The majority of lots assessed have the potential for siting a dwelling with little to no visibility of the Project and where the ZVI identified large portions of the lot with potential views to the Project, vegetation visible on aerial imagery is likely to reduce views to the Project. All lots with potential dwelling entitlements have the opportunity to consider the layout of the wind farm and select areas of the lot, dwelling orientation and existing vegetation screening to minimise visual impact.
- 15 of the 20 lots assessed were identified as being outside of the 35 dB contour and therefore fully achieve the noise criteria.
- Based on these assessment outcomes, the Project is unlikely to impact on the ability of a landholder to develop a dwelling on any of those 15 lots.
- Of the five lots identified as potentially being partially affected by noise, those lots are constrained in other ways unrelated to the Project which may affect whether planning approval would be given to any future planning application. It is noted that these five allotments are owned by two landowners, with which the Proponent is currently in landowner agreement negotiations.

APPENDIX A MLA VISUAL IMPACT ADVICE LETTER



24th February 2022

Amanda Antcliff - ERM

Level 1 | Watt Street Commercial Centre
45 Watt Street Newcastle NSW 2300

Re: Hills of Gold RFI November 2021

Dear Amanda,

1.0 Overview

It is our understanding, the DPIE has requested that the Proponent identify and assess any other lots in proximity to the project site with dwelling entitlements in this response. Moir Landscape Architecture (MLA). A total of 20 lots with dwelling entitlements have been identified and assessed as per the methodology outlined below.

2.0 Methodology

MLA has undertaken a desktop assessment of all lots provided to determine the potential visibility of the Project and determine whether a dwelling could be sited without visual impacts.

A Zone of Visual Influence (**ZVI**) was prepared to identify the number of potentially visible turbines and is provided in **Figure 1**. Further to the ZVI, a desktop assessment using topographic mapping and aerial imagery was undertaken to assess the topography, vegetation coverage and areas potentially suitable for siting a dwelling.

Commentary has also been provided on the potential visibility of the project across the lot, opportunity to avoid impact through anticipated orientation of dwellings (based on climate and / or desirable views) and the capacity for existing vegetation to screen the Project.

3.0 Overview of Findings

The following table provides a brief overview of the desktop assessment undertaken for each lot. The assessments have been undertaken using desktop assessment alone and have been made without consideration of other factors (ie. access, planning requirements) that may limit the potential for siting a dwelling.

Lot	LGA	Summary of Desktop Visual Impact Assessment
107//DP755349 Head of Peel Road Crawney 2338	Tamworth Regional Council (TRC)	Lot is located to the north of the Project Site. Southern side of ridges within the lot are steep and densely vegetated and therefore less suitable for a dwelling. The northern side of ridges are moderately vegetated and more suitable for dwelling due to northerly aspect. The Zone of Visual Influence (ZVI) indicates pockets of land on the northern sides of hills would have areas where less than 10 turbines would be visible. Additionally, existing vegetation would be likely to screen views
1//DP409652 Barry Road, Hanging Rock 2340	TRC	The Lot includes a parcel of land to the east and west of Barry Road. Land on the eastern side of Barry Road is moderately vegetated, and has expansive views to the north. No views of the Project are available. Land on the western side of Barry Road is densely vegetated with the exception of an elevated clearing close to the Road. A dwelling could be sited the cleared land and orientated away from the Project as views are expansive.
67//DP755349 Head of Peel Road, Crawney 2338	TRC	Lot is located to the north of the Project Site. The ZVI indicates the turbines have potential to be visible to the south, east and west of the lot. The lot is moderately vegetated and undulating. It is assumed a dwelling would be orientated to the north (away from the Project) for passive climate control. Existing vegetation could be retained to screen views to the Project from most areas within the lot.
175//DP755335 867 Nundle Creek Road, Nundle 2340	TRC	The ZVI prepared indicates areas of land within the lot with no views to the Project. The Project is located towards the east and south of the lot. It is assumed a dwelling would be orientated to the north for views and passive climate control. Existing vegetation on the lot could be retained to assist in screening views to the Project to the east and south.

