

White Rock Wind Farm

MP10_160 Modification Application No. 4

Environmental Assessment Report



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For: White Rock Wind Farm Pty Ltd (WRWFPL)



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EXECUTIVE SUMMARY

This document provides the Environmental Assessment to support Modification Application No. 4 (MOD 4) for Project Approval MP10_160, White Rock Wind Farm (WRWF). The modification relates to an alternative grid connection arrangement to an existing 330kV transmission line 13km west of WRWF.

This Environmental Assessment has been prepared by Goldwind Australia on behalf of the proponent, White Rock Wind Farm Pty Ltd (WRWFPL).

Project Approval MP10_160 was granted for the WRWF on 10 July 2012 under the now repealed Part 3A of the Environmental Planning and Assessment Act, 1979 (EP&A Act). The project involves development of a wind farm with up to 119 approved wind turbines and associated infrastructure in the Northern Tablelands region of NSW, 20km west of Glen Innes, 45km east of Inverell and approximately 500km north of Sydney.

The Project Approval was modified on 24 July 2015 (Mod 2) and, on 01 April 2016 (Mod 3). Modification Application No. 1, addressing an alternative grid connection at 330kV was withdrawn by the proponent in January 2015. Modification Application No. 4 is for essentially the same project as for Modification No 1.

Modification Application no. 4 relates to provision of an alternative grid connection for WRWF that is required to enable the full output of the approved wind farm to be delivered to the grid and can allow an approximate doubling of output for the WRWF project and for emissions savings delivered by the project. The alternative grid connection also has potential to indirectly benefit other renewable energy development in the locality.

The proposed modification involves the following variations to the approved WRWF development:

- an alternative 132kV transmission line route from the wind farm to TransGrid's 330kV (Qld-NSW Interconnector) transmission line located approximately 13km west of the wind farm site; and
- an alternative grid connection facility involving a 330kV switchyard and 132kV/330kV substation at a location approximately 13km west of WRWF, adjacent the 330kV transmission line.

Key documentation for Mod 1 Application included:

- the Mod 1 Supporting Document (Epuron, January 2013);
- submissions received by DPE in response to the public exhibition and referral of Mod 1; and
- the Mod 1 Submissions Report (Epuron, July 2013).

In the preparation of the MOD 4 application documents, reference has been made to the Mod 1 documents and details in those documents have been updated, as necessary, to address the current WRWF project status, strategic planning context, the advanced stage of assessment including consultation and referrals undertaken for the MOD 1 application process.

This Environmental Assessment for MOD 4 provides details of the key potential environmental impacts for the alternative transmission line and proposed switchyard/substation. The impact assessments included landscape and visual impact assessment, construction and operational noise impact assessment, biodiversity impact assessment and offset assessment, Aboriginal cultural heritage impact assessment. Outcomes of these assessments are provided below:

- **Visual.** The visual impact of the modification has been assessed as low. This outcome is a result of locating the line in a sparsely settled area with setbacks from non-associated residences and the ability of the landscape to visually absorb the development;

- **Noise.** The noise impact of the modification has been assessed as acceptable. The construction noise impacts will be managed through the approved CEMP that addresses the Construction Noise Guidelines. Operation noise of the substation is well below the relevant criteria from the Industrial Noise Policy;
- **Biodiversity.** The line route and substation location have been selected to minimize ecological impacts. In addition, construction would be undertaken in accordance with the approved Construction flora and fauna management plan. Offsets of biodiversity impacts will also be implemented through extension of the WRWF Biodiversity Offset Package that will need to be approved by DPE;
- **Indigenous heritage.** The line route and substation site have been assessed by an archaeologist in conjunction with Aboriginal stakeholders. The line route has been varied to avoid two identified indigenous heritage sites (scar trees). No increase in impact on indigenous or non-indigenous heritage is anticipated for the modification;
- **Traffic and Transport.** The substation and line route can be accessed from the Gwydir Highway using local roads, a farm track and WRWF access tracks. The substation access track will be upgraded and the intersection with Gwydir Highway will be upgraded in consultation with RMS to allow delivery of substation items and particularly the 132kV/330kV transformer. The modification does not give rise to significant increase in impacts for roads and safety of users;
- **Soil and Water Management.** The Project Approval requires and, the CEMP sets out appropriate mechanisms to manage erosion and sediment transfer. These measures are complemented and followed up by progressive rehabilitation of disturbed areas. The modification will not significantly increase impacts for erosion or water quality;
- review of other issues such as, electric and magnetic fields (EMF), bushfire risk management, aviation safety, conflicts with other landuses such as agricultural or mineral resource activities do not indicate any increase in impacts as a result of the modification.

This Environmental Assessment describes the proposed modification of the WRWF, provides the justification for the modifications, sets out the environmental impacts of the modifications and proposed mitigation measures. It concludes that this sustainable energy project, as modified, can be constructed and operated without significant additional impact to the environment.

Implementation of MOD 4 would not only enable the full development of the approved WRWF but would also enable unconstrained operation of the Glen Innes Wind Farm to the east of WRWF. Without the alternative grid connection, the WRWF project is limited to the 70 wind turbines being implemented as Stage 1. If MOD 4 is approved, then the full wind farm can be developed with an approximate doubling in renewable energy generation and doubling in the emissions savings arising from the project.

The additional mitigation measures described in this report will be incorporated into updated management plans required for project implementation.

TABLE OF CONTENTS

Section	Title	Page
	Executive Summary	3
1	Introduction	12
1.1	Purpose and content of this document	12
1.2	Details of Proponent.....	12
1.3	WRWF Project Background	12
1.4	Stage 1 Construction.....	13
1.5	Stage 1 Grid Connection infrastructure	13
1.6	Stage 2 Development.....	13
1.7	Structure of this document	14
2	Context for Grid Connection of the WRWF Project.....	17
2.1	Strategic context.....	17
2.2	Overview of potential WRWF and WRSF generation capacity.....	17
2.3	Northeastern NSW Grid connection options	18
2.3.1	The Glen Innes to Inverell 132kV transmission line	18
2.3.2	Armidale to Dumaresq 330kV transmission line.....	19
2.4	WRWF connection to the existing 330kV transmission line	19
2.5	Other projects requiring grid connection	19
2.6	Benefits of the WRWF Modification.....	20
3	Description of Proposed Modification.....	21
3.1	Overview of the Modifications Sought	21
3.2	Stage 1 Grid Connection infrastructure	21
3.3	Alternative 132kV transmission line route and line design	22
3.3.1	Overview of proposed 132kV line	22
3.3.2	Key line design specifications	22
3.3.3	Line route selection and description.....	22
3.3.4	Overview of Line Impacts	23
3.4	Alternative switchyard/substation location.....	26
3.5	Indicative Project Timeframe	29
4	Property Details for the Modified Project	30
5	Stakeholder consultation	32

5.1	Agency consultation	32
5.1.1	Department of Planning and Environment.....	34
5.1.2	Inverell Shire Council.....	34
5.1.3	Glen Innes Severn Council	35
5.1.4	Office of Environment and Heritage	35
5.1.5	Department of Primary Industries	35
	Agriculture	35
	Water.....	36
	Crown Lands.....	36
5.1.6	Environment Protection Authority.....	36
5.1.7	Rural Fire Service.....	37
5.1.8	Roads and Maritime Services.....	37
5.2	Aboriginal Stakeholder consultation	37
5.3	Community consultation for the alternative grid connection arrangement	38
5.3.1	Landowner agreements.....	38
5.3.2	Neighbour consultation.....	38
5.3.3	Community Consultation in 2016	39
5.3.4	WRWFPL Stakeholder and Community Engagement Strategy	39
5.3.5	Community Consultative Committee (CCC).....	40
6	Statutory Requirements.....	41
6.1	Overview of statutory requirements	41
6.2	Environmental Planning and Assessment Act 1979	41
6.3	WRWF Project Approval under Part 3A of the Act.....	42
6.4	State Environmental Planning Policies	42
6.5	Inverell Local Environmental Plan, 2012.....	43
6.5.1	Inverell Development Control Plan, 2013	43
6.6	Other NSW Environmental legislation	44
6.6.1	Protection of the Environment Operations Act 1997	44
6.6.2	Threatened Species Conservation Act 1995	44
6.6.3	Fisheries Management Act 1994 (FM Act)	44
6.6.4	Native Vegetation Act 2003	45
6.6.5	Noxious Weeds Act 1993 (NW Act).....	45
6.6.6	National Parks and Wildlife Act 1974.....	46

6.6.7	Roads Act 1993	46
6.6.8	Crown Lands Act 1989	47
6.6.9	Heritage Act 1977.....	47
6.6.10	Mining Act.....	47
6.7	Commonwealth Legislation.....	48
6.7.1	Environment Protection and Biodiversity Conservation Act 1999	48
6.7.2	Native Title Act 1993	49
6.7.3	Renewable Energy (Electricity) Act 2000.....	52
6.8	Other relevant policies and plans.....	52
6.8.1	Ecologically Sustainable Development (ESD).....	52
6.8.2	Strategic Regional Land Use Plan – New England North West	53
6.9	Summary of licenses and approvals	54
7	Assessment for the Proposed Modification	55
7.1	Assessment Requirements and Key Issues	55
7.2	Visual Impact.....	55
7.3	Noise Impact Assessment	58
7.3.1	Construction Noise.....	58
7.3.2	Operational Noise	58
7.4	Biodiversity.....	60
7.4.1	Weeds and their management	65
7.5	Indigenous and Non-Indigenous Heritage	66
7.6	Traffic and Transport Impacts	67
7.7	Soil and Water Management	73
7.8	Electric and Magnetic Fields.....	73
7.9	Aviation impacts.....	74
7.10	Land use implications	75
7.10.1	Agricultural landuse.....	75
7.10.2	Residential landuse	76
7.10.3	Mineral Resources.....	76
7.11	Bush fire risk.....	77
7.12	Cumulative Impacts	78
8	Justification	79
9	Conclusion.....	80

10	References	82
11	Appendices.....	82

Figures

- Figure 1.1 - White Rock Wind Farm Locality Map Wind Farm and Alternate Grid Connection layout
- Figure 1.2 – WRWF Stage 1 132kV Transmission line route (MOD 3) and 33kV/132kV substation location
- Figure 2.1 – Indicative profiles for average daily wind and solar generation
- Figure 2.2 – NSW Transmission Network and NE NSW high voltage lines
- Figure 2.3 – Regional Context for WRWF connection and other renewable energy projects
- Figure 3.1 – Approved Stage 1 132kV transmission line and alternative line route for connection to 330kV line on map base
- Figure 3.2 – Aerial image of alternative transmission line route and line assessment sections
- Figure 3.3 – WRWF Indicative Timeline for construction and operation
- Figure 4.1 – Property Map for alternative grid connection facilities
- Figure 4.2 – Plan of Mining lease 1505 – Lease application 1994 – Granted 2002
- Figure 6.1 – Extent of Native Title Claim 2011/06 – Gomeroi People
- Figure 7. 1 – Relative locations of residences surrounding the grid connection facilities
- Figure 7.2 – 132kV/330kV Substation - Predicted Operational Noise Contours
- Figure 7. 3 – Biodiversity Survey Locations and Threatened Species Locations
- Figure 7.4 – WRWF Alternative Grid Connection facilities access routes
- Figure 7.5 – Intersection of Gwydir Highway and 132kV/330kV Substation access track
- Figure 7. 6 – Intersection of Gwydir Highway and Spring Mountain Road
- Figure 7.7 – Typical Transport arrangement Over-mass Vehicle (10 by 8 tyre trailer)
- Figure 7. 8 - Typical Transport arrangement Over-mass Vehicle (Two by 10 by 8 tyre trailers)
- Figure 7.9 – Location of Strategic Agricultural Land for 13km line route locality
- Figure 7.10 – Figure 1 from Mineral and Resources Submission in February 2013

Tables

- Table 1.1 – WRWF and WRSF Projects and Alternative Grid Connection infrastructure
- Figure 1.2 – Stage 1 Grid Connection Infrastructure
- Table 3.1 – Possible transmission line arrangements
- Table 3.2 – Indicative Timeline for WRWF Construction and Operation
- Table 4.1 –Property Details for alternative Grid Connection Facilities
- Table 5.1 – Summary of Agency Consultation for the Modification Application

Table 6.1 – Objects of the EP&A Act and Consideration for the Modification Application

Table 6.2 – Summary of Matters of National Environmental Significance and other Protected Matters

Table 6.3 – Results of Search of National Native Title Claims for the Inverell Council LGA

Table 6.4 – Summary of Licences and Approvals required

Table 7.1 – Nearby residential dwellings and potential visual impact of the alternative transmission line

Table 7.2 – Alternative Grid Connection - Infrastructure footprint

Table 7.3 – Native Vegetation Impact area calculation

Table 7.4 – WRWF Alternative Grid Connection – Biodiversity Credits required

Table 7.5 – ICNIRP Reference EMF Levels

Table 8.1 - Development outcomes for various scenarios and benefits of renewable energy expansion

Plates

Plate 2.1 – The existing 132kV transmission line near the 330kV transmission line

Plate 3-1 - Alternative substation location adjacent to TransGrid 330kV transmission line

Plate 3-2 – Example 330kV substation (Macarthur) constructed in Sydney by TransGrid in 2009

Plate 3.3 – Aerial view of Example Single Transformer Substation in a rural location

Plate 7.1 – Panorama scene viewed east from Spring Mountain Road toward White Rock Mountain (GBD)

Plate 7.2 – White Box Yellow Box Blakelys Red Gum EEC

Plate 7.3 – Ribbon Gum – Mountain Gum Snow Gum Forest/Woodland EEC

Plate 7.4 – Riparian Community / River Oak Vegetation Community (Only in Section 6)

Plate 7.5 – Upland Wetlands of the Drainage Divide of New England Bioregion EEC (localized)

Plate 7.6 – Scar Tree near mid-section of line. Now avoided by re-routing the line

Plate 7.7 - Scar Tree near mid-section of line. Now avoided by re-routing the line

Plate 7.8 – Intersection Gwydir Highway and Spring Mountain Road

Plate 7.9 –Spring Mountain Road north of bridge over Swan Brook

Plate 7.10 – Spring Mountain Road bridge over Swan Brook showing low level bridge bypass

Plate 7.11 – View to south to intersection of Spring Mountain Road (north and east branches), Northcotts Road (south) and Sturmans Road (west)

Plate 7.12 – Entry Point to track to the 330kV/132kV substation site. View west on Gwydir Hwy

Plate 7.13 – Entry point for Substation site. View across Gwydir Highway to existing triple gates.

Appendices

Appendix 1 – White Rock Wind Farm – Mod 4 – Visual Impact Assessment, Green Bean Design, July 2016

Appendix 2 - White Rock Wind Farm – Mod 4 –Noise Impact Assessment, Sonus, September 2016

Appendix 3A – White Rock Wind Farm – Mod 4 – Biodiversity Impact Assessment, Environmental Assessments Pty Ltd, Nov 2016

Appendix 3B – White Rock Wind Farm – Vegetation Condition Mapping and Threatened Species Summaries, Submissions Report, Epuron, July 2013

Appendix 3C - WRWF Alternative Grid Connection – Assessment of Offset Requirements, Eco Logical, December 2016

Appendix 4 - White Rock Wind Farm – Mod 4 – Cultural Heritage Impact Assessment, Environmental Assessments Pty Ltd, October 2016

Appendix 5 - TransGrid letter of Support for the Alternative Grid Connection, 01 November 2016

ABBREVIATIONS

AHIMS	Aboriginal Heritage Information Management System
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
BOP	Biodiversity Offset Package
CEMP	Construction Environmental Management Plan
CCC	Community Consultative Committee
CTAMP	Construction Traffic Access Management Plan
DALP	Design and Landscape Plan
DCP	Development Control Plan
DPE	Department of Planning and Environment
EA	Environmental Assessment
EEC	Endangered Ecological Community (under NSW TSC Act)
EMF	Electric and Magnetic Fields
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act
EP&A Act	Environmental Planning and Assessment Act
EPL	Environment Protection Licence
ER	Environmental Representative
ESD	Ecologically Sustainable Development
EWMS	Environmental Work Method Statement
GISC	Glen Innes Severn Council
GIWF	Glen Innes Wind Farm
GWA	Goldwind Australia Pty Ltd
Ha	Hectare
IC	Inverell Council

ICNIRP	International Commission on Non-Ionising Radiation Protection
ILEP	Inverell Local Environmental Plan
kV	kilovolt
kV/m	Kilovolt/meter (units of electric field)
LGA	Local Government Area
mG	milliGaus (units of magnetic field)
ML	Mining Lease
MP	Major Project
MW	megawatt
OEH	Office of Environment and Heritage
O&M	Operations and Maintenance
PA	Project Approval
POEO Act	Protection of the Environment Operations Act
RFS	Rural Fire Service
RMS	Roads and Maritime Services
ROTAP	Rare or Threatened Australian Plants
SEPP	State Environmental Planning Policy (NSW)
TEC	Threatened Ecological Community (under EPBC Act)
TL	Transmission Line
TSC Act	Threatened Species Conservation Act
VIA	Visual Impact Assessment
WRSF	White Rock Solar Farm
WRWF	White Rock Wind Farm
WRWFPL	White Rock Wind Farm Pty Ltd

1 INTRODUCTION

1.1 Purpose and content of this document

This Environmental Assessment provides supporting information for Modification Application No 4 for the White Rock Wind Farm (WRWF) Project Approval MP10_160. Modification Application No. 4 relates to provision of an alternative grid connection to an existing 330kV transmission line, 13km west of WRWF, to enable the full development of the approved WRWF.

This EA includes:

- details of the proposed modifications being sought and the associated lands affected;
- details of the grid connection context;
- statutory requirements and consultation;
- details of the environmental issues and impacts associated with the proposal;
- details of proposed mitigation measures;
- justification for the proposed modification;
- conclusions; and
- appendices that provide relevant specialist assessments.

1.2 Details of Proponent

This report has been prepared by Goldwind Australia Pty Ltd (GWA) on behalf of the proponent, White Rock Wind Farm Pty Ltd (WRWFPL). In 2014, Goldwind Capital Australia (GWCA) acquired WRWFPL and the project from Epuron Pty Ltd which obtained the planning approval in July 2012.

In 2016, CECEP Wind-Power Corporation (CECWPC) acquired 75% interest in WRWFPL with Goldwind retaining a 25% interest. Construction of WRWF Stage 1 commenced in May 2016.

1.3 WRWF Project Background

The proposed White Rock Wind Farm (WRWF) received planning approval on 10 July 2012, from the NSW Minister for Planning under Section 75J of the Environmental Planning and Assessment (EP&A) Act, 1979 (EP&A Act). The Project Approval was subsequently modified under Section 75W, on 24 July 2015 (MP10_160 MOD 2) and on 01 April 2016 (MOD 3). MOD 1 was withdrawn before determination.

The Project Approval MP10_160, as modified, allows for:

- construction of up to 119 wind turbines, each with three blades mounted on a tubular steel tower and concrete foundation (70 wind turbines are being installed as part of Stage 1 construction);
- access tracks required for the installation and maintenance of the wind turbines;
- electrical connection (at 33kV), between the turbines and an on-site substation, using a combination of underground and overhead transmission lines;
- a 132kV transmission line (approximately 8km) connecting the on-site substation to the existing TransGrid, Glen Innes to Inverell, 132kV transmission line;
- an onsite operation and maintenance (O&M) facility near the northern site entrance from Gwydir Highway and additional O&M facility at the southern entry from Kelleys Road; and
- Temporary facilities for WRWF construction, construction compounds, laydown areas and batch plants.
- Permanent monitoring masts.

White Rock Wind Farm is located between Glen Innes and Inverell, on privately owned rural land, within the Great Dividing Range of NSW. WRWF is about 20km west of Glen Innes, 45km east of Inverell and about 75 km north of Armidale.

While the Project Approval allows for up to 119 wind turbines to be installed, it is intended that the project will be developed in stages. The WRWF Staging Report, required by Condition B11 of the Project Approval, was submitted to Department of Planning and Environment (DPE) initially in November 2015 and an updated version provided to DPE in April 2016. The Staging Report describes the proposed staging of the WRWF implementation, comprising Stage 1 (70 turbines) and Stage 2 (up to 49 turbines) (Figure 1.1).

Stage 1 of the project involves construction and operation of 70 Goldwind GW121-2.5MW wind turbines (see Section 1.4). Stage 2 will follow Stage 1 at a time still to be confirmed and subject to further planning.

1.4 Stage 1 Construction

WRWF Stage 1 construction commenced on 25 May 2016. It involves the installation of 70 Goldwind GW 121–2.5MW wind turbines, grid connection components including a 33kV/132kV substation approximately 1.5km south of White Rock Mountain and 8km of 132kV double circuit transmission line connecting to TransGrid’s existing 132kV Glen Innes – Inverell transmission line, an operations and maintenance facility, access tracks, 33kV collection circuits and temporary construction facilities. Two permanent monitoring masts were installed as pre-construction components. Stage 1 layout is shown in Figure 1.1.

1.5 Stage 1 Grid Connection infrastructure

The route of the approved 8km, 132kV transmission line and location of the 33kV/132kV WRWF substation are shown in Figure 1.2. The 8km 132kV line is a double circuit design. The substation is being constructed approximately 1.5 km south of White Rock Mountain, at the southern site of the two proposed substation locations presented in the EA, April 2011. The northern substation site on White Rock Mountain, which was assessed in the EA, April 2011 is not required. Also, the 132kV switchyard shown at the northern end of the line in EA, April 2011 is not required due to a simpler connection arrangement being implemented by TransGrid. The southern 33kV/132kV substation site was selected as being centrally located for WRWF and minimizing electrical losses. The Stage 1 substation site would need to be upgraded for Stage 2 development.

The Stage 1 design including the abovementioned grid connection facilities has allowed Stage 1 to proceed but the connection to the existing Glen Innes to Inverell 132kV Transmission line does not have any additional capacity to enable connection of WRWF Stage 2 or connection of the nearby approved Glen Innes Wind Farm (GIWF) without constraints on one or both of the WRWF and GIWF projects.

The existing Glen Innes to Inverell 132kV single circuit transmission line was upgraded, from 66kV to 132kV during 2011/2012 with completion of works in May 2012. This upgrade was occurring at the same time as the Project Application MP10_160 was under review by DPE, agencies and the community. The application was determined in July 2012, two months after completion of the line upgrade.

It appears likely that the proponent at the time and, possibly DPE, had considered the WRWF Project Application with the assumption that the 132kV line was being upgraded. However, it may not have been appreciated that even the upgraded line would not have sufficient capacity for the full potential of wind farms that were planned at the locality and which could be connected to it (including WRWF and GIWF to the east of WRWF).

Typical single and double circuit single pole transmission line configurations are shown in Plates 1.1 and 1.2.

1.6 Stage 2 Development

Planning for Stage 2 that allows for up to 49 turbines is in progress and final details are not yet confirmed.

1.7 Structure of this document

Section 0 Executive Summary

Section 1 Background to WRWF project and need for the modification

Section 2 Provides an overview of the strategic context for grid connection of WRWF

Section 3 Describes the proposed modifications sought

Section 4 Provides details of the properties associated with the modified project

Section 5 Outlines statutory requirements for WRWF and the modification application

Section 6 Describes consultation undertaken for the proposed modifications

Section 7 Outlines the environmental assessment for the proposed modifications

Section 8 Sets out the proponent's proposed mitigation measures

Section 9 Lists the conclusions of this EA Report.

Section 10 lists relevant references for preparation of this EA.

