NEWTRICITY

PRELIMINARY ENVIRONMENTAL ASSESSMENT

For proposed

WOOLBROOK WIND FARM & TRANSMISSION LINE

Woolbrook, NSW

Prepared for: Newtricity
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1.0 Introduction

Newtricity is a family owned Australian Business backed by partners in Ireland with extensive experience in the wind farm business. Newtricity's aim is to develop wind farms in NSW.

Newtricity is proposing to construct a wind farm comprising of up to 30 wind turbines, potentially upgrading approximately 60km of transmission line and ancillary infrastructure at Woolbrook, located approximately 38km north-east of Tamworth.

Figure 1 provides a locality plan of the wind farm and Figure 2 shows the transmission line study area.

The development assessment process for a wind farm proposal varies according to the wind farm's capital investment value as outlined in Table 1.

Table 1: Capital Investment Value

Capital Investment Value	Development Category	Assessment By	Determined By
Less than $5 million	Local development	Council	Council
$5-30 million[1]	Regional development	Council	Joint Regional Planning Panel
$30 million or more (of $10 million in an environmentally sensitive area)[2]	State significant development	Department of Planning and Infrastructure	Planning Assessment Commission

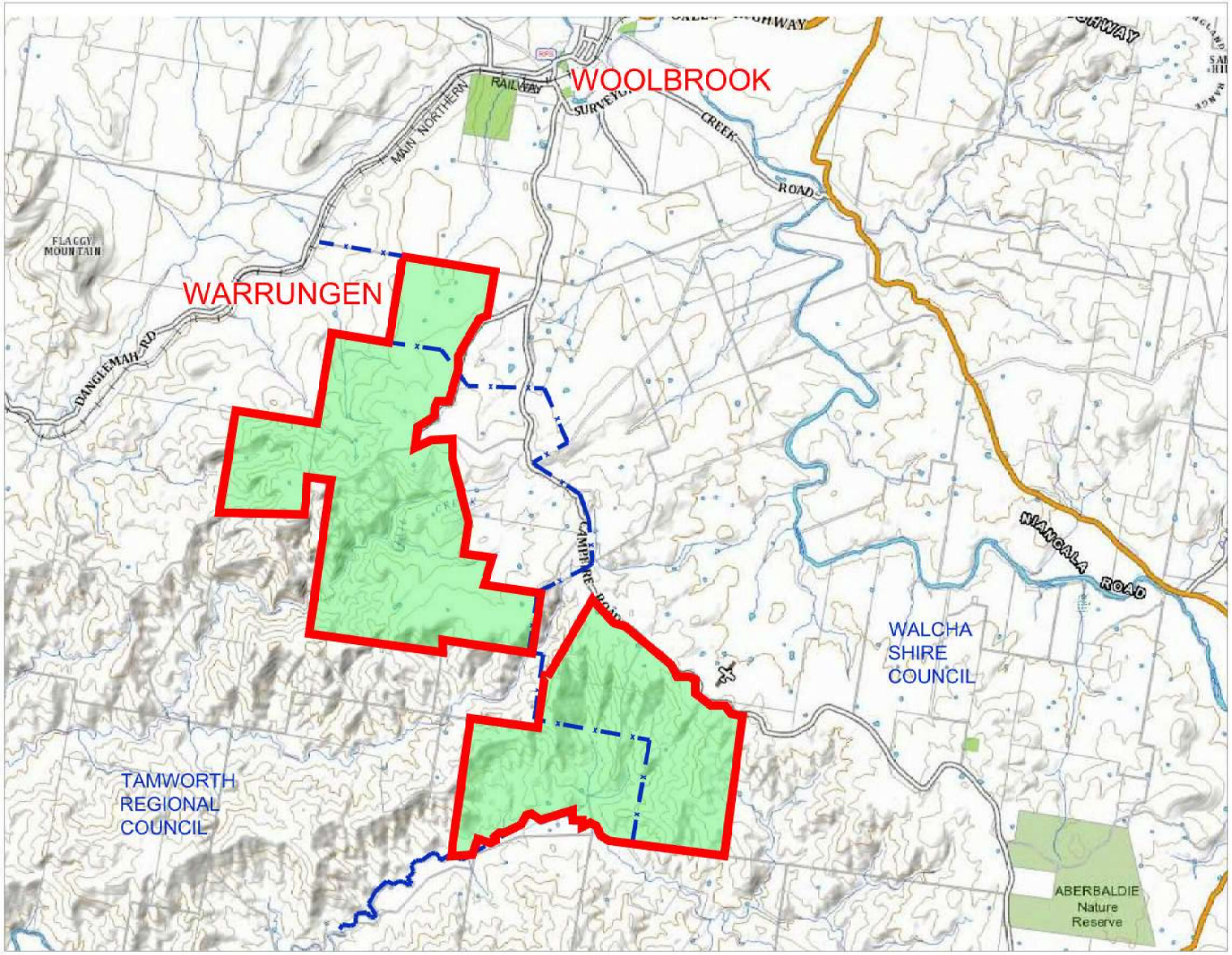
1 Under Schedule 4A of the Environmental Planning and Assessment Act 1979 (NSW)

2 Under State Environmental Planning Policy (State and Regional Development) 2011

Given that the proposed wind farm is estimated to have a total capital investment value of $101 million ($80 million for the wind farm and $21 million for the transmission line upgrade), the proposal will be processed under State Environmental Planning Policy (State and Regional Development) 2011, assessed by the Department of Planning and Infrastructure and determined by the Planning Assessment Commission or the Department of Planning.

Mitchel Hanlon Consulting Pty Ltd has been engaged to prepare a Preliminary Environmental Assessment for the proposed wind farm at

Woolbrook and request that Department of Planning and Infrastructure provide the Director General's Requirements (DGRs) prior to the preparation of the Environmental Impact Statement (EIS).



LEGEND

PROPOSED WIND FARM LOCATION

INDICATIVE LGA BOUNDARY

NOTE:

1. LGA BOUNDARY IS APPROXIMATE ONLY.

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Newtricity - Woolbrook Wind Farm and Transmission Line

Locality Plan - Wind Farm

FIGURE 1

Plot Date: 18 November 2013

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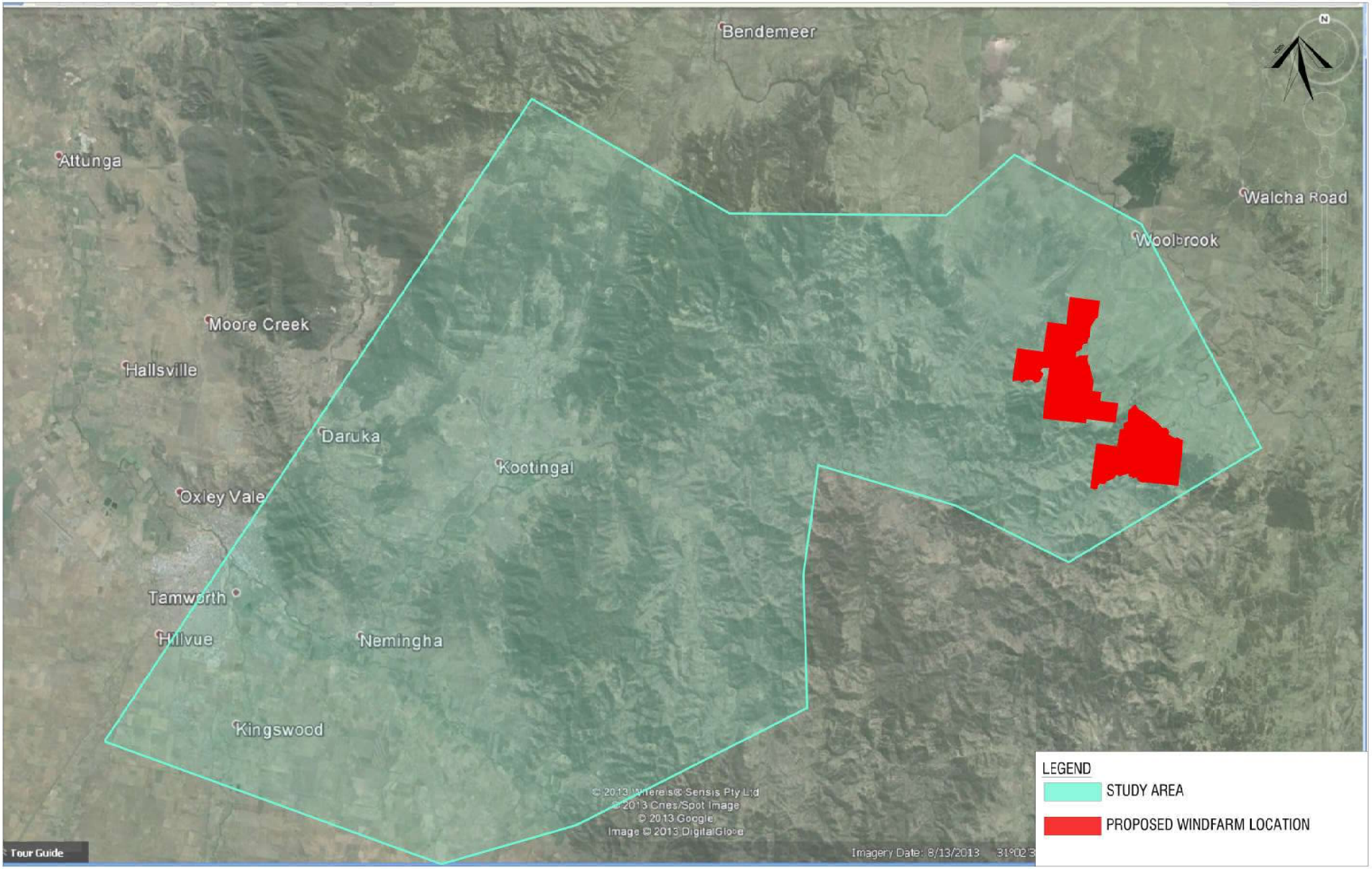

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Newtricity - Transmission Line

Study Area

FIGURE 2

Plot Date: 18 November 2013

2.0 Development Need and Justification

2.1 Strategic Need and Justification

The key drivers for developing renewable energy Projects, particularly wind farms such as Woolbrook are: meeting a growing demand for electricity; supporting the NSW Government objectives and targets for renewable energy; and reducing greenhouse gas emissions through clean energy sources.

The NSW Government has a vision of a secure, affordable and clean energy future for NSW. Renewable energy is a key part of this vision and will contribute to new jobs and investment in NSW and technological advances.

One of the key components of the renewable energy agenda is the Renewable Energy Precincts initiative.

Six Renewable Energy Precincts were established across NSW (covering 47 local government areas) in 2009 to promote and encourage renewable energy development in NSW - in the New England North West, Upper Hunter, Central West, NSW/ACT Cross Border Region, Snowy-Monaro and South Coast Precincts.

The Woolbrook wind farm Project is located in Precinct 1 – New England Tablelands as identified in Figure 3.

At present, wind energy is generally not only the cheapest renewable energy technology, but also the only one currently ready for large-scale deployment.

Sixteen nations (including Australia) now each have more than 1000 megawatts of installed wind capacity. Globally, this represents less than 2% of the electricity generation but in some nations wind is not a significant part of the energy mix, supplying upwards of 10% of electricity needs in some US States (eg.Texas), Spain and Portugal, and 20% in Denmark.

Australian wind energy generation is also growing at a significant rate, with approximately 1700 megawatts of operating wind farms. The

Commonwealth has legislated a 20% renewable energy target to be achieved by 2020.

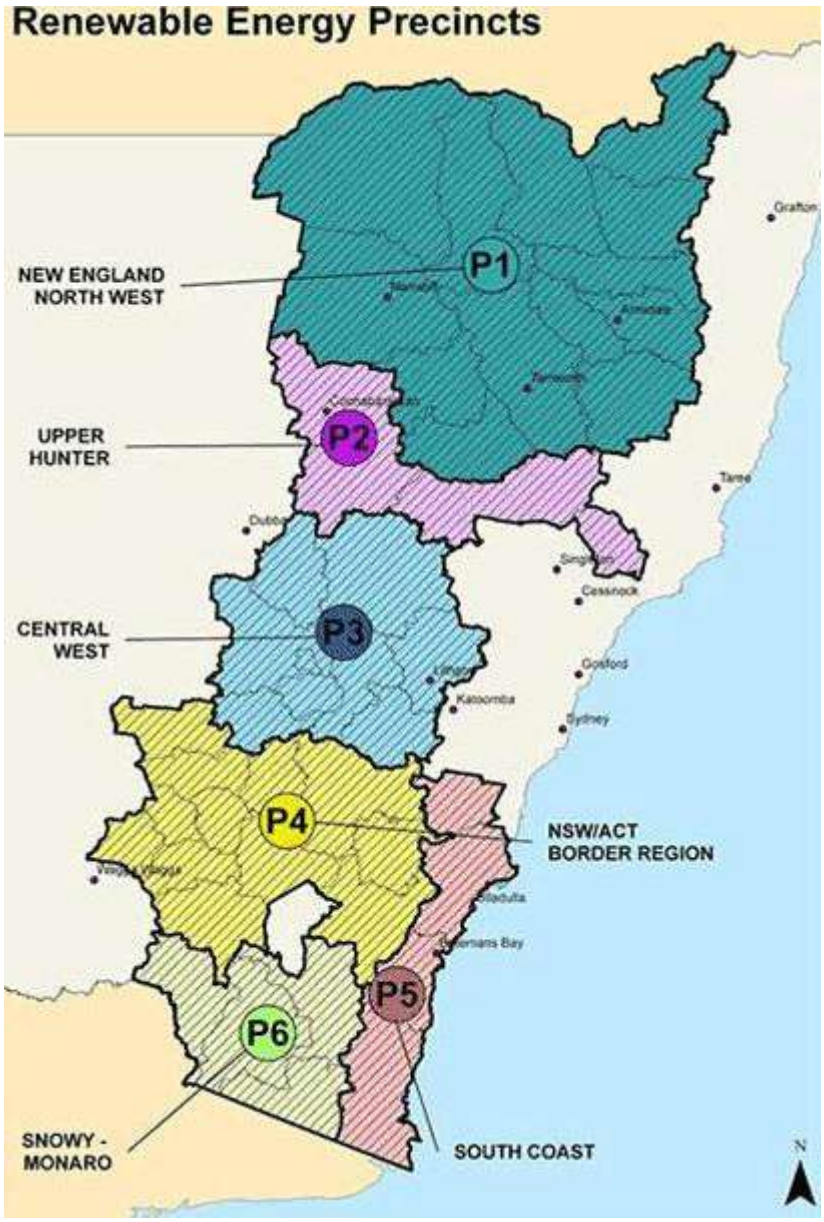


Figure 3: NSW Renewable Energy Precincts

2.2 Project benefits

The NSW Office of Environment and Heritage developed the *NSW Wind Farm Greenhouse Gas Savings Tool* to estimate greenhouse gas savings by multiplying the output from a wind farm with the emissions intensity of the electricity supplied in the National Electricity Market (NEM). The emissions intensity of electricity supplied in the NEM varies according to where and how big the new wind farms will be, so site

specific emissions intensities must be used for different size developments within each Precinct.

Based on the *NSW Wind Farm Greenhouse Gas Savings Tool* the Woolbrook wind farm will:-

- Save 1.3 million tones of greenhouse gas emissions by 2020;
- Generate 251 gigawatt hours (GWh) of electricity annually; and
- Produce enough electricity to power 34,300 homes annually (based on an average NSW household electricity consumption of 7.3 MWh annually).

It is estimated that new renewable energy Projects under the Australian Government's Renewable Energy Target Scheme could lead to the creation of more than 6000 jobs in NSW. It is recognized that a large portion of these jobs will be in the construction and operation of wind farms in regional areas.

Wind farms provide a valuable stream of guaranteed annual revenue for land owners that host turbines which helps 'drought-proof' their farms. Wind turbines can comfortably coexist with other land uses such as grazing and cropping.

2.3 Project viability

Australia has some of the best wind resources in the world and it is also currently the most cost-effective renewable energy source in Australia. A single turbine can produce enough energy to supply up to 2000 average households a year (source: Clean Energy Council).

Newtricity has undertaken wind monitoring of the Project site for approximately 5 years and determined that the wind resource is viable.

2.4 Alternatives

Newtricity have investigated a number of alternative wind farm sites near Scone and Oberon/Lithgow. These sites where determined not viable as a sufficient site area could not be obtained and wind speeds where unviable.

3.0 Site Details

3.1 Site Location

The proposed Woolbrook wind farm Project site is approximately 38km north east of Tamworth and 7km south of the village of Woolbrook.

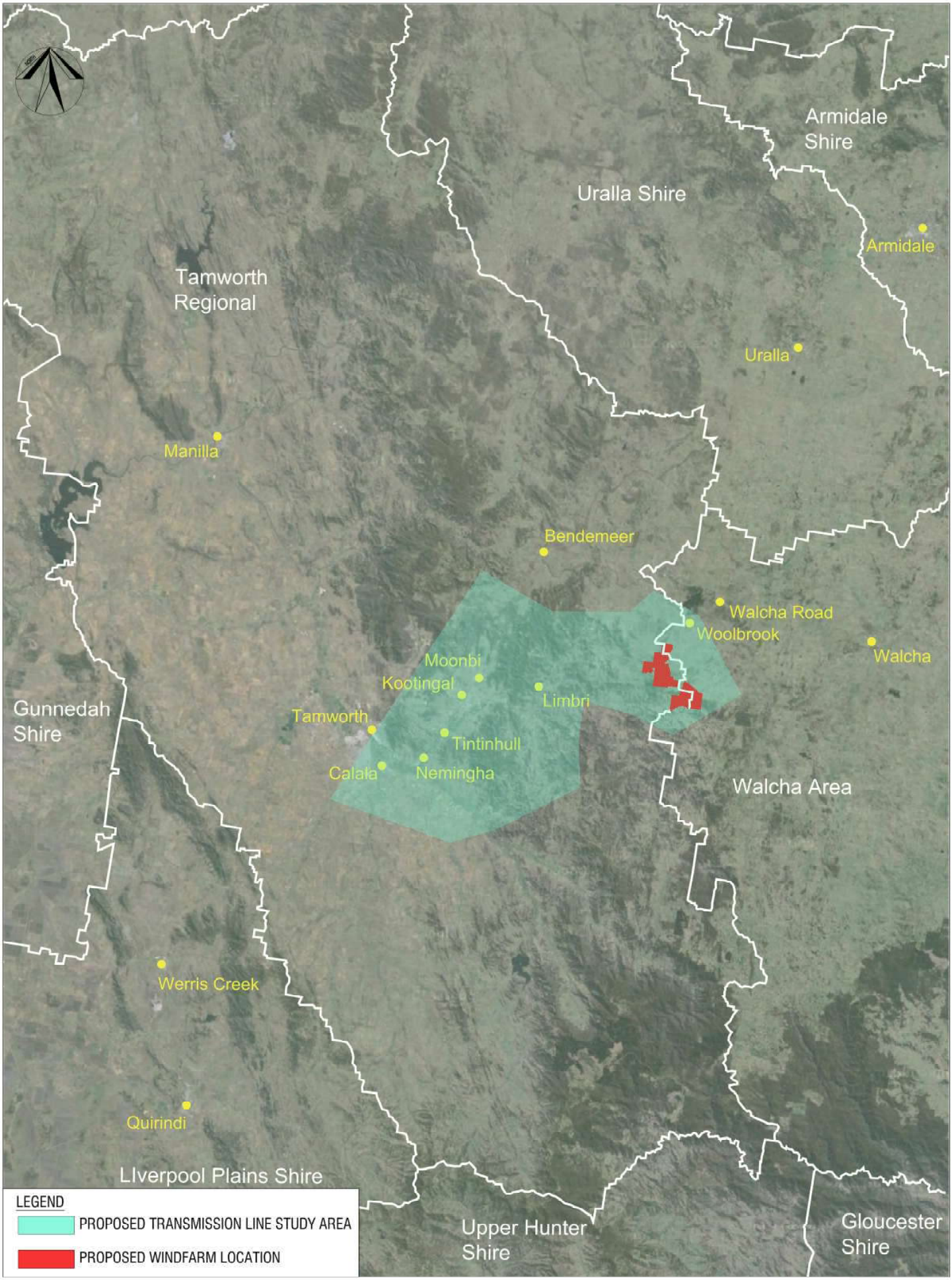
The Project site is on rural land within the Tamworth and Walcha Local Government Areas (LGA) and spans three privately owned properties. Figure 4 shows the approximate location of the wind farm in relation to surrounding LGAs.

Details of the property ownership are shown in Table 2.

Table 2: Property details

Landowner	DP	Lot	Proposed infrastructure
Ian & Lorraine Rennie "Pine Hills"	1009073	1	Turbines, access road
	753847	73 *	Turbines
Rob & Ruth McDonald "Back Creek"	753847	55	Turbines
	753847	53	Access road
	753847	50	Potential access road
Gary Olrich "Windy Hill"	753846	212	Turbines
	753847	19	Turbines
	755345	76	Turbines
	753847	93	Nil
	753847	78	Nil
	753847	17	Potential turbine
	753847	79	Turbines

Note * - Current monitoring tower is located on this parcel.



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Newtricity

Regional Locality Plan

FIGURE 4

3.2 Surrounding and Adjoining Land Uses

The proposed Woolbrook Wind Farm is surrounded by large rural grazing properties.

The subject site is approximately 2,170ha in size and straddles the Shire of Walcha and Tamworth Regional Council Local Government Areas (LGAs). As outlined in Table 2 the Project covers three (3) privately owned properties.

Each host property contains an owners residence and general farm infrastructure, with one property ("Pine Hills") also containing a rural workers cottage.

The surrounding properties are all large rural grazing properties.

The Campfire Road road reserve traverses the north eastern edge of Windy Hill. A single lot of crown land (Lot 7001, DP 1024750) exists north east of Windy Hill across Campfire Road. Approximately half of the eastern side of Pine Hills is bound by Pine Hills Road.

The village of Woolbrook is approximately 3.5km to the north of the Project site with a population of 220 (as determined by census 2006).

Each host property contains an owners' residence, with other farm infrastructure located on the properties including machinery sheds, stock yards and shearing sheds.

There are no non-host properties proposed within 2km of the proposed turbine sites. The closest non-host residence from the proposed turbines is approximately 2.2km away located on Clovernook.

Both Tamworth Regional Council and Walcha Council have been consulted to determine if there are any existing development applications (approved or otherwise) relevant to areas within 2km of the proposed turbine locations. Walcha Council have advised that a development application has been received for the erection of a dwelling on Lot 6 DP 753846 (see Figure 5). The site plan lodged with Council shows the location of the proposed dwelling is not located within 2km from any turbines.

Tamworth Regional Council have confirmed that there are no current development applications within 2km of the proposed turbine locations.

Newtricity have caveats on each of the host properties for the proposed turbines and associated infrastructure for the wind farm. The closest host

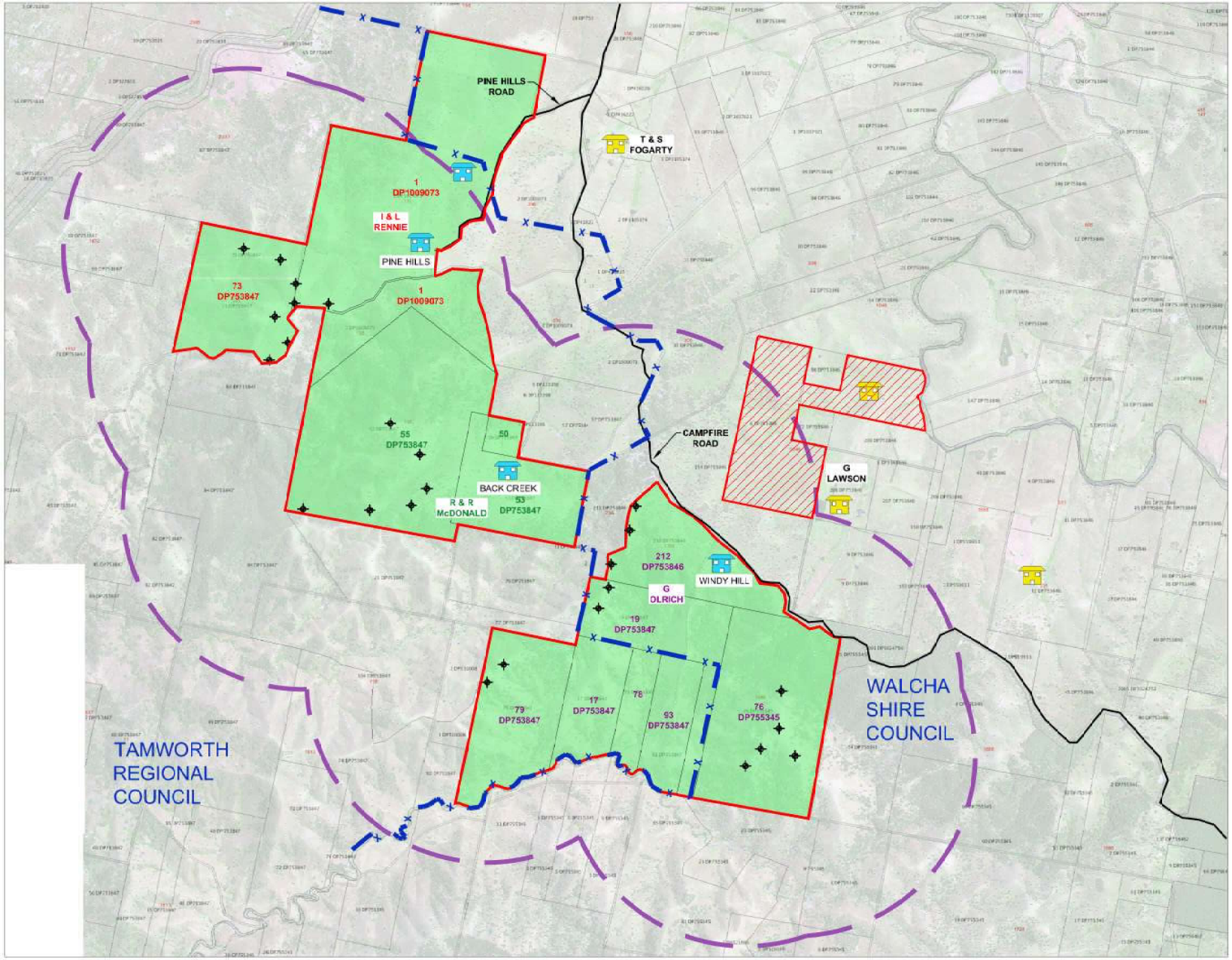
residence from the proposed turbines is approximately 1km away located on Back Creek.

