

TAURUS ENERGY

Response to Public Submissions - Conroy's Gap Wind Farm

In accordance with Part 3A of the *Environmental Planning and Assessment Act 1979*, the Environmental Assessment for the proposed Conroy's Gap wind farm was placed on public exhibition for the period 9th August to 22nd September, 2006.

A total of 22 submissions were received, 4 from Government agencies (DNR, RTA, DoL, CASA) and 18 from the community.

The proponent's response to issues raised in the submissions are presented below. Items in blue ink are from the Response to Submissions provided by the Department of Planning.

COMMUNITY SUBMISSIONS

Issue: Flora and Fauna

- 1) The wedge tailed eagle is considered to be a common species in the Washpen Creek Valley and is also considered to be a dominant native predator in the Blakely's Red Gum-Yellow Box Woodland ecosystem. If, as is stated in the EA, the local population is likely to be threatened by the proposal, there is concern that the whole ecosystem of the valley could be affected as the dominant predator would be removed from the ecosystem. This issue should be explored further.*

Proponent's response

The Environmental Assessment does not state that the local wedge-tailed eagle population is likely to be threatened by the proposal.

The local population may potentially be affected directly by blade strike or indirectly by habitat loss. The EA states that, while some blade strike risk exists, blade collisions are expected to be rare. This conclusion is based on experiences at other wind farm sites and risk modelling documented in the Biodiversity Assessment (BA) in section 5.3.2.

The BA and EA also discuss the potential of the wind farm to reduce access to eagle hunting habitat and so affect breeding success. Again, based on the continuing use of habitat around wind farms by wedge-tailed eagles at other wind farm sites, hunting behaviour and breeding success are not expected to be significantly affected by the wind farm. This risk would be managed using a blade strike and breeding monitoring program and adaptive approach outlined in the EA.

- 2) A wedge tailed eagle's nest has been identified on a property on Graces Flat Road, within a couple of kilometres of the development site. Significant concern is raised regarding the impact the development will have on young eagles whilst they are learning to fly. This issue should be considered further.*

Proponent's response

As noted above, the wind farm is not expected to result in significant blade strike impacts to local wedge-tailed eagles, including young birds. This is based on the experiences at other wind farm sites in Australia, where wind farms are present within eagle home ranges. It is

proposed that direct blade strike impacts and breeding success would be monitored as part of an adaptive environmental management plan. The Grace's Flat nest site could be used for this monitoring, subject to landowner agreement.

Issue: Visual Impact

3) On what basis do you assert that "Primary producers place a low value on the landscape"? Many submissions have noted that they are primary producers and place a high value on the landscape. On this basis, would it alter the conclusions of the visual assessment in Chapter 6 of Attachment 8? If so, then a revised assessment should be provided.

Proponent's response

The assumptions of views of the landholder views of the landscape were developed from a number of sources including public consultation days, feed back forms, personal conversations and outcomes of previous visual assessments.

The conclusion was reached that, on the whole, landholders that earn an income from the land have a pragmatic approach to the landscape and tend to value the landscape as a means of production mainly and any other values are secondary. The landscape that can be seen today in the area has evolved through the activity of primary production, where landscape visual quality is a secondary consideration.

This view was borne out at the public consultation day. It was observed that the rural residential landholders, not primary producers, had concerns over the visual impact as they have chosen to live in the area for its visual quality - this has been reflected in the report. However, primary producers tended to be concerned about other issues such as decreases in property values. The impact the turbines have on the visual aesthetic of the landscape was a secondary consideration.

It is understandable that some landholders do not agree with the necessary generalisations about landscape values. Public perception takes in a whole range of views and any assumptions made about perception will not fit all those that view the landscape. This is acknowledged in the Visual Impact Assessment.

It should be noted that the report acknowledges (on page 22) that regardless of user type unscreened or unfiltered views from a house tend to be valued highly.

On this basis the assessment in the report should not change.

4) How will the Proponent implement a system to switch off turbines during periods of shadow flicker impacts?

Proponent's response

If shadow flicker is found to be a nuisance to residents or motorists, the time and date where shadow flicker would occur for the affected location will be pre-programmed into the wind turbine control system and individual wind turbines automatically shut down during these times.

5) How have the objectives of the Yass Local Environmental Plan been taken into consideration as part of the assessment of the wind farm? A number of submissions consider that the proposal may contradict the expectations and objectives of the plan, particularly in relation to visual amenity.

Proponent's response

The objectives of the land subject to the proposal contained in the Yass Valley LEP are addressed in section 5.1 of the EA. The overarching objectives of the LEP do not cover amenity issues and there are no amenity objectives for the zoning subject to the development proposal.

The land within and surrounding the proposal site is zoned 1(a) Rural Agriculture. The objective of this zone is to set aside certain land for agricultural purposes and purposes incidental thereto. If not prohibited, developments other than agriculture, dams and forestry require development consent. Wind farms are not prohibited under the LEP, but require development consent.

As well as land in zone 1(a), the wind farm would be visible from land in zone 1(b) Rural Highway Zone. The objective of this zone is to maintain a corridor along major National and State highways so as to protect those roads from traffic-generating developments which may affect the efficient and safe movement of the travelling public, and from those developments which would have an adverse impact on the amenity of the rural countryside.

The turbines would also be visible, to a lesser extent, from land zone 1 (c2) Rural Residential – Hobby Farms (located several kilometres to the east of the proposal site) and 1 (d) Rural Smallholdings (near Bookham to the west). These zones have a general objective of ensuring that protection and maximum public benefit is derived from certain areas of high environmental, aesthetic or recreational value.

The visual impact of the proposal on these areas has been addressed in the Visual Assessment (particularly section 6). The assessment includes specific locations within these zones, and in each of these areas takes into account scenic quality, the nature of existing developments and the attitudes and values of residents.

Issue: Land use

6) Has the proponent taken into consideration the fact that the area is intensively settled with smaller rural allotments, with plans for future subdivision in the area?

Proponent's response

The land surrounding the proposal site is zoned 1(a) Rural Agriculture. Yass Valley Council has received a proposal for a 20 lot subdivision to the east of the proposed wind farm site. There is potential for further concessional lot applications in the surrounding district. Pressures for subdivision can be expected to continue, especially between Yass and the proposal site.

The rights of land owners adjoining the proposal will not be affected by the proposal. These land owners can still construct and subdivide their land subject to local planning instruments.

