

|                 |   |             |                                  |
|-----------------|---|-------------|----------------------------------|
| <b>To:</b>      | Leonard Slabbert  | <b>At:</b>  | Tract Consultants                |
| <b>From:</b>    | Gustaf Reutersward  | <b>At:</b>  | SLR Consulting Australia Pty Ltd |
| <b>Date:</b>    | 22 October 2021   | <b>Ref:</b> | 640.30153-M04-v1.0-20211022.docx |
| <b>Subject:</b> | Palings Yard Wind Farm<br>Preliminary Noise Impact Assessment |             |                                  |

## CONFIDENTIALITY

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## 1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Tract Consultants (Tract) to provide a preliminary screening assessment of potential noise impacts to the planning being undertaken for the Paling Yards Wind Farm Project, hereafter referred to as the “Project”. Tract themselves has been engaged to provide project management services by the Project proponent Global Power Generation Australia (GPG).

The NSW Government has a wind energy framework to provide greater clarity, consistency and transparency for industry and the community regarding both assessment and decision-making on wind energy projects. 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 screening noise assessment for the project.

## 2 Project Description

The Project is located approximately 60 km north of Goulburn and 35 km north-east of Crookwell, in NSW. To the west lies the Abercrombie River National Park and to the east is Mount Werong State Forest.

The Project is to be located on the landholdings known as 'Mingary Park', 'Middle Station', 'Hilltop' and 'Paling Yards' which comprise a total of approximately 4,600 hectares. The Project also contains a transmission line corridor located across nine parcels of land to the north-east of the site. The site is situated in the Central Tablelands of NSW.

A State Significant Development (SSD) application will be made for the Project to the NSW Department of Planning, Industry and Environment (DPIE).

The Project proposes a wind farm with a total capacity of approximately 310MW and will have a total operational life of 30 years. At this stage, the construction of the Project is planned for commencement in early 2022 with a timeframe of 24 months.

The wind farm will include the following elements:

- Approximately 47 wind turbines with a total height of 240m (blade tip height);
- Corresponding individual kiosks for the housing of equipment;
- Three wind monitoring masts, fitted with various instruments such as anemometers, wind vanes, temperature gauges and other electrical equipment;
- Obstacle lighting to selected turbines (if required);
- Wind farm substation and approximately 9.0km of overhead powerline of up to 500kV;
- Removal of native vegetation and additional vegetation planting to provide screening (as required);
- Upgrade to existing local road infrastructure and internal unsealed tracks;
- Temporary batching plant to supply concrete.

### 2.1 Characteristics of the Site

The proposed project site incorporates three landowners. A noise assessment has been carried out for all dwellings within 10 kilometres of a turbine under SA EPA Guidelines.

For project involved receptor locations, those who have agreements with GPG, a noise assessment has been carried out under WHO Guidelines to ensure there is no unreasonable impact on amenity.

Topographically, the proposed site runs along a plateau, bisected by Goulburn Oberon Rd. This plateau is approximately 800 m to 1000 m above sea level. The surrounding district is primarily used for agricultural (grazing) purposes with areas surrounding project site covered in native vegetation.

