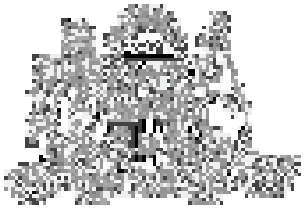

Department of Planning

Report on the Assessment of Development Application No. 241/04 Pursuant to Section 80 of the Environmental Planning and Assessment Act, 1979

Proposal by RES Southern Cross to build a wind farm at Taralga, in the Upper Lachlan Local Government Area

November 2005

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1 INTRODUCTION

On 10 November 2004, Upper Lachlan Shire Council received a development application (DA) from RES Southern Cross Pty Ltd (the Applicant) to build a wind farm consisting of 69 x 1.5-2MW turbines. On 15 December 2004 the then Minister for Infrastructure and Planning signed a direction under s88A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to become the consent authority for the Taralga Wind Farm. The development is proposed to be located between three and seven kilometres east of Taralga in the Upper Lachlan local government area.

Due to issues associated with obtaining a particular landowners consent for the Proposal, the Applicant amended the DA that had been submitted. Formal advice of amendment to the DA was received by the Department in a letter from the Applicant dated 1 March 2005. The amendment involved the deletion of seven turbines from the Omaru property, located on the northern section of the proposed development site. Further information on this amendment is discussed in Section 3.1.

Under the EP&A Act, the Proposal is a State significant, designated, and integrated development. Consequently, the DA is accompanied by an EIS and will be determined by the Minister for Planning. Integrated approval bodies identified for this Proposal are:

- Department of Environment and Conservation (DEC) under the *Protection of the Environment Operations Act;*
- Upper Lachlan Council, the Roads and Traffic Authority (RTA) and Department of Lands under the *Roads Act*; and
- Department of Natural Resources (formerly Department of Infrastructure, Planning & Natural Resources) under the *Rivers and Foreshores Improvement Act*.

Director General's requirements for the form and content of the EIS were issued on 21 July 2004. The DA and EIS were publicly exhibited between 15 November 2004 and 31 January 2005.

This report represents the Department's assessment of the proposed development, in accordance with the EP&A Act. The Department has assessed the DA and the issues raised in submissions. It has determined that a total of 46 wind turbines proposed as part of the Proposal could be constructed and operated with appropriate environmental controls. If the Minister agrees, the Department recommends the imposition of conditions, as per the Recommended Conditions in Section 10. It is considered that these recommendations would impose appropriate measures to ensure the environmental impacts associated with the proposed development are adequately managed, mitigated and monitored.

2 SITE CONTEXT

2.1 Site Location

The site of the proposed development is located between approximately three to seven kilometres east of Taralga in the Southern Tablelands of NSW. It is approximately 38km east of Crookwell, 35km north of Goulburn and 140km south west of Sydney.

The site is located wholly within lands administered by the Upper Lachlan Council. It should be noted that the Upper Lachlan Council was proclaimed on 11 February 2004. Areas of the Upper Lachlan Council that were formerly part of the Crookwell Shire Council and the Mulwaree Shire Council remain subject to the planning controls of each of those former local government areas. The subject site is currently located on land zoned 1(a) General Rural under the Mulwaree Local Environmental Plan 1995.

2.2 Site Description

The site is approximately 3830 hectares in area. It comprises of a number of land holdings, including nine private properties, public roads, Crown roads and vacant Crown land. Grassed farmland with scattered trees predominate the site where it is primarily used for sheep and cattle grazing.

The site has undulating topography with a number of ridges and gullies running in an approximate north south direction, with elevations from less than 830m above Australian Height Datum (AHD) in the gullies, to 960 m AHD on the ridges. There are two main watercourses on the site, Kerrawary Creek and Woolshed Creek. A wooded ridge is located in the south east section of the site.

The wind farm would be built along ridgelines that stretch approximately 11km north to south across the site. The location of turbines and associated land holdings, as shown in the EIS, is displayed in **Figure 1**.

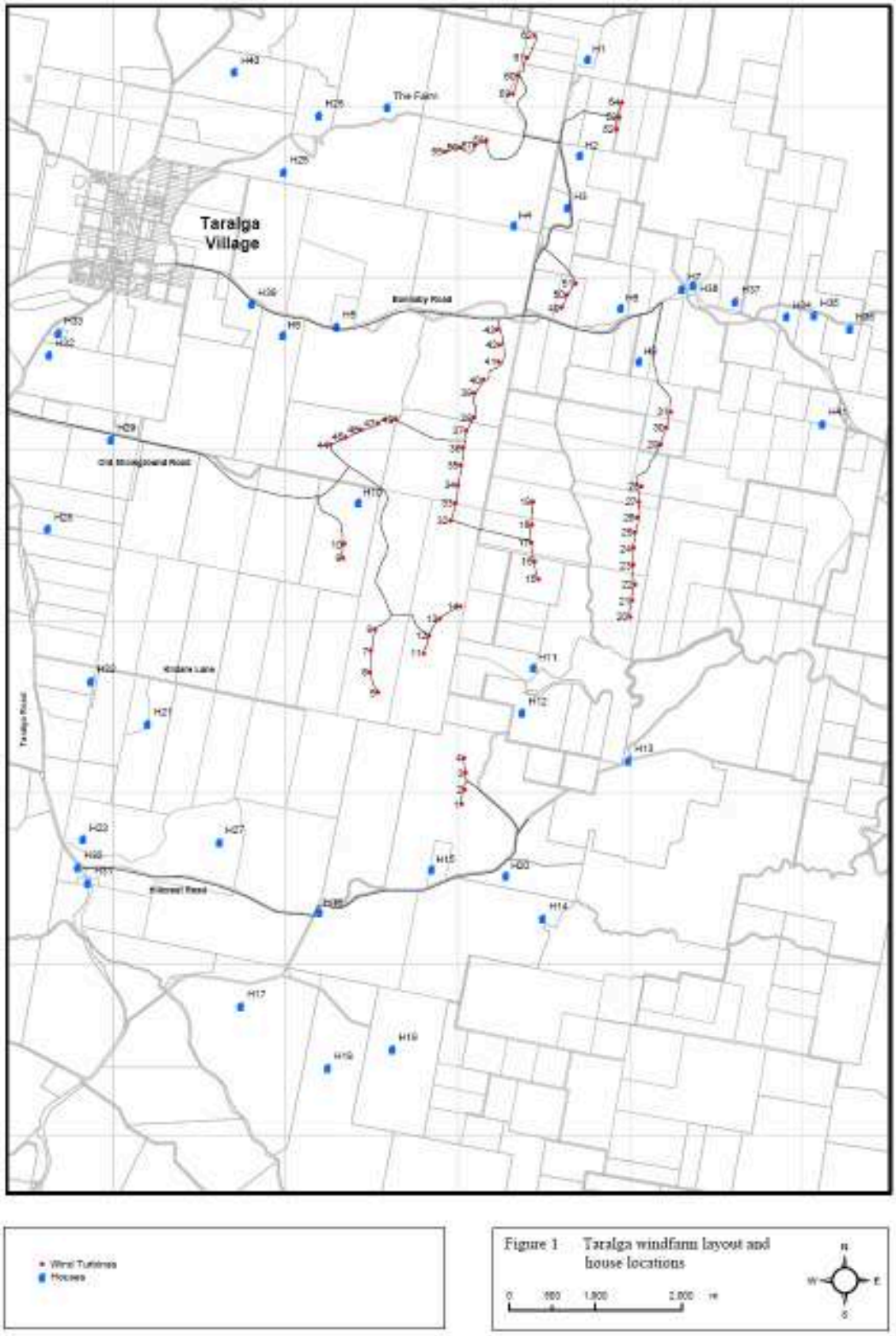

Figure 1 Proposal layout and house locations

Since the preparation of the EIS, seven turbines have been deleted from the Omaru property, identified on Figure 1 as H1. As these turbines were to be located on a single land holding, this landholder is now not associated with the development. The applicant has revised parts of the assessment to account for the deletion of these turbines, in particular those impacts relating to the aforementioned land holder. The revised impacts are discussed in Sections 6 and 7.

2.3 Surrounding Land Uses

To the west of the Proposal, is the town of Taralga with a population of approximately 318[1]. The town has fundamentally been a service centre for the surrounding rural community. Primary production is the dominant land use surrounding the town and the most significant contributor to the local economy. However, the EIS identifies that the town has been identified as a secondary growth centre in the region with population growth expected as a result of housing for people wanting a rural lifestyle.

Running in a north south direction to the west of the Proposal and through Taralga is Taralga Road. Taralga Road connects the town to Goulburn and Wombeyan Caves, and is recognised as tourist route. Tourists are known to visit Taralga, identified in the EIS as a historic village, on-route to the caves. As the town was established in the 1860s there are several heritage buildings within the town including the school, built in 1857, and several churches built between 1861 and 1868.

Immediately surrounding the site are a number of rural properties with associated agricultural structures (e.g. shearing and work sheds), communications infrastructure, local sealed and unsealed roads and tracks.

There are 11 residences located within 1km of a turbine. Four of these are not associated with the development – H1, H3, H12 and 'the Farm' (Figure 1). No residences are located within 500m from a turbine.

[1] Population from the census district including the village taken at the 2001 Census

3 DEVELOPMENT PROPOSAL

3.1 Amendments made by the Applicant

The EIS described the proposal as the construction and operation of a wind farm comprising of 69 turbines and associated infrastructure. The Applicant advised the Department in a letter dated 1 March 2005 that seven turbines, in the northern section of the proposed site would be deleted. These turbines were located on the Omaru property and were identified in the EIS as being turbines T63 to T69, as shown on Figure ES1 of the EIS. Consequently, this property (identified as H1 on Figure 1) changes it's status from associated with the Proposal to non-associated.

On the 15 March 2005, the Applicant provided the Department with additional information on key environmental issues as a result of the amendment. This included revised assessments on noise, visual impacts, greenhouse and energy issues, and traffic and transport. It showed that the environmental impacts would be reduced as a result of the amendment. It also concluded that the amended Proposal would still be justified on the grounds that it provides significant environmental benefits.

The Department considers that the Proposal has not substantially changed by the deletion of seven turbines. It accepts the Applicant's environmental assessment that the amended proposal would reduce key environmental impacts of the Proposal, in particular noise, visual, and shadow-flicker and that the Proposal would still contribute to reducing greenhouse gas emissions. The Department therefore accepts the amendment to the Proposal, proposed by the Applicant.

3.2 Outline of the Proposal

3.2.1 Proposal

The Proposal is for the construction and operation of a wind farm comprising 62 turbines and associated infrastructure. Based on 62 turbines, the Proposal has a generating capacity of between 93.2 and 124.2 MW and has an estimated capital investment value of $185 million.

The Proposal comprises of the following key components:

Table 1 Key components of the Proposal

Component	Description
Wind turbines[2]	Each turbine is 110m high with electricity generating capacity of 1.5-2MW and would be finished in a pale grey colour with a semi-matt finish. It comprises of: • 65 metre tower; • a nacelle which is mounted on the top of the tower, and contains the mechanical and electrical components controlling the turbine; • three 45m length fibreglass blades.

[2] The final design of the turbine has not been identified by the applicant. The applicant has identified that the most suitable machine for Taralga would be chosen following detailed design and negotiations with manufacturers. The basis for assessment of impacts in this EIS has been to assume a turbine generation capacity of 1.5-2MW, with a maximum height to blade tip of 110m.

Transformer Unit	Located next to each turbine tower. The transformer's function is to raise the generation voltage to the higher transmission level that is needed to transport the electricity into the on-site substation.
Electrical substation	40m x 115m in size placed on a concrete foundation
Control building	8m x 20m x 5.5m in size located adjacent to the substation
TV re-transmitter	Consisting of a 20m – 40m high guyed lattice tower
On-site access tracks	28km of unsealed tracks at a width of 5m
Electrical System	Consists of: • a 33 kV underground electrical cable network linking each turbine to the substation. The cable would be laid in trenches approximately 0.5m wide and 1 m deep; • two single overhead poles linking row 1 to row 2 and linking rows 6 and 7 to the substation; and • a 132kV transmission line running south east from the proposed site to a new switching station at Marulan[3].

The wind farm would be served by a central computer system located in the control building which would monitor the performance and behaviour of each turbine. The turbines begin generating automatically at a wind speed of around 4m/s and have a shut down wind speed of around 25m/s.

3.3 Proposed Construction Works

3.3.1 Timing and Personnel

Construction of the Taralga wind farm, including pre-construction through to completed tests following commissioning of the wind turbine generators, would take approximately 16 months. This estimate has been refined from 17 months, identified in the EIS, to 16 months since the removal of 7 turbines from the Proposal.

During construction there would be a temporary workforce varying between 20 and 40 personnel over the 16 month construction period. The temporary construction compounds would be fully reinstated upon completion of construction. They would be cleared of road base, ripped, recovered with soil and re-seeded to establish a vegetative ground cover.

3.3.2 Transport and Erection of Turbines

Turbines would be transported in parts and assembled on site using a heavy duty high-reach crane. The applicant proposes to transport the turbine components by road to Taralga along the following route:

- Hume Highway to Goulburn (start point could be either Sydney or Port Kembla);
- Turn off Hume Highway (first Goulburn exit) onto Sydney Road to junction of Union Street in Goulburn;
- Right turn into Union Street and then right into Wilmot Street which leads onto the Taralga Road;
- Taralga Road (MR 256) for 42 km to the village of Taralga;

[3] The transmission line is being assessed under Part 5 of the EP&A Act and is not part of this development application. Country Energy is the proponent and determining authority for the transmission line. The transmission line is further discussed in Section 7.7.

- Prior to reaching the village of Taralga the vehicles would turn right into either Hillcrest Road or Old Showground Rd to access the turbine sites;
- A new access track would be constructed at the end of Old Showground Rd providing access to the turbines north of Bannaby Rd via Bannaby Rd, Alders Rd, Crees Rd and Riparosso Rd.

The excavation for the turbine foundation would be typically 14m x 14m and 3m deep. The foundation would require approximately 180m^3 of concrete. Following construction of the concrete foundation the excavation would be backfilled. For the erection of the turbines two crane hardstands would be required at each turbine base. The EIS states that the rotor would most likely be constructed while on the ground, then lifted and attached to the turbine hub. At locations where sufficient flat open space is not available, alternative erection techniques would be used where the blades would be lifted individually and secured to the hub one blade one at a time.

3.3.3 On-site Access Tracks

The proposed routes of site access tracks are identified in Figure 2.4 of the EIS and include comprise of new access tracks and upgrading of existing tracks.

The EIS states that the finished width of the tracks would be approximately 5m with local widening restricted to bends and at passing bays and around some turbines. Topsoil would be removed to a suitable founding layer and the track running surface would be constructed by tipping and compacting road base to the required shape and thickness. Approximately 19800m^3 of road base material would be required for the tracks. Culverts would be installed at locations where access tracks cross drainage lines. Alternative construction techniques would be adopted in areas of potential indigenous heritage value.

3.3.4 Other construction areas

Two temporary construction compounds (each approximately 40m x 40m) would be located adjacent to the southern ends of rows 13 and 8. There compounds would contain portable cabin structures, dry chemical toilets, storage areas, parking for approximately 10 cars and construction vehicles and a receiving area for incoming vehicles.

The EIS did not include details of the connection to the grid. However, the Department considers that grid connection is an important component of the potential benefit of the Proposal, thus should be considered in some detail in making an assessment on the development application. Two options were discussed in the EIS; connection to the nearby 330kV line and an overland connection to Marulan substation. Connection to the grid is discussed further in Section 7.7.

3.4 Proposed Operational Works

The proposed wind turbines are designed to operate automatically and largely unattended. Each turbine would be fitted with an automatic system designed to supervise and control a number of parameters to ensure proper performance and to monitor well-being. The control system would automatically shut the turbine down should the need arise. Sometimes the turbines would re-start automatically (i.e. if shut-down had been for high winds) but other shut downs would require investigation and manual restart. The wind turbines do not operate under 4m/s wind speed and over 25m/s. When the wind speed is greater than 25m/s the generator would be disconnected and the wind turbine would be stopped.

The wind farm would be controlled by a computer sophisticated overall supervised control system (SCADA) system located in the control room, and linked to each turbine by a fibre-optic communications cable. The SCADA system provides the infrastructure to monitor and control of the wind farm from the control room and remote off-site locations. Each turbine would also contain two touch screen control panels located in the nacelle and at the base of the tower, allowing interrogation and override control of the system.

It is estimated that the proposed wind turbines would operate for approximately 35 percent of the time. The turbine blades would therefore be stationary for approximately two thirds of the time.

Six staff would be employed for conducting routine maintenance work on an ongoing basis. Remote monitoring of the wind farm would be carried out on a 24 hour basis, with on-call staff available to address any problems.

3.5 Proposed Decommissioning Works

The applicant has entered into a 25 year lease agreement with the landowners for the site, with the option to extend. The EIS states that it is anticipated that replacement turbines with new equipment would be erected at the end of the design life.

If decommissioning is chosen a closure and rehabilitation plan (CRP) would be prepared prior to the decommissioning works which would outline the activities to be undertaken in closing and stabilising the site and the timeframe for completing these works.

Decommissioning would involve the removal of all turbine components, transformers, substation, overhead power lines and control building. Foundations and cabling would be removed to a depth of 600mm. The EIS states that some access tracks would be left to provide continued farm access for the landowners. The buried concrete foundation would not be removed but would be graded over with soil and revegetated.

3.6 Justification for the Proposal

The EIS identifies that the Proposal's objective is to generate electricity to supply a growing market demand for clean, low emission energy production. It has also identified that the Proposal will assist in securing a regional power supply and consequently, avoiding losses that would otherwise be incurred in obtaining power for elsewhere to service the region.

The EIS indicates that the Proposal would generate electricity equivalent to the average annual consumption of between 33,530 and 44,870 households. It also indicates that this will avoid carbon dioxide emissions of between 221,787 and 295,716 tonnes per annum.

An assessment of the Proposal's justification, in particular its contribution to reducing greenhouse gases and meeting Commonwealth and State government policies on this issue, is provided in Section 6.5.

3.7 Alternatives for the Proposal

The EIS outlines a range of renewable energy technologies that are available and/or under development in Australia, including solar geothermal and wind. It argues that wind energy has advantages over other renewable energies including:

- compatibility with other existing land uses, particularly agriculture;
- the site of the wind farm can be rapidly returned to its original state at the end of the project life; and
- wind energy can be harnessed at a large scale and is therefore cost-effective.

The EIS also identified that alternative options in relation to the following aspects of the proposal were considered:

Aspect	Options Assessment
Site selection	The EIS states that the site of the Taralga Wind Farm was selected due to its proven wind resource, network connection viability and landowner interest.
Site layout	The applicant modelled different turbine layouts across the site, to determine the highest energy return. The EIS states that environmental constraints were also considered in site layout design, including ecologically sensitive areas, archaeological features, microwave paths, separation distances from dwellings and landowner/ farmer needs.
Turbine selection	The turbine to be used on site has not been finalised but would be a turbine with a generating capacity of 1.5-2 MW with a maximum height to blade tip of 110m.
Grid Connection	The grid connection for the Taralga wind farm has not been included as part of the current development application. Two main options were considered in the process of reaching the preferred option of an overland connection to the Marulan substation. The transmission line is discussed in more detail in Section 7.7.

4 STATUTORY PLANNING FRAMEWORK

The Department has reviewed the RES Southern Cross proposal with regard to the various State, regional and local statutory planning provisions that apply, as required by section 79C of the EP&A Act. An overview of the various statutory provisions is outlined below, while a more detailed analysis is provided in the Department's Section 79(c) assessment as provided by Appendix A.

4.1 Permissibility

The proposal is located wholly within the geographic boundary of Upper Lachlan Council. However, as the site is located within the boundaries of the former Mulwaree Shire Council, the Mulwaree Local Environmental Plan (LEP) 1995 still applies. The land is zoned 1(a) General Rural under the Mulwaree LEP.

Permissible development without consent and prohibited development, defined under the Mulwaree LEP are listed below.

Permissible without Consent	Prohibited
Agriculture; periodic public entertainments; tree planting (including planting for the purpose of growing farm woodlots of up to 10ha each, but not including planting for the purpose of forestry).	Boarding houses; child care centres; clubs; commercial premises; dog breeding or boarding hospitals; hotels; institutions; motor showrooms; offensive or hazardous industries; residential flat buildings; roadside stalls; shops; professional consulting rooms; refreshment rooms; taverns; units for aged persons.

As the Proposal is not listed as permissible without consent, or prohibited under the relevant LEPs, the Proposal is permissible subject to development consent.

The objectives of zone 1(a) General Rural under each of the relevant LEP are particularly important for this assessment, providing the statutory framework as to whether wind farm developments are appropriate. Evaluation of the consistency of this development Proposal with the objectives for this zone, are discussed in Appendix A.

4.2 Development Assessment Requirements

4.2.1 State Significant Development

On 15 December 2004 the then Minister for Infrastructure and Planning signed a direction under s88A of the EP&A Act to become the consent authority for the Proposal and therefore making it a State significant development. Prior to this, Upper Lachlan Council was the consent authority.

4.2.2 Designated Development

Clause 18(1)(c) of the Schedule 3 of the *Environmental Planning and Assessment Regulation* (EP&A Regulation) lists 'electricity generating station which supply or are capable of supplying more than 30MW of electrical power from other energy sources' as being designated development. As the proposed wind farm would generate between 93.2 and 124.2 MW it is classified as designed development. The development application was therefore accompanied by an EIS.

The Director General issued requirements to be addressed in the EIS on 21 July 2004. The EIS was prepared by Geolyse Pty Ltd, dated November 2004, and submitted in support of the Development Application (DA). The Department is satisfied that the Director General's requirements were generally addressed and the EIS was adequate for exhibition.

The EIS was publicly exhibited between 15 November 2004 and 31 January 2005.

4.2.3 Integrated Development

The development Proposal constitutes integrated development, as defined under Section 91 of the EP&A Act, due to the following licenses, permits and or consents being required:

- an Environmental Protection License (EPL) from Department of Environment and Conservation (DEC) under the *Protection of the Environment Operations Act 1997* (PoEO Act). A license for both construction and operational stages of the project is required, as the development is defined as "electricity generating work" that supplies, or is able to supply, more that 30MW of electrical power under Schedule 1 of the PEOE Act.
- a consent from Upper Lachlan Council and RTA under Section 138 of the *Roads Act* for proposed works, relating to a public road; and
- a consent from the Department of Lands under Section 138 of the *Roads Act* for proposed works relating to Crown public roads;
- a permit from the Department of Natural Resources under Part 3A of *Rivers and Foreshores Act*.

The integrated approval bodies were consulted as per requirement of s93 of the EPA Act. General Terms of Approval were granted by each of the relevant agencies.

4.3 Relevant NSW Environmental Planning Instruments

The assessment of the Proposal is subject to the following environmental planning instruments (EPI):

- *State Environmental Planning Policy (SEPP) No. 44 – Koala Habitat Protection;*
- *SEPP No. 58 – Protecting Sydney's Water Supply;*
- *Draft Regional Environmental Plan(REP) – Sustaining the Catchments;* and
- *Mulwaree LEP;* and
- *Draft Upper Lachlan Council Development Control Plan (2005).*

The objectives and requirements of these environmental planning instruments and how the Proposal complies is detailed in Appendix A. The Department considers that the Proposal is consistent with these environmental planning instruments.

4.4 Additional NSW State Government Acts and Regulations

As the development Proposal is classified as integrated development, there are a number of relevant Acts which require the Applicant to obtain approvals under these Acts. These are identified in Section 4.2.3.

Additional pieces of legislation have been considered during the assessment of the Proposal and are detailed in Sections 6 and 7. These include:

- *Threatened Species Conservation (TSC) Act 1995;*
- *Heritage Act 1997;*
- *Crown Lands Act 1989; and*
- *Water Act 1912 and Water Management Act 2000.*

4.5 Commonwealth Approvals

The following Commonwealth legislation was considered as part of the assessment process:

- *Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1997*
- *Renewable Energy Electricity Act 2000;*
- *Civil Aviation Regulations, 1998.*

4.5.1 EPBC Act

The EPBC Act commenced on 16 July 2000. The EPBC Act includes the assessment and approvals system for actions that have a significant impact on:

- matters of national environmental significance (NES); and
- the environment of Commonwealth land.

Should an action be determined to likely have a significant impact, an approval from the Commonwealth Minister for the Environment and Heritage is required.

The EIS identified that no NES matters or Commonwealth land are likely to be impacted by the Proposal and therefore an approval from the Commonwealth Minister for the Environment is not required.

4.5.2 Renewable Energy Electricity (REE) Act 2000

The *Renewable Energy Electricity Act 2002* establishes the statutory framework for mandatory renewable energy targets (MRET) and energy trading scheme. The Act requires that approximately 2% of total energy produced by 2010 must be from renewable energy sources. Under this Act, wind is classified as a renewable energy source.

Under the MRET scheme, electricity retailers and other large electricity buyers are required to buy approximately 9500GWh (gigawatt hours) of their electricity from renewable or specified waste-product energy sources by 2010. All retailers and large buyers would be required to maintain the 9500GWh of electricity from renewable energy facilities until 2020;

Renewable Energy Certificates (RECs) are issued for renewable energy production developed since 1997, and can be traded through the Green Electricity Market. Electricity wholesalers and retailers are required to annually submit RECs to demonstrate compliance with the individual renewable energy requirement. A fine of $40/Mega Watt hour (MWh) would be applied if insufficient RECs are submitted. As renewable energy production has generally cost more than the traditional energy production in Australia, the MRET scheme promotes renewable energy production by prescribing that a particular section of the energy production must come from renewable energy sources.

4.5.3 Civil Aviation Regulations, 1998

The *Civil Aviation Regulations 1998* require that the Civil Aviation Safety Authority (CASA) be informed of all proposed structures greater than 110 metres in height. The proposed turbine would be 110 metres in height. CASA has advised that there are no aviation safety issues with the Proposal but requested that it be advised of the height and location of turbines prior to operation.

4.6 Relevant NSW Plans and Guidelines

4.6.1 Draft NSW Wind Energy EIA Guidelines

The Department's *Draft NSW Wind Energy EIA Guidelines* identify factors that must be considered when undertaking an environmental assessment of wind farm projects. Under the Director General's requirement's, the applicant was required to address issues raised in the guidelines in the EIS.

The Department has reviewed the EIS and is satisfied that the applicant has adequately addressed impacts discussed in the *Draft NSW Wind Energy EIA Guidelines*.

4.6.2 Warragamba Catchment Blueprint

The *Integrated Catchment Management Plan for Warragamba Catchment 2002* (otherwise referred to as the Warragamba Catchment Blueprint) is a strategic catchment management plan. It provides broad direction and targets for natural resource management and investment in the Warragamba Catchment until the year 2012. The Warragamba Catchment covers an area of approximately 10,030 square kilometres extending from the Mulwaree River catchment in the south, to the Coxs River catchment in the north. It includes storages on the Upper Nepean River and the rivers and streams that flow into Lake Burragorang including areas around the Wollondilly River, such as the subject site.

The Plan provides the overarching framework for the management of the catchment area, setting targets for the following key aspects:

- soil and land contamination;
- river health;
- terrestrial biodiversity; and
- community understanding and input into this natural resource management.

The document sets measurable targets, relating to catchment condition and management actions up to 2012. It identifies key actions to achieve these targets and the responsible agencies and stakeholders. The document therefore provides both a strategic framework and a coordinated action plan for the diffuse stakeholders impacting natural resource management in the catchment.

The document is an advisory plan only and therefore there are no legal offences associated with non-compliance. The Department has considered the impact on water quality, soil management and surrounding riparian zone, resulting from the Proposal and is satisfied that there would be limited adverse impacts on the Wollondilly River.

4.6.3 Wind Farms and Heritage Policy (Draft)

The NSW Heritage Council released a draft *Wind Farms and Heritage Policy* for public comment in September 2003. The policy was prepared as an interim document to minimise or eliminate potential impacts on wind farms on heritage items, including cultural landscapes. Though the policy remains in draft form, the Department has considered the requirements and guidance outlined in relation to the current Proposal.

Consideration of the impact of the Proposal on any heritage items is discussed in Section 7.3.

5 EXHIBITION AND ISSUES RAISED IN SUBMISSIONS

5.1 Public Exhibition

As required for designated development, an EIS was prepared and, in accordance with Division 4, Part 6 and Schedule 2 of the Regulation, the DA and accompanying EIS were publicly exhibited for at least 30 days.

Public exhibition commenced on Monday 15 November 2004, when Upper Lachlan Council was the consent authority. On 15 December 2004, Upper Lachlan Council voted to extend the exhibition period until Monday 31 January 2005. The Department did not oppose the extension of the exhibition period. The DA and EIS were exhibited at:

- Department's Head Office, Sydney;
- Upper Lachlan Council;
- Goulburn Mulwaree Council; and
- Taralga Post Office.

Nearby landowners were notified in writing about the proposed development. Signs providing the same information were also displayed on and in the vicinity of the proposed development site for the duration of the exhibition period. Advertisements were placed in the Goulburn Post and the Crookwell Gazette about the proposed development at the start of the exhibition period and to notify the extension of the exhibition period and state significance declaration.

The Department considers that the requirements of the Act to notify landowners adjacent to the development site have been met.

5.2 Community Submissions

During the exhibition period, 221 submissions were received from the community with 84 submitted to Upper Lachlan Council and 137 submitted to the Department. A further seven submissions were received after the exhibition period but still considered. Of the submissions, 171 stated that they objected to the Proposal while 30 stated that they supported the Proposal.

In addition, two petitions with multiple signatures were received – one of support for the development with 168 signatures and one of opposition to the development with 113 signatures.

Following exhibition of the EIS, a survey was conducted by Upper Lachlan Shire Council on the views of Taralga area residents. A total of 154 residents were received surveyed and of these 102 objected to the Proposal while 52 supported the Proposal.

A variety of issues were raised by submissions regarding the Proposal. As shown in **Figure 2**, visual impact was raised by the greatest number of submissions followed by adverse impacts upon rural character and impacts to property prices. **Appendix C** further discusses the issues raised by community submissions.