Figure 5 shows a Receptor Plan. This is an indicative plan only and shows existing residences (both host and non host) with the 2km radius of potential wind turbine sites.

3.3 Existing Operations

All three host properties are currently operated as working farms, largely for sheep and cattle grazing.

“Pine Hills” has a monitoring tower located on Lot 73. This tower has been in operation for approximately the past 5 years.



NORTH

LEGEND

- PROPOSED WIND FARM LOCATION
- PROPOSED WIND TURBINE
- INDICATIVE LGA BOUNDARY
- INDICATIVE 2km RADIUS FROM TURBINE
- HOST PROPERTY RESIDENCE
- NON HOST RESIDENCE
- DA RECEIVED BY WALCHA COUNCIL - PROPOSED RESIDENCE

NOTE:

1. TURBINE LOCATIONS ARE APPROXIMATE ONLY AND ARE SUBJECT TO FURTHER DETAILED INVESTIGATION.
2. LGA BOUNDARY IS APPROXIMATE ONLY.

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Newtricity - Woolbrook Wind Farm and Transmission Line

Receptor Plan

FIGURE 5

Plot Date: 18 November 2013
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4.0 Project Overview

4.1 Project Description

The Project will involve the construction, operation and maintenance of up to 30 wind turbines and associated infrastructure across the three host properties.

There are three wind turbine layout options currently being investigated. Each are based on differing turbine types.

Transmission line route options are currently being investigated by Clarence Consultants Pty Ltd to connect the Project to an existing sub-station at Tamworth (Calala).

The Project will also include:-

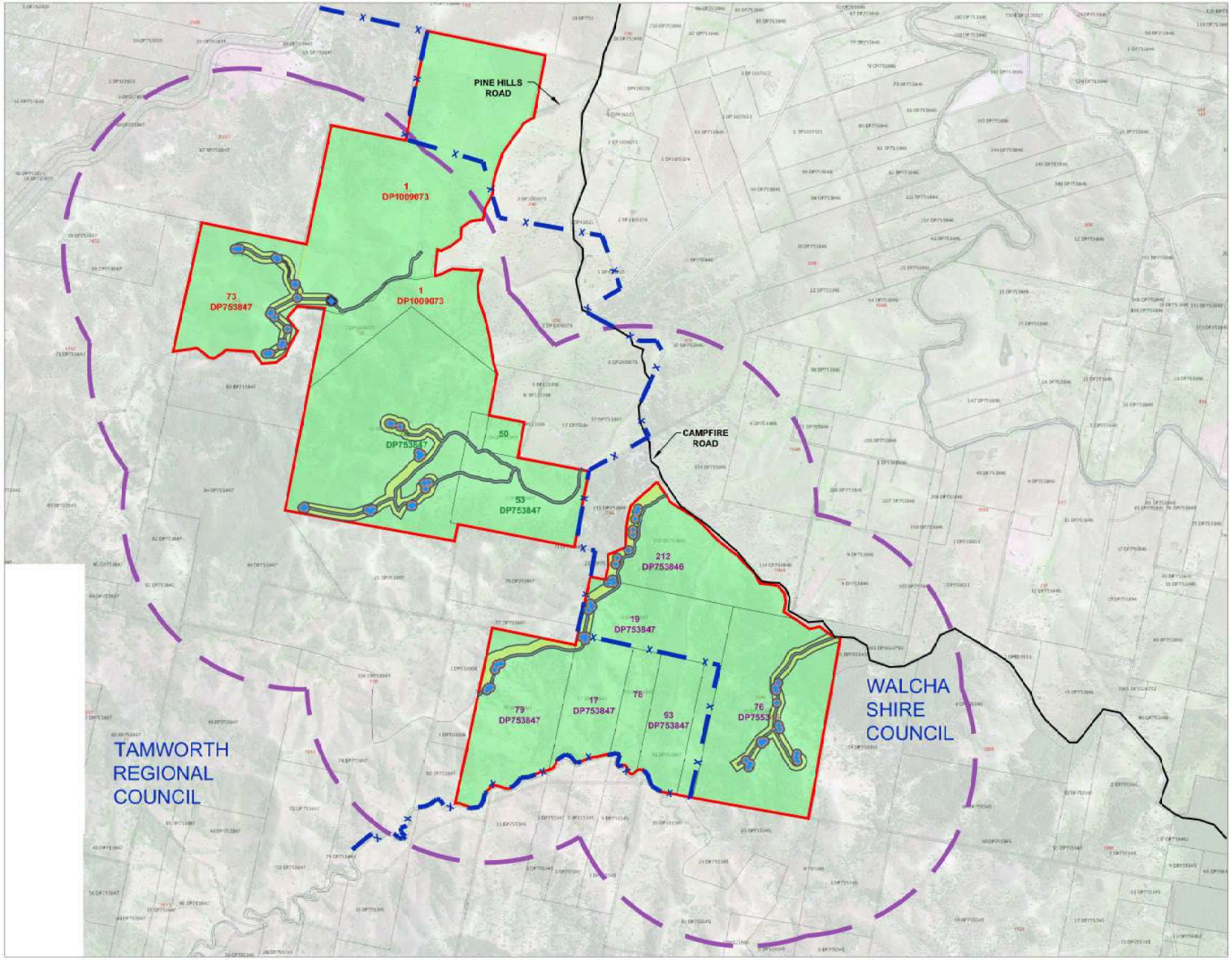
- Construction of a 22kV/132kV sub station onsite;
- Electrical connections between wind turbines and the onsite sub station via underground/overhead 33kV cable network;
- Construction of onsite control buildings and equipment storage facilities;
- Temporary concrete batching facilities to provide supply concrete for turbine footings and sub station construction works;
- Construction of access tracks for each turbine and other onsite structures and upgrades to existing roads/tracks as required; and
- Construction of monitoring masts for wind speed verification and monitoring.

4.1.1 Wind Farm

4.1.1.1 Wind Turbines

Three wind turbine layout options are currently being considered which are made up of a number of differing turbine types.

Figure 6 shows a site plan of the wind farm. The location of the turbines shown on this plan are indicative only.



NOTE:

1. TURBINE LOCATIONS ARE APPROXIMATE ONLY AND MAY SHIFT ALONG RIDGE LINES.
2. LGA BOUNDARY IS APPROXIMATE ONLY.

Newtricity - Woolbrook Wind Farm and Transmission Line

Wind Turbine and access route footprints

FIGURE 6

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Plo: Date: 18 November 2013
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Each turbine will have a height of approximately 130-150m above the ground level at the highest blade tip and have an approximate maximum generating capacity of 2.3-4MW depending on the selected model.

The indicative transfer capacity of the wind farm is approximately 80MW.

The turbine has three 55m blades. Each blade is made in a single mould from fiberglass-reinforced epoxy resin, together with the rotor weigh a total of 66,700kg.

The wind turbines currently being investigated for the Project are particularly efficient for low to medium wind speeds and is manufactured in Denmark.

4.1.1.2 Onsite sub-station

There will be a 22kV/132kV sub station at the wind farm site which will comprise:-

- 132kV circuit breakers and switches;
- 22/132kV transformers;
- 22kV circuit breakers, switches and associated protection and control equipment.

A location for the onsite sub station is yet to be determined but is likely to be 90m by 90m in area.

The sub station will be part of the wind farm installation and will be designed, constructed, operated and maintained by Newtricity.

The individual turbines will be connected electrically by underground cables to the new sub station constructed at the Project site.

4.1.1.3 Onsite control buildings and equipment storage facilities

An onsite concrete batching plant will be required to supply concrete for the wind turbine foundations. A location for the onsite concrete batching plant is yet to be determined.

Although the locations for the onsite infrastructure are yet to be determined the following selection criteria will be used to identify possible locations:-

- Minimising the ecological impacts – avoidance of any identified species, avoidance of mapped hollow bearing trees, away from recorded Threatened Species, avoidance of creeks and watercourses;

- Minimising traffic and transport activity during construction;
- Minimising visual impact from Campfire Road and publically accessible locations;
- Minimising noise impacts at receptor locations; and
- Close to an accessible water source (for the concrete batching plant).

4.1.1.4 Access tracks to turbines and facilities

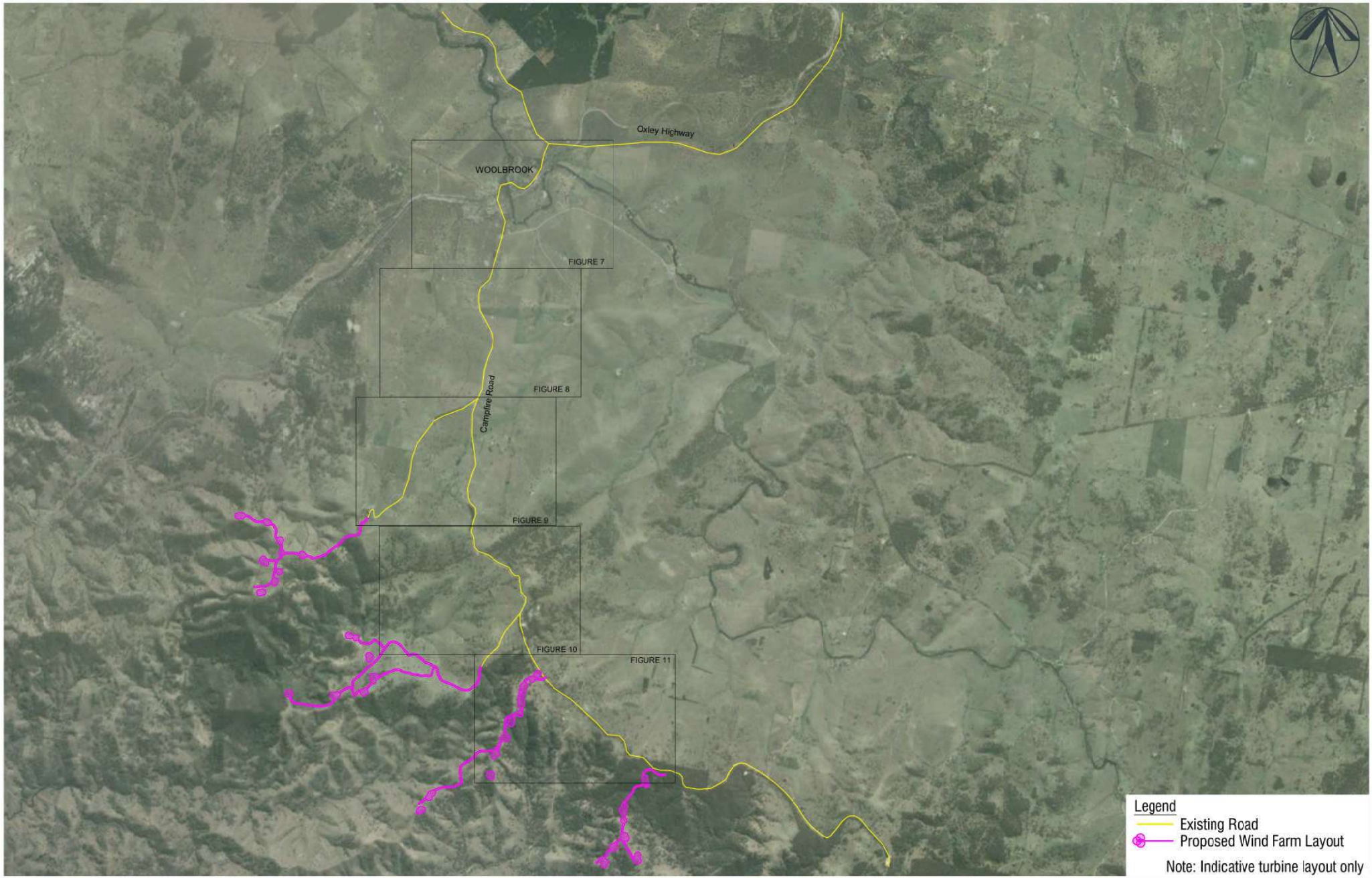
Access tracks will be required in the private lands on which the wind farm is located to provide access to the turbines sites, sub-station and equipment storage facilities building.

Preliminary options for access are currently being identified. The suitability and acceptability of these options will be reviewed and adjusted as necessary based on the findings of the environmental assessments.

4.1.1.5 Local road upgrades

The most suitable access route to the wind farm site is via Campfire Road. This route leads to the most northern end of the Project site.

Preliminary investigations into local road upgrades and access to the site have been undertaken and are represented in Figure 7, Figure 8, Figure 9, Figure 10, Figure 11 and Figure 12.



Newtricity Access Road Constraints

Woolbrook NSW

FIGURE 7

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Plot Date: 19 November 2013
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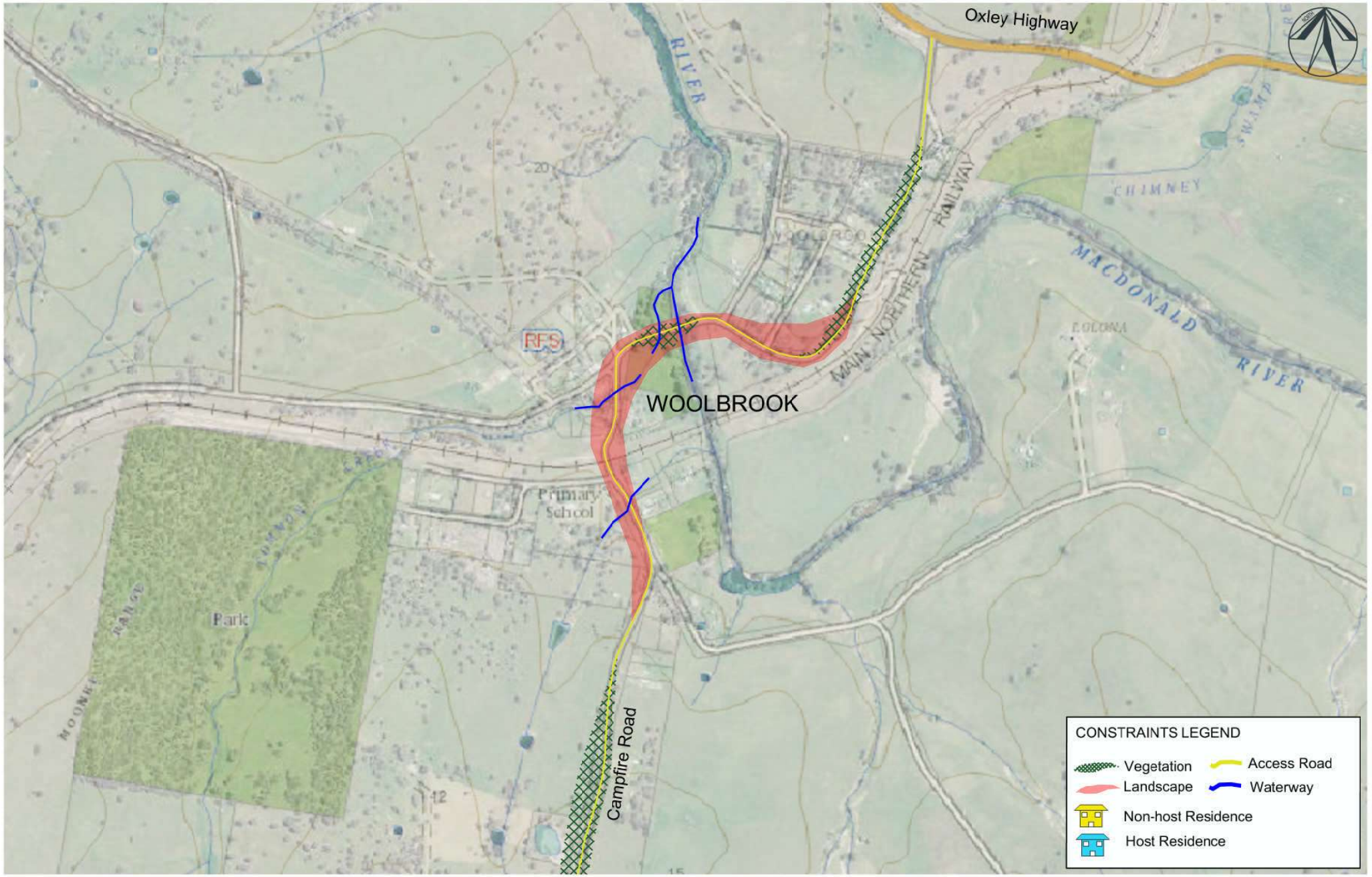

Newtricity Access Road Constraints

Woolbrook NSW

FIGURE 8

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Plot Date: 19 November 2013

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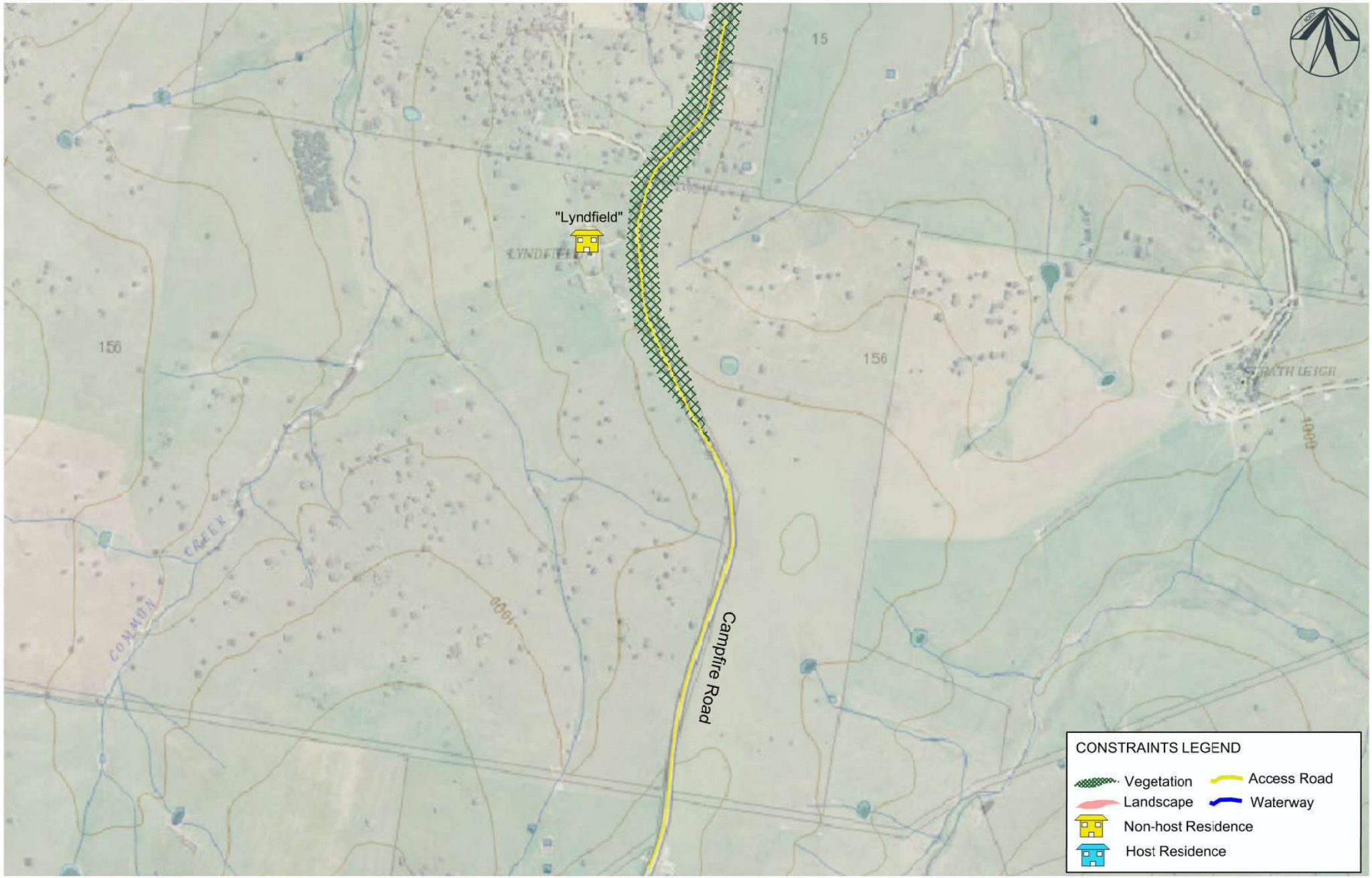

Newtricity Access Road Constraints

Woolbrook NSW

FIGURE 9

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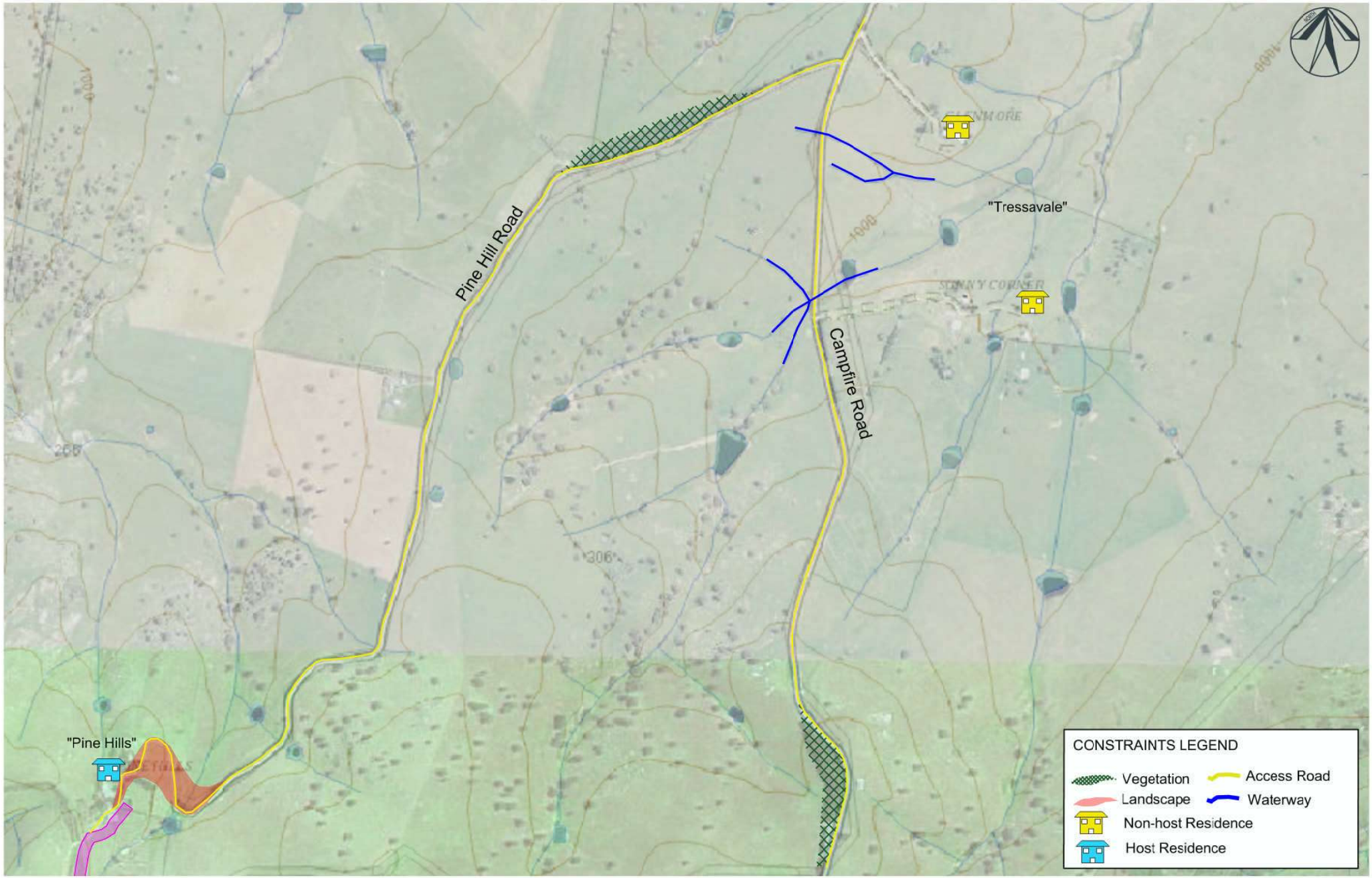