1/1139717 867 Nundle Creek Road, Nundle 2340	TRC	<p>The ZVI indicates areas of cleared, flat land within the lot with no visibility of the Project.</p> <p>Additionally, the Project is located towards the east and south of the lot and it is assumed the dwelling would be orientated to the north (away from the Project) for desirable views across Nundle Creek Valley and passive climate control.</p>
195//DP750922 461 Mountain View Road, Crawney NSW 2338	Upper Hunter Shire Council (UHSC)	<p>Lot is steep and vegetated which limits areas suitable for siting a dwelling.</p> <p>An area of cleared land located in the south-western corner of the lot may be suitable for a dwelling (without any other constraints being considered).</p> <p>A dwelling could be sited in this area and orientated west to take advantage of expansive views to vegetated ranges to the west. If existing vegetation was retained to the north, the Project could be sufficiently screened.</p>
182//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	<p>The lot is undulating with a moderate coverage of vegetation. The ZVI indicates views to the Project would be screened by topography from the majority of the lot.</p> <p>Some areas of the lot will have the potential to view up to 10 turbines, however vegetation could be retained to screen the potentially visible turbines.</p>
52//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	<p>Lot is steep and vegetated which limits areas suitable for siting a dwelling.</p> <p>The ZVI indicates the entire lot has the potential to view up to 10 turbines. Existing vegetation could be retained to screen views to the potentially visible turbines.</p>
2//DP863264 Mountain View Road Crawney 2338	UHSC	<p>Lot is steep and vegetated which limits areas suitable for siting a dwelling.</p> <p>Partially cleared land close to access off Mountain View Road may be suitable for siting a dwelling (without any other constraints being considered).</p> <p>Existing vegetation could be retained to screen views to the potentially visible turbines.</p>

108//DP755349 1969 Timor Crawney Road Crawney 2338	UHSC	<p>Lot is steep and densely vegetated which limits areas suitable for siting a dwelling.</p> <p>The ZVI indicates areas of the lot which have no views to the Project. It is likely a dwelling would be orientated to the south (away from the Project) to take advantage of expansive views across vegetated ranges. Additionally, if existing vegetation was retained the Project could be sufficiently screened.</p>
128//DP750935	UHSC	<p>Lot is steep and moderately to densely vegetated which limits areas suitable for siting a dwelling.</p> <p>The ZVI indicates areas within the lot with no views to the Project, however it is likely a dwelling would be sited on cleared land to the east of the lot. A dwelling would likely be orientated to the south (away from the Project) to take advantage of expansive views across vegetated ranges.</p> <p>Additionally, if existing vegetation was retained the Project could be sufficiently screened.</p>
2//DP1093344 1969 Timor Crawney Road Crawney 2338	UHSC	<p>The lot is steep and moderately to densely vegetated which limits areas suitable for siting a dwelling.</p> <p>The ZVI indicates areas within the lot within close proximity to Timor Crawney Road which will have no visibility of the Project.</p>
193//DP750922	UHSC	<p>The lot is steep and densely vegetated which limits areas suitable for siting a dwelling.</p> <p>The ZVI indicates area of land with a low number of potentially visible turbines. If existing vegetation was retained the Project could be sufficiently screened from most locations in the lot.</p>
110//DP750925 7000 Hunter Road Barry 2340	UHSC	<p>The lot is moderately vegetated, with some areas of cleared land potentially suitable for siting a dwelling (without any other constraints being considered). The ZVI indicates the lot will have views to up to 10 turbines, however if existing vegetation was retained the Project could be sufficiently screened from most locations in the lot</p>
111//DP750925 7000 Hunter Road Barry 2340	UHSC	<p>The ZVI indicates the southern half of the lot will have views to up to 10 turbines. This area is deemed more suitable for a dwelling as there are areas of cleared land. It is likely a dwelling would be sited to take advantage of views to vegetated hills to the south (away from the Project). Additionally, existing vegetation could be retained to screen the Project.</p>

