Department of Planning

New South Wales Government

ASSESSMENT REPORT

Proposal by Woodlawn WindEnergy Joint Venture for a Wind Farm Within Goulburn Mulwaree Council and Palerang Council

DEVELOPMENT APPLICATION NO. 250-10-2004-i

PURSUANT TO SECTION 80 OF THE

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

August 2005

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EXECUTIVE SUMMARY

The Proposal

Woodlawn WindEnergy Joint Venture (WWE JV), comprising EHN (Oceania) Pty Ltd, Collex Pty Ltd, ANZ Infrastructure Services, and ActewAGL (the Applicant) is proposing to construct and operate 25, 2 megawatt (MW) turbines wind farm. The proposal is located approximately 7 km east of Tarago and 37 km south of Goulburn and it is on the boundary between Goulburn Mulwaree Council and Palerang Council. The proposed wind farm is positioned on a ridgeline that crosses two properties, Pylara and Woodlawn. Collex, a member of the joint venture, owns both properties.

Figure 1 illustrates the regional and local context of the proposal.

The proposed development includes:

- Installation of 25 individual wind turbines, made up of a concrete subsurface foundation, a 60m (19 turbines) or 78m (6 turbines) tower, and three rotor blades each of 40m (the top of the blade sweep would be approximately 100m (19 turbines) and approximately 118m (6 turbines) above ground level);
- An underground electrical cable network, linking each turbine to a substation;
- An electrical substation with a transformer to step-up power from 22kV to 66kV;
- A site control room / facilities building;
- A 66kV overhead transmission line (approximately 3.7 km in length) from the existing substation at the Woodlawn Bioreactor so that electricity may be distributed via either of the two existing Country Energy 66kV lines running to Queanbeyan or Goulburn;
- Internal network of tracks running via the Woodlawn Bioreactor Facility entrance to the turbines; and
- A viewing platform located within Pylara, accessed from Collector Road and adjacent to the intersection of Collector Road and Bungendore Road.

Construction is expected to take 12 months. The wind farm would be managed and maintained by three to four staff. The wind farm would also be monitored remotely 24 hours a day, with on call duty staff.

The Applicant expects the wind farm to have an indicative base life of up to 25 years.

The proposal involves a capital investment of $96 million. There will be up to 25 construction jobs and four full time jobs during operation.

The proposed development is classified as State significant, integrated and designated development under the *Environmental Planning and Assessment Act 1979*. Consequently, the Minister for Planning is the consent authority for the development application (DA), which requires an environmental impact statement (EIS), and additional approvals from the:

- Department of Environment and Conservation (*Protection of Environment Operations Act*, and *National Parks and Wildlife Act*);

- Goulburn Mulwaree Council (*Roads Act*); and
- Department of Natural Resources (*Rivers and Foreshores Improvement Act*).

The Applicant lodged a DA and supporting EIS for the proposal with the Department on 1 October 2004.

The DA and EIS were publicly exhibited between 21 October 2004 and 22 November 2004 by the Department in accordance with the requirements for public participation under Part 6, Division 6 of the *Environmental Planning and Assessment Regulation* 2000 (the Regulation).

Submissions

A total of 11 submissions were received in response to the public exhibition of the proposal. Seven were from the general public, three from government agencies, and one from Council. Six of the submissions from the general public were outright objections to the proposal raising concerns about visual and operational noise impacts, perceived property devaluation, and losses to the rural amenity of the area. One submission supported the proposal.

Goulburn Mulwaree Council did not object to the proposal but indicated it would need to be consulted when preparing the construction traffic management plan. Further details of the issues raised are provided in Appendix B of this assessment report.

Key Issues

The Department's detailed assessment of the issues is presented in Section 6 of this assessment report.

Strategic Context

The site contains the former Woodlawn Mine, a copper, zinc, and lead open cut mine that ceased operation in 1998. The mine is now being operated as a bioreactor waste management facility where Collex has development approval to dispose 400 000 tonnes/annum of municipal wastes from Sydney into specially constructed "cells" in the mine void. Methane gas will be extracted from the cells and converted to electricity in a gas to energy facility i.e. co-generation plant.

Under the land use zoning, the wind farm is permissible with consent and would be a compatible land use with respect to the Zone Objective and Development Control Table in the LEP.

The objectives of the LEP encourage the proper management of natural and man-made resources by protecting important features in the landscape. The existing rural uses will not be hindered by the proposal. Arguably the generation of power from wind would be seen as complimentary to the adjacent co-generation plant.

The development is consistent with the relevant State Environmental Planning Policies (SEPPs) that apply to the site. Planning and environmental control matters identified in the Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines have also been addressed in the assessment report.

Visual impacts

The proposal is most visible as transient views along roads that pass through the area. The turbines would be seen up to 8 km to the south, approximately 6 km to the west, 18 km to the north-west, and 4 km to the north. However, many of the views are distant, such as along the Federal Highway 18 km to the north-west, and would be intermittently filtered by roadside vegetation.

Approximately 33 private homesteads located outside of the wind farm site would also see the turbines the closest one being 2.6 km away. Visual simulations, as photomontages, were prepared to gain a better understanding of what the views would be like from certain properties and vantage points located in the vicinity of the proposal. The Department sought additional simulations for the 4 nearest residences not associated with the proposal. These 4 residences are located within 4 km of the proposal.

The area surrounding the proposal has been subject to certain land use changes which reflect the long-term agricultural and mining uses i.e. cleared with an extensive network of tracks and roads. The mine void is now used as a landfill/biogas production facility for generating power.

The Department's assessment identified that the proposal will change the broader landscape views, however the large distances to views for the closest residents not associated with the proposal (i.e. between 2.6 km and 3.3 km), relative low number of short distance static viewers (i.e. 33 homesteads), the short duration for transient viewers, and the cumulative modifications that have already taken place within the view catchment, lessen its overall visual intrusiveness.

The Department's assessment also identified that the scale of the turbines is substantially greater than other vertical structures within the landscape, therefore the four residences closest to the turbines would be subject to the greatest visual intrusion.

No mitigation measures are available to totally eliminate the visual impacts which have been identified. However, mitigation measures are proposed which reduce the visual impacts of the wind farm by moderating its visibility. These include:

- The use of colour to reduce visual contrast between turbine structures and background;
- Designing and constructing substation and facilities buildings to fit in with the rural setting;
- Establishing screen planting around the substation to ensure that no components of the substation are visible;
- Minimising cut and fill for site tracks, installing effective drainage and revegetating disturbed soils quickly;
- Using local material for fill to minimise colour contrast;
- Maintaining revegetation on disturbed areas to avoid erosion; and
- Maintaining tracks to avoid erosion.

The Department has also recommended that the Applicant negotiate individual landscaping treatments with owners whose residences are within 4 km of any turbine with a view to that turbine. This measure may help to soften the visual impacts, if taken up by the land owners, by blocking or disrupting the view to the wind farm from their dwellings.

Operational Noise Impacts

Operational noise is subject to a licence from the Environment Protection Authority (EPA), which is an integrated approval authority[1]. The EPA has adopted the *South Australian Environmental Protection Authority's Wind Farms: Environmental Guidelines'* (2003) (SA Guidelines) as the basis for operational noise assessment when determining its licence conditions.

The EPA identified the noise limits it would licence. The noise limits reflect the changes made by the Applicant to the predicted sound power levels after the preparation of the EIS. Although higher for most integer wind speeds than those indicated in the EIS, the levels do not exceed the SA Guideline criteria.

The EPA also included a condition requiring the Applicant to prepare an operational Noise Compliance Assessment. This condition will require the Applicant to monitor the noise of the wind farm and assess the noise limits set by the EPA against the actual performance. The report requires the Applicant to investigate and propose mitigation and management measures that are available to achieve compliance with the noise limits in the event the assessment indicates that noise from the wind turbines exceeds the specified noise limits.

A number of submissions raised concerns that although noise would be within acceptable limits at the residence, there would be higher levels (i.e. greater than the SA Guidelines) at other sites within the property boundary. The concerns relate to the loss of opportunities for future subdivision potential. The Department notes that the EPA typically requires noise criteria to be met at a location for which a DA for a dwelling is approved but not yet built, and also if a DA for a dwelling is before Council. None of the properties that are potentially affected by the proposal have lodged DAs for new dwellings.

Property Values

There is limited quantifiable data which can be used to identify whether wind farms reduce the saleability of properties and lower their market values.

The assessment did not identify that the existing use of the land was likely to be lessened i.e. the amenity values of the existing rural residential or agricultural uses, or any existing or approved change in the use of the land would be adversely affected by the proposal. There will be changes to the visual outlook amenity, however there is no conclusive evidence that significant value changes, transfers or inequities would result from the project proceeding.

Some submissions raised concerns regarding future land use changes that were anticipated to be made i.e. subdivision of land for rural residential. However, at the time of the consideration of the DA no applications for these developments had been made. It would therefore be inappropriate, in the absence of a strategy document which identified any future higher density settlement outside of the existing 40 hectare minimum sub-division, to support these objections, based on speculation rather than firm proposals.

Flora and Fauna

The risk to birds, particularly waterbirds and migrating birds, and bats is that they may be killed after colliding with the moving blades of the turbines.

[1] The Department of Environment and Conservation (DEC) exercises certain statutory functions and powers in the name of the EPA.

The Department's assessment identified that future changes in surrounding land use practices, seasonal and climatic events that would fill the adjacent lakes after the commencement of the operation of the wind farm all introduce variables that may impose higher risks to the birds and bats than were observed in the pre-operation surveys. Although it is unlikely these variables will introduce unacceptable risks, prudent practice requires the effects to be monitored after the commencement of operation of the proposal in order to determine appropriate mitigation for any unanticipated impacts.

The Department has recommended the Applicant employ a specialist to prepare a Bird and Bat Adaptive Management Program which incorporates monitoring, and a decision matrix that clearly describes how to respond to the outcomes of monitoring. A mitigation measure which may be used includes the turning off of turbines that are causing unacceptable mortality at peak risk times.

Conclusion

The proposal presents an opportunity to harness a commercial wind resource with the capability to provide 140 000 MWh per year of electricity without burning fossil fuel, equivalent to the demand of 22 000 households per year or taking around 29 000 cars[2] off the road each year. This represents a savings equivalent to offsetting the production of approximately 126 840 tonnes of CO_{2e} per annum i.e. greenhouse gas.

The Department has undertaken a through and comprehensive assessment of the likely environmental impacts of the development. The Department is satisfied that all environmental concerns have now been addressed and on balance considers that the broader benefits of the proposal would outweigh any residual negative impacts.

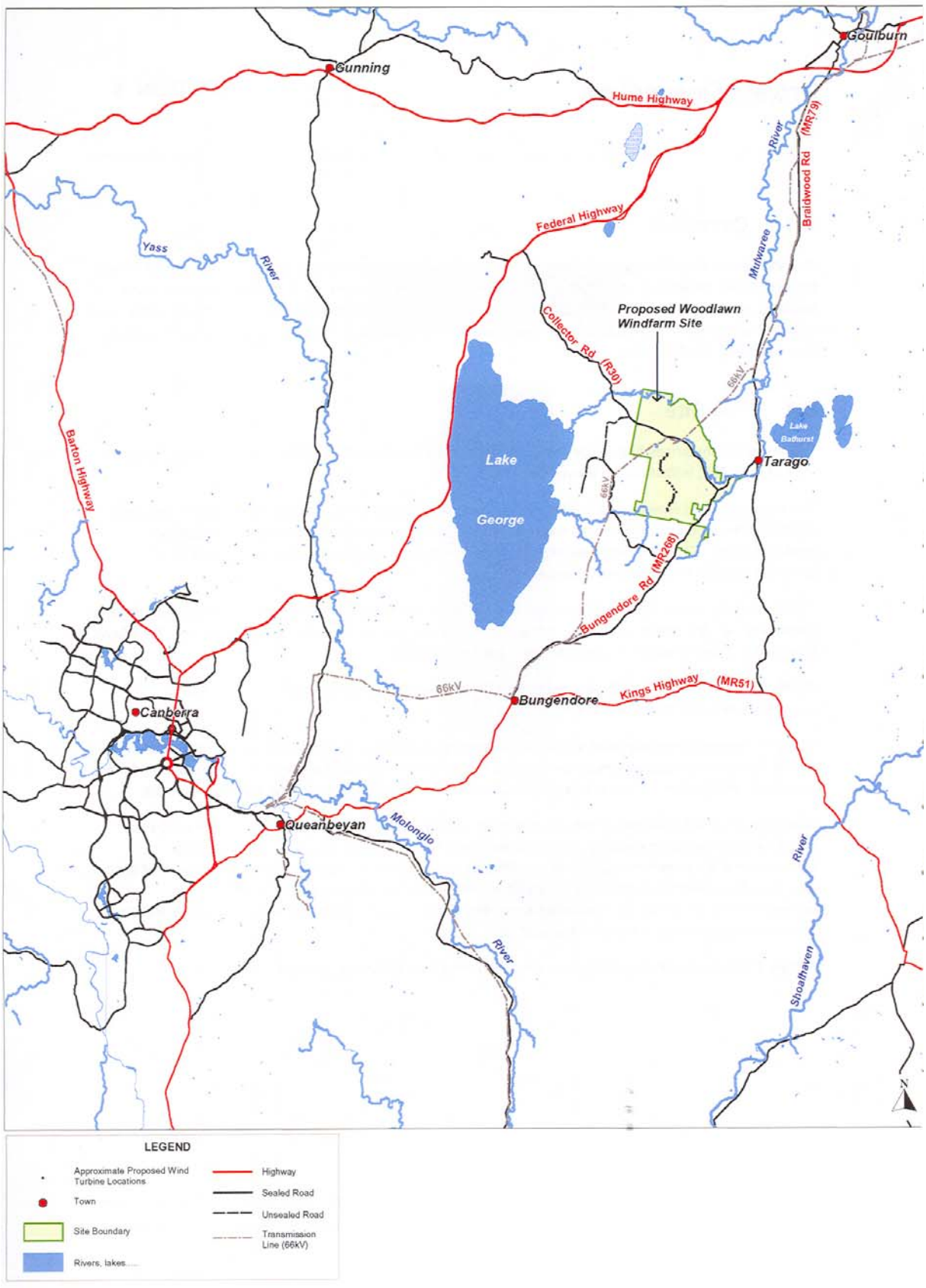
The Department recommends approval of the proposed development, subject to recommendations outlined in the assessment report. The recommendations cover on-going compliance mechanisms, independent reviews, community consultation and complaints management, and performance audits. Specific recommendations are proposed which, if accepted, would require the Applicant to prepare construction and operational environmental management plans incorporating sub plans to address soil and water quality management, flora and fauna, traffic and transport, and off-site landscaping. Recommendations relating to visual amenity and noise (incorporating the EPA's requirements) are also included.

The adoption of the recommendations would help to ensure environmental impacts are mitigated, managed and monitored. The recommendations address issues concerning:

- Construction and operational noise;
- Visual impacts;
- Flora and fauna;
- Decommissioning and site restoration;
- Traffic and road dilapidation;
- Interference to television and radio reception;
- Indigenous cultural heritage;
- Soil and water management; and
- Aviation obstacle lightening.

[2] Based on Victoria's *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria*.

Figure 1 – Location Map



1 INTRODUCTION

1.1 Background

On 1 October 2004, the Department received a development application (DA) and supporting environmental impact statement (EIS) from Woodlawn WindEnergy Joint Venture (WWE JV, the Applicant) for a 25 turbine wind farm located approximately 7 km east of Tarago and 37 km south of Goulburn.

The WWE JV comprises ActewAGL, Collex Pty Ltd, EHN (Oceania) Pty Ltd, and ANZ Infrastructure Services Ltd. Each of the four companies contributes an equal equity share to the project.

Under the *Environmental Planning and Assessment Act 1979* (EP&A Act) the proposal is a State significant, designated, and integrated development. The DA, therefore:

- Will be determined by the Minister for Planning as the consent authority;
- Needed to be accompanied by an EIS, and
- Requires additional approvals from the Department of Environment and Conservation under both the *Protection of the Environment Operations Act* and the *National Parks and Wildlife Act*, Goulburn Mulwaree Council under the *Roads Act*, and Department of Natural Resources under the *Rivers and Foreshores Improvement Act*.

Director General's requirements for the form and content of the EIS were issued on 12 May 2004. The DA and EIS were publicly exhibited between 21 October 2004 and 22 November 2004.

1.2 Site Description

The proposal is located entirely within two adjoining properties, Pylara and Woodlawn. Both properties are owned by Collex, a member of the joint venture. The total land area of both properties is 6 015 ha i.e. Woodlawn is 3 000 ha; Pylara is 3 015 ha.

The proposal is also located on the common boundary between Goulburn Mulwaree Council (formerly Greater Argyle Council) and Palerang Council (formerly Eastern Capital City Regional Council) i.e. the council boundary is generally located on the ridgeline that crosses both properties and forms part of the southern extent of the Great Dividing Range (refer to Figure 1)[3].

The Woodlawn property contains the site of the former Woodlawn Mine, a copper, zinc, and lead open cut mine that ceased operation in 1998. The mine is now being operated as a bioreactor waste management facility where Collex has development approval to dispose 400 000 tonnes/annum of municipal wastes from Sydney into specially constructed "cells" in the mine void. Methane gas will be extracted from the cells and converted to electricity in a gas to energy facility i.e. co-generation plant.

[3] The Greater Argyle Council, and Eastern Capital City Regional Council were formed on 11 February 2004 following a review of local government boundaries. Greater Argyle Council comprises the former Goulburn City Council and parts of Mulwaree Shire Council. The Eastern Capital City Regional Council includes approximately 44% of the former Yarrowlumla Shire, the whole area of the former Tallaganda Shire, and small parts of the former Mulwaree and Gunning Shires. Greater Argyle Council's name was changed by a proclamation of the Governor on 6 October 2004 to Goulburn Mulwaree Council. Eastern Capital City Regional Council's name was changed by a proclamation of the Governor on 8 December 2004 to Palerang Council.

Approximately 290 ha of the 3 000 ha Woodlawn property is occupied by the mine site. The remainder of the property is a working farm carrying approximately 10 000 sheep. Woodlawn contains two main residences, housing both farm and bioreactor staff and management. The Woodlawn farm buildings are located north of Collector Road and approximately 2 km north east of the nearest wind turbine.

Pylara is also a working farm carrying up to 16 000 sheep. There are seven main residences on the property housing farm management workers. The Pylara residences are located south of Collector Road and approximately 2.5 km to the east of the nearest wind turbine.

1.3 Surrounding Land Use

The proposed wind farm is 9 km south-west of Lake Bathurst and 8 km east of Lake George, on the slopes of the Great Dividing Range. The ridgeline is between 830 m AHD (Australian Height Datum) at the southern end to 870 m AHD at the northern end.

The area is characterised by a series of lightly timbered undulating hills and ridgelines, with open valleys and scattered trees. It has been extensively cleared of the woodland vegetation which once characterised the landscape. Sheep grazing is the primary land use.

There are two pine plantations (*Pinus radiata*) located nearby. One is immediately to the west of the former Woodlawn mine and the second to the north of the former mine.

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

Bungendore Road, the road between Tarago and Bungendore, runs to the east of the wind farm site and is an important tourist route. Collector Road is located north of the wind farm site and is used by both tourists as well as people who live and work in the area.

The Goulburn to Bombala railway line passes through the Tarago township and is also to the east of the wind farm site. This line links Sydney and Canberra and stops twice every weekday and once every weekend at the Tarago train station. Bungendore Road runs roughly parallel to the railway tracks.

There are 22 residences located within a 6 km radius of the centre of the proposal not associated with the proposal i.e. off-site of the Woodlawn and Pylara properties – see Figure 2.5 in the EIS. These are mainly located to the south, south-west and south-east of the Pylara property boundary.

The distance to the nearest turbine for the four closest residences not associated with the proposal includes:

- Torokina 2.6 km
- Glendale 2.7 km
- Kildare 2.8 km
- Wroxham 3.3 km.

2 DEVELOPMENT PROPOSAL

2.1 Outline of the Proposal

The proposed wind farm, as described in the EIS and DA, would comprise 25 turbines, access roads, an underground electric cable network generally located beside the access roads, an overhead transmission line, a viewing platform, and a substation. The wind farm and its various components are estimated to occupy 4.9 ha. (See Figure 2)

Note: The Applicant has subsequently sought to modify the transmission line route and this is discussed in Section 5 of this report.

According to the EIS, the WWE JV would enter into a 25 year lease with Collex, a member of the joint venture, over that part of Woodlawn and Pylara properties that is required for the wind farm.

The WWE JV is proposing to enter into a 'turn-key' contractual arrangement for the design, construction, and operation and maintenance (for the duration of a warranty period) of the wind farm. Following the expiration of the warranty the WWE JV would assume operation and maintenance responsibility for the wind farm.

The predicted annual electricity output is estimated to be 140 000 megawatt hours (MWh), taking into account the intermittency of the wind resource and minor electrical losses within the wind farm.

The wind farm, as described in the EIS and DA, will comprise:

- Twenty-five, three bladed, 2 megawatt (MW) turbines mounted on tubular steel towers with hub heights of 60 m for 19 turbines, and 78 m for six turbines. Each of the three blades is 40 m in length, constructed of glass fibre reinforced epoxy fitted to a nodular cast iron hub and mounted directly on the main shaft (rotor) of the turbine. The length between the top of the blade sweep to the ground would be approximately 100 m for the 19 x 60 m high turbines, and approximately 118 m for the 6 x 78 m high turbines. The blades rotate in a clockwise direction, between 9 to 19 revolutions per minute. A wind speed of 4 m/s will initiate rotation. The optimum wind speed for energy generation is 15 m/s. Braking of the rotor would occur at 25 m/s, when the wind speed is too high for safe operation. The tubular steel towers would be painted off-white. The nacelle, the housing for the turbine's control equipment and support for the rotor, is located on top of the tower. The nacelle cover would be constructed of glass reinforced fibre. Access to the nacelle is provided from the centre of the tower for maintenance personnel. The footings of each tower would comprise a 15.7 m, square reinforced concrete foundation set 2.16 m below ground level for the 78 m hub height turbines and 13.0 m, square foundation set 2 m below ground level for the 60 m hub height turbines.

- A 35 m x 28 m electrical substation compound, located off the ridgeline in a depression (i.e. saddle) between turbines 14 and 15 at an elevation of approximately 840 m AHD.

  The compound will be surrounded by a galvanised chainmesh wire fence and contain a single storey, painted, precast concrete panel building (25 m x 10 m x 10 m high) constructed on a 300 mm concrete foundation slab. The building would comprise a control room, workshop, meeting room, toilets and kitchen, and a 66 kV switch room. The roof will be constructed of metal (i.e.

Figure 2 – Wind Farm Layout

Colorbond steel) coloured Shale Grey to match the walls. The compound area will contain four car parking bays. The control room would house a centralised computer system to monitor turbine performance and gather other data related to the power generation.

Water tanks to store rain and tanker water would supply water requirements to the compound. Sewage would be treated in a composting septic tank located within the compound. Domestic wastes would be stored on-site prior to removal by a licensed contractor.

- An internal network of tracks linking each turbine.

  A main track, with up to four side-tracks, is proposed to be constructed to provide access to the wind turbines for their construction and on-going operation inspections and maintenance. The tracks would be six metres wide and gravel covered with grades not exceeding 14%. Drainage trenches are proposed to be provided to collect runoff. The tracks would be accessible from Collector Road with an entry at the Woodlawn Bioreactor.

  Existing tracks would be used and the new tracks constructed in certain areas to provide access to the ridgeline and turbine and substation locations.

- Underground electrical and data cables linking the electrical output of each turbine to the substation.

  Electrical and fibre optic data cables will be permanently installed in 1.1 metre deep and 0.45 metre wide trenches located beside the access tracks.

- An overhead 66 kV electricity transmission line connecting the output of the substation to an existing 66 kV transmission line.