The assessment of social, economic and environmental impacts of the wind farm proposal on existing residences in the locality would have equal relevance to future dwellings. In particular, the visual and noise impacts identified and assessed for non-involved landowners surrounding the development would also apply to new residents in these areas.

The visual assessment found that, from the majority of view points around the wind farm site, the visual impact is moderate to low. In developing the proposal, the original layout was amended to remove turbines from the ridgeline east of the Black Range trig ridge. This will avoid much of the visual impact on viewpoints located east of the site.

For new residences constructed close to the proposal, impacts such as noise can be ameliorated using a range of materials and design techniques in the construction of these homes.

The EA (section 7.3.2) addresses land value and development potential issues and concludes that the wind farm would not be expected to adversely affect the value of surrounding properties, the development potential of properties to the east of the site or the underlying agricultural productive capacity of the land.

The wind farm development is reversible over a 30 year timeframe and would effectively 'quarantine' the ridgelines of the subject site from residential and other development pressures which may detract from scenic values. The revenue provided by the wind farm may also allow the involved landowners to resist subdivision pressures.

7) What consideration has been given to impacts from the wind farm on tourist park operations near the Burrinjuck Dam?

Proponent's response

The EA notes that Burrinjuck Waters State Park, located 3-4 kilometres southwest of the subject site, provides fishing, water sports and nature-based recreation opportunities. Burrinjuck Tourist Park is located beside the lake at Woolgarlo around 2.5 kilometres south of the southernmost 'Ferndale' turbines. The main potential impact of the proposal on recreational activities on visitors to these destinations would be visual. Along with Lake Burrinjuck, these areas were included in the visual assessment, including the Zone of Visual Influence analysis (section 4.4.2) and under areas 7 (Lake Burrinjuck) and 10 (Black Range West) of the visual sensitivity assessment (section 4.4.3), visibility assessment (section 5) and visual assessment (section 6). These areas were considered to have moderate – high visual sensitivity and the proposal would have moderate visual impact.

The primary access roads to these destinations run to the west of the proposal site. Wind turbines would be visible from these routes. Turbines would also be intermittently visible from Black Range Road, a secondary access route from Yass. The Visual Assessment concludes that the transient appearance of the turbines in this highly modified rural landscape is considered unlikely to significantly affect the experiences of recreational travellers on these access roads. The Visual Assessment also notes that recreational users are typically less sensitive to the visual landscape while travelling to the destination, compared to their sensitivity following arrival at the destination.

The turbines would not be visible from the campground and visitor facilities at the Burrinjuck Waters State Park, which is low in the landscape and surrounded by forest. The Zone of Visual Influence Analysis undertaken by Garrad Hassan Pty Ltd (Figure 3 in the Visual Assessment report) indicates that no turbines would be visible from the Burrinjuck Tourist Park. This is due to the steep slopes behind the resort which would screen the ridge tops to the north.

The turbines would however be visible from the water and shoreline of parts of Lake Burrinjuck. The wind farm will be visible high above the Lake, particularly from approximately 8 kilometres due south of Black Range. The southern most group of turbines will be highly visible. There will be limited views of the turbines available from other parts of the Lake as the steep edges of the lake will generally screen the site. The turbines may not be in a regular field of view for users of the lake because of their elevation above the Lake.

The wind farm will be visible from the Lake over a distance range of 5-15 kilometres from the proposal site. The viewpoints from where the wind farm will be most visible are around 8 to 9 kilometres. From that distance, the wind farm will be of moderate visibility particularly as the wind farm will be viewed looking along the wind farm and the wind farm will be narrow in the field of view from the Lake. The Visual Assessment found the contrast of the wind farm to the surrounding modified landscape to be acceptable and judged the visual impact to be moderate.

Issue: Noise

8) A number of noise related issues were raised in this attachment. These issues have been summarised as points 8-1 to 8-11 as follows.

8-1. The proponent has “cherry picked” the applicable guidelines and selected The SA EPA noise guidelines as the most favourable criteria to apply to the project. For example: “Annoying Characteristics” of noise in the SA EPA Noise Guidelines for wind farms have been used to excuse impulsiveness of turbine noise while failing to apply ‘Modifying Factor’ adjustments for impulsiveness under Section 4 of the NSW Industrial Noise Policy. Refer also to WHO reference below.

Proponent’s response

The Department of Planning (DoP) set the terms of reference (Director General’s Requirements) for all assessment studies. The relevant requirement for noise DGR’s for Conroy’s Gap were;

“Operational Noise – comprehensive assessment of the noise impacts associated with the proposal (including ‘infrasound’) to be undertaken in accordance with the DEC’s Industrial Noise Policy and Wind Farms – Environmental Noise Guidelines, South Australian Environment Protection Authority (February 2003). If any Noise Agreements with residents are proposed for areas where noise criteria cannot be met, sufficient information should be provided to enable a clear understanding of what has been agreed, and what criteria have been used to frame any Agreements.”

It was confirmed with the DoP that the assessment of WTG noise for each receiver would be covered by the SA EPA Guideline, and that the INP portion be limited to issues including;

- site selection for background noise measurements,
- description of sites,
- equipment used,
- graphing of results,
- determining the Amenity noise criteria for all time periods, and
- the INP assessment methodology would be adopted for fixed stationary noise sources such as transformers.

It is important to realise that impulsive noise is not necessarily the same as modulation. Impulsive noise is characterised by its sharp rise in level or a high peak (or series of peaks) of short duration i.e. gunshot, hammer strike etc. Modulation refers to a sound pressure level that has a repetitive cycling (varying) sound pressure level. To the best of our knowledge there is no empirical evidence to suggest WTG noise is impulsive in nature.

Neither the SA EPA Guidelines, nor Section 4 of the NSW INP, explicitly lists modulation as characteristic requiring a penalty.

Indeed the SA EPA Guidelines “have been developed with the fundamental characteristics of noise from a wind farm taken into account. These include the aerodynamic noise from the passing blades (commonly termed “swish”)”. Our interpretation is that this includes modulation, in our view this still holds as “passing’ blades suggests a time varying event that given the cyclical nature of WTG’s, is repeating and therefore modulating. This has recently been confirmed with the original author of the SA EPA Guidelines.