Appendices provide specialist reports relevant to the modification application



Plate 1.1 Existing Single circuit 132kV transmission line near the existing 330kV transmission line on skyline



Plate 1.2 Typical double circuit, single pole line

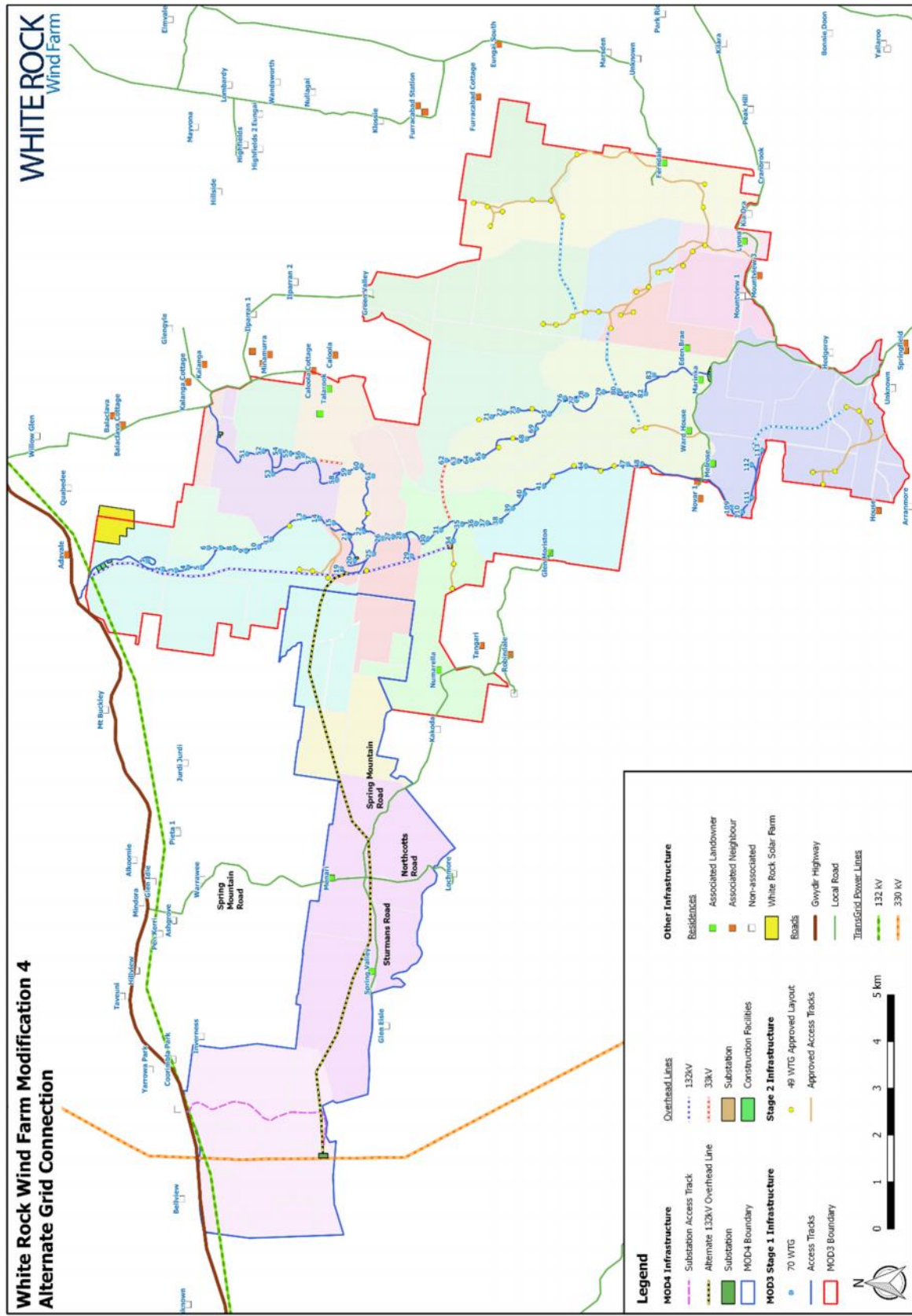


Figure 1.1 – WRWF Locality Map – Wind Farm and Alternative Grid Connection Facilities

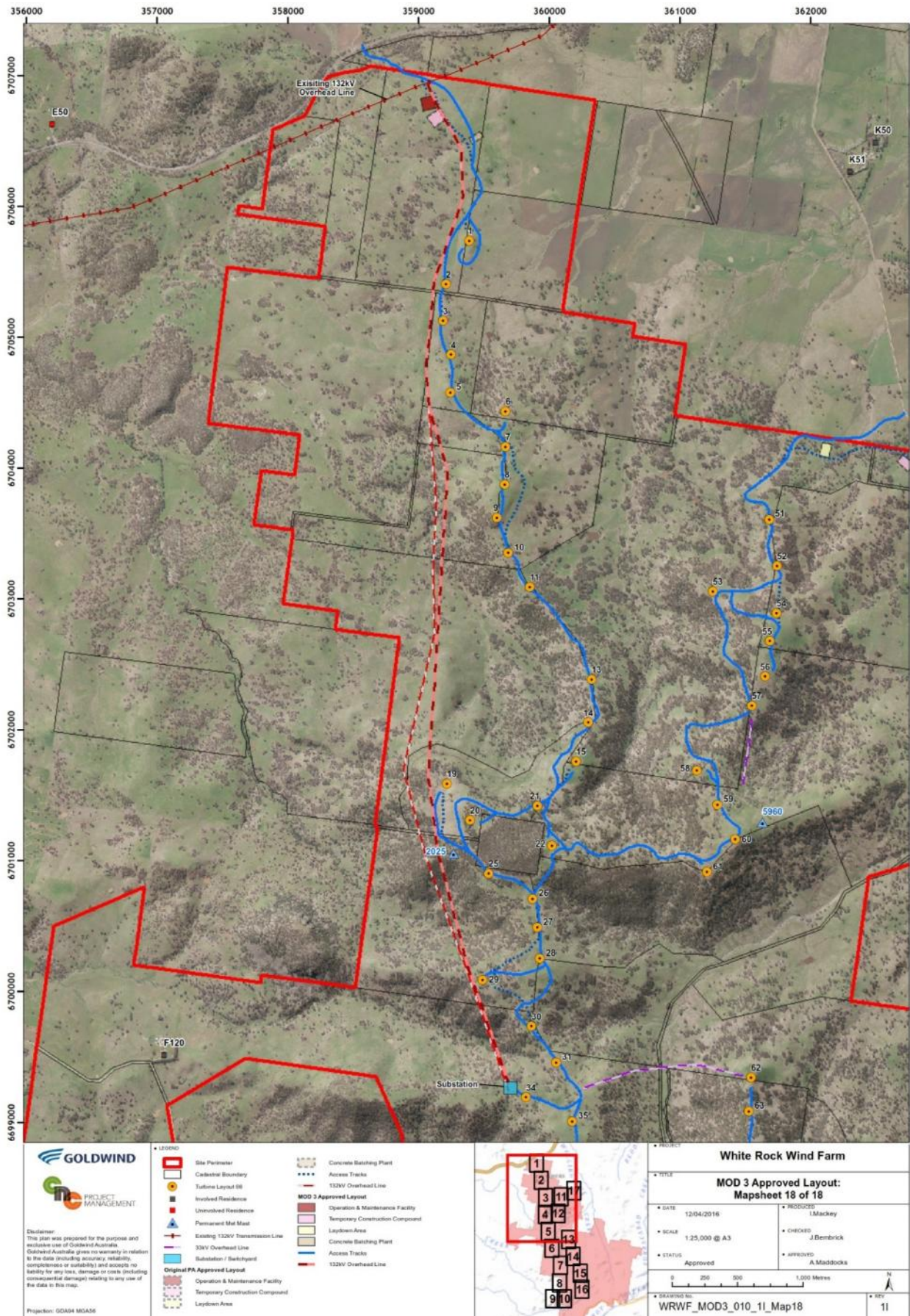


Figure 1.2 – Stage 1 132kV Transmission line route (MOD 3) and 33kV/132kV substation location

2 CONTEXT FOR GRID CONNECTION OF THE WRWF PROJECT

2.1 Strategic context

A review of the strategic context for an alternative grid connection of the WRWF is provided in this section. The review addresses the reasons why the alternative grid connection is required and options available for the grid connection. This section considers the following aspects:

- the potential output of the WRWF and adjacent WR Solar Farm;
- the options available for grid connection; and
- other proposed renewable projects in the locality and context for grid connection.

2.2 Overview of potential WRWF and WRSF generation capacity

The White Rock Wind Farm (WRWF) was based on the Epuron Environmental Assessment, April 2011 and involves the construction and operation of a wind farm with up to 119 wind turbines. The output of the wind farm is dependent on the number of turbines installed and the capacity of the turbines used for WRWF. The capacity of the turbines utilized can vary depending on, site characteristics or, the available turbines at the time of contracting for supply of turbines.

The development of WRWF is in Stages as set out in the Staging Report, April 2016 and summarized below.

- Stage 1 of the WRWF commenced construction in May 2016 and involves installation of 70 Goldwind GW121 2.5MW wind turbines. These turbines have a total generation capacity of 175MW and Stage 1 is scheduled to be operational in latter half of 2017.
- Stage 2 of the WRWF could involve up to 49 additional approved turbines. The turbine model to be selected will be chosen from the available turbine models at the time. Dependent on the turbine generation rating, the total output of Stage 2 could be of the order of 122MW to 166MW.
- The total output of Stage 1 and 2 could therefore be of the order of 300MW to 340MW.

The White Rock Solar Farm (WRSF) has an additional 20MW capacity but the full generation of WRSF, which occurs during daylight hours, rarely coincides with the full output of the WRWF (Figure 2.1).

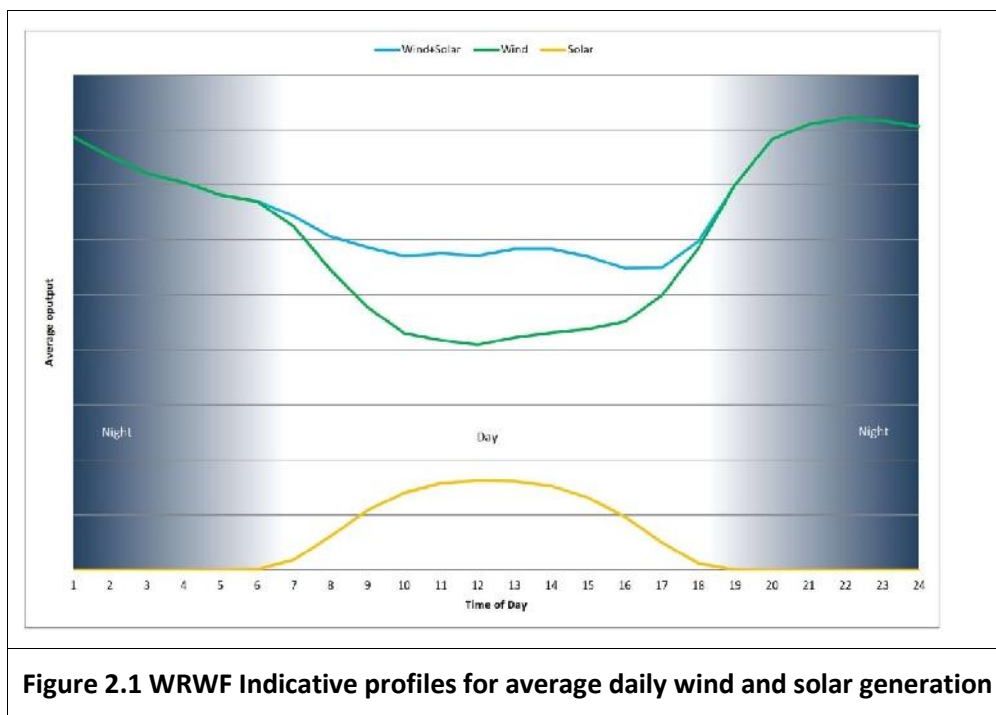


Figure 2.1 WRWF Indicative profiles for average daily wind and solar generation

It has been estimated based on historical regimes that the solar farm in conjunction with WRWF Stage 1 may be constrained about 2% of the time that it could be operating. Curtailment of the WRSF generation would ensure the line capacity is not exceeded. Overall, WRSF reduces variation in the level of output from the WRWF substation (Figure 2.1). The alternative grid connection would avoid any need for curtailment of WRSF.

The total maximum output for WRWF (Stage 1 and 2) and WRSF may be in the order of 320MW to 360MW.

2.3 Northeastern NSW Grid connection options

Figure 2.2 shows the high voltage lines for NSW with more detail for north-eastern NSW.

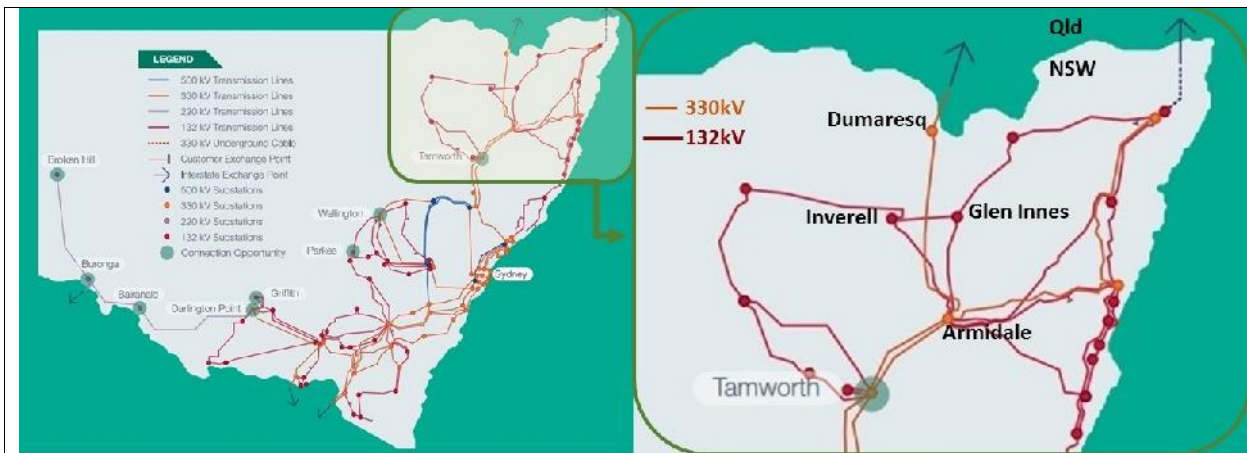


Figure 2-2 - NSW Transmission Network and NE NSW high voltage lines

The WRWF grid connection options include:

- Approved connection to existing Glen Innes to Inverell 132kV single circuit transmission line (capacity 170MW). The upgrade of the line from 66kV to 132kV was completed in May 2012;
- Alternative connection to existing 330kV Armidale to Dumaresq double circuit transmission line (capacity of approximately 1,000 MW) that forms part of the Queensland-NSW Interconnection System.

The above connection options are described below.

2.3.1 The Glen Innes to Inverell 132kV transmission line

The Glen Innes to Inverell 132kV transmission line (referred to by TransGrid as Line 9U4) passes close to the northern extent of the WRWF. The single circuit line runs between Glen Innes and Inverell substations and has a capacity of approximately 170MW. While the east-west route crosses the north-south 330kV line about 13km west of WRWF, the two lines are separate and not connected.

The WRWF, including facilities for connection to the existing 132kV line was approved in July 2012 approximately two months after the line was upgraded from 66kV to 132kV. WRWF Stage 1 has been designed for connection at 132kV and is proceeding on the basis of a design that is able to be accommodated by the 132kV line. As described above, WRWF (Stage 1 and 2) and associated WRSF may have an output of 320 to 360MW which exceeds the line capacity by at least 150MW.

The Glen Innes Wind Farm (GIWF), about 5km east of WRWF, comprises 25 wind turbine sites and was also approved based on connection to the 132kV line. GIWF could have an output in the order of 62.5MW to 85MW.

It is anticipated that development of GIWF may only proceed if the proponent can gain an unconstrained connection to the 132kV line. However, if development of GIWF followed WRWF Stage 1 then both WRWF

and GIWF may experience constraints on exporting the renewable energy that could be generated by the respective wind farms.

If both the WRWF and GIWF were connected to the Glen Innes to Inverell line, then the output of the two wind farms would be more than twice the capacity of the 132kV line in its current form. As a result, over 200MW of potential renewable energy generation would be constrained without alternative grid connection arrangements.

2.3.2 Armidale to Dumaresq 330kV transmission line

The Armidale to Dumaresq 330kV transmission line is located 13km west of the WRWF site and runs generally north to south crossing the existing 132kV transmission line to the south of the Gwydir Highway. The 330kV line is a double circuit line with a capacity in the order of 1,000MW.

The 330kV line provides an alternative connection option for WRWF and has more than adequate capacity for WRWF and other projects. Connection of WRWF to the 330kV line would require an additional 13km of 132kV double circuit transmission line and an additional substation, adjacent the 330kV line, to raise the WRWF output voltage from 132kV to 330kV. This would require an additional 132kV/330kV transformer and 330kV switchyard. Connection could be to one or both circuits of the 330kV line.

There are no other high voltage lines available in the immediate locality that are suitable for connection of the full output of WRWF (Stage 1 and 2), WRSF and GIWF.

2.4 WRWF connection to the existing 330kV transmission line

The alternative grid connection contemplated in this Environmental Assessment involves; an additional 13km section of 132kV transmission line between WRWF and TransGrid's existing 330kV transmission line between Armidale and Dumaresq and, a 132kV/330kV substation located adjacent to the 330kV line, at a point only 13km west of WRWF.

This alternative connection would allow the full renewable energy output from WRWF (Stage 1 and Stage 2) and WRSF to be exported to the national electricity grid and, the export would be achieved with lower energy losses than would apply for the approved WRWF connection at 132kV.

Furthermore, the connection of WRWF to the existing 330kV line instead of the approved 132kV connection would free up the Glen Innes to Inverell 132kV line for future use by other wind farm projects in the region, either the approved Glen Innes Wind Farm that could otherwise be grid constrained or, the Sapphire Wind Farm depending on its extent of development and grid connection arrangements. WRWF Stage 1 is now a committed project and is has been under construction for 6 months. Neither, the Glen Innes Wind Farm or, the Sapphire Wind Farm has yet commenced construction.

The WRWF alternative grid connection would therefore provide benefits for multiple projects, the local region and the community generally. Benefits of the WRWF and realization of the full project generation are outlined further in Section 2.6 of this document.

2.5 Other projects requiring grid connection

There have been four large wind farm proposals in the Glen Innes-Inverell locality, three of which (White Rock, Glen Innes and Sapphire Wind Farms) have been approved and one, Ben Lomond Wind Farm which has been revoked. Additionally, the 20MW White Rock Solar farm (WRSF) adjacent to WRWF has been approved and together with WRWF would form a hybrid wind-solar project optimizing the renewable energy resource at location. These projects are shown in Figure 2.3.

The abovementioned projects form part of the region's potential renewable energy projects that if developed will help address Australia's Large Renewable Energy Target (LRET) objectives. They also represent potential contributors to growth of the New England Regional economy.

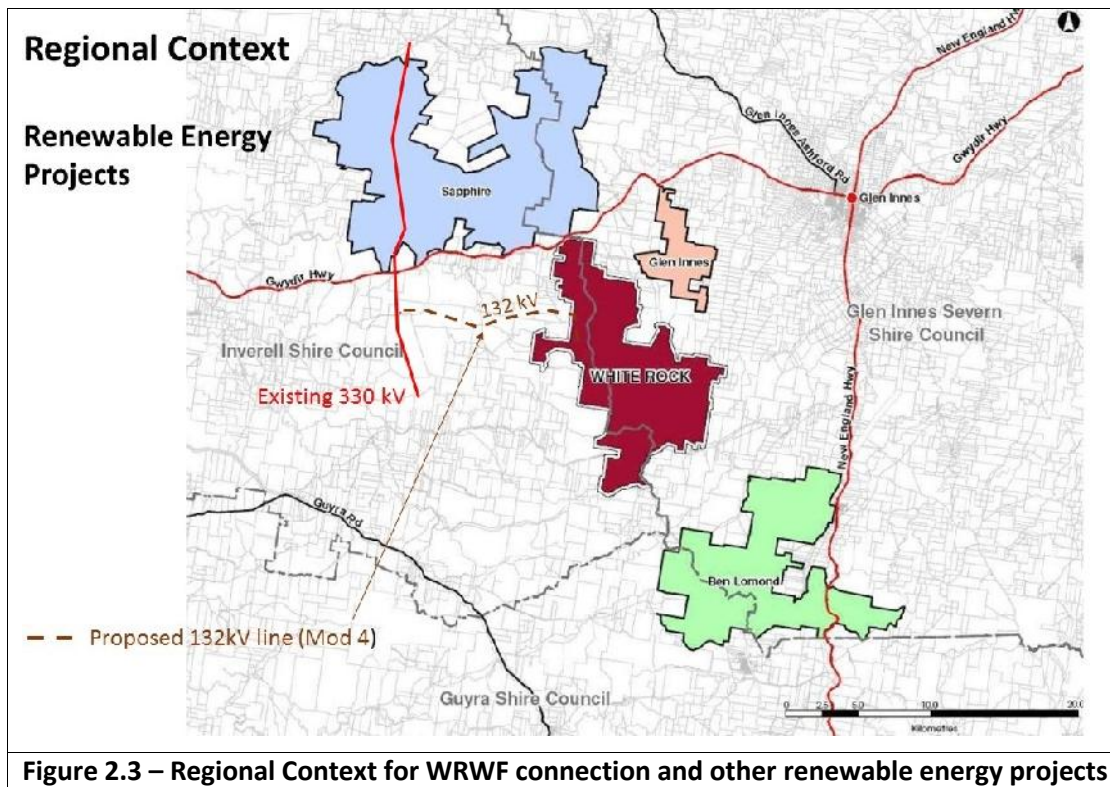


Figure 2.3 – Regional Context for WRWF connection and other renewable energy projects

2.6 Benefits of the WRWF Modification

The alternative grid connection for WRWF would allow the full development of the approved WRWF enabling increased renewable energy output and increased greenhouse gas emissions savings. It would also facilitate more efficient development and operation of Glen Innes Wind Farm that has similar types of benefits. The modified White Rock Wind Farm provides the following primary benefits:

- Directly increases the potential renewable energy capacity by 166.6MW, almost doubling WRWF generation capacity;
- With full development, generation output would almost double from 610,050 MWh of electricity per year for Stage 1 to 1,186,900 MWh per year;
- Based on average consumption per home, the output could increase the number of homes served from 95,550 to 185,900;
- Improve the security of electricity supply through diversification of NSW generation locations.
- It would allow further greenhouse gas emissions savings increasing from 554,411 to 1,082,210 tonnes of carbon dioxide equivalent (CO₂e) per annum (The emissions savings are based on Epuron calculations using NSW Wind Farm Greenhouse Gas Savings Tool developed by DECCW)
- It would contribute to the State and Federal Governments’ target of providing at least 20% of consumed energy from renewable sources by 2020.
- It would contribute to the NSW Government's target of reducing greenhouse gas emissions by 60% by the year 2050.
- It would create local employment opportunities and inject funds of up to \$300 million into the Australian economy.
- In addition to these primary benefits there are also significant secondary benefits which include opportunities for tourism and ecology and improvement to existing infrastructure.

3 DESCRIPTION OF PROPOSED MODIFICATION

3.1 Overview of the Modifications Sought

Modification Application No. 4 seeks approval for an alternative grid connection arrangement for WRWF that involves approximately 13km of 132kV transmission line and a 132kV/330kV substation adjacent to the existing 330kV transmission line between Armidale and Dumaresq. The modification seeks to address inadequate capacity in the local grid to enable the full potential of approved renewable energy projects. In particular, the alternative connection would allow the full development of the approved WRWF. An indirect consequence of approval modification 4 and subsequent implementation of the alternative is that the capacity (170MW) of the existing 132kV line would then be available for the approved GIWF.

Infrastructure required for the alternative grid connection includes the following:

- a 330kV Switchyard and connection to one or two circuits of the existing 330kV double circuit Armidale to Dumaresq transmission line (part of the Queensland/New South Wales Interconnector lines);
- a 132kV/330kV Substation (referred to here as Swan Vale Substation) including 132kV/330kV transformer(s) and operations and maintenance facility, access track from the Gwydir Highway approximately 2.5km to the north of the WRWF substation site;
- 13km of 132kV double circuit transmission line with poles spaced at about 250m and height of up to approximately 35m. The line route is generally east-west and would link the above mentioned 132kV/330kV substation at its western end to the 132kV transmission line being installed for Stage 1 at a point near WRWF Turbine 18 site and approximately 2km north of the WRWF substation;
- Hardstands at each pole site providing a platform for a crane for construction and maintenance;
- Tracks for access to the 132kV line route from public roads to reach the respective pole sites and work locations; and
- Temporary construction facilities at one or more locations along the line route including, site offices, storage sheds or containers, laydown areas and amenities facilities.

The alternative grid connection will replace some infrastructure installed as part of WRWF Stage 1, specifically approximately 6km of 132kV transmission line. The 6km section of 132kV line would be removed and the 6km of line route rehabilitated. The 132kV Glen Innes to Inverell line would be reinstated as a direct connection between the two centres and separate from the White Rock Wind Farm.

While the 6km section of line could be retained by TransGrid to provide future transmission flexibility options, that option may require structures at either end of the 6km section and is unlikely to serve any beneficial purpose. The 6km section is not required for the alternative grid connection.

Subject to the modification application being approved, design being finalized and commercial arrangements being completed, construction of the alternative grid connection components could commence by mid-2017 and continue through 2017 and early 2018 with operation of the 132kV line scheduled to be achieved from early to mid-2018. The objective would be to coordinate the completion of the alternative grid connection with the commencement of the operation of WRWF Stage 2.

The alternate 132kV connection would operate for the life of the wind farm and at least 25 years. Decommissioning would follow cessation of wind farm operation.

3.2 Stage 1 Grid Connection Infrastructure

As indicated in Section 1.5, the approved connection arrangement being implemented for Stage 1 includes approximately 8km of 132kV double circuit overhead transmission line together with a 33kV/132kV substation, 1.5km south of White Rock Mountain. Connection of WRWF Stage 1 is to TransGrid's existing

single circuit 132kV Glen Innes – Inverell transmission line. TransGrid is undertaking the grid connection works for WRWF Stage 1. These grid connection facilities have allowed Stage 1 to proceed from May 2016. However, there is inadequate capacity of the 132kV line to enable connection of WRWF Stage 2 and the full output of WRWF (Stage 1 and Stage 2) to be exported via the existing Glen Innes to Inverell line. The southern 2km of the WRWF Stage 1, 132kV line would form part of the alternative grid connection arrangement. The WRWF Stage 1, 132kV line is being designed for capacity of over 300MW in anticipation that a higher capacity grid connection will be available to support development of WRWF Stage 2.

3.3 Alternative 132kV transmission line route and line design

3.3.1 Overview of proposed 132kV line

The alternative 132kV double circuit transmission line has been proposed as part of an alternative grid connection to provide for the full output of the approved WRWF (Stages 1 and 2). The proposed alternative 132kV line is approximately 13km long and of similar structural dimensions to the 8km of 132kV line being constructed for WRWF Stage 1. A 2km section of the line being installed for Stage 1 would form part of the total line for the alternative grid connection. The total distance from WRWF 33kV/132kV substation to Swan Vale 132kV/330kV substation is approximately 15km.