  A 3.2 km transmission line running from the proposed substation down to the existing 66kV transmission line that runs from the Woodlawn Bioreactor south-west to Queanbeyan. The transmission line would be mounted on 12 metre high concrete monopoles. Each monopole will be spaced approximately 120 metres apart. There will be a 15 metre wide easement that contains a three metre wide maintenance track. (Varied by the Applicant subsequent to the exhibition of the EIS – see Section 5)

- A viewing platform.

  A public viewing platform on land owned by Collex and located off Collector Road, approximately midway between the Pylara Farm gate entry and the intersection with Bungendore Road. Parking would be provided for up to 20 cars and two buses.

2.2 Justification for the Proposal

The Department's view is that the Woodlawn Wind Farm embodies the principles of Ecologically Sustainable Development (ESD), it addresses issues associated with greenhouse gas emissions and climate change, and a lifecycle assessment estimated that the proposal would have net positive returns with the energy payback of each turbine being approximately 3 months. These are discussed below.

2.2.1 Ecologically Sustainable Development

The principles of ESD arose out the 1987 World Commission on Environment and Development report titled *Our Common Future* (the Brundtland Report). The report identified that the current patterns of economic growth could not be sustained without significant changes in attitudes and actions, and that lifestyles would need to be adopted that could sustain development within the planet's means.

Australia's response was to develop a National Strategy that was adopted by the three tiers of government in 1992 (i.e. Federal, State, and local government).

ESD, according to the National Strategy, means using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the quality of life for both present and future generations is increased. Sustainable development in the National Strategy is embraced in four principles which are also expressed in Schedule 2, Clause 6 (Justification of Development) of the NSW *Environmental Planning and Assessment Regulations*. These include:

- The *Precautionary Principle* – This suggests that if there are threats of serious or irreversible damage then the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- *Intergenerational Equity* – This involves value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to improve the wellbeing and welfare of the community, population or society.
- *Conservation of Biological Diversity and Ecological Integrity* – This refers to the diversity of genes, species, populations, communities and ecosystems, and the linkages between them. Maintaining biological diversity safeguards life support functions and may be considered a minimal requirement for intergenerational equity; and
- *Improved Valuation, Pricing and Incentive Mechanisms* – This acknowledges that the environment is not a free resource but has a monetary or social value which, when recognised, can control its exploitation.

These four principles aim to prevent and reverse adverse impacts of economic and social activities on the ecosystem, while continuing to allow the sustainable, equitable development of societies. The application of these principles to the Woodlawn Wind Farm proposal is discussed below.

The Precautionary Principle

The environmental consequences of the wind farm have been assessed using appropriate specialists in relevant disciplines. The assessment process involved analysis and interpretation of the potential environmental impacts associated with the proposal. This process has enabled the impacts to be identified within a reasonable degree of certainty. Where there was uncertainty, then the worst case scenario was examined.

The Department's assessment did not identify that the proposal would result in any serious or irreversible damage. Environmental monitoring will be undertaken as a precautionary measure to reduce any uncertainty regarding environmental impacts.

Intergenerational Equity

The proposal is consistent with the principles of social equity and intergenerational equity through the harnessing of a renewable resource for energy production. The generated electricity can displace a certain amount of harmful greenhouse gas emissions that would otherwise have been created by

conventional coal fired power stations. This contributes in a positive way to improving the health, diversity, and productivity of the environment for the benefit of future generations.

Conservation of Biological Diversity and Ecological Integrity

The proposal has the potential to kill certain avian and bat species. However, these matters were investigated and the risks associated with the potential impacts were considered to be acceptable. Nevertheless, environmental monitoring will be coupled with a bird and bat adaptive management program as a precautionary measure to ensure responses occur to problems so they do not become major environmental impacts that could affect ecological process or biological diversity.

Improved Valuation, Pricing and Incentive Mechanisms

The notion that the wind farm has the capacity to generate "pollution free" electricity is not strictly true. The proposal will affect the acoustic and visual environments and it was therefore important to ensure the polluter managed these impacts. This has been done by prescribing noise limits in a license that are based on adopted noise criteria. The levels would also be subject to regular compliance monitoring. The visual assessment identified mitigation measures the Applicant has to put in place to ensure that both the broad landscape and individual residences views would be moderated to acceptable levels.

The National Strategy embraces eight sectorial strategies including one for energy use, energy production and transport. The objective for the energy sector strategy is "to limit harmful emissions arising from energy production and distribution wherever economically efficient, and to promote alternative energy sources". Electricity production fuelled by wind meets this objective because it uses a renewable energy source to generate power for the use by the wider community with minimal harmful atmospheric emissions that could disrupt ecological processes and life support systems. It is also an alternative technology to conventional coal powered electricity generation.

2.2.2 Greenhouse Gases

Anthropogenic greenhouse gas emissions are generally acknowledged to be responsible for much of the climate change. In NSW one third of these emissions come from electricity generation.

The recent Victorian Bald Hills Wind Farm Panel Inquiry Report (24 June 2004) into a proposed 52 turbine wind farm in South Gippsland, Victoria concluded:

> *…the Panel finds that the greenhouse effect does exist, and should be considered relevant, significant and weighty. It does not accept submissions that the greenhouse effect is driven by mechanisms other than anthropogenic carbon emissions or is significantly smaller in effect than assumed for the purposes of global analysis in IPCC[4] documentation.*

The Panel also concluded that significant greenhouse benefits would flow from the Bald Hills Wind Farm.

New South Wales does not have a definite wind farm policy position however it has in place a number of initiatives which address greenhouse gas emissions and these are discussed below.

[4] The Intergovernmental Panel on Climate Change (IPCC) is an international panel of scientists and researchers that provides advice on climate change to the international community.

New South Wales Mandatory Greenhouse Benchmarks Scheme

An initiative currently in operation is the New South Wales Mandatory Greenhouse Benchmarks Scheme developed by the New South Wales Department of Energy, Utilities and Sustainability. This Scheme addresses the greenhouse gas emissions from the New South Wales electricity sector.

Under the Greenhouse Benchmarks Scheme, New South Wales electricity retailers and benchmark participants[5] are required to meet mandatory targets for abating the emission of greenhouse gases from electricity production and use for the period 2003 to 2012. These benchmark participants will have to reduce their emissions of greenhouse gases to the pre-set benchmark levels, or pay a penalty of $10.50 per tonne of emissions of carbon dioxide equivalent (CO_{2e}) by which they are above their targets. Benchmark participants can off-set their excess emissions by surrendering abatement certificates bought from low-emission electricity generators and other persons accredited by the Scheme Administrator as certificate providers.

The *Mandatory Greenhouse Benchmarks* Scheme of the New South Wales Government has the potential to encourage the establishment of low emission and alternative energy generation schemes such as wind farms. Other alternatives that could be promoted by this same initiative includes geo-sequestration, solar, geothermal, and bio-generation.

New South Wales Government's Energy Directions Green Paper

The New South Wales Government's *Energy Directions Green Paper*, published in December of 2004 recognised higher greenhouse gas production as one of the negative externalities associated with greater demand for electricity that was brought about by a deregulated electricity industry. The paper suggested that the future contributions of low emission technologies such as wind generation will be dependent on the policy settings for greenhouse emissions as well as technological developments e.g. a future higher cost of greenhouse emissions would make these technologies more cost competitive. The Green Paper also acknowledged the intermittency of wind limited its broader application to greenhouse gas reduction and that complementary generation would still be required.

Commonwealth Government's Mandatory Renewable Energy Target

The Commonwealth Government's renewable energy target places a legal liability on wholesale purchasers of electricity to proportionately contribute towards the generation of an additional 9 500 GWh (gigawatt hours) of renewable energy per year by 2010 under the Mandatory Renewable Energy Target (MRET) scheme. There is a $40/MWh penalty for non-compliance. The 9 500 GWh/annum by 2010 target will be phased in according to a schedule. All retailers and large buyers are required to maintain the 9 500 GWh/annum of new renewables between 2010 and 2020.

Greenhouse Gases and the Woodlawn Proposal

The proposed installed generating capacity for Woodlawn Wind Farm is 50 MW. This would produce approximately 140 000 MWh per year of electricity without burning fossil fuels and therefore offset the equivalent of approximately 126 840 tonnes of CO_{2e} emissions per year[6].

[5] The participants include: electricity retail suppliers, electricity customers taking supply directly from the National Electricity Market, generators with contracts to supply electricity directly to customers, certain other persons who consume large volumes of electricity in NSW and can elect to participate in the scheme.

[6] Under the NSW Greenhouse Gas Abatement Scheme, the Greenhouse Gas Benchmark Rule (Compliance) No 1 of 2003 provides an annual greenhouse gas emission coefficient for power generation in NSW. This is calculated as the average greenhouse gas emissions per unit of electricity delivered for all generating systems supplying the notional NSW Electricity Pool, and has been specified as 0.906 tonnes of CO_{2e} per MWh.

The EIS examined the greenhouse gas budget in a lifecycle assessment which accounted for the greenhouse gases produced during manufacturing of components, transport to and from the site, and through construction machinery used on the site. The assessment was based on results from seven lifecycle assessments for different wind farms. The Woodlawn assessment used a worst case lifecycle emissions factor of 20 kg CO_{2e}/MWh[7].

The overall greenhouse gas savings were calculated as the difference between the lifecycle greenhouse emissions and the comparable greenhouse emissions due to predominantly coal fired electricity generation and represents an equivalent of 124 040 tonnes CO_{2e}/annum. The EIS summaries this savings as equivalent to:

- Supplying 22 472 households with electricity; or
- Planting 185 134 trees; or
- Meeting 1.47% of the 9 500 GWh Mandatory Renewable Energy Target.

2.2.3 Energy Balance

The EIS estimated the energy payback for the Woodlawn proposal i.e. the ratio between the amount of energy used for manufacturing, construction, operation, maintenance, and final decommissioning/disposal, and the energy which the wind turbine would supply throughout its lifetime (see p 19-4 of the EIS). The estimated energy payback of each turbine would be approximately 3 months.

The Department notes that there can be a wide variation in the assumptions used to estimate the energy balance, or 'payback', of wind power. According to a recent UK report "most studies suggest that wind turbines take between 3 to 10 months to produce the electricity consumed during their life-cycle – from production and installation through to maintenance, and finally decommissioning"[8].

[7] The greenhouse gas emissions on a lifecycle basis reported in the studies used by the Applicant ranged from 7 to 20 kg CO_{2e}/MWh.

[8] *Wind Power in the UK – A guide to the key issues surround onshore wind power development in the UK*, Sustainable Development Commission, May 2005.

3 STATUTORY PLANNING FRAMEWORK

The Department has reviewed the WWE JV proposal with regard to the various State, regional and local statutory planning provisions that apply to the proposal as required by Section 79C of the EP&A Act.

The proposal is located wholly within the former Mulwaree Shire (now the Goulburn Mulwaree, and Palerang local government areas). However, in the absence of a Goulburn Mulwaree, or Palerang local environmental plan the provisions of the *Mulwaree Local Environmental Plan 1995* (MLEP) are applicable to the proposal[9]. An overview of the various statutory provisions is outlined below, while a more detailed analysis is provided in the Department's Section 79C assessment.

3.1 Permissibility

The proposal is within the 1(a) General Rural Zone under the MLEP. Wind farms and associated infrastructure would be a permissible use in this zone, with consent, in accordance with clause 9 of the MLEP (Zone Objective and Development Control Table).

3.2 State Significant Development

The Minister Assisting the Minister for Infrastructure and Planning (Planning Administration) made a declaration on 4 August 2004, pursuant to section 76A (7)(b) of the EP&A Act which covered the area subject to the WWE JV DA. The declaration was published in the *New South Wales Government Gazette* on 20 August 2004. The declaration identified that a wind farm comprising wind generation turbines and towers with an installed generating capacity of ≥60 MW, or 30 or more towers, or an installed generating capacity of ≥30 MW and located in more than one council area, and on the land subject to the WWE JV proposal is State Significant Development. Consequently the Minister for Planning is the consent authority for the development application.

3.3 Integrated Development

Under Section 91 of the EP&A Act, the development proposal is also an 'integrated development', where in addition to requiring development consent, the DA requires other approvals or licences from certain other government agencies.

The WWE JV DA requires approvals from the Department of Environment and Conservation (DEC) under both the *Protection of the Environment Operations Act* (POEO Act) and the *National Parks and Wildlife Act* (NPW Act). It also requires an approval from Goulburn Mulwaree Council under the *Roads Act*, and from the Department of Natural Resources under the *Rivers and Foreshores Improvement Act* (see Section 3.6 below).

3.4 Designated Development

Any proposal for an electricity generating station that supplies or is capable of supplying more than 30 MW of electrical power from a wind energy source is a designated development under Schedule 3, clause 18(1)(c) of the *Environmental Planning and Assessment Regulation 2000*. The WWE JV

[9] The *Local Government Act 1993*: Proclamation, 11 February 2004, Schedule C, Section 9(1) addresses activities of former councils. Section 9 (1) states that anything that was done by a former council that had effect immediately before the proclamation date continues to have effect as if it had been done by the new council.

proposal is for an installed generating capacity of 50 MW and, therefore, an EIS was required to accompany the DA for this proposal.

Director General's requirements for the EIS were issued to the Applicant on 12 May 2004. The EIS was prepared by URS Australia Pty Ltd, dated September 2004 and submitted in support of the DA. The Department is satisfied that the Director General's requirements have been addressed and the EIS was adequate to be placed on exhibition.

3.5 Relevant Planning Instruments and Strategies

The assessment of the proposed development is subject to the following environmental planning instruments:

- *Mulwaree Shire Council Local Environmental Plan 1995* (MLEP);
- *Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines;*
- *State Environmental Planning Policy No.44 – Koala Habitat Protection* (SEPP 44);
- *State Environmental Planning Policy No.58 – Protecting Sydney's Water Supply* (SEPP 58);
- *Draft Regional Plan Sustaining the Catchments – The Regional Plan for the Drinking Water Catchments and Adjacent Regional Centres;* and
- *Warragamba Catchment Blueprint*.

Consideration of the proposed development in the context of the objectives and provisions of these environmental planning instruments is provided below.

3.5.1 *Mulwaree Shire Council Local Environmental Plan 1995*

The proposal is permissible under the MLEP (see Section 3.1 above). Clause 2 of the MLEP identifies the general aims and objectives of the LEP. These include statements which are designed to encourage management, development, and conservation of natural and man-made resources, prime agriculture land, places of high scenic or recreational value, and places of archaeological or heritage significance. The objectives also aim to facilitate residential and employment opportunities, and provide protection for heritage and catchment areas.

The Table accompanying Clause 9 of the MLEP identifies specific objectives for the 1(a) General Rural Zone. These objectives are more focused than the general objectives for the LEP and are directed at promoting, enhancing and conserving:

- Agriculture;
- Soil stability;
- Commercial forestry;
- Mineral deposits;
- Significant vegetation for the protection of species and scenic amenity;
- Important wildlife habitats; and
- Places and buildings of archaeological and heritage significance including Aboriginal relics and places.

These specific objectives also aim to minimise the costs to the community of fragmented and isolated development of rural lands, and higher costs for future rural and residential development.

The Department considers that with the adoption of appropriate mitigation measures which address construction and operational management that the proposal will meet the aims and objectives of the MLEP. These mitigation measures include water and soil management, and careful siting of structures to avoid significant natural areas and cultural values.

3.5.2 *Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines*

See discussion in Section 6.12 and Appendix A below.

3.5.3 *State Environmental Planning Policy No.44 – Koala Habitat Protection*

Schedule 1 of SEPP 44 identifies the local government areas to which this SEPP applies. Schedule 1 includes the land on which the wind farm is proposed (i.e. the former Mulwaree Shire).

The wind farm site and the proposed viewing platform site are not considered potential or core koala habitat as no primary koala feed tree species (as listed in Schedule 2 of SEPP 44) were found to be present as a result of surveys undertaken in the preparation of the EIS. Secondary koala food tree species were recorded on site. However, these occurrences were isolated and fragmented and therefore unlikely to be used by koalas.

The DEC and Department of Environment and Heritage (Commonwealth) databases identified records of occurrence of koalas within a 10 km radius of the site. However, the cleared landscape and the continued active grazing are likely to preclude koalas using this site. The recorded observations in these databases were for sightings on the western side of Lake George.

3.5.4 *State Environmental Planning Policy No.58 – Protecting Sydney's Water Supply*

The primary aim of SEPP 58 is "to ensure that development in the hydrological catchment from which Sydney draws its drinking water supply does not have a detrimental impact on water quality". The Sydney Catchment Authority (SCA) is charged with protecting and managing the catchment areas and catchment infrastructure works in accordance with the *Sydney Water Catchment Management Act 1998* and administers the provisions of SEPP 58.

The SCA is a stakeholder with respect to the proposal because the proposal has the potential to impact on the quality of surface and groundwater of a catchment where Sydney draws its drinking water even though it does not have a formal determining role[10].

The SEPP states in clause 10 (Matters for Consideration) that in relation to any development within the drinking water catchments a consent authority must consider the following:

- Whether the development will 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;
- Whether the water quality management practices proposed to be carried out as part of the development are sustainable over the long term; and

[10] SEPP 58 gives the SCA a concurrence role over designated development throughout the drinking water catchments except for proposals which are classified as State significant developments, as in this case.

- Whether the development 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 SCA reviewed the proposal and was satisfied that the EIS adequately assessed the impact on water quality and was consistent with clause 10 of SEPP 58. It noted that pollutant loads and associated water quality impacts can be contained on the development site and would not reach drainage depressions, dams, or watercourses of concern to the SCA.

3.5.5 *Draft Regional Plan Sustaining the Catchments – The Regional Plan for the Drinking Water Catchments and Adjacent Regional Centres*

Sustaining the Catchments is a draft policy document which outlines the future direction for the drinking water catchments. It is anticipated this will replace SEPP 58 when it is finalised. The policy aims to identify innovative and equitable solutions to change adverse land use practices 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. Public comments were sought on the draft from the end of March 2004 to the end of July 2004.

The statutory component of *Sustaining the Catchments* is a draft regional environmental plan, 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 environmental 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[11]. 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 Sections 16 and 17 of the EIS, when coupled with the Conditions of Consent suggested by the SCA, satisfactorily address water quality objectives contained by the draft *Sustaining the Catchments* policy document[12]. (See also recommendations below associated with flora and fauna in Section 6.2.4.)

[11] 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.

[12] Tables 16.4 and 17.3 in the EIS summarise the hydrology and water quality, and soils and geology mitigation measures.

3.5.6 *Warragamba Catchment Blueprint*

The *Warragamba Catchment Blueprint* (the Blueprint) was published by the former Department of Land and Water Conservation in February, 2003. It represents a "whole-of-government" plan which has been developed through a community/government partnership.

The Blueprint contains objectives and targets for the Warragamba Catchment. These objectives are not specific to development types, rather they relate to good management practices that aim to meet measurable targets. The Blueprint is advisory and not a regulatory plan.

The Blueprint identified six key objectives (termed first order objectives). The most relevant in relation to the wind farm concerns working towards the achievement of "clean, healthy, productive surface and groundwater". This objective is set against a background of four main target areas with the most relevant for this proposal addressed by the River Health Catchment Target. The Blueprint identifies a management action (Management Target 7) to reduce sediment and nutrient pollutant load exported into receiving waters from rural runoff including runoff from roads and easements by 10%.

The Department is satisfied that the water quality mitigation measures proposed in Tables 16.4 and 17.3 in the EIS satisfactorily address the principles of the relevant first order objectives in the *Warragamba Catchment Blueprint*.

3.6 Relevant Acts

The assessment of the proposed development is subject to the following Federal and State Acts:

- *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act);
- *Threatened Species Conservation Act 1995* (TSC Act);
- *Rivers and Foreshores Improvement Act 1948* (RFI Act);
- *Protection of the Environment Operations Act 1997* (POEO Act);
- *National Parks and Wildlife Act 1974* (NPW Act); and
- *Roads Act 1993.*

3.6.1 *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)*

The EPBC Act commenced on 16 July 2000. One of the key functions of the EPBC Act is its assessment and approvals system for actions that have a significant impact on matters of national environmental significance (NES)[13]. An approval from the Commonwealth is required if an action (e.g. activity or development) is likely to significantly impact upon an NES matter. These are referred to as 'Controlled Actions'.

The EIS considers that since the proposal is unlikely to impact on any matters of NES then an approval from the Commonwealth Minister for the Environment is not required. Therefore the proposal was not referred to the Commonwealth under the EPBC Act.

[13] Matters of National Environmental Significance under the EPBC Act are: World Heritage properties; RAMSAR wetlands; threatened species or ecological communities listed in the EPBC Act; migratory species listed in the EPBC Act; the environment in a Commonwealth marine area; nuclear actions; and national heritage places.

3.6.2 *Threatened Species Conservation Act 1995*

The TSC Act aims to conserve and protect threatened species, populations and ecological communities of flora and fauna, and to promote their recovery. The provisions of the TSC Act require that if a threatened species is identified, the proposal should be assessed under Section 5A of the EP&A Act (Assessment of Significance) to determine whether the proposal is likely to have a significant effect on threatened species, populations and ecological communities, and their habitats.

The EIS indicated that no threatened or endangered flora species or ecological communities listed under the TSC Act (or EPBC Act) were recorded on site.

Five threatened fauna species, (one bird, two bat, and two reptile) were identified as likely to be adversely affected by the proposal. Assessment of Significance tests were conduced for these species and a number of mitigation measures identified.

The EIS concluded that provided the mitigation measures identified in Section 11 in the EIS were undertaken then the proposal is unlikely to have a significant effect on these species or their habitats. (Note: Targeted surveys conducted subsequent to the preparation of the EIS, identified the presence of one of the threatened reptile species, *Suta flagellum*. Habitat mapping for this species also identified suitable habitat along the ridgeline in the vicinity of where wind turbines will be placed. Consequently, additional mitigation measures have been proposed for this species.)

The Department concurs with the conclusions of the Assessment of Significance tests for the threatened species. The Department notes that mitigation and monitoring proposed as part of the project, including the additional measures arising from the targeted surveys conducted after the preparation of the EIS, are critical in avoiding and mitigating impacts on threatened species.

3.6.3 *Rivers and Foreshores Improvement Act 1948*

The RFI Act provides for the protection of land and adjoining water bodies in NSW. The Department of Natural Resources administers the RFI Act. Any person who excavates or removes material from 'protected land'[14] or does anything likely to interfere with the flow of 'protected waters'[15] must first obtain a permit from the Department of Natural Resources under Part 3A of the RFI Act.

The Applicant will be required to obtain a Part 3A permit because construction includes excavation of material from within 40 m of a bank of an intermittent stream. The Department of Natural Resources has issued General Terms of Approval identifying the matters that will need to be addressed by the Applicant. These include the specific locations for where permits are required and certain design details for creek crossings.

3.6.4 *Protection of the Environment Operations Act 1997*

The POEO Act regulates pollution control and waste disposal in NSW. The DEC, formerly the Environment Protection Authority (EPA), administers the POEO Act. Section 48 of the POEO Act requires activities listed under Schedule 1 (i.e. Schedule of EPA licensed activities) to require an Environment Protection Licence (EPL) from the EPA[16]. Schedule 1 of the POEO Act includes electricity generating works that supply or are capable of supplying more than 30 MW of electrical power from any

[14] Includes land that is the bank, shore or bed of protected waters or is not more than 40 m from the top of the bank, shore, or bed of protected waters.
[15] Includes rivers, streams, intermittent streams and any other water body.
[16] Under the POEO Act, the EPA is still the regulatory authority for all scheduled activities and scheduled development work.

energy source. The Applicant is therefore required to obtain an EPL from the EPA to operate the proposed wind farm.

The EPA has issued General Terms of Approval identifying the matters that will need to be addressed by the Applicant. These matters included, among others, wind turbine noise limits, construction hours, overpressure and ground vibration, monitoring and reporting.

