In relation to existing dwelling entitlements at these properties, the Department notes that given the size of the properties there would be flexibility (in comparison to small lifestyle allotments) for locating a future dwelling in areas of the property that are not affected by noise associated with the project. In this regard, the Department notes that the Proponent's noise modelling indicates that noise generated by the project would be well within noise limits (i.e. 35 dB(A)) at extensive areas of surrounding properties meaning that there would be scope for locating future dwellings in areas within the properties unaffected by noise generated by the project (refer Figure 11). Further, the Department notes that whilst dwelling entitlements exist on currently undeveloped land there is no certainty that these entitlements would be acted on in the near future given existing restrictions at many properties including limited connection to utility services (sewerage, water and electricity) and road access. In consideration of the above matters, the Department is satisfied that the project would not pose an unacceptable impediment to the future development of dwellings in surrounding properties such as to warrant compensation.

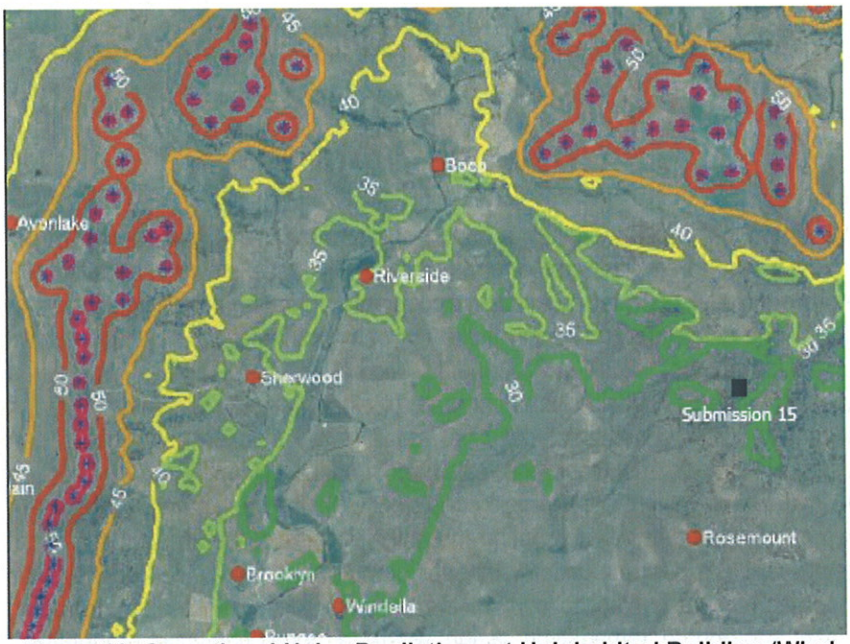

Figure 12: Operational Noise Predictions at Uninhabited Building (Wind Prospect Pty Ltd, April 2010)

A single submission noted that the Proponent's assessment had not taken into account impacts to an existing uninhabited building located within a neighbouring, uninhabited agricultural property to the south, which had the potential to be upgraded in the future to a habitable dwelling. The building site is located approximately 2.5 kilometres to the south of the nearest turbines in the Boco cluster (refer Figure 12). The Department notes that the Proponent's noise assessment does not identify this building as a sensitive receptor, however, based on the noise contour mapping undertaken as part of the assessment, the Department is satisfied that the noise levels likely to be experienced at this site would be within operational noise criteria for the project (i.e. 35 dB(A)). On this basis, the Department is satisfied that the project would not pose any significant noise impediments to the future development potential of this building for a residential dwelling.

Operational Noise – Ancillary Infrastructure

The Department is satisfied based on the Proponent's assessment and predicted low levels of noise generation that the project substation would not pose an operational noise risk to surrounding receptors by itself or cumulatively with surrounding wind turbines. Whilst, the Proponent has not specifically assessed peak noise events associated with the substation ($L_{A1\ (1\ minute)}$), the Department is satisfied the substation is likely to pose a low risk of sleep disturbance during the night time period given its distance to nearest inhabited dwellings (i.e. two kilometres) and given that this type of development would not normally pose a significant source of peak noise events. Notwithstanding, the Department has recommended stringent operational noise verification requirements as part of its conditions of approval to ensure that the substation is designed incorporating all reasonable and feasible mitigation measures to achieve applicable noise criterion at nearest receivers, with consideration of cumulative impacts from the wind turbines.