3.3.2 Key line design specifications

The proposed line that is subject of the modification application has the following specifications:

- A length of 13km, the shortest length with minimal impact for connection to the 330kV line;
- Operate at 132kV similar to existing Glen Innes to Inverell line. If the alternative line were designed at 330kV that would have required larger supporting structures and other modifications at WRWF substation as well as switching station adjacent the existing 330kV line;
- Will require an easement approximately 50m wide;
- Supported on single concrete pole structures of generally 32m and up to approximately 35m height. Multiple poles may be required at points of change in the line route but those details are only confirmed in conjunction with detail design.
- The footings for 132kV poles (assuming poor soil conditions) are typically 5m deep with a diameter of approximately 1.2m. Footings can extend out to approximately 8m if anchoring is required in areas of rock.
- The poles would be delivered in sections that may be approximately 12 to 16m in length. Transgrid has advised that where sections are less than 23m then police escorts are not required;
- Poles are planned to be spaced at approximately 200 to 300m depending on terrain and line design requirements. Spans can be longer where spanning valleys;
- Dual circuit design, 2 sets of 3 phase conductors (i.e 6 conductors – see Plate 1.2);
- Conductor size and arrangement (single or duplex) depending on outcome of design studies;
- Overall line load rating of up to 360MW, to allow for the full output of WRWF Stage 1 and 2;
- Lightning conductors at top of pole structures and above conductors;
- Temporary access tracks for construction of the line; and
- Located in 50m wide easement with clearance zone variable along line route.

3.3.3 Line route selection and description

The alternative 132kV double circuit line has a length of approximately 13km and runs generally east-west. At its eastern end it would connect with the WRWF Stage 1 line being constructed in 2016/2017, in

the vicinity of WRWF Turbine 18. At its western end it would connect to TransGrid’s 330kV transmission line, which runs between Armidale and Dumaresq, at a point about 2.5km south of the Gwydir Highway.

The proposed transmission line route is shown in Figures 3.1 and 3.2 and has been developed by an iterative process which took into account the following matters:

- technical requirements to minimise the length of the transmission line with acceptable impacts
- identifying a suitable location for the substation adjacent to the 330kV transmission line;
- minimising the potential impact on flora and fauna habitat using detailed aerial imagery, field surveys and specialist assessments;
- alignment to allow relatively easy access to the route from existing roads and tracks to reduce the additional impacts of having to construct new access tracks during construction;
- Point 9 and 9A options. While Point 9A allows marginal avoidance of native vegetation, it may not be suitable for avoiding impacts on Mining Lease 1505 (See Section 4 and Section 7.10.3).
- feedback from landowners to minimise impacts on ongoing farming activities; and
- avoiding residences and minimising the visual impact of the transmission line and substation

3.3.4 Overview of Line Impacts

The permanent physical impacts of the transmission line are primarily associated with vegetation clearing and earthworks for the foundations for each pole along the transmission line route. Temporary access tracks and hardstands at pole sites enable installation of the transmission line poles and stringing of the conductors between the pole structures. Use will be made of existing local roads and farm tracks, where possible. New gates through existing fences will be installed to enable the installation to be completed with minimal new tracks. The line route has been chosen to minimize need for vegetation clearing. Safe clearances from the high voltage lines is also required and, once the line is constructed it will require a routine vegetation maintenance program.

In terms of visibility, the double circuit arrangement may be marginally more visible than the single circuit arrangement due to increased pole height, additional conductors and additional insulators at poles. Lines using duplex conductors may also be marginally more visible than those using single conductors. With distance, it will be difficult to distinguish the line and detail of the line structure. It is likely that the line will be of double circuit design to ensure the line has the required capacity.

The construction period for the alternative transmission line and substation would have a duration of approximately 12 months. The line operation is required to commence prior to the operation of Stage 2 and continue for the life of WRWF. Decommissioning of the line would be subject to decommissioning of WRWF.

Table 3.1 – Possible transmission line arrangements

Design Options for alternative 132kV Line		Number of conductors or bundles	Approximate Pole height (m)	Approximate Load rating (MW)
Number of circuits	Conductors/phase			
Single	Single (1)	3	35 max	170 (insufficient)
Single	Duplex (2)	3	35 max	200 - 300
Double	Single (1)	6	Approx. 35	Up to approx. 360
Double	Duplex (2)	6	Approx. 35	Up to approx. 450

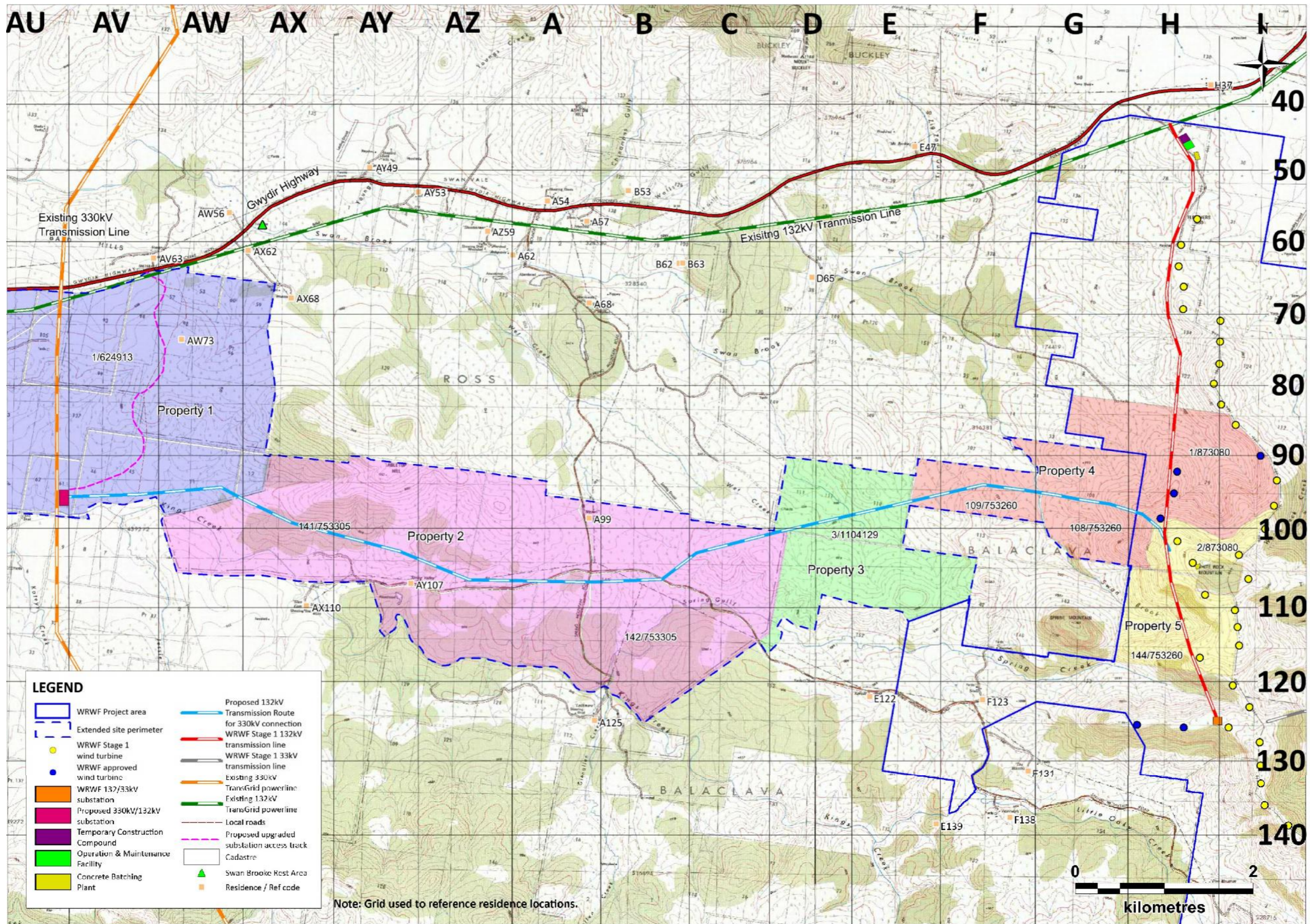


Figure 3-1 Approved Stage 1 132kV transmission line route and alternative transmission line route from the wind farm site to 330kV connection point and substation

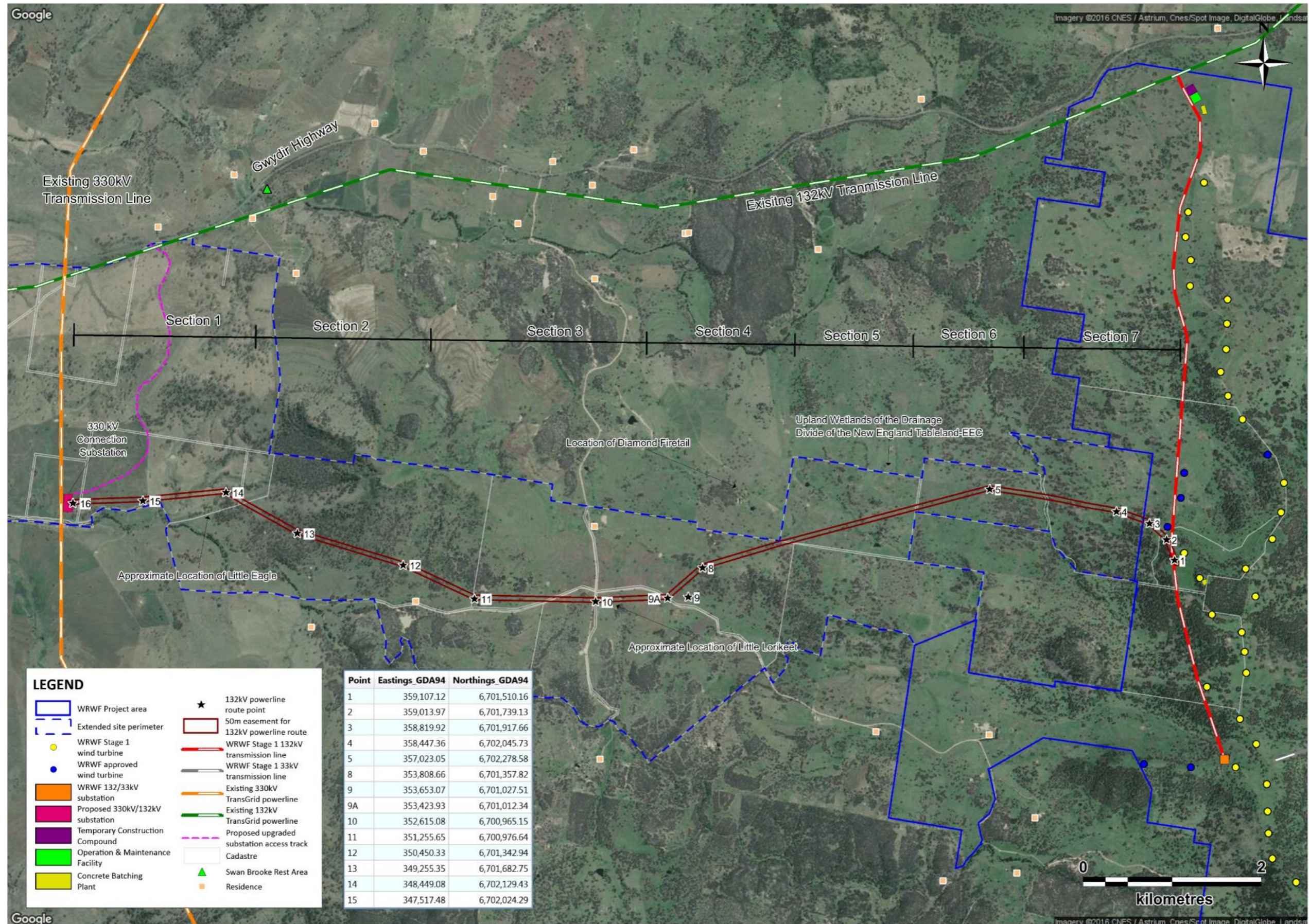


Figure 3-2 Aerial image of alternative transmission line route and line assessment sections

3.4 Alternative switchyard/substation location

The alternative grid connection location (Figure 3-1), that involves a new 330kV switchyard and 132kV/330kV substation, was selected based on a number of criteria including:

- location adjacent to the TransGrid 330kV double circuit transmission line (seen in Plate 3-1);
- existing track and right of way provides access from Gwydir Highway for construction, operation and maintenance. The track will be upgraded for the substation construction;
- no native vegetation to disturb thereby minimising environmental impact of the facility;
- relatively level terrain to reduce construction impact and cost;
- located on the edge of cultivated paddock to minimise disturbance to farming operations; and
- significant distance from nearby residences to minimise visual and operational noise impact



Plate 3-1 - Alternative substation location adjacent to TransGrid 330kV transmission line

The design of the grid connection (switchyard and substation) is likely to be similar to other 330kV substations but will vary in regard to the electrical safety and operability design factors.

Examples of 330kV substations are provided in the photographs in Plates 3.2 and 3.3.

The example in the Plate 3.2 presents a two transformer installation. The proposed substation design may involve one or two transformers depending on network design considerations, loads to be handled and transport of the transformers to the substation location.

The example in Plate 3.3 is for a single transformer arrangement in a rural location that may be similar to the design of the substation and switchyard addressed by this application.



Plate 3-2 – Example 330kV substation (Macarthur) constructed in Sydney by TransGrid in 2009



Plate 3.3 – Aerial view of Example Single Transformer Substation in a rural location

The required switchyard and substation facilities may include the following components with the detail to be confirmed through the final design development and TransGrid approval.

- Upgrade of existing access track to switchyard/substation location and entry from Gwydir Highway;
- Cut-in poles on 330kV line – may involve turning a circuit of the 330kV line into and through the 330kV switchyard. Connection could occur to both circuits but would require additional design and infrastructure;
- 330 kV Switchyard – including gantries for line landings, 330kV busbars, 330kV switchgear, protection devices;
- One or two 132kV/330kV transformers within concrete bunds. Transformer(s) rated at up to the order of 380MVA to suit the load from WRWF.
- Oil/water separation facilities and/or secondary containment dam/facility;
- 132kV busbar, gantries, current and voltage transformers, protection equipment, metering equipment;
- Cable and/or drainage trenches within the switchyard and substation;
- One or two buildings for amenities facility, storage area, office and control room facility, communications facilities, parking area;
- Battery room and auxiliary/low voltage power supply;
- Water supply arrangement for operations stage, potentially with roof collection;
- Sewage facility – small scale – low level visitation once operational;
- Installation of an earthing grid and spreading crushed gravel over much of the ground surface;
- All high voltage components will be surrounded by security fencing and a lockable gate;
- If required, a communications facility will form part of the substation development; and
- Temporary construction facilities and laydown area(s).

The overall facility could occupy an area of up to approximately 2ha (up to 200m by 100m). Its construction would take 8 to 12 months and include the following construction and commissioning phases.

- Site establishment – Access track construction, install temporary construction facilities;
- Site clearing and earthworks to prepare a site bench;
- Install earthing grid, cable trenches, excavate footings for one or two transformers and associated substation and switchyard structures;
- Transport components to site and locate in laydown area pending installation;
- Construct transformer bund(s) and structure footings, pour concrete and complete these structures;
- Install components, transformer(s), switchgear, other;
- Establish cut-in poles in preparation for connection;
- Construct control room and amenities building; and
- Connection to 330kV line, energise and commission substation.

Goldwind Australia has previously managed the construction of the Gullen Range Wind Farm 330kV Substation in 2013 to 2014 and has worked closely with TransGrid for the Gullen Range and White Rock Wind Farm projects. TransGrid is currently developing the grid connection facilities for WRWF.

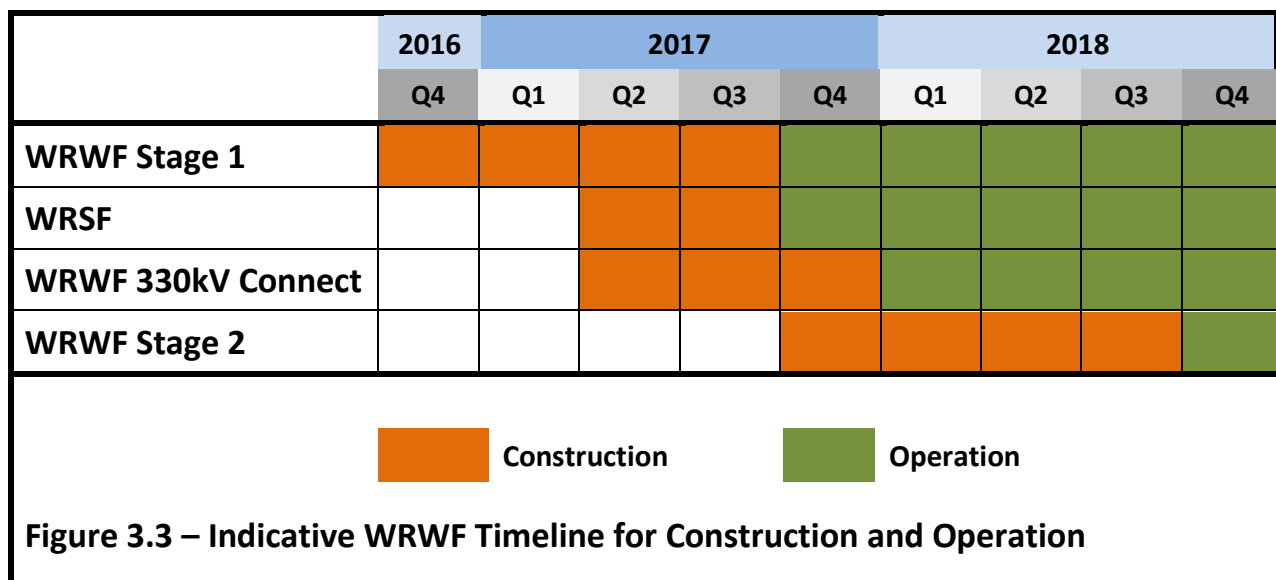
Operation would commence following successful commissioning of the substation and the connection of the WRWF via the new 132kV transmission line. An indicative time line for the alternative grid connection project is shown in section 3.5 in the context of other aspects of the WRWF and WRSF projects.

3.5 Indicative Project Timeframe

An indicative timeline for the alternative WRWF grid connection is shown in Figure 3.3. The timeline distinguishes the various project components that could potentially utilize the 330kV grid connection and the indicative construction periods and commencement of operations. Project components include, Stage 1, Stage 2, the approved WRSF and the 330kV grid connection project as discrete project elements. Indicative timing of these components is as follows:

- WRWF Stage 1 construction from May 2016 with operation commencing in 2017 H2;
- WRSF Development Consent June 2016, Construction from 2017 Q2, Operation late 2017;
- WRWF Mod 4 - Alternative Grid Connection – Construction in 2017;
- WRWF Mod 5 – WRWF Stage 2 – Construction 2017/2018, Operate from late 2018;

Stage 2 commencement is reliant on the alternative grid connection being approved and construction of alternative grid connection facilities being completed in time to enable Stage 2 to operate once constructed. Without the alternative grid connection, Stage 2 would be unable to proceed.



4 PROPERTY DETAILS FOR THE MODIFIED PROJECT

This section describes the lands where the alternative 132kV transmission line route and the 132kV/330kV substation are located.

The alternative 132kV transmission line route and, the 132kV/330kV substation that will be located adjacent the existing 330kV line, are located on freehold land involving four landholdings as indicated in Table 4.1 and shown on Figure 3.1 and 4.1. All these lands, except Lot 1/DP873080 are additional to those listed in Project Approval MP10_160, Appendix 1, *Schedule of Land* and, are relevant to Modification Application No. 4. All of the land for the alternative line route is located within Inverell Local Government Area (LGA) within Zone RU1.

Table 4-1 Property details for the alternative grid connection facilities

Landowner	Real Property description		Infrastructure	Status relevant to MP10_160 land
	Lot(s)	DP	Substation or 132kV Line	
1	1	624913	Substation and line	Additional land
2	141, 142	753305	132kV line only	Additional land
3	3	1104129	132kV line only	Additional land
4	108, 109	753260	132kV line only	Additional land
4	1	873080	132kV line only	Land under existing Approval

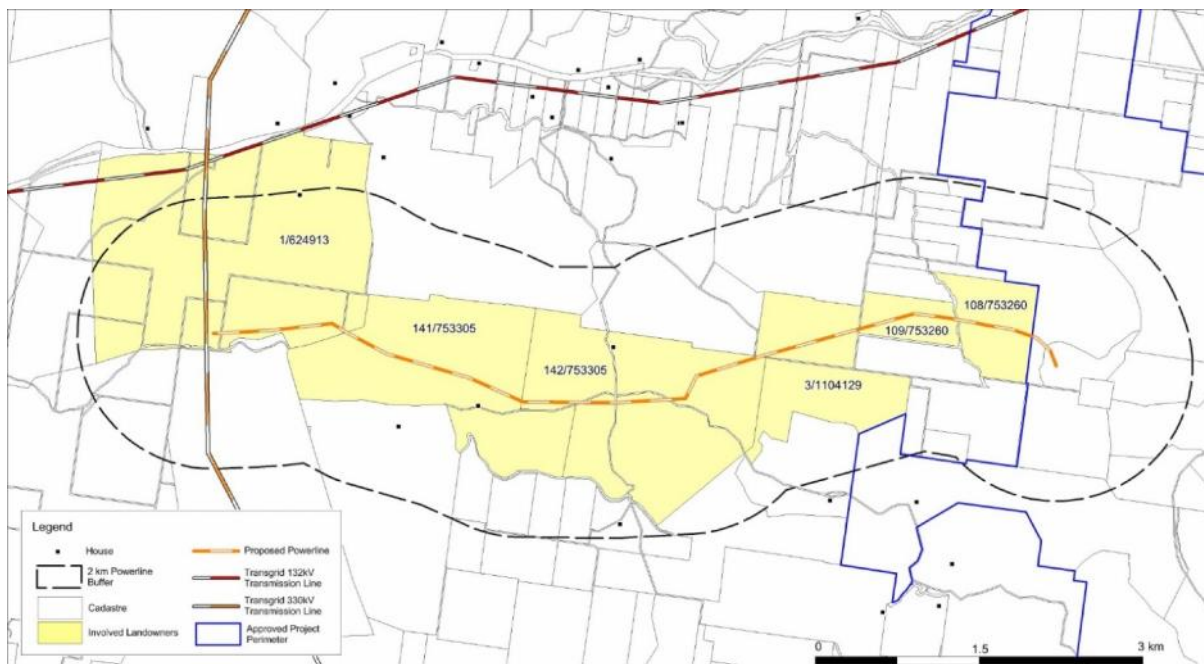


Figure 4.1 – Property Details for the Alternative Grid connection facilities

Subject to approval of the modification application, WRWFPL would, finalise lease arrangements with landowners for access to the subject land and, enter into agreements with Crown lands where infrastructure crosses Crown Lands (as required by existing Condition C32).

Lease agreements with landowners will include provisions for decommissioning as required by existing Condition B8. Similar provisions are already incorporated in the lease agreements for the wind farm site and those provisions for the wind farm site have been approved by DPE.

Neighbour agreements have been formed between WRWFPL and some of the landowners for properties neighbouring the Stage 1 project. The neighbour agreements give rise to changed responsibilities for WRWFPL in respect of impacts addressed by various approval conditions.

Residences in the areas surrounding the alternative grid connection infrastructure are shown in Figure 3.1. Subject to approval of the modification, further consultation would consider the potential impacts for neighbours and, where warranted, discuss the potential for neighbour agreements being established.

Access to the alternative 132kV Transmission Line

There are three main access points to the transmission line route as follows:

- entry to the Substation location, through property 1 south west of Swan Vale, from Gwydir Highway;
- entry to mid-section of the line route to properties 2 and 3, from Spring Mountain Road
- eastern entry point to property 4, from Gwydir Highway, WRWF northern entry and WRWF access tracks

These access routes will require consultation with RMS and Inverell Council.

Mining Lease 1505

The line crosses Mining Lease 1505 and further consultation is required with the lease and land holder and Resources and Energy Branch. The leaseholder supports a line route that does not impact mining potential but this may require adoption of Point 9 rather than 9A shown in Figure 3.2.