The fundamental characteristics of wind farm noise have been built into the assessment procedure. This was the justification for lowering the minimum limit used by the NZS6808 standard from 40 dBA to the 35 dBA minimum limit imposed by the SA EPA Guideline. It ‘assumes’ such characteristics are inherent and therefore no additional penalty need apply.

8-2. The ISO 9613 noise model is used outside its stated limitations.

Proponent’s response

All noise models have limitations. Investigations have shown that calculated noise levels by ISO 9613 were generally more conservative (predicted higher levels) than other commonly used standards such as CONCAWE and NORD2000.

Furthermore, it is expected that due to the elevated nature of WTG’s the predicted propagation of noise according to ISO9613 are indeed conservative as the standard assumes downwind propagation and/or medium level temperature inversion and its algorithms have been determined empirically through measurement of predominantly ground based sources where such affects are significant. Such enhancement effects are not as pronounced for such elevated sources as WTG’s because:

- the wind profile at elevated positions is relatively uniform compared to ground based sources and hence enhancement due to wind not as significant an effect
- inversions generally are not present or strong at high elevations, and hence enhancement due to inversions is not as significant an effect
- the noise sources are generally not acoustically shielded at high elevations

The net result is that the ‘in built’ ISO9613 assumed propagation enhancement effects are not as pronounced for WTG sources and the resulting ‘over prediction’ serves as additional conservatism.

8-3. No evidence of input is presented detailing how the ISO 9613 model has been applied.

Proponent’s response

The model has been implemented using sophisticated 3-dimensional computer noise model. The model assumptions/inputs that have been included in the text of the report include:

- location of WTG sources
- location of sensitive receivers
- distance from each WTG to each receiver
- the sound power level (SWL) and frequency spectra of modelled turbines, and their respective variation with wind speed

8-4. An unjustifiable level of accuracy is quoted for noise predictions.

Proponent's response

The estimated accuracy is stated for the noise model only. No statement is made regarding the accuracy and veracity of guideline methodology assumptions and model inputs. To do so would be a most difficult task well outside the scope of the subject assessment.

8-5. There is no evidence of any margin for error having been applied to the noise predictions.

Proponent's response

The assessment methodology does not prescribe any application of 'margin for error'. It should be noted that the choice of prediction standard serves as means of predicting a conservative result (as discussed above).

By its very nature the EPA Guideline assesses amenity over an average period. No assessment method is able to be 'absolute' given the high degree of variables involved.

8-6. There is no evidence of temperature inversion conditions being assessed as required under NSW Industrial Noise Policy.

Proponent's response

NSW INP temperature inversion assessment was not prescribed in our consultation with DoP. In addition, detailed assessment of the likelihood of inversion conditions is not considered necessary as ISO-9613 algorithms generally account for down wind and moderate temperature inversion conditions in the standard analysis. As discussed in response 8-2 and 8-10, it is unlikely that temperature inversions have a significant effect for elevated noise sources such as WTG's.

8-7. Manufacturer testing for certification of the proposed turbines has been carried out in an unstable to neutral atmosphere. The critical noise condition for this project occurs at night in a stable atmosphere and lower temperatures.

Proponent's response

Atmospheric stability conditions during IEC 61400-11 testing are unknown, however given the prevalence of unstable to neutral conditions such conditions are more likely during the test phase.

Detailed manufacturer's tests against the 'stable' atmospheric conditions which are purported to be the critical noise condition for this project are not available.

8-8. Correlation of ground level wind speeds, 10m height wind speeds and turbine noise levels appear to have been done for neutral or unstable atmospheric conditions. The critical noise case for this project will occur in a stable atmosphere.

Proponent's response

In regards to determining the noise emitted from the WTG's, as stated above, it is uncertain as to what atmospheric stability conditions were present during IEC 61400-11 tests. However, it would be reasonable to assume that these were unstable to neutral conditions, and therefore our results would also reflect the effect of these conditions on turbine noise emissions. The lack of data outlined in 8-7 does not allow further analysis of this issue.

However, in regards to determining the noise limit criteria curve, background noise levels are measured and then analysed in relation to wind speeds at the 10m reference tower. Accordingly, no calculation of local ground wind speed conditions is made, and no direct assumption of stable, neutral or unstable conditions is made in the analysis procedure. The noise monitoring data used in calculating the criteria curve includes the full variety of conditions (including any stable, neutral and unstable conditions) that were experienced during the background noise monitoring periods.

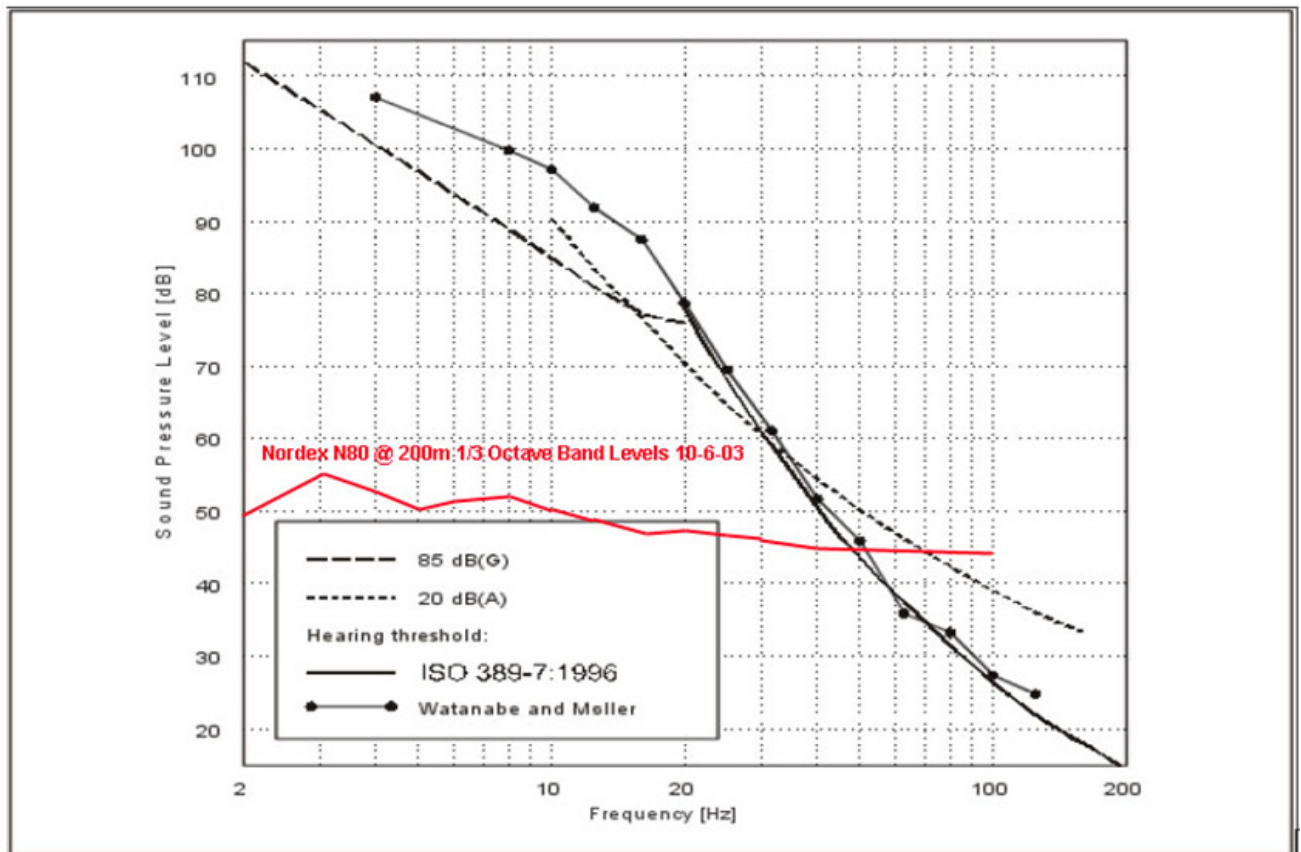
8-9. No C-weighted data for turbine noise has been provided for assessment of low frequency noise as required by Section 4 of the NSW Industrial Noise Policy.