3.6.5 *National Parks and Wildlife Act 1974*

The NPW Act provides the basis for legal protection of all material relating to the past Aboriginal occupation. Consent is required from DEC under Section 90 of the NPW Act prior to destroying, defacing or damaging an Aboriginal object. The NPW Act also establishes administrative procedures for archaeological investigations and the mandatory reporting of the discovery of Aboriginal sites.

Archaeological surveys undertaken for the proposal identified a number of indigenous relics. The Applicant will therefore be required to obtain consent under Section 90 of the NPW Act. The DEC has issued its General Terms of Approval identifying the matters that will need to be addressed by the Applicant.

3.6.6 *Roads Act 1993*

Consent is required for certain actions in relation to public and classified roads including disturbing the surface of a public road under Section 138 of the *Roads Act*.

The Applicant proposes to construct a viewing platform off Collector Road (R 30) near the intersection of Collector Road and Bungendore Road (MR 268). A minor realignment of Collector Road (a public road) will be required to enable vehicles to safely slow down, pull over and enter the viewing platform parking area. These works will require a permit from Goulburn Mulwaree Council under Section 130 of the *Roads Act*.

Goulburn Mulwaree Council issued its General Terms of Approval identifying the matters that will need to be addressed by the Applicant. These included the need for the Applicant to consult with Council when preparing a Traffic Management Plan.

4 CONSULTATION AND EXHIBITION

The Applicant lodged a DA and EIS for the proposal with the Department on 1 October 2004. The Department was satisfied that the Director-General's requirements had generally been addressed and the EIS was adequate to be placed on exhibition.

The EIS was exhibited by the Department between 21 October 2004 and 22 November 2004 in accordance with the requirements for public participation under Part 6, Division 6 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation). The DA and EIS were exhibited at the following locations:

- Department of Infrastructure, Planning and Natural Resources, in the Sydney and Qeanbeyan offices;
- Eastern Capital City Regional Council (now Palarang Council), Queanbeyan Office and Braidwood Office;
- Greater Argyle Council (now Goulburn Mulwaree Council), Goulburn; and
- Nature Conservation Council, Sydney.

The public notification of the proposal was comprehensive, with notices of the proposal placed in the Canberra Times, Goulburn Post, and Post Weekly (on two separate occasions) and on the Department's website. A number of site signs were also placed on various parts surrounding the proposed DA area, particularly at places near public roads and at the site entrance.

The Department also advised all adjoining and surrounding landowners of the proposed development by letter. The Department consulted the Councils concerning the proposed notification area.

Submissions were received until the close of the exhibition period. The Department is satisfied that the statutory process for public consultation for the proposal was undertaken in accordance with the EP&A Act.

In response to the exhibition period, the Department received a total of 11 submissions. Of these submissions, three were from government agencies, one from Council and seven from the general public. The key issues raised in these submissions include:

- Visual impact;
- Noise impact; and
- Property value impacts/Loss of development opportunity.

Six of the submissions from the general public objected to the proposal and one supported the proposal (See Appendix B – Summary of Submissions).

On 12 November 2004, the DEC requested that the deemed refusal clock be stopped pending the receipt of additional information from the Applicant essential for the DEC to consider General Terms of Approval. The Department stopped the deemed refusal clock on 15 November 2004.

The Applicant provided additional information on 21 January 2005, however the DEC indicated that it was not satisfied and the deemed refusal clock remained stopped. The matters identified by the DEC

concerned the need to conduct subsurface sampling for Aboriginal relics. The DEC reasoned that in order for it to issue Section 90 consents to destroy, it had to be satisfied that there was a low probability any relics would be found below the surface.

The Applicant had previously indicated that it would conduct subsurface sampling after and when it had received consent to the DA. However, in discussions with the DEC and the Department the Applicant came to a decision to conduct all the necessary subsurface archaeological sampling before determination of the DA.

The Applicant undertook additional cultural heritage investigations and conducted subsurface sampling. This was completed in July 2005. It subsequently forwarded its report on the subsurface sampling to the DEC to enable the DEC to prepare General Terms of Approval consistent with the findings of the report. The Applicant also undertook to carry out additional consultation with the local indigenous groups.

5 MODIFICATIONS PRIOR TO DETERMINATION

In March 2005 the Applicant forwarded a report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm* dated 11 February 2005. The report identified a revised route option for the proposed transmission line in accordance with Clause 55 of the *Environmental Planning & Assessment Regulation 2000* (the Regulation) i.e. "What is the procedure for amending a Development Application?"

The Applicant initially proposed to connect the electrical output of the wind farm to the grid via a T-connection to Country Energy's 66kV transmission line which runs south to Queanbeyan. The length of the transmission line in the original proposal was approximately 3.0 km. The revised route replaces the route option assessed in an addendum to the EIS (*Addendum – Assessment of Proposed Overhead Transmission Line*). The revised route option would run from the proposed substation to an existing substation located within the Woodlawn Bioreactor site, an overall length of approximately 3.7 km.

Country Energy requested that the Applicant connect the wind farm electrical output via the existing substation at the Woodlawn Bioreactor in order to permit the generated electricity to be distributed via either of the two existing 66kV lines e.g. south to Queanbeyan or north to Goulburn.

It should be noted that the revised route is entirely contained within the boundaries of land owned by the Applicant.

The report also examined some minor modifications that arose out of more detailed design work having been undertaken. These changes involve the access track, a change in location of the site compound and batching plant, and a minor enlargement of the area required for the viewing platform.

The Department's assessment of the proposed amendment is presented below. These amendments differ only in minor respects from the DA. The assessed environmental impacts are deemed acceptable providing the suggested mitigation measures are carried out. Accordingly, the amended DA is considered acceptable in accordance with clauses 55 and 90 of the Regulation.

5.1 Consultation with the Integrated Approval Bodies

In accordance with clause 55 of the Regulation, a copy of the amended DA was forwarded to each of the integrated approval bodies. No comments were received from any of the integrated approval bodies.

5.2 Description of the Transmission Line and Consideration of the Environmental Impacts

The revised transmission line is 3.67 km long and would run south from the existing substation within the former mine processing plant, following internal access roads to a point west of the tailing dams. The route would then run across the lower slopes on the northern side of the main ridge approximately 30-40 m below the ridge. The line would then run a short distance up the gully to the sub-station site located in a saddle between turbines 14 and 15 at an elevation of approximately 840m RL.

The transmission line would be supported 16 metres above ground level on concrete monopoles. The monopoles would be spaced 120 metres apart on foundations 1m x 2m and up to 2m deep.

Where the transmission line route traverses vegetated areas, a 9m to 13 m clearance corridor would be required to reduce the risk of bush fire and ensure plant growth does not impact on the line (i.e. 9 m is required at and around the poles and 13 m in the middle 2/3 of the span). This corridor would be cleared at construction and maintained during operation. A 3 m wide 4WD track would also be formed for construction vehicles (e.g. trucks and cranes) and retained for operational maintenance.

The revised route option was examined for its potential to impact on:

- Cultural Heritage;
- Visual;
- Flora and Fauna; and
- Soils and Hydrology.

5.2.1 *Cultural Heritage*

No non-indigenous archaeological items were identified along the revised route.

An assessment of a 20 m wide transmission line route corridor was made in conjunction with the Buru Ngunawal Aboriginal Corporation and the Pejar Local Aboriginal Land Council. One Aboriginal archaeological site, an artefact scatter, and one area of archaeological sensitivity, a large body of sand and soft sediment, were identified.

Both the archaeological sites could be impacted by construction activities associated with the transmission line including the excavation of the monopole footings, the construction of access maintenance tracks, and general construction vehicle movements on-site.

A number of mitigation measures were proposed to avoid any impacts. These included subsurface testing after obtaining a Section 87 Permit from DEC in order to get a better indication of an alignment of the transmission line which avoids the sites, positioning the poles in the company of Aboriginal representatives, developing a strategy for artefact collection and storage, and continuing to liaise with the Aboriginal community.

5.2.2 *Visual*

The potential visual impacts of the proposed revised transmission line route were also assessed. The assessment was based on the alignment of the route relative to the topography. For example, because the transmission line would be located on the northern slopes of the main ridgeline, it would be visually screened from properties along Taylors Creek Road which are about 4km to the south. Similarly it was determined that the poles in the section of the transmission line running across the lower slopes of the main ridge were generally not expected to be visible from Collector Road because of the visual screening by the tree-covered knolls located east of the tailing dams.

The Department acknowledges that the visual impacts are not likely to be significant because the poles are, for the most part, not visible to the sensitive receivers. However, the potential visual impacts are not just as a result of the poles and electricity line. The visibility of cleared corridors may also cause an undesirable visual impact and it will be important to ensure appropriate erosion controls and re-vegetation measures are undertaken immediately following construction activities

5.2.3 *Flora and Fauna*

The Applicant completed a flora and fauna assessment of the revised transmission line corridor. This included surveying a 30 metre wide corridor along the proposed route in order to:

- Characterise vegetation communities;
- Record any observed fauna;
- Identify habitat suitable for the threatened species potentially occurring along the route e.g. Little Whip Snake, Pink-tailed Worm Lizard, Striped Legless Lizard, and Glossy Black Cockatoo; and
- Identify any additional threatened species or ecological communities listed under the EPBC Act or the TSC Act.

The survey determined that the area is dominated by cleared open forest and woodland remnants dominated by Black She-oak (*Allocasuarina littoralis*) and Black Wattle (*Acacia mearnsii*), native pasture with scattered trees and highly modified areas where there is limited opportunity for vegetation to establish. It is likely that up to 1 hectare of Black She-oak/Black Wattle will be removed. These species provide forage habitat for the threatened Glossy Black Cockatoo.

A test of significance was prepared to assess the significance of the potential impacts of loss and disturbance to the feeding habitat. The Department supports the conclusion that the proposed transmission line is not likely to have a significant effect on the local population of Glossy Black-Cockatoos. No breeding habitat was identified and the amount of feeding habitat likely to be affected is small being restricted to isolated trees located in cleared open pastures.

There is also a community of secondary grassland, dominated by a mixture of native and non-native species. The community is considered to have moderate conservation value and has the potential to provide habitat for the Little Whip Snake (*Suta flagellum*) and the Legless Lizard (*Delma impar*). Construction within the secondary grassland community would require the placement of approximately three footings for concrete monopoles. The footings would measure approximately 1 x 2 metres but it is expected that the disturbance to the grasslands would marginally exceed this area.

Tests of significance were also carried out for the Little Whip Snake and Striped Legless Lizard. The Department supports the conclusion that the proposal is not expected to have a significant impact on these species because the loss or modification of potential habitat is expected to be minimal as a result of the small footprint of the proposal.

Neither the White Box-Yellow Box-Blakely's Red Gum Woodland an endangered ecological community under the TSC Act, or the Natural Temperate Grassland listed as endangered under the EPBC Act, were recorded.

5.2.4 *Soils and Hydrology*

The construction of the transmission line and access track could, in the event of a storm, increase the level of sediment in the run-off. This could wash into the local watercourses. The issues and recommendations covering the potential for erosion and sedimentation have been addressed by the Department in Section 6.4 below and are applicable to the changed transmission line route and access track.

5.3 Obstacle Lightening

Subsequent to the preparation of the EIS the Australian Government's Civil Aviation Safety Authority (CASA) advised the Applicant that any turbine with a height of 110 m or greater above ground level was classified as "hazardous objects' and consequently would require lighting in line with the CASA *Draft Advisory Circular AC 139-18(0) - Obstacle Marking and Lighting of Wind Farms* and the *Manual of Standards Part 139*. The Applicant determined, on the basis of the recommendations in the guidelines, that obstacle lighting (red flashing medium intensity obstacle lights) would be required to be mounted on turbines 1, 3, and 6.

The Department requested the Applicant to investigate:

- The potential environmental impacts of this requirement on bird and bat mortality i.e. is there a likelihood the lights could attract insects which in turn could lure birds or bats into the moving blades; and
- The potential visual impacts i.e. what is the general visibility of the lighting system to adjacent properties and is this likely to adversely affect the visual amenity.

5.3.1 *Bird and Bat Environmental Impacts of the Obstacle Lighting*

Insects have photo receptors and are known to be attracted to light sources within a particular range of the light spectrum. Fortunately red light is a longer wavelength and is one of the hardest for insects to see.

Evidence from other wind farm data investigated by the Applicant suggested that red warning lights on wind turbines do not result in greater numbers of fatalities for birds and that there was no difference between fatality rates at lit versus unlit turbines.

This conclusion is consistent with current scientific understanding about the physiology of the insect eye i.e. the spectrum of light that is detected is displaced to slightly higher range of frequencies; that is to say that an insect's red-end vision is very poor, but they do see a range of colours up into the ultra violet[17].

On the basis of this information, the Department has assessed that the risks associated with birds and bats being drawn to the turbines at night as a result of a higher concentration of insects attracted to the light is not expected to be significant. However any uncertainty will be resolved by undertaking the proposed recommendations Nos. 37-39 which, if adopted, would require the Applicant to prepare a *Bird and Bat Adaptive Management Program* (see Section 6.2.4 below).

5.3.2 *Visual Impact Assessment of the Obstacle Lighting*

The Applicant assessed the likely extent of the visibility of the required obstacle lights by:

- Determining the general visibility of the proposed lighting system at increasing distance from the turbines;
- Locating the proposed turbines to be lit in the 3-D Digital Terrain Model originally used in the visual assessment in order to identify those areas from which turbines 3, 2, and 1 would be visible;

[17] Roux, Justin, Engineering and Physiological Scientist in www.madsci.org/posts/archives/jan2000/948507632.Zo.r.html

- Assessing the potential visibility from the closest homesteads to the three turbines with the obstacle lights by reference to the more detailed analysis carried out in the original visual assessment; and
- Determining the extent to which existing vegetation would screen potential views of the lights at all the view situations shown modelled in the EIS.

The Applicant presented the results of its assessment of potential visibility from the homesteads and other view locations in its letter to the Department (letter from URS dated 12 August 2005 regarding Aviation Obstacle Lights). The results indicated that the aviation obstacle light located on top of the turbines would be visible from some perspectives around each of the homesteads investigated in the original visual assessment. The closest homestead is Torokina at 2.6 km. However the Applicant concludes that the level of visibility will be significantly reduced by the distances involved i.e. between 2.6 km and 4 km to the six nearest homesteads.

Similar findings were recorded by the Applicant for the nearest section of public road from which any of the turbines with lights would potentially be visible i.e. 2.7 km. In this case the volume of traffic using the roads at night is very low and the period of view would generally be short due to both the partial screen of roadside vegetation and local landforms.

The Department accepts any extra visual intrusiveness caused by the obstacle lighting is unlikely to be significant. This is attributed to the fact that the design of the lights is such that the intensity below the horizontal plane is reduced, decreasing the visibility of the light from the ground i.e. the lights are markers for aircraft flying above the turbines. The Department has also identified certain mitigation measures in Section 6.1.4 below which affords an opportunity for any owner of an existing or approved residential dwelling with views of turbine(s) located within four kilometres of their dwelling to request landscaping to be done around their property in order to screen views to the turbines (see in particular recommendation No. 40).

5.4 Other Changes

The proposed viewing platform would incorporate a longer walking track and be located further from Collector Road. The Department supports the Applicants conclusion that no impacts are anticipated from this minor change.

The site office has been relocated to the northern end of the site, adjacent to the small farm dam that is located east of the proposed turbines 22 and 23. This change was made because the site access will be via the Woodlawn Bioreactor access.

The concrete batching plant is now proposed to be located south east of the Woodlawn Bioreactor void in area extensively disturbed by the previous mining operation. The Department examined the relocated batching plant site. It is a levelled, filled and partly sealed work site that was wholly disturbed by the then mining use. No impacts are anticipated.

5.5 Recommended Mitigation Measures

The Applicant has identified in Table 5.1, Summary of Mitigation Measures, contained in the report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm* dated 11 February 2005, a number of mitigation measures it proposes to implement. These include, among others, the need to:

- Prepare Construction and Operation Environmental Management Plans to address erosion control;
- Obtain necessary approvals for any indigenous heritage items affected by the works;
- Carry out compensatory planting of habitat trees associated with the Glossy Black Cockatoo;
- Align access tracks within cleared areas; and
- Use indigenous grass mixes to rehabilitate disturbed areas.

The Department considers the mitigation measures for the proposed modifications outlined in Table 5.1 appropriate to ensure minimum environmental impacts from the proposed changes.

The Department supports these measures and has included them as recommendation Nos. 29, 30, 35, and 36.

6 CONSIDERATION OF ENVIRONMENTAL ISSUES

The Department has reviewed the DA and the accompanying EIS for the proposed development, and considered all submissions from government authorities, Council and the general public. As a result, the Department has identified a number of environmental issues associated with the proposal. A full consideration of each of the issues is provided in this Section of the report.

6.1 Visual Amenity

The proposed Woodlawn Wind Farm would be visible along a 10 km section of the road to Bungendore, a 9 km section of the Collector Road, and a 12 km section of the Taylors Creek Road. Thirty-seven rural residences would be located within the visual catchment of the proposal. However, four of these are located within the WWE JV property. Twenty-three of the remaining 33 residences are located generally to the south along Taylors Creek Road, and 10 are generally located to the west of the proposed wind farm. The closest properties not associated with the proposal are Torokina, 2.6 km west of the nearest turbine, followed by Glendale (2.7 km south), Kildare (2.8 km south-east), and Wroxham, 3.3 km to the south.

The wind farm would also be visible to motorists on the Federal Highway looking east across Lake George. However, these are distant views being approximately 18 km from the wind farm. These motorists would make up the largest number of viewers for the Woodlawn proposal.

6.1.1 Applicant's Position

The Applicant undertook a visual impact assessment based on a methodology which:

- Identified the area from which any of the wind turbines may be visible (the View or Visual Catchment);
- Identified six areas that are relatively consistent in their combination of landform, vegetation, land use and structures within the Visual Catchment (the Landscape Units);
- Identified representative locations from which views of the turbines may be visible from each of the Landscape Units (Viewing Situation or Site Visibility);
- Analysed the viewing situations to determine the potential level of visual impact that may result from the wind farm using a matrix based on distance of view to the turbine relative to period of view and number of viewers; and
- Identified measures available to mitigate the potential impacts.

The assumptions for the assessment were that if the proposed wind turbines or associated development could not be seen from the surrounding areas then the wind farm would not produce a visual impact. However, if one or more turbines were highly visible to a large number of people in the surrounding areas then the potential visual impact was likely to be high. A time dimension (Period of View) was also incorporated which adjusted for length of time the turbine would be seen e.g. long, moderate, short term. This was added in order to account for static views or dynamic views of the turbines e.g. residents or motorists.

Twenty-four viewing situations covering both residents and motorists were examined in the assessment. Photomontages were also constructed at specific locations.

The Applicant concluded that the wind turbines would be visible to a moderate number of viewers, mainly those travelling along the roads. However, as these views are distant (i.e. more than 2 km), the potential visual impact was assessed as low[18].

The analysis concluded that residents within 4 km of the proposal had a moderate visibility score. This results from the long period of view i.e. from a stationary perspective.

The analysis did not identify any viewing points where the visibility score rated high.

The Applicant also concluded that the residents within the visual catchment are likely to have a different visual perception of the proposal than transient viewers because their views will generally be from stationary points over longer periods of time. The residents' perceptions would be strongly influenced by their attitudes towards wind power generation and possibly other impacts associated with the proposal such as noise.

6.1.2 Issues Raised in the Submissions

Five of the public submissions raised general concerns about losses in rural amenity and visual quality. It is clear from the submissions that the residents with short to mid-distant views are not supportive of the proposal.

6.1.3 Department's Position

Although wind farms potentially create other environmental impacts, the principal impact of public concern is visual. It is not possible to shield these tall turbines from all views.

There are no absolute rules when assessing visual impacts of wind farms and each needs to be assessed individually on specific issues. However as a general rule the severity of the visual impact can be influenced by how close a turbine is located to an individual's property (either dwelling or the border of a larger landholding). This principle is acknowledged in wind farm guideline documents and more recently in development control plans prepared for certain local government areas (See Appendix C - *Summary of Visual Impact Assessment Criteria in Selected DCPs and Guidelines*). It was also born out in the Applicant's qualitative visual assessment matrix.

The range of opinions on the visual impacts are often extreme, with supporters claiming wind turbines are things of beauty adding interest to the landscape, and opponents vehement that these are industrial machines which are out of place and a blight on the countryside.

There are two key visual impact considerations for the Woodlawn Wind Farm proposal: the effect on the quality of the broad landscape that is going to be intruded upon; and the effect on individual residences.

Broad Landscape

The location of the individual turbines placed as they are on top of the ridge lines to maximise exposure to the wind, ensures high visibility and would result in a significant change to the visual character of the broad landscape.

[18] It is not possible to characterise all the visual impact as negative since the perceptions of the individuals who are affected may be positive.

The turbines would become an important element in the visual catchment and present a strong image of contrasting form, colour, and elevation. They would be seen up to 8 km to the south, approximately 6 km to the west, 18 km to the north-west, and 4 km to the north in a setting that has already been significantly modified since settlement.

The existing modifications in the landscape reflect changes arising from long-term agricultural and mining land uses where most of the original woodland vegetation has been removed for pasture establishment. Fencing and farm tracks criss-cross the open views of the broad valleys associated with Mulwaree River, Crisps and Taylors Creeks. The highly disturbed areas surrounding the closed Woodlawn Mine, now operating as a biogas landfill, including the water supply and tailings dams, locally dominates part of this view.

The greatest number of viewers to the proposed wind farm will be road users, although in some sections of the affected roads the views would be filtered by roadside vegetation. Approximately 33 homesteads located outside of the wind farm site would also see the turbines.

The visual catchment does not contain a public recreation reserve such as a national park. However, a stand out feature of the landscape is Lake George located to the west of the proposal. Its flat treeless lake bed is covered with grasses on areas exposed by receding water. The flat relief of Lake George makes it possible for the proposal to be seen by motorists from the Federal Highway which winds its way along the western side of Lake George. These are distant, approximately 18 km, views and certain roadside sections of the Federal Highway contain vegetation which would shield the views along parts of the highway.

The Department considers that the proposal will change the broader landscape views. However, the large distances to views (i.e. between 2.6 km and 3.3 km for the closest residents not associated with the proposal), relative low number of short distance static viewers, the short duration of transient viewers, and the cumulative modifications that have already taken place within the view catchment, lessen its overall visual intrusiveness.

Individual Residences

The Applicant presented five simulations (photomontages) in its assessment. The Department sought additional visual simulations from the Applicant for Torokina, Glendale, Kildare, and Wroxham. These four properties are not associated with the proposal but are the closest to the turbines i.e. between 2.6 km and 3.3 km. The visual simulation prepared by the Applicant illustrates the extent to which the turbines will be visible at these properties in addition to the other selected locations. The scale of the turbines is substantially greater than other vertical structures within the landscape. It is clear from the visual simulations that greater distances from the turbines reduce their dominance.

The extent to which turbines would be visible will also be influenced by the layout and orientation of residences, surrounding trees and shrubs as well as localised variations in landform. This was demonstrated in the photomontages and site visits to some locations. This assessment is consistent with the Applicant's findings i.e. residents within 4 km of the proposal had a moderate visibility score as a result of a long period of view from a stationary perspective.

6.1.4 Proposed Mitigation Measures

A number of factors that can offset visual impacts associated with wind farms were identified by the Applicant in their EIS. These included:

- The use of colour to reduce visual contrast between turbine structures and background;
- Designing and constructing substation and facilities buildings to fit in with the rural setting;
- Establishing screen planting around the substation to ensure that no components of the substation are visible;
- Minimising cut and fill for site tracks, installing effective drainage and revegetating disturbed soils quickly;
- Using local material for fill to minimise colour contrast;
- Maintaining revegetation on disturbed areas to avoid erosion; and
- Maintaining tracks to avoid erosion.