The Department notes that noise generated by overhead transmission lines is generally intermittent and in most cases not high enough to be audible above background noise. In the case of overhead transmission lines that would be constructed within the project sites, the Department notes that the lines would be located approximately one kilometre from nearest receptors and therefore unlikely to be perceptible at these receptors with respect to noise. Notwithstanding, the Department has recommended conditions of approval requiring the lines to be designed and installed with consideration to the protection of the noise amenity of surrounding dwellings.

Other Noise and Vibration Impacts

In accordance with the Director-General's requirements, the Proponent has assessed construction noise impacts associated with the project consistent with the *Environmental Noise Control Manual* (EPA, 2004) (ENCM). However, the ENCM has more recently been replaced by the *Interim Construction Noise Guidelines* (DECC, 2009) (ICNG) which requires the derivation of construction noise goals based on existing background noise levels rather than construction timeframe as provided by the ENCM. In the case of low existing background noise levels (such as the project site), the INCG requires that construction noise goals be set at background + 10 dB(A). Whilst the Department is satisfied that the Proponent has undertaken a technically robust construction noise assessment consistent with the ENCM, the Department considers it appropriate that predicted noise levels be compared to the alternate noise goals provided in the ICNG, which comprises current best practice for the assessment of construction noise impacts in NSW.

In the case of the establishment of batch plant sites for the purposes of construction, the Department has in the past taken the conservative approach of assessing these sites against the criteria set out in the *NSW Industrial Noise Policy* (EPA, 2000) (INP), where it was considered that the batch plant would constitute a continuous, stationary noise source for an extended period of time such as the entire duration of construction. However in the current project, batch plants sites are expected to be mobile and may be relocated between up to five possible locations as construction works progress across the site. In this case, the Department considers that whilst it is acceptable that the batching plants are assessed against construction noise goals, it is more appropriate to apply ICNG noise goals than the "less than 4 week period" ENCM noise goals applied by the Proponent, as it is likely that the batch plants would operate at the same location for more than four weeks at a time. Notwithstanding the above the Department notes that even if operational noise criteria under the INP were applied and even accounting for the most stringent noise criteria under the INP (i.e. 35 dB(A)), the batch plant sites are predicted to achieve this criteria at all surrounding receptors with the exception of a single dwelling (Avon Lake), which the Department notes is an uninhabited, associated receptor (already subject to a noise agreement).

The Department has identified that when compared to INCG noise goals, exceedances can be expected at up to 19 receptors during the construction of the project. These comprise predicted exceedances at 13 associated receptors (three of which are currently uninhabited) and six non-associated receptors (refer Table 6). Under worst case, exceedances are expected in the range of: 1-22 dB(A) at inhabited associated receptors, 3-22 dB(A) at uninhabited associated receptors, and 1-6 dB(A) at non-associated receptors. The construction of turbine foundations is expected to result in the greatest likelihood and incidence of exceedances (at each of the 19 identified receptors) followed by turbine assembly (six associated receptors). The remainder of construction activities are expected to result in exceedance of noise goals at only a single receptor: Coopers Hill (associated inhabited dwelling) for road access construction and trench excavation; and Avon Lake (uninhabited associated receptor) for batch plant operation.

Whilst comparison against ICNG noise goals has identified additional receptors as being subject to noise exceedances, the Department notes that the Proponent's predictions have been based on worst case conditions of all machinery operating simultaneously and at full load. Typical construction works are unlikely to involve these conditions at all times and therefore noise impacts are likely to be less than that predicted for the majority of time. Furthermore, the Department notes that for most receptors (and all non-associated receptors) exceedances are only predicted in relation to construction activities associated with turbine foundations, which would be limited to a few months rather than the entire construction period. In all cases, the Department notes that the highest exceedances are predicted at associated receptors (which are already subject to negotiated agreements with the Proponent), whilst exceedances of no greater than 6 dB(A) are predicted at non-associated receptors under worst case. Whilst the Department accepts that a 6 dB(A) exceedance still has the potential to result in nuisance noise impacts at non-associated receptors, given the relatively short duration and finite nature of the construction works, the Department considers that the predicted noise impacts would be acceptable.