Proponent's response

The INP was not the governing policy for assessment; therefore this information was not required. In addition, C-weighted data from WTG's is generally unavailable.

The noise report clearly notes that modern wind turbines do not give rise to infrasound.

The following table is an extract from a paper given by Dr Andy McKenzie during the Australian Wind Energy Association (AusWEA) sixth annual conference AUSWIND 2004, titled "*Infra-sound, Low Frequency Noise, & Vibration from Wind Turbines*". This shows commonly referenced 'threshold' curves against a measured level from a typical 80 metre wind turbine. It can be seen that for low frequency and infra-sound the level is generally well below the 'threshold' levels of human hearing.

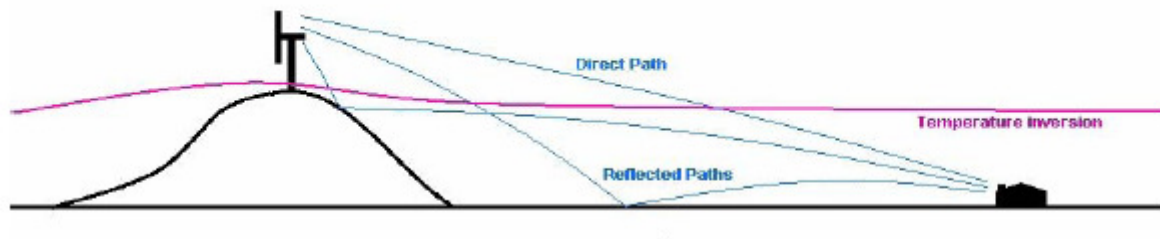


8-10. The proponent has failed to consider acoustic conditions in the context of the accompanying atmospheric and aerodynamic effects around the turbines.

Proponent's response

It is assumed that this claim refers to the beginning of the discussion paper that depicts and explains the critical noise case:

The critical noise case to be considered for this project is as illustrated below



The essential features are:

- 1. It is night time and strong temperature inversion conditions prevail.*

As shown in the diagram the temperature inversion would generally be below the height of the wind turbine.

- 2. The free stream wind velocity profile in front of the ridge reflects stable atmospheric conditions.*
- 3. Topographic features accelerate wind speeds over the ridge, boosting speeds at the turbine. Conditions above the ridge allow the turbine to operate at maximum power while dwellings downwind of the ridge remain in low velocity air*

Baseline monitoring of background noise levels was conducted during similar conditions and therefore account for low velocity air at ground level and are included in establishing baseline conditions.

- 4. Sound received at the dwelling arrives via a variety of paths*
 - a. Direct atmospheric propagation from the turbine*
 - b. Reflections from the ground*

Both paths are affected by the inversion, and sound refraction occurs as a result of both the temperature gradient and the wind velocity gradient. The intensity of both effects is linked and heightened by the meteorology. The result is that sound which makes its way below the inversion propagates as if in a two dimensional tunnel.

The diagram incorrectly shows the direct path as being un-affected by the temperature inversion. Compared to 'normal' atmospheric temperature gradient conditions the direct path would be bent downwards by the inversion and the result would be direct path noise would not propagate as far. Direct path noise at distance would actually be lower compared to 'normal' atmospheric temperature gradient conditions.

Refraction of the reflected path, whilst possible under such conditions, is unlikely to adversely affect wind turbine noise levels as the reflected path intensity is significantly lower than the direct path. The reflected path intensity is determined by the reflection loss, which is a function of the angle of incidence, ground hardness and ground cover and is frequency dependant. Generally the higher the angle of incidence the greater the amount of acoustic energy that is absorbed or lost during the reflection.

For the case of an elevated noise source such as a wind turbine on top of a local hill the direct path may not propagate as far as what it may under neutral conditions and the reflected path whilst it may propagate further, is generally of a lower intensity than that of the direct path. The net effect is that noise propagation under temperature inversion conditions would not be expected to be higher than under neutral conditions.

5. Sound propagation from the turbine is assisted by the above conditions while masking of turbine noise by background noise is minimal or absent at ground level.

As discussed above, sound propagation of WTG's under these conditions is not expected to be assisted. During temperature inversion conditions it would be expected that wind induced noise at ground level would be low (as still conditions at ground level are expected). However, it should also be noted that under such conditions the noise level from other ground based noise sources (traffic on Hume Highway) can be significantly elevated, due to the enhancing effects the temperature inversion has on such sources which are below the inversion level. If background levels are raised as result of the temperature focussing noise from otherwise distant sources, then residual wind turbine noise would be further masked.