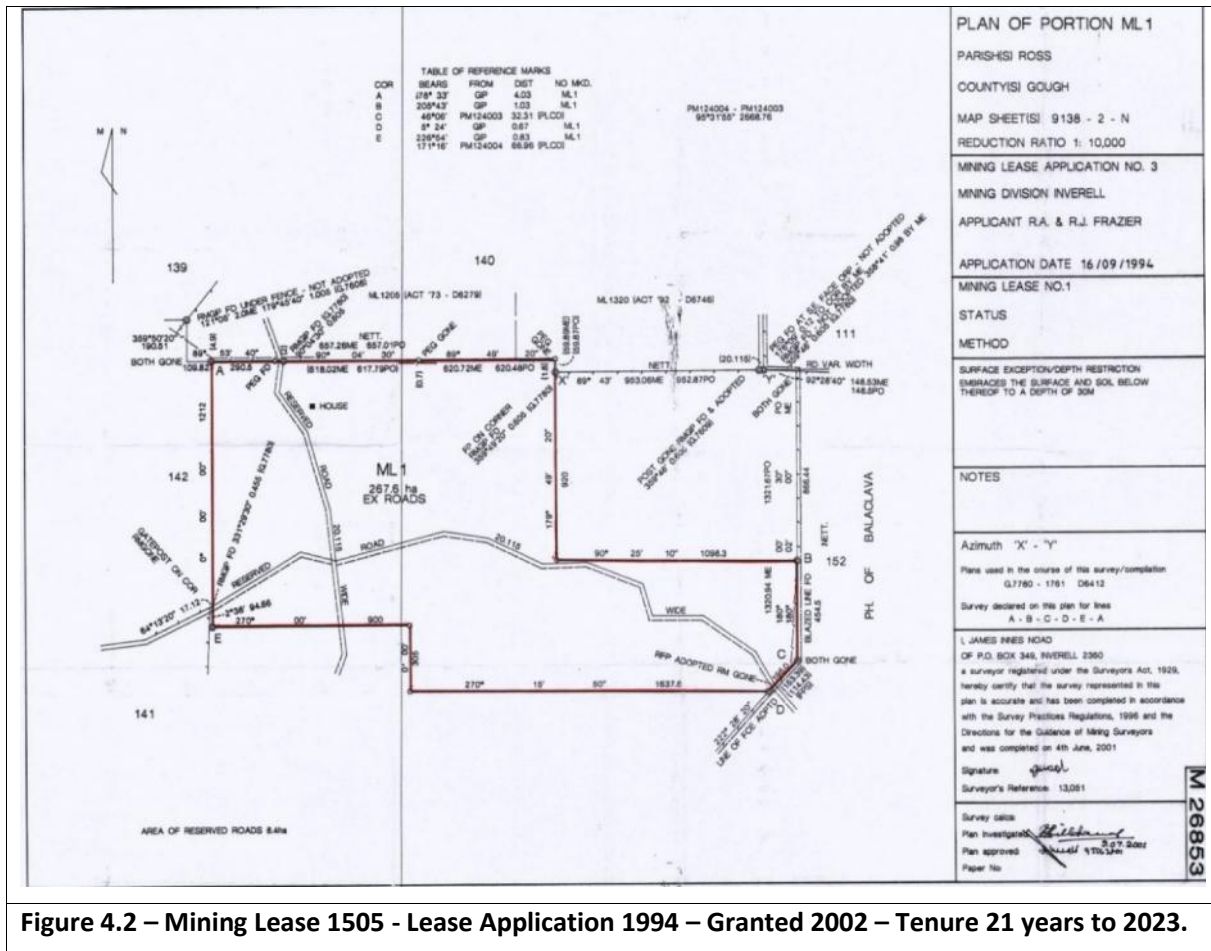


Figure 4.2 – Mining Lease 1505 - Lease Application 1994 – Granted 2002 – Tenure 21 years to 2023.

5 STAKEHOLDER CONSULTATION

5.1 Agency consultation

The WRWF alternative grid connection proposal was initially submitted to DPE in 2012/2013 as Modification Application No. 1. The application progressed to an advanced stage that included public exhibition (30 January 2013 to 15 February 2013), referrals to government agencies and preparation of a Submissions Report (July 2013) by the proponent (Epuron), responding to agency submissions. Ten submissions were received in response to the exhibition and referrals. All were from government agencies. No submissions were made by the community.

The project addressed by this application is essentially the same as was proposed for Modification No 1. The supporting impact assessment and specialist assessments have been updated and additional consultation has occurred. The application has considered prior consultation for Modification Application No 1 and that undertaken for this modification application. This section provides details of the current status of consultation.

Agency consultation is summarized in the Table 5.1 arising from WRWF project generally and Modification Applications No 1 and 4. Consultation with individual agencies is also further discussed in the sections dealing with relevant environmental issues.

Table 5.1 – Summary of Agency Consultation undertaken for the Modification Application

Agency	Issues	Comment
Department of Planning (Tamworth) Feb 2013	No objection as a result of Mod 1 Application.	Noted the updated Inverell LEP, 2012
Department of Primary Industries (Feb 2013)		
• NSW Office of Water	No objection as a result of Mod 1 Application.	Low impact through design and CEMP
• Crown Lands	Proponent to seek and obtain Crown lands easements over affected land	WRWFPL has undertaken this for the wind farm site and would extend applications to other Crown Lands.
• Fisheries NSW	No issues as a result of Mod 1 Application.	No impact expected, minimizes disturbance of watercourses.
• Agriculture NSW	No issues as a result of Mod 1 Application.	Low impact, grazing use to continue.
Airservices Australia	Consider as part of Aviation Impact Statement (AIS)	AIS produced for WRWF – No impact for turbines.
Border Rivers-Gwydir CMA (Feb 2013)	CMA encouraged offsets for vegetation clearing and implementation of recommendations of Biodiversity Report	CEMP and Biodiversity Offset Package developed for WRWF and can be extended for Modification.
Environment Protection Authority (Feb 2013)	Noise can be dealt with by approval conditions and limits. Soil and water aspects be addressed by a condition for an erosion and sediment control plan.	EPL 20665 has been issued for WRWF Construction Soil and Water Quality Management Plan is part of the approved CEMP.

Office of Environment and Heritage (Feb 2013)	Advised insufficient information in respect of assessments of biodiversity, details of mitigation, details of offsets and requirements of Aboriginal consultation Guidelines	Additional information was provided in the Submissions Report. A Biodiversity Offset Package has been prepared and submitted to OEH and DPE. Further consultation has occurred for this application and Biodiversity and Archaeology Reports updated. An additional report (Eco Logical) is also appended with this application for assessment of offset requirements. A Construction Flora and Fauna Management Plan has been approved for WRWF and can be extended to the alternative grid connection.
Department of Defence (February 2013)	Information on tall structures is required. Tall structures are those above 30m within 30km of an aerodrome and 45m or more above the ground elsewhere.	Detail of proposed turbine structures and meteorological masts have been provided prior to commencement of Stage 1 construction. Details of line structures can be provided to Defence prior to construction.
Department of Trade and Investment – Resources and Energy (Feb 2013)	Notes intersection with Exploration Licences (EL 7301 and EL 7302) for bauxite and Mining Lease (ML) 1505 for alluvial sapphires, indicated to expire in 2023. Consultation with mineral stakeholders and modification of the line route to avoid these areas.	Epuron advised that following consultation the line route was amended to avoid current and future planned extraction locations for ML 1505. Epuron’s consultation for the EL 7301 and 7302 was indicated to confirm no conflict with the line route and potential bauxite resources and it is understood that EL 7301 and 7302 are no longer current.
Rural Fire Services (Feb 2013)	Proposed the following: 20m asset protection zone for switchyard/substation Adequate access is provided to the development Adequate water supplies for bush fire suppression be provided Emergency evacuation measures Operational procedures related to mitigation and suppression of bush fire relevant to the development.	A 330kV/132kV substation is a high voltage facility that has stringent electrical safety clearances . The access track will upgraded to enable delivery of the large transformer to be installed The project emergency response plan and bushfire risk management plan will address these measures

Glen Innes Severn Council (Feb 2013)	No issues for the modification that is predominantly in Inverell LGA.	GISC has been kept aware of the planning status through the CCC.
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Consultation has been undertaken or arranged by WRWFPL as appropriate for the nature of the proposal and potential impacts as assessed by this EA. This has included:

- Consultation with relevant local, state or commonwealth government authorities, infrastructure and service providers, community groups and affected landowners.
- Consultation with affected landowners surrounding the development, and relevant local Council(s)

This EA describes the consultation that has been carried out, identifies the issues raised during this consultation, and explains how these issues have been, or will be addressed. Specific consultation with specific Government agencies that has occurred during the development of the EA is summarised below.

5.1.1 Department of Planning and Environment

WRWFPL has consulted with the DPE at various stages throughout the planning the Project. Review of WRWF Mod 1 application reached an advanced stage through 2013 and 2014 including preparation of draft conditions of approval. However, the application was withdrawn in January 2015, prior to determination.

Prior to preparing the Mod 4 application an initial meeting was held between DPE and WRWFPL on 24 May 2016 to discuss the current status of the alternative grid connection project, the nature of the planning process for a modification application and, whether DPE would specify assessment requirements. DPE advised that no assessment requirements were warranted for the Mod 4 application.

Based on the information provided during that meeting, and WRWFPL's subsequent project review and preliminary planning investigations, this Environmental Assessment Report has been prepared for submission to DPE to support an application to modify the WRWF Project Approval. It addresses DPE's verbal advice given in respect of Mod 4 assessments. In response to DPE verbal advice and issues arising for the modification application generally, this EA report has addressed the following requirements and issues:

- Targeted key planning issues identified for the WRWF Project Application in 2010/2011;
- Addressed DPE's advice to revisit Modification No. 1 assessments and update these to address submissions received from public exhibition of Mod 1 Application (2013) and current expectations for environmental impact assessments;
- Addressed DPE's advice to ensure consultation is up to date, particularly in respect of Aboriginal stakeholders;
- Addressed any other issues considered relevant by the proponent given the current project status, strategic planning context and evolution of the NSW Planning System and requirements.

Following submission of the Modification Application, DPE is expected to arrange a public exhibition and referral of the application to relevant government agencies.

5.1.2 Inverell Shire Council

The proposed modification is wholly within Inverell LGA and subject to zoning under the Inverell LEP 2012 as Rural Zone RU1 – Primary Production. The proposed substation is about 30km east of Inverell.

Inverell Shire Council (ISC) has been consulted in regard to the proposal for an alternative grid connection for WRWF. Consultation with ISC has included the following:

- Initial consultation for Mod 1 application for the proposed alternative grid connection;
- Informal discussion of the Mod 4 application for the proposed alternative grid connection;
- An Inverell Council representative attends the WRWF Community Consultative Committee (CCC) and an overview of the proposed modification was provided to the CCC on 11 August 2016;
- Inverell Council has indicated support for the WRWF Stage 2 development and alternative grid connection based on its potential for additional contribution to the regional economy.

5.1.3 Glen Innes Severn Council

The modifications are not located within Glen Innes LGA but have potential to provide for increased scale of wind farm development in the locality. There is no direct impact on the Glen Innes Severn LGA.

Consultation with the Glen Innes Severn Council (GISC) has included the following:

- Informal discussion with GISC development planning representative.
- A GISC representative attended the WRWF Community Consultative Committee (CCC) meeting in August 2016 that discussed the proposed alternative WRWF grid connection.

5.1.4 Office of Environment and Heritage

The NSW Office of Environment and Heritage has responsibility for management of issues associated with Biodiversity and Aboriginal Heritage. OEH provides advice to DPE in respect of Modification Applications and previously was involved with review of the WRWF Modification Application No. 1.

Consultation with the Office of Environment and Heritage (OEH) has included the following:

- OEH response to public exhibition for Mod 1 Application during 2013 as documented in OEH submission and proponent response to the OEH submission (Submissions Report, May 2013). The specialist assessments provided with this Modification Application have taken account of OEH previous comments and recent discussions between the biodiversity specialist and OEH.
- Recent consultation between OEH and WRWFPL in respect of associated matters, WRWF Biodiversity Offset Package and WRSF DA 7487, EIS, March 2016, Appendix B - Biodiversity Assessment Report.
- Teleconference in mid-2016 between OEH and Biodiversity Consultant, Daniel O'Brien of Environmental Assessments in relation to the biodiversity assessment methodology, previous surveys and mapping, basis for vegetation categories, reference to NSW Scientific Committee determinations.

5.1.5 Department of Primary Industries

Agriculture

Consultation with Department of Primary Industries (DPI) has been previously undertaken in respect of the WRSF development to assess the potential impacts of the solar farm proposal on pastoral land use in the locality and key sensitivities from an agricultural perspective. The advice obtained is considered applicable for this Modification Application. The alternative grid connection has a lesser land requirement than was the case

for the solar farm. The grazing activities characteristic of the line route will continue despite the installation of the 132kV line. The 330kV substation will only occupy about 2 ha of land at the western end of the line.

Maps of Strategic Agricultural Land (SAL) are provided by DPE but are general and have not been fine-tuned or ground truthed. DPI previously recommended that in relation to the WRSF location on SAL, that discussions should be undertaken with the landowner on their land value, in the context of loss of agricultural productivity for the subject land.

DPI also raised the importance of using the guideline *Primefact 1063: Infrastructure proposals on rural land (DPI)* to guide the assessment of land use impacts.

Overall, the alternative grid connection will have minor impact in relation to agriculture due to the small footprint spread over a wide area and due to the reversibility of impacts post operations.

Impacts to agricultural land use have been discussed in Chapter 7 of this EA.

Water

The NSW Office of Water was previously consulted in 2016 regarding the impact on water courses for the WRSF development. The WRSF did require some structures placed in the watercourses however, the design of the transmission line is likely to involve the line spanning watercourses with structures set back from the watercourses. As such, the modification is not likely to significantly impact watercourses.

Crossing of watercourses by the 132kV transmission line includes upper sections of Swan Brook (for the eastern end of the line) and upper sections (tributaries) of Kings Creek catchment for the western part of the line. Neither Kings Creek or Spring Creek or Spring Gully is crossed by the line. All streams are within the McIntyre Catchment. In all cases the line will be designed to place pole structures away from watercourses and for the line to span across the watercourses.

Drainage lines classified as a 'river' under the *Water Management Act 2000* may require a Controlled Activity Approval (CAA) to undertake any works within 40 metres of the watercourse. Even where development under the Project Approval exempts the work from being a Controlled Activity (CAA), WRWFPL was still encouraged by DPI to reference to the DPI document, '*Guidelines for watercourse crossings on waterfront land*'.

Crown Lands

Crown Land responded to the Mod 1 Application advising that the new 132kV line route crosses Crown waterway and Crown roads and that the proponent will need to seek and obtain appropriate easements from Crown Lands. The WRWF Project Approval, Condition C32, includes requirements in respect of Crown Land as follows. Further consultation in respect of specific activities on Crown Lands would occur following an approval of the Modification Application.

C32. Prior to the commencement of construction of the project, the Proponent shall consult with and comply with the requirements of the Department of Lands in relation to any Crown land affected by the project to enable the lawful use of that land by the project.

WRWFPL has fulfilled requirements of Condition C32 for the WRWF Stage 1 development and subject to the alternative grid connection proceeding would satisfy C32 requirements in respect of that development.

5.1.6 Environment Protection Authority

While an Environment Protection Licence (EPL) is required for WRWF, the alternative 132kV transmission line and 132kV/330kV substation do not constitute scheduled premises and an EPL is not required for these components. Subject to positive determination of the Modification Application, WRWFPL would consult EPA

in regards to the need for any variation to EPL 20665. Safeguards will be integrated at the 132kV/330kV substation to prevent the loss of insulating oil from the transformer to the environment.

5.1.7 Rural Fire Service

A Bushfire Risk Management Plan has been developed for WRWF in consultation with Rural Fire Service (RFS). The Plan forms part of the approved WRWF Stage 1 CEMP. Subject to approval of the modification application, further consultation would be undertaken with RFS and it is expected that based on the consultation with RFS that an updated Bushfire Risk Management Plan would be developed to cover both WRWF and the alternative grid connection arrangement.

5.1.8 Roads and Maritime Services.

The construction and operation of the alternative 132kV line route and 132kV/330kV substation will require access by a number of routes from the Gwydir Highway as follows:

- **Eastern end** of the alternative 132kV line route could be accessed from WRWF Stage 1 access tracks that are currently under construction. These tracks are reached via the main access point for WRWF, direct from Gwydir Highway. The entry from Gwydir Highway to WRWF Stage 1 is being upgraded in consultation with RMS and in accordance with a WAD agreement.
- The **middle sections** of the alternative line route would be accessed via Spring Mountain Road that joins Gwydir Highway to the west of WRWF. RMS will be consulted if there is considered to be any need to upgrade this intersection. Its current form is likely to be suitable for the purpose.
- The **western end** of the alternative 132kV line and 132kV/330kV substation location will be accessed by an existing farm access track directly from Gwydir Highway. RMS will be consulted about the upgrade of this entry to allow for the delivery of a large 132kV/330kV transformer and associated substation construction traffic impacts.

WRWFPL would consult with Roads and Maritime Service (RMS) to agree on the design for any upgrade works for entry/exit points for the Gwydir Highway. Subject to the modification being approved and the project proceeding, the approved upgrade works could be implemented in 2017.

RMS was not a respondent to the MOD 1 Application for the alternative grid connection arrangement but will be consulted with regards to any road works adjoining the Gwydir Highway.

5.2 Aboriginal Stakeholder consultation

Consultation with Aboriginal stakeholders in regard to the White Rock Wind Farm has occurred from 2010. Aboriginal groups and individuals were notified and invited to register interest in the WRWF project. At that stage five Aboriginal Community Stakeholders registered their interest in the project. Field work for the WRWF project area was undertaken by an archaeologist from RPS Group and an Aboriginal community representative Hilda Connors from 18 October 2010 to 22 October 2010. The results were reported in the WRWF Environmental Assessment, April 2011 and formed a basis for the Project Approval in July 2012.

Following the granting of the project approval, Epuron commenced a process to modify the Project Approval to include an alternative grid connection to the 330kV line, 13km to the west of the WRWF project area. The alternative grid connection infrastructure lies within the Anaiwan Local Aboriginal Land Council jurisdiction. A further registration of Interest by Aboriginal Stakeholders was sought in relation to the alternative grid connection through advertisement on 18 December 2012.

Subsequently members of the Anaiwan Local Aboriginal Land Council were selected for involvement in field surveys occurring over three days including, 18 July 2012 and 9 and 10 August 2012. Records of consultation with Aboriginal stakeholders are provided in the Modification No. 1 Supporting Document, January 2013.

As the Modification Application No. 1 was withdrawn in January 2015 and this new application is occurring some four years after the previous consultation for the alternative grid connection, WRWFPL has requested Environmental Assessments Pty Ltd to update the Heritage Assessment in conjunction with further Aboriginal stakeholder consultation. The recent consultation is additional to Aboriginal stakeholder consultation undertaken for:

- development of a WRWF Cultural Heritage Management Plan (part of the Stage 1 CEMP) in 2015;
- cultural heritage assessment prepared by ERM in 2015 for WRWF Modification Application No. 3
- cultural heritage assessment by NGH Environmental for White Rock Solar Farm in early 2016

For the current modification application for the alternative grid connection, WRWFPL placed further advertisements in three newspapers in August/September 2016 to seek updated expressions of interest for Aboriginal Community Stakeholders.

As a result, Aboriginal representatives participated in further site survey work undertaken on 20 September 2016 and for review of the assessment report that is appended to this EA. The assessment report also includes the Representative's report. Details of heritage consultation are provided in Appendix 4.

5.3 Community consultation for the alternative grid connection arrangement

5.3.1 Landowner agreements

In late 2012, Epuron, as the WRWF proponent at that time, initially consulted with landowners for the alternative 132kV transmission line route in respect of the WRWF Modification Application No. 1 and secured the agreement of landowners for the proposed transmission line and substation. Mod 1 was subsequently withdrawn in early 2015, in the context of proceeding with Stage 1 and, with connection to the existing Glen Innes to Inverell 132kV transmission line providing adequate capacity for Stage 1.

With the recognition that the alternative grid connection is now required to enable WRWF Stage 2 connection as well as providing an indirect benefit of enabling GIWF to proceed with an unconstrained grid connection, WRWFPL has again approached landowners for the alternative line route. Consultation is ongoing to finalise lease agreements for the applicable properties.

5.3.2 Neighbour consultation

In addition to Epuron's efforts in 2012/2013 to establish landowner agreements, and subject to approval of the modification, the owners of the neighbouring properties (and non-associated residences) will be contacted in relation to the proposed transmission line and substation and where relevant, involvement by neighbour agreement.

There are five rural residences located within 2km of the alternative transmission line and substation site (see Figure 3.1). Three of the residences are associated landowners and two are non-associated landowners. Non-associated residences have been considered by the specialist assessments such as noise and visual impact. To date, no objections have been raised by any of the neighbouring landowners.

Epuron's contact with the local community in respect of Mod 1 included:

- phone calls;
- written correspondence with route maps & photos; and
- personal visits.

The landowners and neighbours were generally well informed about transmission lines and their potential impact due to the recent (2010 – 2012) TransGrid project to upgrade the 55km of 66kV transmission line, between Glen Innes and Inverell, to a 132kV transmission line.

The public exhibition of the Modification Application No. 1 occurred from 30 January 2013 to 15 February 2013. DPE received a total of nine submissions from the public exhibition, all of which were from government agencies. No submissions were received from the community.

A further period of public exhibition may be required by DPE for this Modification Application.

5.3.3 Community Consultation in 2016

WRWFPL has undertaken targeted consultation for the alternative grid connection facilities as addressed in this EA.

Recently, WRWFPL has undertaken the following community consultation:

- Explanation of the alternative grid connection proposal and outline of potential impacts to all CCC Members and community observers at the CCC meeting on 11 August 2016.
- Explanation of the alternative grid connection proposal and outline of potential impacts within the August edition of the WRWF Newsletter. This newsletter is distributed to all residents within 10km of the project and also local community members that have self-selected to receive the newsletter. Copies of the newsletter are available on the project website, at the WRWF shop front, Glen Innes Severn Council office and Glen Innes Visitor information Centre.
- Explanation of the alternative grid connection proposal and outline of potential impacts on the project website.
- Provision of further information by the local project representative for any specific questions related to the proposal available at the WRWF local shop front (located at 303C Grey Street, Glen Innes, open 10am-3:30pm Monday -Thursday).

5.3.4 WRWFPL Stakeholder and Community Engagement Strategy

WRWFPL is committed to engaging the local community and ensuring information is available for the proposed development. A Stakeholder and Community Engagement Plan (the Plan) has been developed for WRWF to guide all engagement activities. The Plan identifies objectives and aims, project stakeholders, proposed consultation strategies, challenges and opportunities, and specific engagement tools.

The objectives of the Plan include:

- To establish and maintain a level of acceptance or approval of the project within the local community.
- To have a culture of openness, inclusiveness, responsiveness and accountability.
- To enable better community integration of the project.
- For WRWF to be considered as an integrated and valued component of the social and economic fabric of the community.
- For a low or infrequent level of complaints and conflicts and few regulatory issues.

In line with the Plan, a range of engagement tools have been used for the WRWF Project. These include:

- Establishment of dedicated telephone line, email address and postal address.
- Development of project factsheets for distribution as required to the community.
- Development of a project website to provide information and updates.
- Direct engagement with all potentially involved landowners.
- Direct engagement with neighbours through phone calls, email and face to face meetings.
- Media release to the local Glen Innes and Inverell newspapers
- Regular provision of information to Federal and State politicians, through briefing, site visits, media releases etc. and
- Presentation to the WRWF CCC on 11 August 2016, and August Newsletter as outlined in Section 1.3.3.

During the public exhibition period, a community information sessions would be held in Glen Innes and Inverell. The sessions will provide all stakeholders the opportunity to find out more about the project, talk one-on-one with the project staff and provide feedback.

Engagement activities will continue throughout the determination period, as set out in the CEP.

The CEP will be reviewed regularly, as well as at key transition phases between different stages of project development (e.g. prior to construction or operation). The Plan will continue to guide engagement activities at all stages of the project, ensuring that engagement is appropriate and in line with good practice.

5.3.5 Community Consultative Committee (CCC)

Condition D1 of the Project Approval MP10_160, requires the Proponent to establish a Community Consultative Committee (CCC) for the life of the project. The Proponent established a CCC for the project and the first meeting was held on 19th November 2012. The most recent meeting was 3 November 2016. The CCC enables information to be exchanged between the Proponent and the Community through the CCC process and its appointed members. The objectives of the CCC include enabling information about the wind farm to be provided to the community and providing an opportunity for the community to express any concerns regarding the potential impacts.

As highlighted above, the alternative transmission line and substation was discussed at most recent meeting of the CCC during 2016 (11 August).

6 STATUTORY REQUIREMENTS

6.1 Overview of statutory requirements

WRWF is authorized by Project Approval MP10_160 and Environment Protection Licence EPL 20665.

This modification to the Project Approval is being sought under Section 75W of the EP&A Act (which continues to apply to 'transitional Part 3A Projects').

An Environmental Protection Licence (EPL) is also required to be held for the wind farm project. EPL 20665 was issued in April 2016. A number of other approvals are also required for the project.

Provisions of specific planning and environmental legislation or associated instruments relating to the project are provided in the following sections.

It is noted that NSW Parliament has recently passed two biodiversity and land clearing reform bills that repeal and replace the *Threatened Species Conservation Act 1995* (Section 6.6.2), and the *Native Vegetation Act 2003* (Section 6.6.4). This modification has been considered in respect of existing legislation and not the future legislation that will not commence until a time to be set in 2017.

6.2 Environmental Planning and Assessment Act 1979

Development in NSW is subject to the requirements of the EP&A Act and its associated regulations. Environmental planning instruments prepared under the EP&A Act set the framework for development approval in NSW. The relevant objects of the EP&A Act are shown in Table 6.1.

Table 6.1 – Objects of the EP&A Act and Consideration for the Modification Application

Ref	Specific Objects of the EP&A Act (as per Clause 5 of the Act)	Consideration
(a)	To encourage:	
i	proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,	Consistent Infrastructure for export of renewable energy development with due consideration to environmental impacts.
ii	the promotion and co-ordination of the orderly and economic use and development of land	Consistent
iii	the protection, provision and co-ordination of communication and utility services	Consistent
iv	the provision of land for public purposes	Not applicable
v	the provision and co-ordination of community services and facilities	Not applicable
vi	the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	Consistent. Comprehensive EIA conducted and mitigation measures are proposed.
vii	ecologically sustainable development	Consistent

viii	the provision and maintenance of affordable housing	Not applicable
(b)	to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	Not applicable
(c)	to provide increased opportunity for public involvement and participation in environmental planning and assessment	Consistent through consultation and public exhibition of the Modification Application

The objects of the EP&A Act have been considered by the modification application and within this environmental assessment report. The project aims to promote the orderly and economic use of the land through the provision of utility services (electricity generation from a renewable energy resource). The project has been located and designed such that it would avoid protected areas to the extent reasonably and feasibly possible and generally minimises the use of natural and artificial resources while still promoting the social and economic welfare of the local community. The local community has been consulted in regards to the project.