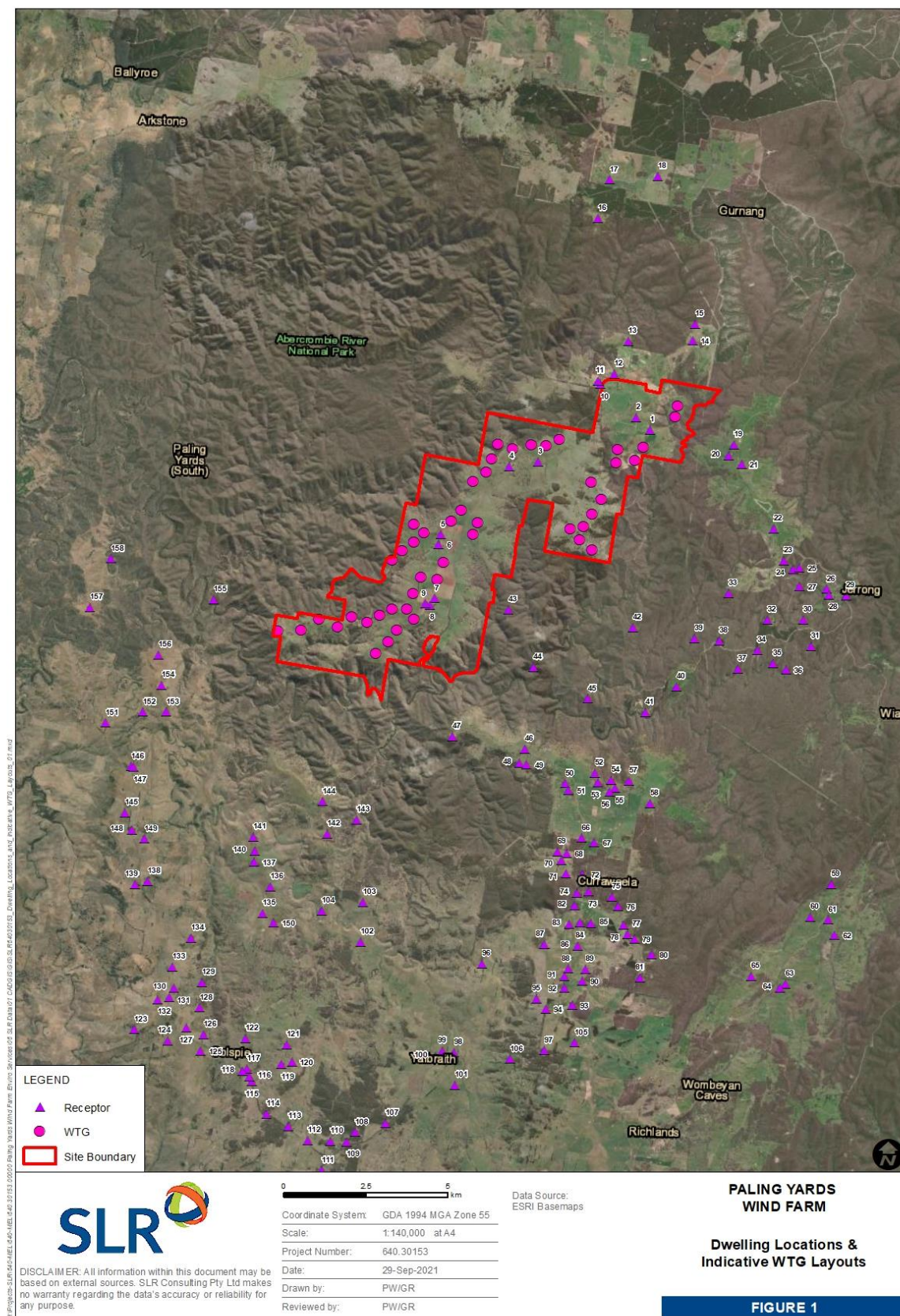
The Abercrombie River is to the south of the project site and plateaus in a steep gully. Prevailing winds are easterlies and westerlies. The district receives approximately 700 mm – 800 mm of rainfall annually

All receptors surrounding the proposed Wind Farm site have an ambient background noise environment that is determined by pre-dominantly natural sources which are largely wind influenced. Previous noise assessment of an earlier proposed layout of this project were undertaken by SLR Consulting and included baseline noise monitoring in 2011. However, this preliminary screening assessment will only consider the relevant base noise limits and it is anticipated that updated baseline noise monitoring will be completed in a subsequent detailed noise assessment.

### 1.1 Dwelling Locations

Receptors are situated on either side of Goulburn-Oberon Rd (Also known as Abercrombie Rd) and are predominantly to the south-west, south, as well as a cluster on a plateau to the east of the wind turbines. The assessment locations include all dwellings located within 10 km of a proposed WTG. **Figure 1** shows the nearby dwellings assessed for the project in and indicative turbine positions are shown in red.

**Figure 1 Dwelling Locations and Indicative WTG Layout**





## 2.2 Preliminary Investigation:

GPG has provided the updated layout as per email dated 13 September 2021 which has two alternative indicatively sized WTG models being considered. The modelling include:

Layout A = 47 WTGs - @ 6.2MW

Layout B = 47 WTGs - @6.6MW

It is expected however, to show elevated impact predictions at this stage and should be interpreted in this context.