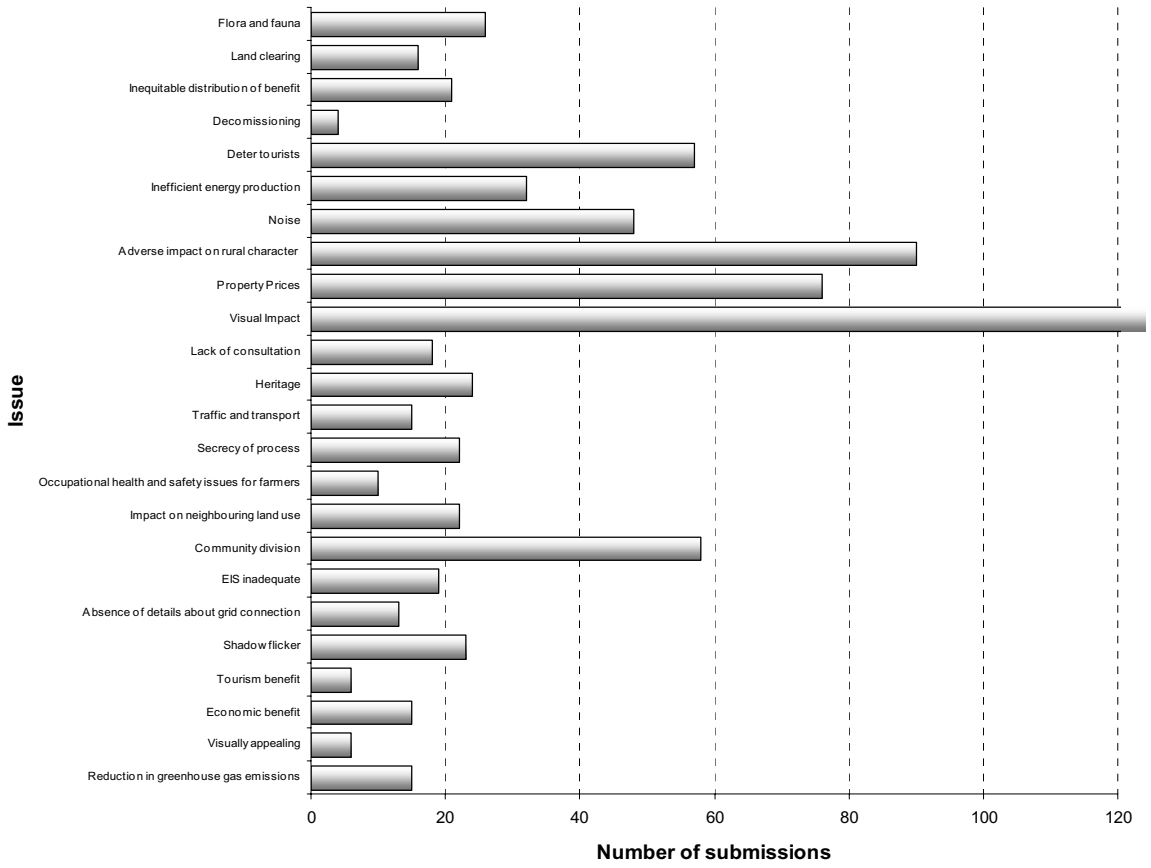

Figure 2 Issues Raised by Community Submissions

5.3 Government Agency Submissions

Comments and General Terms of Approval provided by each of the integrated authorities are identified in Section 4.2.3 are discussed in Sections 6 and 7. Their requirements have been included in the Department's Recommended Conditions (Section 10).

Comments have also been received from the following government agencies during the exhibition of the DA and EIS:

- NSW Police Force;
- NSW Heritage Office;
- NSW Rural Fire Service;
- NSW Department of Primary Industries;
- Sydney Catchment Authority;
- NSW Health; and
- Civil Aviation Authority.

The issues raised by these government agencies have been considered in Sections 6 and 7.

5.4 Request for Commission of Inquiry

Upper Lachlan Council requested on 17 September 2004 that the Minister direct a Commission of Inquiry (COI) into wind farms within the Upper Lachlan local government area. The request was not directed at any specific proposal. Council indicated that a COI should occur due to the potential number of wind farm proposals in the area, the size of the proposed wind farms and the lack of planning policies to guide the environmental assessment of wind farm developments. One submission from the community was submitted supporting the request for the COI.

As has been noted earlier, the Proposal is classified as State Significant Development. To ensure that a robust and comprehensive assessment for all large wind farm proposals is undertaken, the Minister has declared major wind farm developments as State Significant on 3 December 2004. The Minister also signed a direction under s.88A of the EP&A Act for the Proposal to be State significant.

As an extensive independent assessment has been undertaken for the Proposal, including a comprehensive identification and understanding of key issues raised, an extensive community consultation process, and use by the Department of an independent specialist in the more subjective area of visual impact and, it is not considered that an Commission of Inquiry is justified.

6 KEY ENVIRONMENTAL ISSUES

The Department has undertaken a detailed review of information supplied by the Applicant in the EIS and additional information, and issues raised in submissions received in response to the public exhibition of the development application. In light of these considerations, the Department has been able to complete a screening of environmental planning and assessment issues associated with the Proposal. Issues have generally been considered in the context of the assessed environmental planning significance of matters outlined in the EIS, and the level of interest, concern or complexity of matters raised in submissions. A combination of these considerations has been used to ensure a focussed consideration of key issues associated with the Proposal, with an appropriate level of detail applied depending on the relative importance of the issue under consideration.

The Department has identified the following as key issues of the Proposal:

- visual and landscape;
- operational noise;
- flora and fauna;
- property values; and
- justification for the Proposal.

Other issues are discussed in Section 7.

6.1 Visual and Landscape

6.1.1 The EIS

The EIS contains an assessment of the visual impact of the proposed development. It discusses the following key elements:

- landscape setting;
- landscape conservation values;
- visual catchment;
- receptors;
- landscape sensitivity;
- impacts; and
- mitigation measures.

Landscape Setting

The landscape setting around the Proposal is described in the EIS as largely cleared farming country on rolling hills. The wind farm is proposed to be located on the eastern plateau edge of the tablelands. To the south are the Tarlo River National Park and the Cookbundoon Range and to the north east is the Wombeyan Karst Conservation Reserve.

The EIS describes Taralga village as an unspoilt historic town that retains many well preserved and restored buildings dating from the 1860s to 1890s. The landscape has been identified as a mature cultural landscape. The EIS states that residents east of Orchard Street in the town have views

over gently rising hill country. It also states that there is a possibility of expansion of the Taralga town in the mid to longer term dependant on water and sewerage development in the town.

The EIS states that there is little risk that the landscape setting or surrounding land uses in these landscapes will change.

Landscape Conservation Values

The EIS discusses the regional and local landscape conservation values and argues that the basis for recognising highly valued landscapes is through either registration or listing in jurisdictional heritage registers. Items listed on state and national registers in the Taralga district are listed below.

Items listed on state registers:

- The Catholic Church of Christ the King

Items listed on national registers:

- Tarlo River National Park
- Wombeyan Karst Conservation Reserve
- The village boundary is listed as an urban conservation area by the national trust
- Bannaby Anglican Churchyard
- Stonequarry general cemetery
- Taralga courthouse
- Taralga war memorial

The EIS argues that the landscape features of the wind farm site are not unique. However, it acknowledges that the landscape may be valued by different communities for different reasons.

Visual Catchment

The EIS contains a map of the zone of visual influence of the development (figure 5.3 of the EIS), although it states that this zone is conservative as it does not account for physical screens such as vegetation or weather conditions which may limit visibility.

Receptors

The EIS considers three types of visual receptors: residents, travelling public and visitors. Residents are generally considered sensitive to changes in their landscape and visual environment, particularly to changes to views from their homes. The travelling public would vary in their level of sensitivity to the Proposal, depending primarily on the purposes for travelling. It argues that visitors to the area may not be as sensitive to changes in the landscape as residents.

Landscape sensitivity

The EIS argues that a complex landscape, relative to a simple landscape, is generally less sensitive to change, thus the landscape around the proposed site has a low sensitivity to change. That is, there are diverse elements and features in the landscape including vegetated deep gullies, cleared ridges, planted wind breaks, farm residences and sheds and above ground electrical transmission towers.

Impacts

The EIS states that the Proposal would visually add a new feature to the landscape. Visual impacts would occur both during construction and operation.

The EIS contains four photomontages from representative public viewpoints identified through consultation with council and through feedback from an open community forum. The views were from Taralga Rd north and south of the village (Viewpoints A and D), one point adjacent to Sacred Heart School on the south-eastern edge of the village (Viewpoint B) and from opposite Goodhew Park on the main street in the centre of the town of Taralga (Viewpoint C). Photomontages of the Proposal from Viewpoints B and C are repeated in **Figures 3a** and **3b**. The views from the other Viewpoints are also contained in **Appendix D**.

Figure 3a Photomontage of Proposal from the township of Taralga (Viewpoint B)

Figure 3b Photomontage of Proposal from the township of Taralga (Viewpoint C)

Mitigation measures

Visual impacts were considered in the design of the wind farm. The EIS discusses mitigation measures for potential visual impacts. These include:

- turbines are arranged in rows with relatively even spacing to avoid tight clustering;
- all turbines are identical;
- existing access tracks are used where possible and new access tracks have been routed to the existing pattern of the landscape;
- turbines will be a matt-grey colour to reduce the contrast of turbine colour against the sky; and
- the substation has been located to be visible from as few offsite view points as possible.

The EIS acknowledges that the development provides virtually no opportunity for vegetative screening.

Conclusion

The EIS concludes that:

- the Proposal will not impact on items of heritage conservation significance as it is located a sufficient distance away;
- turbines are sufficient distance away from residences to ensure that they do not obscure features of the landscape;
- many people find turbines attractive to view;
- turbines would add visual interest to the landscape; and
- the complexity of the landscape renders it less sensitive to change and would reduce the visual prominence of the turbines.

The EIS concludes that while the Proposal would become a visible landscape feature, it would not alter key landscape elements, features or characteristics.

6.1.2 Issues raised in submissions

Visual Impact was clearly the most important potential impact outlined in public submissions with some 124 received regarding this issue. The vast majority of submissions expressed concern that the development would have adverse visual impacts. Some six submissions stated that the wind farm would be visually appealing.

The main concerns raised by submissions were:

- visibility of turbines from heritage items;
- turbines would be visible from a large view shed and that it would reduce amenity and deter tourists;
- turbines were ugly and would detract from views;
- size and number of turbines and transmission lines and access tracks will detract from the rural setting;
- location of turbines on the ridge lines will be dominating;
- EIS failed to identify the true impact of proposal on the Taralga landscape by providing poorly located photomontages and incorrectly stating that the area is largely cleared agricultural land, rather than native grassland;
- proximity of the wind farm to the township of Taralga; and

- large visual impacts to surrounding property owners.

6.1.3 Additional information provided to the Department

General

In recognition of the extent of concerns raised about visual impacts, the Applicant produced additional photomontages from four key residences (H3, H5, H12 and 'The Farm' – Figure 1) to further assess impacts. The Department considered that at least two of these properties could potentially be severely visually affected by the proposed development (H3 and H12). The other two residences were nominated as they were considered to be potentially affected and representative of a number of other private viewpoints.

Hassell Report

The Department engaged an independent visual consultant, Hassell Pty Ltd, to review the potential visual impact of the proposal. The visual consultant was requested to:

- identify the impacts of the wind farm on specific properties;
- identify the impact of the wind farm on the broad landscape of the area including impacts on local landmarks, views from public roads etc;
- peer review the EIS assessment of the grading of the significance of the landscape; and
- provide recommendations for mitigation of any potential visual impact.

Hassell's report is contained in **Appendix D**.

Hassell used both quantitative and qualitative methods to predict the visual impact of the proposed development. The quantitative visual assessment was conducted using a matrix and criteria including existing visual character of the landscape, the degree of visual modification of the proposal, the horizontal visual effect, vertical visual effect and the distance of visual effect. Each visual aspect was then rated and then an accumulative value given for the "visual effect" from nominated viewpoints. The final visual effect value was then used to classify the visual effect as negligible, slight, moderate, substantial or severe.

Qualitative methods, relating to viewer sensitivity, were then applied to the quantitative results to determine acceptability. Viewer sensitivity is qualitative as the level of sensitivity of the viewer is based on individual qualities and personal preferences.

Hassell applied the assessment to eight viewpoints. Four public viewpoints were identified from the EIS and considered by Hassell to be a good representation of critical public views. Four private viewpoints were nominated by the Department. The findings of Hassell's assessment at these viewpoints are discussed below.

Public Viewpoints

Hassell assessed the same four public viewpoints identified in the EIS. The locations of these viewpoints are:

A – South of Taralga at Taralga Rd and Hillcrest Rd
B – Within the township of Taralga at Bunnaby St
C – Within the township of Taralga at Orchard Street
D – North of Taralga on Taralga Rd

The Hassell's Report found that, when using just the quantitative assessment, visual impacts on the two public viewpoints in the town of Taralga (B and C) would be valued as 'moderate' while the viewpoints outside of Taralga (A and D) would be valued as 'slight to moderate'. However, Viewpoints B and C would be experienced by a relatively large number of viewers and the viewers would have a heightened sensitivity as most of the viewers would be residents. These viewpoints affect people of the town in their everyday activities. Viewer sensitivity at these locations was therefore determined to be 'substantial'. The report concluded that, combing a moderate 'visual effect' with a substantial 'viewer sensitivity, the Proposal would result in an unacceptable visual impact.

For Viewpoints A and D, the report found that the sensitivity of the viewer group would be 'moderate' to 'substantial. It concluded that the proposed development could be considered acceptable from these public viewpoints.

Private Viewpoints

Four sites were quantitatively assessed to identify the visual impact from the following residential properties adjacent to the wind farm (Figure 1):

- H3 (Kearn's property);
- H5 (Property off Bannaby Road);
- H12 (Ross' property);
- 'The Farm' (west of H12);

The report found that the visual impact on H3, H12 and 'the Farm' would be 'substantial'. The finding of substantial impact is driven by the large degree of visibility of the development on the horizontal plane and the proximity of the turbines. The visual impact at H5 was assessed as 'moderate'.

Mitigation Strategies Identified

Hassell considered a number of mitigation strategies such as landscaping and relocation and deletion of turbines. It concluded that only by the deletion of turbines, would an acceptable visual impact upon the private and public viewpoints be achieved.

Based on deleting turbines, two strategies were investigated. The first strategy was to remove 37 turbines from the centre of the site, however, this strategy was not pursued as some of the private properties would still retain a substantial impact. The second strategy, and considered by Hassell as the preferred option, was to remove 19 turbines from the south and 11 turbines from the north of the proposal (see Figure 6 of Appendix D). This would result in:

- private viewpoints substantially affected (H3, H5 and 'the farm') to be reduced to 'moderate'; and
- public viewpoints substantially affected (B and C) to be reduced to 'slight'[4].

Hassell considers that the overall visual impact of the remaining 32 towers would be acceptable. However, the Applicant indicated that this strategy would make the windfarm unviable.

[4] The reason for not reducing both the private and public viewpoints to the same level was because of visual sensitivity identifying that greater weight must be given to the more significant public viewing points in the village because there is a greater number of viewers.

EDAW Gillespie's Report

Given the extent of potential turbine removal, the Department provided the Applicant with an opportunity to consider the issues raised by Hassell. The Applicant subsequently engaged its own independent visual consultant to peer review the assessment by Hassell. EDAW's Report is contained in **Appendix E**.

Overall, EDAW Gillespie argued that, for the **public** viewpoints (i.e. from the township of Taralga), there were a number of flaws in Hassell's Assessment and that its conclusion that the Proposal was unacceptable on visual grounds could not be supported based on the assumptions and methods provided.

EDAW Gillespie concluded that the Proposal would be acceptable from public viewpoints without deletion of any turbines. In particular, it argued that generally the values given for each of the visual components identified in the Hassell's matrix should be lower than that given by Hassell. A comparison of these values is shown in Table 2.

Table 2 Comparison between the values given by Hassell and EDAW Gillespie from public viewpoints, based on Hassell's matrix for visual assessment.

Visual Component	Hassell		EDAW Gillespie	
	Viewpoint B	Viewpoint C	Viewpoint B	Viewpoint C
Existing Visual Landscape Character	Moderate to Substantial	Moderate	Slight to Moderate	Slight
Degree of Visual Modification	Substantial	Substantial	Much lower than Substantial	Much lower than Substantial
Horizontal Visual Effect	Moderate	Moderate	Negligible to Slight	Negligible to Slight
Vertical Visual Effect	Negligible	Negligible	No change	No change
Distance of Visual Effect	Moderate	Slight	No change	No change
Visual Sensitivity	Substantial	Substantial	Neutral level	Neutral level

From this perspective the report by EDAW Gillespie indicated that no turbines needed to be removed to address public views.

For **private** viewpoints, however, EDAW Gillespie generally concurred with the Hassell analysis with respect to impact on H3 and H12.

6.1.4 Department's Consideration of Public Viewpoints

General

The Hassell's report and its critique by EDAW Gillespie, along with the submissions received provide the Department with a comprehensive basis on which to assess the visual impacts of the proposal.

The Department considers that the Hassell matrix represents a useful tool for characterising the visual impact on the nominated viewpoints. However, the Department is not necessarily bound by the recommendations of the report, particularly as it specifically (and intentionally) focuses on

visual impact issues alone. Hassell's report did not, nor was it required to, consider the broad economic and policy issues regarding renewable energy needs, economic efficiencies/ wind energy yields and commercial viability aspects.

Notably the key differences between the findings of Hassell and EDAW Gillespie relate to public viewpoints within the Taralga township and the acceptability of the visual impacts on these viewers. With regard to the private viewpoints, there is consensus that the Proposal would have a substantial impact upon two rural residences (H3 and H12 – Figure 1). Issues regarding public viewpoints are provided below. Details on private viewpoints follow.

Consideration of Public Viewpoints to Unmodified Proposal

As discussed in Section 6.1.3 and outlined in Table 2, the Applicant's EDAW Gillespie Report states that many of the values given for the visual components of the Hassell's matrix are too high. A comparison of Hassell's evaluation of the Proposal against EDAW's is shown in Table 3.

The Department has considered the arguments by EDAW Gillespie on all issues and overall considers that the evaluation by Hassell of the unmodified (ie 62 turbine) proposal would be appropriate on all factors apart from Existing Landscape Character. Details of this consideration are provided in **Appendix F**.

The Department believes that the existing landscape character from Viewpoints B and C is more likely to be valued as 'moderate' and 'slight to moderate', respectively given the arguments put forward by EDAW Gillespie and the description of the criteria used by Hassell (see **Appendix D** - Table 1 of Appendix E). The resultant changes to the evaluation matrix are also shown on Table 3.

Table 3 Assessment of Unmodified Proposal

Visual Components	**Identified by Hassell**		**Identified by EDAW***		**Accepted by the Department**	
Viewpoint	B	C	B	C	B	C
Existing Landscape Visual Character	3.5	3	2-3	2	3	2.5
Degree of Visual Modification	4	4	<4	<4	4	4
Horizontal Visual Effect	3	3	1-2	1-2	3	3
Vertical Visual Effect	1	1	1	1	1	1
Distance of Visual Effect	2	2	2	2	2	2
Total Visual Effect	13.5	13	9-12	9-12	13	12.5
Overall Visual Effect	Moderate	Moderate	Slight	Slight	Moderate	Slight to Moderate
Visual Sensitivity	Substantial	Substantial	Neutral	Neutral	Substantial	Substantial

Overall Visual Effect Rating**		Visual Component Rating**	
5 to 8	Negligible	1	Negligible
9 to 12	Slight	2	Slight
13 to 16	Moderate	3	Moderate
17 to 20	Substantial	4	Substantial
21 to 25	Severe	5	Severe

* No exact figures were given by EDAW Gillespie. These figures have been interpreted from their report.

** These ratings are from Hassell (see Appendix E of the Hassell's Report which is contained in Appendix D of this Report)

It is noted from Table 3 that even with the adjustments made by the Department, the impact from Viewpoint B and C would still be rated generally in the moderate range, as identified by Hassell. When this is combined with a Visual Sensitivity of substantial, this indicates that the impact would still determined to be unacceptable.

The Department therefore considers that despite the position of EDAW Gillespie, mitigation would still be required to reduce the visual impacts upon the public viewpoints to an acceptable level.

Mitigation

As indicated above, Hassell used a combined qualitative and quantitative matrix approach to assess the visual impact of the windfarm. The report recommended that to achieve an acceptable outcome (ie using a combination of visual effect with visual sensitivity) the deletion of 30 turbines (or around 50% of the total windfarm turbines) was required.

As indicated above the evaluation by Hassell did not, nor was it required to, consider the broader economic and policy issues regarding renewable energy needs, economic efficiencies/wind energy yields and commercial viability aspects. The Department subsequently undertook a detailed review of the Hassell report and in addition considered a subsequent independent assessment by EDAW Gillespie. The review identified that the removal of 30 turbines would reduce the "visual effect" score for Viewpoints B and C by 4 points. However, according to the revised matrix (ie Table 3) only a reduction of 1 point and 0.5 point would be required to achieve acceptability (according to the Hassell matrix approach) for Viewpoints B and C respectively.

A reduction in 1 point and 0.5 point at Viewpoints B and C, respectively, could be achieved by either:

- reducing the *Distance of Visual Effect* score (i.e. deleting turbines close to the town) or;
- reducing the *Horizontal Visual Modification* score (i.e. deleting turbines to reduce the degree of horizontal spread around the town).

In investigating these two options, the Department found that to reduce the *Distance of Visual Effect* by at least one point, turbines up to five kilometres of the town would require deletion. This would result in the deletion of approximately 27 turbines, similar to that proposed by Hassell. Conversely, reducing the values by affecting the *Horizontal Visual Modification* requires significantly less turbines to be deleted. Given this, the Department considers that this latter approach would be a more valid option to pursue in the interest of achieving a viable windfarm.

At Viewpoint B, the horizontal field of view was measured as 95 degrees. If turbines were deleted and/or moved to reduce the angle to 80 degrees, a one point reduction in the *Horizontal Visual Modification* score would occur and consequently, the overall visual effect for Viewpoint B would be reduced to 'slight'.

This could be achieved by a number of options such as deleting/relocating turbines in the north, in the south, or a combination of both. In determining which turbines would be deleted/relocated, the Department consulted with the Applicant to determine whether there was a preference for which turbines were deleted based on individual turbine productivity and whether opportunities existed for relocation of any turbines.

From consultations with the Applicant, and as shown on **Figure 4**, it was determined that the 80 degree angle from Viewpoint B could be most effectively (i.e. minimum reduction in turbines) achieved by:

- deleting the four northern most turbines (T59 to T62);
- relocating four turbines (T5 to T8) by up to 250m to the north east subject to a staged consent and supplementary environmental assessment – see **Figure 5** for revised locations;
- deleting the southern most turbine (T1).

A re-evaluation of the visual impact (using the revised Hassell' matrix) with this mitigation strategy is shown in Table 4.

Table 4 Revaluation of scores with the deletion and relocation of turbines

Visual Components	**Table 3 Revised Scores**		**With Mitigation**	
	Viewpoint B	Viewpoint C	Viewpoint B	Viewpoint C
Existing Landscape Visual Character	3	2.5	3	2.5
Degree of Visual Modification	4	4	3.5	3.5
Horizontal Visual Effect	3	3	2	2
Vertical Visual Effect	1	1	1	1
Distance of Visual Effect	2	2	2	2
Total Visual Effect	13	12.5	11.5	11
Overall 'Visual Effect' Rating	Moderate	Slight to Moderate	Slight	Slight

Overall Visual Effect Rating**		Visual Component Rating**	
5 to 8	Negligible	6	Negligible
9 to 12	Slight	7	Slight
13 to 16	Moderate	8	Moderate
17 to 20	Substantial	9	Substantial
21 to 25	Severe	10	Severe

* No exact figures were given by EDAW Gillespie. These figures have been interpreted from their report.

** These ratings are from Hassell (see Appendix E of the Hassell's Report which is contained in Appendix D of this Report)

Table 4 shows that with the deletion of five turbines and the relocation of four turbines, the *Overall 'Visual Effect' Rating* for both Viewpoints B and C would drop from 'moderate' to 'slight'. When combined with a visual sensitivity score of 'substantial', the Department considers that this form of mitigation would enable the visual impacts on the public viewpoints (accepting the quantitative methods used by Hassell) to be acceptable.

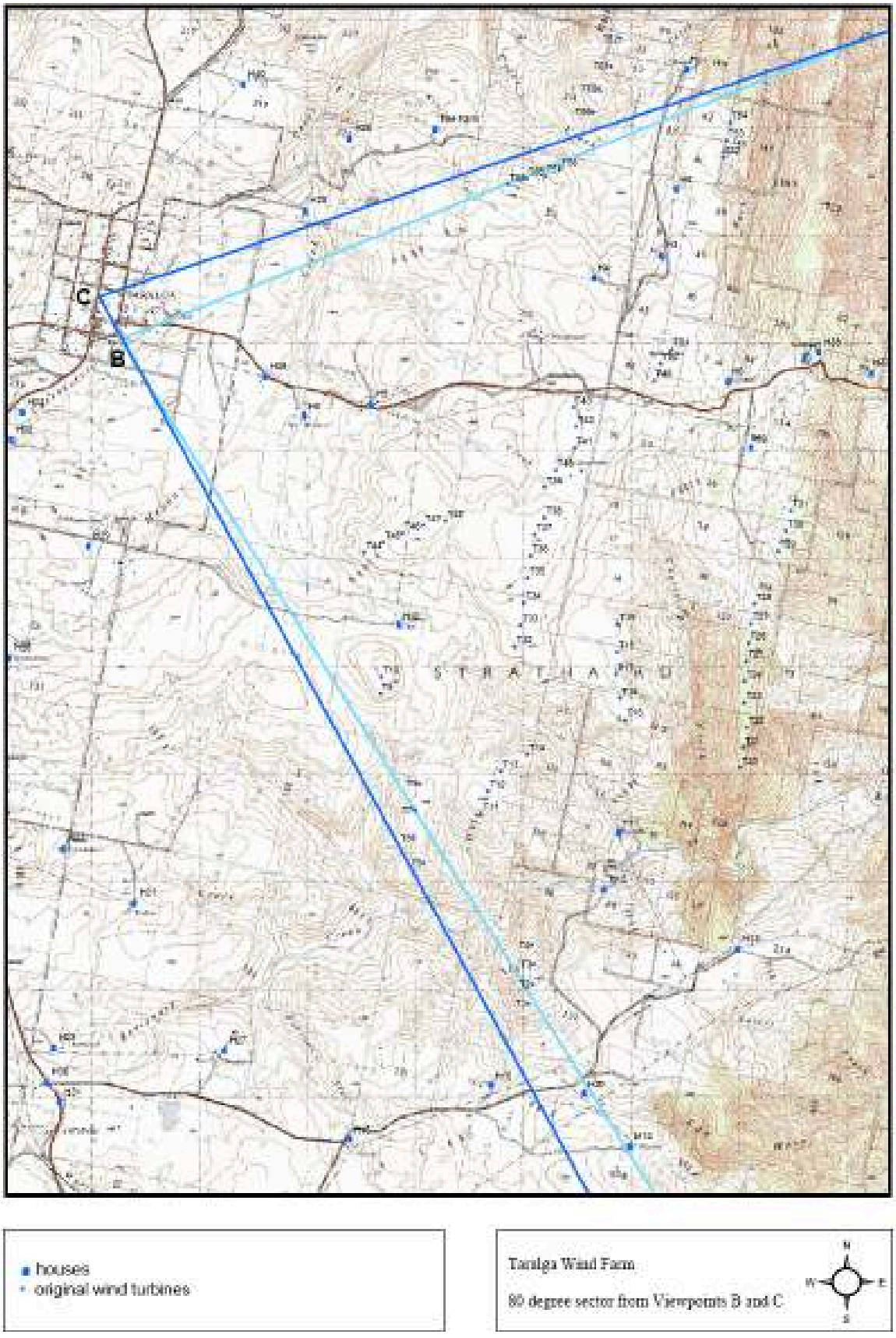

Figure 4 Eighty degree horizontal view angle from Viewpoints B and C

Figure 5 Relocation of turbines T5 to T8 as a result of 80 degree horizontal view angle

Department's Conclusion on Public Viewpoints

The Department acknowledges that the quantitative approach used by Hassell is but one tool in the assessment and that there is a need for some caution in using the analysis too literally.

In this regard, and in accepting a minimum mitigation measure, the Department has inherently given weight to the overall benefit of wind farms. That is, as part of the framework for the broader decision making, the Department has considered the severity of any residual impacts and the ability to manage these impacts within the context of the broader community. In addition, it has considered the environmental benefits of the proposal, in particular, the potential contribution of wind farms to the much broader state, national, and ultimately global, objective of greenhouse gas reduction.

As dealt with elsewhere in this assessment, wind farms would be consistent with the highest level of government and international policy. The Commonwealth Government's support for renewable energy provision is expressed through the National Greenhouse Strategy (NGS) and the Mandatory Renewable Energy Target (MRET) scheme, and at the State level through programs of the Sustainable Energy Development Authority (SEDA) which has been incorporated into the Department of Energy, Utilities and Sustainability (DEUS), the NSW Greenhouse Gas Abatement Scheme and the NSW Greenhouse Office.

In recognition that:

- the broad landscape setting for the wind farm is not unique;
- the closest turbine to existing residents from within the township of Taralga would be around 3 kilometres away;
- the views of the wind farm from town would be by large (but not always) filtered through built and natural forms and hence diminish the overall bulk and scale (refer to Photomontages 2 and 3 in **Appendix D**);
- the degree of visual effect from town would be 'slight' to a possible very conservative maximum of 'moderate';
- that there is some diversity of opinion in town towards the Proposal (albeit more against than supportive);
- there is a need for the developer to achieve an effective and efficient Proposal; and
- windfarms are a key contributor to providing renewable energy,

the Department considers that the Proposal with the adjustments described above would provide an acceptable balance between achieving an effective and efficient wind farm, and visual impacts on the township of Taralga.

6.1.5 Department's Consideration of Private Viewpoints

As discussed in Section 6.1.3, Hassell assessed the visual impacts upon four private residences not associated with the Proposal (H3, H5, H12 and 'the Farm' – Figure 1). Although several other non-associated residences in the locality may also have views of the turbines, these residences were not assessed in detail as the level of visual impact was considered to be acceptable.

Of the four non-associated residences, Hassell found that there would be a 'substantial' impact upon three – H3, H12 and 'the Farm'. H5 was found to have a 'moderate' impact. The report prepared by EDAW Gillespie concurred with Hassell's findings.

Hassell recommended that deletion of turbines was required to reduce the impacts upon these residences to a 'moderate' level. These residences have a lower level of visual sensitivity because of the lower number of affected viewers reduces the significance of the visual impact. Therefore a reduction to a 'slight' level, as required for public viewpoints, is not necessary . The Department accepts this approach.

In determining the level of mitigation, the number of turbines recommended for deletion for the public viewpoints must firstly be considered. As identified in Section 6.1.4, the Department recommends deleting four northern turbines (T59 to T62), relocating four turbines (T5 to T8) subject to a staged consent, and deleting the southern most turbine (T1).

A consequence of deleting T59 to T62 is that the visual impacts upon 'The Farm' will also be reduced. As shown in Table 5, this impact will be reduced from 'substantial' to 'moderate' using the Hassell's matrix. Although the Department calculated that the visual impacts for H3 would still be 'substantial', it has been advised that the Applicant has reached an agreement with the owners of this property. Specific mitigation for H3 is therefore not required.

However for H12, although the deletion of T1 will reduce the visual impacts upon this property, the impacts will still be considered 'substantial'. Further mitigation measures are therefore required. Using Hassell's matrix approach, the Department has determined that the deletion of turbines T1 to T4 and relocation of turbines T5 to T8 to the north east would reduce the visual impacts of the Proposal to an acceptable level (refer to Table 6).

Table 5 Revaluation of scores for 'the Farm' with the deletion of T59-T62

Visual Components	**Before Deletion**	**With Deletion**
	'The Farm'	'The Farm'
Existing Landscape Visual Character	3#	3#
Degree of Visual Modification	4	2
Horizontal Visual Effect	4	2
Vertical Visual Effect	2	2
Distance of Visual Effect	4	4
Total Visual Effect	17	13
Overall Rating	Substantial	Moderate

Overall Visual Effect Rating**		Visual Component Rating**	
5 to 8	Negligible	11	Negligible
9 to 12	Slight	12	Slight
13 to 16	Moderate	13	Moderate
17 to 20	Substantial	14	Substantial
21 to 25	Severe	15	Severe

* No exact figures were given by EDAW Gillespie. These figures have been interpreted from their report.
** These ratings are from Hassell (see Appendix E of the Hassell's Report which is contained in Appendix D of this Report)
# This score has been revised, as discussed in Appendix F

A potential consideration in deleting turbines is whether any associated residents (i.e. land owners who have turbines on their property) will become non-associated. The Applicant has advised that this will be the case for one resident, who resides at H15 (see Figure 1) if turbines T1 to T4 are deleted[5].

[5] Property identified in Figure 3.1 of the EIS as 'Tyrol'.

The Department has considered the visual impacts upon H15 and determined that the level of impact would be less than 'moderate', particularly as the nearest turbines (T5 to T8) would be more than 2km away. This level of visual impact is considered acceptable.

