Our reference: DOC16/504288-03; EF16/308
Contact: Sharon Peters

Ms Elle Donnelly
Planning Services
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

17 November 2016

Dear Ms Donnelly

Re: Crookwell 2 Wind Farm (DA 176-8-2004-i) - Modification 2

I refer to your email dated 7 October 2016, requesting comments from the NSW Environment Protection Authority (EPA) in relation to the proposal to modify the approved Crookwell 2 wind farm. Crookwell Development Pty Ltd ('the proponent') seeks to modify the existing development consent to reduce the number of wind turbines, include a 50 metre micro-siting allowance, make changes to the lighting and telecommunications infrastructure, and increase the turbine envelope to allow for newer turbine models which have the potential for greater energy yields than the currently approved models.

The EPA has reviewed the supporting documentation provided which includes an Environmental Assessment (EA) prepared by Mecone and dated 29 September 2016. The EA contains a revised Noise Impact Assessment (NIA) undertaken by SLR Consulting Pty Ltd. As some sensitive receptors are affected by both Crookwell 2 and Crookwell 3 wind farms the NIA addresses the cumulative operational noise impacts of both proposals.

The NIA concludes that the modified Crookwell 2 wind farm proposal can be constructed and operated to achieve compliance at all sensitive receptors using a mitigated layout where some wind turbines are operated in Noise Management Mode (NMM). Please refer to **Attachment A** for further details in relation to EPA's review of the modification proposal. The EPA advises it could issue an Environment Protection licence for the modified Crookwell 2 wind farm subject to the recommended noise limits provided in **Attachment B** to this letter and requests these be formalised as conditions of any approval.

The supporting documentation provided does not specifically identify whether the construction of both wind farm projects will occur simultaneously or independent of each other. The traffic/materials delivery route is essentially the same for both projects, however the NIA has not taken into consideration the potential for cumulative noise generated during the construction phase from sources including traffic noise, construction works or any potential blasting activities.

Large scale wind farms that have a capacity for generating more than 30 megawatts of electricity and/or approved as a major project require an Environment Protection Licence under the *Protection of the Environment Operations Act* 1997 for both the construction and operational phases. The EPA notes that whilst construction activities for this project reportedly commenced in 2009, wind turbines have not yet been installed. Should this modification be approved, the applicant will need to apply for a Licence for the premises prior to commencement of **any** further construction activities.

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If you have any queries or wish to discuss this matter further, please contact Sharon Peters on (02) 6229 7002.

Yours sincerely

JULIAN THOMPSON
Unit Head, South East Region
Environment Protection Authority

ATTACHMENT A

NSW EPA comments on Crookwell 2 Wind Farm Project Modification 2
November 2016

The EPA notes that the proponent has submitted a concurrent modification to the development application for Crookwell 3 Wind Farm. Given the close proximity of the Crookwell 1, 2, and 3 wind farms, the NIA assesses the cumulative operational noise impacts, uses the same input and model data, and the reports themselves are largely identical.

The NIA predicted that some receivers would be impacted, however, found that compliance at all receptors could be achieved using a mitigated layout where some turbines are operated in Noise Management Mode (NMM). The assessment suggested that NMM can be used on selected wind turbines to enable otherwise non-compliant turbine models to meet the criteria. It further stated that NMM would mean those turbines always operate in a low noise mode (NMM), as opposed to sector management which turns certain turbines off depending on wind directions.

During its review EPA noted the following inconsistencies in relation to sensitive receiver locations which should be reviewed by the proponent and DPE prior to granting any approval. The EPA compared the coordinates given in the noise impact assessment with available aerial and satellite imagery and topographic maps, and noted that some locations appear up to 1500 metres from their ' true' location, for example:

- R32 which is near a gate, about 250 metres west of the nearest house;
- R38 which is in the middle of a public road;
- R56 "Mathlie", which is actually about 500 metres north, according to Google Maps, SIX Maps (3 November 2016) and the topographic map;
- R77 "Bellevue Park" which is in a public road reserve, about 340 metres east of the house marked "Bellevue" on SIX Maps (3 November 2016) and the topographic map;
- R97 which has the same coordinates as R98;
- R125 which is about 190 metres south east of a house marked "Wulcuru" on SIX Maps (3 November 2016) and the topographic map;
- R133 "Lake Edward" which is about 1500 metres NNW of the homestead marked as "Lake Edward" on SIX Maps (3 November 2016) and the topographic map.