Anecdotal evidence of this exists where residents noted they were able to hear the distant highway and isolated trucks etc. under such conditions.

8-11. Noise levels have been applied only at dwellings not at the most critical noise boundaries of properties.

Proponent's response

The SA EPA criteria (and the NSW INP) prescribe the assessment location to be places of residence and that amenity be preserved within the curtilage of the home. Such an approach is applied to noise assessments from other industries (such as mining) also.

8-12. Acoustic testing of the wind turbines was conducted for wind speeds up to 10 m/s. The turbines are rated for operation in wind speeds of 13 m/s. The higher wind speed can be expected to occur or be exceeded on site.

Proponent's response

Available data for the proposed WTG's was limited to the wind range in which they have been tested.

Whilst it is expected that the WTG's will operate in wind speeds greater than those tested, it is most unlikely that extended data would make any difference to the assessment outcome. The sound power level (SWL) of WTG's increases with wind speed at a lesser rate than typically what the baseline ambient noise levels do. The most critical area of assessment is typically where the **Background + 5 dBA** curve meets the minimum 35 dBA line, sometime referred to as the 'knee point' in the graph. This varies with each particular site, but typically occurs in the 5-7 m/s range.

Accordingly, wind turbine tests are carried out to cover these most critical areas. All available data has been used for analysis of the wind turbines.

8-13. WHO guidelines for sleep disturbance assume 15 dB attenuation at building facades. The NSW Noise Guidelines specify 10 dB for this. No evidence is presented that the higher level of attenuation assumed for the project holds true for rural Australian homes.

Proponent's response

There is nothing to suggest the WHO attenuation is based upon 'well insulated European houses with double insulation'. 15 dBA sound transmission loss is easily achieved by typical building construction and glazing. 10 dBA is commonly adopted as this value is generally achieved for typical bedrooms with all windows open. It is worth remembering that the WHO noise limits are only being applied to project involved residences.

8-14. Where SA EPA guidelines exceed WHO guidelines for sleep disturbance the Noise Assessment notes that the more lenient criteria will be applied.

Proponent's response

This occurs at high wind speeds with high ambient noise levels (wind in trees etc.) and only when background masking reduces the intrusiveness of external noise. The WHO policy does not consider the masking effects of surrounding noise levels, as these increase with higher wind speeds it would not make sense to apply a stricter noise limit to involved houses than would apply under SA EPA Guidelines to neighboring houses.

8-15. Taken as a whole, the project Noise Assessment adopts an advocacy stance, presenting a "marketing" perspective of the acoustic merits of the proposal. It fails to provide balanced material on which to base a dispassionate assessment of the likely impact on property owners.

Proponent's response

On the whole the noise assessment attempts to;

- follow the methodology of the SA EPA Guideline;
- use available WTG data;
- capture and use significant baseline noise monitoring data;
- use the latest in sophisticated computer noise modelling techniques;
- take consideration of latest 'emerging issues';
- adopt prediction standard algorithms that are generally conservative (predict higher level); and,
- form an independent and balanced assessment of outcomes.

There are countless factors that influence wind turbine noise generation, noise propagation, background masking, subjective response to noise and attenuation of noise through structures, etc., and it is not possible to calculate each and every aspect or potentiality. The assessment simply applies a recognised methodology that has been developed with the intent of finding an equitable outcome for all.

Issue: Meteorology

9) One submission contends that Conroy's Gap and the Black Range dictate most of the local weather pattern with the cyclical storms and rain coming from the north, following the range westward and spreading to the lower terrain and along Yass River. What impact will the turbulence from the wind turbines have on the storm and rain patterns in the area?

Proponent's response

Computer modelling by researchers at Princeton University in the United States (Baidya *et al.* 2004) suggested that large wind farms can affect local weather by slowing wind behind the hub and creating vertical eddies, and drying and heating the air on the ground. Temperatures were found to increase by approximately 0.7°C and wind speed by approximately 0.6 metres/second at ground level. The researchers found that the effects on weather could be reduced by using more efficient, low turbulence rotors.

However, CSIRO's Dr Peter Coppin (Atmospheric Research Division) has noted that this effect on weather from wind farms is quite small and the impact on agriculture would be negligible (ABC Online 2004). Dr Coppin said that people living near wind farms didn't need to worry, as wind farms would have little impact on weather conditions near the ground.

Wind speed impacts should be confined to a distance from each turbine equivalent to 10 times the vertical height of the turbine (SEDA 2002). A distance of up to 1.25km (SEDA 2002) around each wind turbine is likely to experience warmer night temperatures and faster wind speeds on average, although this attenuates rapidly with distance from the turbine. It is considered unlikely that the Conroy's Gap wind farm would significantly affect regional or local rainfall patterns. The impact on local weather, vegetation and land use would be minor and would not warrant mitigation.

Issue: Fire Risk

10) A number of submissions are concerned about fire risk. One submission in particular raised concern that sparks from a burning turbine could spread over a large area because of the turbine's height and that the fire would be difficult for a volunteer rural fire service to control. How does the Proponent propose to manage issues such as these?

Proponent's response

Representatives from the RFS were present at the proposal site during the Planning Focus Meeting, to ensure that this issue was properly considered. The key issues identified by these representatives were access to the site in the event of a fire, potential for containment lines, potential for the substation to start a fire, and activities such as hot welding in fire danger periods. The representatives commented that the development was not substantially different to other infrastructure risks in the area and therefore they held no large concerns over the issue from a bushfire risk perspective.

The main potential causes of turbine ignition are internal electrical or equipment failure, bushfire and lightning strike. A turbine ignition risk exists, but the overall risk is assessed as low.

The Environmental Assessment (section 7.3.8) makes the point that fires due to electrical or equipment failure are very rare in modern wind turbines. Turbines are designed to shut down automatically if ambient temperatures exceed the safe operating range, or if components overheat.

Turbines can also be shut down following notification of a bushfire in the locality or in the event of extreme fire conditions.

The turbines will be fitted with lightning protection, which is designed to effectively earth any lightning strike. The presence of lightning rods on the turbines would in fact reduce the general risk of wildfire at the site caused by lightning strikes. Relatively minor damage to turbines is expected from lightning strike. At Crookwell, east of the site, a direct strike

resulted in damage to one of the turbine blades, which was able to be repaired onsite. No fires were ignited. The risk of fires being caused by lightning strikes to turbines is remote.