Newtricity Access Road Constraints

Woolbrook NSW

FIGURE 10

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Plot Date: 19 November 2013
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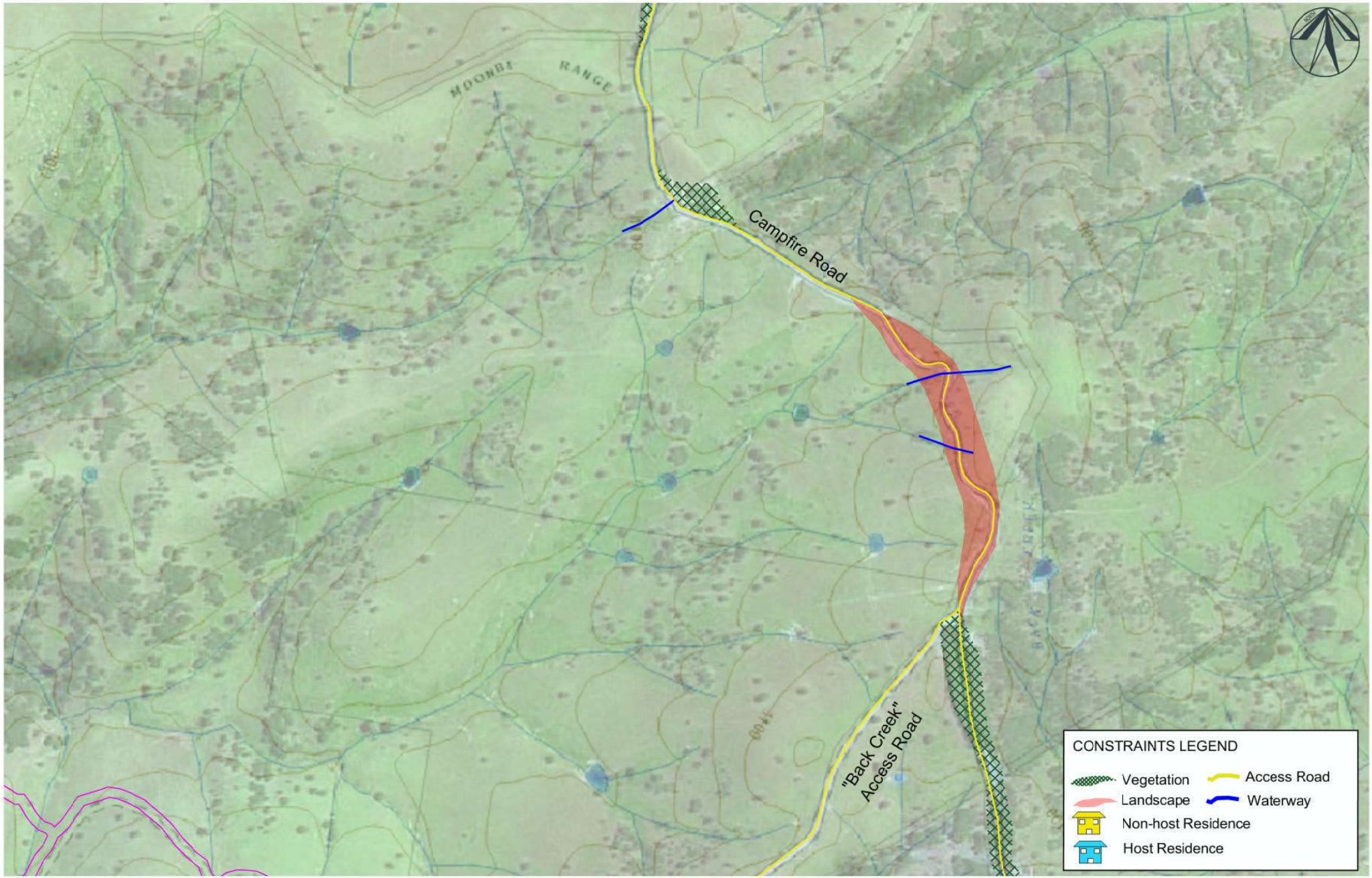

Newtricity Access Road Constraints

Woolbrook NSW

FIGURE 11

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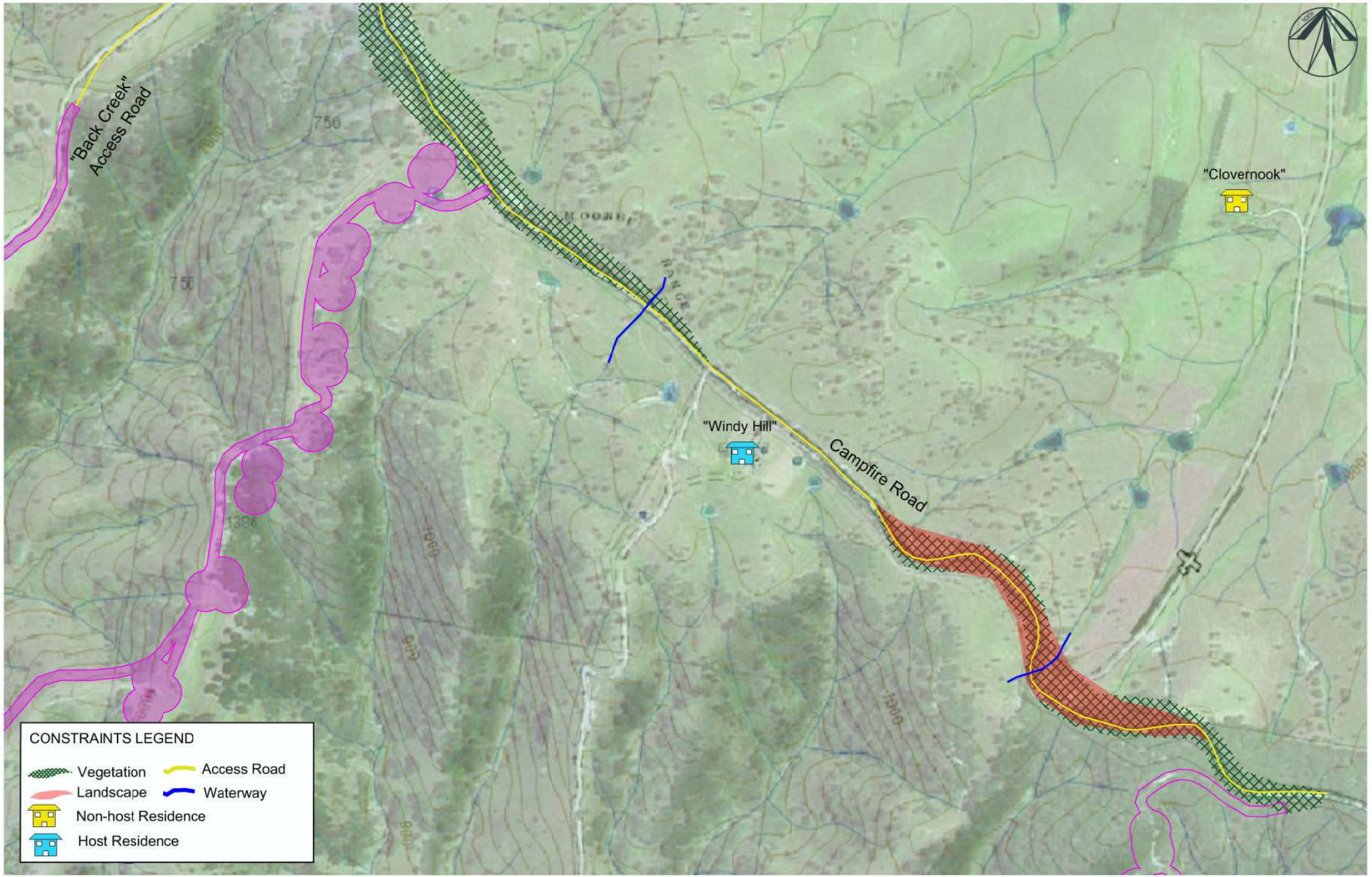

Newtricity Access Road Constraints

Woolbrook NSW

FIGURE 12

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4.1.2 Transmission Line

As part of the assessment of the costing for the Woolbrook Wind Farm, Clarence Consultants was appointed by Newtricity to undertake a preliminary investigation into the possible connection of the wind farm to the grid network.

The connection of the wind farm to the existing electricity grid is a key element in the assessment of the viability of the Project. The purpose of the preliminary investigate was **not** to determine a specific route, but to determine the potential options, opportunities and constraints and a bandwidth of cost.

The identified potential line routes should be considered no more than corridors at this stage, requiring significantly more analysis, extensive landholder negotiations and community consultation prior to a firm alignment being identified.

A Connection Enquiry to Essential Energy was lodged with the following formal comments received:-

- The existing Essential Energy network is not capable of receiving the proposed 80MW input from Woolbrook wind farm;
- The network connection will be into the Transgrid network.

Newtricity's discussions with Transgrid found that there are two network connection options. These are as follows:-

1. Transgrid 330kV line at Bendemeer – The 300kV line at Bendemeer is approximately 18km to the north west of the Woolbrook wind farm site and is a of steel lattice tower construction, This option would require the construction of a 330/132kV substation at Bendermeer making this option cost prohibitive;
2. Transgrid Tamworth (Calala) substation 132kV – The Transgrid substation is approximately 38km south

Following this feedback from Transgrid, three potential route options where identified by Clarence Consultants to connect into the Tamworth (Calala) substation. Figure 13 shows the potential routes.

As outlined above, these routes have been identified for costing purposes only. The final alignment of the transmission line connecting the wind farm to the grid requires further detailed investigation and costing.

The proposed connection of the Woolbrook Wind Farm to the existing network will require the construction of approximately 60km of 132kV

overhead powerline. The line will be funded and constructed by Newtricity and “gifted” to Essential Energy at the time of commissioning.

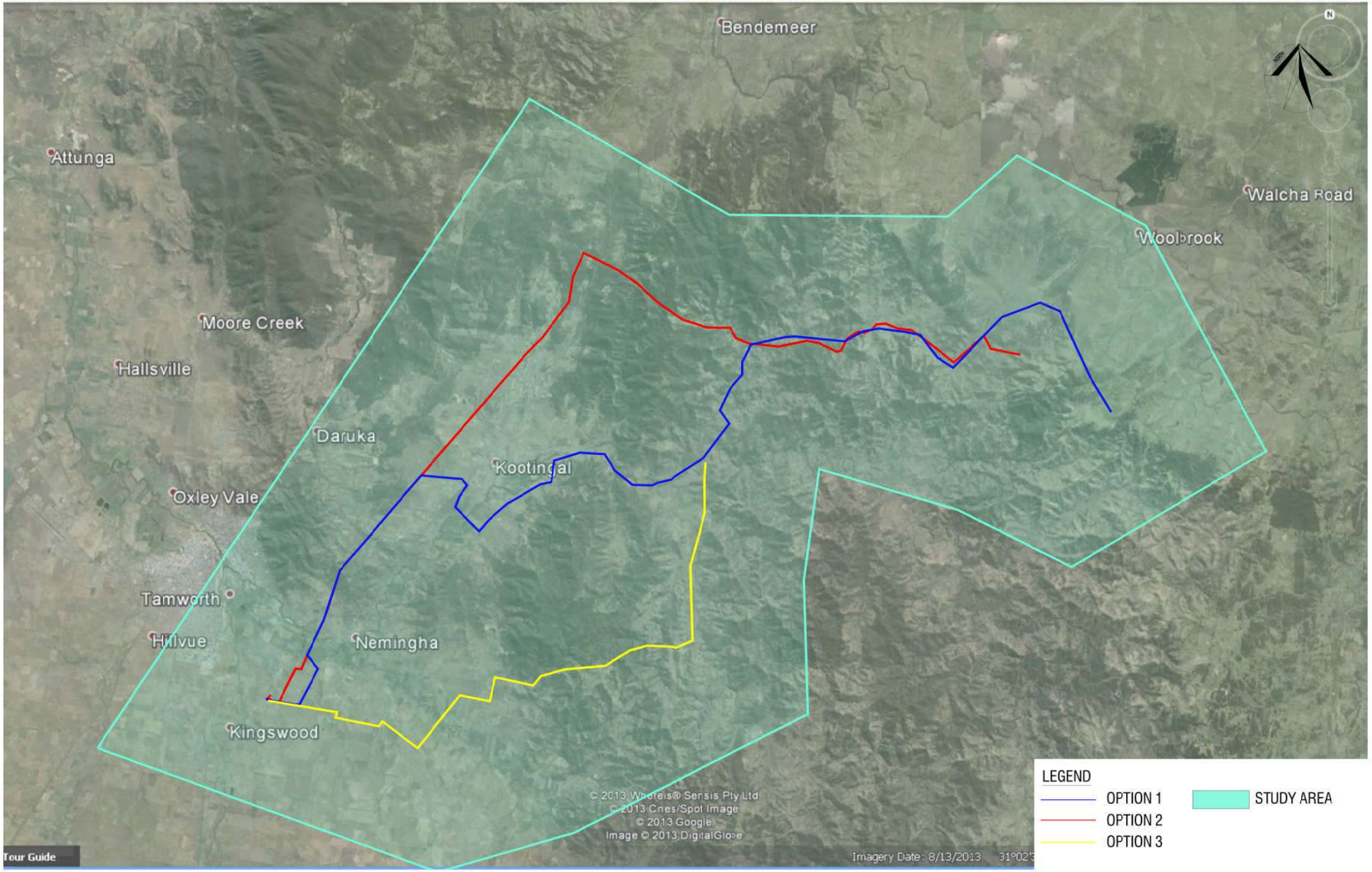
The proposed transmission line route options span a large range of sites, owned by various different parties and accommodating a range of land uses. These sites are already host to existing transmission lines, all of which lack the capacity to accommodate the additional energy expected to be generated by the proposed Woolbrook Wind Farm.

A study area has been developed for further investigations into the potential options for connections of the wind farm via transmission lines to the Tamworth (Calala) substation. Figure 2 shows the study area that is to be investigated for the transmission line routes.

The study area falls wholly within the LGA boundaries of Tamworth Regional and Walcha Councils.

The identified potential transmission line routes study area requires significantly more analysis, extensive landholder negotiation and community consultation to be undertaken to confirm a firm alignment of the line.

The planning for the lines must be done in consultation with Essential Energy and Essential Energy’s policies, procedures and standards adhered to throughout the process.



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Newtricity - Transmission Line

Study Area

FIGURE 13

Plot Date: 19 November 2013
J:\2013\13059 Newtricity Preliminary Project Assessment Report\ACAD\13059 Transmission line corridor.DWG

4.1.2.1 Power pole design

The power poles will be steel or concrete poles, typically 21m above ground.

Figure 14 hows the proposed poles that are currently being considered for the Project.

4.1.2.2 Tamworth (Calala) sub station

The Tamworth (Calala) sub-station is a major Transgrid 330kV/132kV sub-station on the Transgrid network.

The sub-station is supplied from the Transgrid 330kV network and the 132kV lines emanating from the sub station co-supply 132/66/11kV sub-stations in the Tamworth area and beyond.

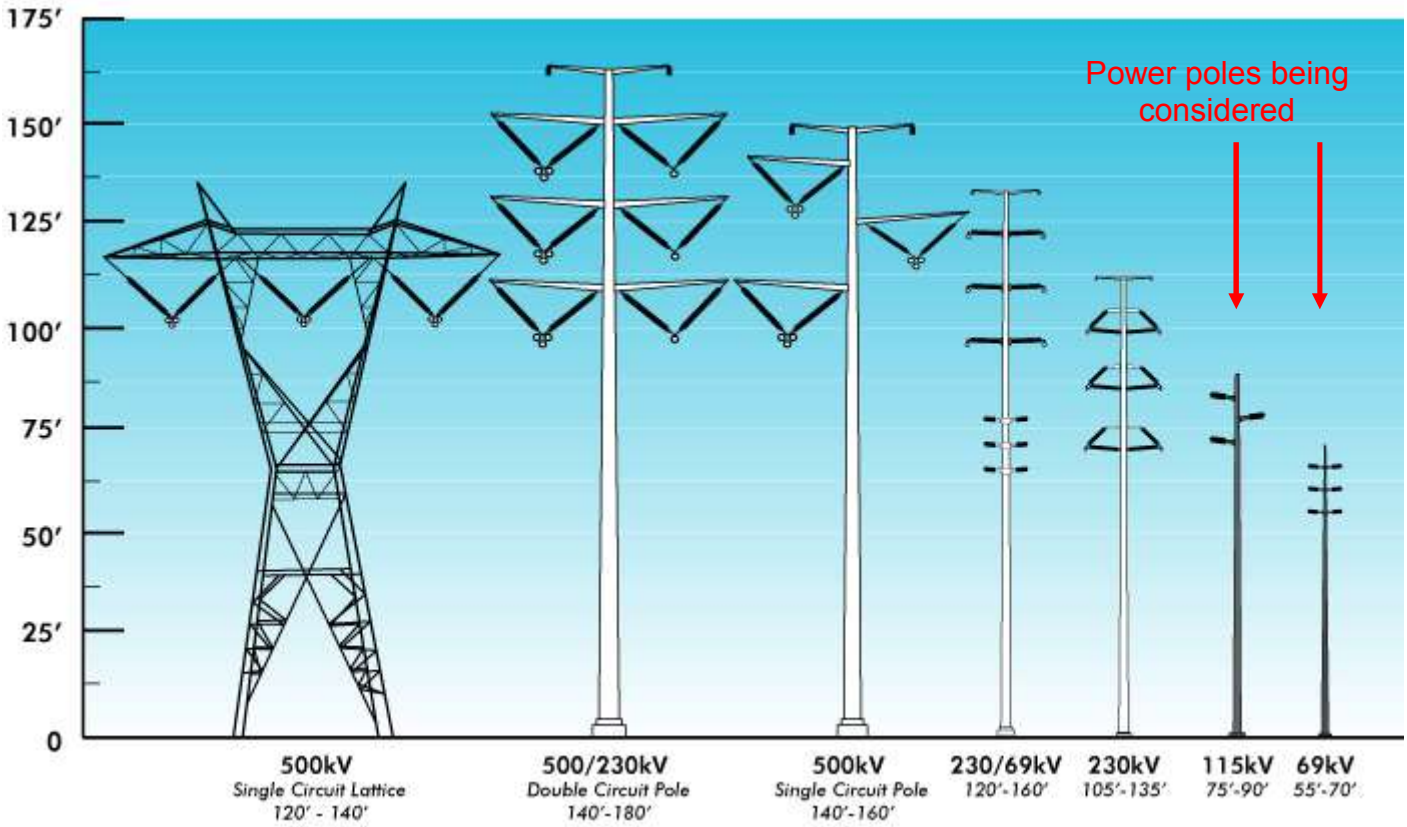


Figure 14: Power poles being considered

4.2 Project Definition

4.2.1 Wind Farm

As outlined in Table 1, the wind farm is identified as "State Significant Development" (SSD) under SEPP (State and Regional Development) 2011.

The Woolbrook Wind Farm Project falls into the use class *"electricity generating works and heat or co-generation"* in Schedule 1 of the State and Regional Development State Environmental Planning Policy (SRDSEPP). It is defined as:-

20 Electricity generating works and heat or co-generation

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, bio-fuel, distillate, waste, hydro, wave, solar or wind power) that:

(a) has a capital investment value of more than $30 million, or

(b) has a capital investment value of more than $10 million and is located in an environmentally sensitive area of State significance.

The Project does not fall within an environmentally sensitive area of State significance but has a capital investment of $80 million (wind farm component) and therefore falls under section (a) of the electricity generating works and heat or co-generation definition under Schedule 1 of the SEPP.

The wind farm is to be assessed under Part 4 of the EP & A Act.

4.2.2 Transmission Line

As outlined in Section 0 of this Report, the final location of the transmission line has not been determined and wont be determined for some time. However, as shown in Figure 2, a study area has been identified

The transmission line is an integral component of the wind farm which will be "gifted" to Essential Energy following construction. It is requested that the transmission line also be assessed under Part 4 of the EP & A Act.

4.3 Project Timeframe

This request for DGRs is submitted to enable the requirements of the preparation of an EIS to be provided.

Table 3 below provides an estimated timeframe for the Project.

Table 3: Preliminary Project timeframe

Project Stage	Estimated Duration	Estimated Completion
Request for DGRs lodged		November 2013
DGRs received	3 months (includes time for Planning Focus Meeting & Christmas holiday period)	February 2014
Preparation and submission of Development Application and EIS (including transmission line route determination and investigation)	Up to 24 months	February 2016
Consent authority review and public exhibition	3 months	May 2016
Consent authority approval	3 months	August 2016
Pre-construction approvals and management plans	3 months	November 2016
Construction	6 – 9 months	August 2017
Operation	20 years	2037
Decommissioning or project renewal	1 year	2038

The above timeframe reflects investigations, negotiations of easements and construction of the transmission line.

4.4 Capital Investment Value

Details of the cost of carrying out the proposed development must be provided at the time of lodgment of the DA. Usually a quantity surveyor's report must be provided to confirm the value of the development where the development is SSD because of its capital investment value.

The estimated value of the total Project is $101 million, being $80 million for the wind farm and $21 million for the transmission line.

Clarence Consultants on behalf of Newtricity and in collaboration with MHC undertook a Network Connection Options Analysis which included preliminary cost estimates for the transmission line. Clarence Consultants preliminary estimation for the transmission line is $21 million.

A quantity surveyor's report will be prepared prior to the lodgment of the Environmental Impact Statement.

5.0 Statutory Planning Requirements

The applicable planning legislation is detailed in the following sections.

5.1 Environmental Planning and Assessment Act 1979 (as amended)

While the vast majority of development applications in New South Wales are assessed and determined by local council, there are a small number of Projects whose scale, significance or potential impacts mean they are of regional or State, rather than just local, significance.

The State's planning system has, for more than 30 years, allowed for such Projects to be dealt with by the NSW Government.

For these Projects, the planning system consists of two separate assessment frameworks, State significant development (SSD) and State significant infrastructure (SSI).

5.1.1 Wind Farm

As outlined in Table 1 the wind farm is identified as "State Significant Development" (SSD) under SEPP (State and Regional Development) 2011.

See Section 5.3 for further detailed commentary on SSD and SEPP (State and Regional Development) 2011.

5.1.2 Transmission Line

The connection of the Woolbrook Wind Farm to the existing network will require the construction of a 132kV overhead powerline. A study area for the potential transmission line has been identified in Figure 2.

The line will be funded by Newtricity and "gifted" to Essential Energy at the time of commissioning. The transmission line forms an integral component of the wind farm Project.

See Section 5.4 for further detailed commentary on SSI and SEPP (Infrastructure) 2007.

5.2 Environmental Planning Regulation 2000 (as amended)

The Environmental Planning and Assessment Regulation 2000 (as amended) requires that a formal request be lodged with the Director General of the Department of Planning and Infrastructure prior to preparing an Environmental Impact Statement (DGRs).

This Preliminary Environmental Assessment has been prepared to accompany a formal request to the Director General for the requirements to be addressed by the Environmental Impact Statement.

5.3 State Environmental Planning Policy (State and Regional Development) 2011

The aims of State Environmental Planning Policy (State and Regional Development) 2011 (SRDSEPP) are as follows:-

(a) to identify development that is State significant development;

(b) to identify development that is State significant infrastructure and critical State significant infrastructure;

(c) to confer functions on joint regional planning panels to determine development applications.

As outlined in Section 5.1 of this Report the Woolbrook Wind Farm Project has been identified as State Significant Development and is therefore subject to and guided by SRDSEPP.

The transmission line forms an integral component to the wind farm and is not being constructed by an electricity supply authority or public authority, the proposal is not considered to be a SSI.

5.4 Sate Environmental Planning Policy (Infrastructure) 2007

The aims of State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) are as follows:-

(a) Improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and

(b) Providing greater flexibility in the location of infrastructure and service facilities, and

(c) Allowing for the efficient development, redevelopment or disposal of surplus government owned land, and

(d) Identify the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and

(e) Identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure, and

(f) Providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

Part 3 Division 4 of ISEPP relates to electricity generating works. ISEPP defines electricity generating works as *"a building or place used for the purpose of making or generating electricity".*

It is considered that the proposed Woolbrook Wind Farm best falls within the "electricity generating works" definition of the ISEPP as the proposal will generate electricity.

Clause 34(1) goes on to further state:-

"34(1) Development for the purpose of electricity generating works may be carried out by any person with consent of any land in a prescribed rural, industrial or special use zone."

Clause 33 of the ISEPP includes RU1 Primary Production as a prescribe zone, which is consistent with the zoning under the Walcha and Tamworth Regional Council's as the wind farm is within the RU1 Primary Production zone. This allows for the proposed Woolbrook Wind Farm to be permitted with consent.

5.5 Other Relevant State Legislation

5.5.1 Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 (TSC Act) lists threatened species, populations and ecological communities of animals and plants. It provides a framework for the assessment of any action that may impact on threatened species.

An Independent Scientific Committee has been set up under the Act to determine which species, populations and ecological communities have a status as endangered, vulnerable or extinct. Key threatening processes are also determined.

Section 94 of the TSC Act lists seven criteria for consideration when the proposed development potentially affects threatened species, populations and ecological communities.