A number of other mitigation measures commonly adopted for wind farms include[19]:

- Providing aesthetic uniformity by ensuring the rotor, nacelle, and tower of each turbine look similar and their rotors spin in the same direction;
- Ensuring the turbines are spinning when there is wind. (Apparently the public perception is that it is being cheated if it has to put up with the visual intrusion and there is no real benefit i.e. the turbines are not working);
- Burying the power lines;
- Controlling lighting;
- Good "housekeeping" by managing the site to be free of litter, and ensuring maintenance wastes are disposed of correctly e.g. lube oils; and
- Informing the public with information stands.

The Applicant has already committed to some of these mitigation measures in the EIS. For example it has indicated that its turbine design will be uniform in appearance and that power and monitoring lines (other than the line leading to the substation) will be buried. The proposal also includes a public viewing platform. The Department accepts that controlling lighting and site management (i.e. housekeeping) would be appropriate to be addressed in an Operational Environmental Management Plan.

The visual simulations also suggest that there may be further opportunities to mitigate visual impacts by requiring the Applicant to landscape around dwellings located within 4 km of turbines with views to the turbines. This has been adopted for the WWE JV proposal as an off-site landscaping sub plan to the Operation Environmental Management Plan in order to afford some visual relief from the turbines. (See recommendation No. 40)

Other visual mitigation measures available to address visual impacts are incorporated in recommendations Nos. 46-48.

6.1.5 Conclusions

It is evident that the development of the wind farm will introduce a highly visible element into the predominately rural vistas and result in a significant change to both the broad landscape and certain

[19] See for example - Gipe, P, *Design as if People Matter: Aesthetic Guidelines for the Wind Industry* a paper presented to the American Wind Energy Assoc. conference in Washington, DC March 30, 1995.

individual residences. However, the extent of the adverse impacts is likely to be tempered by the changes that have already taken place within the view catchment of the proposal. These changes include the open cut mine void converted into a waste landfill site for the production of biogas, the clearing of the land for agricultural production, and road and track construction that has taken place over many years.

The number of static viewers who would overlook the proposed wind farm is small and most of these are located at least 4 km distant from the nearest turbine. The visual mitigation measures proposed in the EIS have been incorporated as recommendations in this assessment report. These should help to reduce the visual impacts of the turbines and ancillary components of the wind farm by moderating its visibility.

The Department has also recommended that the Applicant negotiate individual landscaping treatments with owners whose residences are within 4 km of any turbine with a view to that turbine. This measure may help to soften the visual impacts, if taken up by the land owners, by blocking or disrupting the view to the wind farm from their dwellings.

6.2 Flora and Fauna Assessment

The study area is dominated by highly disturbed rural landscapes with stands of cleared open forest and a number of small and large farm dams. Vegetation along the track and ridgeline is cleared open forest with scattered trees. The ground layer consists of exotic and some native species. Continuous grazing prevents the regeneration of trees, shrubs and many native grasses. There is limited habitat potential for fauna due to a lack of vegetative structure and limited foraging/feeding resources. The site, particularly the ridgeline, provides very few habitat resources for bats.

The exposed rocky ridge provides habitat of varying quality for reptiles. Four common reptile species were recorded. Potential habitat occurs for two threatened reptile species including the Little Whip Snake and the Pink-tailed Worm-lizard (these species were not recorded in the surveys undertaken at the time of the EIS preparation).

A large diversity of common birds utilise the study area, with around 70 species being recorded. Of these, evidence of the Glossy Black-Cockatoo (a threatened species) was recorded. A number of raptors were also recorded.

The proposal would result in direct disturbance of isolated trees to facilitate the placement of turbines 1, 2, 3, 20 and 21.

6.2.1 Applicant's Position

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 during April and May 2004 (6 days), involving:

- Transect-based botanical surveys along the entire ridgeline;
- Opportunistic fauna observations (100+ hours);
- Spotlighting in woodland remnants (3.5 hours);
- Amphibian searches (farm and mine dams);

- Reptile searches, including targeted searches for threatened species, along a 200m wide transect at all suitable habitat along the entire ridgeline;
- Bird surveys and counts, including targeted searches for raptors and threatened species (6 km transect along ridge, 6 woodland sites (120 minutes), 2 large dam sites);
- Mapping of bird habitats;
- 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 (1:40 000).

Note: A separate report outlining the changes to the alignment of the transmission line corridor including an assessment of the flora and fauna is discussed in Section 5.2.3 above.

The Applicant provided additional information regarding raptor and waterbird movements subsequent to the preparation of the EIS in a separate report entitled *Raptor and Waterbird Movements at Woodlawn Wind Farm Site*, URS Report, 8 February 2005. The report provided the results of a survey to locate raptor nests and map home ranges within 500 metres of the turbine sites, especially for Wedge-tailed Eagles and Peregrine Falcons. The survey also mapped movements of waterbirds and shorebirds associated with Lake George and Lake Bathurst.

A targeted reptile search was also conducted as part of the on-going monitoring of flora and fauna. It was reported separately in a report entitled *Targeted Reptile Search at Woodlawn Wind Farm*, URS, 15 November 2004. The aim of this search was to survey for the presence or absence of the threatened reptiles Little Whip Snake and the Pink-tailed Worm-lizard at a different time of year from the survey conducted for the EIS.

The Department sought additional information from the Applicant on bat occurrence in the area. The Applicant subsequently provided a report entitled *An Assessment of the Bat Fauna at the Proposed Woodlawn Wind Farm, NSW* prepared by Dr GC Richards for URS, dated April 2005. The report included two site inspections, a desktop assessment and field surveys during the summer period.

The three additional reports, prepared after the exhibition of the EIS, provide baseline data for fauna utilising the site and will assist proposed on-going monitoring programs.

Construction Impacts On Fauna and Fauna Habitats

The Applicant identified that good quality reptile habitat that has the potential to support two threatened species, the Pink-tailed Worm-lizard (*Aprasia parapulchella*) and the Little Whip Snake (*Suta flagellum*) is present in the area where a number of turbines are proposed to be located. Targeted reptile surveys, conducted after the exhibition of the EIS (see *Targeted Reptile Search at Woodlawn Wind Farm*), found the threatened Little Whip Snake on the ridgeline but did not find the Pink-tailed Worm-lizard. As a precaution it should be assumed that the proposal has the potential to disturb the habitat of these two threatened species. .

The proposal includes a viewing platform which would occupy a 250 square metres area of grazed pasture located off Collector Road. The EIS notes some sections of ungrazed grassland, consisting of native and exotic species along the Collector Road fence line. This area, as well as the existing tree line afford good quality habitat that needs to be protected from clearing.

An overhead 66 kV transmission line to connect the proposed wind farm to the local electricity grid system is also proposed. Subsequent to submitting the EIS, the Applicant revised the route. The revised route would run from the proposed substation (located on the ridgeline between proposed turbines 14 and 15) down slope in a north-easterly direction, and would then run north to an existing substation located within the Woodlawn Bioreactor site.

The revised route was assessed in a modification to the proposal in a document entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm*, prepared by URS and dated 11 February 2005 (see Section 5 above). The modification included a flora and fauna assessment.

Operational Impacts

The Applicant noted that the operation of the proposal is not expected to create any significant impacts on vegetation, mammals or reptiles although there is potential for turbine blades to strike locally occurring raptors, waterbirds, migratory passerines, Glossy Black-Cockatoos, and bats.

According to the EIS, raptors would have a moderate risk of being struck by turbines and this could have an impact on regional populations of Peregrine Falcon (including one breeding pair at Woodlawn mine) and Wedge-tailed Eagles. Both species have large home ranges and a low reproductive rate. Waterbirds have the potential to strike turbines as they migrate between Lake George and Lake Bathurst (i.e. when there is water in the lakes). However, the EIS indicates that movements across the study area are less likely to be favourable than other routes and the numbers of waterbirds would be low.

Small numbers of migrating honeyeaters were observed during the field survey. The EIS considered the risk of this species, or other migratory passerines, striking the turbines to be moderate, even though the number of birds exposed to this risk would be low.

Patches of Black She-oak, a food resource for the Glossy Black-Cockatoo, with a low number of potential breeding hollows occurs in the study area. There was evidence this species uses the study area. The EIS indicated that the strike risk for Glossy Black-Cockatoos would be moderate as they are known to cross open spaces and sometimes fly at turbine height. The EIS anticipates the annual strike rate would be low as the study area is probably only visited irregularly and for short periods outside the breeding season.

The EIS and the supplementary studies conclude that the behaviour of bird species and implementation of the proposed mitigation measures would reduce the risk of bird strike to an acceptable level (see 6.2.4 below). Monitoring is proposed to confirm this.

The additional assessment report on bats (see *An Assessment of the Bat Fauna at the Proposed Woodlawn Wind Farm*) identified that four threatened bat species were known from the region, but only two (the Yellow-bellied Sheathtail Bat and the Large Bentwing Bat) could be expected in the vicinity of the proposal. Neither of the species was recorded during field surveys. The report concluded that the there would be very little impact, if any, on threatened bat fauna from construction and operation of the wind farm.

The bat assessment also recorded nine other species of bat in the area during the sampling period. The bulk of the activity (89% of the calls) was recorded over water i.e. dams. The study assumed that the low number of calls from the other sites (i.e. dry) reflects the poor quality of bat habitat in the majority of the site.

6.2.2 Issues Raised in the Submissions

One submission raised concerns regarding the potential for the black swans flying between Lake Bathurst and Lake George to strike the turbine blades. Another submission expressed concern that a local population of Wedge-Tailed Eagles could be affected.

6.2.3 Department's Position

The Department has assessed the potential flora and fauna impacts of the proposal. The construction of the proposal would result in the removal of some vegetation. Clearing is anticipated to occur for the turbine footings, construction pad, access tracks, viewing platform, and construction associated with the transmission line.

The targeted reptile survey identified the presence of the threatened reptile *Suta Flagellum* on the ridgeline of the wind farm site[20]. It is likely that this species could be adversely affected by construction associated with the turbine footings and special care will be required.

The reptile survey report recommended additional mitigation measures to be included in a construction management plan. These are outlined in Section 5 of the reptile report[21]. The additional measures included the need to cordon off the areas around the turbine footings, roads and underground cabling within the areas identified as potential habitat for *Suta flagellum* and *Aprasia parapulchella*. It also identified the need to protect the areas from cut and fill disturbances and ensure the habitat areas are not used for soil and erosion control structures. The Department considers that these measures should help to ensure the protection of these threatened species.

The Applicant's additional information regarding raptor and waterbird movements recommended an amended table of mitigation measures to those outlined in Table 11.9 of the EIS[22]. These were incorporated in Section 5 of the raptor and waterbird movement report. The additional measures included, among others, recognition of the need to stop lambing along the ridgeline, removing dead animals around the turbines, and removing a dam around turbine site 11. The Department considers that these measures should help to ensure greater protection for raptors and waterbirds during operation of the wind farm by not attracting them to areas where they may be struck by the turbine blades.

The Applicant, in response to a request for further information from the DEC concerning potential impacts on birds provided details of a bird monitoring and management program as part of its on-going ecological responsibilities for the Woodlawn proposal. The surveys proposed by the Applicant would monitor and record bird movement patterns and mortalities resulting from strikes on the turbines. The monitoring results would be used to refine an adaptive management program for birds which incorporates strategies and actions that are available in the operation of the wind farm to limit bird mortalities[23].

The Department's assessment identified that the operation of the turbines would pose the greatest risks to birds and bats. The risks arise from the potential for birds, particularly waterbirds, and bats to collide

[20] *Targeted Reptile Search at Woodlawn Wind Farm*, URS, 15 November 2004.
[21] ibid
[22] *Raptor and Waterbird Movements at Woodlawn Wind Farm Site*, URS Report, 8 February 2005.
[23] Adaptive management, as defined by Walters 1997 (*Challenges in adaptive management of riparian and coastal ecosystems, Conservation Ecology* 1(2): Article 1), is 'a concerted effort to integrate existing interdisciplinary experience and scientific information into dynamic models that attempt to make predictions about the impacts of alternative policies'. Adaptive management applies the lessons learned to the development of future management policy and decisions.

(i.e. strike) with the moving blades. Waterbirds recorded within the broader study area, some of which are threatened species (e.g. the Freckled Duck, which was recorded prior to exhibition of the EIS), currently occur in relatively low numbers. However, it is noted that these numbers could increase when Lakes George and Bathurst fill with water.

Several species of Honeyeater are known to migrate through this area in flocks during the autumn. The migratory paths however are not known but could overlap with the wind farm array.

The Department considers that there was insufficient information regarding the movement of waterbirds, raptors, migratory birds, and bats at the time of the preparation of the EIS[24]. This has been partly redressed by the raptor and waterbird, and bat studies undertaken post EIS exhibition. However, future changes in surrounding land use practices, seasonal and climatic events that would fill the adjacent lakes after the commencement of the operation of the wind farm all introduce variables with unforeseen consequences to bird and bat behaviour. The effects of these variables can only be accounted for by direct observations after the commencement of operation of the proposal i.e. monitoring.

It will therefore be essential to undertake bird and bat monitoring surveys post operation of the wind farm. This will be especially important during and after the filling of Lakes Bathurst and George in order to assess whether waterbirds and bats are likely to move between these two waterbodies in a path through the turbines.

6.2.4 Proposed Mitigation Measures

The Department's recommendations Nos. 29 and 35, if adopted, would require the Applicant to prepare flora and fauna management sub plans as part of the *Construction and Operational Environmental Management Plans* of recommendations Nos. 26 and 33. The respective sub plans should incorporate the relevant mitigation measures outlined in:

- Table 11.9 of the EIS;
- Section 5 of the report entitled *Raptor and Waterbird Movements at Woodlawn Wind Farm Site*;
- Table 5.1 of the report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm*;
- Section 5 of the report entitled *Targeted Reptile Search at Woodlawn Wind Farm*; and
- The section headed Recommendations of the report entitled *An Assessment of the Bat Fauna at the Proposed Woodlawn Wind Farm, NSW*.

The sub plans should also include strategies to control the spread of weeds.

The Department's recommendations Nos. 37-39, if adopted, would require WWE JV to prepare a *Bird and Bat Adaptive Management Program*. The program should be undertaken by a suitably qualified expert approved by the Director General and:

- Incorporate monitoring, and a decision matrix that clearly describes how the Applicant will respond to the outcomes of monitoring;
- Incorporate an on-going role for the suitably qualified expert;

[24] Lake George and Lake Bathurst were both dry at the time of the EIS preparation. Bat surveys were not carried out as the assessment was completed in winter 2004. Bats at that time of year would be expected to be in torpor i.e. semi-hibernation and not active.

- Set out monitoring techniques, taking into account best practice bird and bat monitoring methods for wind farms such as those 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;
- 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 waterbodies;
- Incorporate a decision making framework that sets out specific actions and when they may be required, to reduce identified impacts on birds and bats;
- Identify 'at risk' bird and bat groups and include monthly censuses of their movements; and
- Apply the mitigation measures outlined by the Applicant in the EIS, raptor and water bird study, and bat study.

Recommendation No. 38, if adopted, would require the Applicant to prepare annual reports from the start of operation describing the activities and effectiveness of the mitigation measures undertaken within the adaptive management program.

The Department considers that the proposal would be unlikely to affect the long-term viability, or contribute to the extinction, of any threatened species and concurs with the conclusions of the test of significance for threatened species that no Species Impact Statement is required. The Department notes that mitigation measures outlined in the EIS, and as amended by the bat, raptor, and reptile reports, are crucial in order to avoid or minimise potential impacts on all species including threatened species.

6.3 Traffic and Transport

6.3.1 Applicant's Position

The construction of the wind farm will entail the road transport of an inventory of component pieces that are both oversized and over mass. A summary of the dimensions and weights of the wind farm components is presented in Table 14.1 in the EIS. The components include the nacelle, hub, blades, and 4 piece towers parts for the 60 metre towers and 5 piece tower parts for the 78 metre towers. In addition to the items listed in Table 14.1, there will also be the substation transformer equipment which comprises two transformer units of 45 tonnes each.

The Applicant would either import the turbine components or commission their manufacture in Australia. Imported components, or those manufactured in Tasmania, would arrive via Port Kembla[25]. Components made in Victoria or South Australia would be transported by road. Rail transport was examined but ruled out as there is a lack of vertical and horizontal clearance along the electrified sections which would limit the size and type of wind turbine equipment that could be hauled.

The Applicant identified all possible road routes from Port Kembla and South Australia/Victoria to Goulburn and determined that either National Highways or State roads can physically accommodate over mass and over dimension vehicles.

[25] Port Botany and Darling Harbour were also examined but dismissed because of the lack of long term storage and/or inadequate facilities for loading/unloading of oversized containers.

The Applicant also examined three route options from Goulburn to the wind farm site. Two of these options would bypass Goulburn and one option would pass through it (see Figure 14.2 in the EIS).

The option through Goulburn had two different routes, one avoided the town centre the other passed through the town centre. The preferred option is the route that passes through Goulburn but avoids the town centre. It passes down Hume Street and Cowper Road, right into Clinton Street, right into Blackshaw Road and crossing the rail overpass to Braidwood Road, then south via the Braidwood Road to Tarago, then via Bungendore and Collector Roads to the site. This is the shortest route to the wind farm site from Goulburn and has appropriate carriageway and clearance through all sections.

The other two options were not considered feasible for heavy vehicle transport as they are both longer and would require improvements to enable heavy vehicle usage.

The preferred route option through Goulburn avoids the town centre and a large proportion of the route (Hume Street and Cowper Road – the former Hume Highway) has a wide carriageway and high pavement strength.

Ultimately the transport contractor would be required to submit a transport plan to the RTA detailing route, time of travel, load type and proposed vehicles prior to the RTA issuing a transport permit.

6.3.2 Traffic Assessment

The Applicant assessed the current status of traffic flows for the key local roads and intersections using RTA traffic count data to determine the road capacity of each road and intersection[26]. The assessment identified that Bungendore and Collector Roads are operating at a Level of Service (LOS) of 'A'[27] and that the LOS will remain unchanged in 2005.

Peak hour intersection counts at both Bungendore Road/Collector Road and Collector Road/Woodlawn Bioreactor Facility Entry intersections were also done. Both intersections yielded LOS 'A' results.

The Applicant assessed construction traffic impacts on the affected roads. Construction traffic estimates were identified for equipment and materials, construction staff, and wind turbine equipment movement. It was estimated that a maximum of 200 trips per day would occur during months 2 to 8 of the construction program.

The traffic assessment concluded that the LOS of all local roads and intersections would remain unchanged as 'A' during construction even taking into account the Woodlawn Bioreactor traffic.

Traffic at the viewing platform is expected to peak during weekends and holiday visitor periods. The maximum traffic load is expected to be approximately 20 vehicles per hour.

The Applicant estimated that traffic generated during wind farm operation would consist of 2 to 3 site staff driving to work between 2 and 4 times per fortnight.

[26] This was based on Austroads *Guide to Traffic Engineering Practice, Part 2: Roadway Capacity* for level and rolling terrain.
[27] An LOS 'A' is defined as free flow condition, high degree of freedom for drivers to select desired speed and manoeuvre within traffic stream.

6.3.3 Issues Raised in the Submissions

Only Goulburn Mulwaree Council's submission offered any comment on the traffic and transport aspects of the DA. Council commented that it did not have any objections to the preferred routes however it considered that its engineering staff should have an input into a Traffic Management Plan for the construction phase. It also identified that any damaged road pavement should be reinstated by the proponents.

Goulburn Mulwaree Council also requested that the Applicant contribute toward the upgrade and maintenance of road infrastructure in accordance with the Mulwaree Section 94 Development Contributions Plan 2003-2008. These costs relate to the construction traffic and extra traffic expected to be generated by the visitors centre/viewing platform.

Palerang Council did not forward any submission on the proposal.

6.3.4 Department's Position

Construction is expected to take up to 12 months. In that time traffic is expected to increase on each of the key roads as indicated below:

Local Road/Intersection	Existing Vehicles/day	Construction Vehicles/day	Total Vehicles/day
Bungendore Rd South	544	136	680
Bungendore Rd North	500	64	656[28]
Braidwood Rd North	1080	64	1144
Collector Rd East	50	200	342[29]
Collector/Bungendore	53	70	134[30]
Collector/Bioreactor	8	70	89[31]

The traffic flow and LOS of all affected local roads and intersections from construction traffic is within the identified existing capacity (i.e. LOS 'A'). The Department supports the Applicant's conclusion that construction of the wind farm is expected to have a minimal impact on the existing capacity of each local road and intersection.

6.3.5 Proposed Mitigation Measures

The Applicant has identified a number of mitigation measures it proposes to implement in order to minimise traffic and transport impacts including:

- The design and construction of access tracks to ensure safe and stable activities;
- Community consultation program to ensure residents are informed on program timing and management;
- Implementation of controls in the Traffic Management Plan to manage traffic on and off-site to minimise impacts on local traffic flows; and
- Road inspections prior to use, and on-going monitoring during activities to ensure access roads and access tracks are maintained in safe and adequate conditions.

[28] Includes 92 vehicles/day from the Intermodal facility
[29] ibid
[30] Includes 11 vehicles/day from the Intermodal facility
[31] ibid

These measures are summarised in *Table 14.16 – Summary of Traffic and Transportation Mitigation Measures* in the EIS. The Department supports these measures and has included them in recommendation No. 28.

In addition, recommendation No. 28, if adopted, would require a Transport Management Plan to be prepared in consultation with Goulburn Mulwaree Council and the Applicant to contribute to the Goulburn Mulwaree Council's Section 94 in accordance with the submission by Council.

It is noted that articulated vehicles, some with pilot vehicles and possibly police escorts, will be required to carry the nacelle, hub, blades, and tower pieces. Many of these component parts are over weight and may damage road surfaces. It will therefore be appropriate to prepare a road dilapidation report, before construction commences, for all roads likely to be used by construction traffic[32]. Any road/footpath/cycleway damage (aside from that resulting from normal wear and tear) attributable to the construction of the proposal, must be repaired to a standard at least equivalent to that existing prior to any disturbance. This matter is addressed in recommendation No. 61.

6.4 Soil and Water Management

The proposal is located on a ridgeline that separates two catchments. The eastern side of the ridgeline drains to Crisps Creek and the Mulwaree River and is part of the Sydney drinking water catchment. The western side drains into the Lake George catchment.

Three tailings dams of the former Woodlawn Mine are located downstream on the eastern side of the ridgeline. The closest tailings dam, 150 m from the nearest proposed turbine, would receive runoff from a small section of the proposed wind farm. The western side of the ridgeline drains to Taylors Creek and Allianoyonyiga Creek.

Water is used in both catchments for local and domestic supply, stock watering, and irrigation. Farmers also retain water for stock watering in farm dams.

The soil landscapes are dominated by shallow soils which have formed *in situ* from weathering of the parent rock (vestigal) and soils which have been deposited by mass movements (colluvial). Top soil is very thin (i.e. less than 0.2 m deep) and is highly erodible.

Sydney's drinking water catchment is subject to three special considerations: *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply* ; *Sustaining the Catchments, Draft Regional Plan for the drinking water catchments of Sydney and adjacent regional centres*; and *Warragamba Catchment Blueprint* (see discussion in Sections 3.5.4, 3.5.5, 3.5.6 respectively). The aim of the provisions associated with these instruments is to protect the quality of Sydney's drinking water.

6.4.1 Applicant's Position

The Applicant has identified the likely construction and operational impacts on water and soils from activities associated with the turbine footings, access road, construction platforms, transmission line, and buildings. These included, among others:

- Increased erosion risks associated with ground surface disturbance and removal of soil;

[32] Goulburn Mulwaree Council has indicated that the section of Collector Road from the Collex Intermodal Terminal to the Woodlawn site does not need to be subject to this condition.