198//DP750922 2260 Pages Creek Road Pages Creek 2337	UHSC	<p>The lot is steep and densely vegetated which limits areas suitable for siting a dwelling.</p> <p>The ZVI indicates the majority of the lot has the potential to view up to 10 turbines.</p> <p>The Project could be sufficiently screened from most locations in the lot by existing vegetation.</p>
181//DP750922	UHSC	<p>The lot is located to the south of the Site, accessed off Mountain View Road. The lot is densely vegetated. The ZVI indicates up to 20 turbines will be visible from most of the lot.</p> <p>The Project could be sufficiently screened from most locations on the lot by existing vegetation.</p>
103//DP750925	UHSC	<p>The lot is located to the south of the Site and is densely vegetated. The northern half of the lot is sloped towards the north. The ZVI indicates the northern half of the lot has the potential to view to up to 20 turbines from some areas. The southern half of the lot slopes to the south and no views will be available to the Project due to topography.</p> <p>The Project could be sufficiently screened by a combination of topography and vegetation from this lot.</p>
112//DP750925	UHSC	<p>The lot is located to the south of the Site and is densely vegetated.</p> <p>The ZVI indicates most areas of the lot will not have any visibility of the Project (due to topography). The ZVI shows some vegetated areas of the lot have the potential to view up to 10 turbines.</p> <p>The Project could be sufficiently screened from most locations in the lot by existing vegetation.</p>
162//786649	UHSC	<p>The lot is a large area located to the south of the Site. The ZVI indicates the Project will not be visible from the northern portion of the lot. Views to the Project are likely to be available from the southern part of the lot, however dense vegetation would significantly reduce these views.</p> <p>The Project could be sufficiently screened from most locations in the lot by existing vegetation.</p>

4.0 Summary

The desktop visual impact assessment undertaken for the lots. The assessment found the majority of lots assessed have the potential for siting a dwelling with little to no visibility of the Project. Where the Zone of Visual Influence (ZVI) identified large portions of the lot with potential views to the Project, vegetation visible on aerial imagery is likely to reduce views to the Project. Further more, the design of future dwellings could be undertaken with consideration of the potential for visual impact and measures could be included to reduce potential visual impacts for example:

- Orientate the dwelling away from the Project
- Retain existing vegetation to screen the Project
- Locate of sheds to screen views to the Project.

Please do not hesitate to contact me if you require any further information.