**2.2.1 Sound Power Levels** Table 1 presents the manufacturer estimated sound power levels and frequency spectrum consistent with that for a WTG of the considered capacity. The presented sound power levels have been used as the basis of the modelling impact assessment and will be revised when finalised manufactures data is available.

**Table 1 Assumed Sound Power Level**

| WTG Size       |          | Octave band sound power level, dBA |       |       |       |      |      |      |      | Overall dBA |
|----------------|----------|------------------------------------|-------|-------|-------|------|------|------|------|-------------|
| Rotor diameter | Capacity | 63Hz                               | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz |             |
| 162 m          | 6.2 MW   | 77                                 | 89    | 96    | 100   | 100  | 97   | 90   | 79   | 104.8       |
| 170 m          | 6.6 MW   | 87                                 | 94    | 96    | 97    | 100  | 100  | 95   | 84   | 105.5       |

## 3 Noise Criteria

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

The minimum noise criteria is:

- 35 dBA at relevant receivers in localities which are primarily intended for 'rural living' e.g. rural-residential 'lifestyle' area
- 40 dBA at relevant receivers in localities in other zones e.g. intensive primary production areas

For project involved receptors there is typically an agreement in place with the wind farm developer, which provides the developer with land for appropriate siting of the wind farm and also offers the landowner a level of compensation and diversity in their income stream. However, developers still have obligations under the EP Act by entering into an agreement with a landowner. In practice this typically achieved by adopting a World Health Organization *Guidelines for Community Noise* recommendation which translates to an external limit of 45 dBA.

## 4 Noise Predictions

Noise modelling of the worst-case layout was completed using SoundPLAN V8.1 software implementing algorithms from ISO9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation (ISO9613)*.

The ISO9613 method is for downwind noise propagation, and as such the prediction model assumes downwind noise propagation from all sources to all receptors. This propagation assumption is conservative and 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.

Furthermore, the model input parameters recommended by the UK Institute of Acoustics - *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (IoA Wind turbines) as implemented in SoundPLAN were adopted, which include:

- Atmospheric conditions at 10°C temperature and 70% relative humidity.
- Topographic screening attenuation of no greater than 2 dB
- 4 m receptor height
- A conservative 100% acoustically hard ground ( $G=0$ ) has been assumed.
- + 3 dB(A) correction where a concave ground profile “across a valley” between a wind turbine and a receptor, defined as:  $h_m \geq 1.5 \times (\text{abs}(h_s - h_r) / 2)$

The predicted Leq noise level at all residential receptors for Layout A are detailed in **Table 2** and shown graphically in **Appendix A**.

**Table 2 Layout A - Predicted WTG Leq Noise Level**

| Receptor | Description / Agreement status | Northing (m) | Easting (m) | Distance to nearest WTG (km) | WTG noise level, (dBA) | Minimum criteria (dBA) | complies |
|----------|--------------------------------|--------------|-------------|------------------------------|------------------------|------------------------|----------|
| 8        | House - Agreement              | 6217349      | 752720      | 0.5                          | 46.1                   | 45                     | N        |
| 6A       | House - Agreement              | 6220843      | 759168      | 0.5                          | 43.5                   | 45                     | Y        |
| 8A       | House - Agreement              | 6217645      | 752775      | 0.5                          | 46.2                   | 45                     | N        |
| 9A       | House - Agreement              | 6215538      | 752297      | 0.5                          | 46.5                   | 45                     | N        |
| 7        | House - Agreement              | 6219927      | 755733      | 0.5                          | 44.9                   | 45                     | Y        |
| 7A       | House - Agreement              | 6219783      | 754852      | 0.6                          | 45.6                   | 45                     | N        |
| 9B       | House - Agreement              | 6215711      | 752581      | 0.6                          | 44.9                   | 45                     | Y        |
| 9        | House - Agreement              | 6215508      | 752455      | 0.6                          | 45                     | 45                     | Y        |
| 6        | House - Agreement              | 6221219      | 758725      | 0.9                          | 40.6                   | 45                     | Y        |
| 5        | House - No Agreement           | 6222233      | 757652      | 2.0                          | 34.5                   | 35                     | Y        |
| 114      | House - No Agreement           | 6220400      | 761708      | 2.0                          | 32.6                   | 35                     | Y        |
| 2A       | House - No Agreement           | 6223577      | 760453      | 2.0                          | 29.9                   | 35                     | Y        |
| 4        | House - No Agreement           | 6222283      | 757528      | 2.0                          | 34.2                   | 35                     | Y        |
| 115      | House - No Agreement           | 6220052      | 761553      | 2.1                          | 32.7                   | 35                     | Y        |
| 3        | House - No Agreement           | 6222550      | 758065      | 2.1                          | 33.3                   | 35                     | Y        |
| 10       | House - No Agreement           | 6215678      | 745869      | 2.1                          | 29.4                   | 35                     | Y        |
| N        | House - Non identified         | 6215362      | 754842      | 2.4                          | 34.3                   | 156                    | Y        |
| 149      | House - No Agreement           | 6223537      | 758486      | 2.4                          | 29.4                   | 35                     | Y        |
| 2        | House - No Agreement           | 6224074      | 760521      | 2.5                          | 27                     | 35                     | Y        |