Table 6 Revaluation of scores for H12 with the deletion of T1 to T4 and relocation of T5 to T8

Visual Components	Before Mitigation	With Mitigation
Existing Landscape Visual Character	3#	3#
Degree of Visual Modification	5	4.5
Horizontal Visual Effect	5	3
Vertical Visual Effect	1	1
Distance of Visual Effect	4	3
Total Visual Effect	18.5	15
Overall Rating	Substantial	Moderate

Overall Visual Effect Rating**		Visual Component Rating**	
5 to 8	Negligible	16	Negligible
9 to 12	Slight	17	Slight
13 to 16	Moderate	18	Moderate
17 to 20	Substantial	19	Substantial
21 to 25	Severe	20	Severe

* No exact figures were given by EDAW Gillespie. These figures have been interpreted from their report.
** These ratings are from Hassell (see Appendix E of the Hassell's Report which is contained in Appendix D of this Report)
# This score has been revised, as discussed in Appendix F

The Department also considers that landscaping should also be provided to rural residences to further minimise visual impacts, where possible. Although it recognises that the size of the turbines means that they are unlikely to be able to be fully screened by vegetation, the Department considers that the provision of landscaping on site and on neighbouring properties would further reduce the potential visual dominance of the turbine(s), as well as providing a form of offset for impacted rural residences.

In order to mitigate broader visual impacts arising from the proposal, the Department recommends the Applicant implements On-Site and Off-site Landscaping Plans to further mitigate visual impacts arising from the Proposal (Recommended Conditions No.31 and 32).

6.1.6 Conclusion

The Department considers that the Hassell's report and its critique by EDAW Gillespie, along with the submissions received provide the Department with a comprehensive and transparent basis on which to assess the visual impacts of the proposal. The Hassell's matrix provides a useful method to assess the visual impacts of the proposal and to determine the level of mitigation required. However, the Department has reviewed some areas of the application of the methods particularly with respect to the impact upon the public viewpoints within the town of Taralga.

The Department considers that the visual impacts on the public viewpoints and three private viewpoints require mitigation and that the Hassell's matrix is an appropriate tool to determine the level required. It considers that to reduce visual impacts to an acceptable level, the overall visual effect from Viewpoints B and C, located within the township of Taralga, should be reduced from

'moderate' to 'slight'. For the private viewpoints, a 'moderate' impact is acceptable as viewer sensitivity is substantially less than from the public viewpoints.

To achieve an acceptable visual impact upon both the public and private viewpoints, the Department recommends the following mitigative strategies which are reflected in Recommended Conditions No.**Error! Reference source not found.** and **Error! Reference source not found.**:

- deletion of eight turbines (T1 to T5 and T59 to T62); and
- staged consent for four turbines (T5 to T8) subject to the proposed relocation of these turbines so that they are within the 80 degree horizontal view angle from Viewpoint B (see Figure 4) and further environmental assessment of key issues.

To further minimise visual impacts, and to provide a form of offset for impacted residences, the Department also recommends the Applicant to implement On-Site and Off-Site Landscaping Plans (Recommended Conditions No.31 and 32).

6.2 Operational Noise

This section addresses issues relating to operational noise. Construction noise issues are addressed in Section 7.2.

6.2.1 EIS

The EIS addressed both construction and operational noise issues. A more detailed assessment of operational noise issues was provided in Appendix H to the EIS (Noise Impact Assessment). This Section also identifies updates made by the Applicant to the EIS assessment.

The noise performance criteria for the wind farm were derived from the South Australian Environmental Protection Authority's *Wind Farms: Environmental Guidelines* (2003) (SA Guidelines). These guidelines have been adopted by the NSW Environment Protection Authority (EPA) as the basis for the noise assessment of wind farm projects[6]. The guidelines specify the following noise criteria for new wind farms:

> "*The predicted equivalent noise level (LAeq,10) adjusted for tonality in accordance with these guidelines should not exceed:*
>
> - *35dB(A); or*
> - *the background noise (LA90,10) by more than 5 dB(A).*
>
> *whichever is the greater, at all relevant receivers for each integer wind speed from the cut-in to rated power of the turbine*".

The SA Guidelines require that background noise measurements be carried out on surrounding sensitive receivers likely to be impacted by noise from the proposed wind turbines. Generally, a valid measurements position is within 20 metres of a residential dwelling (or at a site where a development approval has been granted for a residential dwelling), in the direction of the proposed wind farm, and at least 5 metres from any reflecting surface. The SA Guidelines state that "*background noise is measured at relevant receiver locations over continuous 10-minute intervals*

[6] Note the EPA is part of the Department of Environment and Conservation (DEC). However, the DEC exercises certain statutory functions and powers in the name of the EPA, including in relation to Environment Protection Licences.

and particularly over the range of wind speeds at which the WTGs (Wind Turbine Generators) operate. The data must adequately represent conditions at the site and cover approximately 2000 intervals".

Noise levels were predicted for the nearest 41 residential properties at wind speeds 6ms^{-1}, 8ms^{-1} and 8.6ms^{-1} to determine compliance with the SA Guideline. Noise modelling was used to determine the noise levels at these residences using the ISO 9613 Part 2 model. The EIS states that this model is the most appropriate for use in rural settings and accounts for geometric spreading, atmospheric absorption, ground effects and barriers. Validation studies have demonstrated that the ISO 9613 model tends to overestimate noise levels at nearby dwellings. The predicted noise levels in the Noise Impact Assessment are based on sound power level (L_W) data for a NEG Micon NM82-1650 WTG.

The results of the predicted noise levels at these properties, for the three wind speeds, were presented in Table 1.4 of Appendix H to the EIS.

Background noise monitoring was undertaken at the following sites (see Figure 1):

- H 9,
- H 10, and
- H 16.

These three residences were chosen to represent the residences located in the vicinity of the Proposal, as they were determined by the Noise Impact Assessment to be the most noise sensitive dwellings and likely to be representative of the other dwellings, enabling indicative background levels to be inferred for all of them.

Houses were placed in three groups and a representative house (i.e. H9, H10 and H16) was selected from each group. The representative house was chosen to represent the worst case in terms of highest predicted noise emission levels from the turbines and equal or lower predicted background noise.

Recommended noise levels, based on the SA Guidelines, for the three residences (and therefore the three groups) were specified in Table 1.6 of Appendix H. Table 1.7 provides a comparison of predicted noise levels at all 41 properties, with noise limits based on the SA Guidelines[7]. It indicates that the predicted noise levels would be within the noise limits at all of the properties, at all three wind speeds modelled. It should be noted that this assessment was undertaken on the original 69 turbines that comprised the proposal described in the EIS. As indicated in Section 3.1, the Applicant subsequently removed seven turbines, resulting in one residence (H1) changing its status from associated to non associated. The Applicant provided information on the 15 March 2005 which assessed the implications of this change, including the noise implications.

The noise modelling showed there may be some minor exceedances of the SA Guidelines (different criteria had been applied when H1 was associated). However, the Applicant has argued that, because of the conservative nature of the modelling, it is unlikely that the SA Guideline criteria will be exceeded in practice. The Applicant has also indicated mitigation options are available

[7] Note that some adjustments (increased lower noise limit from 35 dB(A) to 40 dB(A) were made for properties associated with the wind farm, as they have a financial interest in the proposal

should noise prove to be a problem, such as turning off turbines at certain wind speeds or operating turbines at low speed mode.

The Applicant provided noise information on a property known as 'the Farm' (Figure 1), which had been overlooked in the EIS noise assessment. This noise assessment stated that noise levels would be below SA Guideline criteria at all modelled wind speeds. The EIS also addressed low frequency noise (i.e. $20H_Z$ to $200H_Z$ range) and vibration. It concluded that noise in the low frequency range and vibration are unlikely to be problematic.

6.2.2 Issues raised in submissions

Public submissions

Forty-eight submissions were received by the Department where noise was cited as a concern. The following issues were raised:

- noise from turbines;
- low frequency noise and associated health problems;
- noise impacts will result in loss of sleep, health problems and loss of amenity;
- noise levels are not appropriate for a rural setting, in particular the affects on livestock;
- the accuracy of noise predictions in the EIS including the ability of the noise modelling to predict overnight noise levels due to low ground level wind speeds (i.e. wind speeds measured at 10m, when the turbines are much higher) and the absence of a number of properties in the noise modelling.

EPA comments

The EPA is an integrated approval body for this development proposal, responsible for licensing noise impacts from the wind turbines – an Environment Protection Licence (EPL) will be required for the proposal to be able to proceed.

During the exhibition period, the EPA raised a number of issues including:

- the background noise monitoring assessment – whether the monitoring locations are properly representative of other residences;
- the assessment criteria used in the noise impact assessment – the EPA questioned the raising of the base level criteria from 35 to 40 dB(A) for associated dwellings;
- the modelling of noise impacts based on the NM82-1650 Wind Turbine Generator and noise impact predictions contained in the EIS;
- concerns with the ISO9613 noise model including that it has not been used to predict the impact of wind speeds above 5m/s, errors of +/- 3dB(A) can be expected using the calculation algorithms of the ISO9613 standard and that there are limitations to the application of the ISO9613 standard to wind turbine noise where there are large heights above the ground and large propagation distances.

This resulted in the EPA stopping the 'deemed refusal clock'. The Applicant provided responses and clarifications to the EPA. However, the EPA was not satisfied with the initial responses, and there were subsequent requests for additional information/clarification and, consequently, further 'stop the clocks'.

Following further reviews of the information provided, the EPA advised the Department on 7th April, 2005, that it would be able to issue an EPL and provided its General Terms of Approval (GTAs) relating to noise licensing and other matters[8].

Subsequent to the issue of these GTAs, the Applicant raised a number of questions about the GTAs and provided noise information on a property known as 'the Farm', which had previously been overlooked in the EIS noise assessment. These matters were referred to the EPA.

As a consequence of this information, the EPA has made certain amendments to its GTAs, dated 21st July, 2005. It accepted that predicted noise levels at 'the Farm' would not exceed SA Guideline criteria. It also made some changes based on the Applicant's submission. However, not all of the Applicant's submission was accepted. It further amended these GTAs on 29th July, 2005, by adding conditions dealing with noise limits for residences located on properties associated with the wind farm proposal.

6.2.3 Consideration of Issues

Noise Assessment

The Department worked closely with the EPA to reach a position regarding noise impacts resulting from the operation of the Proposal.

As noted above, the EPA requested additional information on background noise monitoring to determine if the monitoring locations were properly representative of other residences. The Applicant produced additional information demonstrating that the representative houses used in the noise monitoring were worst case for predicted noise levels and had equal or lower predicted background noise. The Department is satisfied that the background noise monitoring undertaken by the Applicant at surrounding residences provides an adequate basis to identify appropriate noise criteria at each of these receivers at specified wind integers, in line with the requirements of the SA Guidelines.

The EPA requested that the Applicant acknowledge the SA Guideline criteria will be exceeded at some residences, and that Table 1.7 from the Noise Impact Assessment reflects this. This request was made in response to the Applicant using a base value of 40 dB(A) for residences associated with the development. The Applicant subsequently revised Table 1.7. The amended noise assessment, which also included an expanded range of wind speeds compared to the EIS Noise Impact Assessment, was presented in Tables 1.7a, 1.7b and 1.7c, submitted to the Department on 17th February, 2005. This clarification enables a better appreciation of noise impacts at associated properties and ensures additional information on noise impacts can be provided to associated land holders. However, these revised tables remain incomplete because:

- H1 is treated as an associated residence. As indicated above, its status has now changed to non associated;
- Data for 'the Farm's not included. As indicated above, additional data has now been provided;
- Changes in predictions resulting from additional modelling, accounting for circumstances where the ground level falls away significantly between the noise source and receiver – see discussion below;

[8] Note: the EPA was advised by the Department, prior to the issuing of its GTAs that the status of H1 had changed from associated to non associated.

- Recommended deletions to turbines and potential location changes, resulting from the Department's visual assessment – see discussion below.

The EPA requested additional information about the ISO9613 validation model. It is noted that calculation algorithms in ISO9613 for wind effects are outlined in the standard to come from ISO1996-2:1987 which considers wind speeds of between 1m/s to 5m/s. The EPA requested further information to demonstrate that propagation effects at wind speeds above 5m/s have been adequately considered in the propagation model. The Applicant provided field tested sound power levels for wind speeds 6m/s, 7m/s, 8m/s and 8.6m/s to demonstrate that sound power levels used in the noise impact assessment were appropriate and conservative.

The Applicant provided further information about whether sound power levels from other short listed turbines will not exceed those levels modelled using the NM82-1650 WTG. The Applicant has indicated that the final wind turbine selection will account for acoustic emissions to ensure that noise levels predicted in the noise impact assessment will be taken into account, and not exceed predicted noise levels.

The Applicant also made some corrections to the noise impact assessment to account for errors expected in the calculation algorithms and for circumstances where there are large heights above ground and large propagation distances.

It should be noted that the revisions to Table 1.7 do not reflect the +3dB(A) correction to the ISO 9613 model recommended for circumstances where the ground falls away significantly below the line of sight between the source and the receiver. The Applicant confirmed (in correspondence to the Department dated 3rd March 2005) that the +3dB(A) correction will result in exceedence of the SA guidelines at H3 by 1.0 dB(A) at 6 m/s wind speed and at H12 by 1.5 dB(A) at 7 m/s wind speed. Further, predicted noise levels for houses associated with the development (H2, H4, H6, H9 and H10) will be slightly higher than those presented in the revised Table 1.7. The Applicant has argued that these impacts represent a conservative approach, resulting from making worst case assumptions. It also emphasised that mitigation measures are available to ensure that noise levels will be below criteria. The Department has also been advised that the Applicant has reached an agreement with the owners of the property referred to as H3. Noise mitigation at this property is no longer required.

As discussed in Section 6.1.6, the Department is recommending the following changes to the Proposal on visual grounds:

- deletion of eight turbines (T1 to T4 and T59 to T62); and
- staged consent for four turbines (T5 to T8) involving relocation and further environmental assessment.

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No additional noise modelling has been required to account for these recommended changes.

The deletion of eight turbines will result in a noise reduction in the northern and southern sections of the proposed site. The other four turbines would require a further consent before they can be constructed. A noise assessment will be required before any determination is made on whether to approve these turbines.

Another consequence of deletion is that one associated property ('Tyrol Property - H15) would become non-associated. Given H15 would be over 2 km away from nearest turbines (T5 to T8) noise impacts are likely to be minimal.

The Department is satisfied that the revised Noise Impact Assessment in response to requests by the EPA is appropriate and conservative predictor of potential noise impacts at residences adjacent to the development.

Off site noise impacts

Taking into account revisions to the Noise Impact Assessment provided to the Department, the following exceedences to the SA Guidelines are predicted at some wind speeds at non-associated residences:

- H1: 0.8 dB(A) at 3m/s, 0.8 dB(A) at 4m/s, 0.8 dB(A) at 5 m/s, 1.0 dB(A) at 6m/s, and
- H12: 1.3 dB(A) at 7m/s.

It is noted that the noise assessment uses conservative assumptions and in practice may over predict noise levels at residences. Nonetheless, the Applicant has committed to undertake sector management to ensure that these exceedences do not occur in practice. In correspondence with the EPA, the Applicant has demonstrated that feasible sector management strategies are available to ensure that noise exceedences can be prevented at non-associated residences. These management strategies include turning off turbines at particular wind speeds (including T49-T53 and T60-62 at 6m/s, and T11, T12, T14 at 7 m/s) and operating turbines at low noise mode at particular wind speeds. These mitigation measures are considered feasible by the Applicant.

It is noted that the recommended deletion of turbines will result in reduced noise levels at some residences. In particular noise levels should be reduced at H1 and H12.

The EPA's GTAs provide clear guidance on the noise limits to be achieved at each residence. These limits are presented in the table to Recommendation No.39. At all other non associated residences (i.e. those not identified in the table) noise from the Taralga wind farm must not exceed 35 dB(A).

Some sector management strategies may be required in order to meet the noise limits specified in the table. Prior to the operation of the wind farm, the Applicant will be required to submit to the EPA details of a Noise Compliance Assessment Plan (Recommendation No.44). This must demonstrate how compliance with the noise criteria specified in the Recommended Conditions (Section 10) will be achieved. In addition, the Applicant will be required to undertake monitoring to demonstrate compliance with the noise criteria (Recommendation No.45). It will be required to investigate and propose management measures, should noise criteria be exceeded.

On-site noise impacts

The Department notes that exceedences to the SA Guidelines are predicted at some residences associated with the development. Exceedences are predicted to occur at the following residences at some wind speeds (based on the revised table 1.7): H2, H4, H6, H9, and H10. The Department acknowledges that in practice the noise impacts at these residences may not be as high as predicted – the EPA has accepted that the noise model is conservative.

The Department accepts that any financial agreement undertaken between the Applicant and an associated landholder will in part compensate for any loss of amenity due to noise. It is important, however, that associated landholders be fully informed of noise impacts at their residences. The Department, therefore, has recommended that the Applicant disclose the noise impacts at residences when entering into a financial agreement with a land holder about the placement of turbines on their land. Noise levels at associated residences will not be required to meet the noise criteria specified in the Department's Recommended Conditions. However, there will still be a

need to comply with SA guideline requirements for minimising impacts on the amenity of associated residences (Recommendation No. 43).

Low frequency noise

Several submissions were concerned specifically about the health effects of low frequency noise emissions from wind turbines on nearby residents. Submissions described that turbines were responsible for a variety of potential health impacts. The Department has chosen to review this issue in more detail in order to determine the extent to which low frequency noise is emitted from wind turbines, and whether low frequency noise at these levels will represent a health impact to people living close to wind turbines. The bulk of the literature clearly states that low frequency noise is not emitted from modern wind turbines at levels perceptible to the majority of people. The health literature is conclusive in stating that no health effects will occur at low frequency noise levels below the level of perception. The Department is satisfied that no health impacts will occur due to low frequency noise from the proposed development. The EPA has provided advice which concurs with this conclusion.

6.2.4 Conclusion

The Department acknowledges the concerns raised by residents about the potential amenity impacts relating to noise impacts of the proposed development. The Department has assessed the noise impact assessment and considers that, with the additional information provided, the Applicant has effectively demonstrated the robustness of the noise modelling and predicted noise levels.

The noise modelling predicts that small exceedences to the SA guidelines may occur at H1 and H12 (although this is likely to be mitigated by the recommended deletion of turbines). Accordingly, the Applicant will be required to implement sector management strategies where necessary to ensure that these exceedences do not occur in practice. These sector management strategies will be outlined in the noise compliance assessment plan to be submitted to the EPA prior to the commissioning of the wind turbines.

Clear noise criteria have been set in the Recommended Conditions (Section 10), in line with EPA specifications, which should ensure that any potential impacts on neighbouring residences' amenity is minimised or avoided. Monitoring will be required to ensure compliance.

It should be noted that the EPA has indicated that it will be able to issue an Environment Protection Licence.

6.3 Flora and Fauna Impacts

6.3.1 EIS

The flora and fauna assessment was based on targeted survey and review work, including a review of relevant State and National databases. Field studies were undertaken for the Proposal over five days (2 and 3 July 2004; 1 and 2 September 2004), involving:

- flora observations and representative samples across the entire site;
- opportunistic fauna observations;
- spotlighting in woodland remnants (6 sites);
- amphibian searches (water depressions and farm dams);

- reptile searches, including targeted searches for threatened species, at all suitable habitat adjacent to proposed wind turbine rows (tracks, log turning, rock lifting);
- bird surveys and counts (12 sites), including targeted searches for raptors and threatened species (raptor observations along ridgelines);
- estimation of bird flight heights and flight paths;
- an assessment of bat habitat suitability; and
- mapping of vegetation and habitat features in the vicinity of the Proposal (1:50,000).

The study area is dominated by highly disturbed rural landscapes with modified woodland remnants. The ground layer consists of exotic and some native species. Continuous grazing prevents the regeneration of trees, shrubs and many native grasses. Relatively large areas of native vegetation occur in the east of the study area, particularly along ridgelines. The vegetation extending from the east of the Proposal forms a continuous corridor between significant conservation areas in the region. The vegetation in the vicinity of wind turbine row 6 represents an isolated western edge of this corridor.

A majority of the study area provides limited habitat potential for fauna due to a lack of vegetative structure and limited foraging/feeding resources. However, the vegetated ridgelines to the east of the Proposal provide habitat resources for woodland birds and bats and provide a fauna corridor function.

The Proposal would result in direct disturbance of grassland. To facilitate the placement of wind turbine row 6, clearing of extant native woodland would be required.

Exposed rocky outcrops across the study area provide habitat of varying quality for reptiles. Potential habitat occurs for one threatened reptile species, the Little Whip Snake (not recorded).

Operational Impacts

Operation of the Proposal is not expected to create any significant impacts on vegetation, woodland birds, ground-dwelling mammals or reptiles. There is potential for bird/bat strike for locally occurring raptors, migratory passerines and migratory bats. The Proposal is not located in the vicinity of major water courses, wetlands or important waterbird areas.

Raptors would have a moderate risk of being struck by turbines and this could have an impact on local Wedge-tailed Eagles. This species has a large home range and a low reproductive rate.

The risk of striking turbines migratory passerines is considered moderate, but the number of birds exposed to this risk would be low.

The EIS notes the potential for bat strike is uncertain, but likely to be low. Farm dams currently attract foraging bats.

The EIS concludes that the low abundance of birds, behaviour of bird and bat species and implementation of the proposed mitigation measures would reduce the risk of bird strike to an acceptable level.

Flora and Fauna Management

The EIS identifies a number of mitigation measures that would be implemented during construction to ensure that impacts on flora and fauna are avoided or minimised. These would include:

- vegetation pre-clearance surveys;
- relocation of suitable hollows if necessary;
- micro-siting of turbines to avoid positioning turbines in the vicinity of farm dams, or relocating dams;
- flagging of areas to be avoided during construction;
- pest and weed control;
- implementing standard erosion and sedimentation controls during construction; and
- rehabilitation of disturbed sites.

During operation, the EIS proposes monitoring of bird and bat collisions. The EIS does not provide further details on this aspect of the Proposal.

6.3.2 Issues raised in submissions

26 submissions raised concern that the Proposal would adversely affect flora and fauna on site. These concerns included:

- flora and fauna surveys were inadequate, in particular the absence of autumn and spring surveys and surveys undertaken in drought;
- many species were not considered in the EIS considered;
- impact of blade strike on bird and bat species and that insufficient assessment has been undertaken on these impacts; and
- impact of noise on flora and fauna.

6.3.3 Consideration of Issues

Adequacy of Survey effort

The flora and fauna impacts of the Proposal have been subject to a reasonable assessment of the proposed turbine sites and the surrounding area, including bird use and movement surveys. The Department considers the ecological survey work undertaken to be satisfactory. The Department supports ongoing ecological survey and monitoring of bat species as proposed in the EIS and recommends that the Applicant is required to undertake this work (see Recommendation No.81).

Impacts of turbines

With the exception of Row 6 (T20 to T28), vegetation and habitat disturbance is limited to cleared grazing land composed mainly of introduced ground species and isolated trees. All areas identified for access tracks appear to have been previously impacted by grazing or existing farm tracks. The Construction Flora and Fauna Management Sub Plan (Recommendation No.78) would ensure that micro-siting of turbines and location of access tracks are undertaken consistent with the avoidance principle identified in the EIS.

Disturbance of woodland vegetation for the placement of turbines would typically result in a footprint of approximately 0.2ha per turbine, of which 80% could be reinstated after erection. No permanent barrier to fauna movement would be created as a result of clearing.

The direct and indirect impact of each row is described in Table 5.

Table 5 Direct and indirect impact of each turbine row.

Row	Direct Impact	Indirect Impact
1	Open grazed ridge with small rocky outcrops. Adjacent vegetation is fenced.	Stock camp may attract birds
2	Open grazed grassland	
3	Open grazed grassland	
4	Open grazed ridge with small rocky outcrops. Adjacent vegetation is fenced.	
5	Open grazed ridge with small rocky outcrops. Up to 30 small trees removed.	Adjacent woodland provides 'stepping stone' habitat – potential for bird strike. Stock camp and farm dam may attract birds
6	Woodland in good condition with complex ground cover present.	Minor clearing adjacent to vegetation corridor. Adjacent woodland provides good bird and bat habitat.
7	Grazed grassland adjacent to woodland (no tree removal required).	Adjacent woodland provides good bird and bat habitat. Farm dam may attract birds and bats.
8	Open grazed grassland with rocky outcrops.	Planted wind break may provide perching site. Farm buildings and shearing shed may attract birds
9	Cultivated and cropped paddocks	
10	Previously cropped paddock now grazed. Small rocky outcrops	
11	Grazed sheltered site with potential for restoration to native grassland.	Adjacent woodland provides 'stepping stone' habitat – potential for bird strike. Stock camp may attract birds.
12	Open grazed hilltop with rocky outcrops	Stock camp may attract birds

Turbines proposed at row 6 would result in disturbance of native woodland. The Department remains concerned about the potential impact of clearing native vegetation. The Applicant has indicated that the disturbance zone would be smaller at row 6 by adopting a specialised construction technique:

> *Although more time consuming, the modified method would avoid clearing a larger area for construction. The method involves erecting the towers in sections and lifting the nacelle into position as for the standard methodology. However, the rotor hub and individual blades would be lifted into position on the nacelle with four separate lifts. This avoids the requirement to assemble the three bladed rotor on the ground and therefore reduces the amount of cleared land required at the tower base for the rotor lift. Figure 29.2* [figure 6] *shows the construction layout used recently for turbines erected in a forested area on another RES windfarm. For Row 6, RES Southern Cross will negotiate with the turbine manufacturer for the use of a similar construction layout, with the purpose of minimising the clearing required.*

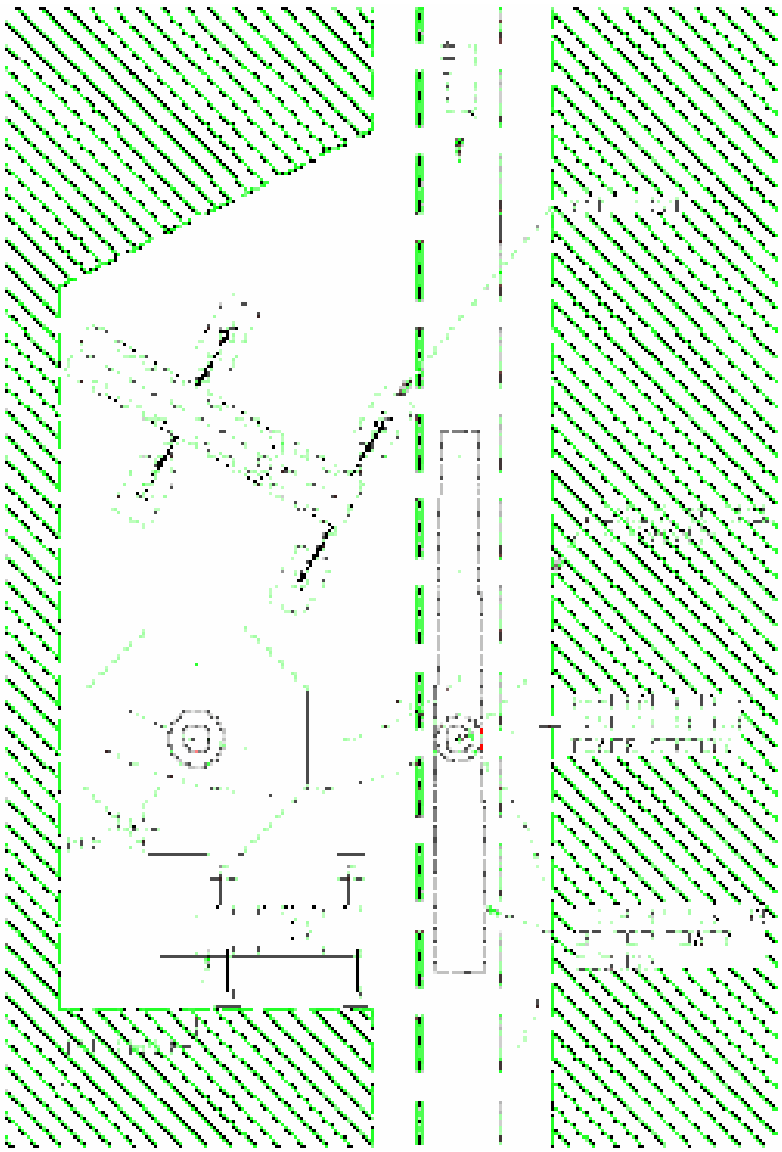


Figure 6 Proposed single blade lift construction layout on the wooded ridge

The Department notes that the ridge top in the vicinity of row 6 is sparsely populated with trees possibly due to a previous access road along the ridge which has since become over grown. Additionally, some clearing has occurred due to placement of a wind monitoring tower.

Whilst the Department supports the modified construction technique, it is critical that vegetation disturbance is minimised through micro-siting and careful work practices. The Department's Recommendation No.79 would ensure that all vegetation outside of the construction footprint is flagged and protected. Additionally, rehabilitation would occur following construction, as required by Recommendation No.78 .

The Department considers that fauna movement within and adjacent to wind row 6 would not be affected by operation of the wind turbines. Habitat corridors to the east of the Proposal would remain after the construction and rehabilitation associated with wind row 6. The minor permanent clearing would not affect the ability of fauna to move though the area.

Impacts on threatened species

The Department notes that no intact natural grassland community exists in the vicinity of the proposed turbine sites. Also, the potential recovery or succession of any areas of Natural Temperate Grassland (listed under the Commonwealth EPBC Act) in the study area would not be impeded by the Proposal.

The Department concurs with the conclusions of the eight part tests for threatened species. However, mitigation measures and ongoing monitoring is required to manage potential blade strike issues.

Flora and fauna management

Overall, the Department supports the proposed strategies and commitments outlined in the EIS to minimise construction impacts.

The EIS notes that the potential for the turbines to generate on-farm income would enable landowners to adjust stocking rates such that a better groundcover is maintained throughout the year. Whilst this is not a typical mitigation measure and can not be enforced by the Department, it is an ecological and farm management benefit that is acknowledged and supported.

Whilst the risk of blade strike for birds and bats is identified as low in the EIS, mitigation measures are still required, particularly a comprehensive monitoring program and an adaptive management framework to respond to any issues. Additional ongoing monitoring is recommend for bats, particularly migratory species, due to the lack of knowledge regarding potential impacts[9].

The Department supports an adaptive approach to monitor and minimise this impact. Monitoring programs would trigger the need for mitigation action should carcass finds at any one turbine site exceed pre-determined numbers. Mitigation actions would include further monitoring of relevant bird usage movements and development of practical deterrents to achieve a reduction in bird/bat mortality. Examples of reasonable and feasible mitigation measures that could be implemented to ensure that bird/bat activity is reduced include:

- minimising the availability of raptor perches;
- modifying structures to prevent perching;
- management of lambing;
- swift carcass removal;
- pest control, including rabbits;
- management of stock (grain) feeding;
- filling in of small dams that might attract insects and birds;
- use of deterrents (eg. flags, marker balls); and
- minimising external lighting.

[9] Based on available evidence (Erickson *et al* 2003, *Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments*, prepared for Bonneville Power Administration), it does not appear that bat mortality involves resident bats foraging within the wind plant or commuting between foraging and roosting areas. This may be due to the use of echolocation and the ability to navigate through complex environments. Bats are also able to detect large landscape and background features by echolocation out to 100 m. Additionally, foraging usually occurs a heights below typical wind blades. Bat collision mortality documented at other structures indicates that migrant bats (that would generally not be echolocating) are at higher risk.

Should the above measures fail to reduce bird/bat activity and/or impacts, turbine management may be required. This might include the turning off of turbines that are predicted to cause unacceptable bird/bat mortality at identified times. Additional measures identified from research undertaken at other wind farms may also reduce the incidence of bird/bat strike.