Kind Regards,



Ashley Robertson

Associate Landscape Architect

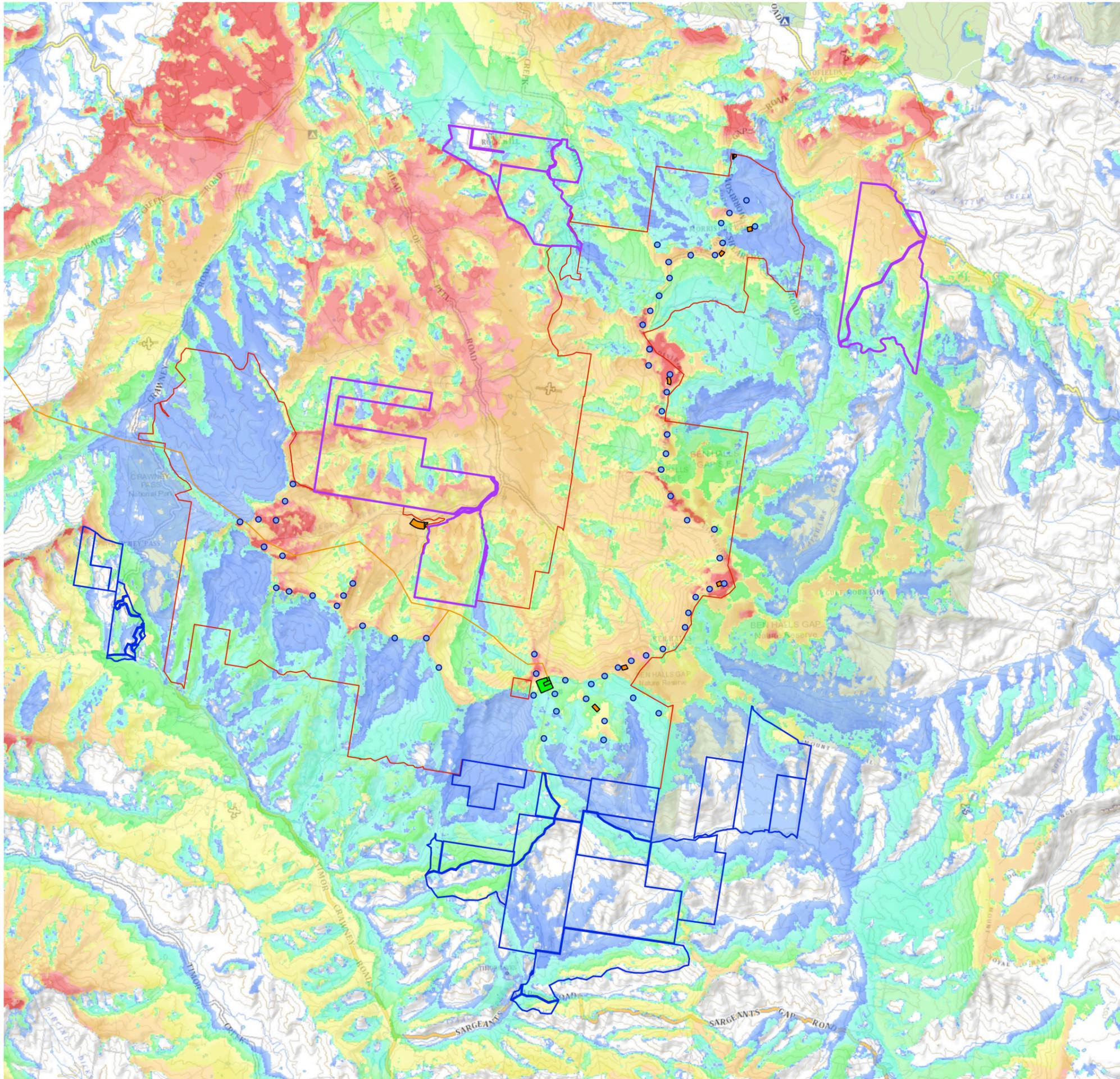


Figure 1:
 Lots with Dwelling Entitlements
 Zone of Visual Influence (230m)

Legend

- Site Boundary
- 230m Turbine
- UHSC Lot (40 ha)
- TSC Lot (200 ha)

ZVI Legend

- Nil
- 1 - <10
- 10 - <20
- 20 - <30
- 30 - <40
- 40 - <60
- 60 - <= 65

APPENDIX B SONUS NOISE ADVICE LETTER

ERM
Level 1, Watt Street Commercial Centre
45 Watt Street
NEWCASTLE NSW 2300

S6400C30

Attention: Amanda Antcliff

28 February 2022

Dear Amanda,

**HILLS OF GOLD WIND FARM
RESPONSE TO REQUEST FOR INFORMATION-22 November 2021**

Sonus previously conducted a Noise and Vibration Assessment of the proposed Hills of Gold Wind Farm, which was summarised in a report (Ref: S6400C14), dated October 2020 (the **Original Assessment**). Since the Original Assessment, minor changes were made to the proposal and Sonus prepared a summary describing (amongst other things) the potential change in the environmental noise associated with these changes (Ref: S6400C27).

The following request for information has now been received:

As outlined in the NSW Government Wind Energy Framework, the assessment should include the consideration of existing dwelling entitlements on land within the vicinity of the wind energy project.

The Original Assessment identified operational noise criteria for existing dwellings based on the NSW “*Wind Energy: Noise Assessment Bulletin*”. The most onerous (lowest noise level) criterion identified was 35 dB(A) for dwellings currently experiencing low background noise levels. Based on this criterion, an assessment of each allotment with a dwelling entitlement has been made to determine the predicted operational noise level on the allotment.

Table 1 summarises the allotments identified as having a dwelling entitlement. It is understood that the selected allotments have been based on the Tamworth Local Environmental Plan 2011, the Nundle Local Environmental Plan 2000 and the Upper Hunter Local Environmental Plan 2013.