| Receptor | Description / Agreement status | Northing (m) | Easting (m) | Distance to nearest WTG (km) | WTG noise level, (dBA) | Minimum criteria (dBA) | complies |
|----------|--------------------------------|--------------|-------------|------------------------------|------------------------|------------------------|----------|
| 116      | House - No Agreement           | 6219796      | 761946      | 2.5                          | 30.3                   | 35                     | Y        |
| 125      | House - No Agreement           | 6214826      | 758644      | 2.7                          | 30.1                   | 35                     | Y        |
| 128      | House - No Agreement           | 6211506      | 753128      | 3.5                          | 29.7                   | 35                     | Y        |
| 12       | House - No Agreement           | 6213996      | 744181      | 3.7                          | 25.2                   | 35                     | Y        |
| 13       | House - No Agreement           | 6213071      | 744279      | 3.9                          | 24.7                   | 35                     | Y        |
| 126      | House - No Agreement           | 6213611      | 755608      | 4.0                          | 27.6                   | 35                     | Y        |
| 135      | House - No Agreement           | 6213072      | 755459      | 4.1                          | 27.1                   | 35                     | Y        |
| 127      | House - No Agreement           | 6214494      | 760498      | 4.2                          | 23.3                   | 35                     | Y        |
| 14       | House - No Agreement           | 6212254      | 744405      | 4.2                          | 22.1                   | 35                     | Y        |
| P        | House - Non identified         | 6215874      | 761552      | 4.4                          | 26                     | 157                    | Y        |
| 134      | House - No Agreement           | 6212656      | 757264      | 4.6                          | 26.5                   | 35                     | Y        |
| 117      | House - No Agreement           | 6217831      | 762928      | 4.6                          | 25.8                   | 35                     | Y        |
| 136      | House - No Agreement           | 6214418      | 761256      | 4.8                          | 25                     | 35                     | Y        |
| 15       | House - No Agreement           | 6212250      | 743708      | 4.8                          | 19.2                   | 35                     | Y        |
| 21       | House - No Agreement           | 6209529      | 749190      | 4.8                          | 25.5                   | 35                     | Y        |
| L        | House - Non identified         | 6213024      | 759962      | 4.9                          | 23                     | 155                    | Y        |
| 22       | House - No Agreement           | 6208962      | 750230      | 5.2                          | 24.2                   | 35                     | Y        |
| 29       | House - No Agreement           | 6211123      | 755333      | 5.2                          | 26.6                   | 35                     | Y        |
| 123      | House - No Agreement           | 6212248      | 759010      | 5.2                          | 23                     | 35                     | Y        |
| 129      | House - No Agreement           | 6216854      | 763229      | 5.5                          | 23.9                   | 35                     | Y        |
| 23       | House - No Agreement           | 6208543      | 749326      | 5.7                          | 23.2                   | 35                     | Y        |
| 11       | House - No Agreement           | 6215447      | 742104      | 5.7                          | 20.9                   | 35                     | Y        |
| 122      | House - No Agreement           | 6213571      | 761829      | 5.8                          | 20.4                   | 35                     | Y        |
| 120      | House - No Agreement           | 6215059      | 762729      | 5.8                          | 22.9                   | 35                     | Y        |
| 121      | House - No Agreement           | 6214140      | 762418      | 5.9                          | 22.2                   | 35                     | Y        |
| 16       | House - No Agreement           | 6211923      | 742570      | 6.0                          | 20.3                   | 35                     | Y        |
| 130      | House - No Agreement           | 6216648      | 763712      | 6.0                          | 20.5                   | 35                     | Y        |
| 18       | House - No Agreement           | 6210570      | 743420      | 6.1                          | 20.4                   | 35                     | Y        |
| 17       | House - No Agreement           | 6210592      | 743349      | 6.1                          | 20.3                   | 35                     | Y        |
| 131      | House - No Agreement           | 6216081      | 763704      | 6.3                          | 20                     | 35                     | Y        |
| 124      | House - No Agreement           | 6213740      | 762906      | 6.5                          | 19.4                   | 35                     | Y        |
| 24       | House - No Agreement           | 6208011      | 747122      | 6.8                          | 21.2                   | 35                     | Y        |
| 118      | House - No Agreement           | 6215060      | 763826      | 6.8                          | 21.5                   | 35                     | Y        |
| 143      | House - No Agreement           | 6210384      | 757485      | 6.9                          | 23.5                   | 35                     | Y        |
| 137      | House - No Agreement           | 6213540      | 763294      | 7.0                          | 18.9                   | 35                     | Y        |
| 1        | House - No Agreement           | 6228570      | 759405      | 7.0                          | 17.2                   | 35                     | Y        |
| 133      | House - No Agreement           | 6215996      | 764539      | 7.0                          | 19.5                   | 35                     | Y        |
| 132      | House - No Agreement           | 6216225      | 764803      | 7.0                          | 19.5                   | 35                     | Y        |