In the event of a fire within a wind turbine or within the substation, the NSW Fire Brigade would have responsibility for control, with the RFS involved in a support role. These officers are trained in the control of structural fires and fires involving electrical infrastructure, which is relatively abundant in the district.

The NSW Fire Brigade, RFS and Council would be consulted regarding safety, communication, site access and response protocols in the event of a fire originating in the wind farm infrastructure, and also in the event of an external wildfire threatening the wind farm. Written endorsement of these procedures would be sought from the RFS and submitted to DoP, before the commencement of the construction phase. Auditing would occur as part of the Project Environmental Management Plan.

Issue: Expansion Plans

11) If the wind farm is approved, does the Proponent have any future plans to expand the wind farm at this site?

Proponent's response

There are no plans to expand the wind farm at the site.

Issue: Fuel Storage

12) What quantity of fuel/ oil will be held at the site, including fuel/ oil contained within the turbines, control buildings, substation, transformers etc. ?

Proponent's response

There is no fuel contained at the site during the operational phase; during the construction phase small volumes may be stored on site to service the construction vehicles and equipment. This would be stored in accordance with industry standard protocols and relevant regulations. Small volumes of oil may be stored on site for top-up of gearboxes and other components, bulk volumes required for irregular oil replacements would not be permanently stored on site and would be brought to site as required. REPower has provided the following lubricating oil quantities in relation to the 2 Megawatt MM82 and MM92 turbines:

- Gearbox oil < 400 litres
- Other grease and oils within turbine < 90 kilograms
- turbine transformer oil ~700 kilograms

This is indicative of lubricating fluid quantities typically contained within modern wind turbines. All modern wind turbines under consideration have oil pans sufficient to contain their lubricating fluids in the event of a leak or rupture.

Issue: Traffic and Site Access

13) The traffic assessment report notes that Payne's Road is unfenced and as such, there is an increased chance of collision with stock. Could the Proponent please provide fencing along Payne's Road and sheep yards, if requested by a landowner whose property is adjacent to the road, to address this impact?

Proponent's response

Taurus Energy will discuss the situation with relevant landowners and will offer to temporarily fence paddocks where the potential to impact stock is considered significant. Fencing would be removed at the end of construction.

14) Will access to the communications sites change if the proposal is approved (particularly the emergency services comms)?

Proponent's response

No changes will be made to access to the communications sites.

15) Will emergency services need additional permission to get access?

Proponent's response

No additional access permission will be required by emergency services.

Issue: Grid Connection

16) How does the Proponent propose to get the power from the turbines "on-line" at either of TransGrid's existing 132kV lines as it is considered that both of these lines are already on-line?

Proponent's response

Appropriate "cut over" procedures will be in place to ensure continuity of supply during the commissioning of the wind farm. The existing line will temporarily be taken out of service to allow connection of the new power line; this will not involve reduction of power supply to any customers. In the event that Transgrid is unwilling to allow the line to be taken out of service for a short period, the cut-over could be carried out using live line techniques.

17) Is there sufficient capacity within the 132kV lines to carry the extra input of power from the wind farm?

Proponent's response

TransGrid has confirmed that there is sufficient capacity in the lines to accept the extra power from the wind farm.

Issue: Compensation

18) A number of submissions consider it unfair that only the landowners with wind turbines located on their property will benefit monetarily from the scheme. Is it possible for the

Proponent to compensate other landowners on a sliding scale based on distance from the project?

Proponent's response

In order to minimise the visual impact of the proposal, the proponent has committed to offering screening by way of tree planting to all residences within a 2km radius of the wind farm. This process will be carried out by the proponent individually with each land owner so that the screening is appropriate to the impact and to the property. This would be carried out within 3 months of the construction phase completion.

The proponent's intent is to mitigate noise impacts to ensure compliance with the relevant guidelines rather than offer compensation after the fact.

As the proponent intends to mitigate these impacts, monetary compensation is not considered to be appropriate.

The local community will receive direct benefits from the community fund, whereby \$25,000 per annum will be offered for local community projects.

In addition, the local community will receive indirect benefits including economic and environmental benefits as outlined in the EA.

GOVERNMENT SUBMISSIONS

Department of Natural Resources (DNR)

Soil and Landscape Issues

The majority of the area involved in the proposal has been mapped by DNR as Rural Land Capability Class VI. These are undulating ridge tops and moderate side slopes which would be affected by turbine and road construction works. There are limited areas on the involved properties classified as vulnerable (steep and highly erodable). These are steep side slopes which are largely outside the construction area, but may be indirectly affected by runoff and sedimentation.

The proponent acknowledges that the proximity of the development to these vulnerable areas makes effective erosion and sedimentation control imperative.

The risks to soil and water values are considered manageable using best practice works design, erosion control measures and site rehabilitation. A detailed Erosion and Sedimentation Control Plan will be developed prior to the works, including maps of environmentally sensitive areas, parking and lay down areas, and locations of environmental protection works and emergency response resources (Commitment CS1).

A site restoration plan will also be prepared in advance which will apply the best practice principles outlined in section 3.5 of the EA (Commitment CS3). Disturbed areas will be stabilised and rehabilitated progressively during the construction period.

While hard surface access tracks will be required to each of the turbine sites during the construction phase, most of these tracks would be rehabilitated and revegetated following construction (Commitment CS5). These will include tracks along ridgelines which access the turbines. Steeper track sections on side slopes may require gravelling to ensure stability and traction.

Drainage techniques such as out sloping and rollover drainage banks will be used where appropriate on revegetated tracks to assist long term track stability.

Existing hard surface roads required for trig access and farm activities will be retained and upgraded as required.

The proponent has committed to applying the *Guidelines for the Planning, Construction and Maintenance of Tracks* (DLWC 1994) referred to in the submission (Commitment CS4). The methods and outputs of the Environmental Assessment are consistent with guidelines in the publication *Soil and Landscape Issues in EIA*, Technical Report No. 34 (DLWC 2000). The preparation of the detailed Erosion and Sedimentation Control Plan for the project will draw on standards and techniques contained in *Managing Urban Stormwater* (Landcom 2004).