An ecological assessment is currently being undertaken by Niche Environment and Heritage. The survey targets relevant threatened species listed under the TSC Act. Where required, assessments of significance will be undertaken to ensure that the proposed development will not have a significant impact of any TSC threatened communities or species.

The work undertaken to date by Niche is summarised in Section 6.3 of this report.

5.5.2 Native Vegetation Conservation Act 2003

It is likely that the development will impact on native vegetation. The management of native vegetation is governed by the Native Vegetation Conservation Act 2003 (NVC Act), as administrated by the NSW Office of Environment and Heritage (OEH).

The ecological assessment currently being undertaken by Niche Environment and Heritage identifies areas of native vegetation to ensure it is an appropriate assessment and management as per the NVC Act.

5.5.3 Roads Act 1993

Permits will be required under Section 138 of the Roads Act 1993 for underground cabling that will pass under the neighbouring roads and also upgrades to both State and local roads for the transport of construction materials and the wind turbine components.

A Traffic Impact Assessment will be undertaken as part of the EIS and will include advice being sought with respect to the associated road authority.

5.5.4 Crown Lands Act 1989

Crown land comprises approximately half of all land in New South Wales. The Crown Lands Act 1989, administrated by the NSW Crown Lands Division, is the Authority for the management of all land owned by the Crown. The objects of this Act are to ensure that Crown land is managed for the benefit of the people of New South Wales.

While the proposed site for the Woolbrook wind farm spans three (3) privately owned properties, potential impacts on adjacent crown lands will be required to be assessed as per the Crown Lands Act 1989.

5.6 Commonwealth Legislation

5.6.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government's principal piece of environment legislation. The Act protects Australia's native species and ecological communities determined to be “Matters of National Environmental Significance” (NES).

The environmental assessment requires that ‘Matters of National Environmental Significance’ (NES) listed under the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 be reviewed in light of the proposed activities. Any action that will or is likely to have a significant impact on species or ecological communities of National Environmental Significance listed in the categories of extinct; critically endangered; endangered or vulnerable and extinct in the wild: will require approval from the Minister after assessment under the *“Significant Impact Criteria”.*

The ecological assessment currently being undertaken by Niche Environment and Heritage has been designed in accordance with the requirements of the EPBC Act.

The Working Paper prepared by Niche Environment and Heritage (August 2013) has identified that preliminary investigations show that native vegetation cover and associated fauna habitats exist within the subject site and would be impact by the Woolbrook Wind Farm Project. These investigations relate to the wind farm site itself.

Further investigations are required for the transmission line. However, given the local distribution of White Box, Yellow Box, Blakely's Red Gum, Grassy Woodland and Derived Native Grassland, it is likely that some of this community may also be impacted by the transmission line. This community type, in addition to other endangered ecological communities which may occur, will be assessed further during the preparation of the Environment Impact Statement.

Given the above, a referral will be lodged with Department of the Environment requesting “an accredited assessment process” to be declared under the bi-lateral agreement between the State of NSW and Commonwealth.

5.6.2 Civil Aviation Safety Regulations 1998

The Civil Aviation Safety Regulation 1998 requires the Civil Aviation Safety Authority (CASA) be informed of proposals to build a structure greater then 110m above Australian Height Datum. This is required to determine whether any structures may represent a hazard to aircraft and to provide any associated mitigation measures including any requirements for markings or lighting.

CASA will be consulted during the preparation of the Environmental Impact Statement to determine any requirements they may have.

5.7 Regional Environmental Plans

There are no Regional Environmental Plans applicable to the Site.

5.8 Local Environmental Plans

The Project straddles the Walcha and Tamworth Regional local government boundaries. As a result, the Project is affected by two separate Local Environmental Plans as outlined in the following section.

5.8.1 Walcha Local Environmental Plan 2012

The aims of the Walcha Local Environmental Plan 2012 are:-

1.2 Aims of Plan

(1) This Plan aims to make local environmental planning provisions for land in Walcha in accordance with the relevant standard environmental planning instrument under section 33A of the Act.

(2) The particular aims of this Plan are as follows:

(a) to encourage the orderly management, development and conservation of resources by protecting, enhancing and conserving:

(i) land of significance for agricultural production, and

(ii) timber, minerals, soils, water and other natural resources, and

(iii) areas of high scenic or recreational value, and

(iv) native plants and animals, including threatened species, populations and ecological communities, and their habitats, and

(v) places and buildings of heritage significance,

(b) to provide a choice of living opportunities and types of settlements,

(c) to facilitate development for a range of business enterprise and employment opportunities,

(d) to ensure that development is sensitive to both the economic and social needs of the community, including the provision of community facilities and land for public purposes.

The wind farm site is currently zoned RU1 Primary Production under the Walcha Local Environmental Plan (LEP) 2012. Figure 15 shows the zoning under the current LEP.

The objectives and uses of the RU1 Primary Production zone are:-

Zone RU1 Primary Production

1 Objectives of zone

- 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.
- To allow for non-agricultural land uses that will not restrict the use of other land in the locality for agricultural purposes.

2 Permitted without consent

Airstrips; Environmental protection works; Extensive agriculture; Forestry; Home-based child care; Home occupations; Home occupations (sex services); Intensive plant agriculture; Roads

3 Permitted with consent

Air transport facilities; Animal boarding or training establishments; Aquaculture; Boat launching ramps; Boat sheds; Camping grounds; Cellar door premises; Cemeteries; Charter and tourism boating facilities; Community facilities; Correctional centres; Crematoria; Depots; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Educational establishments; Environmental facilities; Extractive industries; Farm buildings; Flood mitigation works; Function centres; Funeral homes; Highway service centres; Home businesses; Home industries; Industrial training facilities; Information and education facilities; Intensive livestock agriculture; Jetties; Landscaping material supplies; Marinas; Mooring pens; Moorings; Mortuaries; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Service stations; Signage; Tourist and visitor accommodation; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems

4 Prohibited

Hotel or motel accommodation; Serviced apartments; Any other development not specified in item 2 or 3

Whilst wind farms and transmission lines (defined as *"electricity generating works"*) are not a listed land use under the Walcha LEP 2012 RU1 – Primary Production zone and therefore fall under provision 4 Prohibited, as outlined in Section 5.4 of this Report, the development of a wind farm and transmission line is permitted with consent pursuant to the provisions of the ISEPP.

The transmission line is likely to only be affected by the RU1 – Primary Production zone.

5.8.2 Tamworth Regional Local Environmental Plan 2010

The aims of the Tamworth Regional Local Environmental Plan 2010 are:-

1.2 Aims of Plan

(1) This Plan aims to make local environmental planning provisions for land in the Tamworth Regional Council area in accordance with the relevant standard environmental planning instrument under section 33A of the Act.

(2) The particular aims of this Plan are as follows:

(a) to encourage the orderly management, development and conservation of natural and other resources within the Tamworth region by protecting, enhancing or conserving:

(i) important agricultural land, and

(ii) timber, minerals, soil, water and other natural resources, and

(iii) areas of significance for nature conservation, and

(iv) places and buildings of archaeological or heritage significance,

(b) to allow flexibility in the planning framework so as to encourage orderly, economic and equitable development while safeguarding the community's interests and residential amenity,

(c) to manage and strengthen retail hierarchies and employment opportunities, promote appropriate tourism development, guide affordable urban form and provide for the protection of heritage items,

(d) to promote ecologically sustainable urban and rural development and control the development of flood liable land, and

(e) to secure a future for agriculture by expanding Tamworth's economic base and minimising the loss or fragmentation of productive agricultural land.

As with the Walcha LEP, the wind farm site is currently zoned RU1 Primary Production under the Tamworth Regional Local Environmental Plan (LEP) 2010. Figure 15 shows the zoning under the current LEP.

The objectives and uses of the RU1 Primary Production zone are:-

Zone RU1 Primary Production

1 Objectives of zone

- 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.
- To permit subdivision only where it is considered by the Council to be necessary to maintain or increase agricultural production.
- To restrict the establishment of inappropriate traffic generating uses along main road frontages.
- To ensure sound management of land which has an extractive or mining industry potential and to ensure that development does not adversely affect the extractive industry.
- To permit development for purposes where it can be demonstrated that suitable land or premises are not available elsewhere.

2 Permitted without consent

Environmental protection works; Extensive agriculture; Forestry; Home-based child care; Home occupations; Moorings; Roads

3 Permitted with consent

Cellar door premises; Dual occupancy (attached); Dwelling houses; Extractive industries; Farm buildings; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Plant nurseries; Roadside stalls; Rural workers' dwellings; Any other development not specified in item 2 or 4

4 Prohibited

Amusement centres; Cemeteries; Child care centres; Commercial premises; Crematoria; Depots; Eco-tourist facilities; Educational establishments; Entertainment facilities; Exhibition homes; Exhibition villages; Function centres; Health services facilities; Heavy industrial storage establishments; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Mortuaries; Registered clubs; Residential accommodation; Respite day care centres; Restricted premises; Service stations; Serviced apartments; Sex services premises; Storage premises; Vehicle body repair workshops; Vehicle repair stations; Wharf or boating facilities; Wholesale supplies

Whilst wind farms and transmission lines *("electricity generating works"* definition) are not a listed land use under the Tamworth Regional LEP 2010 RU1 – Primary Production zone and therefore fall under provision 3 Permitted with consent, as outlined in Section 5.4 of this Report, the development of a wind farm and transmission line is permitted with consent pursuant to the provisions of the ISEPP.

Given the length and linear characteristic of the potential transmission line, the line will be affected by a wide variety of zones in the Tamworth Regional LEP 2010 including, but not limited to, R1 General Residential,

R5 Large Lot Residential, RU4 Rural Small Holdings and E3 Environmental Management, . All zones, except E3 Environmental Management, “electricity generating works” falls under “any other development not specified in item 2 or 4 is permitted with consent”. In relation to the E3 Environmental Management zone, “electricity generating works” is a listed use permitted with consent.

5.9 Walcha and Tamworth Regional Development Control Plans

Development Control Plans (DCPs) do not apply to SSD. This is as a result of DCPs being generally concerned with local or specific issues and do not provide appropriate planning controls for large, complex developments of importance to the State or region. However, a local council can identify controls within a DCP that relate to a proposed SSD DA and request that they be addressed in the EIS.

A review of Walcha and Tamworth Regional DCPs reveals that it is considered that none of the DCPs are applicable to this Project.

Zone

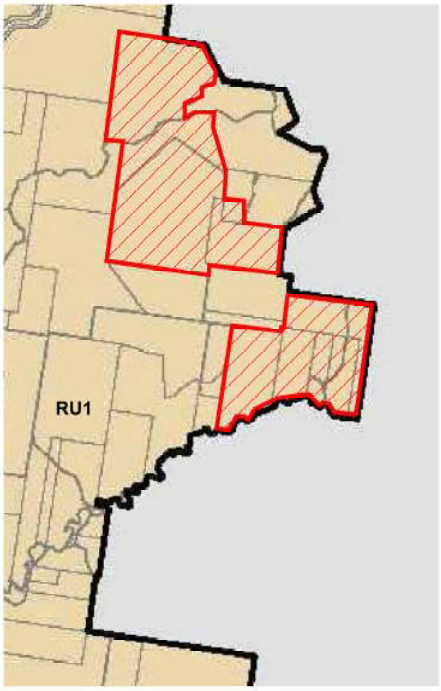
- B2 Local Centre
- B4 Mixed Use
- E1 National Parks and Nature Reserves
- E2 Environmental Conservation
- E4 Environmental Living
- IN1 General Industrial
- R1 General Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RU1 Primary Production
- RU4 Primary Production Small Lots
- RU5 Village

Legend

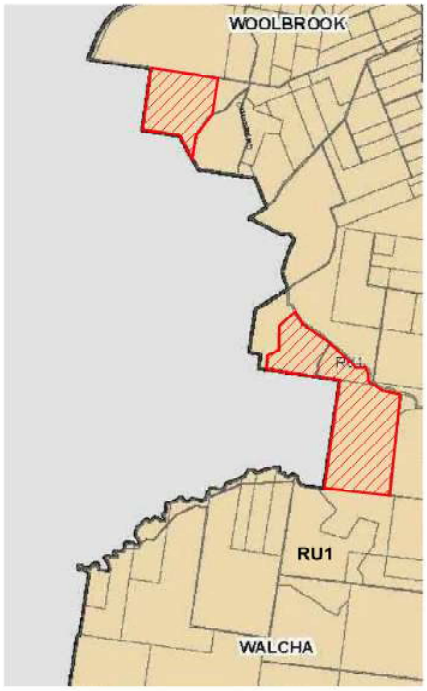
- Subject Sites

Cadastre

- Cadastre 29/11/2010 © NSW LPMA



TAMWORTH REGIONAL LEP 2010



WALCHA LEP 2012

6.0 Environmental Issues and Management

As outlined in the NSW Department of Planning and Infrastructure *Draft NSW Planning Guidelines: Wind Farms (December 2011)*, where a wind farm application is State Significant Development, specific assessment requirements are specified in Director General Requirements (DGRs).

The following section provides preliminary information on the environmental issues and management considerations for the Woolbrook Wind Farm.

6.1 Landscape and Visual Amenity

It is understood from preliminary informal consultation with adjoining neighbours that visual impact is a key issue to the proposed Woolbrook Wind Farm.

The proposed Wind Farm is located in an elevated position on the edge of gorge country and will be visible to varying degrees from the surrounding lands.

A Landscaped and Visual Amenity Impact Assessment (Assessment) will form part of the Environmental Impact Statement. This Assessment will be undertaken in accordance with the *Draft NSW Planning Guidelines: Wind Farms* and will include:-

- A comprehensive assessment of the landscape character, values, any scenic or significant vistas of the area and the potential impact the proposed Woolbrook Wind Farm may have;
- Photomontages of the wind farm and associated transmission line; and
- Provide an assessment of the feasibility, effectiveness and viability of proposed mitigation measures.

6.2 Social Issues

6.2.1 Noise

There are a number of potential sources of noise from a wind farm that include:-

- Wind turbines;
- Sub-stations;
- Construction noise;
- Traffic noise; and
- Vibration

It is recognised that wind turbines have unique noise generating characteristics that is affected by the wind speed and the location of the turbines. It is also recognised that with the accompanying increase in noise from a turbine as wind speed increase, an equal or greater increase in the background noise also occurs which may completely or substantially mask the wind turbine noise (NSW Department of Planning and Infrastructure, 2011).

An Environmental Noise Impact Assessment will be prepared to consider and address all potential noise sources emitted from the Woolbrook Wind Farm, in particular, noise emanating from turbines measured at hub height.

The procedures and criteria to undertake the Environmental Noise Impact Assessment will follow those outlined in the draft Guidelines. For the purpose of the Woolbrook Wind Farm EIS, if the draft Guidelines have not been finalized, an Environmental Noise Impact Assessment will be undertaken, in accordance with the *South Australian Wind Farms – Environmental Noise Guidelines 2003* (South Australian EPA Guidelines).

Additionally assessment of such issues as construction and general operation noise will be investigated in accordance with the Protection of the Environment Operations Act 1997, the NSW Industrial Noise Policy (INP)(NSW EPA, 2000),Interim Construction Noise Guidelines (ICNG) (DECC, 2009) and any other relevant policies and/or guidelines.

6.2.2 Blade Glint and Shadow Flicker

The *Draft NSW Planning Guidelines: Wind Farms* specifies that the potential impact of 'blade glint' and 'shadow flicker' on neighbours residences within 2km of a proposed wind turbine should be assessed.

As there are no neighbours (non-host) residences within 2km of any of the proposed wind turbines the impact of blade glint and shadow flicker is not considered an impact to be investigated any further.

6.2.3 Electromagnetic Fields

Wherever electric equipment operates, electric and magnetic fields (EMFs) are created in the surrounding environment. The main sources of EMFs typically associated with wind farms is the electrical equipment within the turbine structures, the sub-station and the interconnecting underground and overhead wiring.

Whilst adverse health effects of electromagnetic fields have not been established, despite extensive research, the possibility of effects has also not been ruled out.

To minimise the potential impact from electromagnetic fields, all equipment will be constructed to the relevant standards and avoidance of areas frequented by people will be incorporated into the site designs.

6.3 Ecological Issues

The Working Paper prepared by Niche Environment and Heritage (August 2013) has identified that preliminary investigations show that native vegetation cover and associated fauna habitats exist within the subject site and would be impact by the Woolbrook Wind Farm Project. These investigations relate to the wind farm site itself.

Further investigations are required for the transmission line. However, given the local distribution of White Box, Yellow Box, Blakely's Red Gum, Grassy Woodland and Derived Native Grassland, it is likely that some of this community may also be impacted by the transmission line. This community type in addition to other endangered ecological communities which may occur will be assessed further during the preparation of the Environment Impact Statement.

Given the above, a referral has been lodged with the Department of the Environment (DOTE), requesting "an accredited assessment process" to be declared.

Preliminary site inspections and winter bird surveys indicate the potential for threatened flora and fauna occurrences within the subject site and

study area. At least three threatened fauna species have already been confirmed within the study area, these being:-

- Koala
- Varied Sittella; and
- Scarlet Robin.

Habitat for migratory threatened fauna such as the Regent Honeyeater and Swift Parrot is also apparent within the subject site. Winter and spring flowering eucalypts such as Yellow Box, White Box, Mugga Ironbark and Orange Gum represent potential feed resources for the Regent Honeyeater during its breeding season and Swift Parrot during its mainland non-breeding migratory activity. The importance of these resources would be investigated through the winter and spring survey period.

The vegetation has also the potential to provide foraging resources for threatened cave roosting bat species such as Eastern Cave Bat and Large-eared Pied Bat. In addition, tree hollows may provide suitable roost sites for a third threatened bat species known as the Eastern False Pipistrelle.

Early indications are that none of the woody vegetation is consistent with a listed threatened ecological community, although further detailed floristic surveys are required to validate this preliminary observation. Notwithstanding, there is potential for grasslands derived from threatened grassy woodland communities to occur within the subject site.

A copy of Niche Environment and Heritage Biodiversity Working Paper – Constraints (August 2013) is contained in Appendix C.

6.4 Economic Issues

6.4.1 Mineral Resources

Under the EP&A Act, all new coal mines, mineral sand mines, other large mines and any mines in environmentally sensitive areas of State significance are classified as State Significant Development. The NSW Department of Planning and Infrastructure Major Projects Register has been consulted for Major Projects occurring in the Tamworth Regional and Walcha Shire Local Government Areas. The search returned no results for either LGA relating to the proposal area.

The NSW Department of Trade and Investment, Resources and Energy search engine for mineral, petroleum and coal exploration titles has been consulted to identify title applications and existing titles for the development area. It has been determined that the proposal site is not the subject of any title applications or existing titles for coal, petroleum or mineral resources.

Tamworth Regional Council and Walcha Shire Council have been consulted in regard to mineral related development applications within the proposal area. Both Councils have confirmed that there are not existing local government applications or approvals yet to be acted upon.

Subsequently there are no evident existing mining land use rights pertaining to the development area.

6.4.2 Property Values

In August 2009 DuPonts and PRP Valuers and Consultants prepared *Preliminary Assessment of the Impact of Wind Farms on Surrounding Land Values in Australia* for the NSW Valuer General.

The aim of this study was to conduct a preliminary assessment on the impacts of wind farms on surrounding land values in Australia, mainly through the analysis of property sales transaction data. This included consideration of the contribution of various factors (including distance to a wind farm, view of a wind farm, and land use) to any price changes, positive or negative.

A review of this study and any other information available will be considered and addressed in the EIS.

6.4.3 Socio – Economic Outcomes

Wind farms provide a valuable stream of guaranteed annual revenue for land owners that host turbines, which helps 'drought-proof' their farms. The turbines can comfortably coexist with other land uses such as grazing and cropping.

In 2005, the Climate Institute was established as an independent research organization focused solely on the issue of climate change.

As part of the renewable energy precinct initiative, the Climate Institute was awarded a grant from the Department of Environment, Climate Chance and Water to assess the employment opportunities associated with renewable energy on each of the six precincts.

The Climate Institute appointed Ernest and Young to prepare a report which was released in January 2011 that reveals the following for the New England Tablelands Region for clean energy potential:-

- 1,704 new jobs could be created through the development of the region's full renewable energy resource;
- This includes 508 new permanent ongoing jobs, and a peak construction workforce of 1,107 people;
- In regard to employment for wind Projects during the construction phase it is estimated that by 2030, as low as 147 positions could be generated with the upper estimate being 591 positions; and
- In regard to employment for wind Projects during the operation phase it is estimated that by 2030, as low as 17 positions could be generated with the upper estimate being 287 positions.

The Woolbrook Wind Farm provides an opportunity for not only employment during construction and operation but in the long term may also provide tourism potential as discussed with Councilors at Walcha Shire Council.

6.5 Heritage Issues

Reviews of State and Federal Heritage databases have been undertaken for both the Tamworth Regional and Walcha local government areas.

Sites and places determined to be heritage items under the NSW Heritage Act 1977 are listed on the NSW Office of Environment and Heritage NSW Heritage Search Tool.

The search tool has been consulted for listings occurring within the Woolbrook Area. A single listing was returned for the Macdonald River

Rail Bridge. The rail bridge, which is located approximately 7 km from the development area, is not expected to be impacted by the development.

Sites and places determined to be heritage items under the Environment Protection and Biodiversity Conservation Act 1999 are listed on the Department of the Environment (DOTE), Australian Heritage Database. The data base has been consulted for listings occurring within the Woolbrook Area with the Macdonald River Rail Bridge being identified.

While database searches indicate that there are no listed heritage items occurring within the vicinity of the development area, it is known that the tablelands of the Walcha area have been occupied extensively by Indigenous Australians. The NSW Planning *Draft Planning Guidelines for Wind Farms* details that a cultural heritage assessment of the development site is required to be undertaken. The cultural heritage assessment will determine the presence of any previously unidentified items of European or Aboriginal Significance.

6.6 Hazards and Risks

6.6.1 Electromagnetic Interference

The potential for the proposed Woolbrook Wind Farm to cause electromagnetic interference (EMI) with communication signals and services will be addressed as part of the Environmental Impact Statement.

This will include an assessment of local telecommunications services and identification of mitigation measures to minimise any potential impacts.

6.6.2 Health Issues

Concerns relating to wind farms and potential links to impacts on human health generally focus on:-

- Audible and inaudible noise;
- Blade glint;
- Electromagnetic fields;
- Night Lighting (where required); and
- Shadow flicker.

It is a requirement of the *NSW Draft Planning Guidelines: Windfarms, December 2011* that potential health impacts of residents within 2km of proposed turbine locations be considered.

Specifically, the EIS will consider health impacts with reference to:

- Up to date, evidence based research;
- Consultation undertaken regarding health issues and concerns; and
- Predicted levels of impacts including impacts from noise, shadow flicker, blade glint, night lighting and electric & magnetic fields.

While the majority of available scientific literature suggests that there are no direct links between wind farms and human health, the potential for these impacts will be considered accordingly.

6.6.3 Aviation Safety

The potential impact of the Woolbrook Wind Farm on aviation safety will be assessed as part of the Environmental Impact Statement.

A review of aerial photography of land within 30kms of the proposed wind farm will be reviewed for any existing aerodromes or airfields and consultation will be undertaken with Walcha and Tamworth Local Governments, the local communities and the Civil Aviation Safety Authority (CASA).

A preliminary review of topographical maps identifies one potential private airstrip to the north-east of the wind farm site.

6.6.4 Bushfire Hazard

Potential bushfire hazards and risks will be assessed as part of the Environmental Impact Statement in accordance with the *Draft NSW Planning Guidelines: Wind Farms.*

Mitchel Hanlon Consulting will consult with the NSW Rural Fire Services as part of the bushfire hazards and risks assessment and will include consideration of the *Planning for Bushfire Protection 2006* to provide necessary emergency management.

6.6.5 Blade Throw

The risk of 'blade throw' will be assessed during the preparation of the Environmental Impact Statement.

6.7 Construction

It is estimated that the construction of the wind farm will take approximately 9 months. The date of the commencement of the construction phase of the wind farm will be principally driven by the length of time it takes to obtain planning approval and other permits/authorisations, financial approval/Project financing and the manufacturing of the wind turbine components.

An Environmental Management Plan identifying how the site will be managed through construction and future operation will be prepared following approval of the Project.

6.7.1 Traffic and Transport

As outlined in Section 4.1.1.4 of this Report access tracks will be required in the private lands on which the wind farm is located to provide access to the turbines sites, substation and equipment storage facilities building.

Preliminary options for access are currently being identified. The suitability and acceptability of these options will be reviewed and adjusted as necessary based on the findings of the environmental assessments. The most suitable access route to the wind farm site is via Campfire Road. This route leads to the most northern end of the Project site.

A Traffic and Transport Assessment will be undertaken at the time of preparation of the Environmental Impact Statement. This Assessment will include:-

- Details of traffic volumes and transport routes during construction and operation;
- Assess the potential traffic impacts of the Project on road network function and safety;
- Assess the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project during construction and operation;
- Detail any required upgrades to roads, bridges and site access provisions;
- Detail any mitigation and/or potential impact management measures;
- Detail access roads within the site and ongoing operation maintenance requirements for these roads; and
- Consideration of any relevant RMS and Council traffic/road policies.

6.7.2 On-site concrete batching plant

Due to the size of the development and the distance from Walcha and Tamworth it is likely that a concrete batching plant will be required on site to supply concrete for the wind turbine foundations.