Given the Project would support a number of the objects of the EP&A Act, and is not inconsistent with the remaining objects of the Act, the Project is considered appropriate in the context of the EP&A Act.

The modification application can be assessed under Section 75W of Part 3A of the EP&A Act as described below.

6.3 WRWF Project Approval under Part 3A of the Act

The WRWF obtained Project Approval in July 2012, under Part 3A of the EP&A Act. Subsequent modifications of the Project Approval were granted in July 2015 (Mod 2) and April 2016 (Mod 3). Mod 1 that related to the alternate grid connection was withdrawn in January 2015.

Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) was repealed on 1 October 2011. However because the environmental assessment for White Rock Wind Farm was submitted in April 2011 (prior to the Part 3A repeal date), the Minister approved White Rock Wind Farm on 10 July 2012 as a 'transitional Part 3A project' (EP&A Act Schedule 6A, clause 2(1)(d)).

Part 3A continues to apply to transitional Part 3A projects (EP&A Act Schedule 6A, clause 3). Accordingly, this modification application is lodged pursuant to former section 75W (Modification of Minister's approval).

6.4 State Environmental Planning Policies

Under S 75R(2) of the EP&A Act, SEPPs apply to the carrying out of a project but, in the case of a critical infrastructure project, only to the extent that the provisions of a SEPP expressly provides that it applies to a particular approved project. However, a number of SEPPs are discussed here for completeness.

The State Environmental Planning Policy (Infrastructure) 2007 (SEPP Infrastructure) is applicable to the permissibility of the WRWF and this modification application. More details of how SEPP (Infrastructure) 2007 applies are provided in the following section.

State Environmental Planning Policy 44 (Koala Habitat Protection) was considered as part of the Biodiversity Assessment Report (Appendix 3A to this Report). It was concluded that the study area is not "Core Koala Habitat" and that no further provisions of SEPP 44 apply to the proposed modification.

6.5 Inverell Local Environmental Plan, 2012

Under S 75R(3) of the EP&A Act, environmental planning instruments including LEPs do not apply to projects approved under Part 3A. Whilst not relevant to the determination of this modification application, the Inverell Local Environmental Plan is considered here for completeness.

As described in section 6.3.1 of the WRWF Environmental Assessment, April 2011, the Minister may (but is not required to) take into account the provisions of any environmental planning instrument that would apply to the project. The alternative transmission line and grid connection facility is entirely within Inverell Local Government Area (LGA) and on land zoned, RU1 - Primary Production, under Inverell Local Environmental Plan, 2012 (ILEP).

The Objectives of ILEP Zone RU1 – Primary production, are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*

The WRWF and the proposed modification are considered to be consistent with the above objectives and, for the operational life of the project, would support the harnessing a natural resource (wind energy). While the activity would impact on land availability for primary production, the land would meet objects (2nd and 3rd dotpoints above) as identified above; it would allow for diversity in land use, appropriate to the area and it would not fragment resource lands. Being fully reversible and involving limited ground disturbance, it would not remove the potential to use the land for primary production in the long term.

Under the LEP, electricity generation is prohibited in the RU1 Zone. However, the project is permissible with consent under State Environmental Planning Policy (SEPP) (Infrastructure) 2007, Clause 34 which states that:

“Development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone.”

To the extent that there is an inconsistency between a SEPP and an LEP, a SEPP prevails.

6.5.1 Inverell Development Control Plan, 2013

The Inverell Development Control Plan (DCP), 19 July 2013, prepared by Inverell Council in accordance with Section 74C of the Environmental Planning and Assessment Act 1979, is indicated by Inverell Council to be aimed towards the facilitation of good development outcomes for the Inverell Shire.

While development control plans are not environmental planning instruments (EP&A Act section 4), the Minister may wish to take into account Inverell Shire Council Development Control Plan, 2013 (DCP) as an expression of the policy concerns in the local area.

Section 8 of the DCP addresses wind power generation. The content of Section 8 is predominantly directed to the actual wind turbine elements and their locations and assessment. As such the DCP is less relevant to this modification application in respect of an alternative grid connection.

6.6 Other NSW Environmental legislation

Under S 75R(s) of the EP&A Act, Part 3 of the EP&A Act (under which Development Control Plans are made) only applies to a project approved under Part 3A to the extent that the provisions of a policy expressly provide that the policy applies to a particular project. Whilst not relevant to the determination of this modification application, the Inverell Development Control Plan is considered here for completeness.

Other potentially applicable environmental legislation is discussed below.

6.6.1 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) provides an integrated system of licensing for polluting activities within the objective of protecting the environment.

- Section 148 of this Act requires notification of pollution incidents.
- Section 120 of this Act provides that it an offence to pollute waters (Referenced by Condition C8 of Project Approval MP10_160)
- Schedule 1 of the POEO Act describes activities for which an Environment Protection Licence (EPL) is required. It includes wind farms and EPL 20665 has been issued for WRWF.

WRWFPL must ensure that all stages of the Project are managed to prevent pollution, including pollution of waters. WRWFPL is also obliged to notify the relevant authorities (e.g. Environment Protection Authority) when a 'pollution incident' occurs that causes or threatens 'material harm' to the environment.

Legal requirements for the management of waste are also established under the POEO Act and the *Protection of the Environment Operations (Waste) Regulation 2005*. Unlawful transportation and deposition of waste is an offence under section 143 of the POEO Act. Waste management is also required to be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act).

Waste minimisation and management is addressed in Section 6.10 of the WRWF CEMP and this will be updated to address the modified project.

6.6.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) deals with the listing of threatened species, populations and communities, the declaration of critical habitat, recovery plans, threat abatement plans, licensing, Species Impact Statements requirements, biodiversity certification and bio-banking.

An assessment of the potential impacts of the proposed activities on threatened species, populations and ecological communities was undertaken, as documented in Appendix 3A of this EA Report.

A significant impact on any listed threatened species, population or ecological community is considered unlikely due to the low condition of the vegetation and lack of habitat features. A species Impact Statement has not been prepared.

6.6.3 Fisheries Management Act 1994 (FM Act)

The Fisheries Management Act 1994 (FM Act) sets out to conserve fish stocks and key fish habitats, threatened species, populations and ecological communities of fish and marine vegetation and biological diversity. Further, it aims to promote viable commercial fishing, aquaculture industries and recreational fishing opportunities. Threatened species, populations and ecological communities and key threatening process are listed in the FM Act's Schedules.

The Project area is in the upper reaches of the McIntyre River catchment. Several creeks are crossed by the line route, from west to east these include:

- Swan Brook
- Wet Creek
- Various unnamed creeks/watercourses

The transmission line route is to the north of Spring Gully and Kings Creek that flow generally east to west. The 132kV/330kV substation site is located several hundred metres north of Kings Creek. The design of the line will be based on the conductors spanning watercourses. Access tracks along the transmission line would also be designed and constructed generally in accordance with the DPI guidelines and would not impede fish passage.

There are no watercourses on the site considered to be Key Fish Habitat under the FM Act. Key Fish Habitats are those aquatic habitats that are important to the sustainability of the recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species (DPI 2016). Key Fish Habitat has been mapped on a local government basis.

6.6.4 Native Vegetation Act 2003

The *Native Vegetation Act 2003* regulates the clearing of native vegetation. Clearing is defined as cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning native vegetation including native grasses and herbage.

The Substation location and 132kV line route have, as far as practically and feasibly possible, been located to minimise impacts on remnant vegetation.

The WRWF Project Approval includes conditions to protect biodiversity including:

- Conditions C1 to C5 to minimise impacts on native vegetation and habitat
- Condition C6 relating to preparation and implementation of a Bird and Bat Adaptive Management Plan;
- Condition C7 requiring the proponent to prepare a Biodiversity Offset Package (BOP); and
- Condition E22 requiring a Construction Flora and Fauna Management Plan as sub-plan of CEMP.

The WRWF Stage 1 CEMP has been approved by DPE and would be extended for any approved grid connection works.

A BOP has also been prepared for WRWF Stage 1 and subject to approval of the modification, the BOP would be extended to address the additional vegetation impacts for the modification. This issue is addressed further in Section 7.4 of this EA.

As indicated in Section 6.1, a bill has passed both houses of NSW Parliament to repeal and replace the *Native Vegetation Act* and regulation and Codes for the new legislation is likely to be implemented in 2017.

6.6.5 Noxious Weeds Act 1993 (NW Act)

This Act aims to control noxious weeds in NSW. Part 3 of this Act outlines the obligations of private occupiers and public authorities to control noxious weeds.

Several environmental weeds are present within the study area including five species declared as noxious weeds for the Inverell Local Government Area as well as being listed under the *Noxious Weeds Act 1993*.

These weed species are:

- Sweetbriar *Rosa rubiginosa* (exotic),
- Blackberry *Rubus fruticosus* (exotic),
- Fireweed *Senecio madagascariensis* (exotic),
- Prickly Pear *Opuntia stricta* (exotic) and
- Chilean Needle Grass *Nassella neesiana*.

Noxious weeds are discussed in Section 7.4 of this EA and Appendix 3A.

The WRWF Stage 1 Construction Flora and Fauna Management Plan addresses weed management and will be updated for the alternative grid connection in association with the CEMP for the implementation of any works approved for the Mod 4 application.

6.6.6 National Parks and Wildlife Act 1974

Under the *National Parks and Wildlife Act 1974* (NPW Act), the Chief Executive of OEH is responsible for the care, control and management of all national parks, historic sites, nature reserves, reserves, Aboriginal areas and state game reserves. The Chief Executive of OEH is also responsible under this legislation for the protection and care of native fauna and flora, and Aboriginal places and objects throughout NSW.

The provisions of the NPW Act have been considered for the Project. The Project site is not in or in the vicinity of any protected areas as defined in the Act.

A summary of the assessment of impacts to Aboriginal Heritage is provided in Section 7.5 of the EA (and in full, Appendix 4). An Aboriginal Heritage Impact Permit (AHIP) under section 90 of the NPW Act is not required for this project (section 75U of the EP&A Act).

An Aboriginal Heritage Management Plan (AHMP) has been prepared for WRWF Stage 1 construction and would be extended to include any approved grid connection facilities.

6.6.7 Roads Act 1993

The Roads Act provides for the classification of roads and for the declaration of the RMS and other public authorities as roads authorities for both classified and unclassified roads. It also regulates the carrying out of various activities in, on and over public roads. This includes the erection or removal of structures, the excavation or disturbance to a public road surface, the pumping of water into a public road from any land adjoining the road or the connection of a road to a classified road.

The Project would involve works in, on, or over a public road. The mid-section of the proposed 132kV line crosses Spring Mountain Road, Northcott Road and Sturmans Road. Spring Mountain Road connects with Gwydir Highway.

Access to the project area also requires an upgrade of the access track to the substation site. The access track connects with Gwydir Highway west of Swan Vale.

Access to the eastern end of the proposed transmission line would be via roads that will be used for the construction and operation of WRWF. The entry from Gwydir Highway has been upgraded as part of WRWF Stage 1 construction works.

Any required upgrading of roads (widening works and bridge upgrade works) would take place in consultation with the relevant road authority (RMS or Inverell Council) either prior to the construction works or, at a timing agreed with the relevant road authority. Road repair works due to dilapidation would also be assessed and arranged in accordance with the process described in the Project Approval Conditions and agreements made with the respective road authority.

Approvals under Section 138 of the Roads Act will be required for parts of the new 132kV line route where it crosses Spring Mountain, Northcotts or Sturmans Road or for any upgrades of classified or unclassified roads associated with deliveries of project components to the site.

Traffic and Transport issues, potential impacts and their mitigation are discussed in Section 7.6.

6.6.8 Crown Lands Act 1989

The objective of the Crown Lands Act is to ensure that Crown land is managed for the benefit of the people of New South Wales. The Department of Industry - Lands is responsible for the sustainable and commercial management of Crown land. This involves the management of state-owned land, linking with other agencies, local government, the private sector and communities to provide social and economic outcomes for NSW. The Department previously responded to the MOD 1 application advising that it raised no issues with the proposal and advised that the proponent will need to seek and obtain from Crown Lands appropriate easements over affected land.

The northern entry to the WRWF site from the Gwydir Highway utilises an existing farm entry point across a Crown Reserve where a Licence has been obtained. No further upgrade to this access is needed for the modification activities and no further approval is expected to be required for that access.

Elsewhere, crossing of Crown land by the alternative grid connection infrastructure would require agreements from Crown Lands and/or Inverell Council.

It is expected that the Modification Application will be referred to Crown Lands. Subject to approval of the modification and decision to proceed to the implementation, all necessary Crown Land approvals would be obtained as required by Condition C32.

6.6.9 Heritage Act 1977

The Heritage Act 1977 aims to conserve heritage values. It defines 'environmental heritage' as those places, buildings, works, relics, moveable objects and precincts of State or local heritage significance. A property is a heritage item if it is listed in the heritage schedule of the local Council's LEP or listed on the State Heritage Register, a register of places and items of particular importance to the people of NSW.

Section 7.5 of this EA and Appendix 4 address potential impacts on heritage items or places.

6.6.10 Mining Act

The main objective of the *Mining Act 1992* is to encourage and facilitate the discovery and development of mineral resources in New South Wales, having regard to the need to encourage ecologically sustainable development. The Department of Trade and Investment, Resources and Energy Branch responded in February 2013 to referral of the MOD 1 Application and raised the matter of Exploration Licences 7301 and 7302 and Mining Lease (ML) 1505.

A recent search of Department of Industry's MinView database (Department of Industry 2016) found that:

- there are no existing Mineral Exploration Licences within the development area. A historical exploration licence (EL7302) existed covering the southern portion of the development envelope was for the exploration of metallic mineral between 2009 and 2013 but has now lapsed.
- Mining Lease 1505 was granted in 2002 for a period of 21 years and is crossed by the line route. The landowner and holder of the lease does not object to the line development. Nevertheless, development of the line across an existing Mining Lease will need to be managed in consultation with the landowner and Resources and Energy Branch. Further consultation is expected to be required for this aspect.

6.7 Commonwealth Legislation

6.7.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of Environment (DoE). Under the EPBC Act, if an action is a 'controlled action' which has, will have or, is likely to have a significant impact on a Matter of National Environmental Significance (MNES) or Commonwealth land, then the action may not be undertaken without prior approval of the Minister.

The EPBC Act identifies nine MNES:

- World Heritage properties.
- National heritage places.
- Ramsar wetlands of international significance.
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

When a person proposes to take an action that they believe may be a 'controlled action' under the EPBC Act, they must refer the Project to the Department for a decision about whether the proposed action is a 'controlled action'.

A search for MNES and other matters protected by the EPBC Act was carried out within a 50km radius of the Project area using the Commonwealth online Environmental Reporting Tool (report created 24 November 2016). A summary of the findings is provided in Table 6.2.

Table 6.2 - Summary of Matters of National Environmental Significance and other Protected Matters

A - Matters of National Environmental Significance	No.
World Heritage Properties	0
National Heritage Places	0
Wetlands of International Significance	5
Great Barrier Reef Marine Park	0
Commonwealth Marine Areas	0
Threatened Ecological Communities	5
Threatened Species	62
Migratory Species	10
B - Other Matters Protected by the EPBC Act	No.
Commonwealth Lands	6
Commonwealth Heritage Places	2
Listed Marine Species	16
Whales and Other Cetaceans	0
Critical Habitats	0
Commonwealth Reserves	0
C - Extra Information	No.
State and Territory Reserves	18
Regional Forest Agreements	1
Invasive Species	33
Nationally Important Wetlands	2
Key Ecological Features (Marine)	0

Relevant matters are discussed within Section 7.4 Biodiversity. No matters of National Environmental Significance would be significantly affected by the proposed activity. The WRWF Project has been referred under the EPBC Act in 2011 and was declared a 'Not a Controlled Action'. The Biodiversity Assessment (Appendix 3A) concluded that alternative grid connection would not have a significant impact on threatened species and endangered ecological communities that are listed under the TSC Act or EPBC Act. No further referral is required based on the assessment undertaken for the Modification.

6.7.2 Native Title Act 1993

The *Native Title Act 1993* provides a legislative framework for the recognition and protection of common law native title rights. Native title is the recognition by Australian law that Indigenous people had a system of law and ownership of their lands before European settlement. Where that traditional connection to land and waters has been maintained and where government acts have not removed it, the law recognises the persistence of native title.

People who hold native title have a right to continue to practise their law and customs over traditional lands and waters while respecting other Australian laws. This could include visiting to protect important places, making decisions about the future use of the land or waters, hunting, gathering and collecting bush medicines. Further, when a native title claimant application is registered by the National Native Title Tribunal, the people seeking native title recognition gain a right to consult or negotiate with anyone who wants to undertake a project on the area claimed.

Native title may exist in areas such as:

- Vacant Crown land.
- Some national parks, forests and public reserves.
- Some types of pastoral lease.
- Some land held for Aboriginal communities.
- Beaches, oceans, seas, reefs, lakes, rivers, creeks, swamps and other waters that are not privately owned.

A search of the Register of National Native Title Claim Details, for the Inverell Council LGA, returned one result as follows, NC2011/006 – Gomerioi People. Details are set out in Table 6.3 and the extent of the Claim is shown in Figure 6.1. The area of the Claim corresponds with the area where the alternative Grid Connection would be located.

Table 6.3 – Results of Search of National Native Title Claims for the Inverell Council LGA

NC2011/006 - Gomerioi People

Tribunal file no.	NC2011/006
Federal Court file no.	NSD2308/2011
Application name	Gomerioi People
State or Territory	New South Wales;
Representative A/TSI body area(s)	New South Wales
Local government area(s)	Armidale Regional Council, Coonamble Shire Council, Gilgandra Shire Council, Glen Innes Severn Shire Council, Gunnedah Shire Council, Gwydir Shire Council, Inverell Shire Council, Liverpool Plains Shire Council, Mid-Western Regional Council, Moree Plains Shire Council, Muswellbrook Shire Council, Narrabri Shire Council, Tamworth Regional Council, Upper Hunter Shire Council, Uralla Shire Council, Walcha Council, Walgett Shire Council, Warrumbungle Shire Council
Date filed	20/12/2011
Date claim entered on Register	20/01/2012

Register extract and attachments

Register extract RNTCEXtract_NC2011_006.pdf

Register extract attachment/s NC2011_006 1. Map of the area covered by the application.pdf

NC2011_006 2. Description of area covered by the application.pdf

NATIVE TITLE DETERMINATION APPLICATION

Gomeri People

 Gomeri People

RNTC Attachment:
NSD2308/2011 (NC2011/006)
Map of the area covered by the application
Attachment C of the Application
Page 1 of 1, A3, 20/12/2011



KILOMETRES
Latitude and Longitude based on Geocentric Datum of Australia 1994
New Territories

© Commonwealth of Australia 2011

The Registrar, the National Native Title Tribunal and its staff, members and agents and the Commonwealth (collectively the Commonwealth) accept no liability and give no undertakings, guarantees or warranties concerning the accuracy, completeness or fitness for purpose of the information provided. In return for you receiving this information you agree to release and indemnify the Commonwealth and third party data suppliers in respect of all claims, expenses, losses, damages and costs arising directly or indirectly from your use of the information and the use of the information you obtained by any third party.

NOTE: To determine areas subject to claim within the external boundary, reference to the application description is necessary.
Application boundary data compiled by the NNTT from data sourced from DOL (NSW).

Topographic image data is © Commonwealth of Australia and is used under licence from Geoscience Australia 2008

NOTE: Topographic images should be used as a guide only.

Map created by: Geospatial Services, National Native Title Tribunal (09/12/2011)

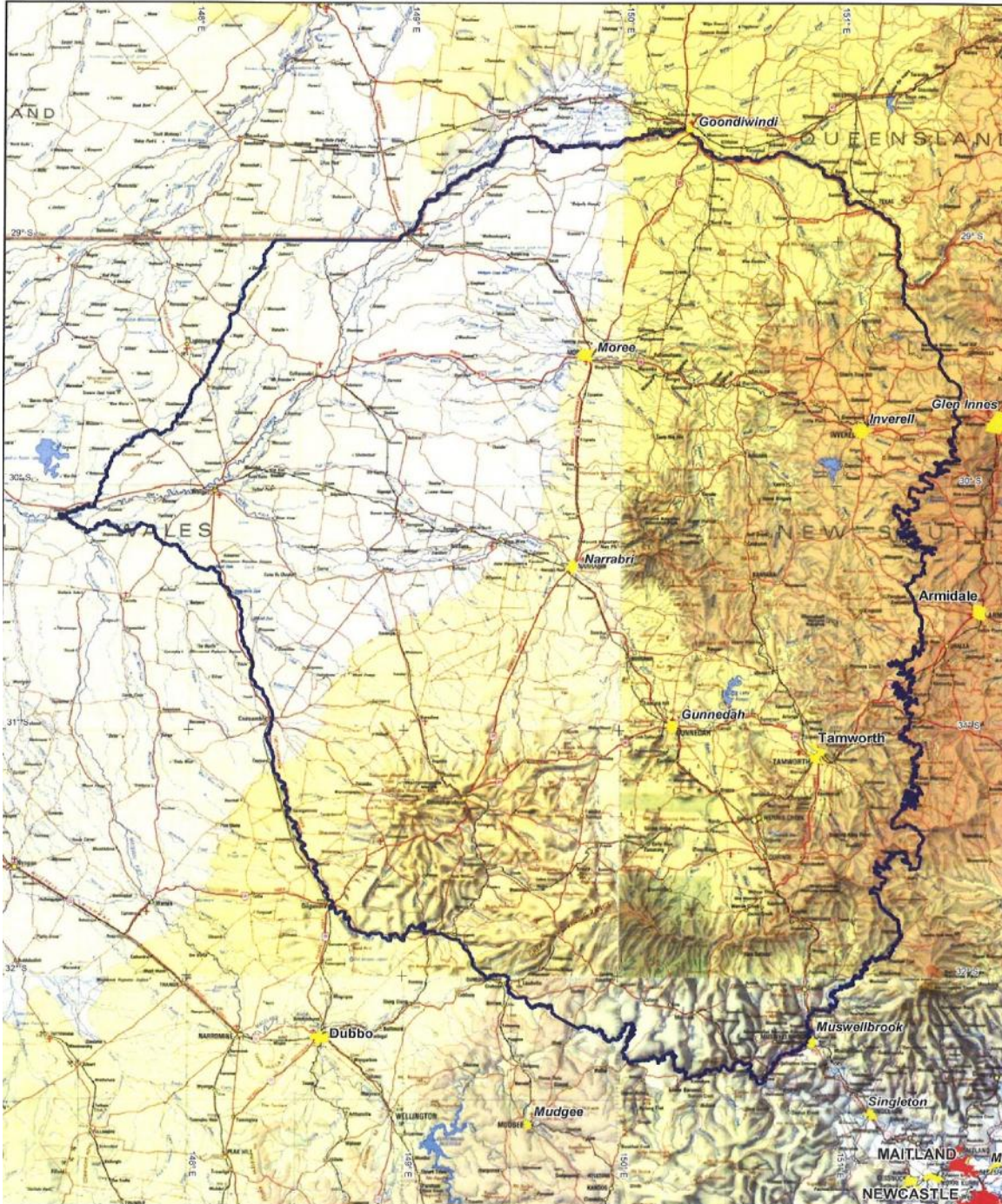


Figure 6.1 – Extent of Native Title Claim 2011/06 – Gomeri People

6.7.3 Renewable Energy (Electricity) Act 2000

The *Renewable Energy (Electricity) Act 2000* (RE Act) aims:

- To encourage the additional generation of electricity from renewable sources.
- To reduce emissions of greenhouse gases in the electricity sector.
- To ensure that renewable energy sources are ecologically sustainable.

Section 17 of the RE Act defines renewable energy sources eligible under the Commonwealth government's Renewable Energy Target (RET). This includes wind energy.

Certificates for the generation of electricity are issued using eligible renewable energy sources. This requires purchasers (called liable entities) to surrender a specified number of certificates for the electricity that they acquire. In January 2011, renewable energy certificates were reclassified as either large-scale generation certificates or a small-scale technology certificates following changes to the RET scheme.

White Rock Wind Farm Pty Ltd (WRWFPL) will need to be accredited as a Renewable Energy Generator to create Renewable Energy Certificates.

6.8 Other relevant policies and plans

6.8.1 Ecologically Sustainable Development (ESD)

Ecologically Sustainable Development (ESD) involves the effective integration of social, economic and environmental considerations in decision-making processes. In 1992, the Commonwealth and all state and territory governments endorsed the *National Strategy for Ecologically Sustainable Development*.

In NSW, the concept has been incorporated in legislation such as the EP&A Act and Regulation. For the purposes of the EP&A Act and other NSW legislation, the Intergovernmental Agreement on the Environment (1992) and the *Protection of the Environment Administration Act 1991* outline principles which can be used to achieve ESD. These principles are presented below along with a description of how the WRWF and this EA have considered each principle.

