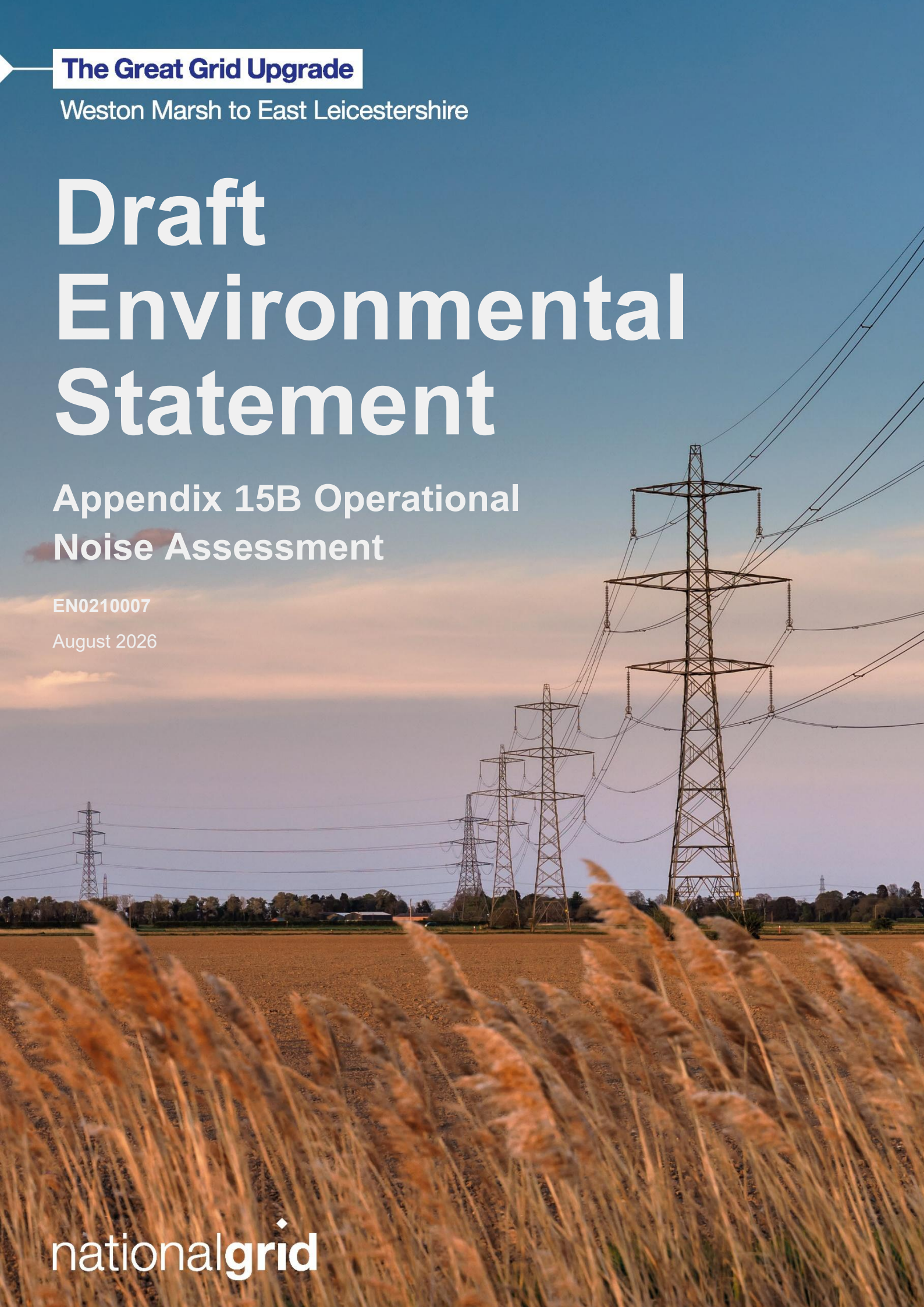




The Great Grid Upgrade

Weston Marsh to East Leicestershire

Draft Environmental Statement

Appendix 15B Operational Noise Assessment

EN0210007

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nationalgrid

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15B. Operational Noise Assessment