6.8 Servicing and Maintenance

Maintenance staff are likely to be on-site throughout the year undertaking routine checks of the wind turbines on an ongoing basis. Major planned servicing may be carried out a number of times a year on each wind turbine. Each major service visit may potentially involve a number of service vehicles and a crane on site.

6.9 Decommissioning and Rehabilitation

The Woolbrook Wind Farm has an estimated operating life of 20 to 25 years. At the end of this period the Project will be reviewed to determine if it will be refurbished or decommissioned.

A Decommissioning and Rehabilitation Plan will be prepared in accordance with the *Draft NSW Planning Guidelines: Wind Farms* and included in the Environmental Impact Statement.

7.0 Consultation

As identified by a number of documents, including the *Draft NSW Planning Guidelines: Wind Farms* and the *CSIRO Exploring Community Acceptance of Rural Wind Farms in Australia: a snapshot (2012)*, community consultation is critical part of the planning process for wind farm Projects.

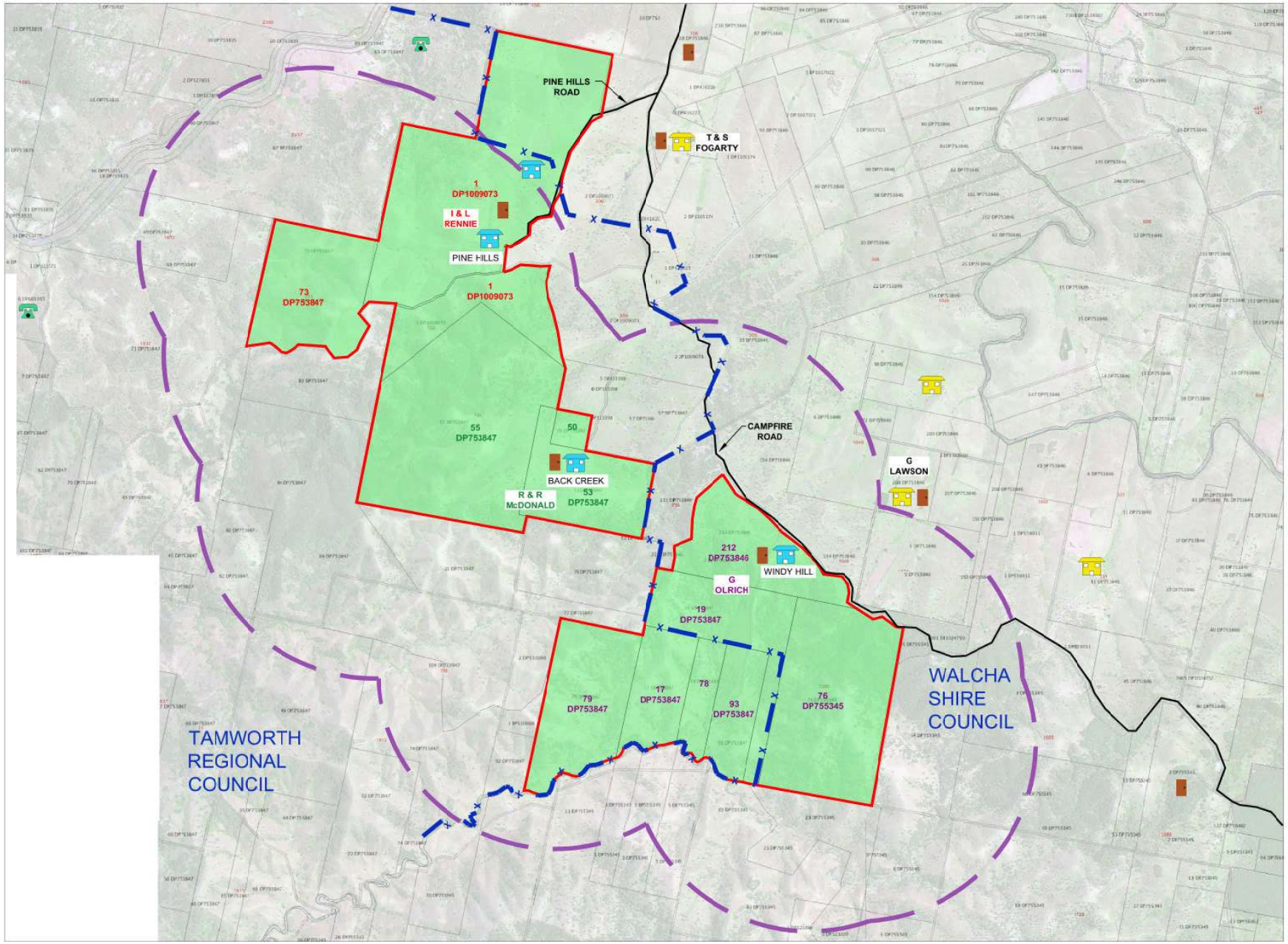
With this in mind, Mitchel Hanlon Consulting and Newtricity have commenced informal consultation with host property landowners, non-host property landholders, Walcha and Tamworth Local Governments and State Agencies.

Mitchel Hanlon Consulting undertook preliminary informal community consultation of the host property landowners and adjoining neighbours to the subject site on the 12 and 13 June 2013. Information packages which included preliminary mapping and Project information were provided to the members of each household visited.

Figure 16 shows those properties contacted during the preliminary informal community consultation.

An Information Flyer was prepared by Mitchel Hanlon Consulting and has been distributed to the host land owners, neighbouring land owners and made available on Mitchel Hanlon Consulting web site www.mitchelhanlonconsulting.com.au. A copy of this information flyer is available in Appendix A.

A Community Consultation Plan is currently being prepared by Mitchel Hanlon Consulting outlining in detail the community consultation process.



LEGEND

- PROPOSED WIND FARM LOCATION
- INDICATIVE LGA BOUNDARY
- INDICATIVE 2km RADIUS FROM TURBINE
- DOOR KNOCK
- PHONE CALLS

NOTE: SEE PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT FOR DETAILS ON CONSULTATION

NOTE:

1. TURBINE LOCATIONS ARE APPROXIMATE ONLY AND MAY SHIFT ALONG RIDGE LINES.
2. LGA BOUNDARY IS APPROXIMATE ONLY.

Newtricity - Woolbrook Wind Farm and Transmission Line

Consultation Plan

FIGURE 16

Mitchel Hanlon Consulting Pty Ltd

Plot Date: 19 November 2013
J:\2013\13059 Newtricity Preliminary Project Assessment Report\ACAD\13059 Wind Turbine and access route footprints.DWG

7.1 Host Land Owner Meetings

The proposed wind farm spans three (3) separate properties. Consultation with the Landowners of the three (3) host properties has been summarised in Table 4 below:-

Table 4: Host land owner meeting summary

Property/Owner	Homestead Location			Comments/Feedback
	Lot	DP	Road	
Door knock undertaken Wednesday 12 June 2013				
"Windy Hill" – Gary Olrich	212	753846	Campfire Road	• Gary is in support of the development and is a local advocate for its benefits as a long term renewable energy source. • Raised a concern regarding proposed turbine locations straddling the boundary of his land and the McDonalds (land which is owned by the McDonalds, but has not been included in Newtricity's landuse agreement). • Gary is realistic about development issues and timeframes and seems to have an understanding of the planning processes involved. • Gary does not live onsite, and works as a stock & station agent.
Door knock undertaken Thursday 13 June 2013				
"Pine View" – Ian and Lorraine Rennie	1	1009073	Pine Hill Road	• Ian and Lorraine seem divided in their attitude towards the development. • Ian, while seeing some negatives, feels that the wind farm would be an additional source of income. • Lorraine is very concerned about their loss of privacy should the access road pass the homestead. • Lorraine is also concerned about the impacts of the turbines on local bird life.

"Back Creek" – Rob and Ruth McDonald (Ruth spoken to only)	53	753847	Campfire Road	• Ruth said that her and Rob are concerned that the development will impact on future landuse options for the site. • Ruth also expressed concerns regarding impacts on amenity and land value. • Ruth feels that the terrain on which the turbines are proposed to be located may not be viable due to access limitations.

7.2 Neighboring Land Owner Meetings

Nine (9) neighbours have been identified that directly adjoin or are likely to be impacted upon by the construction and future operations of the Newtricity Wind Farm on the subject site. A summary of the outcomes of discussions with these neighbours in provided in Table 5.

Table 5: Neighboring land owner meeting summary

Property/Owner	Homestead Location			Comments/Feedback
	Lot	DP	Road	
Door knock undertaken Wednesday 12 June 2013				
"Clovernook" – Gordon Lawson	208	753846	Campfire Road	• Gordon was not contactable by phone. Mitchel Hanlon Consulting visited his home briefly and provided him with details of the Project. • Gordon did not seem overly concerned or overly excited about the Project.
"Lindfield" – Terry and Tanya Payne	28	753846	Campfire Road	• The Paynes were not contactable by phone. Mitchel Hanlon Consulting visited their home briefly and provided him with details of the Project. • Terry and Tanya were both concerned about impacts on amenity and wanted to be provided with details of the turbines being used.
"Tressavale" – Ted and Sheri	2	1009073	Campfire Road	• Sheri was not present for discussion, with all issues being raised by Ted.

Fogarty				• Ted is concerned about impacts on amenity, land value, and dust which may be generated by increased traffic along Campfire Road. • Overall Ted seemed to have a negative attitude towards the Project.
Door knock undertaken Thursday 13 June 2013				
"Glenelg" – Bruce and Margaret Davidson	2	755345	Campfire Road	• Bruce and Margaret seemed confused as to why their land was not included in the preliminary layout plans. • They revealed that Newtricity had investigated their land as a host property some time ago. • Bruce explained that Margaret and he were happy to have the wind farm on their property and that they had not heard from Newtricity in quite some time and had assumed that the Project was not proceeding.
Note: Since meeting with the Davidsons, Newtricity has been in contact with them to discuss the potential of placing a number of wind turbines on their land. At the time of the submission of this PEA, there had been no agreements made with the Davidsons.				
"Blair Athol" Janette Wark	51	755345	Campfire Road	• Janette met with us on behalf of her husband John, Son Andrew and daughter in-law Courtney. • Janette said that they do not have any concerns with the development and that they feel that it too far away to have any impact on their property.

- Note: Lot 51 DP 755345 is not shown on Figure 16 due to the scale of the map

7.3 Land owner information mail outs

Four (4) landowners who have property immediately adjacent to the proposed wind farm site do not permanently reside onsite. Mitchel Hanlon Consulting has contacted all four land owners by phone to discuss the Project and any concerns that they may have had. An

information package was sent to each of these land owners. Discussions with absentee land owners is summarised in Table 6 below.

Table 6: Land owner information mail outs

Property/Owner	Homestead Location			Comments/Feedback
	Lot	DP	Road	
Phone Correspondence from 11 June 2013				
Tony Roberts				• Is onsite very occasionally when doing stock work. • Does not have any issues with the Development. • Was wondering if the development may involve the improvement of his current access road (through Windy Hill).
Darryl Henry				• Darryl is only at his property on weekends. • No real opposition to the development, however his professional experience with transmission line developments has left him doubtful that the proposal will come to fruition.
"The Grange" - Richard Etona	65	753847	Danglemah Road	• Lives at Lake Macquarie. • Did not seem to have any clear opinion on the proposed development.
"Ulindra" - Ian Bithry	6	665055	Danglemah Road	• Lives at Barrington. • Did not seem to have any clear opinion on the proposed development.

7.4 Local Government Consultation

7.4.1 Tamworth Regional Council

A number of informal meetings have been held with Council Senior Officers and Councillors at Tamworth Regional Council.

A formal presentation was made to all Councillors and Senior Officers on 25th June 2013. Appendix B contains a copy of the Power Point presentation given at this meeting.

7.4.2 Walcha Shire Council

A number of informal meetings have been held with Council Senior Officers and Councillors at Walcha Shire Council.

A formal presentation was made to all Councillors and Senior Officers on 26th June 2013. Appendix B contains a copy of the Power Point presentation given at this meeting.

7.5 Meeting with the Environmental Protection Agency

A meeting was held between Mitchel Hanlon and Jocelyn Ullman of Mitchel Hanlon Consulting and Michael Lewis, Regional Operations Officer and Robert O'Hern at the Environmental Protection Agency (EPA), Armidale Office on Monday 17th June 2013.

The purpose of this meeting was to provide an outline of the Project and seek initial feedback on the requirements for the Preliminary Environmental Assessment.

7.6 Meeting with the Department of Planning and Infrastructure

A meeting was held between Mitchel Hanlon and Jocelyn Ullman of Mitchel Hanlon Consulting and officers of the Department of Planning and Infrastructure in Sydney on 19th July 2013.

The purpose of this meeting was to provide an outline of the Project and seek initial feedback on the requirements for the Preliminary Environmental Assessment.

7.7 Other meetings

Mitchel Hanlon, Jocelyn Ullman and Newtricity's representative, Annmaree Laverty met with Scot MacDonald, Member of the Legislative Council in Sydney on 19th June 2013 to provide a background on the Project.

Mitchel Hanlon and Jocelyn Ullman met with Kevin Anderson, Member for Tamworth in Tamworth on 9th July 2013 to provide a background on the Project.

7.8 Proposed Future Consultation

Newtricity and Mitchel Hanlon Consulting Pty are committed to continuing to engage with the Walcha and Tamworth communities and stakeholders on the Project.

In addition to the consultation that has been undertaken to date, the proposed consultation outlined in Table 7 below and in accordance with the *Draft NSW Planning Guidelines: Wind Farms* a Community Consultative Committee will be formed.

The purpose of the Community Consultative Committee is to provide a forum for open discussion between representatives of the proponent, the community, both Walcha and Tamworth Local Governments and other stakeholders on issues directly relating to the assessment, and its environmental performance of the Woolbrook Wind Farm.

The Community Consultative Committee is proposed to comprise of:-

- An independent chairperson;
- Five to seven representatives of the local community and other stakeholders;
- A representative each of Walcha and Tamworth Local Governments; and
- Two representatives of proponent.

The formation of the Community Consultative Committee will occur upon receipt of the DGRs.

A number of consultation tools have and are proposed to be used. These tools are outlined in the Table 7 below:-

Table 7: Future proposed consultation

Consultation Phase	Tool/Method Use	When/Comment
Tell: Informing the community	• Web site www.newtricity.com.au www.mitchelhanlon.com.au • Information Flyer (See	• The web sites are on line • An Information Flyer was distributed as part of the information package in May 2013 Further Flyers are planned as the Project

Consultation Phase	Tool/Method Use	When/Comment
	Appendix A)	progresses.
	• Door knock • Presentation to Tamworth and Walcha Local Government	• A door knock was undertaken 11-12 June 2013. • Presentation to Tamworth and Walcha Local Government where undertaken on 25 & 26 June 2013
Listen: Gaining the community's input	• Telephone calls • On-site meetings with host and neighbouring non-host land owners • Door knock	• A number of telephone calls have already been made as part of the informal consultation process undertaken. • On-site meetings with host and neighbouring non-host land owners was undertaken as part of the door knock.
Discuss: Negotiation and issue resolution	• Proposed "Drop-in" sessions • Roundtable discussions with host and neighbouring non-host land owners • Joint meetings with Walcha and Tamworth Local Governments • Planning Focus Meeting	• Three "Drop-in" sessions are proposed as part of the Wind Farm and Transmission Line proposal. • Roundtable discussions with host land owners • It is envisaged that a Planning Focus Meeting involving key regulatory authorities will be convened by the Department of Planning and Infrastructure to inform the preparation of the DGRs.

The community consultation process for the transmission line will be conducted as a separate consultation process from the Wind Farm. This is as a result of the approval process and the requirements for the design of the transmission line. Also given the distance the transmission line covers and the large number of land owners affected it is envisaged additional/alternative consultation will be required. This may involve:-

- Setting up a 1800 telephone number for Project enquiries and complaints;
- Providing ongoing information on the Newtricity and Mitchel Hanlon Consulting web sites;

- Providing information on the proposed transmission line as part of the 'drop-in' sessions; and

- Meetings on site with individual land owners or in groups may be required to negotiate the final alignment of the transmission line.

An initial Information Flyer was produced by Mitchel Hanlon Consulting at the beginning of the Project. It is anticipated that these flyers will continue to be produced throughout the lifetime of the Project to keep the community and stakeholders up to date. See Appendix A.

A Community Consultation Plan is currently being developed that will guide and manage engagement with the local community and potentially interested and affected stakeholders.

8.0 Conclusion

This Preliminary Environmental Assessment (PEA) has been prepared for the wind farm and transmission line upgrade at Woolbrook, NSW.

We request that the Department of Planning and Infrastructure provide the Director General's Requirements (DGRs) prior to the preparation of Environmental Impact Statement.

As outlined in the Report, the Project has a number of significant benefits and based on the *NSW Wind Farm Greenhouse Gas Savings Tool* the Woolbrook wind farm will:-

- Save 1.3 million tones of greenhouse gas emissions by 2020;
- Generate 251 gigawatt hours (GWh) of electricity annually; and
- Produce enough electricity to power 34,300 homes annually (based on an average NSW household electricity consumption of 7.3 MWh annually).

Through community and stakeholder consultation, addressing environmental and planning requirements, and employing mitigation measures where necessary, the Woolbrook Wind Farm Project aims to have a minimal impact on the environment and community of Woolbrook whilst generating clean, renewable energy.

9.0 References

Auswind *Best Practice Guidelines – For Implementation of Wind Energy Projects in Australia* (December 2006)

Environmental Protection and Assessment Act 1979 (as amended)

Environmental Planning and Assessment Regulations 2000 (as amended)

EPA South Australia, *Wind Farms Environmental Noise Guidelines* (July 2003)

EPA NSW Industrial Noise Policy (2000)

NSW Department of Climate Change and Environment Interim Construction (2009)

Hear the World Foundation web site accessed on the 22 May 2013:-

http://www.hear-the-world.com/en/hearing-and-hearing-loss/noise-how-loud-is-too-loud.html

Niche Environment and Heritage *Biodiversity Working Paper – Constraints*; Woolbrook Windfarm Project (August 2013)

NSW Department of Planning and Infrastructure Planning Circular PS11-019 *Assessment of state significant development and infrastructure* (September 2011)

NSW Department of Planning and Infrastructure Planning Circular PS11-022 *Determination of state significant applications* (September 2011)

NSW Department of Planning and Infrastructure Planning Fact Sheet – *State significant assessment system: an overview* (September 2011)

NSW Department of Planning and Infrastructure Fact Sheet – *About the consolidated assessment process for State significant assessment* (December 2011)

NSW Department of Planning and Infrastructure Fact Sheet – *Appeals against the Minister's determination of applications under the Environmental Planning and Assessment Act 1979* (December 2011)

NSW Department of Planning and Infrastructure Planning Fact Sheet – *What is State significant development and how are applications assessed and determined?* (February 2012)

NSW Department of Environment, Climate Change and Water – *The Wind Energy Fact Sheet* (1 November 201).

NSW Valuer General (2009), Preliminary assessment of the impact of wind farms on surrounding land values in Australia, http:/www.lands.nsw.gov.au

Protection of the Environment Operations Act 1997 (as amended)

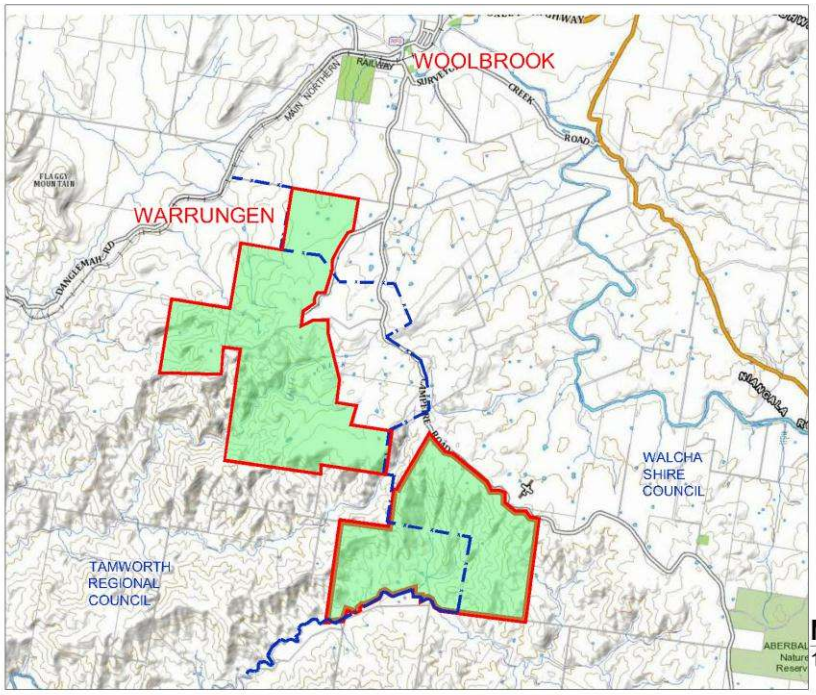
State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (State and Regional Development) 2011

Tamworth Regional Local Environmental Plan 2010

Walcha Local Environmental Plan 2012

Appendix A Information Flyer – May 2013



LEGEND

PROPOSED WIND FARM LOCATION

INDICATIVE LGA BOUNDARY

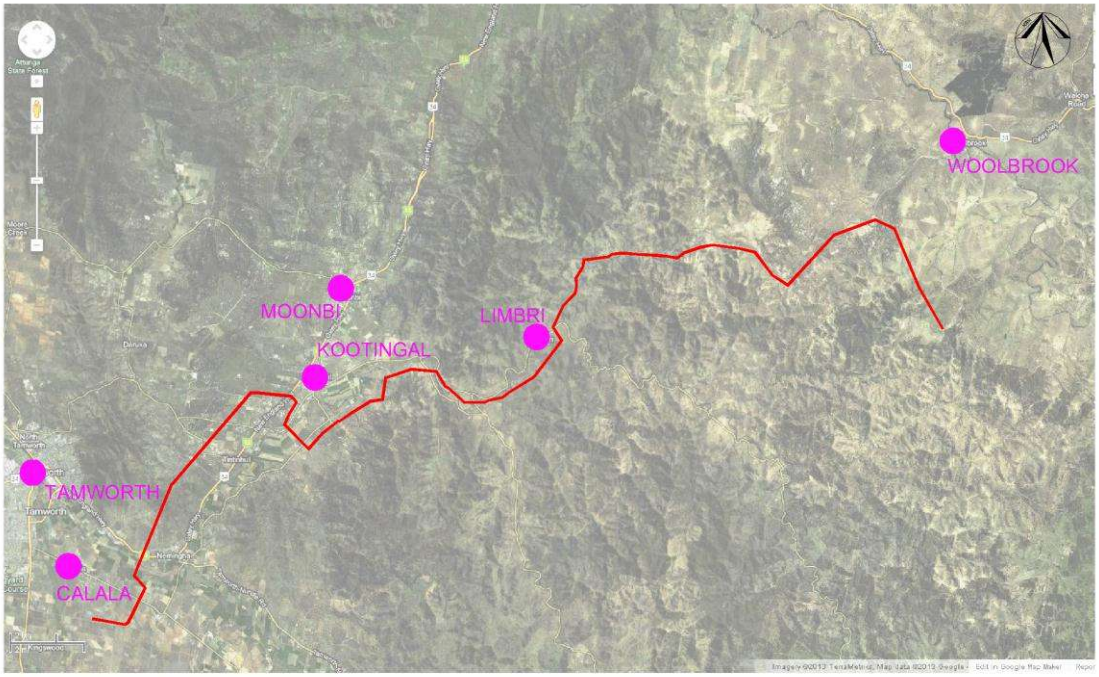
NOTE:

1. LGA BOUNDARY IS APPROXIMATE ONLY.

Mitchel Hanlon Consulting Pty Ltd

Newtricity - Woolbrook Wind Farm and Transmission Line

Locality Plan - Wind Farm



Mitchel Hanlon Consulting Pty Ltd

Newtricity - Woolbrook Wind Farm and Transmission Line

Locality Plan - Transmission Line



NEWTRICITY WIND FARM – WOOLBROOK NSW

PROJECT UPDATE – MAY 2013

Mitchel Hanlon Consulting has been appointed by Newtricity to undertake a preliminary project assessment for a 80MW wind farm at Woolbrook approximately 38km north east of Tamworth, NSW.

THE PROPOSAL

The wind farm will comprise the construction, operation and maintenance of up to 30 wind turbines, a transmission line and associated infrastructure. The wind farm is proposed to be connected to the existing substation at Calala, Tamworth.

Three wind turbine layout options are currently being considered which are made up of a number of differing turbine types. The layouts remain within the three identified host properties.

The proposal will also include:

- Construction of a 22kV/132kV substation onsite;
- Upgrade to approximately 60km of existing 11kV and 66kV transmission line to 132kV;
- Electrical connections between wind turbines and the onsite substation via an underground/overhead 33kV cable network;
- Construction of onsite control buildings and equipment storage facilities
- Temporary concrete batching facilities to provide supply concrete for the turbine footings and substation construction works;
- Construction of access tracks for each turbine and other onsite structures and upgrades to existing roads/tracks as required; and
- Construction of monitoring masts for wind speed verification and monitoring.

THE SPECS

Each turbine will have a height of approximately 130-150m above ground level at the highest blade tip and have an approximate generating capacity of 2.3-4MW. The estimated construction costs for the wind farm is approximately $100 million (exc. GST).