Table 6: Revised Construction Noise Predictions (modified from Wind Prospect Pty Ltd, November 2009)

Receiver	Background Noise Level (dB(A))	ENCM Noise Goal (dB(A))	INCG Noise Goal (dB(A))	Predicted Noise Levels for Construction Activities (dB(A))				
				Concrete Batching Plant	Access Roads	Turbine Foundations	Trench Excavation	Turbine Assembly
Avonlake* **	26	46	36	**58**	31	**50**	31	**39**
Belmore	22	42	32	-	14	**33**	14	22
Benbullen*	25	45	35	-	25	**44**	25	33
Boco*	26	46	36	23	18	**37**	18	26
Brooklyn*	25	45	35	-	19	**38**	19	27
Bungee	25	45	35	-	17	**36**	17	25
Clifton	25	45	35	-	0	19	0	8
Coombala	22	42	32	-	19	**38**	19	27
Coopers Hill*	22	42	32	-	**35**	**54**	**35**	**43**
Curry Flat	27	47	37	-	8	27	8	16
Edendale	26	46	36	-	3	22	3	11
Glenfinnan*	27	47	37	-	35	**54**	35	**43**
H1	22	42	32	14	15	**37**	15	23
H2	25	45	35	-	0	19	0	8
H3	25	45	35	-	2	21	2	10
Hyland Grange	25	45	35	-	2	21	2	10
Kangaroo Camp Retreat	25	45	35	-	11	30	11	19
Kanoute	25	45	35	-	10	29	10	18
Kelton Plains (Ruin) * **	22	42	32	12	27	**46**	27	**35**
Kenilworth	26	46	36	-	4	23	4	12
Lofty Vale	30	50	40	-	1	20	1	9
Lynndarra	26	46	36	-	4	23	4	12
Mia Mia	27	47	37	-	20	**39**	20	28
Mohawke	25	45	35	-	2	21	2	10
Monastery	22	42	32	-	11	30	11	19
Mountain View	26	46	36	17	13	32	13	21
Nestlebrae* **	26	46	36	20	36	**55**	36	**44**
Old Curry Flat	27	47	37	-	8	27	8	16
Old Springfield*	26	46	36	-	9	28	9	17
Peters Park	22	42	32	-	14	**33**	14	22
Riverside*	26	46	36	15	19	**38**	19	27
Rockybah*	30	50	40	26	29	**48**	29	37
Roselea*	30	50	40	32	30	**49**	30	38
Rosemount	26	46	36	-	5	24	5	13
Roslyn	22	42	32	-	12	31	12	20
Sherwood*	25	45	35	10	14	33	14	22
Springfield*	26	46	35	-	6	25	6	14
Telembugrum*	25	45	35	-	14	33	14	22
Tinbery Lodge	26	46	36	13	16	35	16	24
Windella*	25	45	35	-	15	34	15	23
Wodburn	22	42	32	14	13	32	13	21
Woodbine	27	47	37	-	18	37	18	26
Wyuna*	26	46	36	12	27	**46**	27	35
Xenmor	22	42	32	-	4	23	4	12
Yandra*	26	46	36	10	33	**52**	33	**41**

* denotes an associated receptor
** denotes a currently uninhabited / uninhabitable dwelling

Highlighting denotes exceedances of ICNG noise goals
Shading denotes exceedance of ICNG and ENCM noise goals

The Department further considers that there would be scope for minimising noise generation (compared to the worst case noise levels predicted) through the implementation of standard measures such as the use of low-noise machinery, the erection of temporary shielding and/ or the implementation of respite periods. In this regard and notwithstanding the fact that associated receptors would be subject to negotiated agreements with the Proponent,

the Department considers that noise mitigation measures should be implemented with adequate consideration to associated as well as non-associated receptors, as the former are predicted to result in the highest level of exceedances and in the case of receptors such as Coopers Hill the highest frequency of exceedance (i.e. exceedances during road access construction, turbine foundation construction, turbine assembly and trench excavation). The Department considers that the Proponent should also provide for the management of noise at currently uninhabited, associated dwellings for which exceedances are predicted (such as Avon Lake), should they be inhabited at the time of construction. To ensure that all reasonable and feasible noise mitigation measures are implemented during construction, the Department has recommended conditions of approval requiring the Proponents to develop comprehensive noise management measures as part of a construction environmental management plan, including measures for community notification, noise monitoring and complaints management.