Recommendation: The proponent check and confirm the exact location of each identified receiver and quantify any resulting change to modelled noise levels.

The EPA is supportive of the proposed approach to use noise management mode in certain turbines to achieve noise limits, however, based on the information provided, and prior to granting approval, EPA recommends DPE should:

- Require the proponent to:
  - check and confirm the exact location of each identified sensitive receiver
  - quantify the impact of any change on modelled noise levels in the NIA
- Confirm that sector management, if needed, is a viable (technical and financial) option for noise mitigation for the project should measured noise levels not meet predictions in the NIA.

The Department of Planning and Environment should confirm with the proponent that sector management, if needed as a noise mitigation measure, is a viable technical and financial option.

ATTACHMENT B

NSW EPA Recommended conditions for noise and blasting – Crookwell 2 Wind Farm Modification 2

Noise Limit Conditions (suggested to replace conditions 40 and 43 – 46 of the current approval)

40 Construction activities associated with the project, including heavy vehicles entering and exiting the site, may only be carried out:

a) between 7am and 6pm, Monday to Friday
b) between 8am and 1pm Saturdays
c) at no time on Sundays or Public Holidays.

40A The following activities may be carried out outside the hours specified in condition 40:
a) construction that causes $L_{Aeq(15minute)}$ noise levels that are:

I. no more than 5dB above Rating Background Level at any residence in accordance with the *Interim Construction Noise Guideline* (DECC, 2009); and
II. no more than the Noise Management Levels specified in Table 3 of the *Interim Construction Noise Guideline* (DECC, 2009) at other sensitive land uses; or

b) for the delivery of materials required by the police or other authorities for safety reasons; or
c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
d) as approved through the process outlined in condition 4 of this approval.

40B The hours of construction activities specified in this approval may be varied with the prior written approval of the Secretary. Any request to alter the hours of construction shall be:

a) considered on a case-by-case or activity-specific basis
b) accompanied by details of the nature and justification for activities to be conducted during the varied construction hours
c) accompanied by written evidence that appropriate consultation with potentially affected sensitive receivers and notification of relevant Council(s) (and other relevant agencies) has been and will be undertaken
d) all feasible and reasonable noise mitigation measures have been put in place
e) accompanied by a noise impact assessment consistent with the requirements of the *Interim Construction Noise Guideline* (DECCW, 2009).

43 For wind speeds from cut in to rated power of the wind turbine generators, wind turbine noise generated from the premises must not exceed the greater of:

a) 35 dBA or
b) the existing background noise level plus 5 dBA for each integer wind speed at 10 metres above ground level at the wind farm site

at the nearest non-involved residential receivers.

43A For the purpose of determining compliance with condition 43, the locations and noise limits in the table below apply. The locations referred to in the table below are defined in condition 44A.

Location	**$L_{eq(10minute)}$ NOISE LIMITS (dBA)**									
Integer wind speed (m/s) at hub height	**3 or less**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12 or more**
R1, R8	35	35	35	35	35	35	36	38	41	45
R19	35	35	35	35	35	35	37	38	41	43
R20, R117, R118, R119	35	35	35	35	35	35	36	38	41	43
R58, R59	35	35	35	35	35	36	38	39	41	42
R60, R61, R62	35	35	35	35	35	36	38	40	43	45
R64, R65	35	35	35	35	35	38	41	43	46	48

R69, R70	35	35	35	35	35	35	38	40	44	46
R71, R73	35	35	35	35	35	37	40	42	45	48
R106	37	38	39	40	42	44	45	47	49	51
R120, R123, R124, R130, R131	35	35	35	36	37	38	39	41	42	43

44 The noise limits specified in conditions 43 and 43A do not apply to any sensitive receiver location (residence) where a noise agreement is in place between the licensee and the respective land owner(s) in respect to noise impacts and/or noise limits.

Drafting note: the proponent should confirm the names and grid references of all assessed receivers, particularly those marked with superscripts "a" to "d".

44A For the purpose of condition 43A, locations are defined in the table below. Grid references (eastings and northings) refer to the Map Grid of Australia 1994 (MGA94), zone 55.