Table 1: Identified allotment

No	Local Government Area (LGA)	Lot
1	Tamworth Regional Council (TRC)	107//DP755349
2	Tamworth Regional Council (TRC)	1//DP409652
3	Tamworth Regional Council (TRC)	67//DP755349
4	Tamworth Regional Council (TRC)	175//DP755335
5	Tamworth Regional Council (TRC)	1//DP1139717
6	Upper Hunter Shire Council (UHSC)	195//DP750922
7	Upper Hunter Shire Council (UHSC)	181//DP750922
8	Upper Hunter Shire Council (UHSC)	182//DP750922
9	Upper Hunter Shire Council (UHSC)	52//DP750922
10	Upper Hunter Shire Council (UHSC)	2//DP863264
11	Upper Hunter Shire Council (UHSC)	108//DP755349
12	Upper Hunter Shire Council (UHSC)	128//DP750935
13	Upper Hunter Shire Council (UHSC)	2//DP1093344
14	Upper Hunter Shire Council (UHSC)	193//DP750922
15	Upper Hunter Shire Council (UHSC)	103//DP750925
16	Upper Hunter Shire Council (UHSC)	112//DP750925
17	Upper Hunter Shire Council (UHSC)	110//DP750925
18	Upper Hunter Shire Council (UHSC)	111//DP750925
19	Upper Hunter Shire Council (UHSC)	198//DP750922
20	Upper Hunter Shire Council (UHSC)	162//DP7586649

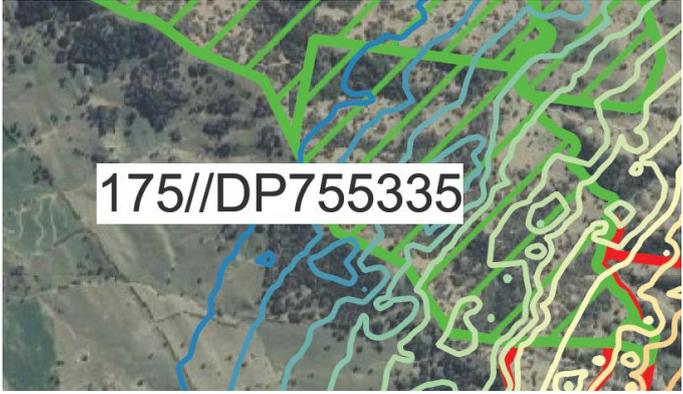
A 65-turbine layout, identified allotments and noise contours ranging from 25 dB(A) to 40 dB(A) with 1 dB(A) increments is shown in Appendix A. For each of the allotments, the noise contours have been used to determine if the noise levels on the allotment are likely to exceed 35 dB(A). The allotments have then been classified in the following way:

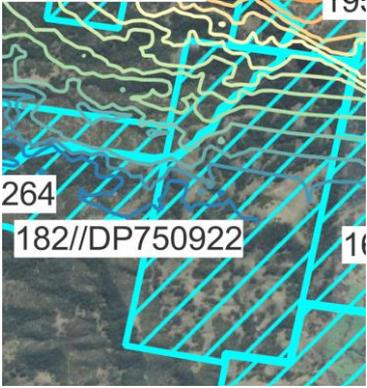
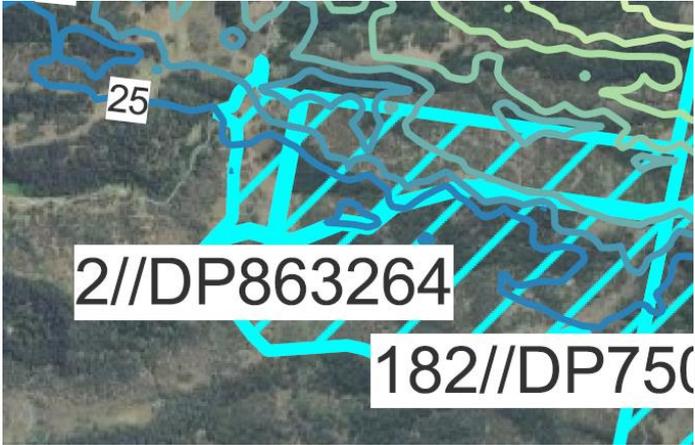
- An allotment which is fully outside of the 35 dB(A) contour, fully achieves the noise criteria
- Where the 35 dB(A) contour intersects an allotment, part of the allotment achieves the criteria
- An allotment which is fully inside the 35 dB(A) contour is unlikely to achieve the criteria.

