

APPENDIX G PRELIMINARY NOISE ASSESSMENT

Prepared by SLR Consulting

HILLS OF GOLD WIND FARM

Preliminary Noise Assessment

Prepared for:

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PO Box 470
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with NGH Environmental Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
640.11759-R01-v1.1	11 September 2018	Benjamin French	David Lindsey	Gustaf Reutersward
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CONTENTS

1	INTRODUCTION.....	4
1.1	Proposal description	4
1.2	Wind farm site	5
1.3	Preliminary investigation: worst case approach.....	6
1.4	Wind farm layout.....	6
	1.4.1 Sound power levels	6
1.5	Noise sensitive locations.....	6
2	NOISE CRITERIA.....	7
3	NOISE PREDICTIONS	7
4	CONCLUSION	10

DOCUMENT REFERENCES

TABLES

Table 1	Predicted WTG noise level.....	8
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APPENDIX A

PREDICTED WTG NOISE CONTOUR MAP

1 Introduction

Wind Energy Partners (WEP or the Proponent) proposes to develop a wind farm on the ridgeline between Hanging Rock and Crawney Pass, 60 km south-east of Tamworth. The proposed wind farm will supply electricity directly into the national electricity grid through a proposed connection into the TransGrid Liddell to Tamworth transmission line.

SLR Consulting (SLR) Pty Ltd has been engaged by NGH Environmental Pty Ltd (NGH) on behalf of the Proponent to complete a Preliminary Noise Assessment for the proposed Hills of Gold Energy project wind farm site, located approximately 9 km to the south east of the township of Nundle in NSW.

The NSW Department of Planning and Environment released the *Wind Energy Noise Assessment Bulletin for State significant wind energy development* in December 2016. During the Scoping and Pre-lodgement phase of a project it requires:

Proponents of wind energy projects are required to consider the potential noise impacts of a wind energy project at all stages of the project, including during the site selection and project design phase, where the development should be designed to minimise noise impacts.

At the pre-lodgement stage, a proponent should undertake an indicative noise impact assessment of noise levels expected at all receivers. The indicative noise assessment will form part of the Preliminary Environmental Assessment to be submitted when making a request for SEARs. While it is recognised that a project's design may change at the development application stage, it is important to provide early indicative noise predictions using simple modelling techniques and conservative assumptions. Such assumptions would include using the maximum sound power level of the likely turbine proposed and calculated under the worst case noise propagation conditions. These indicative predictions should be compared against the base criteria adopted in NSW of 35 dB(A), unless detailed studies support more elevated criteria on the basis of prevailing background noise levels.

This report has been prepared as a preliminary noise assessment for the project.

1.1 Proposal description

The Hills of Gold Energy project proposal would comprise of the installation of a wind farm with a capacity up to 410 MW that would supply electricity to the national electricity grid through capacity available in the TransGrid Liddell to Tamworth transmission line.

It is currently proposed that the wind farm would include development of the following infrastructure:

- Up to 97 wind turbines, mounted on tubular steel towers. It is currently proposed that each turbine will have a maximum tip height of 220 m above ground level.
- Construction compound and temporary construction infrastructure, potentially including concrete batching facilities.
- Electrical connections between wind turbines and the substations (likely to be underground, subject to constructability).
- Internal access tracks and upgrades to existing access roads, where required.

- Up to two substations and control room.
- Approximately 23 km of high voltage, overhead powerline, connecting the wind farm site to the TransGrid Liddell to Tamworth transmission line.
- Connection infrastructure including a switching station and battery storage.

The project will have three stages:

1. Construction - The duration of the construction period will be approximately 24 months.
2. Operation - The operational life of the wind farm is expected to be 35 years.
3. Decommissioning - At this time, infrastructure may be recommissioned or decommissioned and the site rehabilitated to its current land capability for ongoing agricultural or alternative land use.