Recommendation No.80 requires the development of an Operation Flora and Fauna Management Plan, to implement a variety of the mitigation measures outlined above. An ongoing Bird and Bat Adaptive Management Program is also recommended (Recommendation No.81). The Applicant must employ a suitably qualified expert to undertake ongoing monitoring of bird and bat species during operation of the Proposal. This Recommendation also requires the Applicant to clearly demonstrate what actions will be undertaken if the monitoring results show a prevalence of bird and bat strike. All reasonable and feasible measures are to be implemented by the Applicant which may include switching off turbines during certain seasons. The Department considers that mitigation measures implemented through the program would reduce the risk of bird and bat strike to an acceptable level.

6.3.4 Conclusion

The Department has assessed the key issues relating to the potential flora and fauna impacts of the Proposal. The Proposal would result in removal of some vegetation. Provided appropriate management strategies to minimise clearing of vegetation and rocky habitat and manage erosion and sedimentation, construction would not result in any significant impacts on flora and fauna.

The key risk during operation of the turbines relates to bird and bat strike. However, this risk is considered low. The Department recommends a number of comprehensive management strategies and minimum standards for bird/bat monitoring to direct adaptive management strategies as required. The Proposal would be unlikely to affect the long-term viability, or contribute to the extinction, of any threatened species.

6.4 Property Values

6.4.1 EIS

The EIS notes that there are several factors which impact on the land values of a particular property including:

- changes in the income earning potential of property,
- aesthetic appearance and scenic views,
- changes in natural vegetation and ecology,
- noise, and
- regional property trends.

The EIS also notes that the key concerns relating to property value include:

- lost capital appreciation of land value because of a reduced capacity to sub-divide and develop land for residential purposes;
- loss of income from tourism businesses; and
- reduced returns on property sales because of loss of amenity and changing views.

The EIS argues that providing these potential impacts on surrounding properties are minimised then property values surrounding the Proposal will not be significantly reduced. It also states that

there is no evidence to suggest that property values are reduced by proximity to wind farm development. The following evidence was provided to support this:

- observations of 15 properties in Salmon Beach WA, found that only one reduced in value after the wind farm was constructed,
- a comparison of property sales records within five miles (8.05km) of wind farms to comparable surrounding areas/ counties was undertaken in the USA. In all but two of the studies the authors found a strong increase in prices in the view sheds relative to the comparable surrounding areas[10].
- two public opinion surveys for wind farm developments in Wales and Scotland, commissioned by National Wind Power, a major wind developer in the UK. Respondents from Scotland indicated that house prices have not decreased because of the wind farm and 78 per cent of respondents in Wales indicated that wind farm had no impact on property prices.

The EIS states that capacity for future subdivision is limited as subdivision of agricultural land is contrary to the local Council's settlement strategy. There is also no evidence that tourism is reduced by wind farm development (see Section 7.9).

6.4.2 Issues Raised in Submissions

Seventy-three submissions received raised concerns that the Proposal would result in a reduction in property values. These submissions indicated that land values would primarily be affected by the visual impact of the wind turbines and alterations to the rural character of the landscape. Several submissions stated that property valuers in the local area and experience from other wind farm sites in Australia and internationally support these claims.

Others argued that overseas studies cited in the EIS are not relevant. Concern was raised that property values had declined in South Gippsland since the development of wind farms in that region.

Several submissions in support of the Proposal stated that the wind farm would have a positive impact on property prices by securing income for farmers and preserving rural use of the land.

6.4.3 Consideration of Issues

The Department notes that the impact of property values of neighbouring properties resulting from the Proposal is a key concern. The Department has therefore sought to identify the studies that have been undertaken, albeit limited, in regards to this matter.

The Renewable Energy Project Policy in the USA used statistical property sales data to determine whether wind farm development harm property values[11]. The study found that for the great majority of project, the property values in the view shed actually went up faster than values in the comparable regions.

[10] Sterzinger, Beck, Kostuik (2003). Renewable Energy Policy Project: The Effect of Wind Development on Local Property Values. Washington, USA

[11] Sterzinger, Beck, Kostuik (2003). Renewable Energy Policy Project: The Effect of Wind Development on Local Property Values. Washington, USA

A survey of chartered surveyors by the Royal Institution of Chartered Surveyors (RICS), published in November 2004 sought to evaluate the impact of wind farms on property prices for residential and agricultural land. Survey results entitled ''*Impact of wind farms on the value of residential property and agricultural land*' identified the following. It should be noted that the survey did not provide quantifiable property sales figures to support these opinions.

- 60% of respondents suggested that wind farms decrease the value of residential properties where the development is within view;
- 67% indicate that the negative effect of property prices begins when a planning application to build the wind farm is lodged;
- the negative impact on property values continues to become less severe after two years or so after completion; and
- 63% suggested that wind farm do not influence the value of agricultural land, whist an additional 9 per cent suggested that wind farms had a positive effect on agricultural land value.

The Bald Hills Wind Farm Panel Inquiry in Victoria examined the issues of property devaluation for neighbouring properties. Several property valuers and real estate agents appeared before the Panel Inquiry as expert witness on this matter. From a review of this evidence the Panel concluded that the effect of wind energy facilities on surrounding property values is inconclusive, beyond that the position that the agricultural land component of value would remain unchanged. The Panel states that it had not been demonstrated that significant value changes, transfers or inequities would result from the project proceeding.

There is no evidence before the Department to support the concern that the property values of neighbouring properties are likely to decline as a result of the Proposal. The Department considers that any long term impact on property value from wind farms would be the results of impacts on noise, visual amenity or development and agricultural potential of the land. These issues are considered in detail in Sections 6.1, 6.2, 7.1 and 7.5. For each of these issues the Department has made recommendations to minimise impacts. The Department considers that these issues have been adequately assessed and, on balance, consider that there is no evidence to suggest that property values around the Proposal will decline significantly as a result of the Proposal.

6.5 Justification for the Proposal

6.5.1 EIS

The EIS highlights that monitoring by the DEUS has identified that the potential wind energy availability at the proposed site would be sufficient for a wind farm development to be potentially economically viable. The EIS has initially identified that the Proposal would produce sufficient electricity to power around 37,260 to 49,860 households, whilst avoiding emission of between 246,430 – 328,573 tonnes of greenhouse gas emissions per year.

The EIS identifies that electricity generated from the wind farm would supply a growing market for clean, low emission energy production. It would assist electricity retailers to:

- secure supply for the increasing demand for electricity;
- meet consumer demand for renewable energy in the form of Green Power; and
- satisfy their obligations under the Commonwealth's Mandatory Renewable Energy Target and the NSW Government's Greenhouse Gas Abatement Scheme.

The EIS also indicates that the Proposal would assist in securing a regional power supply and, by virtue of being embedded in the regional distribution system, avoid the losses that would otherwise be incurred in obtaining power from another region. However, the EIS clarifies that the electricity generated from the Proposal would be sold on the National Electricity Market with the end use being anywhere in the region or beyond. It is therefore not intended for a particular customer or region.

6.5.2 Issues Raised in Submissions

Several submissions raised concerns regarding the justification for the Proposal. Specific issues raised included:

- the ability of wind energy to deliver promised electricity production and associated reductions of greenhouse gas emission. Arguments identified were the requirement of 'back-up' electricity supplies, the intermittency of wind energy, line losses of electricity and energy costs of installation and operation of turbines;
- government support for wind farm technology is inappropriate and produces a false sense of the technology's viability;
- there are more efficient alternatives for energy production; and
- demand reduction schemes are more appropriate ways of managing greenhouse gases.

6.5.3 Consideration of Issues

Consistency with State and Federal Policies

There is increasing evidence that greenhouse gas emissions, including carbon dioxide, are resulting in the warming of the earth's surface and associated changes to the climate and natural ecosystems. In Australia, the electricity generation industry produces approximately 33% of greenhouse gases in Australia. With demand for electricity predicted to increase by approximately 14% by 2008, there are a number of national and state government policies promoting the provision of electricity via renewable energy facilities, such as wind farms. The key justification of the Proposal is its consistency with these Government policies, which are discussed below.

The Commonwealth Government is supporting renewable energy through the National Greenhouse Strategy (NGS), the Mandatory Renewable Energy Target (MRET), and the national accreditation program, Green Power. The MRET is established under the *Renewable Energy Electricity Act 2002* and is further discussed under Section 4.5.2.

The National Greenhouse Strategy (NGS), released in November 1998, was developed by the Commonwealth and State and Territory Governments. It maintains a comprehensive approach to tackling greenhouse issues, and details both existing and additional measures aimed at improving our awareness and understanding of greenhouse issues, limiting the growth of emissions and enhancing greenhouse sink capacity, and developing adaptation responses. In endorsing the Strategy, the Commonwealth, States and Territories demonstrated the commitment of governments to an effective national greenhouse response.

Green Power is a national accreditation program that sets stringent environmental and reporting standards for renewable energy products offered by electricity suppliers to households and

businesses across Australia. Since the Green Power program was established in 1997, sales to consumers have increased from 40,000 MWh per year to 424,000 MWh per year in 2002/03.

The NSW government has also developed specific state policy for the support of renewable energies. The NSW Greenhouse Gas Abatement Scheme, implemented from 1 January 2003, is administered by the Independent Pricing and Regulatory Tribunal, although the Department of Energy, Utilities and Sustainability has responsibility for policy development. The Scheme requires electricity retailers to meet mandatory targets for reducing greenhouse gas emissions from the production of electricity that they sell. Failure to meet targets attracts a penalty of $11.00 per tonne of carbon dioxide equivalent.

Interpretation of Claims in EIS

The Department considers that statements in the EIS regarding the ability of the Proposal to meet the electricity requirements of 37,260 to 49,860 households could give rise to an incorrect perception that the supply from the wind farm would be continuous. This is not likely to be the case as wind energy is, in most cases, an intermittent source of generation requiring 'traditional' sources of electricity from coal to provide a continuous supply of electricity.

Also, the Applicant's claim that between 221,787 and 295,716 tonnes of carbon dioxide equivalent per annum would be saved as a result of the Proposal should be qualified given that electricity being displaced may be from coal, gas or hydro generation depending on the operating regime of generators in the National Electricity Market.

In addition the Applicant claims that the Proposal would assist in securing a regional power supply and, by virtue of being embedded in the regional distribution system, avoid the losses that would otherwise be incurred in obtaining power from another region. Given the intermittent nature of wind energy, security of regional power supply is dependent on existing coal and gas generation supplying the regional electricity grid. Although avoidance of losses may be achieved by wind generated supply, the level achievable is dependent on the operational characteristics of the regional grid and is impacted by a number of factors including the direction of power flow. In this regard, the avoidance of loss may vary depending on the regional distribution of the system.

Revised Figures

Amendments were made by the Applicant to delete seven turbines from the Proposal. As discussed in Section 6.1.6, the Department recommends the deletion of at least a further eight turbines.

As a result of these changes, the Proposal will now consist of a maximum of 54 turbines. Consequently the energy output and greenhouse gas emissions saved will be less than those identified in the EIS.

The Applicant has advised that a 54 turbine project would provide electricity to power around between 29,160 to 38,570 households. Greenhouse gas emissions saved by the Proposal would be approximately 192,860 to 257,140 tonnes of carbon dioxide equivalent each year.

6.5.4 Conclusion

The Department is satisfied that the Proposal is consistent with State and Federal government policies on renewable energy and greenhouse reduction. As discussed, wind farm proposals are

consistent with the National Greenhouse Strategy, Mandatory Renewable Energy Target (MRET) scheme, Green Power accreditation program and the NSW Greenhouse Abatement Scheme.

The estimate that the revised Proposal, as discussed above, would generate electricity equivalent to the average annual consumption of at least 29,160 households whilst avoiding emissions of at least 192,860 tonnes of carbon dioxide equivalent per annum is considered valid. It is also accepted that the Proposal may achieve some level of loss avoidance from the supply of electricity into the regional grid.

7 OTHER ISSUES

7.1 Shadow Flicker and Reflected Light

7.1.1 EIS

Shadow flicker from wind turbines describes the phenomenon of alternating changes in light intensity caused by discontinuous shadow casting from rotating wind turbine blades. Shadow flicker results from the position of the sun in relation to the blades of the wind turbine as they rotate. This occurs under certain combinations of geographical position and time of day. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site.

The EIS included an assessment of the predicted impacts of shadow flicker farm, on residential properties in the vicinity of the proposed development. The assessment of shadow flicker indicated that shadow casting would not cause a significant nuisance to nearby residents.

The EIS notes that the predictions are based upon a number of conservative assumptions, including:

- wind turbines would be operating at 100% capacity utilisation, with no downtime due to variations in wind speed or maintenance requirements;
- rotor blades are always perpendicular to the receptor (so would always be at maximum effect);
- there is no cloud cover shielding the sun and minimising the effect; and
- there are no visual barriers, either natural or man-made, between the turbine and the receptor.

A related visual effect to shadow flicker is that of reflected light. The EIS states that several factors associated with the turbines would minimise any reflected light from the turbines, including:

- turbines have a semi-matt surface finish which means that they do not reflect light as strongly as materials such as glass or polished vehicle bodies, and
- due to the convex surfaces found on a turbine, light would generally be reflected in a divergent manner.

The EIS concludes that any nuisance from reflected light and shadow flicker would not be significant.

7.1.2 Issues Raised in Submissions

The Department received 23 submissions about the impact of shadow flicker. The main concerns raised by representations were:

- potential health effects of shadow flicker on residents and people working on neighbouring properties, One submission raised concern about shadow flicker triggering epilepsy.
- shadow flicker was not adequately assessed in the EIS.

7.1.3 Consideration of Issues

The Department does not have any adopted standards for shadow flicker from wind turbines. In order to ensure that the impacts of shadow flicker were adequately considered, assessment guidelines currently in place in other states were used in the assessment process.

The Policy and Planning Guidelines for the Development of Wind Energy Facilities in Victoria (May 2003), requires that shadow flicker experienced at any dwelling should not exceed 30 hours per year as a result of the operation of the wind energy facility. These guidelines are based on the impact of shadow flicker on amenity of residences rather than potential health impacts.

Intermittent changes in lighting can adversely impact human health. In photosensitive epileptics these health effects can include triggering of seizures. Approximately 4% of people with epilepsy are considered to be photosensitive and thus susceptible to these impacts. In non-epileptics, these impacts can include headaches, nausea and dizziness. It is well accepted that any adverse impacts of shadow flicker occur in a limited frequency of flicker, in the range of 8-30Hz (flashes of light per second). The Epilepsy Association of Australia, for instance, advises that a frequency of 8-30 Hz (flashes of light per second) may trigger seizures.

A literature review by Verkuijlen and Westra, referred to in the EIS, suggests that shadow flicker should not exceed 2.5 Hz in order to avoid effects on human health. This is equivalent to, for a three bladed turbine, a rotation speed of 50 revolutions per minute (rpm). The Proposal is predicted to have a rotation frequency of 20 rpm, which is equivalent to a shadow flicker frequency of 1Hz. The shadow flicker frequencies of the proposed turbines are well below the frequency ranges that potentially effect human health.

The Department is satisfied that shadow flicker generated by the Proposal would not adversely affect human health. However, it considers that its potential impacts are an amenity issue and that shadow flicker on neighbouring properties should be minimised.

Following requests by the Department, the applicant provided an estimate of annual amount of shadow flicker at each of the impacted properties, including those residences associated with the development. This modelling was undertaken using 'worst case' assumptions. All turbines located within 2km of a residence were modelled for the effect on residences, although it is likely that shadow flicker of significant intensity would not occur greater than 10 turbine lengths from a turbine. The modelling also assumed that the turbines operate 100% of the time, that the sun always shines and the turbine blades are always oriented towards the residence in such a way as to produce maximum shadow flicker. These are conservative assumptions and in reality the number of hours that residences are likely to experience shadow flicker will be significantly lower than predicted.

The predicted annual amount of shadow flicker at affected residences was subsequently provided to the Department (Table 6). The Applicant identified that no other residences, would experience shadow flicker from the turbines.

Table 6 Predicted annual amount of shadow flicker at affected residences

Affected Residences (Fig 1)	Predicted Shadow flicker (hours)
H1	55.3
H2	44.7
H6	49.1
H12	24.6

Supplementary modelling provided by the applicant predicts that three residences would receive greater than 30 hours per annum of shadow flicker and one additional house (H12) would receive greater than 20 hours per year of shadow flicker. It is recognised, however, that these predicted shadow flicker impacts are based on worst case assumptions and in reality significantly reduced impacts would occur. Some sources suggest that actual impacts are as much as 75% less than predicted[12].

The extent of shadow-flicker is also likely to be further reduced by the presence of significant vegetative screening at H6 and H1. The deletion of eight turbines in the north and south of the site, to mitigate visual impacts (Section 6.1) is also likely to significantly reduce shadow-flicker on all four residences.

The Applicant has stated that there are mitigation measures available to minimise shadow flicker impacts on nearby residences if these impacts occur. These measures include use of a light sensor to detect when shadow flicker is likely to impact on nearby residences and cease operation of the relevant turbines. The Applicant is required to implement these mitigation measures in the event that a complaint is received from an affected resident (

Given the above, the Department is assured that the Proposal would comply with 30 hours per annum maximum shadow flicker at any associated or non-associated residence, as recommended in *The Policy and Planning Guidelines for the Development of Wind Energy Facilities in Victoria* (May 2003). However, to ensure exceedances do not occur, it is recommended that the Applicant be required to comply with this standard (Recommendation No.36).

7.2 Construction Noise and Vibration

This Section addresses construction noise and vibration issues. Operational issues are addressed in Section 6.2.

7.2.1 The EIS

Construction Noise

The EIS states that the construction period is likely to extend over 17 months (an estimate revised to 16 months with the removal of 7 turbines from the Proposal. This period could be further refined, as a consequence of the Department's recommendations about turbine deletions and staged consents – see Section 6.1.6). Within that time there would be periods of intense activity associated with the civil works programme, specifically construction of the access tracks and turbine foundations. This period would generate the most heavy vehicle movements to and from the site (concrete and road-base) and have a range of earthmoving plant in operation.

[12] Danish Wind Energy Association Website www.windpower.org/en/tour/env/shadow/shadowr.htm

The civil works programme would extend over a period of eight months. The EIS states that construction of the access tracks would be completed over a period of four months. Noise sources during this phase would include trucks delivering road base (1,150 truck loads) and operation of earth moving equipment to form the access roads.

Excavations for turbine foundations would be dug with front-end loaders/excavator/back hoe with hydraulic or pneumatic rock breakers. The EIS states that blasting may be required at some locations. The extent of blasting would be determined following geotechnical investigations undertaken as part of the detailed design. Each foundation would require approximately 18 x 10m^3 agitator trucks delivering concrete for each foundation pour. These trucks would be running between Goulburn and the site and it is anticipated that a turbine foundation would be poured over a day. The EIS states about 1242 truck loads of concrete would be required. The period between pours would depend on the locations of the foundations, weather and project scheduling.

Old Showground Road would provide the central access route to the wind farm for construction traffic. No heavy vehicle movements would be required through the village. The EIS states that traffic related noise is not likely to be a problem as roads where heavy vehicle movements are to occur during construction are 700 metres from most residences. Civil works for Turbine Row 10 to Turbine Row 12 (see Figure ES1 of EIS), north of Bannaby Road, would impact on landowners who use Alders and Crees Road. Riparosso Road which provides access to a farming paddock without a residence would also be used to access Row 12[13].

Other noise sources during construction would include truck deliveries of plant and equipment, the operation of welding and portable machinery generators, power tools, light vehicle movements for workers, and the operation of cranes for erecting the turbine towers and rotors. The EIS states that these activities would generate less noise than the civil works programme.

The EIS states that construction equipment and vehicles delivering materials to the site may be discernible at times for surrounding residents. These noise sources would not be continuous over a whole day and would be likely to vary, depending on the direction and strength of the wind in the area. It concludes that construction noise can be managed through effective consultation and, if required, structural measures such as temporary acoustic shielding.

The EPA's *Environmental Noise Control Manual* (EPA, 1995) recommends noise level goals and hours of work for construction activity.

The noise goals include, for construction activities of:

- short duration (i.e. less than 4 weeks) - may exceed background noise levels by up to 20dB(A) (the L_{10} level measured over a period over a period of not less than 15 minutes);
- longer than four weeks but less than 26 weeks - may exceed background by up to 10dB(A);
- for longer construction periods levels (greater than 26 weeks) - should not exceed background by more than 5dB(A).

[13] Row 13 would have been accessed by this route. However, the Department has recommended the deletion of the turbines in this row)

The manual specifies that hours of work for construction sites are limited from 7.00am to 6.00 pm weekdays and 8.00 am – 1.00 pm on Saturdays, with no construction taking place on Sundays or Public Holidays.

The EIS references these provisions but makes no specific commitment to them.

Construction Vibration

The EIS stated that vibration from construction activities is not expected to be discernible at residences. Some minor blasting may be required at some turbine locations. The size of charge used would be based on ensuring acceptable limits are met at any residence. The EIS stated that details of any blasting programme would form part of the landowner and community consultation process specified within the Construction Environmental Management Plan (CEMP).

The EIS outlined EPA requirements for blasting and ground vibration. These are based on ANZECC guidelines.

Ground vibration and air blast levels that cause concern or discomfort to residents are generally lower than relevant building damage limits. ANZECC guidelines for assessing potential residential disturbance arising from blast emissions specify:

- the overpressure from blasting operations must not exceed 115dB (Linear Peak) for more than 5% of the total number of blasts over a 12 month period and should not exceed 120dB at any time;
- ground vibration peak particle velocity must not exceed 5mm/s for more than 5% of the total number of blasts over a period of 12 months and should not exceed 10mm/s at any time; and
- blasting should generally only be permitted from 9.00 am to 5.00 pm Monday to Friday, and 9am to 12pm on Saturdays, with no blasting on Sundays or public holidays. Blasting should generally take place only once per day.

The EIS also outlined building damage criteria, which are generally higher than the above levels.

No specific commitments were given in the EIS, nor any specific data provided on potential impacts.

7.2.2 Issues raised in submissions

A number of submissions were received by the Department where construction noise was cited as a concern, although many of the issues cited relate to noise and vibration from traffic movements.

7.2.3 Consideration of Issues

Construction Noise

Little detail is provided by the Applicant about the potential noise impacts due to construction activities. The EIS states that issues around construction noise would be addressed in the Construction Environmental Management Plan. Construction noise would occur due to construction of the access tracks, heavy vehicle and other vehicle movements along roads and the access tracks delivering concrete, turbines and road base and excavation and blasting of the turbine foundations. During construction of the proposed development, noise impacts would be

limited to those residences adjacent to the development site or roads and access tracks. The Applicant has committed to no heavy vehicle traffic being directed through Taralga village for the duration of the construction period. The EIS does not contain any modelling of potential noise levels due to construction activities in the EIS. It proposes a noise management plan be prepared.

The proposed construction activities are remote from the town of Taralga, and from most residences not associated with the proposed development. This should reduce the likely noise impacts on neighbours from on site construction activities. There could be traffic noise generated by vehicle movement to and from the site. However, the access routes will avoid the town. In addition, most residences are set back from the access roads, which should reduce the potential noise impacts.

It should also be noted that any impacts will be short term. Nevertheless, the Department recognises there is potential to cause some adverse impacts on neighbours. To ensure that any such impacts are minimised, the Department recommends the Applicant prepare a Construction Noise and Vibration Management Sub Plan (Recommendation No.37). This will require the Applicant to address the means of minimising potential noise impacts, develop community information/notification programmes, develop a complaints system and identify contingency measures. Construction hours will be generally limited to standard EPA hours (Recommendation No.38).

It should also be noted that the construction of the wind farm would require an EPL from the EPA. The EPA has indicated it could licence the proposal, and has issued its GTAs for the proposal.

Construction Vibration

Some minor blasting may be required at some turbine locations and is likely to be the key construction vibration concern.

The remoteness from non associated residences should reduce the potential for any adverse impacts. The EPA, in its GTAs, has specified conditions relating to overpressure, ground vibration and hours of blasting operations. These have been framed to protect residential amenity and should ensure that any potential impacts are minimal. These requirements have been incorporated in the Recommended Conditions (Section 10).

Conclusion

The EIS provided limited detail on the likely impacts of construction noise and vibration.

However, given the relative remoteness of the site, that traffic routes generally avoid residential areas, and the short term, temporary nature of the works, the Department is satisfied that impacts can be managed to acceptable levels. To ensure this is achieved, it is recommended that the Applicant be required to prepare a Construction Noise and Vibration Management Sub Plan, limit operational hours and limit blasting overpressure/ground vibration.

7.3 Heritage

7.3.1 EIS

A specialist indigenous and non-indigenous cultural heritage assessment of the site was undertaken as part of the EIS. OZARK Environment and Heritage Management Pty Ltd undertook a background study of the area, historical studies, as well as a field survey to identify potential archaeological and heritage sites. These studies were undertaken in collaboration with the Pejar Local Aboriginal Land Council (LALC) and the Gundungurra Tribal Council Aboriginal Corporation. Crown Land within the survey area is included within Gundungurra Native Title Claim #6 – NC97/7.

Indigenous Heritage

The study noted that limited archaeological research has been undertaken in the area around Taralga. A predictive model was established to assist with the identification of sites on the ground.

A field survey of the subject site was undertaken as part of the EIS investigations and included representatives of the Pejar LALC. The field survey identified six Aboriginal open sites (OS) and one scarred tree (ST) and these are shown in Figure 5.9 from the EIS (it should be noted that one open site identified with the survey was in close proximity to a row of turbines that the applicant did not progress in the EIS further OS6 and the ST were associated with turbines on the Omaru property which the applicant removed during the assessment period). The remaining four OS were assessed as having low ranging to moderate significance.

The report states that the sites of access tracks and turbines were modified following the indigenous assessment, and documented in the EIS, creating buffers to ensure that there would be no physical disturbance to these sites. The EIS identifies that protective fences would be installed around OS 1 and 2 to ensure that construction work does not impinge on these sites.

The report identifies that OS 3 and 4 and associated potential archaeological deposit (PAD) may be part of one larger site. The report indicates that although the access road has been rerouted to the south of this site/s the uncertainty surrounding the extent of it requires the adoption of sensitive construction techniques. This would involve no excavation and the use of a geotextile to cover the ground in this area prior to putting down road building material for the construction of the access road.

The Pejar LALC had not provided a formal response to the indigenous heritage assessment study, at the completion of the EIS.

Non-Indigenous Heritage

The EIS identifies that the village of Taralga is a historic place with a number of buildings listed on various heritage registers. The village boundary itself is listed by the National Trust as an Urban Conservation Area.

Listings on the Register of the National Estate include the Bannaby Anglican Churchyard, Stonequarry General Cemetery, Taralga Courthouse and the Taralga War Memorial. The NSW Heritage Office's State Heritage Register also lists the Catholic Church of Christ the King within the

village. The LEP also lists the Hillas Farm Homestead and Outbuildings and the St Matthews Church in the Parish of Bannaby.

The Tarlo River National Park to the south of the Proposal is listed on the Register of the National Estate and the Wombeyan Karst Conservation Reserve to the north of the Proposal also has an interim listing status on the Register of the National Estate.

The field investigations identified two potential non-indigenous heritage sites in close proximity to wind turbines and access tracks. These two sites are identified in Figure 5.9 of the EIS and consist of a stone cottage ruin and the remains of a stone hearth.

The study concluded that the sites were of low heritage significance and did not meet any of the criteria to be considered for the state heritage register. The EIS also stated that there would be no direct impact on the two sites as a result of the Proposal.

7.3.2 Issues Raised in Submissions

Twenty-three community submissions raised issues in relation to heritage. The key concerns raised were:

- EIS did not provide sufficient information on indigenous and non-indigenous heritage;
- consistency with the NSW Heritage Office's *Draft Wind Farms and Heritage Policy*; and
- indirect impacts on the heritage sites in and around Taralga and the broader surrounding landscape.

7.3.3 Consideration Indigenous Heritage

The Department requested additional details from the applicant on the feasibility of construction techniques proposed for the access road in the vicinity of two Aboriginal open sites (OS3 and OS4). The applicant advised the Department that the proposed construction techniques in the vicinity of OS 3 and 4 were feasible on the basis of existing land slopes etc. Examples were provided of where these techniques have been used overseas.

The Department sort the advice of DEC as to whether the Proposal would trigger the need for an approval under Section 90 of the *National Parks and Wildlife Act*. DEC confirmed that the proposed approach for the construction of the access road around OS3 and OS4 with no excavation and the laying of a geotextile fabric to protect the underlying ground surface would not constitute a need for an approval.

In the absence of further comment from the DEC and local Aboriginal land groups, the Department is satisfied that the assessment of indigenous heritage for the EIS has been adequate. Notwithstanding, the Department has recommended that, in the event an Aboriginal object or relic is uncovered, all work must cease and DEC is contacted immediately (Recommendation No.76).

7.3.4 Consideration Non-indigenous Heritage

It was suggested in one of the submissions that the proposed wind farm contravenes the NSW Heritage Office's *Draft Wind Farms and Heritage Policy September 2003*. A submission from the NSW Heritage Office did not raise the consistency of the Proposal with its guideline as an issue. Nevertheless, the Department is aware that the Draft Policy from the Heritage Office advises of the heritage significance of cultural landscapes should be taken into consideration during the assessment particularly where those landscapes could be regarded as 'State Significant'. The

Wind Farms and Landscape Values – Draft Issues Paper (May 2004) prepared by the Australian Wind Energy Association and Australian Council of National Trusts also suggests that assessment of significant cultural landscapes should be undertaken.

Several community submissions raised concerns in relation to the indirect impacts that the Proposal would have on the heritage sites in and around Taralga and the broader surrounding landscape. The Department is satisfied that the Proposal would have no direct physical impact on known items of non-indigenous heritage. Whilst it recognises that the Proposal is not sited within a listed State Significant Cultural Landscape its proximity to the historically significant village of Taralga and to a lesser extent the conservation areas of Tarlo River NP and Wombeyan Karst Conservation Area have also been taken into consideration.

The independent visual assessment undertaken by Hassell on behalf of the Department (Appendix D) discusses this cultural landscape context in further detail and has influenced the recommendations of Hassell and the Department's decision making process. Further discussion of the impact of the Proposal on the landscape and the Department's decision making process is in Section 6.1 of this report.

7.4 Construction Traffic

7.4.1 EIS

The EIS identifies that during construction, there will be a number of different types of vehicle movements ranging from light vehicles carrying construction workers, to haul trucks and dog trailers carrying roadbase, concrete trucks, semi-trailers and modified semi-trailers carrying oversize and overmass equipment. The oversize and overmass equipment deliveries would be associated with the wind turbines themselves i.e. the nacelle, hub, blades and possibly the transformer (up to 96 tonne). It is estimated that there will be approximately 900 oversize vehicle movements (450 to the site and 450 from the site) associated with the Proposal. The EIS proposes that the elements will be transported by road routes described in Section 3.3.2.

The EIS noted that the Taralga Road currently has a gross weight limit of 42.5 tonnes. However, the EIS further noted that it was unlikely that there would be any severe limitations of weights up to 100 tonnes. RTA's permission will be required for the transportation all over mass and over dimensional components of the wind turbine. This is to be obtained by the appropriate haulage contractor. Timed road restrictions are likely to apply for transportation of over mass and over dimensional components. The EIS indicated that the oversize loads may necessitate the temporary removal or relocation of street furniture and lifting of electrical and communication lines within Goulburn.

To minimise impacts and disruption to the village of Taralga, the EIS also indicated that all heavy vehicle construction traffic movements would avoid travelling through Taralga by using Old Showground Rd and access tracks constructed at the end of this road as part of the Proposal.