- Increased volume and velocity of the runoff from less permeable and cleared surfaces;
- The potential for soil and water contamination from leaks associated with wastewater from temporary toilets, fuel and oil from leaking vehicles, spills of chemicals such as lubrication oils within the turbines, transformer oil within the substation, or paints; and
- The potential for soil erosion from runoff discharge points around the substation and control building and from site access tracks and parking areas.

The Applicant provided a commitment in the EIS to prepare Construction and Operational Environmental Management Plans and include sub-plans to address soil and water management. In addition the Applicant provided a number of soil and water mitigation measures it proposes to implement (see *Table 16.4 – Summary of Hydrology and Water Quality Mitigation Measures* and *Table 17.3 – Summary of Soils and Geology Mitigation Measures* in the EIS). These included such measures as:

- Detailed geotechnical investigation to test for acid generating material;
- Commitment to design and maintain site tracks in accordance with appropriate standards;
- Manage on-site traffic to minimise dust generation and soil erosion;
- Install erosion and sediment control measures prior to vegetation clearance and construction;
- Limit vegetation removal;
- Maintain sedimentation works; etc.

6.4.2 Issues Raised in the Submissions

The SCA reviewed the assessment provided at Sections 16 and 17 of the EIS, which discussed the effects the proposal would have on water and soils, in its detailed submission. The SCA concluded that information provided in the EIS satisfies the matters for consideration contained in clause 10 of SEPP 58 subject to the incorporation of certain conditions it has recommended[33].

The conditions suggested by the SCA reinforce the recommendations in the EIS and relate to the preparation of Construction and Operational Environmental Management Plans which address stormwater management and soil and erosion control. The SCA has also recommended certain treatment measures for human wastewater management, and fencing to ensure grazing can be managed.

6.4.3 Department's Position

The Department considers that good management practice would entail the incorporation of the measures proposed by the SCA for the whole of the project area and not just that part of the proposal within the Sydney catchment area.

[33] Clause 10 of SEPP 58 identifies that a consent authority must consider: whether the development or activity will 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; whether the water quality management practices proposed to be carried out as part of the development or activity are sustainable over the long term; and 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 Department considers that with the incorporation of the suggested conditions provided by the SCA, and the implementation of the mitigation measures outlined in Tables 16.4 and 17.3 of the EIS, water and soil management can be effectively managed to meet the aims and objectives of *State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply Sustaining the Catchments, Draft Regional Plan for the drinking water catchments of Sydney and adjacent regional centres*, and *Warragamba Catchment Blueprint*.

6.4.4 Proposed Mitigation Measures

The Department supports the Applicant's commitment to develop construction and operational Soil and Water Management Sub-Plans to the Construction and Operational Environmental Management Plans. The Department included in recommendations Nos. 30 and 36 the suggested conditions provided by the SCA, and the mitigation measures outlined in Tables 16.4 and 17.3 of the EIS.

6.5 Indigenous Cultural Heritage

The vegetation of the site that existed before settlement would have provided the Aboriginal population of the area with food, raw material for tools and utilitarian items and shelter. The traditional owners were the Ngunawal people, their lands extending across the Southern Tablelands wet from Goulburn to Yass and north to Tumut to Boorowa.

The Applicant reviewed previous indigenous cultural heritage investigations and identified that there was a dearth of recorded sites. The review concluded that this was indicative of the low amount of archaeological work that has been conducted in the immediate Woodlawn locality.

There were no registered Aboriginal archaeological sites in the Woodlawn study area at the time of the investigations undertaken by the Applicant. However, the Applicant's models of Aboriginal settlement and archaeological site distribution for the region suggested that stone artefact sites were the most common archaeological sites and these were likely to occur on lower slopes or alluvial landforms.

6.5.1 Applicant's Position

The DEC advised the Applicant to undertake consultation with the Pejar Local Aboriginal Land Council (LALC) and the Buru Ngunawal Aboriginal Corporation (representing the Ngunawal People Native Claim NC00/1). Representatives from both the Buru Ngunawal and Pejar LALC participated in separate archaeological surveys of the study area.

The two archaeological surveys of the study area focused on the impact localities of the proposal. Fifteen previously undocumented Aboriginal archaeological sites were discovered by the surveys. Al the sites are stone artefact sites, and all but one was assessed as being of low archaeological significance. The archaeological significance of each site was based on site contents, site condition and representativeness.

The proposal would directly impact on eight out of the 15 Aboriginal archaeological sites identified in the surveys. These 8 sites are within 5 m of construction activities, and disturbance to these sites is considered unavoidable.

The remaining seven Aboriginal archaeological sites would not be impacted by the proposed development.

The Buru Ngunawal and Pejar LALC advised that all pre-European sites in the study area are considered to have cultural significance to the Aboriginal community, and should be preserved.

The Applicant undertook to obtain a Consent to Destroy with Salvage permit from the DEC in accordance with Section 90 of the *National Parks and Wildlife Act* for those sites which would be directly affected by the construction.

6.5.2 Issues Raised in the Submissions

No indigenous cultural heritage issues were raised in the submissions. However, the DEC advised after the exhibition of the EIS, that it would require additional information to enable it to make a decision about issuing its General Terms of Reference in relation to Section 90 permits under the NP&W Act. The additional information included the subsurface extent and content of those sites that are to be affected.

The Applicant undertook the subsurface sampling in accordance with the information requirements of the DEC which included:

- Identification of specific objects with photo, GPS location, morphological description and dimensions and weight; and
- Additional consultation with the Buru Ngunawal and Pejar LALC regarding the care and control of objects and their views on proposed monitoring of collection/salvage works.

The results of the sub-surface sampling were reported in a document entitled *Archaeological sub-surface testing of the proposed Woodlawn wind farm, Tarago, New South Wales* dated July 2005.

Sub-surface investigation involved 204 spade probes which recovered eight artefacts from eight separate locations. The report identified that the most notable result of the sub-surface testing was the small number of sub-surface artefacts recovered particularly as the testing concentrated on known areas of artefact occurrence. The report concluded that the geomorphic conditions that exist on the ridge was the most reasonable explanation for the apparent lack of sub-surface artefacts i.e. the slow accumulation and recent erosion of the shallow soils of the ridge have likely combined to result in the almost total exposure of the archaeological record of the Woodlawn ridge study area.

The report was forwarded to the DEC in early July 2005 with a request for the GTAs for Section 90 permits to cover all relevant objects.

6.5.3 Department's Position

The Department notes that the DEC is an integrated approval body for this proposal. The Department was guided by the advice from the DEC that it required this information in order to issue Section 90 permits.

The DEC has reviewed the information provided for this proposal, including the additional report on sub-surface sampling. The DEC advised in late August 2005 that it was able to issue its GTAs in relation to Section 87 and Section 90 of the NP&W Act for the proposed development, subject to conditions.

6.5.4 Proposed Mitigation Measures

The Applicant identified a number of mitigation measures in its EIS. These have now been refined to take into account the more detailed investigation that was originally proposed to be done after any GTAs

were issued by the DEC. The mitigation measures are outlined in Section 8.0 of the report entitled *Archaeological sub-surface testing of the proposed Woodlawn wind farm, Tarago, New South Wales* dated July 2005 and include:

- Continuing consultation with the Buru Ngunawal and Pejar LALC regarding Section 90 application and Care Agreement for storing and displaying recovered artefacts;
- Implementing protection measures such as barrier fencing to confine construction impacts to as small an area as possible for those sites likely to be affected;
- Implementing protection measures such as fencing-off conservation areas for those sites and areas of sites that will not be directly impacted by the construction activities; and
- Finalising a Cultural Heritage Management Plan to implement the above mitigation measures and incorporate appropriate induction processes for all construction personnel.

The Department included in recommendations Nos. 57 and 58 the measures suggested by the Applicant outlined above and the GTAs provided by the DEC.

6.6 Property Values

The question of wind farms adversely affecting property values arises when a reduction in a particular amenity value, such as visual or noise, lowers the saleability of the property. This is usually reflected as a lower market value for the property.

6.6.1 Applicant's Position

The proposed wind farm is located in a rural area where agriculture is the principal land use. According to the Applicant, the wind farm will not interrupt these agricultural uses. The Applicant therefore assumes that any fluctuation in the value of agricultural land will be more significantly affected by a range of factors including commodity prices, interest rates, existing improvements, infrastructure and services and supply and demand, than a wind farm.

The conclusion in the EIS was that in general "wind farms do not have a material effect on property values". This was supported in the EIS on the basis of a review of international reports and surveys. According to the EIS, one of these reports investigated impacts on property values at up to ten wind farm developments and others included public opinion surveys conducted by independent market researchers.

6.6.2 Issues Raised in the Submissions

For the Woodlawn Wind Farm proposal the issue of its affect on property values was raised either directly or indirectly by reference to a loss in amenity, in four of the seven submissions received from the public. The submissions were from land holders whose properties were used for rural residential and agricultural purposes although one submission identified the potential for the proposal to adversely impact an approved future residential subdivision.

6.6.3 Department's Position

The Department acknowledges that any negative effect wind farms may have on property values is a particular concern to landholders. However, there is limited quantifiable data which can be used to identify any valuation effects.

The most extensive survey to examine the effect of wind farms on property values was undertaken in the United States and presented in as Analytical Report by the Renewable Energy Policy Project[34]. The study did not model the changes in property values, rather it was an empirical review where data from 10 wind farm sites was collected and subjected to a statistical regression analysis to determine price changes in three ways:

- How property values (prices) changed over the entire period of the study for the view shed and comparable region;
- How prices changed in the view shed before and after the projects came on-line; and
- How property values changed for both the view shed and comparable community but only for the period after the project came on-line.

The results identified that in thirty separate analyses (i.e. 10 wind farm sites subjected to three assessments), twenty-six property values in the affected view shed performed better than the comparable properties. The study conclusion that "there is no support for the claim that wind development will harm property values" was qualified with a statement that more data will need to be analysed as it becomes available. This suggests that the conclusions drawn from the analysis are indicative and preliminary and should be used cautiously when translating to other sites that were not investigated.

The Bald Hills Wind Farm Panel Inquiry in Victoria examined the issues of property devaluation for neighbouring properties in a more qualitative manner[35]. A number of property valuers and real estate agents provided submissions and appeared before the Panel Inquiry as expert witnesses. From a review of this evidence the Panel Inquiry report concluded that:

> *All that appears to emerge from the range of submissions and evidence on valuation issues is the view that the effect of wind energy facilities on surrounding property values is inconclusive, beyond the position that the agricultural land component of value would remain unchanged. On this there appeared to be general agreement.*

The Department notes the concerns expressed in the submissions for the Woodlawn wind farm proposal regarding the potential to adversely affect property values. The assessment did not identify that the existing use of the land was likely to be lessened i.e. the amenity values of the existing rural residential or agricultural uses, or any existing or approved change in the use of the land would be adversely affected by the proposal. Although there will be changes to the visual landscape the Department's conclusion is that there will be no significant adverse impact on visual amenity. There is no conclusive evidence that significant value changes, transfers or inequities would result from the project proceeding.

Some submissions raised concerns regarding future land use changes that were anticipated to be made i.e. subdivision of land for rural residential. However, at the time of the consideration of the DA, no applications for these developments had been made. It would therefore be inappropriate, in the

[34] Sterzinger, G *et. al The Effect of Wind Development on Local Property Values*, May 2003.
[35] *Bald Hills Wind Farm Project: EES, EES Supplement and Called-in Permits* Panel Report, Victorian State Government, 24 June 2004

absence of a strategy document which identified any future higher density settlement outside of the existing 40 hectare minimum sub-division, to support these objections[36].

One submission identified the potential for the proposal to adversely impact an approved future residential subdivision. Goulburn Mulwaree Council confirmed that the objector had received consent for 6 allotments including 3 concessional allotments of at least 10.4 hectares. The lots are located on the eastern side of Bungendore Road approximately 4 km from the nearest turbine. To date, no applications have been made with Council for development consent to erect new dwellings on these lots.

The Department considers that given the distances separating the subdivision, the construction of a dwelling would not have any major adverse impacts from the wind farm.

6.7 Operational Noise Impacts

The EPA is an integrated approval body for this proposal. It has adopted the South Australian Environmental Protection Authority's *Wind Farms: Environmental Guidelines'* (2003) (SA Guidelines) as the basis for operational noise assessment in relation to issuing an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act* 1997. (See Section 3.6.4 for a discussion of what constitutes a wind farm requiring a licence from the EPA). The SA Guidelines specify the following noise criteria for new wind farms:

The predicted equivalent noise level ($L_{Aeq,\ 10}$) adjusted for tonality in accordance with these guidelines should not exceed:

35dB(A); or
the background noise ($L_{A90,\ 10}$) 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 wind turbine generator (WTG).

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. The EPA interprets the sensitive receiver as an existing dwelling or premise, or a site where a dwelling or premise has received an approval (i.e. consent) to be built. Generally, a valid measurement position is within 20 metres of the dwelling (or at a site where a development approval has been granted for the dwelling), in the direction of the proposed wind farm, and at least 5 m from any reflecting surface.

The SA Guidelines state that:

> *Background noise is measured at relevant receiver locations over continuous 10-minute intervals and particularly over the range of wind speeds at which the WTGs operate. The data must adequately represent conditions at the site and cover approximately 2 000 intervals*.

The Applicant completed the following steps in order to specify appropriate noise assessment criteria:

[36] Mulwaree Shire Council's *Settlement Strategy* document dated November, 2003 applies to the Tarago village area. Tarago was described in the strategy document as an area with limited opportunities for future growth constrained by the lack of sewerage and its location in Sydney's drinking water catchment.

- Established noise level generation for the proposed turbines at integer wind speeds between 2 m/s to 15 m/s;
- Surveyed ambient noise to establish background noise levels at the four nearest residential receptors on properties not associated with the proposal i.e. Kildare, Glendale, Bonnie Doon, and Torokina;
- Established the wind farm noise level criteria at each integer wind speed at each residence;
- Assessed preliminary noise using geometric spreading only i.e. ignoring effects of air absorption, ground effects, and wind propagation;
- Used the wind farm noise prediction model software (WindFarmer) to assess noise contours generated for the proposal;
- Undertook detailed noise assessment using the Environmental Noise Model (ENM) under neutral meteorological conditions and under various meteorological conditions with an adjustment to the ENM for noise at higher wind speeds; and
- Determined the amount of time the predicted noise levels would be greater than the background noise at the four residential receptors using sensitivity analysis techniques.

6.7.1 Issues Raised in the Submissions

One resident made a detailed submission in relation to the potential noise associated with the proposal. Specifically the submission:

- Sought clarification on whether wind across the microphone may have influenced the background noise measurement;
- Sought clarification as to why data points outside the range from cut-in to rated power of the turbines were included in the regression analysis;
- Sought clarification as to why a comparison of the turbine noise versus wind speed was performed only at a particular wind speed range;
- Questioned the modifications used in the ENM propagation model in respect to wind speeds; and
- Questioned the tonality assessment of the proposed turbines.

All these matters were also raised by the EPA in its assessment which sought further information from the Applicant including:

- Photographs of the measurement locations showing the noise measurement positions and associated surrounds;
- Confirmation that the reported noise levels were not influenced by high winds and/or rain across the microphone;
- Details of the instrumentation used with particular reference to the microphone windshield;
- A demonstration that the inclusion of data at the extreme ends of the range of wind speeds did not influence the slope of the fitted regression line;
- An explanation of the descending trend in the fitted regression line between calm and low wind speeds;
- A comparative analysis be made for all integer wind speeds from cut-in to rated power;
- Validation that the modifications to the ENM can be used to predict wind farm noise; and

- Additional information on the tonality of the proposed turbines.

The EPA also requested an assessment of the likely noise impacts on the two residences located on the Woodlawn property and the seven residences located on the Pylara property. Collex, a member of the Joint Venture, owns all these residences and Collex employees occupy some of them.

The approximate distances to the nearest proposed turbine for each of these residences is identified in the following table:

Dwelling Name	Distance to Nearest Turbine (km)
Cow Paddock House	2.5
Train Drivers House	2.6
Old Cottage (derelict)	2.8
Cowley Hills	2.1
Caretakers House	2.6
Farm Managers House	2.7
Shearers Quarters	2.3
Pylara Homestead	2.7
Woodlawn Farm	2.2

Other submissions raised concerns that although noise would be within acceptable limits at the residence, there would be higher levels (i.e. greater than the SA Guidelines) at other sites within the property boundary. The concerns relate to the loss of opportunities for future subdivision potential.

6.7.2 Applicant's Position

The Applicant has chosen a preferred turbine design that achieves a maximum 105 dB noise output. The noise levels were predicted to meet the noise criteria specified in the SA Guidelines on the basis of the analysis undertaken for the 105 dB turbines. The sensitivity analysis demonstrated that noise levels at the closest residences to the east and west would be greater than background noise level for part of the time over a season, but would still be below the SA Guidelines criteria.

If the 105 dB turbines are software controlled to be quieter during the most sensitive part of the operating range (i.e. 101 dB) the predicted noise levels would not exceed background noise level under any wind conditions. This measure is available if any noise problems arise.

The Applicant provided a table of noise level criteria versus wind speed for each of the residences closest to the proposal. The noise level criteria were presented as a function of integer wind speed (at 10 m above ground level) based on the background noise level measurements and the associated regression analysis at each residence.

The Applicant provided additional details in relation to the questions raised in the detailed private submission and by the EPA. All the matters raised in the submission and by the EPA were addressed by the Applicant in a written response from its noise consultant. In particular, the consultant supplied details of the monitoring equipment and photographs of the measurement locations.

The regression data between the cut-in and rated power (2m/s to 15 m/s) were also re-plotted in order to identify what effects the inclusion of data at the extreme ends of the range of wind speeds does to influence the slope of the fitted regression line. This analysis had a minor influence on the regression

line at some wind speeds at the receivers but did not change the conclusions with respect to compliance of the predicted noise levels with the SA Guidelines.

The question of tonality would not be relevant to this proposal as tonality is only apparent at some wind speeds at very close proximity to the turbine. The distances of the residences to the turbines means noise from the turbines would not be tonal at any wind speed at the residences.

A noise assessment was conducted at five locations considered to be representative of the seven residences located on Pylara and Woodlawn properties (i.e. Pylara Farm Managers Cottage, Caretakers House, Shearers Quarters, Woodlawn Farm, and Cowley Hills). On the basis of the assessment the SA Guideline criteria will be complied with at all receivers and at all integer wind speeds between cut-in and rated power.

Subsequent to the exhibition of the EIS the Applicant sought, for the purpose of setting the licence limits, an allowance of +3dB(A) above the predicted levels. This was based on adopting the minimum level for the SA Guidelines and an "intrusiveness" approach at lower wind speeds and an allowance above the predicted levels at higher wind speeds. These suggested changes still meet, and do not exceed, the SA Guideline criteria at any wind speed.

6.7.3 Department's Position

The Department notes that the EPA is an integrated approval body for this proposal. The EPA has reviewed the information provided for this proposal, including the request by the Applicant to increase the allowance of +3dB(A) above the predicted level, and has determined that it is able to issue its GTA's and therefore could provide an Environment Protection Licence (EPL) consistent with these under the *Protection of the Environment Operations Act* 1997 for the proposal subject to a number of conditions. It is noted that the Applicant will need to make a separate application to the EPA to obtain an EPL.

The Department considered the Applicant's change to the predicted sound power levels. The proposed change of 3dB(A) to sound power levels generated by the wind turbines represents a doubling of acoustic energy when compared to the sound power levels identified in the EIS. The EPA has advised that 3dB(A) itself is barely perceptible to the average listener. However the difference may be perceptible at identified sensitive receivers. Nevertheless the additional information provided by the Applicant demonstrates that the changed predicted noise levels will not exceed the EPA's performance criteria for noise i.e. the SA Guidelines.

The Department, in considering the objections raised in the submissions concerning the loss of future subdivision potential because of noise limits exceeding the SA Guideline, is guided by the advice from the EPA. The EPA typically requires criteria to be met at a location for which a DA for a dwelling is approved but not yet built, and also if a DA for a dwelling is before Council. None of the properties that are potentially affected by the proposal have lodged DAs for new dwellings.

The Department is satisfied that, on the basis of the results of the modelling undertaken, the wind farm proposal will meet the SA Guidelines criteria for the residences not associated with the proposal and the residences located on the Pylara and Woodlawn properties.

6.7.4 Proposed Mitigation Measures

The EPA has provided comprehensive GTA's appropriate for this class of development. The EPA, in making its GTAs for noise, accepted the Applicant's position that any noise condition should comply with the SA Guideline criteria noise limits.

The noise limits in the GTA's reflect the changes made by the Applicant to the predicted sound power levels. (See recommendation No. 49.) The noise limits in the GTA's, although higher for most integer wind speeds than those indicated in the EIS, do not exceed the SA Guideline criteria.

The GTAs also included a condition requiring the Applicant to prepare an operational Noise Compliance Assessment (see the Department's recommendations Nos. 53-55). This condition will require the Applicant to monitor the noise of the wind farm and assess the noise limits set by the SA Guidelines against the actual performance. In the event the assessment indicates that noise from the wind turbines exceeds the specified noise limits, the Applicant's Noise Compliance Assessment report must investigate and propose mitigation and management measures that are available to achieve compliance with the noise limits.

It is also noted that the Applicant has provided a commitment that if operational noise level monitoring indicated exceedances of the SA Guideline, the relevant turbines would be software controlled at the times necessary to reduce the noise level to within the SA Guideline criteria.

The Department has also recommended that the Applicant, in the event that a new dwelling is built on a vacant lot legally existing at the date of any consent for this proposal, to implement mitigation and management measure to achieve compliance with the SA Guidelines criteria.

Operational noise is addressed in recommendations Nos. 49-56.

6.8 Construction Noise Impacts

Construction is anticipated to take up to 12 months. It would involve site preparation and establishment works, track upgrades, foundation construction, trenching for cables, construction of the transmission line and substation, and finally construction of the turbines.

6.8.1 Applicant's Position

The Applicant assessed the likely impact of the noise on the nearest residences to the proposal based on the attenuation of the sound pressure levels of the various pieces of equipment and the distances to the receptors. The EPA's *Environmental Noise Control Manual* (ENCM) suggests that the construction should be limited to the following times:

Monday to Friday	7:00 am – 6:00 pm
Saturday	8:00 am – 1:00 pm.

The ENCM provides relevant noise level restrictions for different distances and directions for construction periods greater than 26 weeks. These equate to background plus 5 dB(A) and range between 35 and 36 dB(A) for the four closest residences i.e. Kildare, Glendale, Bonnie Doon, and Torokina.

Noise levels where predicted for the four closest residences based on attenuation due to distance to the residence from the turbines for various construction activities i.e. earthworks, foundations, and superstructure. The predicted construction noise levels meet the criteria from the various activities for the construction phase i.e. range from 28 dB(A) at Torokina for earthworks to 26 dB(A) at Torokina for superstructure construction. (Note: Torokina is the closest of the residences and the maximum noise criteria is 35 dB(A).)

6.8.2 Department's Position

The Department is satisfied with the assessment provided by the Applicant which indicates that the predicted noise levels meet the criteria from the various activities during the construction stage. It is also noted that the EPA has included in its GTAs the times within which all construction works must be conducted (see the Department's recommendation No. 19).

The Applicant did not discuss the need or otherwise to carry out blasting. Blasting can be both noisy and cause ground vibration, which if done should be subject to conditions. The EPA has included in its GTAs criteria for blasting (see the Department's recommendations Nos. 20-22).

6.9 Hazard and Risk

The EIS identified certain hazard and safety issues associated with the proposed wind farm. These included:

- Aviation;
- Bushfire risk;
- Physical safety of site infrastructure;
- Health risks i.e. electromagnetic fields and shadow flicker;
- Electrical safety; and
- Other construction issues.