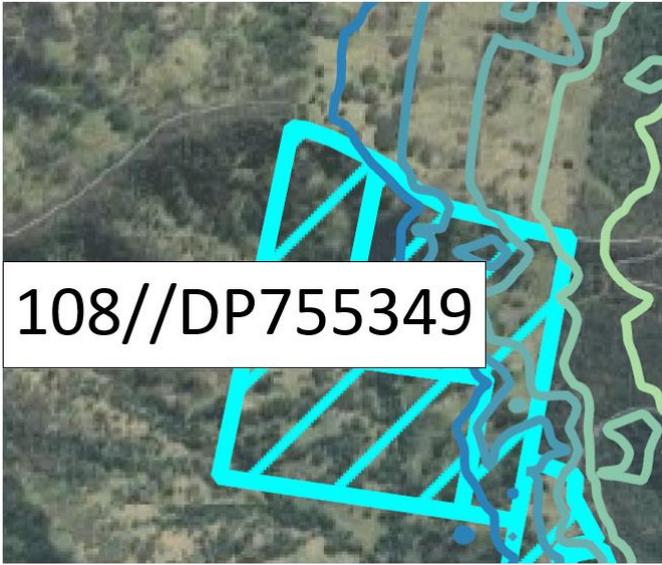
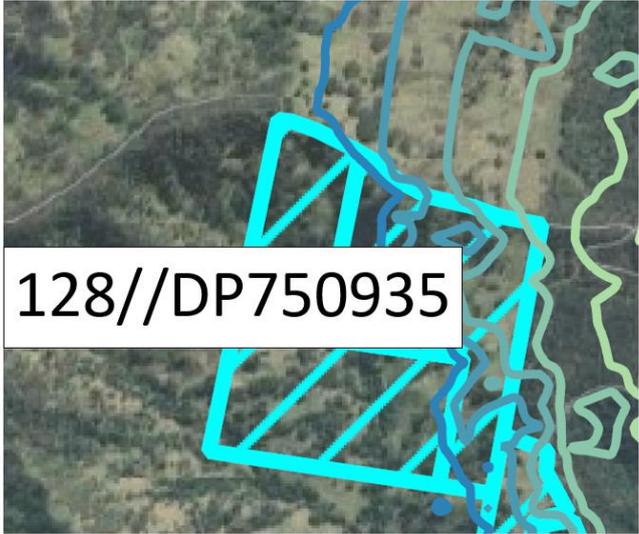
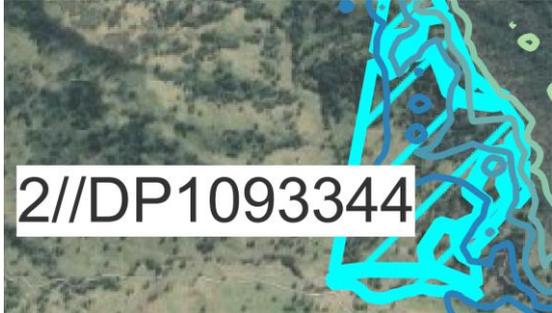
The noise assessment and noise contours for each allotment are summarised in Table 2.