The wind farm will be connected to the existing 330 kV TransGrid Liddell to Tamworth transmission line. A new overhead transmission line will be required from the site's north-eastern sector, north west, to Lindsays Gap Road; a total distance of approximately 23 km.

A proposed solar farm is being considered by WEP in the vicinity of the connection corridor and will be the subject of a separate and independent application, following further investigations.

1.2 Wind farm site

The proposed Hills of Gold Energy project site boundaries comprise approximately 6,808 ha. Land on which the project is proposed to be located is owned by six freehold landholdings and includes Crown land paper roads. Additional land is required to host the transmission line route.

The Development Corridor within the project boundary is predominately agricultural land with a high percentage of overstorey native vegetation adjacent to the Development Corridor and within steeper terrain. The site has a history of agricultural use (grazing cattle). Adjacent land uses include agriculture (grazing) as well as forestry and a national park estate.

The wind farm site contains the head waters of the Peel River, with several low order streams and springs located the higher elevations.

Wind turbines and ancillary infrastructure are expected to be located within the cleared, elevated plateau / ridge line land as much as possible.

1.3 Preliminary investigation: worst case approach

The Proponent has provided the following in relation to the investigation of a ‘worst-case’ layout in advance of a more definitive indicative layout being available.

An indicative turbine layout, including turbine siting, requires agreements with potentially affected landholders. To reduce the potential of misleading these landholders at this preliminary stage, and to ensure the proposed layout best responds to the site’s constraints, this PEA presents information informed by a worst-case layout.
This ‘worst case’ approach will ensure a comprehensive assessment of potential impacts and provide the best information to inform a finalised infrastructure layout that responds to the identified constraints. The potential impacts that are anticipated to reduce throughout the assessment process. Design and turbine siting is an iterative process that will be informed by continued community engagement and specialist assessments. A detailed indicative layout will be presented within the EIS, ensuring the community has the opportunity to discuss concerns and provide feedback prior to its release.

This preliminary noise assessment has modelled the noisiest wind turbine model that may be considered and the upper number of wind turbines that are considered feasible for the site at this stage.

This ‘worst case’ approach will ensure a comprehensive assessment of potential impacts and provide the best information to inform a finalised infrastructure layout that responds to the identified constraints. It is expected however, to show elevated impact predictions at this stage and should be interpreted in this context.

1.4 Wind farm layout

The Hills of Gold project could consider blades between 65-78 m in length such that they don’t exceed the final development envelope. The project proposes a turbine hub height of between 130 m and 155 m above ground. For the purposes of noise predictions, a WTG hub height has been modelled at the maximum height of 155 m.

A worst-case layout comprised of 97 WTGs of 4.5 MW capacity has been considered. The WTGs follow an elevated ridgeline, forming a “U” shape, that spans approximately 24 km in length.

1.4.1 Sound power levels The preliminary noise assessment has assumed a maximum sound power Level of 106.8 dBA, which is consistent with the estimates provided by the manufacturer for a WTG of this capacity.

1.5 Noise sensitive locations

The majority of nearby residential receptors (within approximately 4 km of WTGs) are located to the north of the wind farm site. The map in **Appendix A** shows the location of the nearest noise sensitive locations, indicating which receptors are currently considered to be project involved.

2 Noise criteria

The NSW Government has adopted the South Australian EPA document *Wind farms – environmental noise guidelines – 2009* as basis of the regulatory noise standard and assessment methodology.

The minimum noise criteria are:

- 35 dBA, and
- 45 dBA for project involved receptors.

3 Noise predictions

Noise modelling of the worst-case layout was completed using SoundPLAN V7.4 software implementing algorithms from ISO9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation*.

The ISO9613 method are for downwind noise propagation, and as such the prediction model assumes downwind noise propagation from all sources to all receptors. It should be noted that this assumption is conservative can yield an unrealistic overprediction in some circumstances as it is not possible for the wind to blow from all directions simultaneously. In the predictive assessment of wind farm noise, the actual frequency distribution of wind directions is not used.