15B. Operational Noise Assessment

15B.1 Introduction

- 15B.1.1 The Weston Marsh to East Leicestershire Project ('the Project') comprises new and modified electricity transmission infrastructure, including a new 400 kV overhead transmission line, new 400 kV substations proposed to be known as WMEL-A and WMEL-B, reconductoring of sections of the existing ZA 400 kV overhead line, and associated realignment works to existing overhead lines and distribution networks.
- 15B.1.2 This appendix presents the findings of the preliminary operational noise assessment undertaken for the proposed WMEL-A substation that support the findings and conclusions presented in **Chapter 15 Noise and Vibration**. It provides details of the assumptions adopted in defining the operational plant, including sound power levels for the principal noise generating equipment associated with the proposed substations. Baseline sound survey data results have been obtained for noise-sensitive receptors in the vicinity of the proposed WMEL-A substation and were used to inform the preliminary assessment. The measurements are presented in **Appendix 15A Baseline Sound Survey**.
- 15B.1.3 Baseline sound survey data were not available for receptors in the vicinity of the proposed WMEL-B substation. The operational noise assessment for the proposed WMEL-B substation will be undertaken at the ES stage, once the required baseline information and design details are available.
- 15B.1.4 The results presented in this appendix should be read as preliminary and indicative. They will be reviewed and refined at the ES stage as the design develops, once further baseline survey information and confirmed plant specifications are available.

15B.2 Assumptions and limitations

- 15B.2.1 The operational noise assessment presented in this appendix is preliminary and has been undertaken based on the information available at this stage of design. The following assumptions and limitations apply:
- Detailed specifications for the proposed substations, including final plant selection, layout, orientation, source height and operating conditions, are not yet available.
 - The assessment is based on indicative information derived from the current project description and comparable operational substation schemes.
 - The dominant source of operational noise is assumed to be the transformers associated with the proposed substation. The sound power levels (LAW) and octave band sound power level data (Lw) used in the assessment have been derived from manufacturer information and data from similar schemes and are considered representative for the purposes of this preliminary assessment.
 - All plant items are assumed to operate continuously during daytime (0700-2300) and night-time (2300-0700) periods.

- The assessment has been undertaken with reference to the principles of BS 4142:2014+A1:2019¹. Operational plant noise has been treated as the specific sound level ($L_{Aeq,T}$) at the receptor locations.
- A simple calculation has been undertaken using distance attenuation between the substation site boundary and the identified noise sensitive receptors. The calculation does not include potential effects associated with ground absorption, topography, acoustic screening, reflections from buildings or structures, meteorological conditions, or detailed source and receptor heights. The results should therefore be treated as indicative and will be refined through more detailed noise modelling at the ES stage.
- A +4 dB acoustic feature correction has been applied to the specific sound level to derive the rating level ($L_{Ar,Tr}$). This accounts for the potential presence of acoustic features, including tonal characteristics, typically associated with transformer noise.
- The initial indication of impact has been determined by comparing the rating level ($L_{Ar,Tr}$) with the representative background sound level ($L_{A90,T}$). The interpretation of potential effects should be read alongside the LOAEL and SOAEL criteria presented in **Chapter 15 Noise and Vibration**.

15B.2.2 The operational plant noise data adopted for the preliminary assessment are summarised in **Table 15B.1**. The values represent the assumed sound power levels for the transformers and will be reviewed and updated at the ES stage once detailed plant specifications are available.