| Receptor | Description / Agreement status | Northing (m) | Easting (m) | Distance to nearest WTG (km) | WTG noise level, (dBA) | Minimum criteria (dBA) | complies |
|----------|--------------------------------|--------------|-------------|------------------------------|------------------------|------------------------|----------|
| 30       | House - No Agreement           | 6209876      | 756669      | 7.1                          | 23.4                   | 35                     | Y        |
| 31       | House - No Agreement           | 6210107      | 757574      | 7.1                          | 23                     | 35                     | Y        |
| 19       | House - No Agreement           | 6209175      | 743160      | 7.3                          | 18.4                   | 35                     | Y        |
| 146      | House - No Agreement           | 6210003      | 758156      | 7.3                          | 22.4                   | 35                     | Y        |
| 145      | House - No Agreement           | 6209968      | 757995      | 7.3                          | 22.5                   | 35                     | Y        |
| 119      | House - No Agreement           | 6214251      | 764059      | 7.3                          | 19.9                   | 35                     | Y        |
| 147      | House - No Agreement           | 6209945      | 758097      | 7.3                          | 22.4                   | 35                     | Y        |
| 144      | House - No Agreement           | 6209813      | 757915      | 7.4                          | 22.3                   | 35                     | Y        |
| 20       | House - No Agreement           | 6208668      | 743375      | 7.5                          | 18.1                   | 35                     | Y        |
| 25       | House - No Agreement           | 6206202      | 749146      | 8.1                          | 16.9                   | 35                     | Y        |
| 140      | House - No Agreement           | 6207996      | 756339      | 8.2                          | 20.9                   | 35                     | Y        |
| 142      | House - No Agreement           | 6208414      | 757075      | 8.4                          | 21                     | 35                     | Y        |
| 141      | House - No Agreement           | 6207955      | 756614      | 8.5                          | 18.8                   | 35                     | Y        |
| 32       | House - No Agreement           | 6207732      | 756458      | 8.5                          | 20.3                   | 35                     | Y        |
| 27       | House - No Agreement           | 6207093      | 743857      | 8.6                          | 14.7                   | 35                     | Y        |
| 33       | House - No Agreement           | 6208284      | 757449      | 8.8                          | 20.6                   | 35                     | Y        |
| 26       | House - No Agreement           | 6205834      | 747687      | 8.8                          | 15.9                   | 35                     | Y        |
| 28       | House - No Agreement           | 6206999      | 743472      | 8.9                          | 16.1                   | 35                     | Y        |
| 139      | House - No Agreement           | 6207335      | 756601      | 8.9                          | 17.8                   | 35                     | Y        |
| 110      | House - No Agreement           | 6206742      | 756932      | 9.6                          | 16.4                   | 35                     | Y        |
| 64       | House - No Agreement           | 6205361      | 745165      | 9.8                          | 15.4                   | 35                     | Y        |
| 111      | House - No Agreement           | 6206354      | 756847      | 9.8                          | 16                     | 35                     | Y        |
| 138      | House - No Agreement           | 6205787      | 756686      | 10.2                         | 15.5                   | 35                     | Y        |
| 36       | House - No Agreement           | 6205174      | 755925      | 10.3                         | 16.3                   | 35                     | Y        |



The predicted Leq noise level at all residential receptors for Layout B are detailed in **Table 3** and shown graphically in **Appendix B**.