- a) **The precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - i. careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - ii. an assessment of the risk-weighted consequences of various options.

The precautionary principle has been adopted in the assessment of impact; all potential impacts have been considered and mitigated where a risk is present. Where uncertainty exists, measures have been included to address the uncertainty.

- b) **Inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The majority of potential impacts of the WRWF are likely to be localised and would not diminish the options regarding land and resource uses and nature conservation available to future generations.

Importantly, the Project would address the need to minimise the risk of climate change to current and future generations by reducing carbon emissions.

- c) **Conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

The impacts of the Project on biodiversity, including EPBC listed species, have been assessed in Appendix 3A and are summarised in Section 7.4. This has included avoidance of areas of higher conservation value and management prescriptions to minimise, manage and offset residual impacts.

- d) **Improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
- i. polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - ii. the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - iii. environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Attributes of the Project site such as the existing native vegetation, soil and hydrology have been valued in terms of their broader contribution to the catchment and catchment processes.

The aims, structure and content of this EA have incorporated these ESD principles. Mitigation measures are described in the Sections addressing the respective environmental issues. The existing Project Approval conditions and the CEMP updated to address the Modified Approval form an appropriate basis for management of potential impacts. Based on the social and environmental benefits accruing from the Project at a local and broader level, and the assessed impacts on the environment and their ability to be managed, it is considered that the development would be ecologically sustainable within the context of ESD.

6.8.2 Strategic Regional Land Use Plan – New England North West

The New England North West Strategic Regional Land Use Plan represents one component of the Government's broader Strategic Regional Land Use Policy which comprises multiple initiatives being staged over time to address land use conflict in regional areas. The primary aim of the plan is to provide greater protection for valuable agricultural land and better balance competing land uses.

The plan is particularly focused on managing coal and coal seam gas issues (DP&I 2012), however is relevant to all developments within the New England North West region as it identifies land that is considered to be Strategic Agricultural Land. Strategic agricultural land is defined as highly productive land that has both unique natural resource characteristics (such as soil and water resources) as well as socio-economic value (such as high productivity, infrastructure availability and access to markets). Two categories of strategic agricultural land have been identified:

1. biophysical strategic agricultural land
2. critical industry clusters.

Biophysical strategic agricultural land is land with a rare combination of natural resources highly suitable for agriculture. These lands intrinsically have the best quality landforms, soil and water resources which are naturally capable of sustaining high levels of productivity and require minimal management practices to maintain this high quality.

Critical industry clusters are related to the lands importance to a highly significant agricultural industries (eg, wine making, horse breeding etc). There are no critical industry clusters in the New England North West.

The Project is partly located on land that is mapped as Biophysical Strategic Agricultural Land. Potential impacts to this high value land are considered in this EA Section 7.9.1 along with management measures to minimise the impact.

6.9 Summary of licenses and approvals

Table 6.4 – Summary of Licences and Approvals required

Legal Instrument or, Organisation	Approval, Licence, Permit or Agreement
EP&A Act, 1979, Part 3A	<ul style="list-style-type: none"> Modified Project Approval (MOD 4)
Crown Lands Act 1989	<ul style="list-style-type: none"> Licence for works crossing Crown roads
Roads Act 1993	<ul style="list-style-type: none"> Possible Works Authorisation Deed (WAD) – entry to 132kV/330kV Substation, west of Swan Vale
Roads Act 1993	<ul style="list-style-type: none"> Section 138 Approval from Inverell for any works in local roads (Spring Mountain, Sturmans and Northcotts Roads)
Inverell Council	<ul style="list-style-type: none"> Dilapidation Agreement where the project uses local roads and wear beyond normal usage is indicated

Note, if it is determined that additional licenses or approvals are required, WRWFPL would obtain these prior to commencement of relevant activities.

7 ASSESSMENT FOR THE PROPOSED MODIFICATION

7.1 Assessment Requirements and Key Issues

The key issues for assessment in respect of WRWF as taken from the Director-General's Requirements, October 2010 for the original WRWF Environmental Assessment (2011) are listed below:

- visual impact;
- noise impact;
- biodiversity impact; and
- indigenous & non-indigenous heritage impact.

The above issues have been considered for this Modification Application. This EA also considers other potential environmental issues including issues such as:

- Traffic and Transport;
- Soil and Water Management;
- Conflict with agriculture or mining activities;
- Aviation Safety;
- Electric and Magnetic Fields; and
- Bushfire Risk Management.

Relevant assessments for the alternative grid connection were previously provided in the WRWF Mod 1 Supporting Document, January 2013 and additional information was supplied in the WRWF Mod 1 Submissions Report, July 2013. Those assessments have been referenced and as necessary updated in the preparation of the assessments provided with this EA for the Mod 4 Application.

7.2 Visual Impact

A Visual Impact Assessment (VIA) of the proposed WRWF modifications prepared by Green Bean Design landscape architects in July 2016 and is provided in Appendix 1. An overview of the VIA and its conclusions is provided in this section.

The alternative 132kV transmission line would extend through a rural landscape of pastoral grazing land with small pockets of cultivated arable crops and patches of remnant woodland vegetation. The landform is undulating to gently sloping with steeper hillside sections rising to the wind farm site in the east. There are a variety of topographical features within the local and regional landscape and an overall moderate landscape scale with a range of distant to mid distance views into neighbouring landscapes.

The undulating topography with a combination of open views interrupted by groups of trees and small forested areas has a high capability to visually absorb the transmission line without significantly changing the amenity. The transmission line will have poles with maximum height of about 35 metres which is much less than the height of the wind turbines and also less than the lattice tower structures of the existing 330kV line.

There are five residential dwellings located within 2km of the alternative transmission line route as shown in Table 7-1 and in the map in Figure 3.1. Three of these are associated with the project.

The alternative 132kV transmission line route would be located in a landscape with a moderate to high visual absorption capability, and the existing physical characteristics of the landscape surrounding the alternative transmission line would tend to reduce the overall visibility and visual impact of the alternative line route.

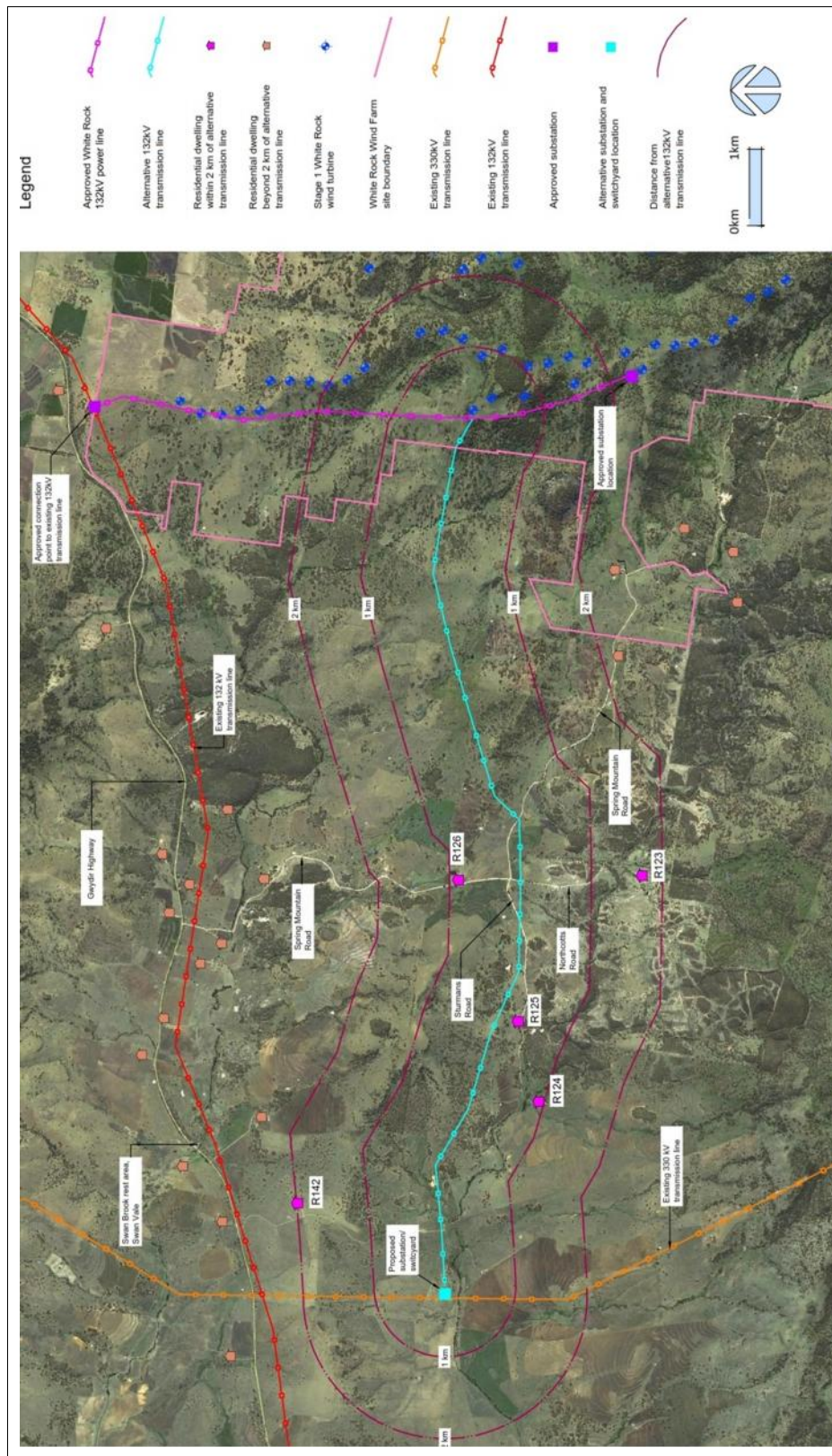


Figure 7.1

Location of Residences and Viewpoints surrounding 132kV transmission line and 132kV/330kV substation

(From GBD Visual Assessment Report, 2016)

Table 7-1 Nearby residential dwellings and potential visual impact of the alternative transmission line

Location (residence Codes as per Figure 7.1)	Distance to alternative transmission line	Overall Visibility & Potential Impact
Non-associated residential dwelling R123	1.7 km	Nil/low
Non-associated residential dwelling R124	0.9 km	Low
Associated residential dwelling R125	0.3 km	Low
Associated residential dwelling R126	0.8 km	Low
Associated residential dwelling R142	1.9 km	Nil

There are a very low number of people travelling through or residing in the landscape surrounding the alternative transmission line alignment. Views from residential dwellings within 2km of the alternative alignment are unlikely to result in a high visual impact. Four of the five residential dwellings will have restricted views toward the transmission line route resulting from topography and vegetation screening. One associated dwelling would have potential short distance views towards a short section of the transmission line, however existing tree cover would partially obscure views.

The VIA preparation has included desktop study of visual character, identification of the view catchment for the line, site inspection, fieldwork and photography, assessment and determination of Visual Absorption Capability, preparation of figures to support the VIA, assessment of visual impact from publicly accessible view points and residential dwellings and discussion of mitigation measures and how they may reduce levels of potential visual impact.



Photo Location P1A- View north east to south from Spring Mountain Road

Plate 7.1 – Panorama scene viewed east from Spring Mountain Road toward White Rock Mountain (GBD)

The alternative substation and switchyard for connection to the existing TransGrid 330kV transmission line would be located 2.5km south of the Gwydir Highway in a sparsely settled area. Due to distance and intervening topography the substation is unlikely to be visible from Gwydir Highway and as a result of low settlement density it will not result in any significant visual impact. The substation location has been selected to ensure low visual and noise impacts.

GBD has concluded that *“the substation location is unlikely to result in any significant visual impact with views from surrounding receiver locations largely screened by scattered tree cover and landform”*.

The Landscape and Visual Impact Assessment prepared by Green Bean Design landscape architects is provided in Appendix 1.

The Design and Landscape Plan (DALP) required by Condition C30 would also need to be updated for the modified project.

7.3 Noise Impact Assessment

An Environmental Noise Assessment of the proposed WRWF modifications has been prepared by Sonus Pty Ltd in September 2016 and is provided in Appendix 2. An overview of the noise assessment and its conclusions is provided in this section. The assessment has considered construction and operation of the alternative grid connection facilities in relation to relevant Project Approval Conditions.

7.3.1 Construction Noise

The assessment considered the construction noise from the substation and transmission line. Relevant conditions are E5 (Construction Hours) and E21/E22 (CEMP and Construction Noise and Vibration Management Plan (CNVMP)).

Condition E5 of the Project Approval limits the hours of construction activities to the standard hours of the Interim Construction Noise Guidelines (ICNG) and as shown below. Circumstances allowing construction activities outside these hours are also prescribed in Condition E5

- a) 7am to 6pm Mondays to Fridays
- b) 8am to 1pm Saturdays
- c) At no time on Sundays or NSW public holidays

The ICNG sets goal levels and an upper limit that should only be exceeded in exceptional circumstances and for short periods.

The assessment considered phases of construction for the substation and transmission line, site preparation, foundation works, infrastructure construction, equipment, pole installation and site rehabilitation/removal of temporary facilities.

The predicted noise levels at the closest residences to the substation were shown to be less than the ICNG goal noise level of 40 dB(A) and therefore no specific acoustic mitigation is needed for the substation construction.

The construction noise for the transmission line will move along the length of the corridor as installation progresses and have a short term impact at any location adjacent the line. The closest residences are associated landowners.

Subject to the Modification being approved, the WRWF CNVMP would be updated to address the feasible and reasonable work practices and noise reduction measures for the alternative grid connection facilities.

7.3.2 Operational Noise

The Sonus noise assessment considered the operational noise from the substation and transmission line. Relevant conditions are E23 (Operational Noise Criteria-Ancillary Infrastructure) and E24 (Operating Conditions). This requires that noise generated by the operation of ancillary infrastructure does not exceed 35dB(A) LAeq(15 minute) at any non-associated residence. Noise generated by the project is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy* (as may be updated from time to time) as modified by the provision in Appendix 2 of the Project Approval.

The alternative substation would incorporate a single 132/330kV transformer rated at approximately 360-380 MVA which would be the only significant noise source at the substation and switchyard. There is a significant separation distance in the order of 2.4 km between the 132kV/330kV substation location and the nearest residential dwelling.

The noise from the proposed transformer was modelled using the CONCAWE propagation model within the SoundPlan noise modelling software and sound power levels for the transformer were based on the

Australian/New Zealand Standard AS/NZS 60076.10:2009 Power transformers – Part 10: Determination of sound levels which derives the maximum sound power level of a transformer unit based on its rating.

The noise associated with the operation of the proposed substation was predicted at all residential locations located within 5km. The noise level at each of the residences was well below the criteria of 35 dB(A) set out in Condition F23, with the greatest predicted noise level being 12 dB(A) at the nearest dwelling (Figure 7.2).

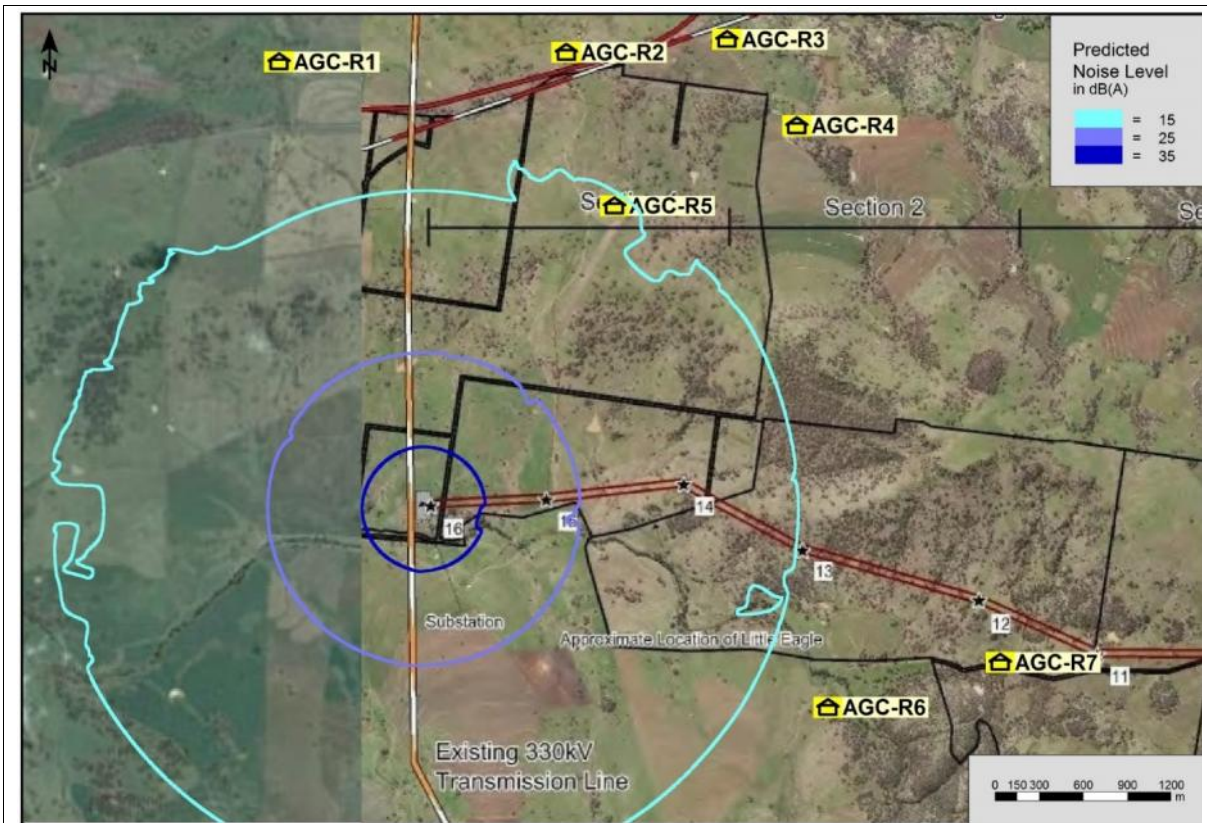


Figure 7.2 – 132kV/330kV Substation - Predicted Operational Noise level contours

Details of the environmental noise assessment prepared by Sonus are provided in Appendix 2.

Subject to approval of the modification, the preparation of the Operational Environmental Management Plan will address any need for operational noise reduction measures.

Residence reference codes vary for the different studies – A correspondence table is provided below.

Epuron – Fig 3.1	GBD Visual Codes Fig 7.1	Noise Study Appendix 2	Dwelling status
A125	R123	Not referenced *	Non-associated
AX110	R124	AGC-R6	Non-associated
AY107	R125	AGC-R7	Associated
A99	R126	AGC-R8	Associated
AW73	R142	AGC-R5	Associated

Note: A125/R123 is a similar distance from the line as AW173/R142 and much further from the substation

7.4 Biodiversity

Biodiversity Assessments have been prepared by Environmental Assessments Pty Ltd and Eco Logical Australia (ELA) in the following phases. An overview of the assessments and their conclusions is provided in this section.

- A Biodiversity Assessment for MOD 1 was prepared, by Environmental Assessments Pty Ltd, in 2013;
- An updated Biodiversity Assessment Report, November 2016, is provided in **Appendix 3A**.
- Additional Biodiversity advice responding to an OEH submission to MOD 1 was included in the WRWF Submissions Report July 2013. Items not included in updated report are provided in **Appendix 3B**
- Eco Logical (ELA) provided an offsets assessment for the alternative grid connection facilities. This included biometric plot data and Credit Reports to support a future update of the WRWF Biodiversity Offset Package (BOP) in accordance with Condition C7. The ELA Report, December 2016, is attached as **Appendix 3C**.

The line route and substation site are located in a landscape of mostly cleared highly disturbed and modified land with grazing and cultivation as the dominant land use. Patches of remnant woodland are interspersed through the landscape. To the extent practically and reasonably possible, the line route has been varied to minimize impacts on remnant woodland areas.

The permanent impact of the alternative transmission line is limited to, a small area at the base of each transmission line pole, a temporary impact occurs for the hardstand at each pole site for the erection of the pole and associated cross arms, insulators and cable stringing and any clearing of taller vegetation that needs to be removed to provide safe clearances. The transmission poles will be spaced at intervals of approximately 200 – 250m with an estimated 60 poles required for the 13km line route. The temporary access tracks used for the installation will be reinstated where practical to enable the original grazing or cultivation land use.

The preliminary easement corridor for the proposed transmission line was selected to minimise the potential impact on flora and fauna habitat using high resolution aerial images of the route. An ecology assessment of the easement corridor (100m wide study area, twice the width of proposed easement) was then carried out to identify potential ecology impacts and any constraints to the proposed route. During the course of the planning for alternative grid connection facilities, variations to the line route have been made to reduce environmental impacts and for practical purposes.

The biodiversity surveys and assessments addressed relevant threatened species, populations and ecological communities (Figure 7.3).

Searches for daylight bird species were carried out by area searches and point counts. Particular species were targeted as follows:

Species	Target Location
Regent Honeyeater	Along approximately 500m length of the riparian community in Section 6 of the study area, and within mistletoe plants and flowering White Box trees whilst in flower across the study area
Swift Parrot Little Lorikeet	Remnant vegetation surrounding the study area which contained White Box <i>Eucalyptus albens</i> which was in flower during the assessment period
Hooded Robin Scarlet Robin Speckled Warbler	Within adjacent White Box remnant areas with understorey and in sections 2, 5, 6 and 7.

Black Bittern	In Upland Wetland and riparian areas in section 6
Brown Treecreeper	In riparian areas adjacent to section 2 and in section 6, particularly along the 500m riparian zone
Grey Crowned Babbler	Throughout study area and environs

The survey methodology for threatened species of fauna and flora has been described in the supplementary biodiversity assessment for the alternate powerline and considered:

- Search of OEH Atlas database for Glen Innes and Inverell LGAs with a 50km radius from the study area
- Actual recording during the field survey – this included transects, plot based (quadrat) surveys and targeting threatened plants. There was no suitable habitat for amphibians and relevant survey methods were not used. Reptile searches were limited. Area searches and opportunistic assessment were done for Diurnal birds.
- Likelihood of occurrence based on the broad habitat parameters encountered in the study area

No Rare or Threatened Australian Plant (ROTAP) species were recorded during the biodiversity assessment. Several threatened fauna species were identified within the study area: Diamond Firetail; Little Lorikeet; and Little Eagle. Seven Part Assessments for potentially present Threatened Species have also been provided in the Biodiversity Assessment Report (Appendix 3A). An assessment was also undertaken in respect of SEPP 44 (Koala Habitat Protection) and concluded that the study area does not contain “Core Koala Habitat”.

Two endangered ecological communities are present within the study area as follows:

- *White Box Yellow Box Blakely’s Red Gum EEC*; and
- *Ribbon Gum-Mountain Gum-Snow Gum Forest/Woodland EEC*.

An area of *Upland Wetlands of the Drainage Divide of the New England Tableland Bioregion-EEC* was also mapped within the original line route and the line route was subsequently amended to avoid that area by relocating the line route further to the south.

A fourth vegetation community was also mapped in part of Section 6, *Riparian Community /River Oak Vegetation Community*.

Representative photographs of these vegetation communities are provided in Plates 7.2 to 7.5.

The biodiversity assessment concluded that the proposed 132kV transmission line, substation and associated construction access tracks will not have a significant impact on any threatened species or endangered ecological communities. Mitigation measures in updated management plans will be implemented to further minimise the potential impacts on the environment. Appropriate offsets will also be included in an updated BOP in consultation with DPE and OEH.

Within the forested areas of the easement (predominantly *White Box Yellow Box Blakely’s Red Gum EEC*) a corridor of approximately 15m wide will need to be cleared to maintain the technical and safety clearances. The minimum conductor clearance required either side of a 132kV transmission line is 7.5m. For the purpose of the vegetation offset calculations, a 45m wide clearance zone has been conservatively used.

The impact of this alternative transmission line on native vegetation has been calculated and is shown in Table 7-3. The alternative substation location will not have any impact on native vegetation as it has been located on land used for cultivation of exotic pasture.