The EIS estimates the construction traffic movements would be spaced out over a 17 month estimated construction programme. Additional information from the applicant indicated that maximum daily construction traffic associated with the Proposal would be 82 movements (ie. 41 in and 41 out), consisting of 36 light vehicle movements and 46 heavy vehicles movements.

Based on previous Council traffic counts, the EIS estimated that approximately 630 vehicles a day (an estimated 10-15% heavy vehicle proportion) travel on the Taralga Rd (south of Taralga Village), 180 vehicles a day on Bannaby Road and low counts (40 or less a day) on the other local access roads which would be used during construction. Traffic generated by the wind farm operation is expected to be negligible, consisting of staff and maintenance vehicles movements to and from the site.

The EIS identifies that approximately 29.2km of access tracks will be required to be constructed or upgraded for the Proposal. The tracks would not be sealed but would be constructed to provide an approximately 5m wide finish with appropriate drainage controls.

The EIS notes that a licensed and experienced haulage contractor will be employed to transport the turbines to the subject site. A Transport Management Plan will be developed in consultation with the RTA and Upper Lachlan Council that outlines traffic movements, access points and associated community consultation.

7.4.2 Issues raised in Submissions

Fifteen community submissions raised issues in regard to construction traffic. Specific issues raised, included:

- localised traffic delays;
- safety impacts; and
- need for road upgrades.

The RTA also identified that there was a lack of information on traffic movements generated at all junctions along the Taralga Road and proposed treatments/upgrades at these junctions may be required.

7.4.3 Consideration of Issues

The Applicant confirmed that preliminary consultations had been held with the RTA and Upper Lachlan Council regarding construction traffic. The Applicant deferred additional details to the preparation of a Transport Management Plan but committed to further discussions with Councils, RTA and utility authorities prior to work beginning.

The Department and the RTA support the preparation of a Transport Management Plan (Recommendation No.51) but consider that it is important that this plan address the issues relating to traffic delays, road upgrades, and safety impacts.

Traffic and Road Upgrades

The Applicant suggested that the vehicle movements associated with the Proposal would not cause significant delays along Taralga Road nor the need to upgrade any intersections. The Applicant has committed to inspecting all roads and bridges and culverts prior to commencement of works and in consultation with Councils, the RTA and other road users.

The Department agrees that the volumes of proposed traffic movements on an average day are unlikely to cause significant delays on Taralga Road. Furthermore, the Construction Traffic Management Plan (Recommendation No.51) will assist in appropriately managing any traffic related issues.

With regard to upgrading intersections, the RTA has required the Applicant to upgrade the junction of Lagoon Street and Union Street if turning movements of large vehicles at this intersection cannot be achieved (Recommendation No.60). The Applicant is also required to prepare an 'after' road dilapidation report to determine whether works are required to restore the road to at least is pre-development condition (Recommendation No.58). Any works required will be at the cost of the Applicant and must be completed within three months of the commencement of Operation (Recommendation No. 59).

Upper Lachlan Council has also identified a number of potential issues regarding site access points. Recommendation No. 62 requires the Applicant to construct site access points at Bannaby Road, Alders and Crees Road, and Hillcrest Road with minimum stopping sight distances of between 160m and 180m for approaching traffic.

Safety Impacts

The Applicant confirmed with the Department that all heavy vehicle movements to the construction sites would be undertaken without the need to traverse the town of Taralga itself. A bypass of town would be created by using Old Showground Road and extending it to provide access to the majority of turbine sites, as shown in Figure 5.16 of the EIS. The Department endorses the scheme to avoid the need for heavy vehicles and recommends that this be a requirement of this consent (Recommendation No.55).

7.5 Land Use

7.5.1 EIS

As stated earlier, the Proposal's site and surrounding landholdings are all zoned Rural 1(a). Figure 3.1 from the EIS provides cadastral information providing some guidance of the size of parcels of land in the area. This figure also indicates that property ownership of the properties associated with the Proposal (it is noted that Omaru was removed from Proposal by the applicant during the assessment phase) where in the majority of cases a property is made up of numerous lots.

The EIS also refers to future settlement patterns in the area and makes reference to the Settlement Strategy prepared by the former Mulwaree Council in 2003. The EIS noted that the Settlement Strategy suggested that additional population growth in the vicinity of Taralga should be concentrated in the village itself which has considerable spare capacity. It was also indicated that the Settlement Strategy recommends restricting sub-division of high quality agricultural land (the majority of the site is Class 3 high quality grazing country). Restrictions on this land are also in place as a result of SEPP 58 and it being in the drinking water catchment of Sydney (refer to Section 4.3).

Generally, sub-division of properties zoned rural 1(a) is permissible with consent under the Mulwaree LEP 1995 for the purposes of a dwelling house as long as the allotment has an area of at least 40ha. There are other complicating provisions of the LEP and historical concessional entitlements that allow smaller sub-divisions to occur in specific cases. It is also permissible with consent to build a residential dwelling on land zoned rural 1(a) again where the property size is at least 40ha. The EIS provided a brief assessment of a proposed sub-division on the Tyrol property (associated with the wind farm) in the vicinity of Row 1.

The EIS concluded that the wind farm development was consistent with the objectives of the Rural 1(a) zoning and the broader principles related to future strategic landuse in the area.

7.5.2 Submissions

Nineteen submissions raised concerns about impacts on neighbouring landuse as a result of the Proposal. Concerns related to potential restrictions on adjacent properties to subdivide or to build a residence as a result of noise impacts and shadow flicker caused by the Proposal. There was also concern that future residences and farm/work environments were not considered in the EIS.

7.5.3 Additional Information

Upper Lachlan Council has advised the Department that it has received three proposals for rural subdivisions. Two of these are located on associated landowners – 'Tyrol' and 'Summerlea' properties.

The other subdivision is on the Ross' property. Since receiving the application for the Proposal, this subdivision was approved by Council on 18 March 2005.

Council confirmed that no Development Applications for new dwellings in the vicinity of the wind farm had been lodged during the assessment phase.

7.5.4 Consideration of Issues

The Department considers there are three key issues regarding the Proposal's impact upon land use. These are:

- Suitability of landuse;
- Impacts upon current subdivision applications; and
- Impact upon future landuses.

Suitability of landuse

The Department recognises that, through consultation with the community, a number of residents consider the rural character to be defined, in the first place, by the existing visual outlook of bare fields and a broad, clear skyline. Notwithstanding, these expectations must be balanced with the nature of rural industry that is allowable and promoted within the Rural 1(a) zone of the relevant LEPs.

The Proposal is wholly located on land zoned Rural 1(a) under Mulwaree LEP. As identified in Appendix A, the Department considers the Proposal is consistent with the objectives of this zone and its provisions.

The Upper Lachlan Council's consideration of Rural 1(a) Zone requirements for the approved Walwa Wind Farm development provides a key understanding to Council's understanding and application for land use within this zone. The Department recognises that the Gunning LEP is the applicable Environmental Planning Instrument (EPI) for the Walwa Wind Farm, unlike the current proposal, whereby the Mulwaree LEP is the applicable EPI. Both LEPs, however, share similar objectives of relevance when assessing wind farm proposal, particularly in relation to land use and its integral role in retaining the rural character of the area.

Neither LEP defines protection of visual outlook as an objective for the Rural 1(a) Zone. The emphasis within both LEPs is on land use and this more intangible objective of maintaining the rural character. Objective 8(a) of the Rural 1(a) zone under the Gunning LEP is to *maintain the rural character of Gunning*, whilst objective 8(b) is to *encourage use of rural land for agriculture or other forms of development associated with rural activity*.

The objectives of Mulwaree LEP do not consider visual outlook or rural character at all, but rather outline the direction for land usage in the zone. Of particular relevance is objective 1(a) of the Mulwaree LEP, which involves promoting, enhancing and conserving agricultural land in a manner which sustains its efficient and effective agricultural production. This indicates a strong weighting towards land use in defining and contributing to the rural character of the area rather than protecting the visual amenity.

Council's assessment of the Walwa Wind Farm, tabled at a meeting of Upper Lachlan Council on 3 November 2004, notes that the question of visual impact and its affect on the rural character is centre to the debate about wind farms and one that draws the most criticism by anti-wind farm groups. Whilst Council acknowledges that wind turbines are visually dominating, the assessment suggests that the proposed wind farm can generally operate in harmony with existing and continued grazing use of the site. Council's assessment report suggests that wind turbines are an appropriate usage for the rural 1(a) zone in that *'strong breezes and air movement is part of the ambience and rural character of the locality and presence of wind turbines emphasises these positive natural characteristics'.*

The Department concurs with Council's application of the objectives of the Rural 1(a) zone in relation to wind farms and the general consistency of wind farm developments towards achieving these. The Department considers that at a basic level, wind farm development is an appropriate land use within the Rural 1(a) level.

Notwithstanding the agreed suitability of wind farms within the zone, the Department recognises that the broad objectives of promoting social and economic welfare, as defined under the EP&A Act, must not be overlooked. In this regard, the Department's considers it imperative that the proposal not result in a highly deleterious or unacceptable visual impact and that some basic visual amenity standards should be maintained. This is discussed in detail in Section 6.1.

Impacts upon Subdivisions

Council has advised the Department of three subdivisions which are relevant to this Proposal. Of most concern to the Department is the subdivision located on the Ross' property as this subdivision has firstly been approved by Council and secondly, is located on a property not associated with the Proposal. The impacts of the Proposal on this subdivision therefore requires further assessment.

As the other two subdivisions are located on properties associated with the Proposal ('Tyrol' and 'Summerlea'), and have not yet been determined by Council, they are of less concern. Council has advised that a determination will not be made on these subdivisions before the Minister reaches a decision regarding the Proposal. The Department concurs with this approach given they occur on associated properties and to these subdivisions are not adversely impacted by impacts of the Proposal such as noise and visual. It should be noted that these impacts are now likely to minimal on the proposed subdivision located on the 'Tyrol' property given with the deletion of turbines T1 to T4 (see Section 6.1.5).

The Department's assessment of the approved subdivision on the Ross' property, has found that the impacts from the Proposal are likely to be minor. The subdivision is located approximately 500m to the east of H12 (Figure 1) and is subsequently further away from the wind turbines than H12. With the deletion of turbines T1 to T4, to reduce the visual impacts upon H12 to a 'moderate' and therefore acceptable level (see Section 6.1.5), visual impacts on any future residences will also be acceptable. With regard to noise and shadow-flicker, these impacts are likely to be minor given that the nearest turbines will be more than 2km away.

Impacts upon Future Land use

A key issue that must be considered as part of land use is the likely impacts of this current wind farm proposal on future land use. A number of submissions raised concerns that the proposal could restrict opportunities for houses or other developments in the future.

Overall the Department does not consider that it is reasonable to expect a proposed development to consider a wide range of new land uses and potential developments not yet approved, if at all proposed. The current development should not be restricted because of a potential change in the future, which is yet to go through any formal public consideration. As discussed above, the assessment of this proposal should be firstly based on the objectives of the Rural 1(a) zone.

In the same case, the Department considers that neighbouring properties should not be adversely limited by the current project, nor their existing activities restricted. The Department therefore believes that a property owner should retain the opportunity for at least one residential dwelling on a rural lot as permitted under the relevant zoning, within the range of acceptable amenity (Recommendation No.47).

7.6 Water Quality

7.6.1 EIS

The Applicant proposes to develop a Soil and Water Management Plan prior to the commencement of construction and operation outlining mitigation practices. The Soil and Water Management Plan would include an Erosion and Sedimentation Control Sub Plan which would outline specific mitigation measures to be employed on the site, including:

- locating site tracks on relatively flat gradients to minimise erosion;
- siting of surface and outfall drainage structures to reduce runoff along site tracks; and
- revegetation of disturbed areas as soon as applicable.

As the Proposal falls within the Sydney drinking water area catchment, the consideration of the *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply* was appropriate. Further, access tracks will need to cross several small creeks and watercourses. The draft Regional Plan: *Sustaining the Catchments: The Regional Plan for the drinking water catchments of Sydney and adjacent regional centres*, was also considered. This draft Regional Plan will replace SEPP 58, once gazetted.

Clause 10 of SEPP 58 requires that the consent authority, when exercising functions under Part 4 of the EP&A Act, consider whether the Proposal will have a neutral or beneficial effect on the water

quality and whether the water quality management processes proposed are sustainable. The draft Regional Plan, states that neutral or beneficial effect can be demonstrated by:

- the development having no identifiable impact on the water quality;
- impacts on the water quality can be treated or removed;
- impacts on the water quality can be contained within the site; or
- the development maintains the status quo or improves the water quality leaving the site.

There is a risk of increased sediment flow into the creeks and river system during construction and operation, particularly in the areas where permeability will be reduced, around the turbines, the substation, and along site tracks. There is also a risk of contamination from accidental spills and the on-site wastewater treatment systems established at work sites during construction.

The Applicant has indicated that implementation of steps outlined in the Soil and Water Management Plan and the Erosion and Sedimentation Sub Plan, should ensure there are no adverse impacts to water quality flowing from the site and that the principles of Clause 10 of SEPP 58 are met.

The EIS indicates that groundwater is unlikely to be encountered during construction works.

7.6.2 Issues Raised in Submissions

Nine submissions cited water quality as a concern. Several were concern that the EIS did not accurately identify temporary and permanent water courses. Concern was also raised that the construction and operation of access tracks, clearing of ridges and turbine foundations would adversely affect groundwater and surface water, creating additional runoff and erosion problems.

7.6.3 Consideration of Key Issues

Erosion and Sediment

The proportion of the site to be impacted by construction and operation is relatively small, in relation to the overall site area. Iincreased potential runoff resulting from the development will be minimal. There are a number of areas on site where the erosion risks increase due to the development, particularly as a result of new site tracks.

Specific recommendations from the SCA, DEC and the Central West Office of the Department coupled with the mitigation measures listed in the EIS will provide effective means of minimising the potential for erosion and sedimentation on site.

The SCA has advised the Department that the Proposal has adequately met the requirements of Clause 10 of SEPP 58. Siting of access road on ridges and minimising watercourse crossings where possible will reduce the risk of sediment runoff reaching the waterways.

SCA and DEC have also recommended detailed Soil and Water Management Sub Plans be prepared for the construction and operation phases of the Proposal. As identified in Recommendation No. 84, the Sub Plans must be prepared in consultation with relevant government agencies, including DEC and SCA, be in accordance with relevant guidelines, and

include details on how soils erosion and discharge of sediment and water pollutants from the site will be managed.

The Proposal requires a Part 3A Permit under the *Rivers and Foreshores Improvement Act* 1948 (Part 3A permit) for crossing of watercourses. General Terms of Approval (GTAs) were received from the Department's regional office relating to this permit and the need to ensure adequate rehabilitation of the riparian zone and to minimise soil erosion and water quality impacts. These GTAs have been reflected in the Recommended Conditions (Section 10) and include:

- A Riparian Vegetation Management Sub Plan (Recommendation No. 83);
- A Soil and Water Management Sub Plan (Recommendation No. 84); and
- A requirement to identify and fence off high erosion hazard areas from livestock (Recommendation No. 85).

Soil Contamination

The Department recognises there is a small risk of soil and water contamination during construction and operation of the Proposal. The Department considers that if chemicals and oils are stored, bunded and handled, appropriately, as stated in the EIS, the risk of spillage will be minimised. Similarly, checking of vehicles for leaks should minimise any risk of small scale contamination.

As wastewater from the sanitary facilities provided during construction will be removed and disposed of off-site, contamination risks are minimised. Similarly, as the sanitary facilities provided during operation do not involve external release of effluent on-site, contamination risks are also minimised.

The SCA has recommended that the human wastewater management systems be designed in accordance with relevant Australian and New South Wales standard and guidelines and be located at least 100 metres from watercourses and 40 metres from drainage depression. It is recommended that this be a requirement of the Applicant (Recommendation No.99).

7.7 Electricity Grid Connection

7.7.1 The EIS

The EIS identified that two main route options were being considered for connecting the Proposal to Country Energy's electricity grid. These were:

- construction of a 132kV overhead line to the Marulan substation;
- connection direct into the existing 330kiV overhead line that traverses the southern end of the wind farm site.

No details were given on the environmental impacts of the Proposal. The reasons given for this the EIS were that the grid connection does not form part of the Proposal for which consent is being sought.

7.7.2 Issues raised in submissions

Thirteen submissions raised concerns that the details of connection to the grid were not included in the EIS. Issues included the cumulative impact of the grid connection not being considered.

7.7.3 Additional information

The Department was not satisfied with the level of information provided in the EIS. Although it was recognised that the electricity grid connection is being assessed under Part 5 of the EP&A Act where Country Energy is the Proponent and is likely to be the determining authority, the Department expects that a reasonable understanding of the environmental impacts of the connection is required as part of this assessment. Clearly, connection to the grid is an integral part of the Proposal for without it, the benefits of the Proposal, minimising greenhouse gas emissions for the production of electricity, cannot be realised.

The Department therefore requested details of the grid connection in order to be satisfied that any impacts relating to connection to the grid would be acceptable. The Applicant provided a draft Review of Environmental Factors (REF – June, 2005) by Sinclair Knight Merz which summarises the potential environmental impacts and mitigation measures of the preferred option. The preferred option was identified as being the 132kV overhead line to the Marulan substation.

The draft REF states that the transmission line would be approximately 32km long and would pass through predominately privately owned grazing land. It would occupy an easement width of 40m and consist of 20m above ground height concrete poles spaced between 150 to 300m apart. A new switching station would be located approximately 700m to the east of the existing Marulan Substation and would occupy an area of approximately 57m by 54m.

Construction of the transmission line and switching station is expected to be completed within a 12 month period. Access to each pole would be required during construction and in most locations access is possible via existing roads and access tracks. In some locations, however, creation of new tracks or upgrading of existing tracks will be required.

7.7.4 Consideration of Issues

The main potential environmental impacts of the transmission line and switching station identified in the draft REF are terrestrial ecology, indigenous heritage and visual amenity. The draft REF states that refinements have been made to minimise impacts and included reducing extent of vegetation clearing and avoiding indigenous heritage impacts. It concludes that the proposed electricity grid connection would not result in significant environmental impacts provided identified safeguards and mitigation measures are strictly implemented.

The Department acknowledges that the proposed electricity grid connection does not form part of this development application. Nevertheless, the connection is an integral component of the wind farm and therefore it was considered important that the Department is satisfied that the environmental impacts of the transmission line and switching station are acceptable.

The Department has reviewed the draft REF and is satisfied that the impacts of the proposed electricity grid connection will not have a significant impact upon the environment. A number of refinements have been made to the route in consideration of potential environmental impacts, in particular ecology and archaeological issues. Route modifications, identified in the draft REF, include:

- aligning the route adjacent to the existing easement of the 330kV transmission line in the vicinity of Bannaby Road;
- redirecting the route through previously cleared areas; and

- moving the switching station to avoid impacts on indigenous heritage items and a remnant path of an endangered ecological community.

The Department considers that a thorough environmental impact assessment has been undertaken of the transmission line route and switching station which minimises environmental impacts. Notwithstanding it is considered appropriate to defer any construction activities associated with the windfarm until relevant approvals are in place for the transmission line. The Department therefore recommends a deferred commencement.

7.8 Decommissioning

7.8.1 EIS

The EIS notes that the design life of the Proposal is 25 years. The EIS indicates that at the end of the design life of the wind farm a decision will be made whether to refurbish, remove or replace the turbines. If a decision is made to decommission the wind farm the removal of all turbine components, transformers, substation, overhead powerlines and control building would occur. Foundations and cabling would be removed to a depth of 600m.

7.8.2 Issues Raised in the Submissions

Four submissions were received during the exhibition period that raised concerns about the decommissioning process. The main concern was the lack of any guarantee that the wind turbines and the associated site facilities would be removed.

7.8.3 Consideration of issues

As the decommissioning date of the wind farm is uncertain, the Department considers that it is impractical for the applicant to provide specific details of the decommissioning and restoration process that will occur on the site. Once the wind farms operations cease, however, the Department considers that the Applicant must ensure that wind turbines are removed and the site restored. Furthermore it is considered that any individual wind turbines should be dismantled and removed from the site, once they are no longer used in the generation of electricity.

To ensure that the wind turbines will be removed and the site restored, the Department recommends that the wind turbines, substation, control and facilities building, and the associated above ground electricity are to be removed and the site restored once the wind farm is decommissioned (Recommendation No.102). In addition, the Department considers that if any individual wind turbine has not been used to generate electricity for a continuous period of 12 months it also must be removed (Recommendation No.103).

To further strengthen the Applicants decommissioning requirements, Recommendation No.102 requires the Applicant to demonstrate to the Department that suitable lease agreements are in place with the site landowners. These lease agreements must show that the Applicant is responsible for removing turbines and associated infrastructure from the site once operation is complete. The Department requests this information prior to the commencement of construction.

7.9 Tourism Impacts

7.9.1 EIS

The EIS briefly discusses the current contribution of tourism to the local economy of Taralga. Two major categories of tourists to Taralga exist, those passing through Taralga (particularly on the way to Wombeyan Karst National Park) and those visiting Taralga to enjoy local attractions. Taralga has a number of facilities for overnight accommodation and attractions include village shops, the Taralga museum, and a local vineyard.

The EIS states that the initial polls and anecdotal evidence identified by AusWEA indicated that wind farms are likely to have a positive effect on tourism. The EIS concludes that the Taralga wind farm provides realistic opportunities for increasing visitation, given the existing significant tourist draw of the Wombeyan Caves and the experience of other wind farms in Australia.

7.9.2 Issues raised in Submissions

Fifty submissions expressed concern that the Proposal would have an adverse impact on tourism to the Taralga area. The majority of these submissions believed that the Proposal would detract the local tourist trade by reducing scenic amenity, increasing noise and shadow flicker and destroying unique landscape around Taralga.

Conversely, several submissions stated that tourism is an important contributor to the local economy and that opportunities exist for growth of Taralga as a tourist centre.

7.9.3 Consideration of issues

Several opinion polls have been undertaken to ascertain the impact, or likely impacts of wind farms on tourism. A poll undertaken by Mori Scotland on behalf of Scottish Renewables Forum and the British Wind Energy Association in 2002, indicated that wind farms did not deter tourists from visiting the Argyll & Bute area of Scotland (though it should be noted that 52% of tourists interviewed had not seen any of the wind farms in the area). AusWEA notes that an Australian survey found that only 8% of Victorians would be less like to visit a coastal area for a holiday or day drip if a wind farm was built in the area. As no information was provided about the targeted survey group, including the number surveyed, limited reliance can be placed on this study.

The Department notes that limited empirical studies have been undertaken to assess the impact of wind farms on a tourist industry. The key forms of tourism in Taralga are visitors passing through Taralga on route to Wombeyan Caves and visitors to local attractions of Taralga. The Department considers that the wind farm operation will not adversely impact visitation by these tourists. Although affectation is possible, there is little evidence from other wind farm to suggest that this will be the case.

7.10 Aviation

7.10.1 EIS

Aircraft safety

The EIS indicates that the Proposal should have limited adverse impact on aerial activities in the area. The Civil Air Safety Regulations, the Civil Aviation Safety Authority (CASA) were consulted about the project, and advised that the proposed development did not represent a hazard to aviation. CASA requested that details of the final location and height of turbines be provided prior to operation.

The EIS states that the Department of Defence were also consulted about the project and confirm that the proposed turbines are outside the areas affected by Defence (Areas Control) Regulations. The Department of Defence have requested that the RAAF (Aeronautical Information Service) be provided with the "as constructed" details of the development.

Aerial Weed Spraying

The EIS states that consultations with landowners confirms that aerial pesticide and fertiliser applications are no longer routinely undertaken on lands associated with the wind farm development. There is no local aerial application operator and no nearby landing strip. The Aerial Agricultural Association of Australia (AAAA) has advised that they wish to be advised on the location, number and height of the turbines.

7.10.2 Issues Raised in Submissions

No submissions raised concern about aircraft safety relating to the Proposal.

7.10.3 Consideration of Issues

Aircraft Safety

As noted above, CASA and the Department of Defence have indicated that the Proposal would not raise any aviation safety issues. Recommendation No.91 requires the Applicant to provide height and location details to these agencies prior to the commencement of Operation. This information is also to be provided to AAAA, as identified in the EIS.

In September 2004, CASA released a draft Advisory Circular entitled '*Obstacle Marking and Lighting of Wind Farms*'. The Circular outlines safety guidelines about the marking and lighting of turbines, which are of relevance for the current project. Turbines of a basic single colour and visually conspicuous against the prevailing background, such as those currently proposed, would not require obstacle marking colours and/or patterns. CASA has confirmed that no obstacle lighting would be required for this Proposal.

Aerial Spraying

The AAAA has advised the Department that it does not provide specific comments about proposals, due to the wide variables associated with wind farm developments. Generally the AAAA

advises wind farm developers to undertake consultation with local aerial operators to identify any likely restrictions on the aerial spraying program resulting from the Proposal. A separate expert risk assessment by a licensed aerial applicator may be required to be undertaken.

The Applicant has contacted the closest aerial operator, located in Yass, who confirmed that very little recent aerial application has occurred in the area around Taralga. The Applicant confirms that although very little aerial application is undertaken in the area, in the event that aerial application would occur there may be some small increase in application costs to accommodate adjusted turning patterns.

The Department considers that the surrounding property owners should note be financially disadvantage due to the restrictions on the aerial weed control program resulting from locations of the turbines. The Department therefore recommends that in the event that required aerial weed control is restricted due to the location of turbines, that the applicant shall fund the cost difference between the aerial weed spraying and a reasonable alternative weed control method in the restricted area (Recommendation No.92).

7.11 Hazards

7.11.1 EIS

Bushfire Risk

Some sections of the site of the Proposal are located within identified bushfire prone land. The EIS nominates a number mitigation measures to be used to minimise the risk of bush fires during the construction phase including:

- restricting motorised equipment from being driven in grassed areas unless that machine is designed so that any heated areas do not come in contact with combustible matter;
- restricting any activities that could generate sparks (ie. welding and use of angle grinders) and adopting prescribed fire safety equipment (e.g knapsack spray pumps);
- providing on site trailer mounted water tankers with fire fighting pumps and spray hoses; and
- preventing the build up of combustible matter around the site.

Employee Safety

The development is to be constructed in accordance with the relevant requirements of the WorkCover Authority. A Safety Manual will be developed and implemented through the lifetime of the project. Authorised personnel and persons under their supervision who visit the site would operate under site specific safety rules.

Public Safety

The EIS states that the wind farm would not pose a risk to public safety. Infrastructure associated with the wind farm would be located on private land or Crown land where public access is limited. The EIS also states that the final turbine selected would have full certification by an internationally recognised authority and have a proven record of safe operation. Turbines will also be monitored remotely via modem for any faults.

Electrical Safety

The EIS lists a number of key design elements to maximise electrical safety, including:

- electrical equipment to be installed in accordance to relevant industry standards;
- protective equipment to be installed to detect faults and disconnect faulted equipment from the system;
- safety training of all site personnel;
- adequate signage around electrical infrastructure;
- use of underground cablings generally to prevent access to electrical cables; and
- earthing of turbine tower to limit voltage rises, protection of internal electrical equipment and protection of measures for electrical equipment against voltage rises.

The EIS acknowledges that the possibility of attracting lightening strikes applies to all tall structures and therefore proposes a number of specific lighting protection measures of turbines and substations. These include earthing of turbine tower to limit voltage rises, lightening masts at the substation, conductors within the turbine blades, protection of internal electrical equipment, and protection of measures for electrical equipment against voltage rises.

7.11.2 Issues raised in submissions

Three submissions received during the exhibition period raised concern about turbines increasing the risk of bushfires.

7.11.3 Additional Information

The Department requested further information from the Applicant the distance of turbines to public roads. Concerns have been previously raised for other wind farm proposals about the potential safety issues of turbines in close proximity to these roads.

7.11.4 Consideration of Issues

Bushfire risk

The Department has consulted with the NSW Rural Fire Service (RFS) in regards to the proposed development. The RFS have recommended the Applicant be required to implement the following, in order to increase the risk of bush fire or restrict bush fire fighting:

- the Applicant is to required consult with the local RFS during period of high fire danger, to verify that the proposed construction activities will not adversely increase the risk of fire (Recommendation No.94); and
- the Applicant is required to consult with the local RFS at the commencement of operation, and any time required thereafter, to ensure the local RFS is familiar with the development, including location and identification of wind turbines for the purposes of fast access in emergencies (Recommendation No.95).

Physical and Electrical Safety

The location of wind turbines and the safety measures proposed including the circuit breaker, mean that the risk of fire and associated hazards on site is unlikely to increase because of the project.

To ensure that there are adequately measures in place to ensure the safe operation of the development, Recommendation No.96 requires that the Applicant prepare a Safety Management System, specifying safety related procedures, responsibility and polices to be implemented for the development.

Public Safety

Concerns have been previously raised about the potential safety issues of turbines in close proximity to busy public roads by the RTA and the Department for other wind farm proposals. Following the Department's request, the applicant confirmed that the closest proposed turbine to a public road would be T43 which would be no closer than 120m to Bannaby Rd.

The Department is satisfied that there should be no adverse safety impacts given that T43 will be further from Bannaby Road than the actual height of the turbine. In addition, the risk is further minimised by T43 being adjacent to a relatively straight section of Bannaby Road and that this road only carries around 600 vehicles a day.

The RTA has not raised any specific concerns in relation to the proximity of this or other turbines to public roads.

7.12 Electric and magnetic Fields

7.12.1 EIS

The EIS states that electromagnetic fields (EMF) are generated in the vicinity of all electrical equipment including power lines, underground cables and transformer. Under the current Proposal, sources of electromagnetic fields would include electrical equipment associated with the turbines, the underground electrical cables and the substation.

The EIS states that the electrical equipment will be manufactured and constructed in accordance with accepted industry practices and operated in accordance with the relevant guidelines from the National Health and Medical Research Council, thus the wind farm would not pose a risk to human health.

7.12.2 Issues Raised in Submissions

Three submissions raised concern about potential health effects associated with electromagnetic fields produced by the wind farm. One submission expressed concern that electromagnetic fields were not considered in sufficient detail in the EIS.

7.12.3 Consideration of Issues

Electricity generates both electrical and magnetic fields. The EIS does not distinguish between the two.

The electric field is proportional to the voltage, which can be considered as the pressure with which electricity is pushed through the wires. Therefore, the strength of the electric field depends on the voltage. Typically 240V is used for households. The electric field is present in any live wire

whether an electrical appliance is in use or not. Electric fields can be easily shielded, but the shielding of magnetic fields is technically difficult and therefore very expensive.

Magnetic fields are produced by electric currents. The magnetic field is proportional to the current of electricity flowing through the wires. The direction of the current, and therefore that of the magnetic field, changes 50 times per second (or at 50 Hz). When an electrical appliance is turned off, there is no magnetic field; a magnetic field is created around the lead and the appliance when it is operating.

The National Health and Medical Research Council (NHMRC) have issued *Interim Guidelines on Limits of exposure to 50/60 Hz electric and magnetic fields.* The guidelines are aimed at preventing immediate or acute health effects resulting from exposure to these fields. The recommended magnetic field exposure limited for members of the public (24 hour exposure) is 0.1 millitesla (1000mG or milligauss) and for occupational exposure (for a working day) is 0.5 millitesla (5000mG or milligauss).

The EIS does not indicate the levels of electric or magnetic fields likely to result from the project, although the EIS states that all electrical equipment would be manufactured and constructed to ensure compliance with recommended exposure limits in accordance with guideline values issued by the NHMRC.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has provided information on levels of magnetic fields generated from variety of sources, which can provide an indication of the likely exposure levels for the Proposal. The estimated exposure levels to magnetic fields approximately 40 metres from HV powerlines, will be under 10 milligauss. The estimated exposure levels to magnetic fields when directly under HV powerlines is in the range of less than 10 milligauss to approximately 80 milligauss. These exposures levels are well below the exposure limits recommended by the NHMRC.