**Table 3 Layout B - Predicted WTG Leq Noise Level**

| Receptor | Description / Agreement status | Northing (m) | Easting (m) | Distance to nearest WTG (km) | WTG noise level, (dBA) | Minimum critiera (dBA) | complies |
|----------|--------------------------------|--------------|-------------|------------------------------|------------------------|------------------------|----------|
| 8        | House - Agreement              | 6217349      | 752720      | 0.5                          | 46.1                   | 45                     | N        |
| 6A       | House - Agreement              | 6220843      | 759168      | 0.5                          | 43.4                   | 45                     | Y        |
| 8A       | House - Agreement              | 6217645      | 752775      | 0.5                          | 46.2                   | 45                     | N        |
| 9A       | House - Agreement              | 6215538      | 752297      | 0.5                          | 46.5                   | 45                     | N        |
| 7        | House - Agreement              | 6219927      | 755733      | 0.5                          | 44.9                   | 45                     | Y        |
| 7A       | House - Agreement              | 6219783      | 754852      | 0.6                          | 45.5                   | 45                     | N        |
| 9B       | House - Agreement              | 6215711      | 752581      | 0.6                          | 44.8                   | 45                     | Y        |
| 9        | House - Agreement              | 6215508      | 752455      | 0.6                          | 45                     | 45                     | Y        |
| 6        | House - Agreement              | 6221219      | 758725      | 0.9                          | 40.5                   | 45                     | Y        |
| 5        | House - No Agreement           | 6222233      | 757652      | 2.0                          | 34.7                   | 35                     | Y        |
| 114      | House - No Agreement           | 6220400      | 761708      | 2.0                          | 33                     | 35                     | Y        |
| 2A       | House - No Agreement           | 6223577      | 760453      | 2.0                          | 30.5                   | 35                     | Y        |
| 4        | House - No Agreement           | 6222283      | 757528      | 2.0                          | 34.5                   | 35                     | Y        |
| 115      | House - No Agreement           | 6220052      | 761553      | 2.1                          | 33.1                   | 35                     | Y        |
| 3        | House - No Agreement           | 6222550      | 758065      | 2.1                          | 33.6                   | 35                     | Y        |
| 10       | House - No Agreement           | 6215678      | 745869      | 2.1                          | 29.9                   | 35                     | Y        |
| N        | House - Non identified         | 6215362      | 754842      | 2.4                          | 34.8                   | 35                     | Y        |
| 149      | House - No Agreement           | 6223537      | 758486      | 2.4                          | 30                     | 35                     | Y        |
| 2        | House - No Agreement           | 6224074      | 760521      | 2.5                          | 27.7                   | 35                     | Y        |
| 116      | House - No Agreement           | 6219796      | 761946      | 2.5                          | 31                     | 35                     | Y        |
| 125      | House - No Agreement           | 6214826      | 758644      | 2.7                          | 31                     | 35                     | Y        |
| 128      | House - No Agreement           | 6211506      | 753128      | 3.5                          | 30.7                   | 35                     | Y        |
| 12       | House - No Agreement           | 6213996      | 744181      | 3.7                          | 26.9                   | 35                     | Y        |
| 13       | House - No Agreement           | 6213071      | 744279      | 3.9                          | 26.5                   | 35                     | Y        |
| 126      | House - No Agreement           | 6213611      | 755608      | 4.0                          | 28.6                   | 35                     | Y        |
| 135      | House - No Agreement           | 6213072      | 755459      | 4.1                          | 28.3                   | 35                     | Y        |
| 127      | House - No Agreement           | 6214494      | 760498      | 4.2                          | 24.9                   | 35                     | Y        |
| 14       | House - No Agreement           | 6212254      | 744405      | 4.2                          | 24                     | 35                     | Y        |
| P        | House - Non identified         | 6215874      | 761552      | 4.4                          | 27.6                   | 35                     | Y        |
| 134      | House - No Agreement           | 6212656      | 757264      | 4.6                          | 28.2                   | 35                     | Y        |
| 117      | House - No Agreement           | 6217831      | 762928      | 4.6                          | 27.5                   | 35                     | Y        |
| 136      | House - No Agreement           | 6214418      | 761256      | 4.8                          | 26.9                   | 35                     | Y        |
| 15       | House - No Agreement           | 6212250      | 743708      | 4.8                          | 21.5                   | 35                     | Y        |
| 21       | House - No Agreement           | 6209529      | 749190      | 4.8                          | 27.2                   | 35                     | Y        |