Plate 7.2 – White Box Yellow Box Blakelys Red Gum EEC



Plate 7.3 – Ribbon Gum – Mountain Gum Snow Gum Forest/Woodland EEC on White Rock Mtn



Plate 7.4 – Riparian Community / River Oak Vegetation Community (Only in Section 6)



Plate 7.5 – Upland Wetlands of the Drainage Divide of New England Bioregion EEC (localized)

Table 7-2 Infrastructure Footprint

Description	Number	Width (m)	Length (m)	Area (ha)
Study Area – Transmission line corridor	1	100	13,210	132.1
Transmission line Easement	1	50	13,210	66.1
Transmission line Poles Footprint	60	1	1	0.01
Transmission poles – Hardstand for construction	60	5	5	0.15
Switchyard/Substation	1	100	200	2.0

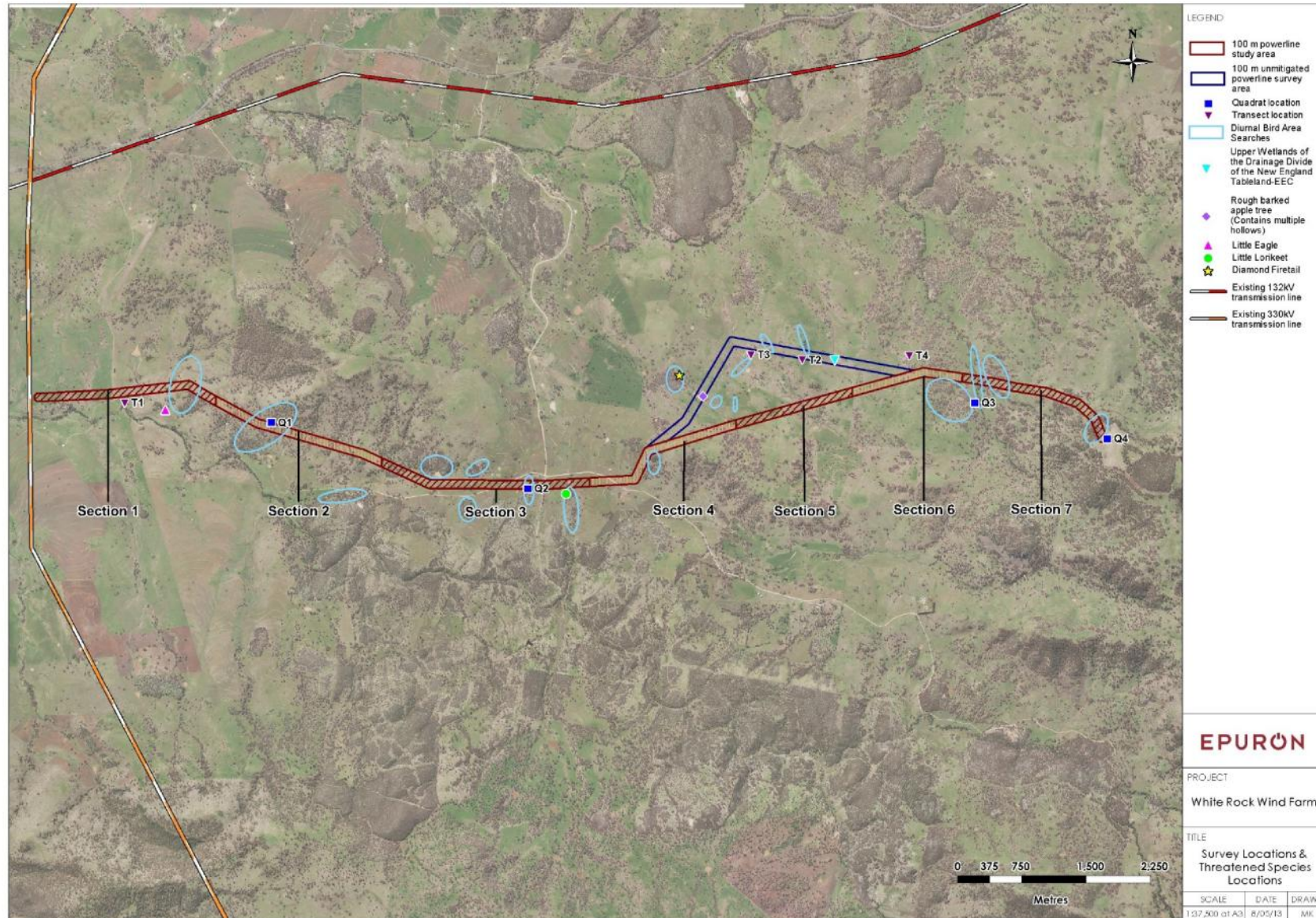


Figure 7.3 - WRWF – Alternative Grid Connection Facilities - Survey Locations and Threatened Species Locations

Table 7-3 Native Vegetation Impact Area Calculation

Description	Ribbon Gum Mountain Gum Snow Gum Forest/Woodland EEC	White Box Yellow Box Blakely's Redgum EEC	Derived Native Grassland	Possible Derived Native Grassland
Study Area (100m x 13,210m)	0.79 ha	13.84 ha	0.49 ha	1.42 ha
Clearance for 7.5m wide conductor clearance zone (<i>Env Assessments</i>)	0.13 ha	2.0 ha	-	-
Clearance for 45m wide conductor clearance zone (<i>ELA</i>)	5.27 ha	0.53 ha	-	-
DNG areas will not be impacted as it will not need clearing and as all poles will be positioned to avoid DNG areas.				

Condition C7 of the Project Approval requires the preparation of a Biodiversity Offset package (BOP) to address the WRWF impact on native vegetation. A BOP has been submitted to DPE/OEH in respect of WRWF Stage 1.

The impact of the alternative transmission line route and alternative substation location, including the quantum, biometric vegetation type and condition, has been determined which will allow the alternative transmission line to be included in the updated Offset Plan to be developed in consultation with OEH prior to construction. Suitable potential offset areas have been identified to offset the White Box Yellow Box Blakely's Red Gum Woodland EEC that will be impacted by the construction of the alternative transmission line. Credits have also been identified on land owned by the proponent that can be used to fulfil the project's offset obligations (**Appendix 3C**).

Environmental Assessments Pty Ltd (**Appendix 3A**) calculated that up to 2.003 ha of 'Box Gum Woodland' and 0.127 ha of 'Ribbon Gum – Mountain Gum' EEC would be impacted within a 15m wide route corridor within the 50m easement. ELA (**Appendix 3C**) has however, assessed a worst case scenario that assumes loss of all canopy, canopy regeneration and any hollow bearing trees and mid-story vegetation within a 45m corridor that is within the 50m easement to allow the establishment and ongoing maintenance of the easement (although individual trees will be retained within this corridor where possible).

The results of the FBA credit calculations (Table 7.4) and a copy of the credit report and trading profile are provided in **Appendix 3C**. The report shows that 209 ecosystem credits are required to offset the impacts to woodland areas and 42 credits for impacts to DNG areas, if these were to be impacted.

Adequate offset areas have been identified by ELA and an updated BOP can be prepared and approval of DPE sought as required by Condition C7.

WRWF Stage 1 CEMP includes a Construction Flora and Fauna Management Plan (CFFMP) that sets out measures to minimize impacts on Flora and Fauna. The CFFMP would be updated to address the modified infrastructure. Weed management measures have also been identified for the WRWF project and are being implemented for Stage 1 construction works.

Table 7.4: FBA impact and credit calculations for loss of tree and mid-story vegetation along alternate powerline route

Veg Zone	Plant Community Type	PCT / BVT	Ancillary	Current SV	Area (ha)	Future SV	Credits	Credits/ha
1	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion	PCT 599 / BVT 271	Woodland	63.93	1.21	22.95	42	34.65
3	Ribbon Gum - Rough-barked Apple - Yellow Box grassy woodland of the New England Tableland Bioregion and NSW North Coast Bioregion	PCT 554 / BR330	Woodland	90.62	0.53	27.60	27	50.65
4	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	PCT 590 / BR391	Woodland	63.93	4.06	22.95	140	34.46
					5.8		209	36.03

Derived Native Grassland Areas – not impacted

Veg Zone	Plant Community Type	PCT / BVT	Ancillary	Current SV	Area (ha)	Future SV	Credits	Credits/ha
2	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar Bioregion	PCT 599 / BVT 271	DNG***	32.79	3.72	32.79	14	3.76
5	White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion	PCT 590 / BR391	DNG***	40.44	7.58	40.44	28	3.69
					11.3		42	3.72

***DNG areas will not be impacted as it will not need clearing and as all poles will be positioned to avoid DNG areas.

7.4.1 Weeds and their management

Several environmental weeds are present within the study area and include five species declared as noxious weeds for the Inverell Local Government Area as well as being listed under the *Noxious Weeds Act, 1993*.

These weed species are:

- Sweetbriar *Rosa rubiginosa* (exotic),
- Blackberry *Rubus fruticosus* (exotic),
- Fireweed *Senecio madagascariensis* (exotic),
- Prickly Pear *Opuntia stricta* (exotic) and
- Chilean Needle Grass *Nassella neesiana*.

All of the above species are listed as Class 4 species under the *Noxious Weeds Act, 1993*. Class 4 species under the NW Act meaning these plants pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. Chilean Needle Grass is also listed as a Weed of National Significance.

The WRWF Flora and Fauna Management Plan includes measures for weed management and would be updated as necessary for the alternative grid connection facilities.

7.5 Indigenous and Non-Indigenous Heritage

An Indigenous and non-Indigenous Heritage Assessment of the proposed WRWF modifications has been prepared by Environmental Assessments Pty Ltd, October 2016, and is provided in Appendix 4. An overview of the assessments and its conclusions is provided in this section. Previous assessment information provided in the Mod 1 Submissions Report is integrated in the current assessment.

A heritage assessment was carried out in order to assess the potential impact of the proposed transmission line and substation on both indigenous and non-indigenous heritage. The assessment was in 2012 carried out consistent with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005) as requested by DPE.

Consultation with Aboriginal stakeholders was carried out in accordance with the above guidelines. The consultation included notification and an invitation for registration of interest via an advertisement in the local print media. It also included consultation with the Aboriginal stakeholders who were contacted as part of the original heritage assessment carried out for the wind farm site.

The indigenous heritage assessment was carried out in conjunction with members of the Anaiwan Local Aboriginal Land Council. The assessment did not identify any significant impacts from the proposed transmission line or substation. Two scarred trees were identified for the original line route and the line route proposed in this EA now avoids those two scarred trees (Plates 7.6 and 7.7). It was recommended that they be protected during the construction of the transmission line by creating a 30m buffer around these two items prior to the commencement of any works.

No potential impact on items of non-indigenous heritage was identified in the field survey or in the database search of the area. Please refer to the assessment completed by Environmental Assessments Pty Ltd in Attachment 4 for more details.

An outline of consultation is provided in Section 5 and details of the heritage assessment are provided in Appendix 4.

The WRWF Stage 1 Construction Heritage Management Plan (CHMP) would be updated to address the additional infrastructure for the grid connection facilities and management of construction impacts.



Plate 7.6 - Scar Tree near mid-section of line. Now avoided by re-routing the line.



Plate 7.7 – Scar Tree near mid-section of line. Now avoided by re-routing the line.

7.6 Traffic and Transport Impacts

The alternative grid connection facilities are located to the west of the WRWF Stage 1 development in rural land within Inverell Shire. The proposed 330kV/132kV substation is located adjacent to an existing 330kV line at the western end of the proposed 13km double circuit 132kV transmission line and approximately 2km south of the Gwydir Highway. The 132kV transmission line route crosses existing unsealed local roads within Inverell LGA near the middle of the 13km section of the line route. Roads and Maritime Services (RMS) and the Inverell and Glen Innes Severn Councils have been previously consulted about the WRWF Stage 1 development and the Development Application (DA) for WRSF. Based on RMS advice of 21 April 2016 relating to the WRSF DA:

“The Gwydir Highway (HW12) is a classified (state) road. Glen Innes Severn Council and Inverell Shire Council are the Roads Authorities for all public roads in the subject area in accordance with Section 7 of the Roads Act 1993. Roads and Maritime has responsibilities for classified roads in accordance with the Act.”

The construction and operation of the alternative grid connection will require additional site access points as shown on the map in Figure 7-4 and described below:

- **Western Entry** (Figure 7.5) from the Gwydir Highway to the new 330kV/132kV substation site using an upgraded farm track and potentially upgraded entry from the Gwydir Highway. The intersection occurs approximately 1.5km west of Swan Brook. This access would be used for construction of the substation and western sections of the 132kV line. It would also be needed for operations and maintenance of the substation and inspection and maintenance of the western section of the 132kV line.
- **Mid route entry** (Figure 7.6) using Spring Mountain Road (that joins the Gwydir Highway) to access the mid-section of the line during its construction and if needed for inspections and any maintenance
- **Eastern Entry** access route to the eastern end of the 132kV line from the WRWF project area using the main northern site entrance from Gwydir Highway that is being upgraded under a WAD process arranged between RMS and WRWFPL. RMS has approved commencement of construction and the upgrade will be completed well before any works commence on the alternative grid connection.

The additional access points to the modified WRWF from the Gwydir Highway are to Spring Mountain Road and to an existing right of way to a farm access track that leads to the proposed substation location. Any upgrades required to these two intersections with the Gwydir Highway will be designed and developed in consultation with the RMS and the WRWF Traffic and Access Management Plan that will be updated accordingly in consultation with RMS and the two Councils.

Aerial views of the Gwydir Highway intersections with the access road for the substation and Spring Mountain Road are shown in Figures 7.5 and 7.6. There are no significant constraints with use of these two existing access routes subject to RMS agreement to the entry design.

The local roads are expected to be suitable for installation of the power poles for the 132kV line and associated transmission line conductors. The transmission poles that may have a total length of 40 metres or more are likely to be transported in sections and able to negotiate existing intersections and road curvature. Representative photographs of the existing local roads and intersections are also shown in Plates 7.8 to 7.13.

The 330kV/132kV transformer is likely to comprise the longest load due to its weight and number of axles needed to spread the load. The Substation access road will need to be designed and constructed based on the transport of the transformer. Typical transport arrangements for large transformers are shown in Figures 7.7

and 7.8. The intersection with Gwydir Highway will need to be assessed and designed to accommodate the transformer delivery and any works connecting to Gwydir Highway will need to be arranged in consultation with and approval of RMS. It is expected that RMS may require a WAD process for the design and construction of this entry point. The substation access road that will enable the delivery of the over-mass loads such as the main transformer, is not expected to require any native vegetation clearance as the access route passes through an area of cultivated lands.

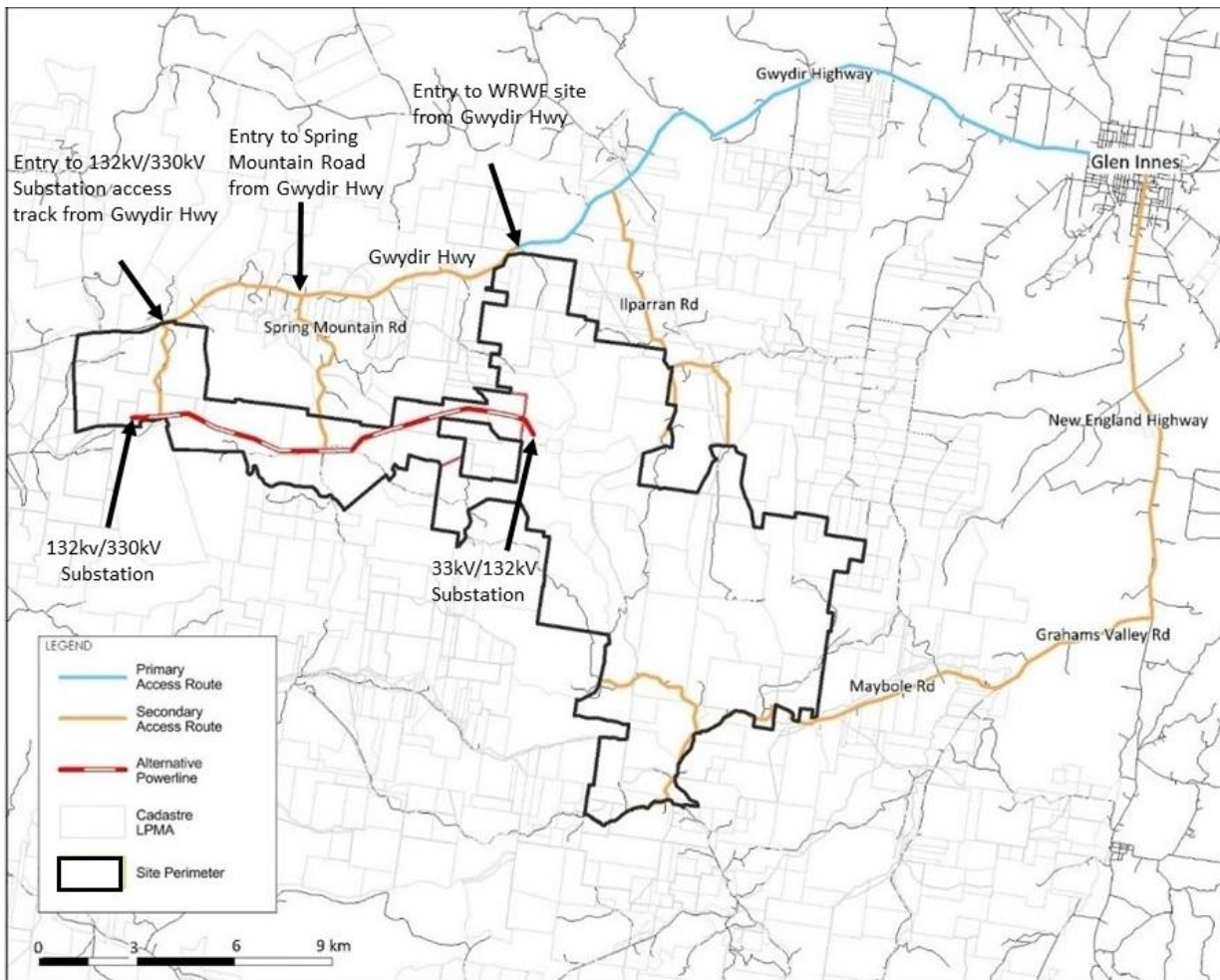


Figure 7-4 – White Rock Wind farm and alternative grid connection facility access routes



Figure 7.5 – Intersection of Gwydir Highway and 330kV/132kV Substation Access Route



Figure 7.6 – Intersection of Gwydir Highway and Spring Mountain Road



Plate 7.8 – Intersection Gwydir Highway and Spring Mountain Road



Plate 7.9 –Spring Mountain Road north of bridge over Swan Brook
There is a sharp corner on southern side of bridge that can be avoided by a low level creek crossing as shown in following Plate.



Plate 7.10 – Spring Mountain Road bridge over Swan Brook showing low level bridge bypass on eastern side of bridge.

	<p>Plate 7.11 – View to south to intersection of Spring Mountain Road (north and east branches), Northcotts Road (south) and Sturmans Road (west)</p>
	<p>Plate 7.12 – Entry Point to farm access track that leads to the substation site. The track and entry point will require upgrade for the construction phase particularly delivery of a 330kV/132kV transformer.</p>
	<p>Plate 7.13 – Entry point for Substation site. View across Gwydir Highway to existing triple gates.</p>

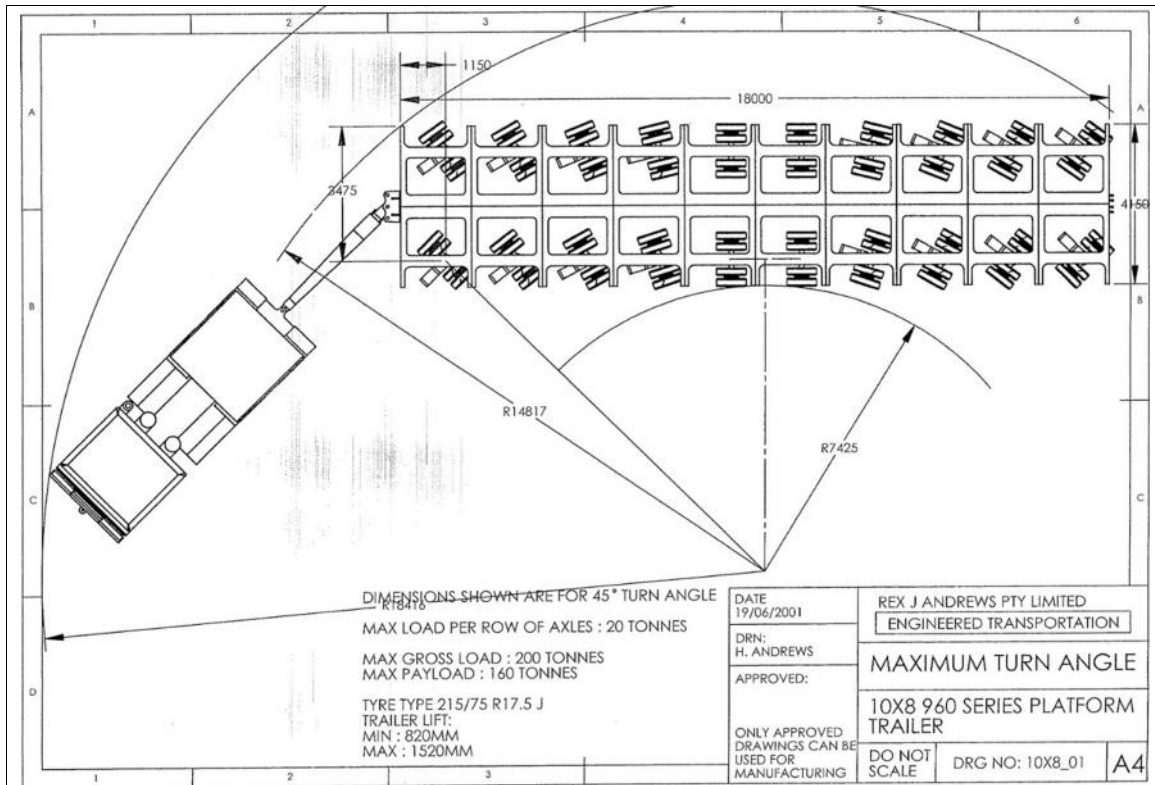


Figure 7.7 - Schematic – Platform Trailer – 10 Axle by 8 Tyre configuration

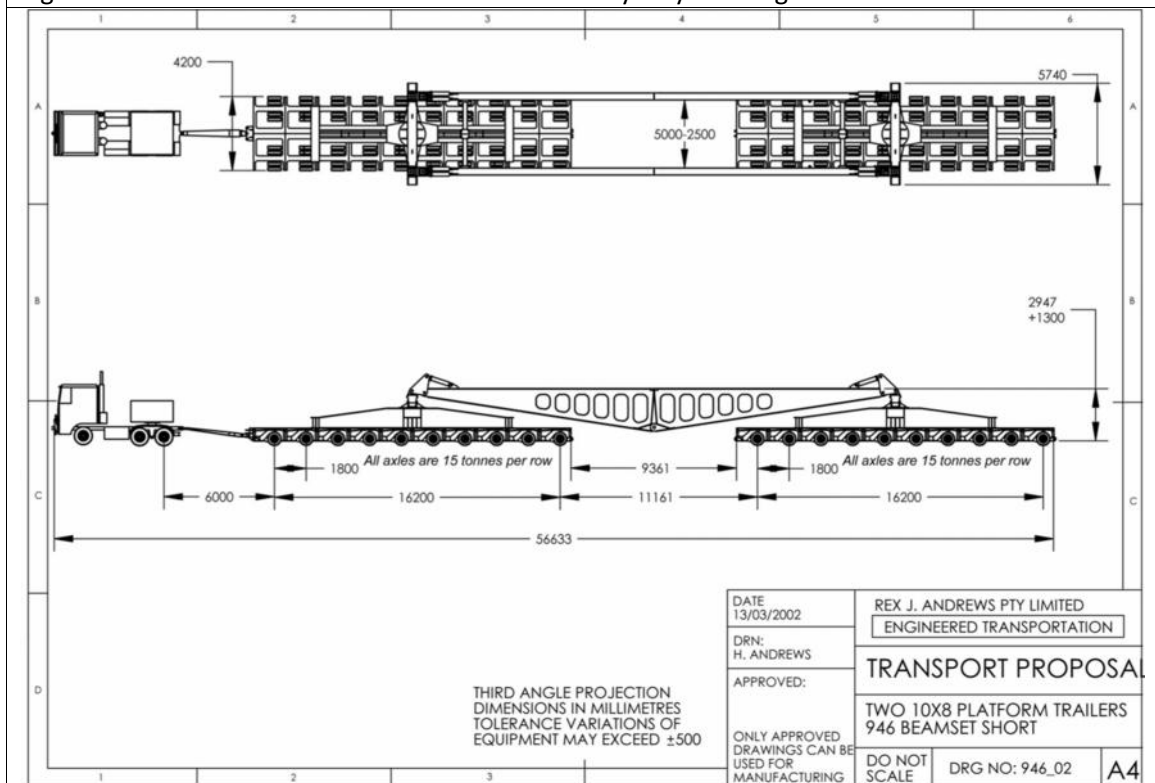


Figure 7.8 - Schematic – Platform supported on Two 10 Axle by 8 Tyre Trailers

7.7 Soil and Water Management

The construction of the alternative grid connection facilities includes earthworks for access tracks, the substation site and at pole locations. This has potential for causing erosion and sediment transfer and requires management of all activities that disturb soil and rock to avoid or minimize the potential risks.

Areas on steep slopes, concentrated water flows, or unstable soils will pose higher risk and require greater attention to management of the risks.

The project approval conditions include the requirement for a Construction Environmental Management Plan (CEMP) and Construction Soil and Water Quality Management Sub-Plan (CSWQMP). A CEMP incorporating a CSWQMP has been approved for the Stage 1 construction works and will be extended to the alternative grid connection prior to those works proceeding. Progressive Erosion and Sediment Control Plans would also be developed for sub-areas of the works and reviewed and updated as necessary. Regular inspections of earthworks will assess the adequacy of controls and any need for improvements. In addition, progressive rehabilitation of disturbed areas will occur as soon as practicably possible. This package of measures will ensure that the risks for erosion and sediment transfer are appropriately managed.

7.8 Electric and Magnetic Fields

The alternative grid connection facilities are similar to infrastructure that have been owned and operated by Transgrid. The following review of potential impacts of Electric and Magnetic Fields (EMF) arising from the Modification has drawn on material available from Transgrid and provides details of EMF and safe levels.

Electric and Magnetic Fields (EMF) are part of the natural environment and electric fields are present in the atmosphere and static magnetic fields are created by the earth's core. EMF is also produced wherever electricity or electrical equipment is in use. Transmission lines, electrical wiring, household appliances and electrical equipment all produce power frequency EMF.