The easiest way to reduce exposure to magnetic fields is to increase the distance from the source, as magnetic fields decay exponentially as a function of distance from the source. For example, between 50 to 100m from a powerline, magnetic field exposure will be zero or negligible. Under the current Proposal, no residence is located within 500 metres of any electrical infrastructure.

It should be noted that the NHMRC Guidelines do not apply to the avoidance of health risk resulting from chronic exposure to 50 Hz magnetic fields. Reviews by both the UK National Radiological Protection Board (Doll Report) and the International Agency for Research on Cancer (IARC) suggest that there may be an association between exposure to low levels of average extra low frequency (ELF) magnetic field strengths and childhood leukaemia. These reviews indicate that evidence is not conclusive, however, it is recommended that prudent avoidance be observed when considering residential exposures to electromagnetic fields. Prudent avoidance refers to taking reasonable steps to avoid or minimise exposure to magnetic fields.

As the magnetic field exposures generated by the Proposal will be at low levels, and all electrical infrastructure will be located a significant distance from any residential dwellings on site or on adjacent land, human exposures will be negligible. The Department is satisfied that there will be no human health risk associated with magnetic fields from the proposed development.

7.13 Television Reception Inference

7.13.1 EIS

Television services utilise ridgelines that also provided the optimum location for wind turbines. Wind turbines may interfere with electromagnetic signals, by scattering the signal through forward and backward reflections.

An assessment of the impacts of the Proposal on television reception was done through prediction modelling. The modelling confirmed that the Taralga region generally has a poor signal strength and the wind farm may interference with reception at a number of locations.

To mitigate this impact, a re-transmitter would be installed. The EIS predicts that the Proposal would improve the existing quality of television reception rather than impairing it and that a community benefit would be achieved.

7.13.2 Issues Raised in Submissions

Several submissions raised concerns regarding the impact of the Proposal on television reception.

7.13.3 Consideration of Issues

The Department considers that the installation of a re-transmitter is likely to greatly minimise the threat of television reception interference for the community generally. Nevertheless, the Applicant should be responsible if any residential dwellings are found to have impaired reception as a result of the re-transmitter not being effective.

Recommended Conditions No.97 and 98 therefore require the Applicant to review the television reception available at a representative sample of potentially impacted residences prior to the commencement of any wind turbines operating and subsequently provide mitigation measures to overcome transmission problems that can be reasonably attributable to the project. Mitigation measures could include installation of parasitic antenna systems and land lines between affected receivers and antennas with favourable reception.

The International Telecommunications Union advises that television transmission interference is unlikely to occur beyond five kilometres. It is therefore recommended that the Applicant be required to sample dwellings located within five kilometres of a turbine.

The Department considers that the lease agreements entered by the land owners of the subject site would compensate for adverse impacts relating to television transmission. It is therefore not an intent of the Department for the Applicant to rectify any problems with transmission at residences on the site.

8 SECTION 79C CONSIDERATION

Section 79C of the EP&A Act sets out the matters a consent authority must take into consideration when it determines a DA. The Department has assessed the development application in the context of Section 79C of the Act, having regard to the identified heads of consideration. This consideration is provided in Appendix B.

The Department is satisfied that the merits of the proposed development warrant approval subject to the recommended measures outlined in this report.

9 CONCLUSIONS

The Department has assessed the Proposal and considers, overall, it is consistent with the broad State and local planning objectives. Importantly, the Proposal is consistent with Federal and State policies promoting the production and uptake of renewable energies, such as wind farming.

The Department has undertaken an assessment of the likely environmental impacts of the Proposal. In particular, it considers key issues associated with the Proposal's justification, visual and landscape impacts, operational noise impacts, flora and fauna impacts and property devaluation.

The majority of submissions received during the exhibition of the EIS raised concern regarding the visual impacts of the Proposal. The Department considers that changes to the visual outlook and views of the site need to be balanced with the broader environmental benefits of renewable energy sources, however, recognises that some turbines associated with the Proposal could result in significant visual impacts for neighbouring properties and the township of Taralga. In order to address this, eight turbines (T1 to T4 and T59 to T62) have been recommended for deletion and four turbines (T5 to T8) have been recommended for relocation and further environmental assessment under a staged consent process.

Other mitigative measures are also recommended to address operational noise, flora and fauna impacts, and other environmental issues identified in Section 8 of this report. The Department's Recommended Conditions are contained in Section 10 and include:

- **Bird and Bat Adaptive Management Program** to ensure mitigative actions are taken in response to any bird and bat strikes from wind turbines;
- **Off-site Landscaping Plan** to mitigate the visual impacts of the proposal and to provide an offset to neighbouring properties affected;
- **Environmental Management Plans** – to address specific issues associated with construction and operational activities such as noise, stormwater, erosion control, traffic, noise and salinity; and
- **Decommissioning requirements** – to ensure the site is returned to its original condition after completion of operation.

The Department considers that all key environmental concerns have now been adequately addressed. It is recommended that the development application be approved subject to a number of Recommended Conditions identified in Section 10. The Department considers that these recommendations provide a rigorous and strict framework for the management, monitoring and reporting on the development.

A deferred commencement of consent is recommended to ensure that relevant approvals are obtained for the transmission line prior to allowing any construction activities associated with the development on the site.

Sarah Joyce
Environmental Planning Officer
Major Infrastructure Assessment

10 RECOMMENDATIONS

These Recommended Conditions have been drafted as if adopted as Conditions of Consent.

In these Recommended Conditions, except in so far as the context or subject-matter otherwise indicates or requires, the following terms have the meanings indicated:

Act	*Environmental Planning and Assessment Act, 1979*
Applicant	RES Southern Cross Pty Ltd
AHD	Australian Height Datum
BCA	Building Code of Australia
CASA	Civil Aviation Safety Authority
CIP	Community Information Plan
Commissioning	commencement of testing and connection of any individual turbine(s) and may include concurrent ongoing construction activities
Conditions of Consent	The conditions set out in this Schedule
Consent	The Consent granted by the Minister for Planning to the development described in Schedule 1
CEMP	Construction Environmental Management Plan, as required under Condition 24
Construction	any activity requiring a Construction Certificate, the laying of a slab or significant excavation work
Council	Upper Lachlan Council
dB(A)	decibel (A-weighted scale)
the Department	NSW Department of Planning
Development	the development to which this consent applies, the scope of which is described in the documents listed under Condition 2 of this consent
DEC	NSW Department of Environment and Conservation (incorporates the former NSW Environment Protection Authority and National Parks and Wildlife Service)
DoP	Department of Planning (the Department)
Director General	Director General of the NSW Department of Planning or delegate
DNR	Department of Natural Resources (formerly part of the Department of Infrastructure Planning and Natural Resources)
Dust	any solid material that may become suspended in air or deposited
EPA	Environment Protection Authority (part of DEC). DEC exercises certain statutory functions and powers in the name of the EPA.

EIS	Environmental Impact Statement entitled *Crookwell II Wind Farm Environmental Impact Statement* (three volumes) prepared by URS, dated July 2004
EPL	Licence issued under the *Protection of the Environment Operations Act, 1997*
$L_{Aeq(15\text{-}minute)}$	equivalent average sound pressure level that is measured over a 15 minute period
$L_{A1(1\text{-}minute)}$	equivalent average sound pressure level that is measured over a 1 minute period
Minister	NSW Minister for Planning, or delegate
NPW Act	*National Parks & Wildlife Act, 1974*
OEMP	Operational Environmental Management Plan, as required under Condition 25.
Operation	Within three months of the commencement of commissioning, unless otherwise agreed to by the Director General
Publicly Available	Available for inspection by a member of the general public (for example available on an internet site or at a display centre)
POEO Act	*Protection of the Environment Operations Act 1997*
Premises	Sub-areas of the site, as consistent with the relevant DEC licence.
Principal Certifying Authority	the Minister or an accredited certifier, appointed under section 109E of the Act, to issue a Part 4A Certificate as provided under section 109C of the Act
Reasonable and Feasible	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. Feasible relates to engineering considerations and what is practical to build. Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Regulation	*Environmental Planning and Assessment Regulation, 2000*
Relevant Government Agencies	DoP, Department of Natural Resources, Department of Lands, RTA, SCA, and Upper Lachlan Council
RFS	Rural Fire Service
RTA	Roads and Traffic Authority
SCA	Sydney Catchment Authority
Site	the land to which this consent applies
SA Guidelines	the South Australian Environmental Protection Authority's *Wind Farms: Environmental Noise Guidelines* (2003)

GENERAL CONDITIONS

Deferred Commencement

1 In accordance with section 80(3) of the *Environmental Planning and Assessment Act 1979*, this development consent shall not operate until the Applicant has indicated to the satisfaction of the Director-General that it has obtained approvals for the construction of the transmission line and its connection to the electricity grid. For the purpose of this condition, approval means a consent or approval has been obtained under the Act and/or any relevant determining authority has completed its assessment obligations under Part 5 of the Act for the transmission line.

Note:	At the time of lodgement of the Development Application, the Applicant had not determined the final alignment of the transmission line. Details of likely options are known and the Department considers that there are reasonable and likely options where a transmission line could be approved. However, as there are no final approvals, deferred commencement consent has been granted to permit the Applicant to satisfy the Director General that such approvals have been obtained prior to any commencement of construction works related to the development.

Obligations to Minimise Harm to the Environment

2 [14]The Applicant must implement all practicable measures to prevent and minimise any harm to the environment that may result from the Construction, Commissioning, Operation and decommissioning of the Development.

Scope of Development

3 [15]The Applicant must carry out the development generally in accordance with the following documents:

(a) Development Application No. DA-241/04; lodged with Upper Lachlan Council on 10 November 2004;
(b) *Taralga Wind Farm Environmental Impact Statement* (two volumes) prepared by Geolyse, dated November 2004
(c) *Proposed Taralga Wind Farm: Response to DIPNR Questions*, RES Southern Cross, dated 28 January 2005, 4 February 2005, 17 February 2005, 28 February 2005, 11 March 2005;
(d) *Proposed Taralga Wind Farm: Response to RTA Questions*, RES Southern Cross, dated 31 January 2005;
(e) *Proposed Taralga Wind Farm: Response to Questions from Department of Lands*, RES Southern Cross, dated 25 January 2005;
(f) *Proposed Taralga Wind Farm: Response to DEC Questions*, RES Southern Cross, dated 28 January 2005, 17 February 2005, 3 March 2005, 15 March 2005;
(g) *Proposed Taralga Wind Farm: Amendment to Development Application*, RES Southern Cross, dated 1 March 2005;
(h) *Proposed Taralga Wind Farm: Additional Information on Amendment to Development Application*, RES Southern Cross, dated 15 March 2005, 21 March 2005; and
(i) Conditions of this Consent.

[14] Incorporates DEC's GTA A3.1
[15] Incorporates DEC GTA A1.1

If there is any inconsistency between the Conditions of this Consent and a document listed above, the Conditions of this Consent must prevail to the extent of the inconsistency. If there is any inconsistency between documents listed above (other than the Conditions of this Consent) then the most recent document must prevail to the extent of the inconsistency.

4 Pursuant to sections 80(1), 80(4) and 80(5) of the Act:
(a) development consent is granted in respect of the following part of the development, subject to the conditions of this consent: The 50 turbines numbered T9 to T58 inclusive, as identified on Attachment 1;
(b) development consent may be sought in respect of the following part of the development, subject to compliance with Condition 6 of this consent: The four turbines numbered T5 to T8 inclusive, as identified on Attachment 1.

5 Turbines numbered T1, T2, T3, T4, T59, T60, T61 and T62, as identified on Attachment 1, may not be constructed.

6 Development consent may be sought in respect of that part of the development described in Condition 4(b) on completion of the following conditions:
(a) submission of a revised plan for Turbines numbered T5, T6, T7 and T8 in accordance with the Attachment 2;
(b) submission of additional information to the satisfaction of the Director General in respect of Turbines numbered T5, T6, T7 and T8 on noise, shadow flicker, cultural heritage, flora and fauna, electromagnetic interference, and visual impacts of the revised locations identified on Attachment 2. This additional information must include photomontages from key viewpoints and the nearest residences;
(c) undertaking appropriate consultation as determined by the Director General in respect of turbines numbered T5, T6, T7 and T8.

Note:	The form and content of the additional information would be determined by the Director General, in consultation with the DEC and the Upper Lachlan Council. Any application for consent will be subject to an appropriate degree of public consultation including, as a minimum, with impacted neighbours and subject to conditions consistent with this consent.

7 Without limiting the requirements of Condition **Error! Reference source not found.**, any document required to be prepared under this consent may address the issues associated with turbines T5, T6, T7 and T8 prior to a consent issued under Condition **Error! Reference source not found.** provided that:

(a) in preparing, consulting or seeking approval of any document required under these conditions of consent, the status of the consent to turbines T5, T6, T7 and T8 is clearly identified; and
(b) nothing in the document has a dependency or is reliant upon the construction or operation of these turbines. That is, the absence of any or all of these turbines would not in any way limit, restrict or constrain the level of impact mitigation and management measures proposed should any or all of these turbines not be given consent.

Should consent be granted to any of the turbines T5, T6, T7 and T8, the Applicant may also elect to obtain written confirmation from the Director General, relevant government agencies and/or Council (as appropriate), that issues relating to any of these turbines have been

adequately addressed in any documents submitted prior to the consent of any of these turbines.

Note: The purpose of this condition is to enable the Applicant to address in detail any potential cumulative impacts and issues of the Proposal which includes T5, T6, T7 and T8. It would also minimise the extent of potential additional documentation review that may be required by relevant government agencies and Council should consent be granted for any of all of these turbines without necessarily pre-empting a decision on these turbines.

Statutory Requirements

8 [16]The Applicant must ensure that all necessary licences, permits and approvals are obtained and kept up-to-date as required throughout the life of the development. No condition of this consent removes the obligation for the Applicant to obtain, renew or comply with such licences, permits or approvals.

Dispute Resolution

9 In the event that a dispute arises between the Applicant and Council or the Applicant and a public authority other than the Department in relation to a specification or requirement applicable under this consent, the matter must be referred by either party to the Director General, or if not resolved, to the Minister, whose determination of the dispute must be final and binding on all parties. For the purpose of this condition, "public authority" has the same meaning as provided under section 4 of the Act.

Note: Section 121 of the *Environmental Planning and Assessment Act 1979* provides mechanisms for resolution of disputes between the Department, the Director General, councils and public authorities.

Provision and Protection of Public Infrastructure

10 The Applicant must:
(a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
(b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

Note: The Applicant must ensure that all works are carried out in accordance with the *Environmental Planning and Assessment Act 1979* and *the Local Government Act 1993 (Approvals) Regulations* and the *Building Code of Australia*.

Compliance

General

11 The Applicant must be responsible for environmental impacts resulting from the actions of all persons on site associated with the development, including contractors, subcontractors and visitors.

[16] Incorporates DNR's GTA 1

Pre-Construction Compliance Report

12 The Applicant must submit a Pre-Construction Compliance Report to the Director General at least two weeks prior to the commencement of construction (or within a time agreed to by the Director General). The Pre-Construction Compliance Report must include:

(a) details of how the Conditions of Consent required to be addressed prior to construction have been complied with;
(b) details of when each relevant Condition of Consent was complied with, including submission dates of any required report and/or approval dates; and
(c) details of any approvals or licences required to be issued by Relevant Government Agencies prior to the commencement of construction.

Pre-Operation Compliance Report

13 The Applicant must submit a Pre-Operation Compliance Report to the Director General at least two weeks prior to the commencement of Operation (or within a time agreed to by the Director General). The Pre-Operation Compliance Report must include:

(a) details of how the Conditions of Consent required to be addressed prior to commencement of operation have been complied with;
(b) details of when each relevant Condition of Consent was complied with, including submission dates of any required report and/or approval dates; and
(c) details of any approvals or licences required to be issued by Relevant Government Agencies prior to the commencement of operation.

Construction Compliance Report

14 The Applicant must provide the Director General with a Construction Compliance Report. The Environmental Representative, required under Condition 26, must certify the adequacy of the report before it is submitted to the Director General. The Construction Compliance Report must address the first six months of construction and be submitted within six weeks of the end of that reporting period (or at any other time interval agreed to by the Director General).

The Construction Compliance Report must include information on:

(a) compliance with the CEMP and the Conditions of Consent;
(b) compliance with any approvals or licences issued by relevant Government Agencies for Construction;
(c) the implementation and effectiveness of environmental controls. The assessment of effectiveness should be based on a comparison of actual impacts against performance criteria identified in the CEMP;
(d) a summary and analysis of environmental monitoring results;
(e) the number and details of any complaints, including a summary of the main areas of complaint, action taken, response given and intended strategies to reduce recurring complaints;
(f) details of any review and amendments to the CEMP resulting from construction during the reporting period; and

(g) any other matter relating to compliance with the Conditions of Consent or as requested by the Director General.

The Construction Compliance Report must be made publicly available.

15 The Director General may require update report(s) on compliance with all, or any part, of the Conditions of Consent. The report (s) must meet the requirements of the Director General and be submitted within such period as the Director General may require.

16 The Applicant must meet the requirements of the Director General in respect of the implementation of any measure necessary to ensure compliance with the Conditions of Consent, and general consistency with the documents listed under Condition No. 2 of this consent. The Director General may direct that such a measure be implemented in response to the information contained within any report, plan, correspondence or other document submitted in accordance with the Conditions of Consent, within such time as the Director General may require.

Construction and Part 4A Certification

17 Prior to the commencement of construction associated with the development, the Applicant must erect at least two signs at the construction site and in a prominent place at the Site boundary where the signs can be viewed from the nearest public place. The signs must indicate:

(a) the name, address and telephone number of the Principal Certifying Authority;
(b) the name of the person in charge of the construction site and telephone number at which the person may be contacted outside working hours; and
(c) a statement that unauthorised entry to the construction site is prohibited.

The signs must be maintained for the duration of construction works, and must be removed as soon as practicable after the conclusion of the construction works.

Note:	The Applicant must ensure that all works are carried out in accordance with the *Environmental Planning and Assessment Act 1979* (the Act) and *the Local Government Act 1993 (Approvals) Regulations* and the *Building Code of Australia*.

Environmental Monitoring

General Monitoring Requirements

18 [17]The Applicant must undertake all monitoring, including recording and reporting of monitoring results, as required under this consent and as may be specified in an Environment Protection Licence for the development.

19 [18]The results of any monitoring required under this consent must be recorded and maintained, as set out below. All records kept must be:

[17] Incorporates DEC's GTA M1.1
[18] Incorporates DEC's GTA M1.2

(a) in a legible form, or in a form which can be readily reduced to a legible form;
(b) kept for at least 4 years after the monitoring or event to which they relate took place; and
(c) produced in a legible form to any authorised officer of the DEC or the Department who asks to see them.

20 [19] The following records must be kept in respect of any samples required to be collected:

(a) the date(s) on which the sample was taken;
(b) the time(s) at which the sample was collected;
(c) the location at which the sample was taken (including a description of the DEC identification point); and
(d) the name of the person who collected the sample.

Environmental Impact Audits

Environmental Impact Audit Report – Construction

21 A Construction Environmental Impact Audit Report must be prepared and submitted to the Director General within three months of construction completion, or at any other time interval agreed to by the Director General. If requested, the Environmental Impact Audit Report – Construction must be provided to other Relevant Government Agencies.

The Construction Environmental Impact Audit Report must:

(a) identify the major environmental controls used during construction and assess their effectiveness;
(b) summarise the main environmental management plans and processes implemented during construction and assess their effectiveness;
(c) identify any innovations in construction methods used to improve environmental management; and
(d) discuss the lessons learnt during construction, including recommendations for future wind farm developments.

Environmental Impact Audit Report - Operation

22 An Operation Environmental Impact Audit Report must be prepared and submitted to the Director-General within three (3) months after a 24 month period of Operation and then at any additional periods requested by the Director-General. If requested, the report must be provided to other Relevant Government Agencies.

The Operation Environmental Impact Audit Report must:

(a) be certified by an independent person at the Applicant's expense. The certifier must be approved by the Director General prior to the preparation of the audit report;
(b) compare the operation impact predictions made in the EIS and documents identified in Condition 3;
(c) assess the effectiveness of implemented mitigation measures and safeguards;
(d) assess compliance with the systems for operation maintenance and monitoring; and

[19] Incorporates DEC's GTA M1.3

(e) discuss the results of consultation with the local community particularly any feedback or complaints.

The result of the audit report must also be used to update the OEMP where necessary. The need or otherwise to update the OEMP must be certified by the Environmental Representative, required under Condition 26. The Applicant must notify the Director General and Relevant Government Agencies of any updates to the OEMP and provide a copy on request.

Annual Performance Reporting

23 [20]The Applicant must provide an annual return to the EPA in relation to the development as required by any licence under the *Protection of the Environment Operations Act 1997*. In the annual return, the Applicant must report on the:

(a) annual monitoring undertaken (where the activity results in pollutant discharges);
(b) provide a summary of complaints relating to the development;
(c) report on compliance with licence conditions; and
(d) provide a calculation of licence fees (administrative fees, and where relevant, load based fees) that are payable. If load based fees apply to the activity, the Applicant must be required to submit load-based fee calculation worksheets with the return.

ENVIRONMENTAL MANAGEMENT

Construction Environmental Management Plan

24 The Applicant must prepare and implement a Construction Environmental Management Plan (CEMP) in accordance with the Department's publication entitled *Guideline for the Preparation of Environmental Management Plans* (2004) or its latest revision. The Applicant must ensure that the mitigation and monitoring measures identified in the EIS and in these Conditions of Consent are incorporated into the CEMP.

The CEMP must be prepared in consultation with the Relevant Government Agencies and certified by the Environmental Representative, required under Condition 26, as being in accordance with the Conditions of Consent.

The CEMP must be submitted for the approval of the Director General at least one month prior to the commencement of Construction, or within such a period otherwise agreed by the Director General. Site preparation and construction associated with the development must not commence until written approval for the CEMP has been received from the Director General. Upon receipt of the Director General's approval, the Applicant must supply a copy of the OEMP to the DEC and Council as soon as practicable.

The CEMP is to be Publicly Available.

Operation Environmental Management Plan

25 The Applicant must prepare and implement an Operation Environmental Management Plan (OEMP) in accordance with the Department's publication entitled *Guideline for the*

[20] Incorporates DEC's GTA R1.1

Preparation of Environmental Management Plans (2004) or its latest revision. The Applicant must ensure that the mitigation and monitoring measures identified in the EIS and in these Conditions of Consent are incorporated into the OEMP.

The OEMP must be prepared in consultation with the Relevant Government Agencies and certified by the Environmental Representative, required under Condition 26, as being in accordance with the Conditions of Consent.

The OEMP is to be submitted for the approval of the Director General no later than one month prior to the commencement of operation, or within such period otherwise agreed to by the Director General. Operation must not commence until written approval has been received from the Director General. Upon receipt of the Director General's approval, the Applicant must supply a copy of the OEMP to the DEC and Council as soon as practicable.

The OEMP is to be Publicly Available.

Environmental Representative

26 Prior to the commencement of Construction, and in consultation with Council, the Applicant must nominate a suitably qualified and experienced Environmental Representative(s) whose appointment requires the approval of the Director General. The Applicant must employ the Environmental Representative(s) on a full-time basis, or as otherwise agreed by the Director General, during the construction, and commissioning. An Environmental Representative must also be employed during operation. The Environmental Representative must be:

(a) the primary contact point in relation to the environmental performance of the development;
(b) responsible for all management plans and monitoring programs required under this consent;
(c) responsible for considering and advising on matters specified in the conditions of this consent, and all other licences and approvals related to the environmental performance and impacts of the development;
(d) responsible for receiving and responding to complaints in accordance with this consent; and
(e) given the authority and independence to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.

The Applicant must obtain approval from the Director General for changes to the appointment of the Environmental Representative during construction. The Applicant must notify the Director General of any changes to the appointment during operation.

COMMUNICATION AND CONSULTATION

Advice of Construction Activities

27 Subject to confidentiality, the Applicant must make all relevant documents required under this consent available for public inspection upon request, including provision of all documents at the site for inspection by visitors.

Construction Complaints Management System

28 [21]Prior to the commencement of construction of the development, the Applicant must ensure that the following are available for the community for the life of the development:

(a) a telephone number on which complaints about operations associated with the development on the site may be registered;
(b) a postal address to which written complaints may be sent; and
(c) an email address to which electronic complaints may be transmitted.

The telephone number, the postal address and the email address must be advertised prior to the commencement of construction and quarterly until construction is completed.

29 [22]The Applicant must keep a legible record of all complaints received in an up-to-date Complaints Register. The Register must record, but not necessarily be limited to:

(a) the date and time, where relevant, of the complaint;
(b) the means by which the complaint was made (telephone, mail or email);
(c) any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
(d) the nature of the complaint;
(e) any action(s) taken by the Applicant in relation to the complaint, including any follow-up contact with the complainant; and
(f) if no action was taken by the Applicant in relation to the complaint, the reason(s) why no action was taken.

The Complaints Register must be made available for inspection on request of the Director General or an authorised officer of the Department of Environment and Conservation. The record of a complaint must be kept for at least four years after the complaint was made.

Community Information Plan (CIP)

30 A Community Information Plan (CIP) must be prepared prior to the commencement of Construction. The CIP must set out the community communications and consultation processes to be undertaken during the construction period of the project. The Plan must include but not be limited to:

(a) procedures to inform the local community of planned investigations and construction activities, including planned construction activities outside standard construction hours;
(b) procedures to inform the relevant community of construction traffic routes and any likely disruptions to traffic flows and amenity impacts;
(c) procedures to consult with local landowners in regards to construction traffic to ensure safety of livestock and limited disruption to livestock movements;
(d) procedures to inform and consult with impacted residences subject to the Off-Site Landscape Plan; and
(e) procedures to notify relevant properties of the processes available to review potential impacts on television and radio transmission.

[21] Incorporates DEC's GTA (Attachment)
[22] Incorporates DEC's GTA (Attachment)

VISUAL AMENITY

Landscaping Requirements

31 Prior to the commencement of Operation, the Applicant must prepare an On-site Landscaping Plan. The On-Site Landscaping Plan is to address the visual impacts of the development as far as is Reasonable and Feasible including the turbines, site access roads, the substation, and the control and facilities building. The On-Site Landscaping Plan is to include, but not be limited to:

(a) identification of locations for planting and landscaping;
(b) identification of species to be planted; and
(c) details of the maintenance program for on-site landscaping associated with the development.

The On-Site Landscaping Plan is to be implemented within six months of commencement of Operation.

32 The Applicant must develop and implement an Off-Site Landscape Plan and address visual impacts of the Development. Any owner of an existing or approved rural residential dwelling with views of a turbine(s) located within four kilometres of their dwelling, may request, no later than six months after commencement of operation, inclusion of their property in the Off-Site Landscape Plan. The Applicant must notify in writing all owners of a residential dwelling with views of turbines located within two kilometres of their residential dwelling, prior to the commencement of commissioning. The Applicant must consider and implement any reasonable requirements for landscape works to provide screening.

The Off-Site Landscape Plan is to be submitted to the Director General for approval within nine (9) months of the commencement of operation or within a period otherwise agreed by the Director General. The Off-Site Landscape Plan is to be fully implemented within 18 months of the commencement of operation of the Development.

33 The wind turbines must be painted matt off-white/grey. The blades are to be finished with a surface treatment that minimises any potential for glare or reflection.

34 No advertising, signs or logos are to be mounted on the turbines, except where required for safety purposes.

Lighting

35 During Construction, the Applicant must take all practicable measures to minimise any off-site lighting impacts from the development. In particular, the Applicant must ensure that no lights cause an adverse impact to any private residences or public roads.

Shadow-flicker

36 Shadow flicker from the Development must not exceed 30 hours/annum at any residence not associated with the development.

NOISE AND VIBRATION

Construction Noise and Vibration Management Sub Plan

37 As part of the CEMP for the Development, the Applicant must prepare and implement a Construction Noise and Vibration Management Plan. The Plan must include, but not be limited to:

(a) details of construction activities, including timing, duration and predicted noise levels (including likely consistency with the EPA's Environmental Noise Control Manual goals);
(b) best management practices to minimise noise resulting from construction activities;
(c) reasonable and feasible noise mitigation measures including consideration of the need for structural measures such as acoustic shielding;
(d) compliance monitoring methods and program;
(e) community consultation and a community information program to inform residents when they are likely to affected by construction noise. This must include consideration of traffic noise impacts. In particular, residences adjoining site access routes east of Taralga Road must be notified in writing at least two weeks in advance of concrete pour activities and the details of such activities;
(f) a complaints handling and complaints monitoring program, including details of a contact person to follow up complaints; and
(g) contingency measures to deal with incidents when noise complaints have been received, including feedback on appropriate noise amelioration processes put in place in response to complaints and the timeframe for the introduction of these measures. The feedback must be provided to the complainant.

Construction Hours

38 [23]Construction activities associated with the Development, including heavy vehicles entering and exiting the site, may only be carried out between 7:00 am and 6:00 pm, Monday to Friday inclusive, and between 8:00 am and 1:00 pm on Saturdays. No work is to be carried out on Sundays and public holidays. The following activities may be carried out in association with construction outside of these hours:

a) any works that do not cause noise emissions to be audible at any nearby residences not located on the site;
b) the delivery of materials as requested by Police or other authorities for safety reasons; and
c) emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

Any work undertaken outside the specified construction hours, other than those specified in (a) – (c) of this Condition, must not be undertaken without prior consent of the DEC.

Operational Noise Criteria

39 [24]Noise generated from the Development must not exceed the predicted equivalent noise level ($L_{Aeq,10}$) minute noise levels in the table below.

[23] Incorporates DEC's GTA L6.6, L6.7. L6.8
[24] Incorporates DEC's GTA L6.1 and 6.2

Wind Speed at (m/s) at 10m height[25]	Noise Levels L Aeq(10 minutes) at receiver locations (day and night)				
	H1	H5	H7	H12	'the Farm'
3	35	35	35	35	35
4	35	35	35	35	35
5	35	35	35	35	35
6	35	35	35	35	35
7	37	35	35	35	35
8	38	35	35	37	36
9	38	35	35	37	37

The residential receivers H1, H5, H7 and H12 are located as identified in Attachment 1. 'The Farm' is located as identified in a letter to the EPA from the Department (dated 6 June, 2005).

40 [26]At all other sensitive receiver locations, noise from the Taralga Wind Farm, at any given integer wind speed, must not exceed a level of $L_{Aeq,(10\ minute)}$ 35dB(A).

41 [27] For the purposes of Conditions 39 and 40, a positive adjustment of 5dB(A) must be applied to the measured noise levels where audible tones are present. The presence of audible tones must be determined using the methodology in the document "*Wind Turbine Generator Systems – Part 11: Acoustic noise measurement techniques*" (IEC 61400-11:2002).

42 Noise from the Development is to be measured at the most affected point within the residential boundary, or at the most affected point within 20 metres of the dwelling, where the dwelling is more than 20 metres from the boundary, to determine compliance with the noise level limits in Conditions 39, 40 and 41.

43 [28]The noise limits specified in Condition 40 do not apply to on site residences H2, H4, H6, H8, H9, H10, H11 and H20 whilst agreements are in place between the Applicant and the respective owners of the residences. For this condition to take effect, the agreements must satisfy the requirements of Section 2.3 of the SA Guidelines.

Noise Compliance

Noise Compliance Assessment Plan

44 [29]The Applicant must prepare a Noise Compliance Assessment Plan which must be submitted to, and approved by the EPA, prior to Commissioning. The Noise Compliance Assessment Plan must outline how the noise compliance assessment will be achieved and be consistent with the data acquisition methods outlined in the SA Guidelines.