The preliminary noise model conservatively assumes an acoustically hard ground, which is a worst-case assumption.

The predicted noise level at residential receptors is detailed in **Table 1** and shown graphically in **Appendix A**.

Table 1 Predicted WTG noise level

Receptor	WTG noise level dBA	Minimum criteria dBA	Complies	Exceedance dBA
1	20.8	35	Y	
2	21.1	35	Y	
3	21.2	35	Y	
4	21.4	35	Y	
5	21.6	35	Y	
6	22.1	35	Y	
7	21.6	35	Y	
7	25.8	35	Y	
7a	25	35	Y	
8	25.5	35	Y	
9	24	35	Y	
10	24.3	35	Y	
11	26.7	35	Y	
12	27.7	35	Y	
13	25	35	Y	
14	29.9	35	Y	
15	30.2	35	Y	
16	31.4	35	Y	
17	32.4	35	Y	
18	33	35	Y	
19	32.5	35	Y	
20	28.1	35	Y	
21	35.9	35	N	0.9
22	37.7	35	N	2.7
23 - PI	46.7	45	N	1.7
24	36.8	35	N	1.8
25	34.4	35	Y	
26	42	35	N	7
27 - PI	44.5	45	Y	
28	32.6	35	Y	
29	31.8	35	Y	
30	28.7	35	Y	
31	36.8	35	N	1.8
32 - PI	47.9	45	N	2.9

Receptor	WTG noise level dBA	Minimum criteria dBA	Complies	Exceedance dBA
33	30.7	35	Y	
33a	34.5	35	Y	
33b	29.6	35	Y	
34 - PI	37.8	45	Y	
34a	34.7	35	Y	
35	36.7	35	N	1.7
36 - PI	36.5	45	Y	
37 - PI	52.4	45	N	7.4
38 - PI	40.2	45	Y	
39	29.2	35	Y	
40 - PI	27.3	45	Y	
41	27.6	35	Y	
42 - PI	29.3	45	Y	
43	31.9	35	Y	
44	28.6	35	Y	
45	22.8	35	Y	
46	19.8	35	Y	
46a	19.1	35	Y	
47	28	35	Y	
48	29.7	35	Y	
50 - PI	39.2	45	Y	

PI = Project involved

4 Conclusion

The preliminary noise predictions of a worst-case layout with no mitigation applied indicate that:

- the minimum 35 dBA noise criteria are able to be met for most project non-involved receptors, with the exception of:
 - 5 non-involved receptors were predicted to potentially exceed this minimum noise criteria by up to 2 dBA to 3 dBA, and
 - a single project non-involved receptors which is predicted to potentially exceed this minimum noise criteria by up to 7 dBA.
- the minimum 45 dBA noise criteria are able to be met for most project involved receptors, with the exception of:
 - 2 non-involved receptors were predicted to potentially exceed this minimum noise criteria by up to 2 dBA to 3 dBA, and
 - a single project involved receptors which is predicted to potentially exceed this minimum noise criteria by up to 7 dBA.

During the detailed noise impact assessment to be completed with the submission of an EIS it is anticipated the following will be undertaken:

- Baseline noise monitoring at nearby receptors to quantify the existing ambient noise environment. Background noise levels will be statistically regressed with wind speed. The background noise 'curve' is then used to determine the relevant noise criteria for each site across the full operating wind speed range.
- Refinement of the noise model input assumptions e.g. WTG sound power level, ground terrain and hardness etc.
- Refinement and consolidation of the wind farm layout.
- Noise optimised operation of WTGs.
- Finalisation of project involved land-holders