The area directly affected by the proposal is already cleared of native woody vegetation, and now carries mixed native-exotic pasture. There is evidence of past erosion and topsoil loss, and active erosion is continuing on slopes in the north of the study area. The groundwater recharge function of the ridges and slopes has been significantly diminished by the loss of soil and native woody vegetation. The loss of small areas of shallow-rooted herbaceous vegetation and the thin soil layer under the turbine bases and steeper track sections is unlikely to significantly affect the recharge potential of the site.

Relevant Commitments

CS1	An Erosion and Sedimentation Control Plan will be developed prior to the works, including maps of environmentally sensitive areas, parking and lay down areas, locations of environmental protection works and emergency response. The need for any permanent erosion and sedimentation control
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	structures along roads and around hardstand areas will also be addressed.
CS2	A minimum of vegetation will be removed during excavation and construction leaving as great a buffer between the ridge top works area and steep side slopes as practicable.
CS3	Landforms will be stabilised and rehabilitated as soon as practicable after works. A site restoration plan will be prepared in advance which will set out protocols for restoration works, consistent with principles outlined in section 3.5 of the EA.
CS4	Moderate-high use tracks will be graded and drained to enhance stability. Tracks will be upgraded and constructed in compliance with DNR Guidelines (DLWC 1994).
CS5	Where practicable, grass surfaces will be retained on infrequently used vehicle routes to protect soils.
CS8	Subsoil will be separated from topsoil for rehabilitation purposes. All topsoil from the excavation sites will be stockpiled and replaced to its original depth for seeding and fertilising. On steep slopes, topsoil will be stabilised using, for example, jute matting. Any excess subsoil will be removed from the site and disposed of at an appropriate fill storage site.
CS9	On slopes check banks will be installed across trench lines, 20-50 metres apart, following closure of the trench. These will discharge runoff to areas of stable vegetation.
CS10	The eroding slopes east of the northern turbines, the eroding watercourses east (McCullums Creek) and west (Stony Creek) of the northern turbines and the eroding drainage line east of the southern turbines will be protected from concentrated runoff.
CS13	Stabilisation and revegetation of excavated areas will occur progressively following works to stabilise soil, to reduce impact on adjacent water bodies and drainage lines.
CS14	The eroding watercourses east (McCullums Creek) and west (Stony Creek) of the northern turbines and the eroding drainage line east of the southern turbines will be protected from concentrated runoff.
CS15	Following the construction phase, track drainage will be inspected and repaired as required. Service tracks will have robust rollover drains installed (subject to vehicle access requirements), directing road runoff into vegetated areas away from watercourses.
CS16	Disturbed areas will be seeded with native grasses, where appropriate.
CS17	Stock will be excluded to prevent grazing and trampling in disturbed areas and areas being rehabilitated. Grazing will not occur following the rehabilitation works for 3-6 months.

Watercourse Management

The wind farm project will involve the likely replacement of a culvert on Payne's Road, on an intermittent drainage line in the Stony Creek catchment.

The works will be undertaken during dry weather (Commitment CW5), with low or no flows. The replacement culvert and rehabilitation works will be consistent with NSW Fisheries guidelines (NSW Fisheries 1999, 1999a) (Commitment CFA1), and with the Minimum Standards for culverts provided in Attachment 1 of the DNR submission.

The turbines and turbine access tracks are located on ridgelines and will not involve crossing or excavating local watercourses. Aside from the replacement culvert on Payne's Road, no new major or minor watercourse crossings would be required for the wind farm project.

There is potential for watercourses to be impacted from sediment-laden runoff from tracks and turbine development sites, particularly during heavy rain. These risks would peak during the construction phase and diminish progressively as the site is stabilised and revegetated. The proponent will employ best practice works design, erosion control measures and site rehabilitation to manage these risks (Commitments CW2, CW4, CW7).

A detailed Erosion and Sedimentation Control Plan will be prepared prior to the works, including maps of environmentally sensitive areas, parking and lay down areas and locations of environmental protection works and emergency response resources (Commitment CS1).

Relevant Commitments

CS1	An Erosion and Sedimentation Control Plan will be developed prior to the works, including maps of environmentally sensitive areas, parking and lay down areas, locations of environmental protection works and emergency response. The need for any permanent erosion and sedimentation control structures along roads and around hardstand areas will also be addressed.
CW2	Permanent and temporary road construction will employ best practice drainage and erosion/sedimentation control measures.
CW4	Sediment traps will be installed wherever there is potential for sediment to collect and enter waterways.
CW5	Excavation will only be commenced during stable, dry weather conditions, operational requirements permitting.
CW7	Stockpile sites will be identified and turbid water discharged from these treated by a combination of silt fencing and temporary mulching/seeding.
CFA1	To protect aquatic habitats, the concrete batching plant [not part of proposal] will be well bunded, silt fences will be used around all excavation works, the duration of works will be minimised, and drainage line and creek crossings will be stabilised (consistent with Fisheries NSW guidelines).

Vegetation Management

Approximately 4.3 hectares of native secondary grassland derived from dry shrub forest types would be removed during the construction of the turbines, substation and access tracks. Most of the 3.75 hectares of this mixed native-exotic pasture under the new turbine access tracks will be revegetated with native grasses. For each turbine, around 28 square metres of mixed pasture would be permanently lost (for up to 30 years) under the base of the turbines (totalling 0.04ha).

The historical clearing of forest vegetation on ridges and slopes in the district has contributed to localised dry land salinity outbreaks on lower slopes, including parts of the involved properties. No significant tree or shrub clearing will be required for the project. The project has been specifically designed to avoid forest remnants and the need for tree clearing (Commitments DFL2, DFL 3, DFL4, CFL2). The selection of Payne's Road as the primary access route for the site will also avoid the need to trim branches from trees overhanging Black Range Road.

The groundwater recharge function of the ridges and slopes at the turbine sites has been considerably diminished by the loss of soil and native deep-rooted vegetation. The limited loss of herbaceous vegetation that would result from the proposal is not expected to significantly affect groundwater recharge performance at the site. The works are therefore considered unlikely to exacerbate salinity outbreaks in the local area, and no offset plantings are considered to be warranted.

In view of the absence of native forest vegetation or wetland habitats in the development area, the proposal is also not expected to affect fauna connectivity and corridor values.

Because little or no tree clearing is anticipated, prescriptions for the treatment of waste timber waste were not included in the EA. The EA does contain commitments relating to the protection and use of topsoil and sods in revegetation (Commitments CFL5, CFL6, CFL 15 and EA Section 3.5).