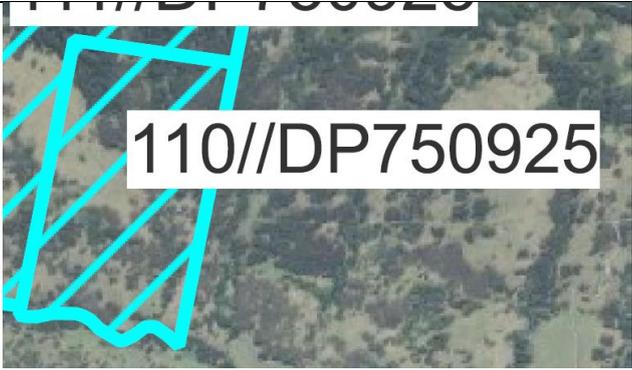
Table 2: Noise assessment summary

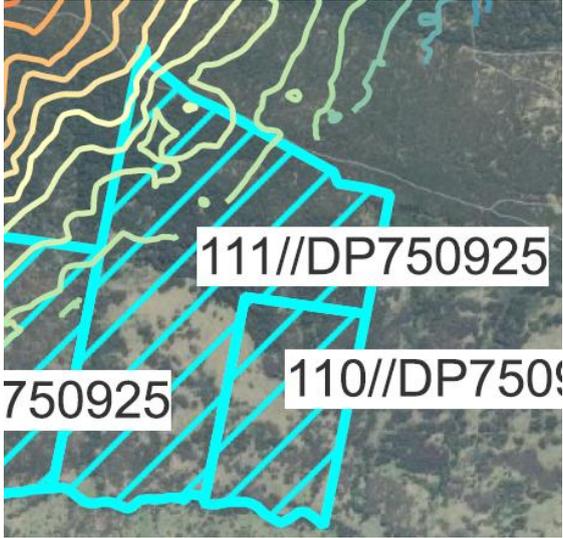
Lot	LGA	Noise Assessment	Noise Contours
107//DP755349 Head of Peel Road Crawney 2338	TRC	~85% of the Lot is outside the 35 dB(A) contour Part of the allotment achieves the criteria	
1//DP409652 Barry Road, Hanging Rock 2340	TRC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	
67//DP755349 Head of Peel Road, Crawney 2338	TRC	~60% of the Lot towards is outside the 35 dB(A) contour Part of the allotment achieves the criteria	

Lot	LGA	Noise Assessment	Noise Contours
175//DP755335 867 Nundle Creek Road, Nundle 2340	TRC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	
1//DP1139717 867 Nundle Creek Road, Nundle 2340	TRC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	
195//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	30% of the lot is outside the 35 dB(A) contour Part of the allotment achieves the criteria	
181//DP750922	UHSC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	

Lot	LGA	Noise Assessment	Noise Contours
182//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	
52//DP750922 461 Mountain View Road, Crawney NSW 2338	UHSC	~60% of the Lot towards is outside the 35 dB(A) contour Part of the allotment achieves the criteria	
2//DP863264 Mountain View Road Crawney 2338	UHSC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	

Lot	LGA	Noise Assessment	Noise Contours
<p>108//DP755349 1969 Timor Crawney Road Crawney 2338</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour</p> <p>Fully achieves the noise criteria</p>	
<p>128//DP750935</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour</p> <p>Fully achieves the noise criteria</p>	
<p>2//DP1093344 1969 Timor Crawney Road Crawney 2338</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour</p> <p>Fully achieves the noise criteria</p>	

Lot	LGA	Noise Assessment	Noise Contours
<p>103//DP750925 2260 Pages Creek Road, Pages Creek 2337</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria</p>	
<p>193//DP750922</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria</p>	
<p>110//DP750925 7000 Hunter Road Barry 2340</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria</p>	

Lot	LGA	Noise Assessment	Noise Contours
<p>111//DP750925 7000 Hunter Road Barry 2340</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour</p> <p>Fully achieves the noise criteria</p>	
<p>112//DP750925 2260 Pages Creek Road Pages Creek 2337</p>	<p>UHSC</p>	<p>100% of the lot is outside the 35 dB(A) contour</p> <p>Fully achieves the noise criteria</p>	
<p>198//DP750922 2260 Pages Creek Road Pages Creek 2337</p>	<p>UHSC</p>	<p>~50% of the lot is outside the 35 dB(A) contour</p> <p>Part of the allotment achieves the criteria</p>	

Lot	LGA	Noise Assessment	Noise Contours
162//DP7586649	UHSC	100% of the lot is outside the 35 dB(A) contour Fully achieves the noise criteria	

Based on the above, there are:

- 15 allotments have been identified to be outside the 35dB contour and therefore fully achieving the noise criteria.
- 5 allotments which have been identified as partially inside the 35dB contour and therefore only part of the allotment achieves the criteria.
- no allotments identified to be fully within the 35 dB(A) contour and therefore none are unlikely to achieve the criteria.

For those locations where only part of the allotment achieves the noise criteria, the area outside the 35 dB(A) contour provides the opportunity to site a dwelling without any other constraints.