Clarence Consultants Pty Ltd have been engaged to determine preliminary costs for the possible alignment and construction costs of the transmission line. The estimated construction costs for the transmission line is approximately $21.4 million (exc. GST).

For further information please contact:

Mitchel Hanlon Consulting
Email: office@mitchelhanlon.com.au
Phone: 02 6762 4411
Website: www.mitchelhanlon.com.au

Mitchel Hanlon Consulting Pty Ltd

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Appendix B PowerPoint Presentation

Newtricity – Woolbrook Wind Farm and Transmission Line

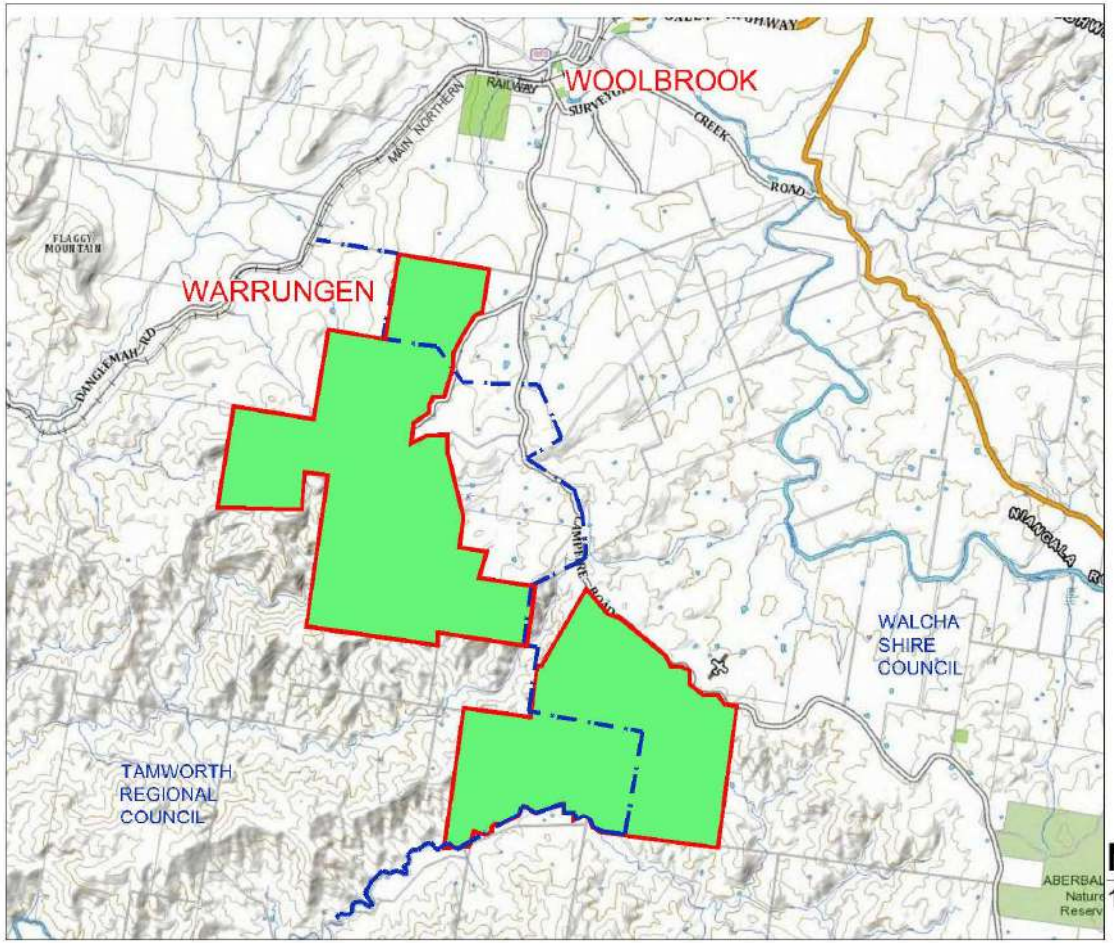
June 2013

Mitchel Hanlon Consulting Pty Ltd

Background

- Newtricity is an Australian owned renewable energy company specialising in wind energy, solar energy and renewable combined heat and power solutions
- Whilst based in Australia, there are also a number of Directors within the company based in Ireland
- Two proposed wind farms in NSW, Biala (near Crookwell) and Woolbrook

Location - Wind Farm



LEGEND

PROPOSED WIND FARM LOCATION

INDICATIVE LGA BOUNDARY

NOTE:

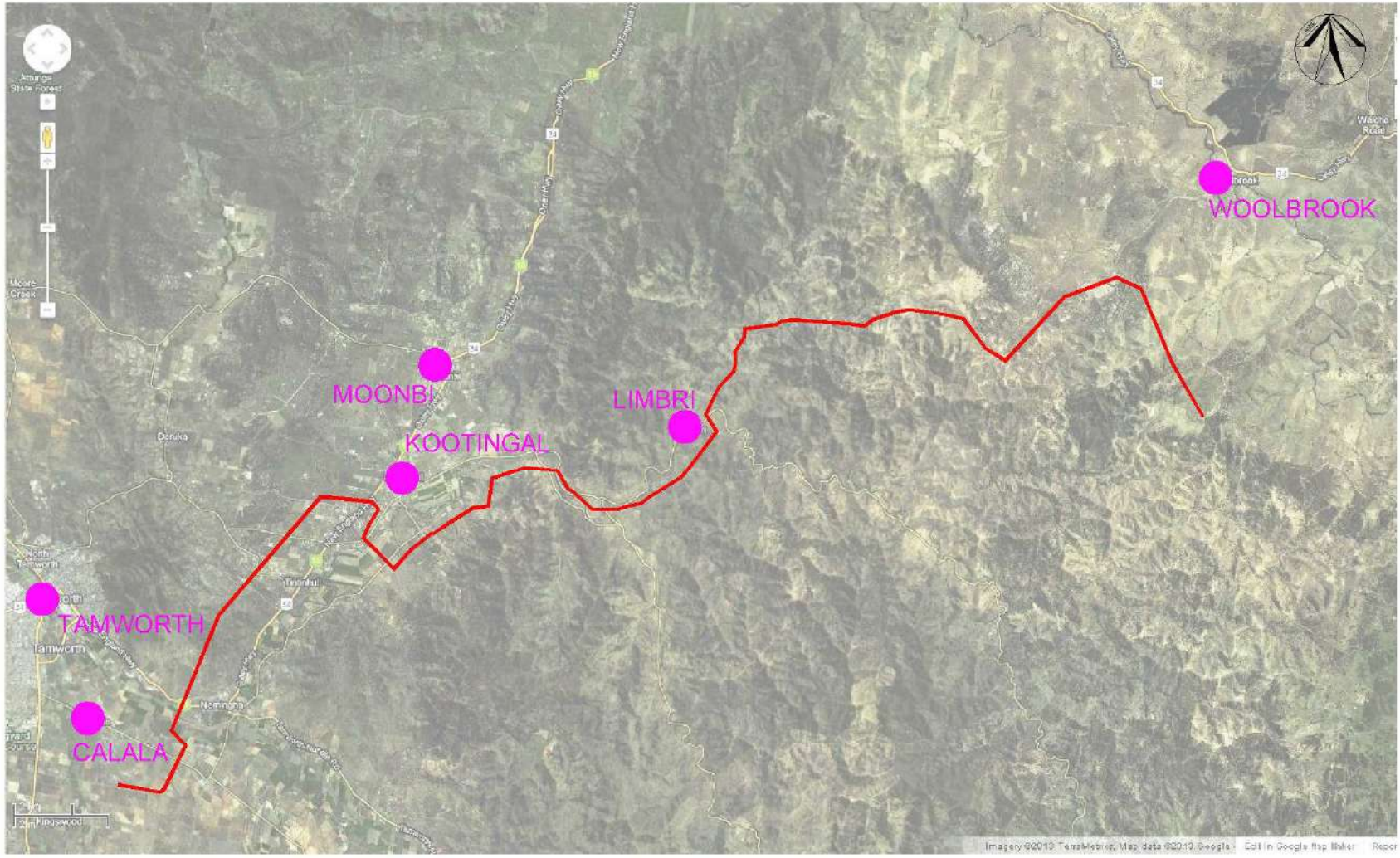
1. LGA BOUNDARY IS APPROXIMATE ONLY.

Mitchel Hanlon Consulting Pty Ltd

Newtricity - Woolbrook Wind Farm and Transmission Line

Locality Plan - Wind Farm

Location - Transmission Line



Mitchel Hanlon Consulting Pty Ltd

Newtricity - Woolbrook Wind Farm and Transmission Line

Locality Plan - Transmission Line

The Proposal

- Up to 30 wind turbines producing 80MW of electricity
- A 22kV/132kV substation onsite
- Upgrade of approx. 60km of existing 11kV & 66kV transmission line to 132kV
- Onsite control buildings and equipment storage facilities
- Temporary concrete batching plant
- Access tracks
- Monitoring masts

The Details

- Turbines
  - 130-150m above ground level at the highest blade tip
  - 55m blades
  - Generating capacity of 2.3-4MW

How a turbine works

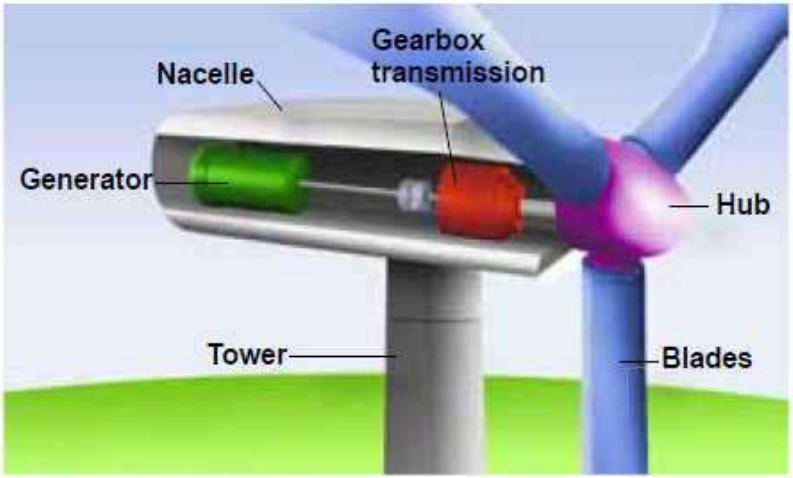
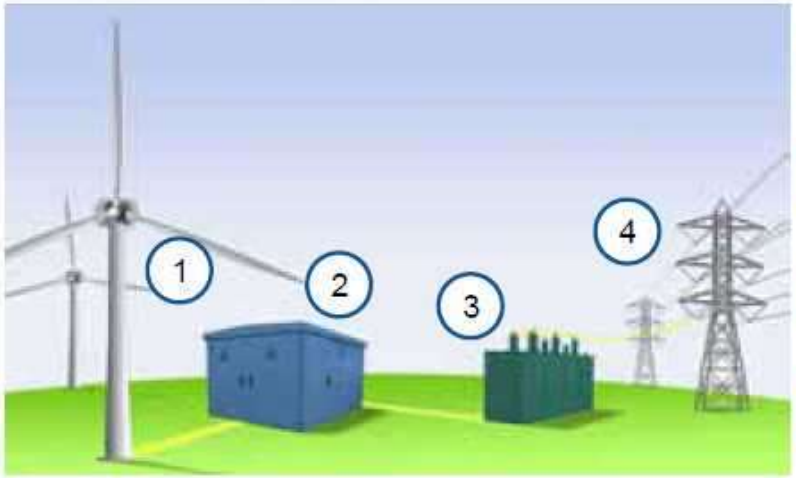


Figure 1 A wind turbine



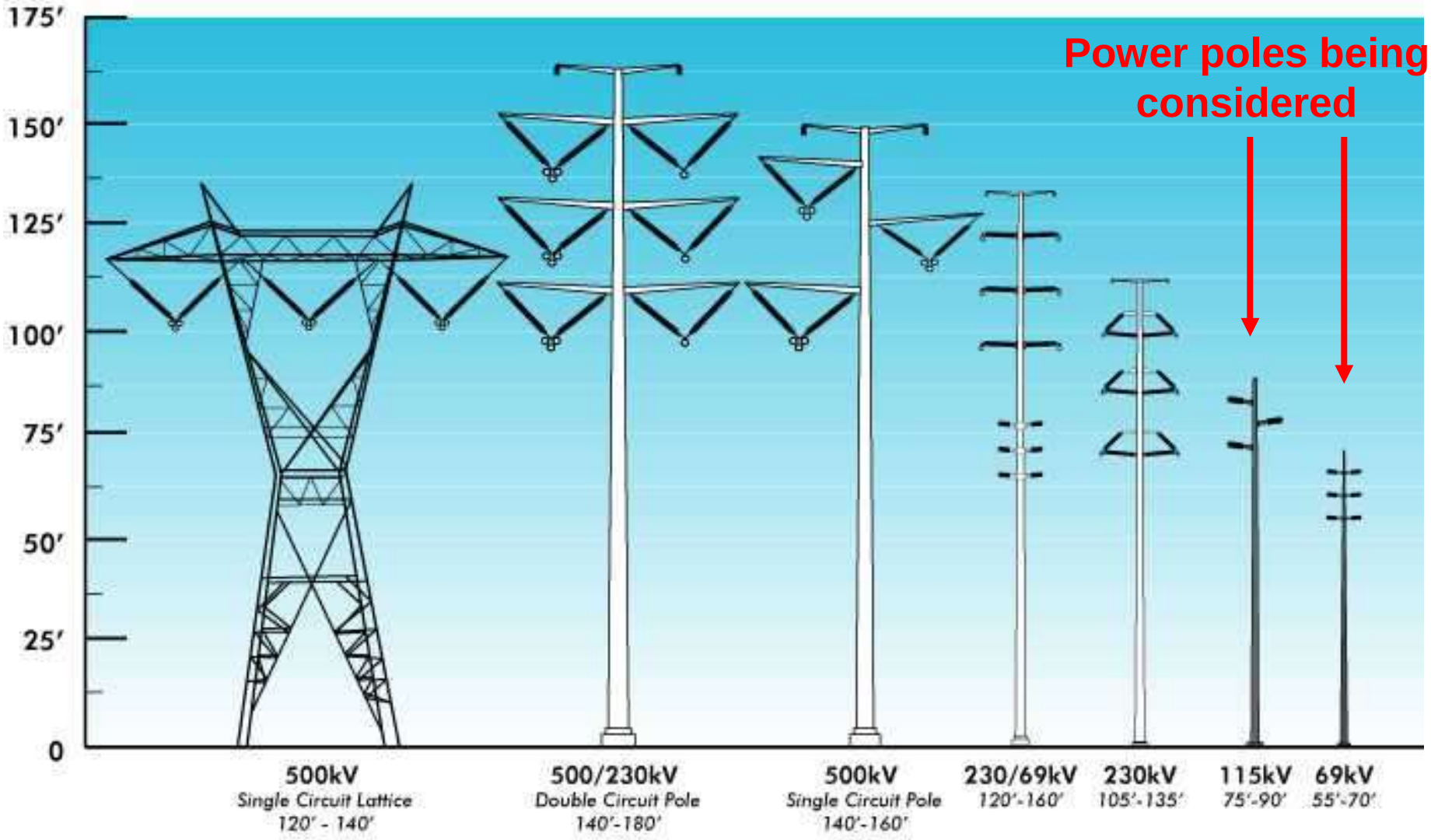
1. Rotating generator converts wind energy to electricity
2. Transformer increases voltage for transmission to substation
3. Substation increases voltage for transmission over long distances
4. Transmission to the grid

Figure 2 How wind turbines transfer power to the electricity grid

The Details

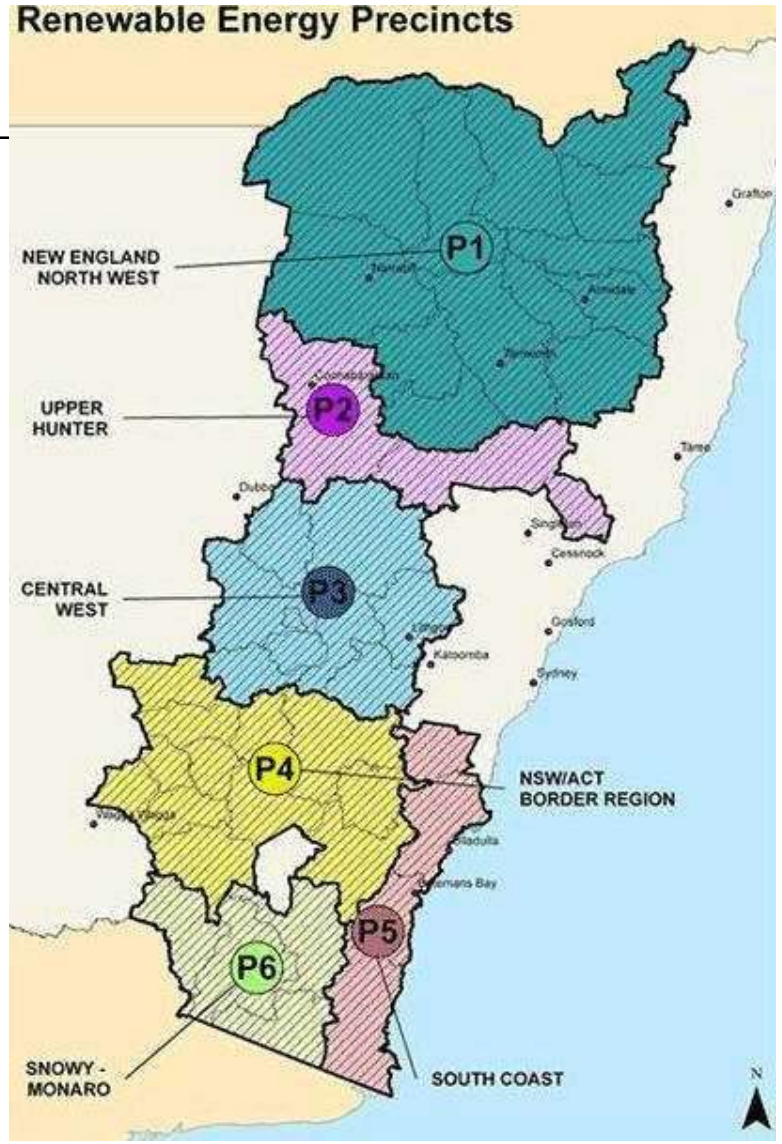
- Transmission line
  - 3 potential routes have been investigated
  - Preferred route is approximately 60km in length
  - Along existing transmission line
- Power poles
  - Steel or concrete poles
  - Typically 21m high

Power poles


175′
150′
125′
100′
75′
50′
25′
0
Power poles being considered
500kV
Single Circuit Lattice
120′ - 140′
500/230kV
Double Circuit Pole
140′-180′
500kV
Single Circuit Pole
140′-160′
230/69kV
120′-160′
230kV
105′-135′
115kV
75′-90′
69kV
55′-70′

Justification, benefits & viability

- Growing demand for renewable energy projects
- Commonwealth renewable energy target 20% to be achieved by 2020



Justification, benefits & viability

- Save 1.3 million tonnes of greenhouse gas emissions by 2020
- Produce enough electricity to power 34,300 homes annually
- 1,704 new jobs
- 598 new permanent ongoing jobs
- 1,107 jobs during construction

Justification, benefits & viability

Technology	Number of Permanent Employees (full-time equivalent) by 2030	
	Lower estimate	Upper estimate
Wind	17	287
Large-scale solar	49	204
Bioenergy*	-	103
Small-scale solar	4	4^
TOTAL	70	598

Notes:
*Includes fuel supply workers
^assumed to be the same as lower estimate

Technology	Peak Construction-Phase Workforce over period 2010-2030	
	Lower estimate	Upper estimate
Wind	147	591
Large-scale solar	130	540
Bioenergy*	-	30
Small-scale solar	50	50^
Solar hot water	50	50^
TOTAL#	170	1,107

Notes:
*Includes fuel supply workers
^assumed to be the same as lower estimate
this is the peak annual workforce for all technologies, not the sum of individual peaks for each technology

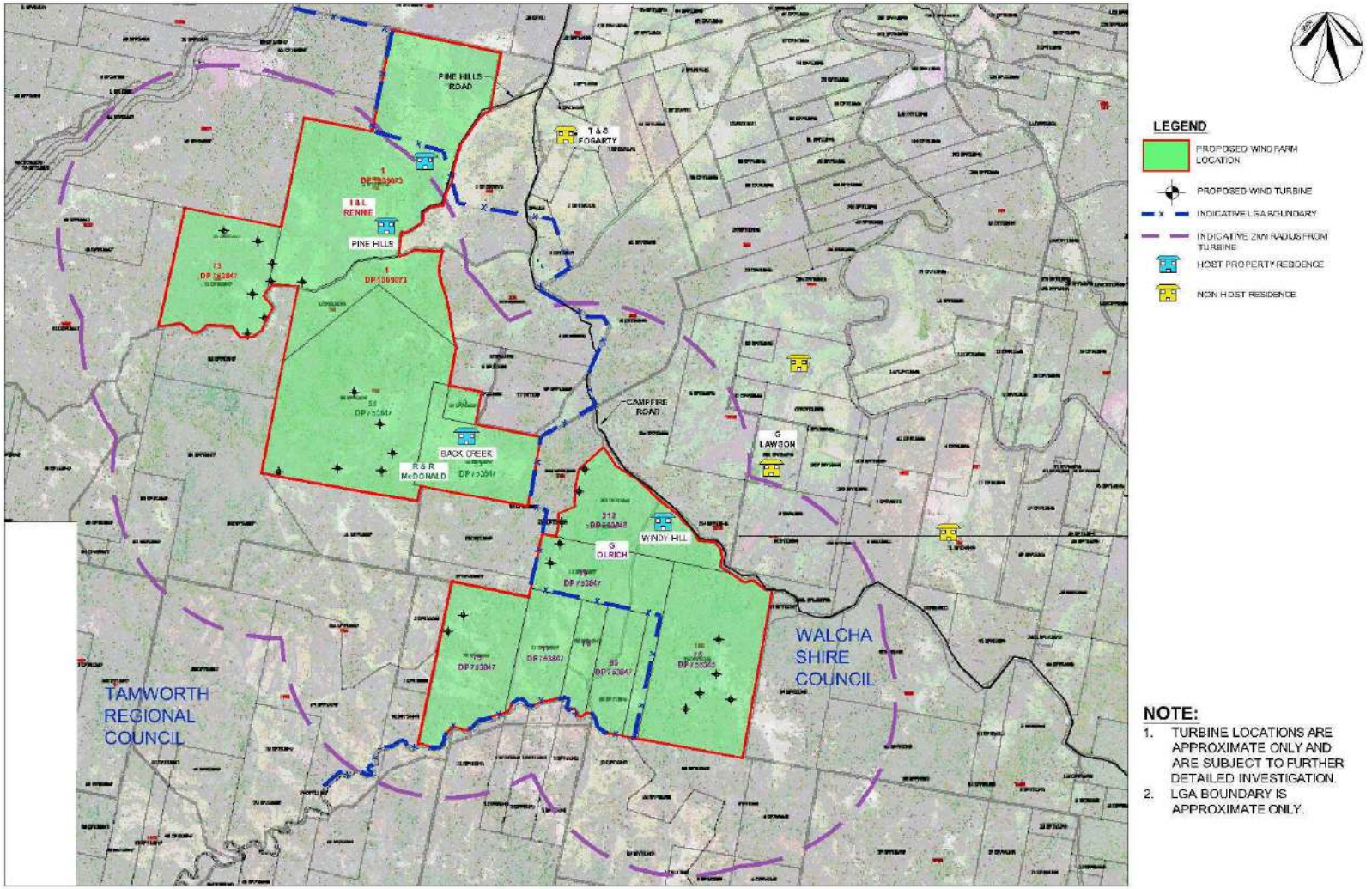
Planning Process

- State Significant Development (SSD)
- Director General Requirements (DGRs) to be sought for preparation of Environmental Impact Statement (EIS)
- Commence preparation of EIS
- Submission of SSD application & EIS with the Department of Planning & Infrastructure
- Public exhibition of SSD application & EIS
- Consideration of submissions
- Determination by the PAC

Community & Stakeholder Consultation

- Consultation undertaken to date
  - Initial meeting with the Department of Environment & Heritages NE Tablelands Renewable Energy Coordinator - Paul Cruikshank
  - Initial meetings with Walcha and Tamworth Council Senior Staff
  - Initial consultation with landowners (host properties)
  - Initial consultation with neighbours
  - Meeting with the EPA
  - Meeting with Department of Planning and Infrastructure
  - Met with Scot MacDonald – Liberal Party

Receptors



Mitchel Hanlon Consulting Pty Ltd

Newtricity - Woolbrook Wind Farm and Transmission Line

Receptor Plan

Community & Stakeholder Consultation

- Future consultation
  - Community information drop-in session
  - Ongoing meetings with Council and Council Senior Staff
  - Planning Focus Meeting
  - Establishment of a Community Consultative Committee
  - Ongoing engagement with host landowners and adjoining neighbours
  - Web page

The Next Steps & Timeframe

Project Stage	Estimated Completion
Submission of Preliminary Environmental Assessment – Request for DGRs	End July 2013
Preparation and submission of Environmental Impact Statement (EIS and Development Application	September 2014
Exhibition of EIS and DA for community and stakeholder comment	December 2014
Review and approval from Department of Planning and Infrastructure	Early 2015
Construction	Completion 12 months from approval (late 2015)
Operation	2016

Appendix C Biodiversity Working Paper – Constraints; Woolbrook Windfarm Project – Prepared by Niche Environment & Heritage (August 2013)

niche
Environment and Heritage

BIODIVERSITY WORKING PAPER – CONSTRAINTS

Woolbrook Windfarm Project

August 2013

DOCUMENT CONTROL

Business unit	Niche Environment and Heritage, /Hunter Office		
Project no.	1595		
Document description	Biodiversity Working paper - Constraints: ,Woolbrook Windfarm Project		
	Name	**Signed**	**Date**
Supervising manager(s)	Frank Lemckert		26/08/2013

Person managing this document	**Person(s) writing this document**
Mark Aitkens	Mark Aitkens

Document revision no.	**Date prepared**	**Reviewed by**	**Date**
Rev0	23/08/2013	Frank Lemckert	26/08/2013

Prepared for:	**Organisation**
Jocelyn Ullman	Mitchel Hanlon Consulting Pty Ltd PO Box 1568 Tamworth NSW 2340

Front cover photograph: Location shot of Woolbrook site

EXECUTIVE SUMMARY

Context

Niche Environment and Heritage Pty Ltd was commissioned by Mitchel Hanlon Consulting Pty Ltd (MHC) on behalf of Newtricity to prepare a biodiversity impact assessment for a proposed Windfarm at Woolbrook, NSW (the Project). In part, this document contributes to this commission by outlining the biodiversity constraints relevant to the Project, hence enabling the submission of a Project application requesting the declaration of State Significant Development and procurement of the Director Generals Requirements (DGRs) for the assessment of the Project.