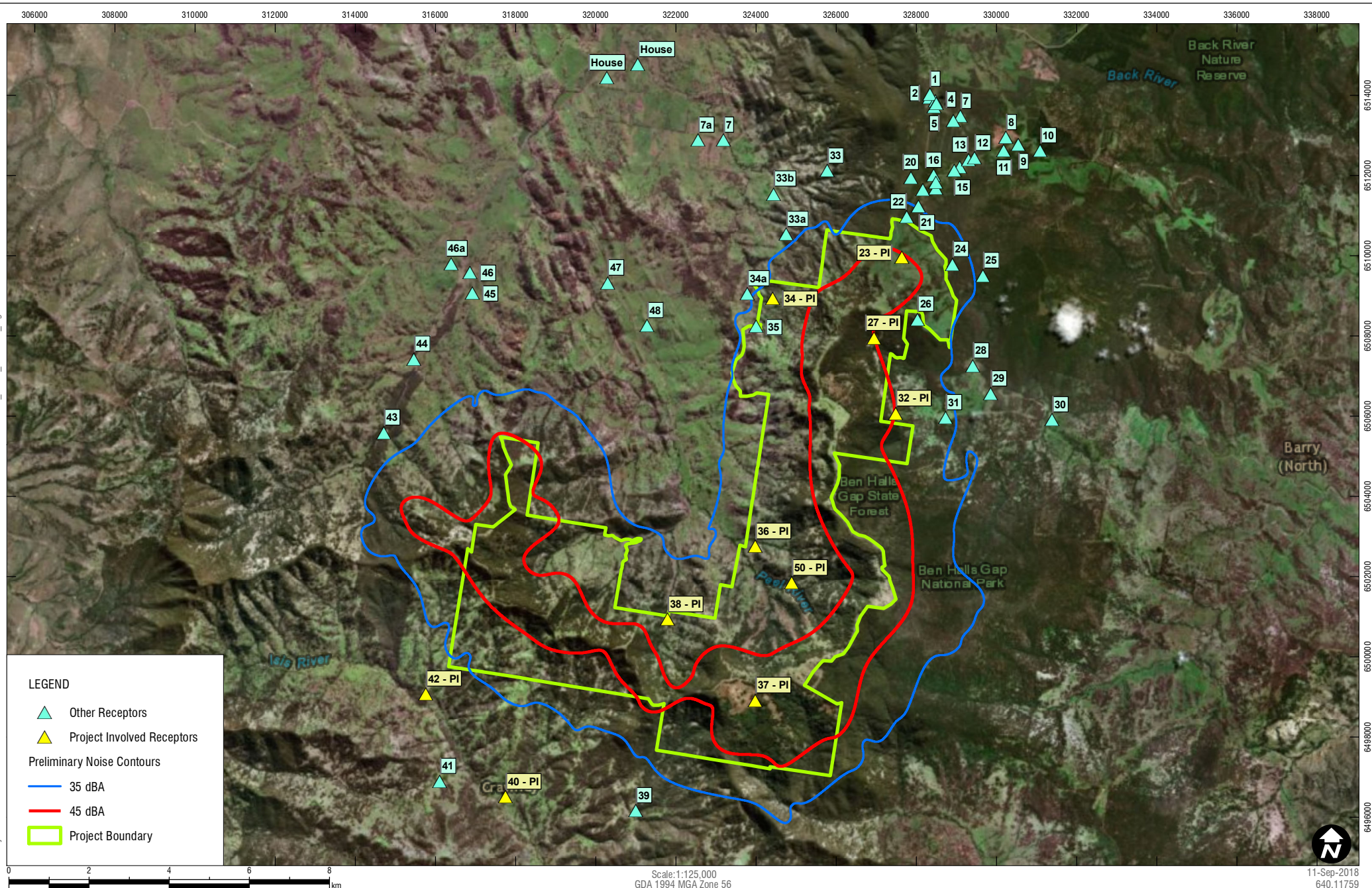
During the detailed noise impact assessment, it is anticipated that the marginal level of exceedance currently predicted at most receptors will be resolved.

The Proponent will be seeking to undertake detailed studies and consult with nearby landowners who are potentially affected.

APPENDIX A

Predicted WTG noise contour map

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