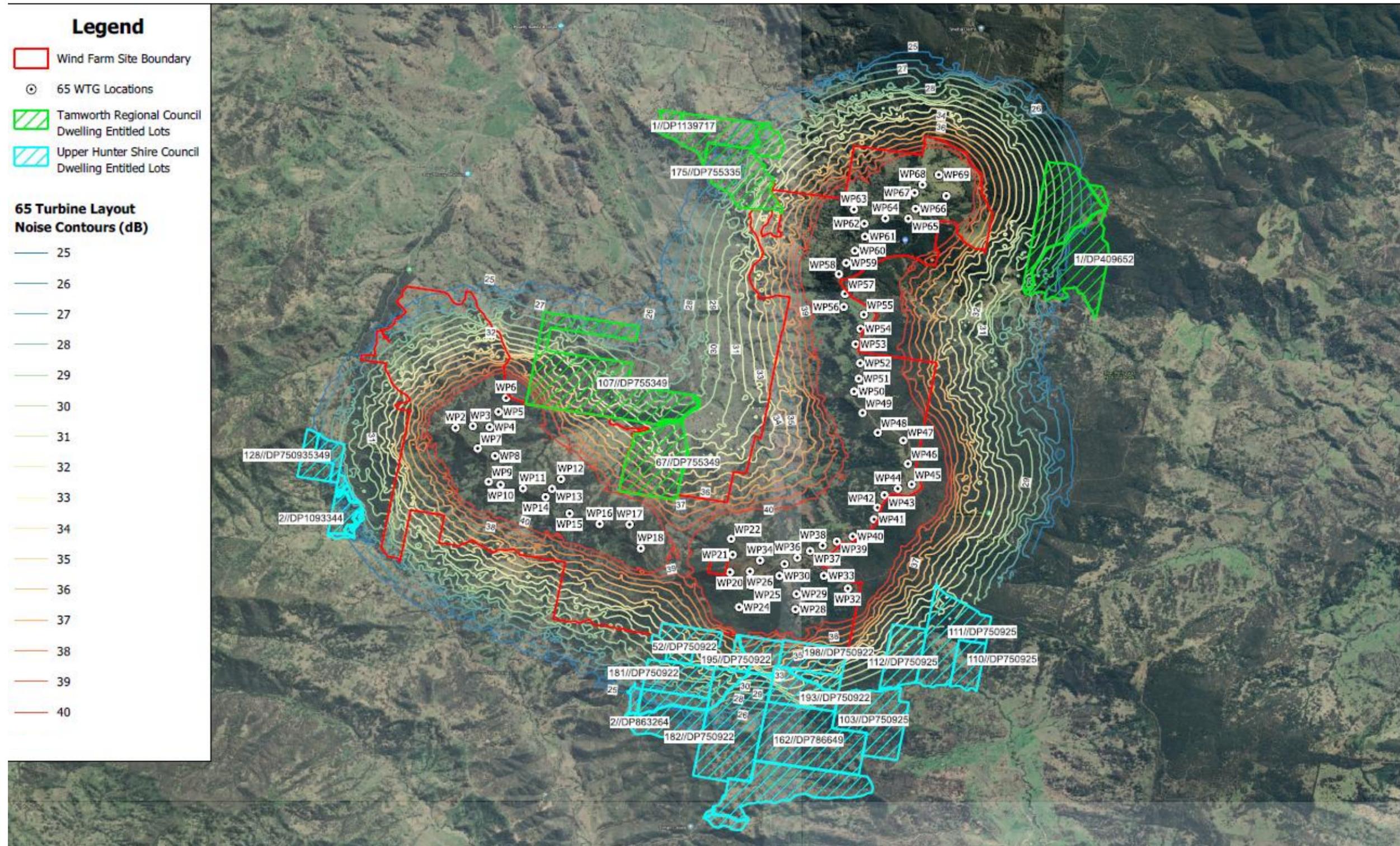
Yours faithfully
Sonus Pty Ltd



Chris Turnbull
Principal

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ct@sonus.com.au

Appendix A: Noise Contour and Identified Allotments



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