Aims

This report aims to provide information enabling the characterisation of biodiversity constraints relevant to the Project such as those listed on the NSW *Threatened Species Conservation Act* 1995 (TSC Act) and/or Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

Methods

Biodiversity constraints were identified from available database and literature resources. Constraints analysis was augmented by a site inspection conducted on 23 July 2013.

Constraints

Preliminary investigations show that native vegetation cover and associated fauna habitats exist within the subject site and would be impacted by the Project. Accordingly, it is expected that the Project would have an impact on listed threatened biodiversity or their habitats. Seasonally targeted surveys and impact assessment would be required to determine the level of impact the Project would have on listed threatened species, populations and ecological communities.

Summary

An assessment of the Project's impacts on State listed threatened biodiversity is required and may be conducted in at least two ways, these being:

- ❒ Preparation of Seven Part Tests under Section 5A of the EP&A Act; or
- ❒ Application for a BioBanking Statement under Section 7A of the TSC Act.

It is anticipated that these options would be elucidated in the DGRs for the Project, which may also include the addition of a hybrid option.

Impact assessment for MNES listed under the EPBC Act is also required. This assessment is conducted in accordance with the Significant Impact Guidelines 1.1 (DEWHA 2009). The Project may be eligible for an 'accredited assessment process', which can only be applied for prior to the issuance of the NSW DGRs. Consideration as to the benefits of this assessment approach should be made during the Project application period under Part 4.1 of the EP&A Act.

CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

Niche Environment and Heritage Pty Ltd was commissioned by Mitchel Hanlon Consulting Pty Ltd (MHC) on behalf of Newtricity to prepare a biodiversity impact assessment for a proposed Windfarm at Woolbrook, NSW (the Project).

1.1 The Project

The Project is described as a windfarm comprising at least 26 wind turbines located within the Woolbrook area of the NSW northern tablelands (Figure 1). The total number of wind turbines is yet to be defined and would only be known following the detailed consideration of relevant limiting factors.

The proposed location of wind turbine sites and associated access tracks, otherwise known as the subject site, is shown in Figure 2. Also shown in Figure 2 is an area referred to as the study area. Definitions for 'subject site' and 'study area', as shown in Figure 2, are as follows:

- Subject site - the Project operational area where direct impacts are anticipated; and
- Study area - the area including the subject site and adjacent lands where indirect impacts are anticipated.

1.2 Purpose of this report

In part, this document contributes to an application for the Director Generals Requirements (DGRs) under Part 4.1 (State Significant Development or SSD) of the NSW *Environmental Planning and Assessment Act* 1979 (EP&A Act) by outlining relevant biodiversity constraints and regulatory framework. The DGRs are a necessary regulatory pre-requisite for the preparation of an Environmental Impact Statement (EIS).

1.3 Legislative context

The following regulatory framework applies to the Project when assessing impacts on biodiversity under Part 4.1 of the EP&A Act and the Commonwealth EPBC Act.

1.3.1 State regulatory framework

Approvals sought for this Project under the NSW State regulatory framework would require the consideration of the following:

- *Environmental Planning and Assessment Act* 1979 (EP&A Act);
- *Threatened Species Conservation Act* 1995 (TSC Act); and
- State Environmental Planning Policy 44 – Koala Habitat Protection (SEPP 44).

The relevance of this legislation is outlined as follows:

EP&A Act

Section 5A of the EP&A Act, or 7-part test, lists seven factors that must be taken into account in the determination of the significance of potential impacts of the Proposal on 'threatened species, populations or ecological communities (or their habitats)' listed under the TSC Act. The '7-part test' is used to determine whether the Proposal is 'likely' to result in 'a significant effect' on threatened biota and thus whether a Species Impact Statement (SIS) is required.

However, for developments assessed under Part 4.1 of the EP&A Act, SISs are not triggered by 7-part tests that identify significant impacts on threatened biodiversity. Alternatively, the 7-part test is used in State Significant Development (SSD) to determine whether or not unavoidable impacts are significant hence require the establishment of biodiversity offsets.

Policies that may be relevant and hence require consideration during the preparation of this impact assessment include:

- NSW State Groundwater Dependant Ecosystems Policy 2001 (DLWC 2002);
- NSW Biodiversity Offsets Policy for SSD and SSI (OEH 2011); and
- State Environmental Planning Policy No. 44 – Koala Habitat Protection.

Guidelines to be considered during the preparation of this impact assessment include, but are not limited to:

- Threatened species survey and assessment guidelines: field survey methods (OEH 2012);
- Threatened species survey and assessment guidelines: field survey methods for fauna - Amphibians (DECC, 2009);
- Threatened biodiversity survey and assessment: guidelines for development and activities - Working Draft (NSW Department of Environment and Conservation, 2004) (where not covered by the above two guidelines); and
- NSW BioBanking Assessment Methodology (DECCW 2009).

TSC Act

The TSC Act defines the legal status for biota of conservation significance in NSW.

In addition to threatened biodiversity listings provided for under this Act, the TSC Act also provides for an alternative assessment pathway for development under Part 7A, otherwise known as the NSW BioBanking and Offsets Scheme (BioBanking Scheme). A BioBanking Statement issued in accordance with the BioBanking Scheme may be sought and used as the approval process for the Project. A BioBanking Statement, which would be approved by the Director General of the NSW Office of Environment and Heritage (OEH), would define the offsetting requirements for the Project.

SEPP 44

SEPP 44 aims to encourage the 'proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline'. This

policy allows for the differentiation between potential and core koala habitat on the basis of preferred feed tree species and koala activity.

This policy dictates a requirement for a specific Koala Plan of Management (KPoM) for development sites that are deemed to contain core koala habitat. The Director General of NSW Planning is responsible for approving a site specific KPoM.

1.3.2 Commonwealth legislation

The only Commonwealth Act applicable to the assessment of the Project's impacts on biodiversity is the EPBC Act. The operation of this Act is briefly outlined as follows.

EPBC Act

The purpose of the EPBC Act is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a project, undertaking, development or activity. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (DSEWPaC).

The EPBC Act identifies matters of national environmental significance (MNES) as:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

Significant impacts on MNES involving *listed threatened species and communities* (sections 18 & 18A) would result in the declaration of a controlled action under Section 75 and Section 87 of the EPBC Act.

A controlled action requires the assessment of matters raised by DSEWPaC. Assessment may be undertaken in the following formats:

- Preliminary documentation;
- Public environment report; and
- Accredited assessment process.

The Significant Impact Guidelines 1.1 for the EPBC Act (DEWHA 2009) set out criteria for determining whether an action is subject to controlling provisions listed under the Act. In particular, the Guidelines contain criteria for determining whether a proposed action is likely to have a 'significant impact' on MNES. Should the proponent deem the proposed works likely to have a significant impact on MNES, a referral to the Commonwealth Minister for the Environment would be undertaken to obtain a determination as to whether the proposed development is a 'controlled action' requiring Commonwealth approval.

Guidelines and listing advice to be considered include:

- Survey guidelines for Australia's threatened mammals (DEWHA, 2011);

- Survey guidelines for Australia's threatened birds (DEWHA, 2010);
- Survey guidelines for Australia's threatened bats (DEWHA, 2010)
- Survey guidelines for Australia's threatened reptiles (DEWHA, 2011);
- Survey guidelines for Australia's threatened frogs (DEWHA, 2010);
- Commonwealth listing advice and conservation advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSSC, 2006a);
- EPBC Act policy statement 3.5 - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands (TSSC, 2006b);
- Species list for the EPBC Act policy statement 3.5 - White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands (TSSC, 2006c);
- Commonwealth listing advice on Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions;
- National Recovery Plan for the Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions ecological community; and
- Natural Grasslands on Basalt and Fine Textured Alluvial Plains of Northern NSW and Queensland, and Natural Grasslands of Queensland Central Highlands and the Northern Fitzroy Basin: A guide to the Identification, assessment and management of nationally threatened ecological communities (DSEWPaC, 2012).

Should a controlled action be declared for the Project then consideration is be given to the timing of this declaration relative to the State approvals process. An early Referral and controlled action determination preceding the acquisition of the NSW DGRs for projects assessed under Part 4.1 provides opportunity for 'an accredited assessment process' to be declared. Such a declaration is designed to substantially reduce the duplication of impact assessment.

2 BIOPHYSICAL ENVIRONMENT

2.1 The Region

The region is defined as the Nandewar Bioregion where it occurs within the Namoi CMA. A regional context is presented in Table 1.

Table 1: Regional geographic context

Geographical Feature	Description
Bioregion	Nandewar
Catchment management authority (CMA)	Namoi
CMA subregion	Walcha Plateau Eastern Nandewars
Mitchell Landscape	Niangala Plateau and Slopes
Local government area(s)	Tamworth Regional Council Walcha Shire local government area
Watercourses	Callaghans Creek (part of the Swamp Oak Creek catchment)
Elevation	900-1000 metres
Geology	Granites and various sedimentary formations
Nearby conservation areas	Watsons Creek Nature Reserve (approximately 37 km to the north west) Oxley Wilds National Park (approximately 41 km to the east) Nowendoc (approximately 45 km to the south south east)

2.1.1 Nandawar Bioregion

At mid to high elevations in mountainous terrain, forests of silver-top stringybark (*Eucalyptus laevopinea*), manna gum (*Eucalyptus viminalis*) and mountain gum (*Eucalyptus dalrympleana* subsp. *heptantha*) occur. White box and stringybarks can can have localised localised occurrences and form associations with mugga ironbark (*Eucalyptus sideroxylon*), an important habitat resource for fauna (OEH 2013a).

More than 60 rare or threatened flora species have been recorded from the Nandewar Bioregion. This includes 18 species listed under the TSC Act, nine of which are considered as endangered and nine vulnerable (OEH 2013a).

Four hundred and sixty seven vertebrate species are known to occur in the bioregion. Of these, 134 species, or almost one-third, are considered to be of conservation significance and 51 of these are listed as extinct, endangered or vulnerable in the TSC Act. Protection of the remnant vegetation of the Nandewar Bioregion is critical to the survival of these species (OEH 2013a).

At least two-thirds of the original cover of woody vegetation in the bioregion has been cleared and less than 2 per cent is protected in conservation reserves. Vegetation clearance remains a significant threat to biodiversity across the bioregion (OEH 2013a).

2.1.2 CMA Subregion

The Walcha Plateau is characterised as follows:

"Faulted inliers of Devonian and Carboniferous sandstone, conglomerate, minor limestone, slate, schist, amphibolite and volcanics. Small stock of granodiorite and central peak and ridge top fingers of Tertiary basalt. Eastern and southern margin is the Great Escarpment. High central plateau capped by basalts. General topography undulating with small rugged areas often related to geology. Mellow and harsh texture contrast soils on sediments and granite. Red brown to black structured loams on basalt, thin in places and often stony." (OEH 2013b).

The Eastern Nandewars is characterised as follows:

"Several intrusions of granites each of slightly different composition. Western edge of the tablelands sloping down to merge with the North West Slopes. 500-1100 m. Hilly with broad valleys and rugged granite outcrops with tors. Siliceous sands amongst rock outcrops. Widespread mellow texture contrast soils of relatively low fertility and poor structure, prone to erosion." (OEH 2013b).

2.1.3 Mitchell Landscape

Mitchell (2002) describes the Niangala Mitchell Landscape as follows:

"High rolling plateau on steeply dipping Devonian slate, phyllite, tuff, sandstone, conglomerate, chert and jasper, faulted Permian conglomerate, sandstone and mudstone, Carboniferous sandstone, slate and schist with small areas of Permian granite, general elevation 1050 to 1400m, local relief 100m.

Substrate to the Tia Tops Landscape. Yellow and brown texture-contrast soils with deeper loam on alluvium. Woodland of snow gum (*Eucalyptus pauciflora*) and black sallee (*Eucalyptus stellulata*) on western ridges, with manna gum (*Eucalyptus viminalis*) and mountain gum (*Eucalyptus dalrympleana*) on midslopes and New England peppermint (*Eucalyptus cinerea*) in the valleys on cold sites.

Open forest of; broad-leaved stringybark (*Eucalyptus caliginosa*), yellow box (*Eucalyptus melliodora*), narrow-leaved peppermint (*Eucalyptus radiata*), and narrow-leaved black peppermint (*Eucalyptus nicholii*) on better soils. Tall open forest of; New England blackbutt (*Eucalyptus andrerwsii* ssp. *campanulata*), silver-top stringybark (*Eucalyptus laevopinea*), diehard stringybark (*Eucalyptus cameronii*), narrow-leaved peppermint, on moist margins of the plateau and grey box (*Eucalyptus molucanna*), yellow box (*Eucalyptus melliodora*), Youman's stringybark (*Eucalyptus youmanii*) on dry margins. Silvertop stringybark and lightwood (*Acacia implexa*) with white box (*Eucalyptus albens*) on northern slopes."

2.2 Existing land use

The existing land use observed within the study area is agriculture (i.e. grazing). The study area is bounded by open grazing land with scattered light timber cover in all directions (Figure 2). Larger uncleared remnant native vegetation occurs in a fragmented pattern along an east west trending escarpment of about 1000 m elevation.

2.3 Vegetation

2.3.1 Regional cover

Remaining native vegetation cover for the region is 1,905,183 hectares or 45 per cent of the pre-1750 extant native vegetation cover (Namoi CMA, 2011). This estimate is less than the 50% threshold used to define 'high' vegetation cover (DEC, 2009). Native vegetation cover in the Niangala Mitchell Landscape is estimated to be 25 per cent of the pre-European cover, which is regarded as an overcleared landscape (i.e. >70 per cent cleared).

2.3.2 The study area

Woodlands and open eucalypt woodlands dominated by a variety of overstorey canopy species occur in the study area. New England Blackbutt (*Eucalyptus andrewsii*) forests are apparent at windy ridge south with sparse midstorey and groundcover structure.

Plate 1: New England Blackbutt forests of windy hill south

White Box (*Eucalyptus albens*) and Red Stringybark (*Eucalyptus macrorhynca*) shrubby forests occur as remnant vegetation on the steeper slopes as do woodlands comprising Yellow Box (*Eucalyptus melliodora*), Orange Gum (*Eucalyptus prava*) and White Box. Patches of Mugga Ironbark (*Eucalyptus sideroxylon*) have also been observed.

Plate 2: Mugga Ironbark forests of windy hill south

Scattered open shrublands on steeper slopes comprising Rough-barked Apple (*Angophora floribunda*) and other previously mentioned canopy species occur in the predominantly treeless parts of the study area.

Plate 3: Native vegetation on steep slopes

Grassland on more arable lands comprise scattered trees including Rough-barked Apple, Kurrajong (*Brachychiton populnea*) and a red gum that is likely to be Blakely's Redgum (*Eucalyptus blakelyi*). Planted rows of New England Peppermint (*Eucalyptus nova-anglica*) were observed where wind breaks have been established.

Plate 4: Planted windrows comprising species such as New England Peppermint

2.4 Preliminary fauna observations

Recent winter bird surveys and general observations have resulted in the detection of fauna expected to occur within partially fragmented remnant woodland of overcleared landscapes. Forested areas appear to have low avifauna abundance, potentially due to the absence of a midstorey and heavy grazed groundcover stratum. Notwithstanding, threatened species including the Varied Sittella and Scarlet Robin were observed within the study area.

The forests also appear to be locally important for the Ringtail Possum, despite the absence of structurally diverse vegetation. No possum dreys were observed and it is speculated that tree hollows are instead being used by this species. The presence of high Ringtail Possum numbers raises the possibility of Powerful Owl occurrence within the study area, although recent survey results have failed to detect this species.

The New England Blackbutt dominated vegetation has been identified as potential Koala habitat due to this tree species being a known feed tree. A single Koala was observed during opportunistic surveys, with no further observations made during spotlighting surveys. Further investigations are required to determine the importance of local vegetation for the Koala.

3 THREATENED BIODIVERSITY

3.1 TSC Act

Listed in Table 3 are the threatened species and ecological communities that are likely to be considered relevant to the Project. Figure 3 and Figure 4 shows the location of threatened flora and fauna species previously recorded within 20 km of the study area.

Table 2: State listed threatened species, populations and ecological communities

Threatened Biodiversity	Status
Threatened Ecological Communities (TECs)	
New England Peppermint Grassy Woodlands	CEEC
Weeping Myall Woodlands	EEC
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	EEC
Threatened Flora	
Barrington Tops Ant Orchid (*Chiloglottis platyptera*)	V
Dichanthium setosum	V
Diuris pedunculata	E
Eucalyptus nicholii	V
Eucalyptus rubida subsp barbigerorum	E
Euphrasia arguta	CE
Granite Homoranthus (*Homoranthus prolixus*)	V
McKie's Stringybark (*Eucalyptus mckieana*)	V
Native Milkwort (*Polygala linariifolia*)	V
Velvet Wattle (*Acacia pubifolia*)	V
Threatened fauna	
Border Thick-tailed Gecko (*Uvidicolus sphyrurus*)	V
Booroolong Frog (*Litoria booroolongensis*)	E
Koala (*Phascolarctos cinereus*)	V
Greater Long-eared Bat (*Nyctophilus corbeni*)	V
Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)	V
Eastern Cave Bat (*Vespedelus troughtonii*)	V
Large-eared Pied Bat (*Chalinobilis dwyeri*)	V
Spotted-tail Quoll (*Dasyurus maculata*)	E
Regent Honeyeater (*Anthochaera phrygia*)	CE
Swift Parrot (*Lathamus discolor*)	E

CEEC = Critically Endangered Ecological Community
EEC = Endangered Ecological Community
CE = Critically Endangered
E = Endangered
V = Vulnerable

3.2 EPBC Act

Listed in Table 3 are the threatened species and ecological communities that are likely to be considered relevant to the Project. A more complete listing of species identified by the EPBC Act Protected Matters Search is provided in Appendix 1.

Table 3: Relevant MNES

MNES Listing	Status
Threatened Ecological Communities (TECs)	
New England Peppermint Grassy Woodlands	CEEC
Weeping Myall Woodlands	EEC
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CEEC
Threatened Flora	
Dichanthium setosum	V
Diuris pedunculata	E
Eucalyptus nicholii	V
Eucalyptus rubida subsp barbigerorum	E
Euphrasia arguta	CE
Threatened fauna	
Border Thick-tailed Gecko (*Uvidicolus sphyrurus*)	V
Booroolong Frog (*Litoria booroolongensis*)	E
Koala (*Phascolarctos cinereus*)	V
Greater Long-eared Bat (*Nyctophilus corbeni*)	V
Large-eared Pied Bat (*Chalinobilis dwyeri*)	V
Spotted-tail Quoll (*Dasyurus maculata*)	E
Regent Honeyeater (*Anthochaera phrygia*)	CE
Swift Parrot (*Lathamus discolor*)	E

CEEC = Critically Endangered Ecological Community
EEC = Endangered Ecological Community
CE = Critically Endangered
E = Endangered
V = Vulnerable

3.3 Project constraints

Preliminary site inspections and winter bird surveys indicate the potential for threatened flora and fauna occurrences within the subject site and study area. At least three threatened fauna species have already been confirmed within the study area these being:

- Koala;
- Varied Sittella; and
- Scarlet Robin.

Habitat for migratory threatened fauna such as the Regent Honeyeater and Swift Parrot is also apparent within the subject site. Winter and spring flowering eucalypts such as Yellow Box, White Box, Mugga Ironbark and Orange Gum represent potential feed resources for the

Regent Honeyeater during its breeding season and Swift Parrot during its mainland non-breeding migratory activity. The importance of these resources would be investigated through the winter and spring survey period.

The vegetation also has the potential to provide foraging resources for threatened cave roosting bat species such as the Eastern Cave Bat and Large-eared Pied Bat. In addition, tree hollows may provide suitable roost sites for a third threatened bat species known as the Eastern False Pipistrelle. Windfarms have been reported to have detrimental impacts on microchiropteran bat species and as such the importance of local habitat resources would need to be evaluated as part of the Project impact assessment.

Early indications are that none of the woody vegetation is consistent with a listed threatened ecological community, although further detailed floristic surveys are required to validate this preliminary observation. Notwithstanding, there is potential for grasslands the derived from threatened grassy woodland communities to occur within the subject site. The consideration of relevant listing advice and identification guidelines in combination with data from detailed spring survey would provide further insight as to the presence of modified threatened ecological community occurrences.

4 INVESTIGATION APPROACH

Assessing the Project's impacts on threatened biodiversity is expected to be undertaken with reference to the following investigation approach.

4.1 Database and literature review

The following data review would be undertaken:

- 20 km threatened species search of the Atlas of NSW Wildlife for records of threatened species listed under the TSC and EPBC Act;
- 20 km search of the EPBC Act Protected Matters Search Tool for MNES;
- 10 km search of the BirdLife Australia Atlas for threatened bird species;
- Review of previously completed flora and fauna surveys, including their methods and results. The results of previously completed flora and fauna surveys would be summarised in a table that would include methods employed and fauna detected; and
- Review of available vegetation mapping, to determine the extent of native vegetation cover, habitat types to assist with the establishment of a field survey program that is representative of all affected vegetation types.

4.2 Study Area definition

The study area, as indicated in Figure 2, is conceptual at this early stage of the Project and may alter following the receipt of detailed site and Project information. Niche, in consultation with Newtricity, would further define the study area prior to the completion of vegetation mapping and design/implementation of systematic spring field surveys. The study area would comprise areas that are likely to experience direct impact (i.e. subject site) and indirect impacts. Prospective offset areas and/or locations for baseline analogue monitoring plots would also be discussed and delineated, if possible, thereby allowing for the completion of appropriate investigations for these areas.

4.3 Field survey design

Preliminary desktop vegetation mapping using available digital imagery, regional vegetation mapping and digital terrain models (if available) would be completed to determine survey stratification units, survey locations and effort. Flora survey effort would be determined in accordance with the NSW BioBanking Assessment Methodology (BBAM) (DECC, 2009), which defines the method for determining stratification units (i.e. vegetation type and estimated condition) and corresponding survey effort required (i.e. number of plots per stratification unit area). Fauna survey effort would be similarly determined although survey stratification and would be defined at the vegetation class scale.

4.4 BioBanking plots

4.4.1 BioMetric

BioMetric plots measuring 1,000 m2 (i.e. 20 x 50 metres) were used to sample vegetation structure and habitat in accordance with the method described by Gibbons et al (2009). The BioMetric plot provides an objective standardised approach to the characterisation of bio-condition and is a method compatible with the BBAM. Bio-condition is assessed by comparing measured site attribute scores (see below) against published 'vegetation benchmarks' for each vegetation type:

- Native plant species richness (NPS);
- Native overstorey cover (NOC);
- Native mid-storey cover (NMS);
- Native groundcover stratum grasses (NGSG);
- Native groundcover stratum shrubs (NGSS);
- Native groundcover other (NGSO);
- Exotic plant cover (EPC);
- Number of trees with hollows (NTH);
- Overstorey regeneration (OR); and
- Total length of fallen logs (FL).

Vegetation benchmarks are quantitative measures of the expected variability in vegetation condition that occurred prior to habitat modification by humans after European settlement (post 1750).

4.4.2 Stand structure

A 50 m transect would be established at each BioBanking plot. The overstorey would be sampled within ten metres on each side of the transect, providing an overall sampling area of 0.1 ha per site. Tree species, average DBH, basal area (BA) and stem density for trees larger than 15 cm DBH would be calculated to the nearest centimetre with a fibreglass tape measure along all transects. The density of trees smaller than 15cm DBH would be tallied. The density per hectare of hollows and HBTs would be calculated by examining all sides of every tree with binoculars. Observed cavities of depth >2 cm are scored as hollows. Hollows would be categorised into the following classes; small (<5cm), medium (5-10cm), large (10-20cm) and very large (>20cm), based on the possible species likely to utilise each type of hollow.