With respect to traffic noise, the Department concurs with the Proponent's assessment that existing road traffic noise levels are likely to be most affected by construction related traffic rather than operational traffic, which would be limited to operational personnel and intermittent maintenance activities. Based on the Proponent's assessment, the Department is satisfied that the construction traffic noise impacts associated with the project are acceptable, given that relevant traffic noise criteria are predicted to be achieved within a moderate setback (i.e. 55 metres) from the road side. Given the rural nature of the area, the Department notes that it is likely that most existing dwellings would be set back at least 55 metres from the roads proposed to be used by the project, and therefore unlikely to be significantly impacted by traffic noise associated with the project.

With respect to vibration impacts, the Department is satisfied that the Proponent's assessment has demonstrated that ground borne vibration and blasting generated during the construction of the project can be managed to achieve relevant human comfort and building damage criteria and that the project would not pose a perceptible source of vibration impacts to surrounding dwellings during operation. The Department has recommended best practice vibration and blasting limits to be incorporated into the conditions of approval to provide performance standards that must be achieved during the construction and operation of the project.

6. CONCLUSIONS AND RECOMMENDATIONS

The Boco Rock Wind Farm project comprises the construction and operation of a wind farm with a total capacity of up to 270 megawatts and associated infrastructure in the Bombala and Cooma-Monaro Shire local government areas. The Proponent has sought project approval for two possible wind turbine layouts (comprising either 122 or 104 turbines) of which only one layout would be constructed. The Department accepts the need for the project with respect to helping to address the State's electricity requirements and considers that the project would entail significant greenhouse gas benefits by resulting in no net greenhouse gas emissions during operation and displacing other greenhouse gas emitting sources of electricity in the National Electricity Market. In this regard, the Department considers the project to be entirely consistent with priorities and targets of the NSW State Plan including "achieve a 60% cut in greenhouse gas emissions by 2050 in line with the Federal Government targets" and "achieve 20% renewable energy consumption by 2020 in light of the Federal Government's expanded Renewable Energy Target".

The key environmental issues associated with the project relate to flora and fauna, visual and landscape, noise and property impacts (including impacts to future development potential and requests for compensation). Submissions on the project mainly reflected these issues, however also raised other concerns including consultation, decommissioning, impacts to aerial agricultural spraying, traffic and transport and waterways.

The Department has assessed the Proponent's Environmental Assessment, Preferred Project Report and Statement of Commitments and submissions received on the project. Based on its assessment, the Department is satisfied that the Proponent has undertaken an appropriate and conservative level of assessment covering both layouts. The Department's assessment indicates that the project would result in some unavoidable biodiversity impact to threatened species habitat and to the Natural Temperate Grassland endangered ecological community. However, the impacts can be suitably offset in perpetuity at ratios of up to 10 hectares to each hectare lost (depending on the species or community) consistent with "maintain or improve" principles. The Department is also satisfied that potential risks in relation to rotor collisions can be effectively managed through the implementation of an appropriate adaptive bird and bat management plan. The Department's assessment on visual and noise impacts has considered impacts on both existing receptors and future development potential and has concluded that significant impacts are unlikely in either case, such as to warrant compensation. In particular, the Department's assessment indicates that in relation to noise, relevant operational criteria would be achieved at all sensitive receptors surrounding the site. Notwithstanding, the Department's assessment indicates that the project may result in some residual impacts to landscape amenity (particularly at a local level). However, the Department does not consider that these residual impacts would outweigh the project's broader public interest with respect to renewable energy generation. To offset residual amenity impacts, the Department has recommended conditions of approval requiring the Proponent to provide an annual contribution of $2500 per turbine to fund local community enhancement initiatives.

The Department's assessment has also addressed a range of other relevant matters. The Department considers that none of these matters raise any significant issues, and is satisfied that any residual impacts can be effectively managed.

The Department has formulated stringent recommended conditions of approval in relation to flora and fauna, visual and landscape, noise, decommissioning, aviation hazard, traffic and transport, waterways and community contributions to ensure that the project achieves acceptable environmental standards, protects public amenity and offsets residual impacts.

On balance, the Department considers the project to be justified and in the public's interest and should be approved subject to the Department's recommended conditions of approval and the Proponent's Statement of Commitments.

15.7.10

Chris Wilson
Executive Director

18/7/10

Richard Pearson
Deputy Director-General