| Receptor | Description / Agreement status | Northing (m) | Easting (m) | Distance to nearest WTG (km) | WTG noise level, (dBA) | Minimum criteria (dBA) | complies |
|----------|--------------------------------|--------------|-------------|------------------------------|------------------------|------------------------|----------|
| L        | House - Non identified         | 6213024      | 759962      | 4.9                          | 25.1                   | 35                     | Y        |
| 22       | House - No Agreement           | 6208962      | 750230      | 5.2                          | 26.2                   | 35                     | Y        |
| 29       | House - No Agreement           | 6211123      | 755333      | 5.2                          | 28.4                   | 35                     | Y        |
| 123      | House - No Agreement           | 6212248      | 759010      | 5.2                          | 25                     | 35                     | Y        |
| 129      | House - No Agreement           | 6216854      | 763229      | 5.5                          | 25.9                   | 35                     | Y        |
| 23       | House - No Agreement           | 6208543      | 749326      | 5.7                          | 25.4                   | 35                     | Y        |
| 11       | House - No Agreement           | 6215447      | 742104      | 5.7                          | 23.8                   | 35                     | Y        |
| 122      | House - No Agreement           | 6213571      | 761829      | 5.8                          | 22.7                   | 35                     | Y        |
| 120      | House - No Agreement           | 6215059      | 762729      | 5.8                          | 25.2                   | 35                     | Y        |
| 121      | House - No Agreement           | 6214140      | 762418      | 5.9                          | 24.5                   | 35                     | Y        |
| 16       | House - No Agreement           | 6211923      | 742570      | 6.0                          | 23.3                   | 35                     | Y        |
| 130      | House - No Agreement           | 6216648      | 763712      | 6.0                          | 22.7                   | 35                     | Y        |
| 18       | House - No Agreement           | 6210570      | 743420      | 6.1                          | 23.4                   | 35                     | Y        |
| 17       | House - No Agreement           | 6210592      | 743349      | 6.1                          | 23.3                   | 35                     | Y        |
| 131      | House - No Agreement           | 6216081      | 763704      | 6.3                          | 22.3                   | 35                     | Y        |
| 124      | House - No Agreement           | 6213740      | 762906      | 6.5                          | 22                     | 35                     | Y        |
| 24       | House - No Agreement           | 6208011      | 747122      | 6.8                          | 24                     | 35                     | Y        |
| 118      | House - No Agreement           | 6215060      | 763826      | 6.8                          | 24.2                   | 35                     | Y        |
| 143      | House - No Agreement           | 6210384      | 757485      | 6.9                          | 26                     | 35                     | Y        |
| 137      | House - No Agreement           | 6213540      | 763294      | 7.0                          | 21.6                   | 35                     | Y        |
| 1        | House - No Agreement           | 6228570      | 759405      | 7.0                          | 20.5                   | 35                     | Y        |
| 133      | House - No Agreement           | 6215996      | 764539      | 7.0                          | 22                     | 35                     | Y        |
| 132      | House - No Agreement           | 6216225      | 764803      | 7.0                          | 22.4                   | 35                     | Y        |
| 30       | House - No Agreement           | 6209876      | 756669      | 7.1                          | 25.9                   | 35                     | Y        |
| 31       | House - No Agreement           | 6210107      | 757574      | 7.1                          | 25.6                   | 35                     | Y        |
| 19       | House - No Agreement           | 6209175      | 743160      | 7.3                          | 22                     | 35                     | Y        |
| 146      | House - No Agreement           | 6210003      | 758156      | 7.3                          | 25.1                   | 35                     | Y        |
| 145      | House - No Agreement           | 6209968      | 757995      | 7.3                          | 25.2                   | 35                     | Y        |
| 119      | House - No Agreement           | 6214251      | 764059      | 7.3                          | 22.8                   | 35                     | Y        |
| 147      | House - No Agreement           | 6209945      | 758097      | 7.3                          | 25.1                   | 35                     | Y        |
| 144      | House - No Agreement           | 6209813      | 757915      | 7.4                          | 25                     | 35                     | Y        |
| 20       | House - No Agreement           | 6208668      | 743375      | 7.5                          | 21.7                   | 35                     | Y        |
| 25       | House - No Agreement           | 6206202      | 749146      | 8.1                          | 20.3                   | 35                     | Y        |
| 140      | House - No Agreement           | 6207996      | 756339      | 8.2                          | 23.9                   | 35                     | Y        |
| 142      | House - No Agreement           | 6208414      | 757075      | 8.4                          | 24                     | 35                     | Y        |
| 141      | House - No Agreement           | 6207955      | 756614      | 8.5                          | 21.9                   | 35                     | Y        |
| 32       | House - No Agreement           | 6207732      | 756458      | 8.5                          | 23.4                   | 35                     | Y        |
| 27       | House - No Agreement           | 6207093      | 743857      | 8.6                          | 18.8                   | 35                     | Y        |