An electric field is the force that fills the space around every electric charge, including any powered electrical appliance or conductor (e.g. a transmission line). Electric fields are measured in volts per metre (V/m) or kilovolts per metre (kV/m). They occur both naturally and as a result of power generation, and are produced every time voltage runs through a wire. The higher the voltage, the stronger the electric field. Electric fields are strongest closest to the wires and their level reduces quickly with distance. Most materials act as a shield or barrier to electric fields.

Magnetic fields are produced by the flow of an electric current through a wire and are measured in milligauss (mG). The higher the current, the greater the magnetic field. Like electric fields, magnetic fields are highest closest to the wire and their level reduces quickly with distance. Most materials would not act as a shield or barrier to magnetic fields. Together, the electric and magnetic fields are referred to as EMF.

All types of electrical equipment, including transmission lines, produce EMF. For a transmission line, the strength of the electric field varies generally with the operating voltage of the line (measured in volts), while the magnetic field strength is related to the current flowing in the line (measured in amps). The current flowing in the line is dependent upon the load or power flow, and would vary with consumer demand (which varies on a daily and seasonal basis). The EMF strengths at ground level below the conductors, are also dependent on the height of the wires above the ground and their geometric arrangements as supported by the transmission structures.

The scientific literature on EMF exposure is extensive, complex and inconclusive. In addressing the question of adverse health effects, WRWFPL will rely on expert advice on EMF available from competent health authorities in Australia and from around the world. This includes the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), which is the Federal Government agency responsible for providing health assessments and recommendations to the Government on matters relating to EMF.

ARPANSA has adopted the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for limiting exposure to EMF, published in 2010. The ICNIRP Guidelines express limits in terms of 'Reference Levels' and 'Basic Restrictions' under general public and occupational exposure conditions.

The Basic Restriction values are expressed as the internal electric fields which can be induced in the body without adverse health outcomes, these must be met. As the Basic Restriction values apply within body tissue, it is difficult and impractical to measure them. For that reason, Reference Levels, which are simpler to measure, are provided as an alternative means of showing compliance with the Basic Restrictions.

If desktop study and/or direct field measurements show that the EMF is below the Reference Levels, the EMF is well within the Basic Restrictions. The reference levels may be exceeded if it can be demonstrated that the basic restrictions are still met.

EMF Reference Levels

The Reference Levels contained in the ICNIRP Guidelines are listed in Table 7.5.

Table 7.5: ICNIRP EMF Reference Levels*

Exposure Characteristic	Electric Field	Magnetic Field
Public Exposure	5 kV/m	2,000 mG
Occupational Exposure	10 kV/m	10,000 mG

* Reference level limits are taken as instantaneous root mean squared values.

The proposed activity would introduce a new 132kV/330kV substation and new high voltage (132kV) transmission lines into the area. Consequently, there would be additional potential increases to electric and magnetic fields. However, the proposed transmission lines would be designed and built to ensure that exposure levels are within the limits recommended by the ICNIRP Guidelines (2010).

TransGrid designs the transmission line and switchyard layouts in accordance with guidelines and standards to ensure that exposure levels remain below the ICNIRP limits, thus minimising the risk of EMF exposure for staff and members of the public.

Typical levels of magnetic field under a 132kV transmission line are indicated to range from 2 – 50 mG at a distance of 15 – 35 m from the centreline of the transmission line. The magnetic field falls away rapidly as the distance increases. These figures are significantly less than the 2,000 mG ICNIRP Reference Level. As the nearest neighbouring residence is 300m away from the alternative 132kV transmission line and 2.5 km from the alternative substation location, there will be no adverse impact from electric or magnetic fields.

7.9 Aviation impacts

A private airstrip was identified south of the alternative transmission line route adjacent to Northcotts Road near the four-way intersection with Spring Mountain, Northcotts and Sturmans Road. Consultation between Epuron and the landowner and an aerial agriculture operator confirmed that the proposed transmission line would not restrict the use of the airstrip. A second airstrip is located about 1.2km northeast of the abovementioned intersection and at its closest point is 550m from the proposed 132kV line.

The impact of the alternative transmission line is not likely to be significant as aerial agricultural operators regularly operate in close proximity to other transmission lines. Any planned aerial operations in the immediate vicinity of the alternative transmission line will need to be assessed by the aerial agricultural operator once the line has been constructed. Impacts on aerial agriculture operations have been addressed by the Project Approval conditions.

Condition C13 of the Project Approval addresses potential for increases to cost of aerial spraying as follows:

“Should increases to the costs of aerial agricultural spraying on any non-associated property surrounding the site be attributable to the operation of the project, the Proponent shall fully fund to the affected landowner, the reasonable cost difference between pre-construction aerial agricultural spraying and the increased cost, as agreed between the relevant parties.”

WRWF Stage 1 has commenced construction after consideration of, risks to aviation, any need for aviation safety lighting on turbines and, with notification to aviation stakeholders providing details of locations and dimensions of wind turbines and meteorological masts. The notifications are required by Condition C12.

The alternative grid connection facilities are much lower than the wind turbine structures and at lower levels in the terrain and are not expected to increase safety risks to aviation. Conditions C12 and C13 are considered appropriate for the project, therefore additional conditions relating to aerial spraying and aviation safety are not required as a result of the modification.

7.10 Land use implications

The alternative transmission line and alternative substation location will not significantly change the current land use due to setback from residences and the small footprint of the project along the linear distribution of the alternative line route. The substation will occupy about 2ha at the western extent of the line route and the transmission poles will have a small area of permanent impact and temporary area of disturbance associated with construction. A temporary access track will be needed for the construction phase and while periodic access may be needed for inspection and maintenance this will not need to be maintained to a high standard but would be similar to partly overgrown farm access track.

Although there may be some minor disruptions during the construction phase, existing grazing and crop cultivation will continue as before. Changes to agricultural methods could potentially occur for agricultural methods such as spray irrigation or low flying aerial agriculture.

7.10.1 Agricultural landuse

The proposed facilities are located on land zoned as ‘*RU1 Primary Production*’ under the Inverell LEP, 2012. The land has been extensively cleared for pastoral activities but retains areas of varying density woodland. Parts of the area where the proposed line is located are classified as ‘*Strategic Agricultural Land*’ (SAL). Areas of SAL are shown on Figure 7.9. Consultation with DPI Agriculture has encouraged reference to Primefact 1063 (June 2013) for infrastructure proposals on rural resource lands.

Figure 7.9 shows the location of Strategic Agricultural Land in the vicinity of the alternative 132kV line route. Primefact 1063 encourages of the following considerations for planning and implementation in rural lands.

- Resource loss and fragmentation;
- Impacts on farming operations and livestock;
- Increased biosecurity, pest and weed risks and impacts on livestock; and
- Site rehabilitation.

The line requires only a small footprint and will not fragment agricultural lands. Impacts for farming are mainly relevant to construction and negligible once operational. Weed management is an integral part of construction

management and has been implemented for WRWF Stage 1. Progressive rehabilitation is required by Conditions F4 and F5 are adequate for the modification. It is also in the proponent's interest to implement timely rehabilitation to reduce ongoing maintenance costs.

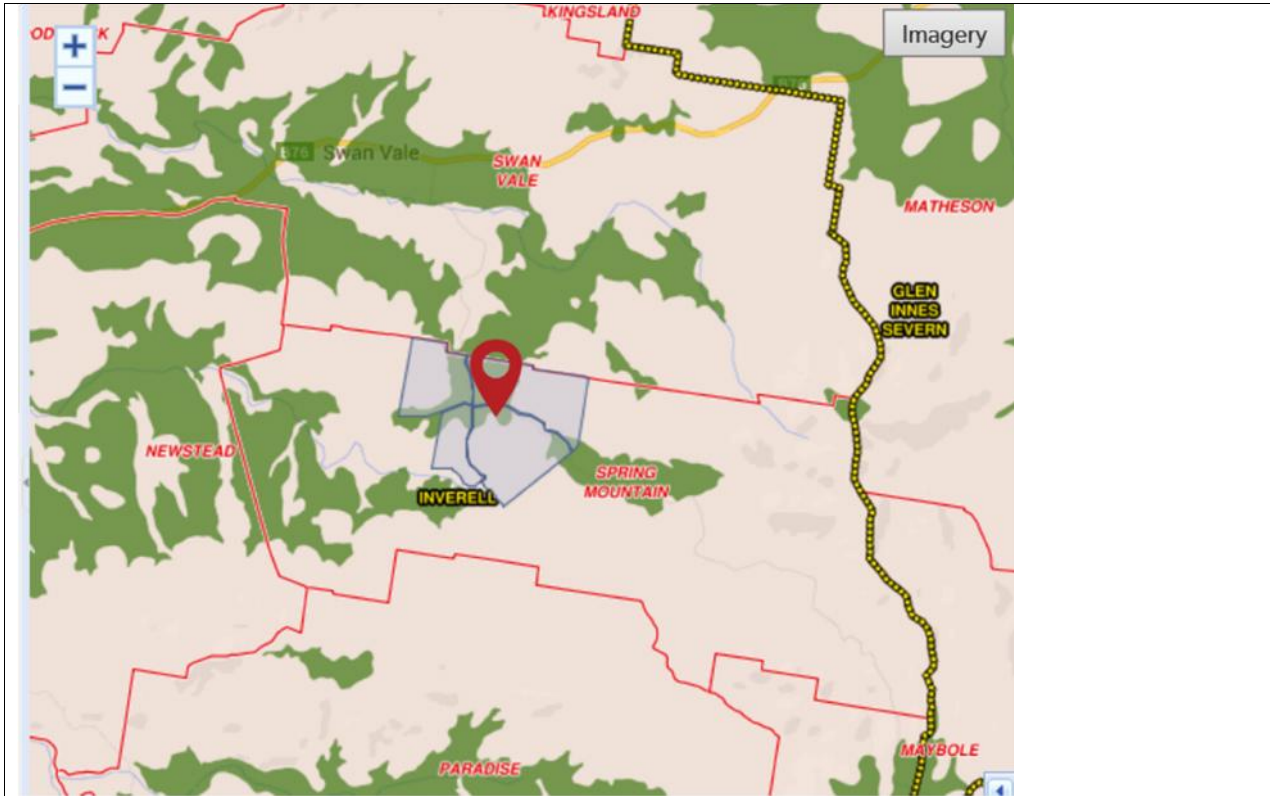


Figure 7.9 – Location of Strategic Agricultural Land for 13km line route locality. (centred Lot142/DP753305)

7.10.2 Residential landuse

There are five residential dwellings located within 2km of the alternative transmission line and substation, three associated landowners and two non-associated landowners. No objections were previously raised by any of the neighbouring landowners following public exhibition of the Modification Application No. 1.

7.10.3 Mineral Resources

A review of mineral resource exploration and mining titles from the NSW Mineral and Resources database has been undertaken to identify potential conflicts between the development and mineral resource potential.

On 14 February 2013, Department of Trade and Investment, Resources and Energy advised that the alternate transmission lines intersected mining and exploration leases as indicated below and shown in Figure 7.10.

- Exploration Licences EL7301 and EL7302 were held by Volcan Australia Corporation Pty Ltd for metallic minerals and bauxite associated with Tertiary basalt. (These are no longer current)
- Mineral Lease ML1505 was indicated to be held by R.A. Frazier for sapphires in alluvial deposits. ML1505 was granted in March 2002 with a period of 21 years and indicated to expire in 2023.
- Mineral and Resources Branch also considered the area to have high potential for economic bauxite resources.

In relation to the Mod 1 Application, Mineral and Resources Branch did not support the transmission crossing a current lease and advised that the route should be altered. Epuron undertook further consultation with Queensland Bauxite in relation to EL7301 and EL7302 and obtained an email response on 27 February 2013. Queensland Bauxite that:

- They were relinquishing EL7302;
- In relation to the intersection of the line with the southern edge of the easternmost block of EL7301 they did not anticipate a conflict between the proposed line and any bauxite resources that they anticipated finding in the remainder of the tenement; and
- A recent review of the DIGs Database indicates that EL7031 and EL7032 are not current.

Epuron consulted with the landowner (and leaseholder of ML1505) and indicated in the Submissions Report, July 2013 that the transmission line route had been amended to avoid current and planned future extraction locations. The leaseholder's correspondence of 10 October 2013 consented to the route of the powerline as shown in Figure 7.10. This would require adoption of Point 9 rather than 9A shown in Figure 3.2.

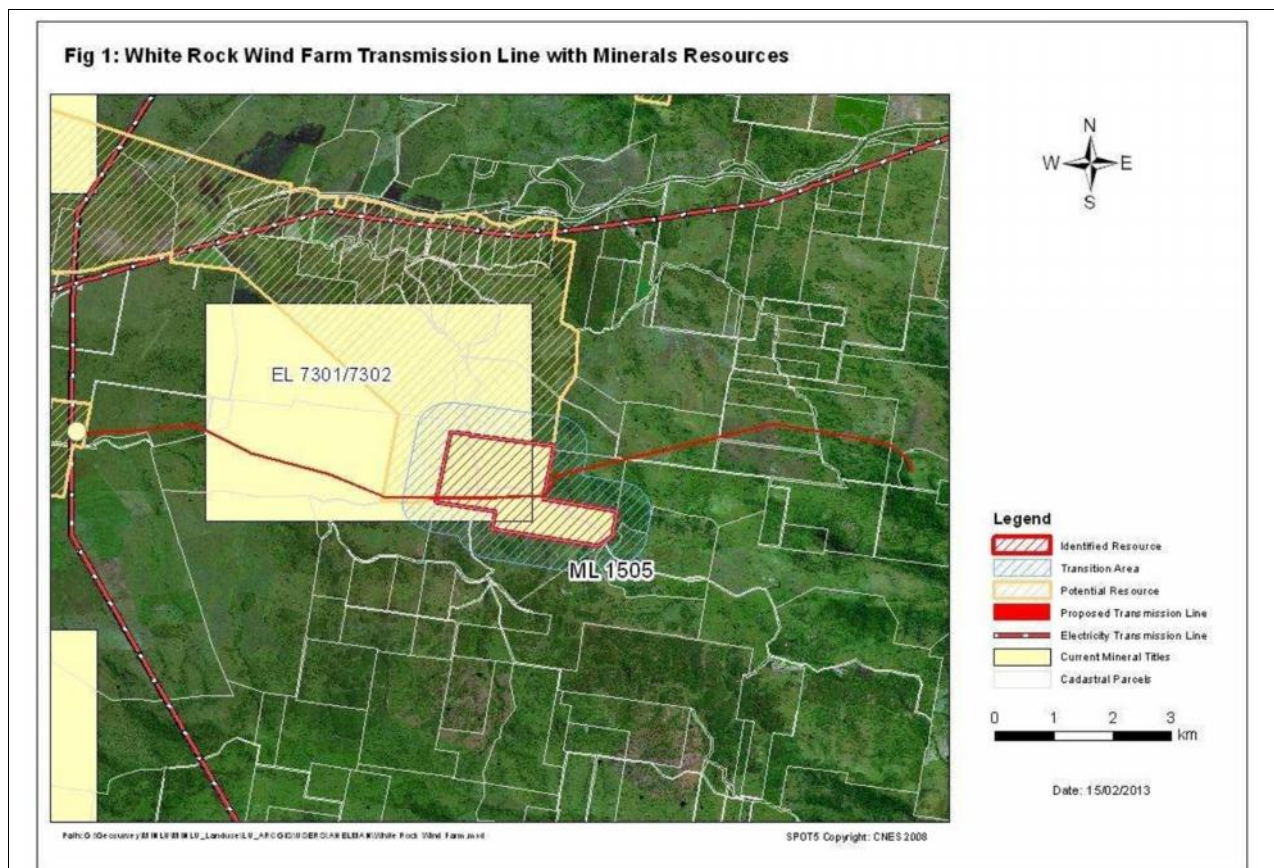


Figure 7.10 – Figure accompanying Mineral and Resources Submission in February 2013

7.11 Bush fire risk

Transmission lines have the potential to increase bush fire risk. The alternative transmission line route has been selected to avoid trees wherever possible reducing the need for clearing of native vegetation. However, some vegetation clearing is required within the transmission line easement during construction and maintenance

once operational to maintain safe electrical clearances. Transmission line easements and infrastructure would be periodically inspected to monitor regrowth and the condition of the infrastructure.

The alternative substation equipment would include substantive volume of insulating oil in the 132kV/330kV transformer. The facilities would be banded to ensure the oil is contained in the event of a major leak. The equipment would be inspected and maintained regularly to ensure that the facility does not create a fire hazard. An asset protection zone would be maintained around the substation facility in accordance with the RFS guidelines to minimise the risk of a fire spreading in the event of a fire at the facility.

A Bushfire Risk Management Plan has been prepared for the WRWF Stage 1 construction works and this would be updated and extended to the alternative grid connection works in consultation with RFS. Relevant details on the assessment and mitigation of the risk of fire from transmission lines and the new substation will be provided in that Plan.

7.12 Cumulative Impacts

The additional impacts of the modified project relate to those for grid connection facilities and differ from those for the wind turbine components. The alternative grid facilities are also outside the footprint of the wind farm so the impacts are in a different setting.

The visual impacts of the grid connection are minor relative to the wind farm as the line and substation components are generally subdued in sparsely settled land compared to the prominent wind turbine structures.

Noise impacts are assessed as minor and at a different location to where the turbines are located. Construction noise impacts are temporary and considered manageable within acceptable criteria.

Additional biodiversity impacts apply but the increase in impact has been contained and will be offset through the Biodiversity Offset Package required by Condition C7.

The line route has been designed to avoid impacts on Indigenous heritage values and does not increase impacts.

Traffic and transport impacts are mostly temporary during construction and minor once operational. There is no significant cumulative impact. Safety of the existing farm entry west of Swan Vale is likely to be improved.

Soil and Water impacts can occur mainly associated with construction but involve a much smaller footprint than for the wind farm and manageable through the required CEMP. There is not expected to be any significant cumulative impact on soil and water quality as a result of construction of the alternative grid connection facilities.

8 JUSTIFICATION

The need for an alternative grid connection for WRWF has been identified based on the limited capacity of the existing approved connection to the Glen Innes-Inverell 132kV transmission line. The connection capacity is limited to the output of the WRWF Stage 1 development. The Stage 1 development comprises 70 by 2.5MW wind turbines that utilize the full capacity of the existing 132kV transmission line.

The 70 turbines can generate a total 175MW slightly exceeding the existing connection capacity but suitably matched after electrical losses are taken into account. Connection of WRWF at 330kV rather than 132kV would reduce electrical losses for output of WRWF Stage 1 to the Grid.

In addition to reducing electrical losses and maximising the WRWF's ability to dispatch the electricity sourced from renewable energy to the National Electricity Market, the alternative grid connection to TransGrid's 330kV transmission line would also allow for development of the WRWF Stage 2 that involves an additional 49 turbines. A second stage WRWF could utilize larger more efficient turbines rated at up to approximately 3.4MW per turbine. This would result in a total wind farm generation capacity of up to 341.6 MW.

An indirect benefit of the alternative grid connection is that it would free up capacity in the existing Glen Innes to Inverell 132kV line. That would improve the development potential of the Glen Innes Wind Farm that has been planned based on connection to the 132kV line.

The WRWF Epuron Environmental Assessment, 2011 took a conservative approach to the potential output of the wind farm using a 2MW wind turbine as the basis of output and emissions savings calculations. This conservative approach aligned with the potential for capacity constraints in the 132kV transmission line.

The modification application proposes connection of the wind farm to an existing nearby 330kV transmission line which has the ability to accept a higher capacity from the wind farm and enables a larger capacity wind farm within generally the same footprint and lower electrical losses thereby delivering a more economically viable wind farm. On the understanding of minimal capacity constraints on the 330kV transmission line the benefits of the project have been recalculated using the higher capacity 3.4MW wind turbine for Stage 2. Table 1 shows that the alternative grid connection can provide for doubling the benefits of the wind farm relative to Stage 1 development only. It could deliver substantially increased output and associated emissions savings.

Table 8.1 – Development outcomes for various scenarios and benefits of renewable energy expansion

Wind Farm	WRWF Stage 1 only 70 WTG at 2.5 MW	Wind Farm EA, 2011 119 WTG at 2MW	Stage 1 and 2 119 WTG at 2.5MW	Stage 1 and Modified Stage 2 70 by 2.5MW 49 by 3.4MW
Wind farm output capacity	175 MW	238 MW	297.5 MW	341.6 MW
Emissions avoided per year	554,411 t CO ₂ -e	754,000 t CO ₂ -e	942,500 t CO ₂ -e	1,082,210 t CO ₂ -e
Electricity generation per year	610,050 MWh	830,000 MWh	1,037,500 MWh	1,186,9 00 MWh
Supplying average consumption for	95,550 households	130,000 households	162,500 households	185,900 households

9 CONCLUSION

The proposed modification for the WRWF project comprises an alternative grid connection for WRWF. This involves connection to an existing 330kV transmission line, approximately 13km west of WRWF. The alternative connection is required to enable the full development of the approved WRWF and can allow an approximate doubling of output for the WRWF project and for emissions savings delivered by the project. The alternative grid connection also has potential to indirectly benefit other renewable energy development in the locality.

The alternative grid connection requires an additional substation, adjacent an existing 330kV line to step-up voltage from the 132kV output from the WRWF Stage 1 33kV/132kV substation. The additional 132kV/330kV substation will have a footprint of up to approximately 200m x 100m and is located in an area where the environmental impacts are low and have been assessed as suitable.

An additional 13km section of double circuit 132kV transmission line is required between the proposed 132kV/330kV substation and the wind farm. This will replace approximately 6km of 132kV line to be installed as part of the Stage 1 development. The 6km section of line can be removed and the footprint rehabilitated.

This Environmental Assessment for this modification has:

- identified and described alternative grid connection facilities between the wind farm site and connection point with TransGrid's electricity network;
- provided an assessment of the potential environmental impacts for the construction and operation of the alternative grid connection facilities based on specialist assessments as follows:
 - **Visual.** The visual impact of the modification has been assessed as low. This outcome is a result of locating the line in a sparsely settled area with setbacks from non-associated residences and the ability of the landscape to visually absorb the development;
 - **Noise.** The noise impact of the modification has been assessed as acceptable. The construction noise impacts will be managed through the approved CEMP that addresses the Construction Noise Guidelines. Operational noise of the substation is well below the relevant criteria from the Industrial Noise Policy;
 - **Biodiversity.** The line route and substation location have been selected to minimize ecological impacts. In addition, construction would be undertaken in accordance with the approved Construction flora and fauna management plan. Offsets of biodiversity impacts will also be implemented through extension of the WRWF Biodiversity Offset Package that will need to be approved by DPE;
 - **Indigenous heritage.** The line route and substation site have been assessed by an archaeologist in conjunction with Aboriginal stakeholders. The line route has been varied to avoid two identified indigenous heritage sites (scar trees). No increase in impact on indigenous or non-indigenous heritage is anticipated for the modification;
 - **Traffic and Transport.** The substation and line route can be accessed from the Gwydir Highway using local roads, a farm track and WRWF access tracks. The substation access track will be upgraded and the intersection with Gwydir Highway will be upgraded in consultation with RMS to allow delivery of substation items and particularly the 132kV/330kV transformer. The modification does not give rise to significant increase in impacts for roads and safety of users;
 - **Soil and Water Management.** The Project Approval and, the CEMP set out appropriate mechanisms to manage erosion and sediment transfer. These measures are complemented and followed up by progressive rehabilitation of disturbed areas. The modification will not significantly increase impacts for erosion or water quality;

- **Aviation Safety.** No additional aviation safety risks are anticipated for the modification.
- documents consultation undertaken. Further consultation will be undertaken generally as set out WRWF community engagement plan; and
- describes the justification for the modification of the WRWF project.

Based on the information in this Environmental Assessment Report, the impacts of this alternative transmission line and substation are deemed acceptable for the nature of the development and given the benefits flowing from the renewable energy generation and associated emissions savings.

The modification results in an increased extent of the project area and marginal increase in land potentially impacted. The design has incorporated avoidance of environmentally sensitive features and a range of mitigation measures to further reduce potential impacts. The Project Approval Conditions support the management of potential impacts and are applicable to the modification.

To ensure any impacts from the proposed modification are minimised, mitigation measures identified in this EA report will be incorporated into updated management plans that are required for implementation of the WRWF project.

10 REFERENCES

DPI	Primefact 1063, June 2013
Epuron	White Rock Wind Farm, Environmental Assessment, April 2011
Epuron	White Rock Wind Farm, Submissions Report, July 2013
ERM	White Rock Wind Farm, Stage 1 - Construction Environmental Management Plan, April 2016
WRWFPL	White Rock Wind Farm, Modification Application, Environmental Assessment Report, Dec 2015

11 APPENDICES

- Appendix 1 – White Rock Wind Farm – Mod 4 – Visual Impact Assessment, Green Bean Design, July 2016
- Appendix 2 - White Rock Wind Farm – Mod 4 –Noise Impact Assessment, Sonus, September 2016
- Appendix 3A – White Rock Wind Farm – Mod 4 – Biodiversity Impact Assessment, Environmental Assessments Pty Ltd, Nov 2016
- Appendix 3B – White Rock Wind Farm – Vegetation Mapping, Submissions Report, Epuron, July 2013
- Appendix 3C - WRWF Alternative Grid Connection – Assessment of Offset Requirements, Eco Logical, December 2016
- Appendix 4 - White Rock Wind Farm – Mod 4 – Cultural Heritage Impact Assessment, Environmental Assessments Pty Ltd, October 2016
- Appendix 5 - TransGrid letter of Support 01 November 2016