[25] Measured at the turbine location.
[26] Incorporate DEC's GTA L6.3
[27] Incorporates DEC's GTA L6.4
[28] Incorporates DEC's GTA L6.6 and L6.7
[29] Incorporates DEC's GTA S1.1, S1.2 and S1.3

Compliance with Noise Limits during the Operation

45 [30]Within six months of Commissioning, compliance monitoring of noise from the development is to be undertaken at the locations identified in Condition 39. If prevailing meteorological conditions do not allow the required monitoring to be undertaken in this period, the EPA must be notified and an extension of time may be sought.

46 [31]A Noise Compliance Assessment Report must be submitted to the EPA within one month of completing the compliance monitoring outlined in Condition 45. The Noise Report must include, but not be limited to:

(a) an assessment of the performance of the Development against the noise limits contained in Condition 39; and
(b) in the event that the assessment indicates that noise from the wind turbines exceeds the noise limits, the Noise Compliance Assessment Report must investigate and propose the mitigation and management measures that are available to achieve compliance.

Noise Mitigation – Vacant Lots

47 Where Reasonable and Feasible, noise mitigation measures are to be provided by the Applicant for no more than one new dwelling, built on any vacant lot legally existing at the date of this consent, upon which a residential dwelling would be permissible at the same date. Noise mitigation is to be provided if the noise levels from the development at the approved location of the new residential dwelling would exceed the SA Guidelines.

Note:	The intention is that this condition does not apply to any potential future subdivision(s) that may be approved after the date of this consent.

Blasting and Vibration

48 [32]The overpressure level from blasting operations associated with the development must not:

(a) exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over the period of any relevant DEC licence; and
(b) exceed 120dB (Lin Peak) at any time.

The above values apply when the measurements are performed with equipment of a lower cut-off frequency of 2Hz or less. If the instrumentation has a higher cut-off frequency, then a correction of 5dB should be added to the measured value. Equipment with a lower cut-off frequency exceeding 10 Hz should not be used for the purpose of measuring overpressure.

49 [33]Ground vibration (peak vector sum) from the blasting operations associated with the Development must not:

(a) exceed 5mm/s for more than five percent of the total number of blasts during construction; and
(b) exceed 10 mm/s at any time.

[30] Incorporates DEC's GTA S2.1, S2.2
[31] Incorporates DEC's GTA S2.3 and S2.4
[32] Incorporates DEC's GTA L7.1
[33] Incorporates DEC's GTA L7.2

when measured at any point within 1 metre of any affected residential boundary or any other noise sensitive location such as a school or hospital.

50 [34]Blasting operations associated with the development may only take place:

(a) between 9.00am and 5.00pm Monday to Friday;
(b) between 9.00am to 12.00pm Saturday; and
(c) at such other times or frequency as may be approved by the DEC.

TRAFFIC

Traffic Management

51 [35]As part of the CEMP, a Construction Traffic Management Plan must be prepared in consultation with Upper Lachlan Council, the RTA and NSW Police, to manage traffic related issues associated with the development during Construction. The Plan must identify:

(a) designated transport routes for heavy vehicles to the site associated with the development;
(b) heavy vehicle movements at the junction of Lagoon Street (MR676) and Union Street (MR256), including demonstration that junction accommodates turning movements in accordance with AUSTROADS standards.
(c) details of procedures to minimise traffic disruption;
(d) procedures to minimise disturbance from traffic noise, particularly during night periods;
(e) procedures to manage construction traffic to ensure the safety of:
    (i) livestock and limit disruption to livestock movement;
    (ii) school children and limit disruption to school bus timetables;
(f) a community information program to inform the community of traffic disruptions resulting from the construction program; and
(g) details of complaints management procedures for traffic impacts.

52 [36]Should any vehicle accessing the site during Construction or Operation of the development exceed the road limit for length or mass on any road, the applicant must apply for Specific Oversized/Over Mass Permit from the RTA.

53 [37]No advertising signs or structures within Taralga Road (MR256) road reserve are to be erected.

54 [38]A Section 138 Approval from Council with RTA concurrence within the Classified Road Reserve must be obtained.

55 All large construction vehicles associated with the Development must only utilise the transport routes identified in Figure 5.16 of the EIS.

[34] Incorporates DEC's GTA L7.3, L7.4
[35] Incorporates Council's GTA 1 and RTA's GTA dated 20 May 2005.
[36] Incorporates RTA's GTA dated 20 May 2005.
[37] Incorporates RTA's GTA dated 20 May 2005
[38] Incorporates RTA's GTA dated 20 May 2005

Road Occupancy

56 [39]The Applicant must apply for a Road Occupancy Licence (ROL) from the RTA Traffic Operations Unit (TOU) before commencing work within the classified road reserve. Should the Traffic Management Plan, identified in Condition 51, require a reduction of the speed limit, a Direction to Restrict must be obtained from the TOU at least two weeks prior to using the road reserve.

Road Dilapidation

57 [40]Prior to the commencement of Construction, the Applicant must undertake a 'before' road dilapidation report utilising the ARRB 'laser car', to assess the existing condition of the Taralga Road (MR256), Bannaby Road and Old Showground Road. The report is required for the respective lengths of road that are to be utilised for heavy vehicle access. It must be undertaken in conjunction with Council's Director of Works.

58 [41]Following completion of Construction, and prior to the commencement of Operation, an 'after' road dilapidation report utilising the ARRB 'laser car' and road video images (i.e. RTA "gypsy"cam car) must be prepared in consultation with Council to determine the works required by the Applicant to restore the road to at least its pre-development condition.

59 [42]The Applicant must restore the roads to a standard not less than recorded in the initial dilapidation report, unless the damage can be reasonably attributed to influences other than the development. The Applicant must restore the road to at least its pre-development condition, to the satisfaction of Council within three (3) months of the commencement of operation, unless otherwise agreed by Council.

Road Upgrades

60 [43]In the event that the turning movements of heavy vehicles at the junction of Lagoon Street (MR676) and Union Street (MR256) cannot be achieved, the Applicant must upgrade the junction in accordance with the RTA Road Design Guide.

61 [44]Prior to the commencement of any transport to the site associated with the development from Taralga Road involving heavy vehicles, the Applicant must construct site access points along Taralga Road to a minimum 'BAL', 'BAR' treatment, to the satisfaction of Council and RTA. Detailed drawings of the access points along Taralga Road must be approved by the RTA prior to the commencement of these works.

62 [45]Prior to heavy vehicle movements to and from the Site associated with the development, the Applicant must complete the following works along the designated route, to the satisfaction of Council:

(a) a condition survey of all bridges and drainage structures along the proposed access roads for construction heavy vehicles by a competent and qualified person, to

[39] Incorporates RTA's GTA dated 20 May 2005
[40] Incorporates Council's GTA 3
[41] Incorporates Council's GTA 3
[42] Incorporates Council's GTA 3
[43] Incorporates RTA's GTA dated 20 May 2005.
[44] Incorporates Council's GTA 5
[45] Incorporates Council's GTA 6

determine the adequacy of the bridges and drainage structures to withstand the proposed loads;

(b) implement a program of works as necessary to reinforce and strengthen bridges and drainage structures identified in (a) above to permit heavy vehicles to pass without causing damage;

(c) construction of site access points and turning bay along the Bannaby Road with a minimum of 180m stopping sight distance for approaching traffic;

(d) construction of site access points and turning bay along the Alders and Crees Road with a minimum of 160m stopping sight distance for approaching traffic;

(e) road improvements and realignment of roads as identified by Council to permit the safe passage of over length and overweight vehicles;

(f) strengthening of a major twin cell culvert at Bannaby Road (chainage 0.87km) by additional temporary supports for the duration of the construction period, if this culvert is identified to be on the route used by Construction vehicles.

63 [46]All roadwork is to be designed and constructed to Upper Lachlan Council's version of AUS-SPEC Design and Construction specification or alternative specifications that meet the minimum requirements of AUS-SPEC. Detailed drawings of the access points along Bannaby Road must be approved by the Council prior to the commencement of these road works.

64 [47]Prior to the commencement of Construction, site road work design and specifications shall be completed and certified by an appropriately qualified person that all roads within the site associated with the development are of an acceptable standard for traffic generating requirements of the development.

Road Maintenance

65 [48]During Construction, designated gravel access roads shall be maintained in a safe and satisfactory condition at all times by the provision of regular maintenance and grading. The maintenance can be undertaken by the Applicant as a work in kind and or by Council at agreed rates.

66 [49]During Construction, designated bitumen road access shall be maintained in a safe and satisfactory condition. Should any of the roads fail due to construction traffic, immediate maintenance must be undertaken by the Applicant as work in kind and or by Council at agreed rates to maintain the road in a safe trafficable condition.

67 [50]Should Construction materials be sourced locally such as road-base, the access route will be jointly inspected with Council's officers to determine the suitability of the route and the extent of improvement works required prior to Construction. Should the route be approved for use, maintenance of the route during Construction shall be undertaken in accordance with Conditions 65 and 66.

[46] Incorporates Council's GTA 7
[47] Incorporates Council's GTA 8
[48] Incorporates Council's GTA 14
[49] Incorporates Council's GTA 15
[50] Incorporates Council's GTA 16

Crown Roads

68 [51]The Applicant must indemnify and keep indemnified the Crown and the Minister for Lands against all claims arising out of the use and occupation of the Crown Public Roads in relation to works associated with this development.

69 [52]No works must be undertaken on any Crown roads until any necessary authorities, easements, licences or approvals, as required by the Department of Lands, have been obtained.

70 [53]In the event of a transfer of ownership, the terms and conditions imposed by approval from the Department of Lands shall also apply to future owners of the development. Following a change of ownership, any existing tenures will be terminated and new tenures granted. The Department of Lands reserves the right to vary the terms and conditions of a new tenure or any authority or consent previously granted.

71 [54]Public access along Crown roads must not be denied, impeded or obstructed when the development is completed. Alternative access is to be provided, if required, during the construction period.

72 [55]The Applicant and any subsequent owner of the Development must be responsible for the maintenance and rehabilitation of Crown roads used for access, construction and installation of works throughout the term of the occupancy.

73 [56]Upon decommissioning of the project, or parts thereof, all structures and works on Crown roads must be removed to the satisfaction of the Department of Lands. A maintenance period of two years shall apply for the rehabilitation work after the works have been removed and the site associated with the development rehabilitated.

Operational Traffic

74 [57]Prior to commencement of Operation, all works relating to permanent vehicle access to the site associated with the development must be completed. In the case of Bannaby Road, permanent access must be completed to the satisfaction of Council and comply with the following requirements:

(a) access points must have an adequate sight stopping distance (180 metres minimum) available in both directions;
(b) any gate must be located so that there is sufficient distance for a vehicle (rigid truck) to stand clear of the road; and
(c) the access shall be sealed for a minimum distance of 50m measured from the edge of Bannaby Road pavement.

[51] Incorporates Department of Lands GTA 1
[52] Incorporates Department of Lands GTA 2
[53] Incorporates Department of Lands GTA 4
[54] Incorporates Department of Lands GTA 5
[55] Incorporates Department of Lands GTA 6
[56] Incorporates Department of Lands GTA 7
[57] Incorporates Council's GTA 17

75 [58]The Applicant must, in consultation with the RTA and Council, identify any road safety changes along the Taralga Road, Bannaby Road, Old Showground Road, Alders and Crees Road that may have arisen during the first 12 months of Operation. Road safety changes must include, but not be limited to, any change in motor vehicle accident rates. The Applicant must implement any reasonable and feasible mitigation measures as required by Council and the RTA, to address the road safety impacts that could be attributed to the development.

HERITAGE

Indigenous Heritage Management

76 In the event that an Aboriginal object (as described in the NPW Act) or a relic is uncovered during the Construction, all work in the vicinity of the object must cease and the Applicant must contact the DEC as soon as practicable. The Applicant must meet the requirements of the DEC with respect to the treatment, management, and/or preservation of any such object.

Historical Relics

77 In the event that a non-indigenous heritage item is uncovered during Construction, all work in the vicinity of the object must cease and the Applicant must contact the NSW Heritage Council to determine an appropriate course of action prior to the recommencement of work in the vicinity of the item.

FLORA AND FAUNA

Construction

78 A Construction Flora and Fauna Management Sub Plan must be prepared as part of the CEMP. The Sub Plan must be prepared in consultation with the Department and include:

(a) plans showing:
- terrestrial vegetation communities; important flora and fauna habitat areas; habitat trees, locations where threatened species, populations or ecological communities were recorded; and areas to be cleared. The plans must also identify vegetation adjoining the development where this contains important habitat areas and/or threatened species, populations or ecological communities;

(b) methods to manage impacts on flora and fauna species (terrestrial and aquatic) and their habitat which may be directly or indirectly affected by the development. These must include:
- procedures for vegetation clearing, soil management and managing other habitat damage (terrestrial and aquatic) during construction;
- methods to protect vegetation both retained within, and also adjoining, the development from damage during construction;
- methods to protect rocky outcrops and other potential reptile habitat both retained within, and also adjoining, turbines and ancillary development from damage during construction;

[58] Incorporates Council's GTA 18

- a habitat tree management program including fauna recovery procedures and habitat maintenance (e.g. relocating hollows or installing nesting boxes); and
- performance criteria against which to measure the success of the methods;

(c) details of how structures associated with the development will be designed to reduce the risk of bird and bat strike;

(d) rehabilitation details including:
- identification of locally native species to be used in rehabilitation and landscaping works, including flora species suitable as a food resource for threatened fauna species;
- the source of all seed or tube stock to be used in rehabilitation and landscaping works including the identification of seed sources within the site. Seed of locally native species should be collected before construction commences; and
- methods to re-use topsoil (and where relevant subsoils) and cleared vegetation;

(e) a Weed Management Strategy including:
- identification of weeds within the site and adjoining areas;
- weed eradication methods and protocols for the use of herbicides;
- strategies to control the spread of weeds during construction; and

(f) a program for reporting on the effectiveness of terrestrial and aquatic flora and fauna management measures against the identified performance criteria. Management methods must be reviewed where found to be ineffective.

79 Prior to Construction, vegetation and habitat to be protected is to be fenced off with clearly visible, durable and appropriately signposted exclusion fencing.

Operation

80 An Operation Flora and Fauna Management Sub Plan must be prepared as part of the OEMP. The Sub Plan must be prepared in consultation with the Department and include:

(a) plans showing terrestrial vegetation communities, important flora and fauna habitat areas, areas to be protected, and areas to be planted;

(b) methods to be adopted on the Site to manage impacts on flora and fauna species (terrestrial and aquatic) and their habitats which may be directly or indirectly affected by the Development. These must include:
- habitat management procedures including rehabilitation requirements and active re-planting of windrows;
- operation stage measures to minimise bird and bat disturbance, in particular reducing the incidence of bird/bat strike. Management measures that must be considered for areas near the turbines include:
  i. minimising the availability of raptor perches;
  ii. modifying structures to prevent perching;
  iii. management of lambing;
  iv. swift carcass removal;
  v. pest control, including rabbits;
  vi. management of stock (grain) feeding;
  vii. filling in of small dams that might attract insects and birds;
  viii. use of deterrents (eg. flags, marker balls);
  ix. minimising external lighting;

x. turbine management, that might include the turning off of turbines that are predicted to cause unacceptable bird/bat mortality at identified times;
xi. measures identified from research undertaken at other wind farms to reduce the incidence of bird/bat strike;

(c) performance criteria against which to measure the success of the methods; and a programme for reporting on the effectiveness of management measures against the identified performance criteria. Management methods must be reviewed where found to be ineffective.

81 A Bird and Bat Adaptive Management Program must be prepared and undertaken, which takes account of bird/bat monitoring methods identified in the current editions of AusWEA *Best Practice Guidelines for the Implementation of Wind Energy Projects in Australia* and *Assessing the Impacts of Windfarms on Birds - Protocols and Data Set Standards*. The Program must be undertaken by a suitably qualified expert, approved by the Director General.

The Program must incorporate Monitoring, and a Decision Matrix that clearly sets out how the Applicant will respond to the outcomes of monitoring. It must:

(a) incorporate an ongoing role for the suitably qualified expert;
(b) set out monitoring requirements. The requirements must account for natural and human changes to the surrounding environment that might influence bird and/or bat behaviour such as changes in land use practices, and significant changes in water levels in nearby water bodies;
(c) incorporate a decision making framework that sets out specific actions and when it may be required to reduce identified impacts on birds and bats;
(d) set out available mitigation measures;
(e) incorporate reporting requirements on the outcomes of monitoring, on the application of the decision making framework, the need for mitigation measures, progress with implementation of such measures, and their success. Reports must be prepared on an annual basis, from the commencement of operation, and must be prepared within 2 months of the end of the reporting period and be provided to the Director General. The Director General may vary the reporting requirement or period by notice in writing to the Applicant;
(f) identify any necessary mitigation measures and implementation strategy including, but not limited to, those referred in Condition 80.

The Applicant is required to implement reasonable and feasible mitigation measures where the need for further action is identified through the Bird and Bat Adaptive Management Program.

PHYSICAL ISSUES

Soil, Water and Riparian Management

82 [59]Construction must not commence until a Permit under Part 3A of the *Rivers & Foreshores Improvement Act* is obtained from DNR.

[59] Incorporates DNR's GTA 1

83 [60]A Riparian Vegetation Management Sub Plan must be prepared as part of the CEMP and be developed in consultation with DNR. This Sub Plan is to outline details of the protected riparian zone(s) including, but not limited to:

(a) requirements of the Permit under Part 3A of the *Rivers & Foreshores Improvement Act*;
(b) drawings demonstrating the locations and extent of the zone(s), remnant vegetation, and where areas will be revegetated/regenerated;
(c) plant species list to be utilised for revegetation; and
(d) maintenance and performance monitoring.

84 [61]Soil and Water Management Sub Plans must be prepared as part of the CEMP and OEMP and in consultation with Relevant Government Agencies. The Sub Plans must:

(a) be prepared by a person or persons with the experience, skills and training in the development and implementation of such plans;
(b) where relevant, be in accordance with Landcom's "Managing Urban Stormwater" (2004), and other relevant guidelines including the RTA's "Guidelines for the Control of Erosion and Sedimentation in Roadworks" and the Department's "Constructed Wetlands Manual";
(c) identify the activities that could cause soil erosion or discharge sediment or water pollutants from the site associated with the development;
(d) describe management methods to minimise soil erosion or discharge of sediment or water pollutants from the site associated with the development including strategies to minimise the area of bare surfaces and to achieve NIL or minimal harm to aquatic and riparian environments;
(e) describe the location and capacity of erosion and sediment control measures;
(f) identify the timing and conditions under which controls will be decommissioned;
(g) include contingency plans to be implemented for events such as fuel spills; and
(h) identify how the effectiveness of the sediment and erosion control system will be monitored, reviewed and updated.

85 The turbines, substation and access tracks in high erosion hazard areas must be fenced off from livestock. The location of fencing and high erosion hazard areas must be identified in the OEMP.

86 [62]Design and construction of any crossings over protected waters and riparian zones must be consistent with the Department's *Draft Guidelines – Watercourse Crossing Design & Construction* and NSW Fisheries' *Why do Fish Need to Cross the Road? – Fish Passage Requirements for Waterway Crossings (2004)* and *Policy and Guidelines for Fish Friendly Waterway Crossings (2004)*.

87 [63]Except as may be expressly provided by a licence under the POEO Act in relation to the development, the Applicant must comply with Section 120 of the POEO Act (prohibition of the pollution of waters), which prohibits pollution of waters.

[60] Incorporates DNR's GTA 21 to 30
[61] Incorporates DNR's GTA 2, 33 and 34
[62] Incorporates DNR's GTA 18
[63] Incorporates DEC's GTA L1.1

Air Quality

88 [64]The Applicant must design, construct, operate and maintain the development in a manner that minimises dust emissions from the site associated with the development.

89 The Applicant must take all practicable measures to ensure that all vehicles associated with the development entering or leaving the site and carrying a load that may generate dust, are covered at all times, except during loading and unloading. Any such vehicles must be covered or enclosed in a manner that prevents emissions from the vehicle at all times.

Spoil and Fill Management

90 For the purposes of the development, imported fill must be Virgin Excavated Natural Material as defined in the Environment Protection Authority's guideline *Assessment, Classification and Management of Liquid and Non-Liquid Wastes*.

MISCELLANEOUS REQUIREMENTS

Aviation

91 Prior to the commencement of Operation, the following details are to be submitted to CASA, Department of Defence, and the Australian Aerial Agricultural Association:

(a) 'as constructed' coordinates of the wind turbines in latitude and longitude;
(b) final height of the wind turbines as per AHD;
(c) ground level at the base of each of the wind turbines as per AHD; and

must comply with any reasonable requirements of CASA and Department of Defence.

92 In the event that required aerial weed control and/or fertilizer application is restricted on any property surrounding the site due to the location of turbines, the Applicant must fully fund the cost difference between aerial weed spraying/fertilizer application and a reasonable alternative weed control/fertilizer application method in the restricted area, unless otherwise agreed to by the Director General.

Hazards

Bush Fire Fighting

93 As part of the CEMP, the Applicant must provide details of measures to prevent fires igniting during construction activities. These measures must include, but not be limited to:

- prohibition of work involving risk of ignition during total fire bans;
- availability of fire suppression equipment; and
- storage and maintenance of fuels and other flammable materials.

94 During Construction, the Applicant is to consult with the local RFS in periods of high fire danger, to verify that proposed activities to be undertaken during this period, will not adversely increase the risk of bushfire. The Applicant must comply with any reasonable request of the local RFS.

[64] Incorporates DEC's GTA O1.1

95 The Applicant must consult with the RFS after the commencement of operation and any other time thereafter as required by the RFS, to ensure that the local RFS is familiar with the development, including location and identification of wind turbines for the purpose of fast access in emergencies.

Safety Management System

96 At least two month prior to the commencement of commissioning, the Applicant must prepare a report outlining a comprehensive Safety Management System, covering all on-site systems related to ensuring the safe operation of the development. The report must clearly specify all safety related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to the procedures. Records must be kept on-site and must be available for inspection by the Department upon request. The Safety Management System must be developed in accordance with the Department's Hazardous *Industry Planning Advisory Paper No. 9, 'Safety Management'*, and should include:

(a) procedures and programs for the maintenance and testing of the safety related equipment to ensure its integrity over the life of the wind farm;
(b) an outline of a documented procedure for the management of change;
(c) procedures and programs for liaison and regular drills with the local RFS; and
(d) procedures for regular fire prevention inspections by the local RFS and implementation of recommendations.

Telecommunications

97 Prior to the erection of any wind turbine(s) on site, the Applicant must undertake an assessment of the existing quality of the television transmission available at a representative sample of residential dwellings located within five kilometres of a wind turbine.

98 The Applicant must undertake any Reasonable and Feasible mitigation measures to rectify any television transmission problems reasonably attributable to the Development, including but not limited to:

(a) installation and maintenance of a parasitic antenna system;
(b) provision of a land line between the affected receiver and an antenna located in an areas of favourable reception; or
(c) other feasible measures.

In the event of interference not being able to be overcome by measures outlined in (a) to (c), the Applicant must negotiate with the impacted landowner about installing and maintaining a satellite receiving antenna.

Any requested works must be completed within three months of the completion of the relevant television and/or radio reception assessment, unless otherwise agreed by the landowner. The Applicant must be responsible for all costs associated with undertaking any mitigation measures.

Wastewater Management

99 The human wastewater management system is to be designed in consultation with the SCA, in accordance with the principles contained within the guidelines *On-site Sewage*

Management for Single Households, and the *AS/NZS 1547-2000 On-site Domestic Wastewater Management*. The system, including any effluent management areas, is to be located at least 100 metres from watercourses and 40 metres from drainage depressions.

100 AAA-rated water conservation devices are to be installed in the site control room/facilities building to minimise the volume of wastewater produced.

101 All stormwater is to be diverted away from any effluent management area associated with the Development.

Decommissioning

102 Prior to the commencement of Construction, the Applicant must provide written evidence to the satisfaction of the Director General, that the lease agreements with the site landowners have adequate provisions to require that decommissioning occurs in accordance with this Consent.

103 If any wind turbine(s) is not used for the generation of electricity for a continuous period of 12 months, it must be decommissioned unless otherwise agreed to by the Director General. The Applicant must keep independently verified annual records of the use of turbines for electricity generation. These records must be provided to the Director General upon request. The relevant wind turbine and any associated infrastructure is to be dismantled and removed from the site within 18 months from the date that the turbine was last used to generate electricity.

104 Within one year of decommissioning, the site must be returned, as far as practicable, to its condition prior to the Construction. All turbines and associated above ground structures including but not limited to, the substation, the control and facilities building and electrical infrastructure, including associated transmission lines, must be removed from the site unless otherwise agreed by the Director General. All other elements associated with the development, including site roads, must be removed unless otherwise agreed to by the site owner(s).

Attachment 1

Taralga Wind Farm Layout and House Locations

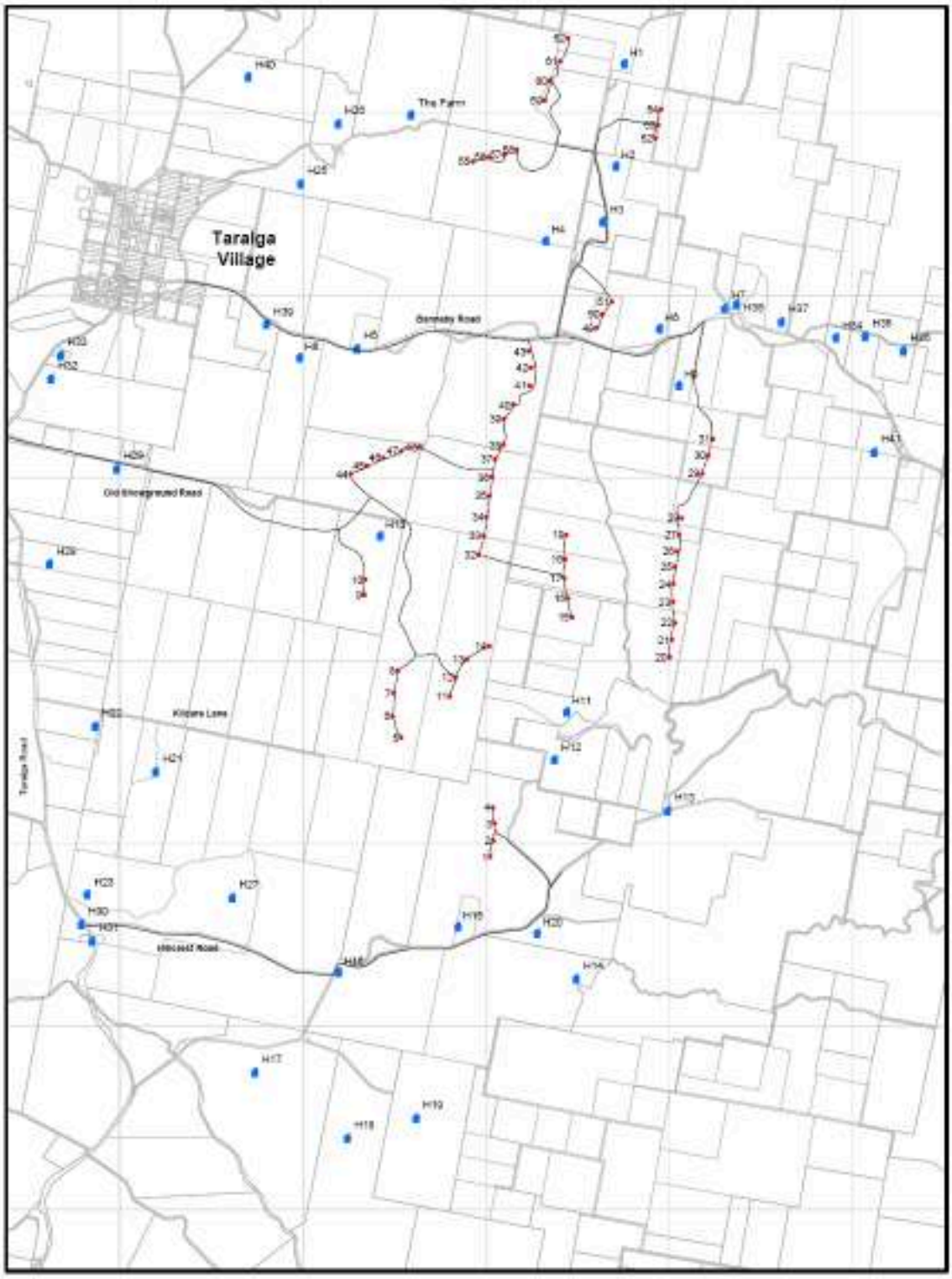
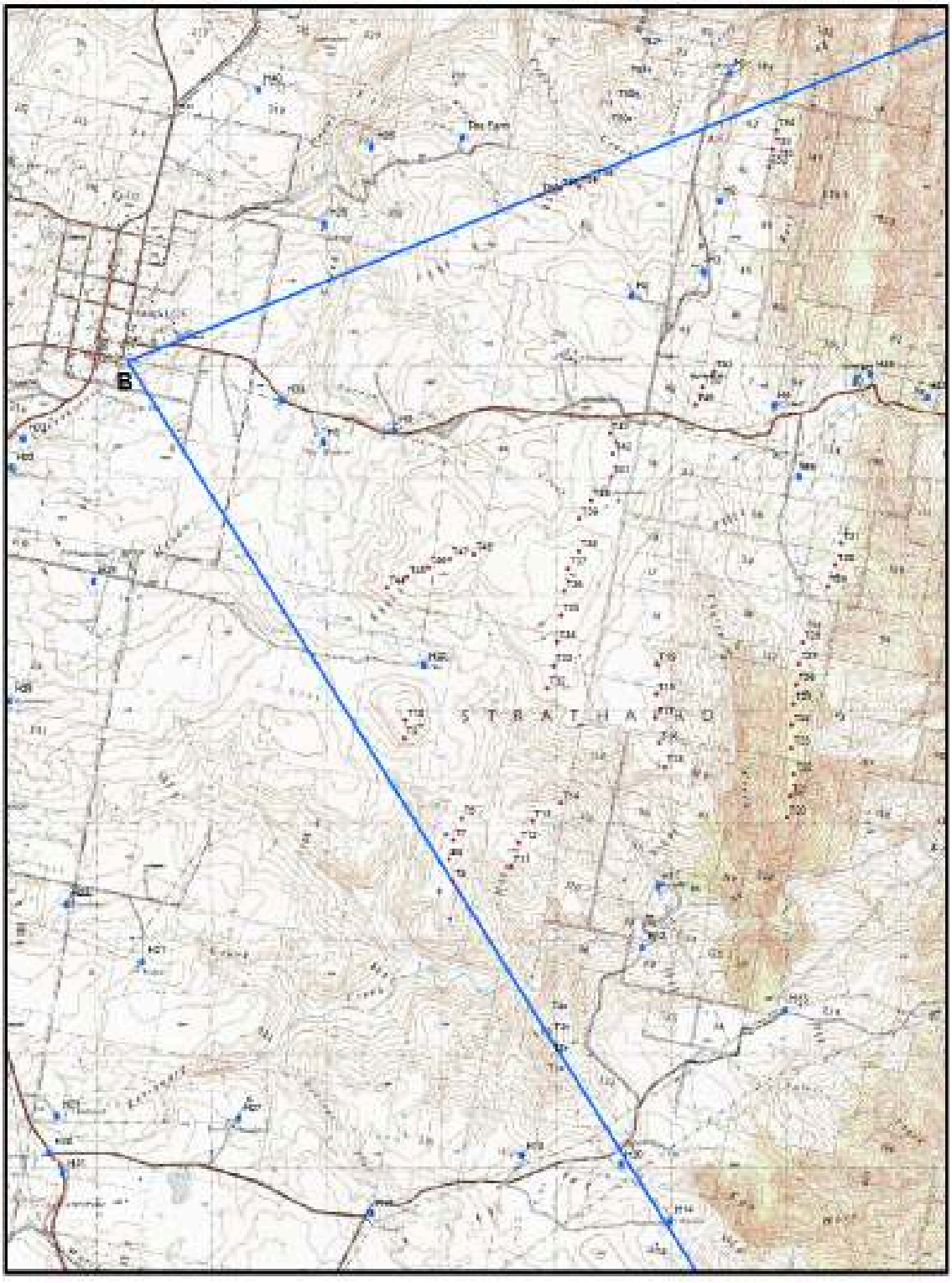


Figure 1 Taralga windfarm layout and house locations

Attachment 2

Proposed Relocations of T5, T6, T7 and T8



houses
proposed relocated wind turbines
original wind turbines

Tanalga Wind Farm

80 degree sector from Viewpoint B

N
W
E
S

0 1,000 2,000 4,000 m

Appendix A

Provisions of Environmental Planning Instruments

Following are considerations of the Proposal in the context of the objectives and provisions of relevant environmental planning instruments.