6.9.1 Applicant's Position

Aviation
The EIS identified that because of the height of the turbines (i.e. maximum of 118 metres) there may be aviation safety issues regarding aircraft landing fields, intrusion into air traffic zones (i.e. the turbines sit atop ridges and are a maximum of 118 metres high), and there could be impacts with aerial crop spraying.

The nearest landing fields are Goulburn (32 km north-east) and Canberra (41 km south-west). Height limits associated with developments in the vicinity of airfields are based on obstacle limitation surfaces (OLS), for which the airfield operator must monitor the immediate airspace to ensure that it is not affected by potential developments. OLS can extend to 16 km from an aerodrome. The EIS identified that the Civil Aviation Safety Authority (CASA) confirmed that the wind farm would not represent a hazard to airfield users.

Under Civil Air Safety Regulations, CASA must be informed about structures with a height greater than 110 metres above ground level. The Applicant sought comments from CASA regarding the need to mount obstacle light on the turbines, at the time of the preparation of the EIS. CASA advised at that time that there would be no impact on the operations of the closest licensed aerodromes and therefore there would be no requirement to mark or light the towers. CASA further advised that should the proposal be given consent and constructed then the Applicant should provide, for each tower, the coordinates, final height (in mAHD), and the ground level of the site so that aeronautical charts can be updated.

CASA has, subsequent to the preparation of the EIS, advised the Applicant that any turbine with a height of 110 m or greater above ground level would be classified as "hazardous objects' and

consequently this group of turbines would require lighting in line with the CASA *Draft Advisory Circular AC 139-18(0) - Obstacle Marking and Lighting of Wind Farms* and the *Manual of Standards Part 139*. The assessment of the potential environmental impacts associated with this requirement is addressed in Section 5.3 above.

Matters relevant to CASA are addressed in the Department's recommendations Nos. 48, and 62-63.

Neither the Department of Defence nor the Aerial Agricultural Association of Australia (i.e. the industry body representing aerial spraying) raised any concerns regarding the proposal when consulted by the Applicant.

Bushfire Risk

Some parts of the land the proposed wind farm is sited on are identified as "bushfire-prone land" in the Mulwaree LEP. The Applicant has indicated that it would prepare a Bushfire Risk Management Plan based on the 2001 *Planning for Bushfire Protection* guidelines prepared by the Rural Fire Service. This matter is addressed in recommendations Nos. 65-66. These recommendations, if adopted, would require the Applicant to prepare the bushfire plan as part of the *Construction and Operation Environmental Management Plans* and in consultation with the Taylors Creek Rural fire Service.

(Note: This recommendation also meets the consent authority's requirements under Section 79BA of the EP&A Act which requires that it be satisfied the development conforms to the *Planning for Bushfire Protection* guidelines.)

Physical safety of site infrastructure

The design and construction of the wind farm will be subject to a number of Australian and overseas standards. These standards include:

- AS/NZS 1170:2002 Structural Design Actions – General Principles;
- AS 3600-2001 Concrete structures;
- AS 3700-2001 Masonry structures;
- AS4100-1998 Steel Structures; and
- AS/NZS 3000:2000 Electrical installations.

The Applicant also indicated that it would prepare a Health and Safety Plan and conduct all construction works in accordance with the requirements of the WorkCover Authority.

Electrical Safety

The Applicant identified Australian Standards and Energy Supply Association of Australia standards that would be applied to cover electrical matters including, for example:

- Lightning protection;
- High voltage switchgear and control gear;
- Circuit breakers;
- Transformers;
- Electric cables;
- Overhead transmission lines; and

- Underground cables.

The wind farm has also been designed with an automated control system to detect faults and disconnect the faulted equipment from the system.

The Department's recommendation No. 67, if adopted, would require the Applicant to prepare a comprehensive Safety Management System in accordance with the Department's *Hazardous Industry Planning Advisory Paper No. 9 'Safety Management'*. The Safety Management System would ensure that the procedures and programs for the maintenance and testing of the safety related equipment are appropriate for the life of the wind farm.

6.9.2 Department's Position

The Department considers that the Applicant has adequately identified and addressed the likely hazards and risks including aviation, bushfires, safety of site infrastructure, and electrical safety associated with the proposed wind farm.

6.10 Electromagnetic Interference

The EIS examined the potential effects the wind farm may have to disrupt electromagnetic signals used in telecommunication, navigation and radar services.

6.10.1 Applicant's Position

The EIS identified all radio communication systems within a 25 km of the wind farm and sought comment from the operators on the potential of the wind farm to cause interference. These included:

- Ambulance Service of NSW;
- Goulburn Mulwaree Council;
- RTA;
- State Emergency Services;
- NSW State Government – Government Radio Network;
- Airservices Australia;
- Palarang Council;
- TransGird;
- Geoscience Australia;
- NSW Rural Fire Service; and
- Commissioner of Police, NSW.

Of these the Goulburn Mulwaree Council and the State Emergency Service raised concerns about the potential impact of the wind farm on mobile communication systems. The Applicant identified that the effects of wind turbine interference are negligible for FM systems such as these, except within a few tens of metres of a turbine.

Similar consultation was also carried out for the three mobile phone companies who use base stations within the vicinity of the proposed wind farm i.e. Optus, Telstra and Vodafone. In this case the

telecommunication firms all did their own investigations and advised the Applicant that the proposed wind farm would not impact upon their services.

Television reception was also investigated. Wind turbines can distort the picture component (video) by reflection and forward scattering interference. The audio component of the signal is not affected.

According to the EIS the accuracy of predicting television interference is low even where there is a large effort put into investigations. As an alternative, the Applicant completed a desk-top study to identify areas around the site which could be affected as a worst case. In this investigation the Applicant identified that properties located to the west of the wind farm may be affected by backward scatter effects, and receivers to the north through to the south-east of the site would potentially be affected by forward scatter effects.

The Applicant also consulted Airservices Australia regarding the potential impact of the proposed wind farm on aircraft navigation systems at Goulburn and Canberra airports. Airservices Australia confirmed that the distance between the proposed wind farm and these two airports is such that there would be no impacts on radio or radar systems.

Finally the Applicant investigated the effect the wind farm could have on trig stations e.g. disrupting the line of sight and degrading the signal between trig stations or from a trig station to overhead GPS satellites. The Department of Lands, the State government agency responsible for trig stations, raised no objections to the proposal.

6.10.2 Department's Position

The Department accepts that the wind farm should not contribute to or generate any additional electromagnetic interference to facilities or residences in the surrounding community. No electromagnetic interference impacts should be created for mobile phones, aircraft navigation and trig stations from the wind farm. However, it is not entirely certain what the effects will be on the radio signal between Cowley Hills and Gibraltar Hill operated by the NSW Rural Fire Service, and television reception at residences around the wind farm.

6.10.3 Proposed Mitigation Measures

The Applicant has identified a number of mitigation measures in *Sections 15.8.2 Television* and *Table 15.3 – Summary of EMI Mitigation Measures*. The Department considers these to be appropriate. However, the Department has proposed a number of recommendations which will require the Applicant to make actual observations of any changes to television and fixed radio links. These recommendations, if adopted, would require the Applicant to:

- Undertake an assessment of the existing quality of two way fixed radio links crossing the site, and television reception at residential dwellings located within five kilometres of a proposed turbine prior to the erection of any wind turbine i.e. the "before" baseline survey;
- Re-survey the two way fixed radio links and the television reception of residences during the first six months of operation i.e. the 'after" survey; and
- Undertake any reasonable and feasible mitigation measures to rectify any radio and/or television reception problems attributable the wind farm i.e. a comparison of the before with the after surveys.

The Department's recommendations Nos. 68-71 address these matters.

6.11 Shadow Flicker

The EIS defines shadow flicker as "the phenomenon of alternating changes in light intensity caused by discontinuous shadow casting from rotating wind turbine blades". Shadow flicker can be an annoyance where shadows are cast on occupied areas. For example if you live very close to the turbine it may be annoying if the blades chop through the sunlight and cause a flickering or strobe effect while the blades are moving.

There are no criteria in New South Wales for shadow flicker. However, the Victorian Government's planning guidelines for wind farms states that *shadow flicker experienced at any dwelling in the surrounding area must not exceed 30 hours per year as a result of the operation of the wind energy facility*[37].

Models are available to accurately predict the probability of when and for how long there may be a flicker effect. These models compute a likely or worst case scenario where there is always sunshine, when the wind is blowing all the time, and when the wind and the turbine rotor keep tracking the sun by yawing the turbine exactly as the sun moves.

The models can be used where shadow flicker is likely to be a significant issue i.e. where there is a separation distance of less than 500 metres between the turbine and any dwelling or defined urban area[38]. The models are based on estimates of actual:

- Rotor direction as indicated from wind rose data;
- Turbine operating hours based on local wind climate; and
- Sunshine hours based on the fraction of the time the sun is shining.

The distance of the proposed Woodlawn turbines to the nearest dwelling means that shadow flicker is unlikely to raise any significant concerns i.e. the nearest dwelling to a turbine is 2.6 km.

6.12 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 development application.

The Department has assessed the DA against these heads of consideration (see Appendix A), and is satisfied that the:

- The proposal is consistent with the relevant provisions in: *Mulwaree Shire Council Local Environmental Plan 1995* (MLEP); *Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines*; *State Environmental Planning Policy No.44 – Koala Habitat Protection* (SEPP 44); *State Environmental Planning Policy No.58 – Protecting Sydney's Water Supply* (SEPP 58); *Draft Regional Plan Sustaining the Catchments – The Regional Plan for the Drinking Water Catchments and Adjacent Regional Centres;* and *Warragamba Catchment Blueprint*;
- Proposal would not result in any significant environmental or socio-economic impacts;
- Site is suitable for the proposal development; and

[37] Sustainable Energy Authority Victoria, *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria*, May 2003
[38] Plan Amendment Report by the Minister for Urban Development and Planning, *Wind Farms*, South Australia, date of Gazette 24 July 2003.

- Development is likely to be in the public interest.

7 CONCLUSION

The Woodlawn Wind Farm proposal has been presented by WWE JV as an opportunity to harness a commercial wind resource. The wind farm, as described in the EIS, would be capable of generating 140 000 MWh of electricity per year without burning fossil fuels. This represents a saving equivalent to approximately 126 840 tonnes of carbon dioxide and corresponds to the amount of electricity required to power the equivalent of 22 000 households per year.

The wind farm is located wholly within the boundary of properties owned by a member of the joint venture applicant. Consequently there is a minimum of 2.6 km between the nearest residence not part of the proposal and the closest turbine. The assessment has demonstrated that both visual impacts and noise impacts are lessened as the separation distances are increased.

The Department acknowledges that the Woodlawn Wind Farm development will become a dominant feature in visual landscape. However, the landscape is not pristine and has been modified over time by mining and agricultural land use practices. Although still predominantly rural in character, the changes that have taken place are indicative of a shift away from the pre-settlement natural landscape. This is particularly evident at the mining site where the mine void is currently operating as a landfill to generate biogas for electricity production.

Operational nose is subject to an EPL from the EPA. The EPA has issued its GTAs consistent with the SA Guidelines, the basis for noise assessment. The noise assessment identified that the proposal can meet the criteria set out in the SA Guidelines.

The Department acknowledges that visual and noise impacts are concerns for existing residents. However, the Department believes that the proposal represents a good example of a renewable energy initiative with certain greenhouse benefits. The identified adverse impacts can be mitigated to acceptable levels by the adoption of recommendations set out in this assessment report.

The Department's recommendations provide a rigorous and strict framework for the management, monitoring and reporting on the construction and operation of the Development covering:

- Visual amenity;
- Noise;
- Flora and fauna;
- Indigenous heritage;
- Soils and water quality;
- Electromagnetic interference;
- Waste management; and
- Decommissioning.

The Department is satisfied that through the application of the recommendations, which incorporate the General Terms of Approval of the DEC/EPA, Goulburn Mulwaree Council, and DIPNR and recommendations of the SCA, the environmental impacts can be adequately managed.

8 RECOMMENDATIONS

The recommendations are attached at Appendix D. The recommendations take into consideration the General Terms of Approval and other issues raised by Government agencies, Council, and land owners.

The recommendations establish a framework for implementing on-going compliance mechanisms, independent reviews and performance audits to mitigate the environmental impacts of the proposal to an appropriate and acceptable level.

The recommendations provide for environmental monitoring and impact audits, and environmental management of construction and operational issues including:
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- Road dilapidation;
- Complaints management;
- Noise;
- Soil erosion and sedimentation;
- Dust;
- Flora and fauna protection;
- Visual impacts;
- Indigenous and non-indigenous heritage;
- Electromagnetic interference;
- Waste management and recycling; and
- Decommissioning.

APPENDIX A - CONSIDERATION UNDER SECTION 79C

The following assessment is based on the matters listed for consideration under section 79C(1) of the amended *Environmental Planning and Assessment Act 1979*.

The provisions of:

(i) any environmental planning instrument;

Aim of Instrument	Relevance to Proposal
State Environmental Planning Policy No.44 – Koala Habitat Protection (SEPP 44)	
The aim of the policy is to encourage the 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. Schedule 1 of SEPP 44 identifies the local government areas to which this SEPP applies. Schedule 1 includes the land on which the wind farm is proposed (i.e. the former Mulwaree Shire).	See Section 3.5.2 in the Assessment Report.
State Environmental Planning Policy No.58 – Protecting Sydney's Water Supply (SEPP 58)	
The aim of the policy is to ensure that development in the hydrological catchment from which Sydney draws its drinking water supply does not have a detrimental impact on water quality.	See Section 3.5.4 in the Assessment Report.
***Mulwaree Local Environmental Plan 1995* (MLEP)**	
The aims of the MLEP are to promote proper management and utilisation of resources e.g agricultural lands, soils, forests, mineral deposits, trees and other vegetation important for conservation and scenic protection, water resources, places and buildings. It is also the aim to minimise the costs to the community of fragmented rural development, to provide and maintain public amenities and provide land for future urban and non-agricultural purposes.	See Section 3.5.1 in the Assessment Report.
Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines	
Need to be permissible under the Local Environmental Plan and compatible with the existing use of the subject land and surrounding land. Proposed sites not to be located within an Environmental Protection Zone as these areas have been recognised for their high landscape values and quality. Avoid areas of high environmental value such as: ▪ Lands protected under the National Parks and Wildlife Act 1974 including National Parks, reserves and other areas covered by a Conservation Agreement or Aboriginal place declaration. ▪ World Heritage Areas, other historic/heritage areas, buildings or sites. ▪ Wilderness areas identified or declared under the Wilderness Act 1987	See Section 3.1 of the assessment report. The proposal is located within the 1(a) General Rural Zone of the LEP No areas of high environment values such as those identified in this DCP are present.

	▪ Areas of National environmental significance as specified under the Environmental Protection and Biodiversity Conservation Act 1999 ▪ Areas affected by State Environmental Planning Policy No 44 – Koala Habitat	See discussion in Section 3.5.2 of the assessment report.
	Developers will: consult with NSW Department of Environment and Conservation with regard to migratory bird and bat habitat and flight path prior to undertaking their environmental assessment, and undertake the necessary assessments and document the impact and appropriate mitigation measures in the Environmental Impact Statement (EIS) or Statement of Environmental Effects (SEE) supporting the development application.	A full and detailed fauna assessment was undertaken by the Applicant in the EIS. See Section 6.2 of the assessment report.
	Consideration is to be given to Aboriginal site significance, identified heritage items and heritage conservation areas as identified in LEPs. Developers are to consult with the Local Aboriginal Community Group or Land Council and Council's heritage advisor.	A full and detailed indigenous heritage study and site survey was undertaken by the Applicant in the EIS. See Section 6.5 of the assessment report.
	Noise amenity impact upon nearest existing or proposed dwelling is not to exceed 5dBA above ambient background noise or an absolute level of 35 dB(A), whichever is greater (South Australian EPA Wind Farms Environmental Noise Guidelines, as referred to by the NSW Department of Environment and Conservation (EPA division) and Department of Infrastructure, Planning and Natural Resources). Notwithstanding, the minimum setback of towers from residential development shall be 350m.	The proposal conforms to the South Australian noise guidelines and has received General Terms of Approval from the EPA for noise licensing. The nearest resident is located 2.6 km from the nearest tower.
	To minimise visual impact, avoid locations where turbines are seem by many people. To this end towers are not to protrude beyond ridgelines within view of land zoned 2, 1(b) or 1(c) under the Goulburn LEP 1990, or zoned 2(v), 1(b) or 1(c) under the Mulwaree LEP 1995. Similarly, the visual impact of new transmission lines must be evaluated.	A full visual assessment was undertaken in the EIS. See Section 6.1 of the assessment report.
	Avoid landing strips and airport facilities especially aircraft flight paths. The Civil Aviation Safety Authority is to be consulted about the need for warning lights on tower. This is a mandatory requirement for development over 110m in height.	The matter was addressed in the EIS. See Sections 5.3 and 6.9 of the assessment report.
	Proposed sites located outside areas identified for future development in LEPs (e.g. urban land release areas, extractive resource).	Mulwaree Shire Council's Settlement Strategy document dated November, 2003 did not identify any future higher density settlement outside of the existing 40 hectare minimum sub-division for this area.
	Site access and road construction will lead to noise, dust and interference with watercourses and vegetation. A total management plan including water management (neutral or beneficial test), road design and management of ecologically sensitive areas needs to be properly addressed and presented to Council as part of the DA and finalised as part of the Construction Certificate application.	These matters were addressed in the EIS. See Sections 6.3 and 6.4 of the assessment report.

Threatened Species Conservation Act 1995		
	The TSC Act aims to conserve and protect threatened species, populations and ecological communities of flora and fauna, and to promote their recovery. The provisions of the TSC Act require that if a threatened species is identified, the proposal should be assessed under Section 5A of the EP&A Act (Assessment of Significance) to determine whether the proposal is likely to have a significant effect on threatened species, populations and ecological communities, and their habitats.	See Section 3.6.2 in the Assessment Report.

Rivers and Foreshores Improvement Act 1948		
	The RFI Act provides for the protection of land and adjoining water bodies in NSW. The DIPNR administers the RFI Act. Any person who excavates or removes material from 'protected land'[39] or does anything likely to interfere with the flow of 'protected waters' must first obtain a permit from the DIPNR under Part 3A of the RFI Act.	See Section 3.6.3 in the Assessment Report.

Protection of the Environment Operations Act 1997		
	The POEO Act regulates pollution control and waste disposal in NSW. The DEC, formerly the Environment Protection Authority (EPA), administers the POEO Act. Section 48 of the POEO Act requires activities listed under Schedule 1 (i.e. Schedule of EPA licensed activities) to require an Environmental Protection Licence (EPL) from the EPA.	See Section 3.6.4 in the Assessment Report.

National Parks and Wildlife Act 1974		
	The NPW Act provides the basis for legal protection of all material relating to the past Aboriginal occupation. Consent is required from the National Parks and Wildlife Service under Section 90 of the NPW Act prior to destroying, defacing or damaging an Aboriginal object. The NPW Act also establishes administrative procedures for archaeological investigations and the mandatory reporting of the discovery of Aboriginal sites.	See Section 3.6.5 in the Assessment Report.

Roads Act 1993		
	Consent is required for certain actions in relation to public and classified roads including disturbing the surface of a public road under Section 138 of the Roads Act.	See Section 3.6.6 in the Assessment Report.

(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;

Draft Regional Plan Sustaining the Catchments – The Regional Plan for the Drinking Water Catchments and Adjacent Regional Centres was exhibited between March 2004 and July 2004. See Section 3.5.5 in the Assessment Report.

(iii) any development control plan;

[39] Includes land that is the bank, shore or bed of protected waters or is not more than 40 m from the top of the bank, shore, or bed of protected waters.

See discussion above under heading entitled "Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines"

(iv) any matters prescribed by the regulations that apply to the land to which the development application relates.

None.

(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,

Natural Environment

Refer to Section 6 of the Assessment Report.

Built Environment

Refer to Section 6 of the Assessment Report.

Social and Economic Impacts

Section 2.2 of the Assessment Report discusses the justifications associated with proposal including the saving in greenhouse gas emissions and principles of ecologically sustainable development which have potentially broad environmental benefits. The proposed wind farm will also create up to 60 full time jobs during the 12 month construction period with 3 to 4 permanent jobs during the anticipated 25 year operation.

Impacts on Amenity

Some residents will receive visual impacts. This has been assessed in Section 6.1 of the Assessment Report.

Overall, the upgrade is expected to have a positive social and economic impact on the locality.

(c) the suitability of the site for the development,

The Assessment Report did not identify any reason to suggest that the site was not suitable for the proposed development.

(d) any submissions made in accordance with this Act or the regulations,

Issues raised by the government authorities, the Council, and in submissions made by the public are discussed in Section 4 of the planning report and summarised in Appendix B.

It is considered that all the issues in these submissions have been satisfactorily addressed, and that there are no outstanding issues that would preclude the granting of development consent with conditions.

(e) the public interest.

The proposal is clearly in the broader public interest because of the overall greenhouse gas savings and the positive contributions this makes towards global warming. The potential adverse impacts are relatively small and largely confined within the boundary of the Applicant's property. Those aspects of the proposal which could potentially contribute to off-site impacts are controllable within a framework of construction and operational management plans and other mitigation measures identified in the Department's recommendations.

APPENDIX B - SUMMARY OF SUBMISSIONS

GOVERNMENT AUTHORITIES/COUNCILS

No.	Authority	Issues Raised
7	Sydney Catchment Authority	▪ Satisfied that the proposal can be designed, constructed and operated to contain its water quality impacts on-site. ▪ Recommended conditions to any approval to address soil and water quality management, grazing management, and human wastewater management.
8	Department of Infrastructure, Planning and Natural Resources	▪ EIS lacks details on where and what watercourse crossings will need Part 3A Permits under the *Rivers and Foreshores Improvement Act*.
11	Department of Primary Industries	▪ Identified a number of matters to be addressed in the construction and operation of the wind farm including: o Minimise tree clearing; o Restore disturbed areas; o Re-use stockpiled soils; o Control weeds; o Provided cattle grids; o Provide measures to contain spills at the substation; and o Liaise with property owners to avoid interference with farm management.
10	Goulburn Mulwaree Council	▪ No planning objections to the proposal. ▪ Council engineering staff to have input into the Traffic Management Plan. ▪ Appropriate arrangements for dismantling and decommissioning the infrastructure at the end of design life.

PRIVATE SUBMISSIONS

No.	Position	Issues Raised
1.	Object	▪ EIS is incomplete in relation to a description of the connection to the grid power. ▪ Country Energy will likely reduce the power output from the wind generators in order to maintain service standards. ▪ Impact of the proposal on migratory black swans flying between Lake Bathurst and Lake George not considered.
2.	Object	▪ Questions permissibility of the proposal within General Rural 1(a) zone of the LEP. ▪ Noise impact issues raised included the need to clarify the following:

		○ A review of the regression equations for both 1 to 20 m/s data and 4 to 20 m/s data to check for possible bias in the 4 m/s to 10 m/s range; ○ The basis for the computer wind speed input values listed in Table 5-3 of Appendix E as these values differ from those recommended by the computer model developer and seller; ○ The basis for the selection of a LA_{10} assessment rather than a LA_{95} assessment; and ○ Whether there was a tonality adjustment included in the calculations in accordance with the noise guidelines. ▪ Concerned with the likelihood of living with inescapable "hum" from the turbines. ▪ Concerned with the visual impacts particularly the lowering of the visual quality by the construction of turbines on the ridgeline. ▪ Suggested alternative colours for the turbine towers to reduce visual prominence i.e. grey or light blue. ▪ Towers will be visible from all parts of this property and not just affect the homestead.
3.	Object	▪ The proposal will reduce the rural amenity and therefore the saleability of a proposed rural residential subdivision. ▪ Unacceptable noise will be experienced on parts of the property even though the homestead will be within acceptable limits in accordance with the noise guidelines. This will affect future subdivision potential of the property. ▪ Visual assessment was only undertaken for homesteads not for other locations on individuals' properties. This has implications for future rural subdivision potential.
4.	Object	▪ Too close to an approved future residential subdivision of their land. ▪ Noise from the turbines would affect future residents of the area. ▪ Rural landscape would be adversely affected by 25 turbines on the ridgeline. ▪ Land values of approved subdivision will decrease.
5.	Object	▪ The position of the noise monitoring was not representative. ▪ Sites near the property boundary would be noise affected and this would limit any future rural subdivision. ▪ Noise stresses cattle and sheep affecting production. ▪ Turbines destroy the aesthetic values of the landscape. ▪ Property values will be less because the tranquil and scenic landscape would change and agricultural uses are less. ▪ Local population of Wedge-Tailed Eagles could be affected. ▪ Current quality of life would be adversely affected by noise and visual impacts from wind turbines.
6.	Object	▪ What compensation is available for residents affected by the proposal. ▪ No indication that one-on-one consultation was undertaken with directly affected landholders. ▪ White background for photomontages not representative. ▪ Noise at 'Torokina' greater than background 7-20% of the time. ▪ No information on vibration/low-frequency noise. ▪ Objector's house is in view but not included in 'primary visual catchment'.