4.5 Flora surveys

4.5.1 Full floristics

Full floristic data would be collected from each plot to update/validate the vegetation map and to provide sufficient information for detailed floristic descriptions of mapped vegetation units. Detailed floristic analysis would involve the use of multivariate statistical analysis techniques, which requires no extra time and adds a significant level of rigour to the survey.

4.5.2 Rapid data plots

Rapid Data Points (RDP) would also be collected to compliment the BioBanking plot data. This would ensure the data collected is sufficient to enable accurate mapping of vegetation types/zones and management zones.

4.5.3 Threatened species

Threatened flora surveys would be undertaken in conjunction with the BioBanking plots where appropriate survey timing overlaps. A scientifically rigorous method would be utilised for this survey in line with the relevant guidelines. However, should threatened flora survey timing requirements not coincide with the BioBanking plot data collection period, then additional threatened flora surveys would be required.

4.5.4 Data collation and analysis

Data collation and analysis would include:

- ❒ Collation of BioBanking plot and transect data;
- ❒ Floristic data analysis;
- ❒ Analysis of threatened flora counts and/or estimates;
- ❒ Collation of flora and fauna species lists;
- ❒ Management of GPS data collected in the field (waypoints and tracks); and
- ❒ Mapping and characterisation of indirect impact areas.

4.6 Fauna surveys

Two separate fauna surveys are proposed including:

- ❒ Winter bird survey to specifically target the Regent Honeyeater and Swift Parrot. An examination of available fauna habitat would also be undertaken. Habitat analysis for threatened fauna would be conducted to guide the timing of the spring fauna survey and required effort; and
- ❒ Systematic spring fauna surveys to target fauna such as microchiropteran bats, birds, reptiles and frogs.

Fauna surveys would be conducted with reference to the draft *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004) and other relevant State and Commonwealth threatened fauna survey guidelines.

4.7 Reporting and mapping

Reporting for the project would initially include a Biodiversity Inventory report (interim) comprising a description of the local setting and any identified constraints. This would be upgraded to a flora and fauna impact assessment report to assess the Project impacts against the relevant regulatory framework. This assessment would include a summary of the findings of the field surveys, including maps showing vegetation, the location of any recorded threatened species and the location of each survey site. A likelihood of occurrence table for species identified from NSW Atlas of Wildlife and SEWPAC Protected Matters Search Tool would be included.

The report would provide analysis of the Projects impacts for the infrastructure and tracks (i.e. direct impacts) and any associated indirect impacts. Impact footprints would be defined and assessed in accordance with the relevant guidelines. The consideration of future monitoring requirements would also be investigated.

The consideration of SEPP 44 Koala habitat protection and NSW Groundwater Dependant Ecosystems Policy 2001 would be provided in the assessment report. An assessment would also be prepared in accordance with V1.1 Significant Impact Guidelines – matters of national environment significance for relevant matters listed under the EPBC Act.

Reporting of the flora and fauna survey and assessment will include:

- description of the methodology;
- flora species list for each community present in the study area;
- classification of the vegetation communities (structural and floristic) and estimates of vegetation clearing;
- an assessment of the condition of the vegetation communities and fauna habitats present;
- fauna habitat descriptions (qualitative);
- survey effort, dates, weather conditions;
- records for threatened species and a list of those with the potential to occur and discussion of other significant species;
- Detailed assessment of potential impacts to threatened species, their habitats, populations and ecological communities;
- limitations;
- State (TSC Act) and Federal (EPBC Act) significance assessments;
- ameliorative measures; and
- BioBanking/ biodiversity offset calculations (if required).

5 IMPACT ANALYSIS

5.1 Avoid, mitigate and offset

The principles *avoid, mitigate and offset* would be applied in this hierarchical order during the preparation of the impact assessment. Impact avoidance is the primary consideration in the impact assessment where design solutions are investigated first to minimise impacts on biodiversity.

Unavoidable impacts are those that the Project cannot avoid. These include direct (e.g. land clearing), indirect and facilitated impacts (i.e. related activates that do not form part of the Project). Examples of indirect impacts are as follows, with some being listed as key threatening processes:

- Edge effects;
- Predation by the European red fox;
- Predation by the feral cat; and
- Dieback caused by root rot Phytopthora fungus.

Requirements for biodiversity offsetting, if deemed necessary, would be investigated if it is concluded that the Project would have a significant residual impact on threatened species and/or ecological communities.

5.2 Monitoring

The consideration of a monitoring program based on a 'Before After Control Impact' (BACI) design would be evaluate in the impact assessment report. BACI is a rigorous audit style process that establishes quantifiable links between predicted impacts and actual outcomes.

Such a monitoring program has the potential to examine the affect of the Project, including direct and indirect impacts, and the efficacy of mitigation. This monitoring would provide information necessary for identifying the need for adaptive management actions designed to remedy unforeseen or unexpected negative Project impacts. The main benefits of this monitoring approach include:

- The timely identification of unexpected environmental impacts (i.e. positive and negative);
- Increased temporal and spatial sensitivity enabling a more targeted and measured response to key environmental issues as they emerge; and
- Quantitative analysis of cause and affect, with the resultant scientific knowledge potentially leading to improved environmental stewardship.

The four principal elements of a BACI are:

- Before data - site data collected prior to development;
- After data - data is collected over areas where management works have occurred but are no longer reoccurring. The purpose of this data is to measure the extent of change (positive or negative) and hence guide on-going actions and activities;

- Control data - control sites are to be established within areas that are stable (e.g. conservations reserves), are not influenced by the Project and have habitat values with biodiversity values. Such data could be collected from conservation areas within nearby State Forest or conservations reserves; and
- Impact data - this is data collected for areas subject to the effects of management. The purpose of this data is to examine the effects of management works while they are occurring against before and control plots. Such data is used to reduce, increase or cease management works.

BACI Monitoring Program and the Project

A BACI monitoring program developed for the Project would provide a clear scientifically objective analytical framework for demonstrating the achievement of the mitigation measures. The proposed monitoring program would focus primarily on measuring:

- Changes, if any, in avifauna presence and abundance;
- Changes, if any, in bat presence and abundance; and
- The success or otherwise of proposed mitigation methods.

Documentation outlining the monitoring methodology would include:

- The term of the monitoring period;
- The variables required to be measured for the evaluation of management actions and Project impacts;
- The methods and protocols for collecting this data;
- The collection of baseline and control datasets;
- The analysis techniques used to detect change; and
- The identification of 'trigger' levels prompting a management response.

Details of the monitoring program would be provided as part of a NSW agency approved management plan for the Project (i.e. flora and fauna management plan and/or environmental management plan).

6 SUMMARY

The Project is classified as an SSD and as such is subject to the regulatory framework defined by Part 4.1 of the EP&A Act. The assessment of biodiversity impacts is required and may be conducted in at least two ways, these being:

- Preparation of Seven Part Tests under Section 5A of the EP&A Act; or
- Application for a BioBanking Statement under Section 7A of the TSC Act.

It is anticipated that these options would be elucidated in the DGRs for the Project, which may also include the addition of a hybrid option comprising both of the above listed assessment options.

Impact assessment for MNES listed under the EPBC Act is also required. This assessment is conducted in accordance with the Significant Impact Guidelines 1.1 (DEWHA 2009). The Project may be eligible for an 'accredited assessment process', which can only be applied for prior to the issuance of the NSW DGRs. Consideration as to the benefits of this assessment approach should be made during the Project application period under Part 4.1 of the EP&A Act.

Impact assessments prepared for State and Commonwealth listed threatened biodiversity would be based on information sourced from relevant databases, literature and site investigations. Site investigations would be conducted in a suitable manner so as to appropriately assess identified relevant threatened species, populations, ecological communities and their habitats. This would include the use of seasonally adjusted surveys.

REFERENCES

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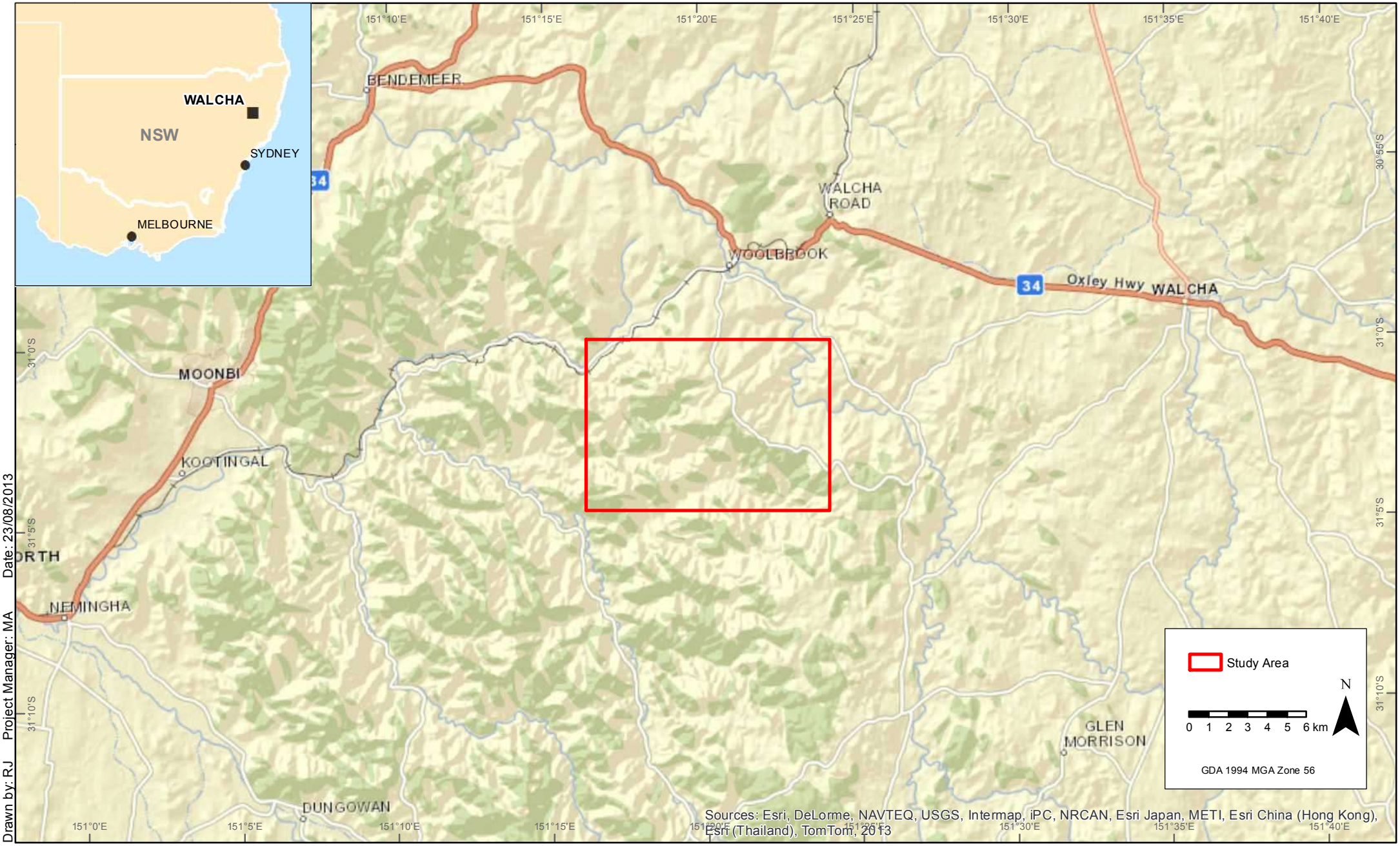
FIGURES



Date: 23/08/2013
Project Manager: MA
Drawn by: RJ

Regional Project Location
Woolbrook Wind Farm

FIGURE 1

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GDA 1994 MGA Zone 56

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Figure 2: Subject site and study area

Date: 23/08/2013

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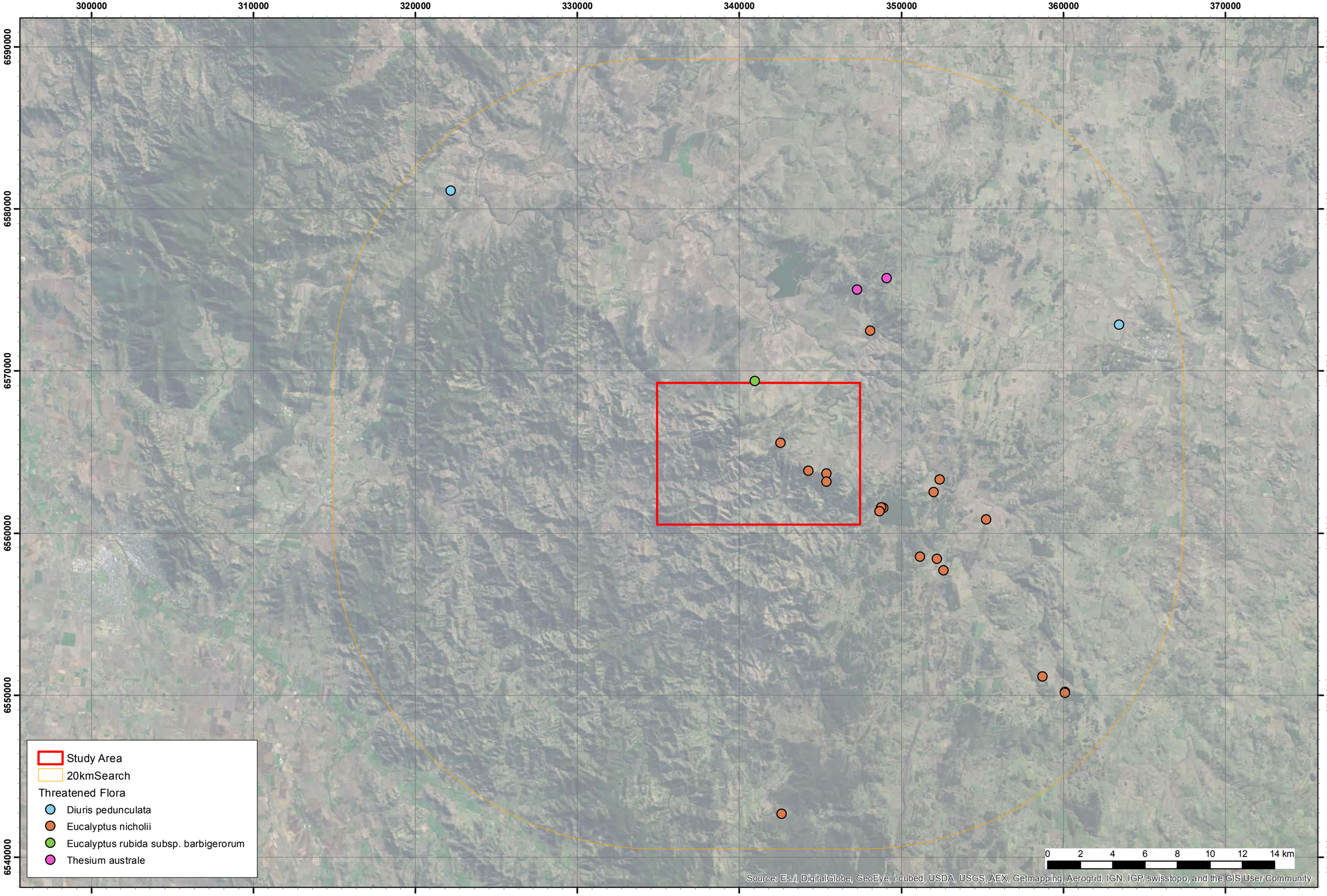

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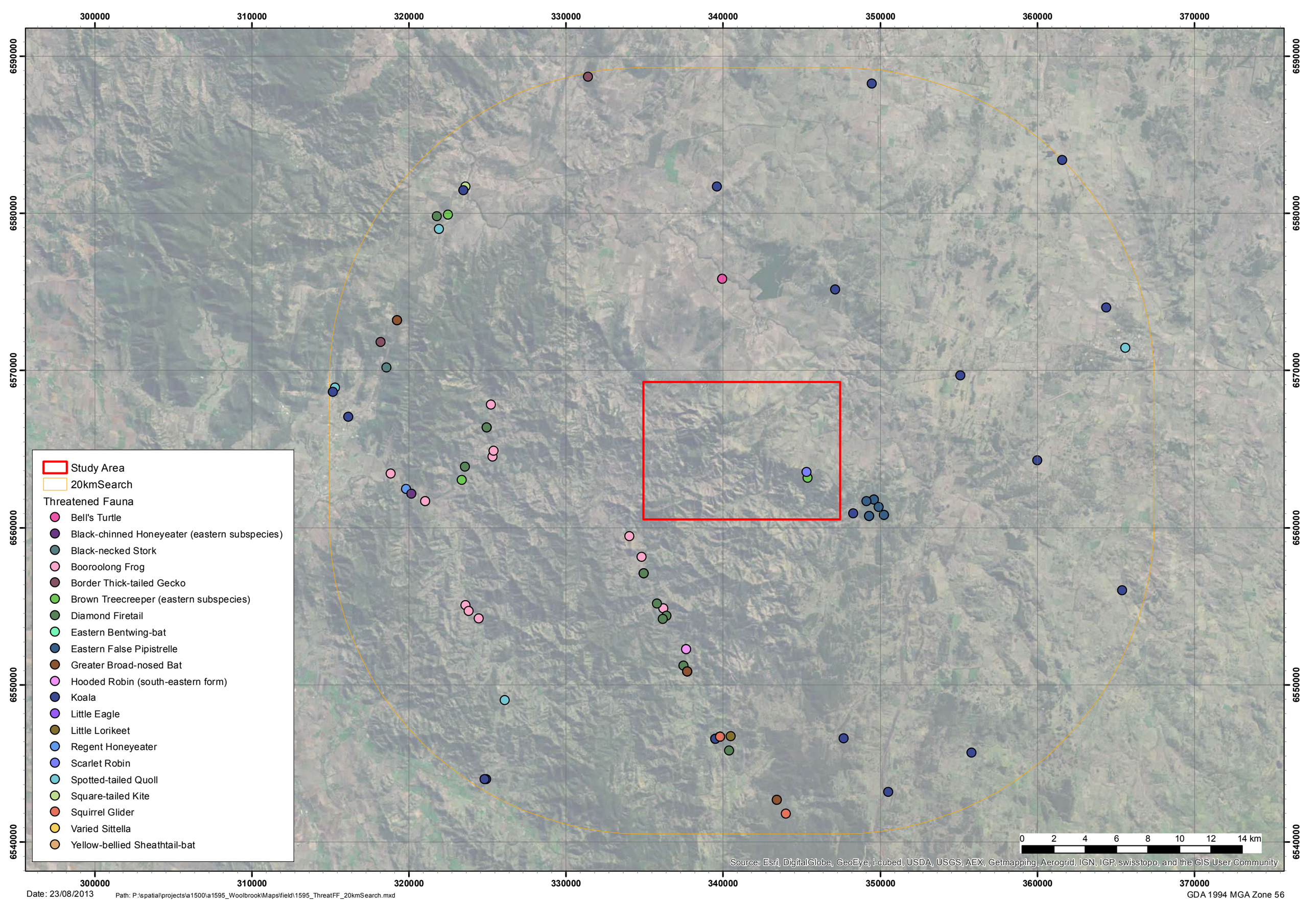
GDA 1994 MGA Zone 56



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APPENDICES

Appendix 1: EPBC Act Protected Matters Search

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

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

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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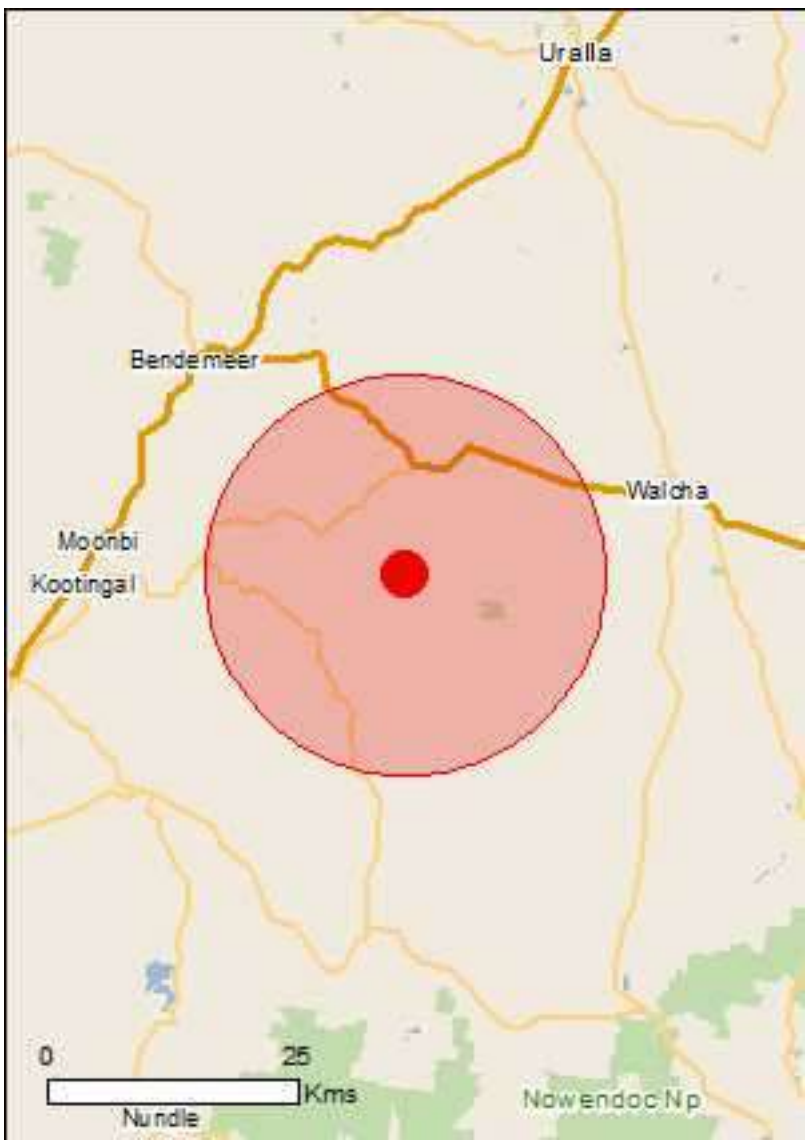

Coordinates

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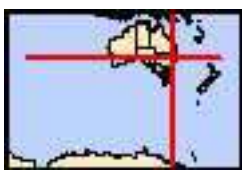

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	29
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

Place on the RNE:	2
State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	32
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area
New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands	Critically Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Fish		
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Frogs		
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat likely to occur within area
Litoria castanea		
Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Nyctophilus corbeni		
South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys oralis		
Hastings River Mouse, Koontoo [98]	Endangered	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Bothriochloa biloba		
Lobed Blue-grass [3153]	Vulnerable	Species or species habitat likely to occur within area
Callistemon pungens		
[55581]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Diuris pedunculata		
Small Snake Orchid, Two-leaved Golden Moths, Golden Moths, Cowslip Orchid, Snake Orchid [18325]	Endangered	Species or species habitat likely to occur within area
Eucalyptus nicholii		
Narrow-leaved Peppermint, Narrow-leaved Black Peppermint [20992]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat likely to occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area
Reptiles		
Uvidicolus sphyrurus Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat likely to occur within area
Wollumbinia belli Bell's Turtle, Western Sawshelled Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle [86071]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Xanthomyza phrygia Regent Honeyeater [430]	Endangered*	Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land - Australian & Overseas Telecommunications Corporation

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat likely to occur

Name	Threatened	Type of Presence
		within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Indigenous		
Niangala Bora Ground	NSW	Indicative Place
Historic		
Macdonald River Rail Bridge	NSW	Registered

State and Territory Reserves [Resource Information]

Name	State
Aberbaldie	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Coordinates

-31.04519 151.34578

Caveat

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

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

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

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

- migratory and
- marine

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

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

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

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

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

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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GLOSSARY AND SHORTENED FORMS

GLOSSARY

Direct impacts	Impacts that directly affect the habitat and/or individual plants and animals and cannot be avoided or mitigated. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat (DEC 2007).
Indirect impacts	Impacts that affect species, populations or ecological communities in a manner other than through direct loss or disturbance. These can usually be avoided or mitigated. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas (DECC 2007).
Local occurrence	The distribution of an ecological community within the study area and continuous with it.
Local population	The population that occurs in the study area and contiguous with it.
Locality	The area within 10 km of the study area.
Study area	The site and any additional areas which may potentially be affected by the proposal either directly or indirectly.
Site	The area directly affected by the proposal.
Subject species	List of threatened species considered in the assessment
Threatened biodiversity	Threatened species, populations, ecological communities or their habitats listed on the TSC and/or EPBC Acts.

SHORTENED FORMS

CMA	Catchment management authority
EEC	Endangered ecological community
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPI	Environmental planning instrument
LGA	Local government area
Matters of NES	matters of national environmental significance.
OEH	NSW Office of Environment and Heritage
RDP	Rapid data point
SEPP	State environmental planning policy
SEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
TEC	Threatened ecological community as listed on the TSC and or EPBC Acts. Includes vulnerable, endangered and critically endangered ecological communities.
TSC Act	NSW *Threatened Species Conservation Act 1995*