SEPP 44

State Environmental Planning Policy No. 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'.*

The subject site has a limited number of trees. Flora and fauna assessments of the area indicates that there is no koala habitat or koalas existing or in the vicinity of the site. The provisions of SEPP 44, therefore, do not apply.

SEPP 58

State Environmental Planning Policy No. 58 (SEPP 58) applies to land with the hydrological catchment for which Sydney draws its drinking water supply, and covers land within the Upper Lachlan Council including the site of the current Proposal. SEPP 58 aims to ensure that development in the hydrological catchment does not have a detrimental impact on water quality.

Clause 10 of SEPP 58 requires that the consent authority when exercising functions under Part 4 of the EPA Act, considers:

> *(a)whether the development or activity would have a neutral or beneficial effect on the water quality of rivers, streams or groundwater in the hydrological catchment, including during periods of wet weather;*
>
> *(b)whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term;*
>
> *(c) whether the development or activity is compatible with relevant environmental objectives and water quality standards for the hydrological catchment when these objectives and standards are established by the Government.*

The Sydney Catchment Authority (SCA) is responsible for managing and protecting the catchment areas, and protecting and enhancing the water quality. The DA was therefore referred to the SCA for comment. The SCA considered that the proposed development satisfies the requirements of Clause 10 of the SEPP 58, subject to a number of Recommended Conditions of Consent. The Department concurs with this advice. The impact on water quality is discussed in Section 7.3 of this report.

DRAFT REP

Sustaining the Catchments is a draft Regional Environmental Plan (REP) which outlines the future direction for the drinking water catchments. It is anticipated that the REP will replace SEPP 58 when it is finalised. The draft REP aims to identify innovative and equitable solutions to change adverse land use practice by encouraging change through incentives and shared knowledge rather than over regulation. It is intended to provide a regional framework to support sustainable development and improve knowledge, as a basis for management decisions.

The statutory component of the draft REP, which when made, will:

- set water quality objectives for the catchments;
- require the SCA to prepare rectification action plans;
- require the preparation and review of councils' local environment plans; and
- set requirements for assessing and approving new developments and activities in the catchments.

To ensure future land uses protect water quality, all proposed developments that require consent under a local environmental plan will need to demonstrate a neutral or beneficial effect on water quality[65]. This may require applicants to undertake a simple water cycle assessment, which identifies potential risks e.g. sediment from construction, and whether the development would cause any impact on water quality.

The Department considers that the EIS, when coupled with the conditions of approval suggested by the Sydney Catchment Authority, satisfactorily address water quality objectives contained by the draft REP.

MULWAREE LEP

The aim of the Mulwaree Local Environmental Plan (LEP) is to encourage the proper management, development and conservation of natural and man-made resources within Mulwaree, to replace the existing planning controls with a single local environmental plan to help facilitate growth and development of the Mulwaree area, and to afford protection of the environmental heritage within the Mulwaree area.

Part 2 of the Mulwaree LEP sets out the zoning objectives and development requirements for 1(a) General Rural. The development is classified as generating works and is permissible with consent in Zone 1(a) General Rural. The objectives of 1(a) General Rural were considered in the assessment.

Zoning

The LEP states that the objectives of Zone 1(a) General Rural are to promote the proper management and utilisation of resources by the factors identified below.

Factor	Compliance
(a) promoting, enhancing and conserving:	
(i) agricultural land, particularly prime crop and pasture land, in a manner which sustains its efficient and effective agricultural production potential,	The Proposal would enable agricultural land on the site to continue, alongside the operating wind farm.
(ii) soil stability by controlling and locating development in accordance with soil capability, as identified by the Department of Conservation and Land Management,	Erosion and soil management has been considered as part of the assessment, as outlined under Section 7.6 of the report. The Department considers that provided that recommended mitigation measures for soil and water

[65] A neutral or beneficial effect can be achieved if: a development has no identifiable impact on water quality; any impact on water quality can be treated or removed through approved systems such as a reticulated sewerage system; the impact on water quality can be contained within the development site; the development maintains the status quo or improves water quality; and the impact on water quality can be managed using approved pollution offsets.

	management are employed, the Proposal would not increase erosion on site.
(iii) forests of existing and potential commercial value for timber production,	Not relevant
(iv) valuable deposits of minerals, coal, petroleum, and extractive materials by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits	Not relevant
(v) trees and other vegetation in sensitive areas and in any place where the conservation of the vegetation is significant to the protection of scenic amenity or natural wildlife habitat or is likely to control or contribute to the control of land degradation,	The Proposal would result in clearing of trees. However, the clearing is not likely to result in adverse impacts to scenic amenity or natural wildlife habitat. The Department is satisfied that the implementation of recommended mitigation measures in relation to flora and fauna and soil and water management would ensure impacts are minimised. Refer to Sections 0 and 7.6 of this report.
(vi) water resources and water catchment areas for use in the public interest,	Provided recommended soil and water management measures are implemented, the Proposal would not adversely impact public water resources. Refer to Section 7.6 of this report.
(vii)localities of significance for nature conservation, including localities with rare plants, wetlands, permanent watercourses and significant wildlife habitat, and	The Proposal would not adversely impact any places of significance for nature conservation.
(viii)places and buildings of archaeological or heritage significance, including aboriginal relics and places,	The Department does not consider that the Proposal would adversely impact indigenous and non-indigenous heritage on the site. Refer to Section 0 of the report.
(b) minimising the costs to the community of:	
(i)fragmented and isolated development of rural land, and	The Proposal would not result in the fragmentation or isolation of development of rural land
(ii)providing, extending and maintaining public amenities and services, and	The Proposal would not require provision, extension or maintenance of public amenities and services.
(c) providing land for future urban development, for rural residential development and for development for other non-agricultural purposes, in accordance with the need for that development, and subject to the capability of the land and its importance in terms of the other objectives of this zone	Not relevant

Special Provisions

Part 3 of the Mulwaree LEP relates to Special Provisions to be considered as part of the assessment. Of relevance to the Proposal are:

- Clause 10 – General considerations for development;
- Clause 25 – development along arterial roads;
- Clause 31 – access; and
- Clause 41 – tree clearing;

Clause 10 – General Considerations for Development

This clause states that Council may consent to an application to carry out development on land within Zone No 1 (a), only if it has taken into consideration, if relevant, the effect of the carrying out of that development on a number of factors. These factors and how the Proposal complies is identified below.

Factor	Compliance
(a) the present use of the land for the purposes of agriculture and the potential of any land which is prime crop and pasture land for sustained agricultural production,	The Department considers that the proposed development is generally consistent with this objective in that the existing agricultural land use on the site would continue, alongside the new operating wind farm. Furthermore, the leasing of land for wind turbines may provide farmers with an additional income stream, thereby potentially encouraging retention and ongoing use of the property in its current form.
(b) vegetation, timber production, land capability (including soil stability) and water resources (including the quality and stability of watercourses, aquatic wildlife habitat, ground water storage and riparian rights),	Consideration of these issues is discussed in Sections 6 and 7.
(c) the future recovery of known or prospective areas of valuable deposits of minerals, coal, petroleum, or extractive materials,	The Proposal is unlikely to affect the future recovery of these materials.
(d) the protection of localities of significance for nature conservation or of high scenic or recreational value, and places and buildings of archaeological or heritage significance, including aboriginal relics and places,	Refer to Section 0
(e) the cost of providing, extending and maintaining public amenities and services, including electricity, to the development,	The Proposal's connection to the electricity grid is discussed in Section 7.7. Maintaining public roads is discussed in Section 7.4.
(f) future expansion of settlement in the locality, and	Refer to Section 7.5
(g) the quality and availability of water resources within the water catchment area.	Refer to Section 4.3 for consideration of SEPP 58 – Protecting Sydney's Water Supply.

Clause 25 – Development along arterial roads

Clause 25 requires the consent authority to consider the impact on access, safety and amenity associated with traffic and transport from a development on an arterial road. The Department has considered and provided recommendations about safety, access and road upgrade requirements based on advice provided by Council, the RTA and Department of Lands. This is discussed under Section 7.4.

Clause 31 - Access

Clause 31 requires that the intersection of a new driveway to any existing public road shall not be constructed without the consent of Council. Requirements for access to the site have been developed based on advice from Council, Department of Lands, and the RTA. This is outlined under Section 7.4.

Clause 41 – Tree Clearing

Clause 41 requires consent of Council for clearing land in areas forming the catchment area for the Goulburn City water supply. The Department has considered the impact of clearing proposed as part of the development, and does not consider that it would result in adverse impacts for the surrounding environment. Clearing of vegetation is discussed in Section 6.3.

UPPER LACHLAN COUNCIL DEVELOPMENT CONTROL PLAN – WIND POWER GENERATION (2005)

The Department's consideration of the planning and environmental controls identified in the Development Control Plan (DCP) are provided below.

a. *The development should be sited and carried out to minimise impacts on, or restrict normal grazing, farming, forestry practices;*

The windfarm would have minimal impact on existing agricultural use. Refer Section 7.5 of the Planning Report.

b. *The development should be carried out in a way that minimises any adverse effects on adjoining land and the development site, particularly in the way of:*
   - *i. Land degradation;*
   - *ii. Alteration to drainage patterns;*
   - *iii. Pollution of ground water;*
   - *iv. Spread of noxious plants and animals;*
   - *v. Bushfire hazard;*

These issues have been addressed in the EIS and the Planning Report. Conditions have also been imposed to ensure the stated outcomes are achieved.

c. *The developer must assess the visual impact of the project including an assessment of scenic value. The developer must consult with the Council and the community on appropriate visual impact measures.*

A detailed visual assessment has been undertaken – refer Section 6.1 of the Planning Report. The Council and the community have been consulted. The Department is well aware of the concerns raised and have been addressed in the Planning Report.

d. *In addition to point c. the developer must assess the cumulative impact of the development in regard to existing wind farms, identified sites of proposed wind farms. Council does not favour large expanse of ridgelines being covered with wind farms and turbines.*

The Taralga wind farm would not share the same visual catchment as other windfarms which have been or are currently under assessment by the Department. In principle, it would be more appropriate that any new windfarm proposal assess its cumulative impacts against windfarms which have been approved or where a DA has been lodged, rather than necessarily speculating impacts which may or may not eventuate from a windfarm where a DA has yet to be lodged.

e. *Proposed wind turbines shall comply with the South Australian EPA Wind Farms Environmental Noise Guidelines. Note that where noise levels are found to exceed EPA guidelines, Council may require remediation work such as cessation or decommissioning of the turbines to reduce the noise impacts on sensitive receptors such as non related dwellings.*

A comprehensive noise assessment has been undertaken, in accordance with the South Australian guidelines, and the DEC has issued its General Terms of Approval relating to noise control. A detailed noise analysis has been undertaken at all critical private views with appropriate mitigation

identified (see Section 6.2 of Planning Report). In the case of two private properties, turbines have been deleted to address unacceptable impacts, and for a third the Applicant has advised that it has an agreement with the land owner to purchase its property if requested.

f. *Where visible from a non related dwelling or immediate surrounds, the development shall not be located within 15 times the blade tip height or 2.0 km's (which ever is the greater) of any dwelling not associated within the development or 15 times the blade tip height or 2.0 km's (which ever is the greater) from any lot that has been created for the purpose of a dwelling. Where turbines are proposed to be significantly higher than such properties/dwelling or where the turbines will dominate the immediate view from the dwelling or dwelling lot, increasing these separation distances is recommended.*

The Department generally considers it problematic to identify specific distance criteria regarding minimum setbacks of wind turbines to residential properties. Togoraphy, property orientation, existing vegetative screens and other site specific variables limit such and approach. Notwithstanding, such distances can provide a useful starting point on which to base the need for a full assessment.

In this regard, a full and comprehensive visual assessment has been undertaken including detailed consideration of impact on non-associated private dwellings. Deletion and relocation of turbines has been recommended to reduce visual impacts to all non-associated dwellings to an acceptable level. Refer to Section 6.1 of the Planning Report.

g. *The development shall not be located within two times the height of the turbine (including the tip of the blade) from a formed public road. A greater distance may be required by the road authority.*

Apart from T43 all turbines would be at least 250 metres from a public road. T43 would be located around 120 metres from the Bannaby Road – or about 1.1 times the height to blade tip. The road carries insubstantial traffic volumes and RTA has raised no issues regarding safety concerns.

h. *The development shall not be located within two times the height of the turbine (including the tip of the blade) from a non related property boundary.*

A full and comprehensive visual assessment has been undertaken including detailed consideration of impact on private dwellings. On and off site vegetation mitigation measures have also been proposed in the conditions.

i. *Turbine locations shall be located sensitive to non related dwellings surrounding the development. Existing and proposed screenings could be used to minimise visual impacts to non related properties – Note due to the height of turbines, screening is not the preferred choice of dealing with visual impact. The developers priority should be endeavouring to position the turbines in locations with low visual impact to near by properties, especially existing dwellings and lots provided for dwellings.*

A full and comprehensive visual assessment has been undertaken including detailed consideration of impact on private dwellings. On and off site vegetation mitigation measures have also been proposed in the conditions, to further minimise visual impacts.

j. *Turbine locations are to be sensitive to existing related dwellings on the subject site. Issues of excessive noise, shadow flicker, and general proximity to turbines should be minimised.*

Issues of noise, shadow flicker and proximity have been addressed in the Planning Report.

k. *Turbine locations should not surround a non related property. Where a non related property has turbines adjacent to more than one axis of the property, there should be sufficient setbacks/distances to the development to minimise the visual impact of that property.*

Issues regarding impacts on private property have been assessed in detail and turbines have been deleted to address cumulative impacts. On and off site vegetation mitigation measures have also been proposed in the conditions.

l. *A communications study should identify the existing status of communications and detail the proposed method of dealing with potential communication interference. Developers are advised that many parts of the Upper Lachlan Shire have very poor radio, TV, mobile phone, two way reception and the like. The development should not detract from the reception of any of these or other communication methods. Where necessary, it may be required to install additional services (boosters/communication towers/ re-transmission towers etc) to maintain such services in the vicinity of the development. Where this is determined to be necessary, the work and equipment shall be at the developers cost.*

Issues regarding communications and interference are addressed in the report and have been conditioned accordingly.

m. *The construction phase of the wind farm shall occur only on identified roads/routes. Construction vehicles, including concrete trucks, carriers of turbine components, and related heavy vehicles (including relevant contractors) shall only travel the approved road. This route shall be identified in the development application for each of the construction components and/or contractors.*

Construction traffic and access has been comprehensively addressed in the assessment and Council has issued its General Terms of Approval as a road authority..

n. *Council requires substantial investigations into the road chosen for the preferred route. Detailed road condition reports will be required as part of any consent. Council prefers the use of the ARRB 'laser car' for this purpose.*

The Department has imposed strict conditions to ensure that any damage to public roads is repaired without cost to the road authority.

o. *Council will usually require road works to cope with the over size and over weight traffic movements related to the construction of a wind farm. Bonds will also be required for any potential damage to roads during the construction phase. The road works and bond amounts will be determined by Council professional staff, but will be determined generally by the length of road and condition of road surface/base bridge, drainage etc relevant to the selected route. Where road works are determined necessary for the development, costs associated with the road works shall be the developer's responsibility.*

Council has issued its General Terms of Approval with respect to impacts on roads. All costs for rectification would be borne by the Applicant.

p. *Internal roads (roads within the property subject to the development) shall be the responsibility of the developer. Council will require proof that they have been adequately designed and constructed for their purpose. Council (and often other State Government Agencies) shall be provided with adequate information about the environmental aspects of the internal road construction.*

Internal road would comprise a network of unsealed tracks and would be used consistently as with any normal farm operations. Prior to the commencement of Construction, site road work design and specifications are required to be certified by an appropriately qualified person that all roads within the site are of an acceptable standard for traffic generating requirements of the development

q. *All infrastructure related to the wind farm should be included in the development application. Management of temporary facilities, waste, numbers of contractors/employees, etc, should be part of the Development Application information. All infrastructure should be located in low visual impact locations and interconnection cables/wiring and the like should be underground.*

Apart from the transmission line, all infrastructure relating to the windfarm has been included in the DA. With respect to the transmission line, this will be assessed by Country Energy under Part 5 of the *Environmental Planning & Assessment Act 1979*. The Department has reviewed a draft environmental assessment by Country Energy and considers that there are reasonable opportunities for a transmission line that would be acceptable. Notwithstanding the Department has recommended that the consent not operate (ie deferred commencement) until a final determination has been made on the transmission line.

r. *Developers shall consider and refer to the Planning NSW Environmental Impact Assessment Guidelines for wind farms, the NSW Wind Energy Handbook, Best Practice Guidelines for implementation of Wind Energy projects in Australia (AusWEA), S.A. EPA Wind Farm Noise Assessment Guidelines and all other relevant polices and legislation applicable to the proposed development. Reference to relevant Council policies and documents should also be made.*

Documents have been considered in the assessment process.

s. *Council prefers to have a viewing area where safe vehicle and pedestrian movements can view the wind farm in a safe manner. The developer should liaise with Council Engineering staff and the RTA.*

The Department considers that providing a viewer platform as a general requirement for any windfarm may not be appropriate in some circumstances nor necessary where an existing viewing platform may be adequate.

No viewing platform is proposed as part of the development application. However it is understood that the Applicant has indicated a preparedness to discuss this requirement with the Council.

t. *Within six months of the wind turbine generators become redundant, any rights of carriageways that were constructed to enable maintenance to be conducted on the wind turbine generators are to be extinguished by the developer, unless otherwise agreed with the landowner.*

The Department does not have any objections to this requirement.

u. *Within six months of the Wind Turbine Generators becoming redundant, they are to be fully dismantled and removed from the site by the developer.*

Requirements for decommissioning are reflected in the conditions of approval.

Appendix B

Consideration under s.79C

Section 79C requires that the consent authority, when determining a development application, takes into consideration the following matters.

Provisions	Compliance
(a) The provisions of the following that apply to the land to which the development application relates;	-
(i) any environmental planning instrument;	In relation to the proposed wind farm, the following environmental planning instruments apply: • State Environmental Planning Policy No. 44 – Koala Habitat Protection; • State Environmental Planning Policy No. 58 - Protecting Sydney's Water Supply; • Mulwaree Local Environmental Plan 1995. Consideration of the provisions of these instruments, in the context of the proposed development is discussed in Appendix A
(ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority;	In relation to the proposed wind farm, the following draft environmental planning instrument applies: • Draft Regional Environmental Plan – Sustaining the Catchments Consideration of the provisions of these instruments, in the context of the proposed development is discussed in Appendix A
(iii) any development control plan;	At the time of preparing this report, there were no development control plans in relation to this development. The Upper Lachlan Council is currently developing a draft Development Control Plan (DCP) for wind farms. The DCP is yet to be adopted by Council. The Department has sought to consult closely with Council throughout the assessment process, to ensure any local issues of concern are adequately identified and addressed. In Council's submission to the Department (dated 8/7/05), it did not raise any issues relating to its draft DCP.
(iv) the regulations	Not relevant
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality;	Section 6 and 7 of this report considers the environmental impacts of the proposed development in detail. The Department is satisfied that all environmental impacts can be appropriately managed and mitigated.
(c) the suitability of the site for the development;	The proposed development site is currently used for the purpose of agriculture. The Proposal would provide a supplementary economy for this site without detracting from the existing use.
(d) any submissions made in accordance with this Act or the regulations;	A total of 228 submissions were made in response to Proposal. All matters raised in these submissions have been given due consideration, as outlined in Sections 6 and 7. Appendix C summarises the issues raised.
(e) the public interest.	The Department considers that the Proposal is in the broad public interest, as it would result in the production of electricity from a renewable energy source, thereby supplanting the production of greenhouse gases. The Department's recommendations include a number of controls, which the Department considers would mitigate negative environmental

	impacts of the Proposal. All issues raised by members of the public have been duly considered during the assessment of the proposed development.

Appendix C

Issues raised in Community Submissions

ISSUES IN OBJECTION TO THE DEVELOPMENT APPLICATION:

Visual Impact

- Environmental Impact Statement did not adequately value the Taralga landscape significance or address impact on residents.
- turbines would be visible from a large view shed and that the visibility of the turbines would result in reduced amenity, deter tourists and migration to the area of people attracted to the scenic value.
- turbines were ugly and would detract from the views.
- size and number of turbines detracting from the heritage, rural setting and change the nature of the countryside, looking industrial. The location of turbines on the ridge lines will be dominating and detract from views on the horizon.
- Environmental Impact Statement failed to identify the true impact of the Taralga landscape by providing poorly located photomontages and incorrectly stating that the area is largely cleared agricultural land (whereas many submissions claim that the area was native grassland on arrival of Europeans to area).
- proximity of the wind farm to the township of Taralga.
- transmission lines and access tracks would also detract from the rural views.
- visual impacts on surrounding property owners.

Adverse impact on rural character

- Proposal out of character with the rural landscape (see visual).

Heritage

- Environmental Impact Statement provided insufficient information on heritage (indigenous and non-indigenous) and raised specific issues about family properties.
- Proposal is inconsistent with the Heritage Office of NSW Draft Wind Energy Guidelines.

Property Devaluation

- proposed wind farm would result in a reduction in property values and reduce the attractiveness of neighbouring properties for future sales and subdivision, particularly the emerging role of hobby farms. Estimates provided by property valuers supported this claim.
- overseas studies cited in the Environmental Impact Statement are not relevant.
- property values had declined in South Gippsland since the development of wind farms in that region.

Decommissioning

- insufficient information was provided about the removal of turbines and there was insufficient guarantee to ensure the turbines and associated facilities would be removed at the end of their life.
- turbines would be replaced with more and larger turbines at the end of their operating life.

Inefficient energy production

- ability of wind energy to deliver promised electricity production and associated reductions of greenhouse gas emission. Arguments include the requirement of 'back-up' electricity supplies, the intermittency of wind energy, line losses of electricity and energy costs of installation and operation of turbines.
- government investment in this technology is inappropriate and produces a false sense of the technology's viability.
- more efficient alternatives for energy production and consider that demand reduction schemes are more appropriate ways of managing greenhouse gases.

Noise

- noise from turbines;
- construction noise.
- low frequency noise and associated health problems.
- noise impacts at nearby residences and workplaces will result in loss of sleep, health problems and loss of amenity.
- the ability of the noise modelling to predict overnight noise levels due to low ground level wind speeds and overnight temperature inversions (in particular the practice of using 10m wind speed measures to extrapolate speed at turbine height).
- noise levels are not appropriate for a rural setting. Concern was also raised about noise impacts on animals.
- inaccuracies in the Environmental Impact Statement, including the absence of a number of properties in the noise modelling in the Environmental Impact Statement.

Assessment process

- Environmental Impact Statement lacked detail, did not identify specify impact on properties and contained inaccuracies, including missing some residences and inaccurately describing water courses. Many submissions were concerned that electricity demand management was not addressed by the applicant.
- applicant did not adequately consult with the community prior to the completion of the Environmental Impact Statement and misrepresented the extent of consultation undertaken.
- negotiations with associated landholders occurred in secret for many years before the community was notified of plans.
- early submissions to Upper Lachlan Council requested an extension to the exhibition period stating that they had insufficient time to consider the Proposal (it is noted that the exhibition period was extended by Council in response to these submissions).

Inequitable distribution of benefit

- economic benefit of the Proposal was unfairly distributed with those landholders associated with the development receiving financial benefit from the Proposal whereas neighbours who would be adversely impacted would not receive any benefit from the Proposal.

Flora and Fauna

- flora and fauna surveys were inadequate and that many species have not been considered. Many submissions were concerned about the impact of blade strike and noise on bird and bat species and suggested that insufficient assessment has been undertaken.

- insufficient surveys were undertaken and limited data provided and that with the absence of autumn and spring surveys and with surveys undertaken in drought, conclusions are not meaningful.
- a number of submissions have provided lists of flora and fauna potentially impacted by the Proposal.

Land clearing

- clearing of land including the wooded region on the ridge on crown land (row 6) as well as other native grassland areas and lightly wooded regions scattered throughout the site.
- wooded ridge on crown land is an important migratory route for flora and fauna between two adjacent national parks.
- adverse effect on greenhouse gases resulting from land clearing.

Local Economy

- Proposal will not provide ongoing local employment or contribute to the local economy.

Tourism

- Proposal may detract from the local tourist trade by reducing scenic amenity, increasing noise and shadow flicker and destroying unique landscape around Taralga.

TV Reception

- adverse impacts on television and CDMA reception were raised.

Traffic and transport

- specific impacts resulting from construction traffic including localised traffic delays, noise, and stormwater runoff and dust impacts.
- impact on farm animals and movement of stock.
- conflicting information was provided in the Environmental Impact Statement on road use, truck movements and costs associated with road maintenance work.
- road upgrades and maintenance would be required and paid for by Upper Lachlan Council.

Cumulative

- approval of one wind farm development would result in the approval of other similar developments destroying the character of the Southern Highlands.

Occupational health and safety issues for farmers

- noise and shadow flicker would provide an unsafe working environment for people working on neighbouring farms.

Impact on neighbouring land use

- wind farms may heat the air and create worsened drought conditions and that noise and shadow flicker will stress animals, particularly horses.
- many landowners who may be planning to subdivide for residential use, or build a residence on their property may be prevented from doing so due to noise and shadow flicker impacts from the wind farm.
- future residences and farm/ work environments were not considered in the noise, visual and shadow flicker assessments.

Shadow flicker

- specific impacts from properties from shadow flicker. One submission raised concern about shadow flicker triggering epilepsy.
- shadow flicker had not been adequately considered in the Environmental Impact Statement.

Community division

- friction and social division that has developed in the community as a result of the development Proposal, leading to stress and health problems.
- Environmental Impact Statement falsely suggests community support for the project.
- project has caused tensions within the community.

Concern about the developer

- developer was not financially stable. Concern was raised that their primary focus is profit and stems from their inability to sell turbines to the Australian market.

Absence of details in Environmental Impact Statement on connection to the grid

- development application did not include details of the grid connection.
- connection to the grid may add greater adverse impacts to the Proposal such as increasing project footprint, adverse visual impact and electromagnetic fields.

Hazards

- wind turbines have a history of catching fire or falling down. Concern was raised by one submission that the presence of turbines would increase the fire risk due to super heating effect of air by turbines and grass fires.
- oil spillage could occur.

KEY ISSUES IN SUPPORT OF THE DEVELOPMENT APPLICATION:

Reduction in greenhouse gas emissions

- reduce greenhouse gas emissions and production of 'clean' energy.

Visually appealing

- wind turbines are visually appealing and will add interest to the landscape.

Tourism benefit

- presence of the wind farm will result in increased tourism in the Taralga area to view the turbines.

Economic benefit

- lead to a range of potential economic benefits from the Proposal including increased employment, increased tourism, and maintenance of current land use by providing income to farmers and employment and use of town services during construction.

Appendix D

Hassell Report

Appendix E

EDAW Gillespie Report

Appendix F

Department's consideration of the Hassell and EDAW Gillespie Reports

Introduction

As discussed in Section 6.1.3, the independent visual assessments conducted by Hassell and EDAW Gillespie differ in regards to the impacts upon public viewpoints, specifically Viewpoints B and C. The Department's consideration of the key differences between the values, originally identified by Hassell and argued by EDAW, is discussed below.

Existing Landscape Character

The Department partially agrees with the argument by EDAW Gillespie's that the existing visual landscape character, identified by Hassell, is too high.

Hassell value the landscape from Viewpoint B and C as between moderate and substantial, respectively. Using the rankings given in Appendix D, Table 1 of Hassell's report and the arguments put forward by EDAW, the Department considers that Viewpoints B and C are more likely to be valued as moderate and slight to moderate, respectively.

Degree of Visual Modification

The Department does not consider that the numeric values given for the *Degree of Visual Modification*, put forward by Hassell is inaccurate, as argued by EDAW Gillespie. From the photomontages provided to the Department and the assessment given by Hassell, the Department agrees that the degree of visual change that will occur as a result of the Proposal would be valued as substantial, where the "landscape is seen as changed permanently with the development dominating the existing landscape" (Table 2, Appendix E).

Horizontal Visual Effect

Similar to the values given for the *Degree of Visual Modification*, the Department does not support the arguments put forward by EDAW for *Horizontal Visual Effect*. It agrees that the Proposal will have a moderate visual impact as the degree of horizontal visual impact from Viewpoints B and C is approximately 95 degrees. As identified in Table 3 of Appendix D, this equates to 40% to 60% of the panorama being taken up by the Proposal.

Visual Sensitivity

The issue of visual sensitivity is arguably one of the more difficult and subjective aspects of the visual assessment. Hassell argues that those views from the town (Viewpoints B and C) are the most important as they affect residents of the town as they go about their daily activities. It also states that the Proposal would dominate views from town as the township sits on an east-facing slope where there are numerous panoramic views to the east. The report concludes that while the visual effect is only moderate, the presence of a large number of viewers will result in the impact being unacceptable because the visual sensitivity is determined to be substantial.

EDAW Gillespie's review argues that Hassell's assessment of visual sensitivity is not an accurate reflection because it assumes that all people will be highly sensitive to the development. It disputes that there is opposition to the Proposal stating that that there is a significant level of support. It also believes that, based on studies undertaken overseas and public perceptions gleaned from wind farm studies in Australia, there would be an almost neutral level of visual sensitivity to this Proposal.

The Department generally disagrees with the arguments put forward by EDAW Gillespie. Firstly, the Department believes that the sensitivity of viewers in the township of Taralga must be considered in determining the overall visual impact of the development on public viewpoints. In particular, reliance should not be given to overseas and Australian studies but an assessment be done on the perception of Taralga residents. As identified by Hassell, the level of sensitivity of the viewer is based on community values and personal preference.

Secondly, the submissions received show that there is a strong opposition to the proposal, as indicated by Hassell. Approximately 75% of submissions object to the proposal with over half of these specifically raising visual impacts as a major concern. A survey conducted by Upper Lachlan Shire Council on the views of Taralga area residents show a similar result with 102 objecting to the Proposal and 52 supporting.

Given this, the Department does not consider the visual sensitivity is as low as identified by EDAW Gillespie. It supports Hassell's findings that the visual sensitivity at the public viewpoints is substantial.

Revised Matrix

Taking into consideration the arguments put forward above, the Department considers it is important to revaluate the visual effect values of the critical public viewpoints - B and C in Hassell's matrix. The remaining public viewpoints A and D are only considered to have a 'slight' impact.

These values, combined with the visual sensitivity of the town, impact directly on the acceptability of the project, to the extent that Hassell has recommended the deletion of 30 turbines.

As discussed in Table 3 of Section 6.1.4, the Department agrees with EDAW in that the existing landscape visual character is less than that identified by Hassell. Consequently, the numeric scores have been reduced by 0.5 at both Viewpoints B and C. The revised visual effect scores with this adjustment is shown in Table 3 of Section 6.1.4.