		▪ Need to have funds held in reserve to meet costs of decommissioning.
9	Support	▪ Provide greenhouse pollution free power.

Appendix C - Summary of Visual Impact Assessment Criteria in Selected DCPs and Guidelines

Guideline/Instrument	Zone (Permissible)	Zone (Prohibited)	Distances	Considerations
Goulburn Mulwaree Development Control Plan No. 1 – Wind Energy Guidelines		▪ Environmental Protection Zones	▪ Minimum setback of towers from residential development is 350 metres	▪ Avoid areas of high environmental value such as o Lands protected under the NPW Act o World Heritage areas o Wilderness areas o Areas of National environmental significance under the EPBC Act o Areas affected by SEPP 44 – Koala Habitat ▪ Avoid locations where turbines are seen by many people e.g. on ridgelines within view of land zoned 2(v), 1(b), or 1(c) under Mulwaree LEP.
Wingecarribee Shire Council - Development Control Plan No 51 *Wind Energy Generation*	▪ Rural 1(a) and Rural 1(b)	▪ Environment Protection 7(a) and 7(b) ▪ Special Uses 5(c) (Catchment) ▪ Rural 1(c) (Small Holdings)	▪ Merit based	▪ Prohibited on ridge lines
Lithgow City Council – Development Control Plan No 11 *Wind Energy Generation Facilities*			▪ 500 metres from a dwelling not associated with the proposal ▪ 5 km from any Residential 2(a), 2(V), Rural 1(c) or 1(d)	▪ Not in areas identified as environmentally sensitive under the LEP ▪ Not in areas defined as the viewshed for Lithgow in DCP No 5 ▪ Merit based but generally not in areas within the viewshed of items of environmental heritage

Oberon Council – Development Control Plan Part O *Wind Power Generation 2003*	Only permissible in the Rural 1(a) zone	Not permitted in Rural 1(c) (rural residential)	▪ Monitoring towers approved under delegation and property owners within 2 km notified. ▪ Property owners within 2 km are notified for wind farm applications ▪ Not located within 1500 m from any registered Lot that has been created for the purpose of a dwelling ▪ Minimum setback from public roads of 250 m	▪ Not in areas having high scenic values
SEDA – *NSW Wind Energy Handbook*				▪ Avoid locations where turbines are seen by many people.
Western Australian Planning Commission – *Guidelines for Wind Farm Development*				▪ Prepare a landscape and visual impact statement to address: siting; layout; design; number; colour; shape; height; visibility and viewsheds; and significance and sensitivity of landscape.
Victorian Government – *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria*		▪ National Parks or land reserved under the *National Parks Act*		Assess against: ▪ Environmental Significance Overlay, ▪ Vegetation Protection Overlay; ▪ Significant Landscape Overlay; and ▪ Planning Scheme objectives; ▪ Visual impacts should be weighted having regard to Government Policy

				in support of renewable energy
DIPNR – *draft NSW Wind Energy Guidelines*				Follow principle of "prudent avoidance" of adverse impacts. Site wind farms away from towns and villages, major roads, airport facilities and the habitat of migratory birds.
Draft Upper Lachlan DCP			The development shall not be ▪ located within 12.5 times the blade tip height of any dwelling not associated with the development where visible from a non related dwelling or immediate surrounds, or ▪ 12.5 times the blade tip height from any lot that has been created for the purpose of a dwelling. ▪ 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. ▪ located within two times the height of the turbine	▪ Where turbines are proposed to be significantly higher than such properties/dwellings or where the turbines will dominate the immediate view from the dwelling or dwelling lot, increasing these separation distances is recommended. ▪ Turbine locations shall be located sensitive to non related dwellings surrounding the development. ▪ 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. ▪ Turbine locations should not surround a non related property.

			(including the tip of the blade) from a non related property boundary.	

Appendix D

Recommendations[40]

In these recommendations, 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	Woodlawn WindEnergy Joint Venture (WWE JV)
AHD	Australian Height Datum
BCA	Building Code of Australia
CASA	Civil Aviation Safety Authority
Commissioning	Commencement of testing and connection of any individual turbine(s) and may include concurrent on-going construction activities
CEMP	Construction Environmental Management Plan
Construction	Any activity requiring a Construction Certificate, the laying of a slab or significant excavation work
Councils	Goulburn Mulwaree Council and Palerang Council
dB(A)	Decibel (A-weighted scale)
Department	NSW Department of Planning
DEC	NSW Department of Environment and Conservation (incorporates the former NSW Environment Protection Authority and National Parks and Wildlife Service)
Development	The development to which this Consent applies, the scope of which is described in the documents listed under Condition No. 2 of this Consent
Director General	Director General of the NSW Department of Planning, or delegate
Dust	Any solid material that may become suspended in air or deposited
EIS	*Woodlawn Wind Farm Environmental Impact Statement* (Volumes 1 & 2) prepared by URS, dated September 2004 and as revised by a report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm* prepared by URS, dated 11 February 2005
EPA	NSW Environment Protection Authority (now incorporated into the DEC)
EPL	Licence issued under the *Protection of the Environment Operations Act, 1997*
ER	Environmental Representative
$L_{Aeq(10\text{-}minute)}$	Equivalent average sound pressure level that is measured over a 10 minute period
Lin Peak	Linear Peak
Minister	NSW Minister for Planning, or delegate
OEMP	Operational Environmental Management Plan

[40] The Recommendations have been drafted as if adopted as Conditions to any consent.

Operation	Within three months of the commencement of Commissioning, unless otherwise agreed to by the Director General
Premises	Sub-areas of the Site, as consistent with the relevant DEC/EPA EPL.
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
Publicly Available	Available for inspection by a member of the general public (for example available on an internet site or at a display centre)
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	Department of Natural Resources, Lands Department, Sydney Catchment Authority
RFS	Rural Fire Service
RTA	Roads and Traffic Authority
SA Guidelines	The South Australian Environmental Protection Authority's *Wind Farms: Environmental Noise Guidelines* (2003)
SCA	Sydney Catchment Authority
Site	The land to which this Consent applies

Recommendations
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GENERAL CONDITIONS

Obligations to Minimise Harm to the Environment

1 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

2 [41]The Applicant shall carry out the development generally in accordance with the following documents:

(a) Development Application No. DA-250-10-2004-i lodged with the Department of Infrastructure, Planning and Natural Resources on 1 October 2004;
(b) *Woodlawn Wind Farm Environmental Impact Statement* (Volumes 1 & 2) prepared by URS, dated September 2004 and as revised by a report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm* prepared by URS, dated 11 February 2005;
(c) *Woodlawn Wind Farm Noise Assessment* prepared by Wilkinson Murray (Report No. 04098, Version B), dated September, 2004;
(d) Letter from URS – Woodlawn Wind Farm Development Application (DA 250-10-2004-i) "Stop the Clock Response" (25 January 2005);
(e) Letter from Wilkinson Murray Acoustical Consultants – Woodlawn Wind Farm – Clarification of DEC Issues (17 January 2005);
(f) *Raptor and Waterbird Movements at Woodlawn Wind Farm Site* – a report prepared for the Applicant by URS dated 8 February 2005
(g) *Targeted Reptile Search at Woodlawn Wind Farm* – a report prepared for the Applicant by URS dated 15 November 2004;
(h) *An Assessment of the Bat Fauna at the Proposed Woodlawn Wind Farm, NSW* – a report prepared by Greg Richards and Associates Pty Ltd, dated April 2005; and
(i) The Conditions of Consent.

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

Statutory Requirements

3 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. None of the Conditions of Consent removes the obligation for the Applicant to obtain, renew or comply with such licences, permits or approvals.

[41] Incorporates DEC General Terms of Approval A1.1

Dispute Resolution

4 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 Act provides mechanisms for resolution of disputes between the Department, the Director General, councils and public authorities.

Provision and Protection of Public Infrastructure

5 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: Note: The Applicant must ensure that all works are carried out in accordance with the Act, the Regulation, the *Local Government Act 1993 (Approvals) Regulations*, and the BCA.

Compliance

General

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

7 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.

8 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.

Pre-Construction Compliance Report

9 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 details of:

(a) how the Conditions of Consent required to be addressed prior to construction have been complied with;

(b) when each relevant condition of this Consent was complied with, including submission dates of any required report and/or approval dates; and
(c) any approvals or licences required to be issued by relevant Government Agencies prior to the commencement of construction.

Construction Compliance Report

10 The Applicant must provide the Director General with a *Construction Compliance Report* within six weeks of the end of the first six months of construction (or at any other time interval agreed to by the Director General). The Environmental Representative must certify the adequacy of the report before it is submitted to the Director General. The *Construction Compliance Report* must be made publicly available and include:

(a) information on compliance with the CEMP and the Conditions of Consent;
(b) information on compliance with any approvals or licences issued by Relevant Government Agencies for Construction;
(c) information on 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.

Pre-Operation Compliance Report

11 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 details of:

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

Construction and Part 4A Certification

12 Prior to the commencement of Construction, the Applicant must erect at least two signs 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 Act, the Regulation, the *Local Government Act 1993 (Approvals) Regulations*, and the BCA.

Environmental Monitoring

General Monitoring Requirements

13 [42]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 EPL for the Development.

14 [43]The results of any monitoring required under this Consent must be:

(a) recorded and maintained 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.

15 [44] 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, if relevant, a description of the DEC identification point); and
(d) the name and qualifications of the person who collected the sample.

Environmental Impact Audits

Environmental Impact Audit Report – Construction

16 An *Environmental Impact Audit Report - Construction* 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. The Director General may request the Applicant to make the construction audit report available to other Relevant Government Agencies. The *Environmental Impact Audit Report - Construction* 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

[42] Incorporates Department of Environment and Conservation General Terms of Approval M1.1
[43] Incorporates Department of Environment and Conservation General Terms of Approval M1.2
[44] Incorporates Department of Environment and Conservation General Terms of Approval M1.3

(d) discuss the lessons learned during Construction, including recommendations for future wind farm developments.

Environmental Impact Audit Report - Operation

17 An *Environmental Impact Audit Report - Operation* 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. The Director General may request the Applicant to make the operation audit report available to other Relevant Government Agencies and Council. The *Environmental Impact Audit Report - Operation* 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 2;
(c) assess the effectiveness of implemented mitigation measures and safeguards;
(d) assess compliance with the systems for operation maintenance and monitoring; and
(e) discuss the results of consultation with the local community particularly any feedback or complaints.

The results of the audit report must also be used to update the OEMP where necessary. The Applicant must notify the Director General, Relevant Government Agencies and Council of any updates to the OEMP and provide a copy on request.

Annual Performance Reporting

18 [45]The Applicant must provide an annual return to the DEC in relation to the development as required by any EPL. In the annual return, the Applicant must:

(a) provide a summary of complaints relating to the development; and
(b) report on compliance with EPL conditions.

ENVIRONMENTAL MANAGEMENT

Construction Hours

19 [46]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 Premises;
(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.

[45] Incorporates Department of Environment and Conservation General Terms of Approval R1.1
[46] Incorporates Department of Environment and Conservation General Terms of Approval L7.1 and L7.2

Any work undertaken outside the specified construction hours, other than those specified in (a) – (c) of this Condition No. 19, must not be undertaken without prior consent of the DEC.

Blasting and Vibration

20 [47]The airblast overpressure level from blasting in or on the Premises must not exceed:

(a) 115dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
(b) 120dB (Lin Peak) at any time.

21 [48]The ground vibration peak particle velocity from blasting operations carried out in or on the Premises must not exceed, when measured at any point within 1 metre of any affected residential boundary or other noise sensitive location:

(a) 5mm/s for more than 5% of the total number of blasts carried out on the Site during each reporting period; and
(b) 10mm/s at any time.

22 [49]Blasting operations on the Premises may only take place:

(a) between 9:00am and 5:00pm Monday to Friday inclusive and between 9:00am and 1:00pm Saturday; and
(b) at such other times or frequency as may be approved by the DEC.

Environmental Representative

23 Prior to the commencement of Construction, the Applicant must nominate a suitably qualified and experienced Environmental Representative(s) (ER) whose appointment requires the approval of the Director General. The Applicant must employ the ER(s) on a full-time basis, or as otherwise agreed by the Director General, during the Construction, and Commissioning. An ER must also be employed during Operation. The ER 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 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.

[47] Incorporates Department of Environment and Conservation General Terms of Approval L8.1.
[48] Incorporates Department of Environment and Conservation General Terms of Approval L8.2.
[49] Incorporates Department of Environment and Conservation General Terms of Approval L8.3.

The Applicant must obtain approval from the Director General for changes to the appointment of the ER during Construction. The Applicant must notify the Director General of any changes to the appointment during Operation.

Greenhouse and Energy Management Strategy

24 A *Greenhouse and Energy Management Strategy* must be prepared to ensure the use of non-renewable *resources* from Construction and Operation is minimised. The strategy must incorporate the mitigation measures identified in Section 19.4 of the EIS.

Air Quality Management Strategy

25 [50]An *Air Quality Management Strategy* must be prepared to control Dust and air emissions resulting from Construction and Operation. The strategy must incorporate the mitigation measures identified in Section 18.5 of the EIS.

Construction Environmental Management Plan

26 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 (see in particular Section 22 of the EIS) and its attachments, and in these Conditions of Consent are incorporated into the CEMP and that the CEMP is Publicly Available.

The CEMP must be prepared in consultation with the Relevant Government Agencies and Councils, and certified by the ER 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.

27 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 CEMP to the DEC, SCA and Councils as soon as practicable.

Traffic and Transport Management Sub Plan

28 As part of the CEMP, a *Construction Traffic and Transport Management Sub Plan* must be prepared in consultation with Goulburn Mulwaree Council[51], the RTA and NSW Police. The sub plan must:

(a) include the mitigation measures outlined in Section 14.6 of the EIS;
(b) identify designated transport routes for heavy vehicles to the Development Site;
(c) include measures to minimise traffic disruption through Goulburn and in the vicinity of the Development Site;
(d) include measures to minimise disturbance from traffic noise;

[50] Incorporates Department of Environment and Conservation General Terms of Approval O4.1.
[51] Incorporates Goulburn Mulwaree Council's GTA No. 3.

(e) include measures 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) include a community information program to inform the community of traffic disruptions resulting from the construction program; and
(g) outline a complaints management procedure for traffic impacts.

Flora and Fauna Management Sub Plan

29 A *Flora and Fauna Management Sub Plan* must be prepared as part of the CEMP. The sub plan must be prepared in consultation with the DEC and Council and include:

(a) plans showing terrestrial vegetation communities; important flora and fauna habitat areas; 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:
  i procedures for vegetation clearing, soil management and minimising other habitat damage (terrestrial and aquatic) during Construction;
  ii methods to protect vegetation both retained within, and also adjoining, the Development from damage during Construction;
  iii a habitat tree management program including fauna recovery procedures and habitat maintenance (e.g. relocating hollows or installing nesting boxes);
  iv where possible, and where consistent with DEC requirements, strategies for re-using in rehabilitation works individuals of any threatened plant species that would be otherwise be destroyed by the Development;
  v performance criteria against which to measure the success of the methods;
(c) rehabilitation details including:
  i 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;
  ii 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 within the Development Site should be collected before Construction commences to provide seed stock for revegetation;
  iii methods to re-use topsoil (and where relevant subsoils) and cleared vegetation;
  iv measures for the management and maintenance of all preserved, planted and rehabilitated vegetation (including aquatic vegetation);
(d) the mitigation measures outlined in:
  i Table 11.9 of the EIS;
  ii Section 5 of the report entitled *Raptor and Waterbird Movements at Woodlawn Wind Farm Site*, as identified in Condition No. 2(f)*;*
  iii Table 5.1 of the report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm*, as identified in Condition No. 2(b)*;*
  iv Section 5 of the report entitled *Targeted Reptile Search at Woodlawn Wind Farm*, as identified in Condition No. 2(g); and

v the section headed *Recommendations* of the report entitled *An Assessment of the Bat Fauna at the Proposed Woodlawn Wind Farm, NSW*, as identified in Condition No. 2(h).

(e) a Weed Management Strategy including:
   i identification of weeds within the Development Site and adjoining areas;
   ii weed eradication methods and protocols for the use of herbicides;
   iii methods to treat and re-use weed infested topsoil;
   iv 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.

Construction Soil and Water Quality Management Sub Plan

30 A *Construction Soil and Water Management Sub Plan* must be prepared as part of the CEMP. The sub plan must be prepared in consultation with Relevant Government Agencies and Councils. The sub plan must:

(a) include, where appropriate, fencing of access tracks, turbines and the substation;
(b) incorporate the mitigation measures identified in Sections 16.6 and 17.5 of the EIS;
(c) incorporate the mitigation measures identified in Table 5.1 of the report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm;*
(d) where relevant, be consistent with the Department of Housing's guideline *Managing Urban Stormwater - Soils and Construction*, the RTA's *Guidelines for the Control of Erosion and Sedimentation in Roadworks*, the DIPNR *Constructed Wetlands Manual* and Landcom's manual entitled *Soils and Construction Managing Urban Stormwater* (2004);
(e) identify the Construction activities that could cause soil erosion or discharge sediment or water pollutants from the Development Site;
(f) describe management methods to minimise soil erosion or discharge of sediment or water pollutants from the Development Site including a strategy to minimise the area of bare surfaces during Construction;
(g) describe the location and capacity of erosion and sediment control measures;
(h) identify the timing and conditions under which Construction stage controls will be decommissioned;
(i) include contingency plans to be implemented for events such as fuel spills; and
(j) identify how the effectiveness of the sediment and erosion control system will be monitored, reviewed and updated.

31 [52]An appropriately qualified soil scientist must be consulted according to a schedule identified in the sub plan required in Condition No. 30 to:

(a) undertake inspections of temporary and permanent erosion and sedimentation control devices;
(b) ensure that the most appropriate controls are being implemented;
(c) check that controls are being maintained in an efficient condition; and
(d) check that controls meet the requirements of any relevant approval and/or licence condition.

[52] Incorporates the Department of Natural Resource's GTA requirements.

32 [53]The Applicant must submit a Part 3A permit application under the *Rivers and Foreshores Improvement Act* to the Department for the four crossings located at chainages 2880, 4330, 5270, and 5910 as shown on URS Australia Ltd Drawings CO-602, CO-603, and CO-604 (Revisions A), dated 7/2/05, at least one month prior to the works commencing, and include the following design details:

(a) full cross-section and long sectioned design detail including drawings of the four culverts;
(b) full cross-section and long section detail of the existing creek line for a distance of 20 metres both upstream and downstream of each of the four culverts;
(c) full cross-section and long section detail of the creek bed/bank stabilisation works at either/or the upstream entry/outlet points of flow into or exiting from each of the culverts; and
(d) details on any remediation/stabilisation works (including revegetation) of disturbed areas adjoining the culvert crossing and road construction works.

Operation Environmental Management Plan

33 The Applicant must prepare and implement an *Operation Environmental Management Plan* (OEMP) 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 (see in particular Section 22 of the EIS) and its attachments, and in these Conditions of Consent are incorporated into the OEMP and that the OEMP is Publicly Available. The OEMP must be prepared in consultation with the Relevant Government Agencies and Council, and must be certified by the ER 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.

34 Operation must not commence until written approval of the OEMP 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, SCA and Councils as soon as practicable.

Operation Flora and Fauna Management Sub Plan

35 An *Operation Flora and Fauna Management Sub Plan* must be prepared as part of the OEMP. The sub plan must include:

(a) plans showing terrestrial vegetation communities, important flora and fauna habitat areas, areas to be protected, and areas to be planted;
(b) methods for managing flora and fauna and their habitats which are directly or indirectly affected by the Development;
(c) the mitigation measures outlined in:
    i Table 11.9 of the EIS;
    ii Section 5 of the report entitled *Raptor and Waterbird Movements at Woodlawn Wind Farm Site*, as identified in Condition No. 2(f)*;*
    iii Table 5.1 of the report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm*, as identified in Condition No. 2(b)*;*
    iv Section 5 of the report entitled *Targeted Reptile Search at Woodlawn Wind Farm*, as identified in Condition No. 2(g);

[53] Incorporates the Department of Natural Resource's GTA requirements.

v the section headed *Recommendations* of the report entitled *An Assessment of the Bat Fauna at the Proposed Woodlawn Wind Farm, NSW*, as identified in Condition No. 2(h); and

(d) strategies to control the spread of weeds during Operation.

Operation Soil and Water Management Sub Plan

36 An *Operation Soil and Water Management Sub Plan* must be prepared as part of the OEMP. The sub plan must incorporate the mitigation measures identified in the Sections 16.6 and 17.5 of the EIS and Table 5.1 of the report entitled *Assessment of Revised Transmission Line Option: Woodlawn Wind Farm*.

Bird and Bat Adaptive Management Program

37 A *Bird and Bat Adaptive Management Program* must be prepared as part of the OEMP and undertaken by a suitably qualified expert approved by the Director General and must:

(a) incorporate monitoring, and a decision matrix that clearly describes how the Applicant will respond to the outcomes of monitoring;
(b) incorporate an on-going role for the suitably qualified expert;
(c) set out monitoring techniques, taking into account best practice bird and bat monitoring methods for wind farms such as those 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*;
(d) 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 waterbodies;
(e) incorporate a decision making framework that sets out specific actions and when they may be required, to reduce identified impacts on birds and bats;
(f) identify 'at risk' bird and bat groups and include monthly censuses of their movements; and
(g) set out available mitigation measures including, but limited to, those identified in Condition No. 35(c).

38 The Applicant must prepare annual reports commencing 12 months from the start of Operation describing the activities undertaken within the *Bird and Bat Adaptive Management Program*. The reports must be prepared within 2 months of the end of the reporting period and be provided to the Director General. The reports must address the:

(a) outcomes of monitoring;
(b) application of the decision making framework;
(c) need for mitigation measures;
(d) progress with implementation of mitigation measures; and
(e) effectiveness of the mitigation measures.

39 The Applicant must implement all Reasonable and Feasible mitigation measures where the need for further action is identified through the *Bird and Bat Adaptive Management Program.*

Off-Site Landscape Sub Plan

40 As part of the OEMP the Applicant must develop and implement an *Off-Site Landscape Sub Plan* to address visual impacts of the proposed development for any owner of an existing or approved residential dwelling with views of turbine(s) located within four kilometres of their dwelling. The Applicant must notify in writing all owners of a residential dwelling with views of turbines located within four kilometres of their residential dwelling, prior to the commencement of Commissioning. These owners may request, no later than six months after commencement of Operation, inclusion of their property in the *Off-Site Landscape Sub Plan*. The Applicant must implement all Reasonable and Feasible requirements for landscape works to provide screening from the turbines. The sub plan is to be fully implemented within 18 months of the commencement of Operation.