Relevant Commitments

DFL2	The southern turbines and access track will be sited to avoid the need to clear or trim remnant eucalypts to the west of the southern turbine sites.
DFL3	The power line will be routed to avoid the need for clearing or trimming of the Long-leaved Box (<i>Eucalyptus goniocalyx</i>) forest remnant on the 'Ferndale' property.
DFL4	The Black Range Road crossing points for the proposed new tracks near the Ferndale residence will be sited in available gaps between mature Yellow Box and Blakely's Red Gum trees in the road reserve. The northern track crossing appears to be sited in such a gap; the southern crossing may

	need to be shifted slightly to the north (to AGD 658311 6141864) to avoid mature trees.
CFL2	Works will avoid impacts to mature eucalypts wherever possible. Wherever practicable, excavations and vehicle/machinery movements will occur outside the canopy drip line of large eucalypts.
CFL5	Excavated topsoil, subsoil and weathered rock will be stored separately and replaced in a manner that approximates the original profile as closely as possible.
CFL6	Where practicable, whole sods will be removed with an excavator where these areas are well-vegetated with dense root systems. Sods will be stored in moist, shaded conditions and replaced following the works. Sod storage time will be minimised and sods will be replaced in a manner that maximises the chances of re-establishment.
CFL15	In areas dominated by native grasses, exposed soils will be lightly mulched with chipped native vegetation or sterile hay, and sown with Weeping Grass (<i>Microlaena stipoides</i>) and/or Wallaby Grass (<i>Austrodanthonia</i> spp), or a cover crop such as oats or millet, depending on season and seed availability. In such areas, seed-bearing native pasture hay could be used for mulching, depending on availability.

Roads and Traffic Authority (RTA)

The RTA recommendations are appropriate and workable, and generally consistent with the proponent's Statement of Commitments.

In particular, the points in the RTA submission are covered as follows:

- point 2 (roadside vegetation clearing) is covered by Commitment CT5;
- point 5 (Payne's Road upgrade) by Commitment CT7;
- point 6 (preferred route notification procedure) by Commitment CT11;
- point 7 (shadow flicker monitoring on Black Range Road) by Commitment OT1;
- point 8 (avoiding fog at Hume Highway intersection) by Commitment CT4;
- point 9 (Traffic Control Plans and Oversize Vehicle Permits) by Commitment CT1;
- point 10 (traffic impact monitoring) by Commitments CT2 and CT3; and
- point 11 (traffic scheduling on Hume Highway) by Commitment CT4.

Signage (point 1) will be addressed in the preparation of a Traffic Management Plan for the intersection of Payne's Road and The Hume Highway (CT10).

Relevant Commitments

CT1	Traffic Control Plans and Oversize Vehicle Permits will be prepared and submitted to the Roads and Traffic Authority for all the operations of over size and over weight vehicles on all the public roads involved in the transport of materials to the site.
CT2	A procedure will be established to monitor the traffic impacts during construction, such as noise, dust nuisance and travel times and work methods modified to reduce the impacts.
CT3	Regular scheduled maintenance of gravel pavements such as grading, dust suppression and drainage control will take place during the construction period.
CT4	Traffic impacts will be reduced by the scheduling of high impact movements to account for varying traffic flows on the Hume Highway. These movements if possible will be scheduled for periods when heavy fogs are unlikely.
CT5	The roadside vegetation will be cleared on the verge of the Hume Highway on the southbound carriageway northeast of Payne's Road to increase the intersection sight distance.
CT7	The pavement, drainage structures and stock grids on Payne's Road require inspection and probable upgrading. The existing narrow pavement requires widening at specific locations to permit opposing traffic to pass safely.
CT10	A traffic management plan will be required for the intersection of the construction track with Black

	Range Road to ensure the safe crossing of construction vehicles.
CT11	A procedure will need to be established to ensure that all construction and related traffic are aware of the preferred site access route via the Hume Highway and Payne's Road.
OT1	The effects of 'shadow flicker' will be monitored from Black Range Road to determine the degree of impact on southbound motorists.

Department of Lands (DoL)

The Department identifies the following Crown land that may be affected by the proposal:

- Crown public roads

The EA notes that approval under section 138 of the *Roads Act 1993* will be required for proposed upgrading works on Payne's Road. While the provisions of s. 91 of the EP&A Act relating to Integrated Development do not apply to the proposal, the proponent would seek appropriate approvals and licences as required.

It is noted that under s. 75V of the Act the s. 138 approval cannot be refused by the relevant roads authority (if approval is granted by the Minister for the Project) and that has to be substantially consistent with the Minister's approval.

There are at least 3 locations where paper roads are likely to be crossed with underground cables and/or access tracks. No major equipment will be located within the boundaries of these Crown roads.

- Trigonometrical reserve

The EA notes that, depending on final cable routes, the proposal may involve the laying of electrical cabling through the Black Trig reserve located in the north of the proposal site. In its submission, the Department of Lands advises that the consent of the Surveyor-General and a licence under the Crown Lands Act would be required if this were the case. If the Trigonometrical Reserve would be affected by the proposal, the proponent will obtain all necessary consents and licences for works affecting the reserve, including non-claimant Native Title applications as required.

The potential impacts of the proposal on telecommunication transmissions are addressed in section 7.3.7 of the EA and related commitments.

It is likely that there will be no impact on the trig reserve; however final site design may require access through the reserve and laying of cables depending on local ground conditions. It is intended that this is avoided where practical; otherwise the relevant consents will be sought.

- Perpetual lease no. 127560

Discussion with Mr Stephen Watts (Land Management Officer, Crown Lands NSW, Goulburn) on 16th October 2006 indicated that conversion of perpetual lease 127560 (lot 207 DP 753596) to freehold land is currently being undertaken. The Department of Land estimates that the conversion process will take approximately 3 to 4 weeks to complete.

Civil Aviation Safety Authority (CASA)

Airservices Australia Procedure Designers have determined that the proposal will not have any adverse effect on the grid lowest safe altitude or on the route lowest safe altitude on any of the air traffic routes in the area.

Notification to this effect with supporting Airservices Australia e-mails was sent electronically by the proponent to Mr Anthony Rohead (District Aerodrome Inspector - CASA) on 25/09/06. We are expecting CASA's formal response shortly and will forward this under separate cover.