Location	Name	Easting (m)	Northing (m)
R1[a]	Evermore	731647	6172983
R8	Narangi	733838	6172296
R19	Wombat Hollow	735698	6171835
R20	Normaroo	735970	6172727
R58		741473	6171450
R59	Glenyarren[b]	741415	6171733
R60	Pejar Park	740389	6172231
R61	Wallaroobie	741369	6171908
R62	Cottonwood	741337	6172055
R64	Valarnam Hill[c]	740395	6174100
R65[d]	Windalee	740315	6174217
R69	Atholvale	740191	6175752
R70	Snowgum	739339	6175736
R71	Lynross	739396	6176926
R73	Highlands	739184	6177867
R106	Rosedale	742598	6176726
R117	Rainmore House DA1	735603	6172925
R118	Rainmore House DA2	734952	6173081
R119	Rainmore House DA3	734950	6172706
R120[a]	Elmgrove	733927	6176267
R123		731321	6175616
R124		731448	6174361
R130[a]	Wharekorari	734250	6177739
R131	Wharekorari (new)	733732	6178313

a. EPA could not verify these locations. The coordinates given in the noise impact assessment were more than 20 metres from the nearest house in EPA aerial imagery.
b. This house was not named in the noise impact assessment, but was named on the topographic map.
c. This name was taken from the topographic map, and is different to the name in the noise impact assessment.
d. EPA could not verify this location. The coordinates in the noise impact assessment are about 50 metres east of the house marked as "Valarnam Hill" on the topographic map.

45 For the purpose of condition L6.1, noise must be determined in accordance with the methodology in the *Environmental Noise Guidelines: Wind Farms* (SA EPA 2003). The modification factors in Section 4 of those guidelines must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

45A For the purpose of conditions 43 and 43A, the presence of excessive tonality (a special noise characteristic) must be determined in accordance with ISO 1996.2:2007 *Acoustics - Description, measurement and assessment of environmental noise - Determination of environmental noise levels*.

If tonality is found to be a repeated characteristic of the wind turbine noise, 5 dBA should be added to measured noise level from the wind farm. If tonality is only identified for certain wind directions and speeds, the penalty is only applicable under these conditions.

The tonal characteristic penalty applies only if the tone from the wind turbine is audible at the relevant receiver. Absence of tone in noise emissions measured at an intermediate location is sufficient proof that the tone at the receiver is not associated with the wind farm's operation.

The assessment for tonality should only be made for frequencies of concern from 25 Hz to 10 kHz and for sound pressure levels above the threshold of hearing (as defined in ISO 389.7:2005 *Acoustics - Reference zero for the calibration of audiometric equipment - Part 7: Reference threshold of hearing under free-field and diffuse-field listening conditions*.

The maximum penalty to be added to the measured noise level from the wind farm for any special noise characteristic individually or cumulatively is 5 dB(A).

45B For the purposes of condition 45A, wind speed is to be measured directly in accordance with a method nominated by the proponent and at a location nominated by the proponent, consistent with the method and location used to determine the background noise regression curves in the Noise Impact Assessment.

Drafting note: the proponent should nominate the location and method for wind speed monitoring in condition 45B.

46 To determine compliance:

a) with the $L_{eq(10\ minute)}$ noise limits in conditions 43 and 43A, the noise measurement equipment must be located:
   - approximately on the property boundary, where any dwelling is situated 20 metres or less from the property boundary closest to the premises; or
   - within 20 metres of a dwelling façade, but not closer than 5m, where any dwelling on the property is situated more than 20 metres from the property boundary closest to the premises.

b) with the noise limits in conditions 43 and 43A, the noise measurement equipment must be located:
   - at the most affected point at a location where there is no dwelling at the location; or
   - at the most affected point within an area at a location prescribed by condition 46(a).

46A A non-compliance of condition 43 or 43A will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- at a location other than an area prescribed by conditions 46(a) and 46(b); and/or
- at a point other than the most affected point at a location.

<u>Suggested new conditions – noise validation monitoring and mode checking</u>

Pre-commissioning validation monitoring

If any wind turbine is operated before the project is commissioned, then the proponent must perform a type test on each one of those turbines within three months of it coming in to operation. The type test must be performed in accordance with IEC 61400-11.

Mode checking

Before using sector management or a noise management mode for any operational wind turbine, the proponent must provide a method by which the Department of Planning and Environment, EPA and community can easily verify that each wind turbine is operating in the correct mode at any time.