| Receptor | Description / Agreement status | Northing (m) | Easting (m) | Distance to nearest WTG (km) | WTG noise level, (dBA) | Minimum criteria (dBA) | complies |
|----------|--------------------------------|--------------|-------------|------------------------------|------------------------|------------------------|----------|
| 33       | House - No Agreement           | 6208284      | 757449      | 8.8                          | 23.7                   | 35                     | Y        |
| 26       | House - No Agreement           | 6205834      | 747687      | 8.8                          | 19.8                   | 35                     | Y        |
| 28       | House - No Agreement           | 6206999      | 743472      | 8.9                          | 20.4                   | 35                     | Y        |
| 139      | House - No Agreement           | 6207335      | 756601      | 8.9                          | 21.1                   | 35                     | Y        |
| 110      | House - No Agreement           | 6206742      | 756932      | 9.6                          | 19.9                   | 35                     | Y        |
| 64       | House - No Agreement           | 6205361      | 745165      | 9.8                          | 20                     | 35                     | Y        |
| 111      | House - No Agreement           | 6206354      | 756847      | 9.8                          | 19.7                   | 35                     | Y        |
| 138      | House - No Agreement           | 6205787      | 756686      | 10.2                         | 19.2                   | 35                     | Y        |
| 36       | House - No Agreement           | 6205174      | 755925      | 10.3                         | 20.4                   | 35                     | Y        |
| 34       | House - No Agreement           | 6205834      | 757028      | 10.3                         | 19.2                   | 35                     | Y        |

## 5 Conclusion

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

- With the layout A - 6.2 MW WTGs, the potential noise from the wind farm was predicted to be marginally above the criteria at 4 receptors.
- With the layout B – 6.6 MW WTGs, the potential noise from the wind farm was predicted to be marginally above the criteria at 4 receptors.

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 model, WTG sound power level, ground terrain and hardness etc.
- Refinement and consolidation of the wind farm layout.
- Noise optimised operation of WTGs, if required.
- Finalisation of project involved land-holders

## 6 Key Issues

The predicted marginal exceedance at the project involved receptors will need to be resolved during the detailed noise impact assessment for the EES. This could involve:

- Establishing ambient noise levels at these locations (typically the criteria applied at project involved locations is 45 dBA or Background + 5 dBA, whichever is the higher).
- Reducing number of WTGs in proximity to these locations.

- Utilising noise optimised modes or substituting quieter WTGs in proximity to these receptors.
- Examining the potential for improved internal acoustic amenity through implementing building acoustic treatment.

I trust that this is sufficient for your current purposes, please feel free to contact me to discuss,

Regards

A handwritten signature in blue ink, appearing to read 'G. Reutersward', is displayed on a light grey background.

**Gustaf Reutersward** Technical Director Acoustics

B.E. Mech. (Hons) M.A.A.S.

Checked/  
Authorised by: AW