COMMUNICATION AND CONSULTATION

Information on the Development

41 The Applicant must make all documents relevant to this Consent, with the exception of that information that may be legitimately claimed is of a confidential commercial nature, Publicly Available at a location on the Development Site convenient for inspection by visitors.

42 The Applicant must establish an internet web site before Construction commences and maintain the internet web site until Construction ends. This internet web site must:

(a) indicate the date of the last update and the frequency of the internet web site updates;
(b) contain periodic updates of work progress, consultation activities and planned work schedules;
(c) be updated within one working day where significant changes in noise or traffic impacts are anticipated;
(d) identify relevant approval authorities and their areas of responsibility;
(e) include a list of reports and plans that are Publicly Available under this Consent and details of how these can be accessed;
(f) include the contact names and phone numbers of relevant communications staff; and
(g) include the 24 hour complaints contact telephone number.

43 The Applicant must ensure that the local community and businesses are advised of Construction activities that could cause disruption. Methods to disseminate this information must be identified in the CEMP. Information to be provided must include:

(a) details of any traffic disruptions and controls;
(b) construction of any temporary detours; and
(c) work approved to be undertaken outside the normal Construction hours, in particular noisy works, before such works are undertaken.

Complaints Management System

44 Prior to the commencement of Construction, the Applicant must ensure that the following is available for the life of the Development:

(a) a postal address to which written complaints may be sent;

(b) an e-mail address to which electronic complaints may be transmitted; and
(c) a 24-hour telephone contact line. This must provide for:
    i [54]complaints about operations associated with the development on the Development Site to be followed-up by the DEC with the licensee or a representative of the licensee who can respond at all times to incidents relating to individual premises; and
    ii construction and operational complaints associated with the Development to be registered by the community.

45 The Applicant must keep a legible record of all complaints received in an up-to-date Complaints Register. The Complaints 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 e-mail);
(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 Department or an authorised officer of the DEC. The record of a complaint must be kept for at least four years after the complaint was made.

VISUAL AMENITY

General

46 The Applicant must implement the landscape and visual mitigation measures identified in Table 9.5 of the EIS.

Signs

47 No advertising or signs are to be mounted on the turbines or placed on the Development Site, except where required for safety purposes. A corporate logo may be placed on the turbines providing it is not distinguishable by the naked eye from any publicly accessible location or from any non associated properties. Appropriately sized information boards are also permitted to be erected at the viewing platform.

Lighting

48 There must be no external night lighting of infrastructure associated with the Development, including the wind turbines, other than low intensity security lighting, unless otherwise agreed by the Director General or required by CASA.

[54] Incorporates Department of Environment and Conservation General Terms of Approval G2.1

NOISE

Operational Noise Criteria

49 [55]Noise generated from the Development must not exceed at the identified properties the equivalent noise level ($L_{Aeq, 10}$) adjusted for any tonality as presented in the table below.

10m (height)wind speed (m/s)	Noise level $L_{Aeq\ (10\ minute)}$ – 24 hours a day			
	Property described in the EIS as Kildare	Property described in the EIS as Glendale	Property described in the EIS as Bonnie Doon	Property described in the EIS as Torokina
2	35	35	35	35
3	35	35	35	35
4	35	35	35	35
5	35	35	35	35
6	35	35	35	35
7	35	35	35	36
8	36	35	35	37
9	36	35	35	38
10	37	36	35	39
11	38	36	35	39
12	38	37	35	40
13	39	37	35	41
14	39	38	35	41
15	40	39	36	42

50 [56]The noise limits applied to the four properties identified in Condition No. 49 must be applied to all residences that were identified as being 'representative' as described in Section 2, Volume 2 of the EIS.

51 [57]Noise from the Premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits set out in the table at Condition No. 49.

52 [58]The modification factors presented in Section 4 of the *New South Wales Industrial Noise Policy* (NSW EPA, January, 2000), must be applied to the measured noise level where applicable.

Noise Compliance Monitoring During Operation

53 [59]The Applicant must prepare a *Noise Compliance Assessment Plan* which must be submitted to and approved by the DEC prior to Commissioning of the wind turbines. The *Noise*

[55] Incorporates Department of Environment and Conservation General Terms of Approval L6.1 and L6.4.
[56] Incorporates Department of Environment and Conservation General Terms of Approval L6.2.
[57] Incorporates Department of Environment and Conservation General Terms of Approval L6.4.
[58] Incorporates Department of Environment and Conservation General Terms of Approval L6.3.
[59] Incorporates Department of Environment and Conservation General Terms of Approval S2.

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Compliance Assessment Plan must outline how the *Noise Compliance Assessment,* as described in Conditions Nos. 54-55, will be undertaken.

54 [60]The *Noise Compliance Assessment* must include, but not be limited to:

(a) a commitment that noise compliance monitoring must be undertaken within three calendar months of the commissioning of the wind turbines. If prevailing meteorological conditions do not allow the required monitoring to be undertaken in this period, the DEC must be notified and an extension of time may be sought;
(b) a requirement that all noise compliance monitoring results are to be submitted to the DEC within one month of completion of the monitoring. The DEC may request that additional noise compliance monitoring be undertaken and completed within a timeframe defined by the DEC;
(c) a demonstration that wind measurements at the proposed wind monitoring station *Woodlawn 15* is consistent with the *Woodlawn 2* wind monitoring station; and
(d) an assessment of the performance of the wind farm against the noise limits contained in Condition No. 49.

55 [61] [62]In the event that the *Noise Compliance Assessment* indicates that noise from the wind turbines exceeds the noise limits contained in Condition No. 49, the Applicant must investigate and propose the mitigation and management measures that are available to achieve compliance with the noise limits. The *Noise Compliance Assessment* must be undertaken in accordance with the procedures presented in the *SA Guidelines*.

Note: The data obtained using the compliance assessment procedures outlined in the SA Guidelines should be used to establish the noise levels contributed by the wind farm. The DEC will also consider other predictive compliance assessment techniques where these techniques can be justified. Although not directly applicable to wind farms, the NSW Industrial Noise Policy (INP) may provide additional guidance on predictive compliance assessment techniques.

Noise Mitigation – Vacant Lots

56 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 of Consent does not apply to any potential future subdivision(s) that may be approved after the date of this Consent.

HERITAGE

Indigenous Heritage Management

57 A *Cultural Heritage Management Sub Plan* must be prepared as part of the CEMP. The sub plan must incorporate the mitigation measures identified in Section 8.0 of the report entitled

[60] Incorporates Department of Environment and Conservation General Terms of Approval S1.1, S1.2, S1.3(a & c), and S1.5.
[61] Incorporates Department of Environment and Conservation General Terms of Approval S1.3(b).
[62] Incorporates Department of Environment and Conservation General Terms of Approval S1.4.

Archaeological sub-surface testing of the proposed Woodlawn wind farm, Tarago, New South Wales, dated July 2005.

58 The Applicant must implement the General Terms of Approval provided by the DEC and reproduced in Attachment A to these Conditions of Consent.

Historical Relics

59 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 re-commencement of work in the vicinity of the item.

MISCELLANEOUS REQUIREMENTS

Spoil and Fill Management

60 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*.

Road Dilapidation Report

61 Road dilapidation reports must be prepared for the construction route where it passes along Cowper Road, Clinton Street, Blackshaw Road, Braidwood Road and Bungendore Road to the Collex Intermodal Terminal. These reports must be prepared before Construction commences and after Construction is complete. Copies of the reports must be provided to the relevant roads authority. Any damage resulting from Construction traffic, except that resulting from normal wear and tear, must be repaired at the Applicant's cost. Alternatively the Applicant may negotiate an alternative arrangement for road damage with the relevant roads authority.

Aviation

62 Details of the construction timetable are to be submitted to CASA prior to the commencement of Construction.

63 The following details are to be submitted to CASA prior to the commencement of Operation:

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

64 In the event that required aerial weed control is restricted on any property surrounding the Development Site due to the location of turbines, the Applicant must fully fund the cost difference between aerial weed spraying and a reasonable alternative weed control method in the restricted area.

Hazards

Bushfire Risk

65 As part of the Construction and Operation EMPs, the Applicant must prepare, in consultation with the Taylors Creek Rural Fire Service, a *Bushfire Risk Management Sub Plan* based on the guidelines *Planning for Bushfire Protection* (RFS, 2001 or its latest edition). The sub plan must include:

(a) details of the bushfire hazards and risks associated with the Development;
(b) mitigation measures including contingency plans;
(c) procedures and programs for liaison and regular drills with the Taylors Creek Rural Fire Service; and
(d) procedures for regular fire prevention inspections by the Taylors Creek Rural Fire Service and implementation of any recommendations.

66 The Applicant must implement the measures identified in Sections 20.5.1 and 20.5.2 of the EIS.

Safety Management System

67 At least two months prior to Commissioning, the Applicant must prepare a report outlining a comprehensive *Safety Management System*, covering all on-site systems related to ensuring the safe Operation. The report must clearly specify all safety related procedures, responsibilities and policies, along with details of mechanisms for ensuring adherence to the procedures. 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 Development; and
(b) an outline of a documented procedure for the management of change.

Electromagnetic Interference

Television Interference

68 Prior to the erection of any wind turbine on the Development Site, the Applicant must advise in writing, any owner of a residential dwelling located within five kilometres of a proposed wind turbine that an assessment of potential television interference is available to them. If requested by the owner, the Applicant must:

(a) undertake an assessment of the existing quality of television reception; and
(b) reassess the electromagnetic interference to television reception during the first six months of Operation.

Any reassessment must be conducted within three months of a request being made. Residential dwellings located on the Development Site are not included in this condition.

69 The Applicant must undertake any Reasonable and Feasible mitigation measures, at its own expense, to rectify any television reception problems identified in the reassessment conducted under Condition No. 68 and attributable to the Development, including but not limited to:

(a) improving the existing antenna system;
(b) installing and maintaining a parasitic antenna system;

(c) installing and maintaining an alternative television connection such as a satellite receiving antenna; and
(d) providing a land line between the affected receiver and an antenna located in an area of favourable reception.

Radio Communication

70 Prior to the erection of any wind turbine on the Development Site, the Applicant must advise in writing the operator(s) of any two-way, fixed radio links crossing the Development Site that, at the request of the operator, the Applicant must:

(a) undertake an assessment of the existing quality in consultation with the operator(s); and
(b) reassess the electromagnetic interference to radio reception during the first six months of Operation.

Any reassessment must be conducted within three months of a request being made.

71 The Applicant must undertake any Reasonable and Feasible mitigation measures, at its own expense, to rectify any radio reception problems identified in the reassessment conducted at Condition No. 70 and attributable to the Development, including but not limited to:

(a) modifying the existing aerial;
(b) installing a directional antenna; and
(c) installing an amplifier to boost the signal.

Community Contributions

72 Prior to the commencement of any construction works the subject of this consent, payment of a contribution totalling $17 200 covering the amount owing for proposed development, shall be made to Goulburn Mulwaree Council, in accordance with the provisions of Section 94 of the Act.

This amount will be reviewed annually, in accordance with the rates applicable in the current version/edition of the relevant Section 94 Plan, based on CPI movements (March to March) with any movement effective from 1 July.

Waste Management and Recycling

73 As part of the Construction and Operation EMPs the Applicant must prepare *Waste Management and Re-use Sub Plan(s)*. The sub plan(s) must address the management of wastes during the Construction and Operation stages respectively in accordance with the NSW Government's Waste Reduction and Purchasing Policy. The sub plan(s) must identify requirements for:

(a) the application of the waste minimisation hierarchy principles of avoid/reduce/re-use/recycle/dispose;
(b) minimising the volume of wastewater produced and include, as a minimum, a commitment to install AAA-rated water conservation devices in the control room/facilities building;
(c) waste handling and storage. The human wastewater management system is to be designed in consultation with the SCA and according to the guidelines entitled *On-site*

Sewage Management for Single Households and the AS/NZS 1547-2000 - On-site Domestic Wastewater Management;

(d) disposal of wastes. Specific details must be provided for cleared vegetation, contaminated materials, glass, metals and plastics, hydrocarbons (lubricants and fuels) and sanitary wastes; and

(e) any waste material that is unable to be re-used, re-processed or recycled, which must be disposed at a facility approved to receive that type of waste.

Decommissioning

74 Within one year of decommissioning, the Development Site must be returned, as far as practicable, to its condition prior to the commencement of Construction. All wind turbines and associated above ground structures (i.e. not including turbine foundations) including but not limited to, the substation, the control and facilities building and electrical infrastructure must be removed from the Development Site unless otherwise agreed by the Director General. All other elements associated with the Development, including Development Site roads, must be removed unless otherwise agreed to by the landowner(s).

75 If any wind turbine 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 wind 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 Development Site within 18 months from the date that the wind turbine was last used to generate electricity.

76 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.

ATTACHMENT A

DEPARTMENT OF ENVIRONMENT AND CONSERVATION - GENERAL TERMS OF APPROVAL

Woodlawn Wind Farm, Tarago – Lots 14, 27, 55, 89 and 94 DP754919

ABORIGINAL CULTURAL HERITAGE

A. SECTION 90 CONSENT TO DESTROY AND SECTION 87 PERMIT TO SALVAGE

The applicant must apply for and comply with Section 90 Consent to Destroy and Section 87 Permit to Salvage under the *National Parks and Wildlife Act 1974*, as amended, for the Aboriginal sites "WL1" (AHIMS# 57-3-0366), "WL2" (57-3-0367), "WL4" (57-3-0369), "WL5" (57-3-0370), "WL6" (57-3-0371), "WL9" (57-3-0374), "WL11" (57-3-0376), "WL12" (57-3-0377), "WL13" (57-3-0378) and "WL14" (57-3-0379) that will be impacted during the course development of the Woodlawn Wind Farm, at Lots 14, 27, 55, 89 and 94 DP754919, Parish of Werriwa, NSW.

Section 87 and 90 Consent can be issued for the Aboriginal sites "WL1", "WL2", WL4", "WL5", "WL6", "WL9", "WL11", "WL12", "WL13" and "WL14", where the Aboriginal objects described in Schedule "A" below are situated upon the land described in Schedule "B", and constitute objects within the meaning of Section 90 of the *National Parks and Wildlife Act 1974*, and where application has been made for consent to destroy those objects subject to the conditions set out below.

Schedule A: All Aboriginal objects located within the Aboriginal sites "WL1" (57-3-0366) located at grid reference: e734400 n6111660, "WL2" (57-3-0367) located at grid reference 733890e 6114790n, "WL4" (57-3-0369) located at grid reference 734290e 6114239n, "WL5" (57-3-0370) located at grid reference 733880e 6115500n, "WL6" (57-3-0371) located at grid reference 733870e 6114840n, "WL9" (57-3-0374) located at grid reference 734550e 611990n, "WL11" (57-3-0376) located at grid reference 734860e 6114970n, "WL12" (57-3-0377) located at grid reference 734250e 6114550n, "WL13" (57-3-0378) located at grid reference 734970e 6113270n and "WL14" (57-3-0379) located at grid reference 734940e 6112680n.

Schedule B: Lots 14, 27, 55, 89 and 94 DP754919, Parish of Werriwa, Woodlawn Wind Farm, Tarago, NSW.

Consent is issued subject to General Terms and Conditions covering all archaeological Permits and Consents, as well as the Specific Terms and Conditions pertaining to Consents to destroy Aboriginal objects and any Special Conditions, all of which conditions are detailed below. Consent does not cover human skeletal material.

B. SPECIFIC CONDITIONS APPLYING TO CONSENT AND PERMIT TO SALVAGE

1. The Consent covers only those objects described in the instrument of Consent and in any Schedules thereto.

2. In the case of Consents granted to cover development activities, the Consent is granted to cover only those circumstances described in the Schedules, and subject to there not being discovered in the course of further operations, in the progress of that development requiring the Consent, any other objects which will be damaged or destroyed by the continuation of the operation. (Destruction of such objects would require the granting of a separate Consent).

3. The Consent is conditional upon all relevant development approvals having been obtained.

4. Should the objects listed in Schedule 'A' above remain in existence two (2) years from the date of this document, the Consent shall be deemed to be void, and any further damage to the objects will require the preparation of a new Consent document.

5. The Consent enables the salvage of objects described in Schedule A. The salvage work is to be carried out by a qualified archaeologist and representatives of the relevant Aboriginal community, as per the methods described in the methodology submitted with a Consent and Permit application unless otherwise specified in the Special Conditions listed below.

6. Unless alternative arrangements are made any Aboriginal objects recovered, being the property of the Crown, shall be deposited at the Australian Museum, in accordance with adopted procedures for the deposition of Aboriginal objects as prescribed by The Australian Museum, at or before a period of two years from the date of expiration of the Permit or any renewal thereof, whichever occurs first. Information about deposition requirements can be obtained from the Aboriginal Collections Manager, Division of Anthropology, The Australian Museum, on (02) 9320 6000.

7. At the same time that Aboriginal objects are deposited in the Australian Museum, a copy of the report referred to in clause 9 below and a copy of the report referred to in clause 14 of the General Terms and Conditions, field notes, site plans, section drawings and relevant photographs, shall be deposited at The Australian Museum.

8. Should any 'relic', defined under the Heritage Act of NSW be uncovered, then excavation or disturbance of that area is to stop immediately and the Heritage Council of NSW is to be informed in accordance with S.146 of the Heritage Act, 1977 (as amended).

   Historic Archaeologists of the Heritage Council can be contacted on (02) 9873 8500

   A 'relic' under the Heritage Act is defined as any deposit, object or material evidence-

   (a) which relates to the settlement of the area that comprises NSW, not being Aboriginal settlement; and

   (b) which is 50 or more years old.

9. The holder of the Permit shall furnish the Department of Environment and Conservation with a report at the completion of the salvage work or expiry of the Permit or any renewal thereof, or as specified in the guidelines, whichever occurs first. Such report shall include:

   - a complete list of all material recovered;

   - a detailed description of the methods of excavation/collection and analysis used;

- a detailed plan of the site, including the location of collection areas, all trenches, pits, auger holes and spoil heaps;

- summary of consultation undertaken with relevant Local Aboriginal Land Councils or relevant Aboriginal Community Groups.

C. SPECIAL CONDITIONS APPLYING TO CONSENT AND PERMIT TO SALVAGE

1. The application for Section 90 Consent to Destroy and Section 87 Permit to Salvage must be accompanied by written concurrence from the relevant Aboriginal communities.

2. An application for Section 87 Permit to Salvage, as part of the Section 90 Consent, will be required to undertake the program of monitoring and artefact salvage collection.

3. Any Aboriginal objects collected or salvaged from the above Aboriginal sites, under Section 87 Permit to Salvage, associated with the development work may be retained by the relevant Aboriginal organisations under a 'Care and Control' Agreement. An application for a 'Care and Control' Agreement should be submitted with the Section 90 Consent application.

4. This Consent and Permit does not provide consent to disturb any human skeletal remains that occur below the existing ground surface. Should any significant Aboriginal objects or Aboriginal skeletal remains be unearthed during construction work, then work should cease and the Department of Environment and Conservation be notified as soon as possible.

5. The Department of Environment and Conservation, Environment Protection and Regulation Division, South Branch Archaeologist at Queanbeyan is to be advised of the date of salvage work at least seven days prior to commencement of salvage.

6. If development works commence prior to salvage, all areas in which salvage is to occur must be temporarily fenced so that these areas are excluded from construction impacts.

7. All salvaged objects are to be analysed and documented according to current Department of Environment and Conservation requirements.

8. Any modifications to the proposed works, the salvage research design, or to the conditions of this Consent, may only be made with the prior approval of the Director, Environment Protection and Regulation Division, South Branch.

9. All actions, and their results, conducted under the terms of the Consent and Permit must be documented in a report that is satisfactory to the Department of Environment and Conservation.

10. If any previously undetected Aboriginal object is uncovered or unearthed during development activity, work at that location must cease immediately and advice on appropriate action must be obtained from the Department of Environment and Conservation.

D. GENERAL TERMS AND CONDITIONS

1. Permits and Consents are not transferable.

2. A Permit covers only that area stated in the Permit

3. A Consent covers only that area stated in the instrument of Consent and in any Schedules thereto.

4. Permits may be revoked at any time at the discretion of the Director-General.

5. Terms and conditions of Permits may be varied at any time at the discretion of the Director-General.

6. The Person to whom the Permit is issued or the Consent granted shall be responsible for the manner in which the work covered by the Permit or Consent is performed.

7. An officer of the Department of Environment and Conservation, acting on the authority of the Director-General, may at any time examine work done or any objects recovered under any Permit or Consent.

8. Permits and Consents are necessary for all activities for which they are issued or granted, but do not in themselves give authority to enter or work on freehold land or leased Crown Land. Permission must be sought from the owner or occupier and arrangements made with him/her.

9. The holder of the Permit or Consent shall furnish, when required to do so, an undertaking to indemnify the Department of Environment and Conservation against all actions, suits, claims and demands of whatsoever nature and all costs, charges and expenses in respect of any accident or injury to any person or property which may arise solely out of the existence of any works associated with the Permit or Consent.

10. All reports received in connection with work carried out under a Permit or Consent shall be treated as confidential but the Department of Environment and Conservation shall have the right to copy all such reports, to allow consideration thereof by qualified referees.

11. For a period of five years from the date of issue of the Permit or Consent, the holder of the Permit or Consent may refuse to allow the Department of Environment and Conservation and The Australian Museum, if such information is held by those institutions, to make public any information contained in any report referred to in Condition 10 above, except where it is deemed necessary for management, protection or research reasons. After this period of five years from the date of issue of the Permit or Consent, the Department and The Australian Museum shall have the right to use and authorise the use of information contained in all reports submitted under the Permit or Consent, except where specifically requested by the holder of the Permit or Consent.

12. Upon publication of any information relating to work done under a Permit or Consent, a copy of such publication(s) shall be forwarded to the Department of Environment and Conservation, The Australian Museum, Sydney, and the Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, unless permission to do otherwise has been obtained from the Department.

13. The holder of the Permit or Consent shall consult with the local Aboriginal community regarding the work covered by the Permit or Consent and shall respond to any reasonable request to involve the Aboriginal community in the work.

14. The Department of Environment and Conservation and The Australian Museum may supply copies of relevant reports as furnished by the holder of the permit or Consent to local Aboriginal communities. Upon request by the Service, the holder of the Permit or Consent shall supply a summary of his/her findings with photographs, diagrams, etc., as required, to local Aboriginal communities or other interest local groups.

15. The holder of the Permit or Consent shall keep field records and a copy of all such records shall be lodged with the Department of Environment and Conservation at the termination of each field work period. A copy of all field records shall be lodged with The Australian Museum at the time the archaeological materials are deposited with the Museum.

16. The holder of the Permit or Consent shall notify the local Area office of the National Parks and Wildlife Service (of the Department of Environment and Conservation) at the commencement and completion of fieldwork, and shall supply to Area officers details of field work programs and results if requested.

17. In the event of a Permit being revoked -

    a) The Person to whom that Permit was issued shall

        (i) Furnish an undertaking to indemnify the Department of Environment and Conservation against all actions, suits, claims and demands of whatsoever nature, and all costs, charges and expenses in respect of any accident or injury to any person or property which may arise solely out of the existence of any works associated with the Permit;

        (ii) leave the areas, the subject of that Permit, in a condition satisfactory to the Department of Environment and Conservation within two weeks from the date of revocation of that Permit;

        (iii) furnish the Department of Environment and Conservation within six months from the date of revocation of the Permit, a full report on the work completed at the date of revocation. Such a report shall include a complete list of any material recovered;

        (iv) deposit any Aboriginal objects removed during work associated with the Permit, together with a copy of all field records, at The Australian Museum or at another place designated by the Museum, after these objects have been fully examined, or within six months from the date of revocation of that Permit whichever occurs sooner.

    (b) The Department of Environment and Conservation and The Australian Museum shall have the right to use and authorise the use of information collected under the Permit.