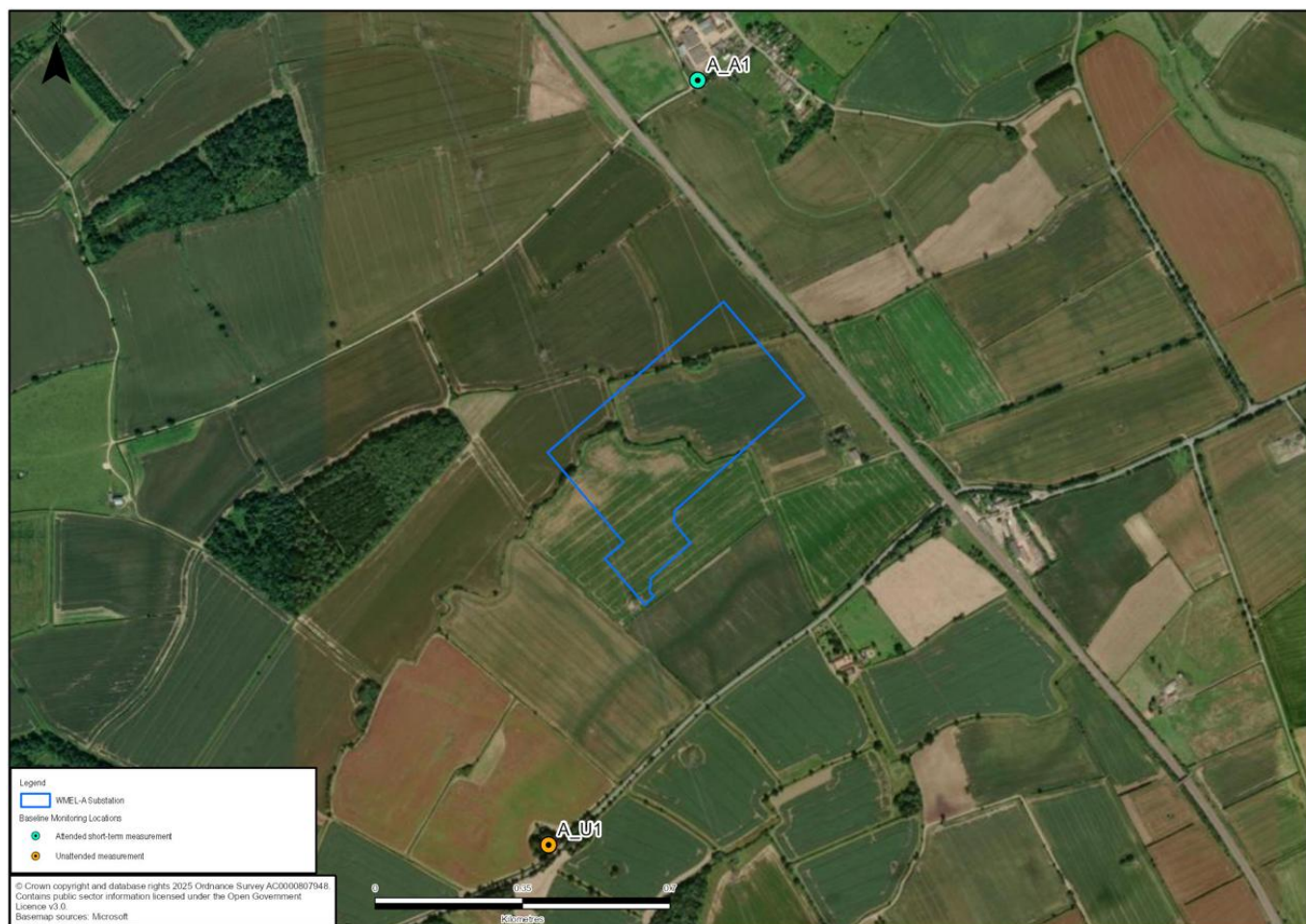
Table 15B.1 Noise levels for proposed substation (per unit)

Plant	Number of plant	Sound power level (dB LAW)	Sound power level spectral data (dBLw) per octave band centre frequency, Hz							
			63	125	250	500	1k	2k	4k	8k
Transformer for 400 kV substation	2	92	92	98	97	90	84	66	64	58

15B.2.3 Baseline sound survey locations and noise-sensitive receptors in the vicinity of the proposed WMEL-A substation are shown on Image **15B.1**. Unattended measurements were undertaken over an approximate one-week period at location A_U1. Attended daytime measurements were undertaken at location A_A1.

¹ British Standards Institution (2014). BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound. London: BSI

Image 15B.1 Baseline sound survey locations



15B.3 Operational noise assessment

15B.3.1 The preliminary operational noise assessment results for the proposed WMEL-A substation are presented in **Table 15B.2**. The specific sound level ($L_{Aeq,T}$) has been calculated at the identified receptor location, and a +4 dB acoustic feature correction has been applied to determine the rating level ($L_{Ar,Tr}$). The rating level has then been compared with the representative background sound level ($L_{A90,T}$) to provide an initial indication of potential impact in accordance with the principles of BS 4142².

² British Standards Institution (2014). BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound. London: BSI

Table 15B.2 Preliminary operational noise assessment (proposed WMEL-A substation)

Baseline survey location (Receptor ID)	Address	Distance between site boundary and receptors (m)	Measured typical background sound level (dB LA90)		Specific sound level (dB LAeq)		Rating level (dB LAr,Tr)		Level relative to background (dB)	
			Day	Night	Day	Night	Day	Night	Day	Night
A_U1	15 Birkholme, Corby Glen, NG33 4LE	600	46	35	32	32	36	36	-10	1
A_A1	Hilltop Cottages, Manor Road, Burton Coggles, NG33 4JP	490	38	29* ³	33	33	37	37	-1	8

15B.3.2 At 15 Birkholme, the rating level is calculated to be 10 dB below the representative daytime background sound level and 1 dB above the representative night-time background sound level. On this basis, the predicted daytime rating noise level is below LOAEL. The daytime and night operational assessment does not indicate the potential for a likely significant adverse operational noise effect at this receptor.

15B.3.3 At Hilltop Cottages, which is considered representative of approximately 20 residential properties in Burton Coggles and approximately 5 residential properties in Corby Glen, the daytime rating level is calculated to be 1 dB below the representative daytime background sound level and 8 dB above the representative night-time background sound level. On this basis, the predicted daytime rating noise level is below LOAEL and the predicted night-time rating noise level is between LOAEL and SOAEL. The assessment indicates the potential for a likely significant adverse operational noise effect at these properties during night-time.

15B.3.4 This assessment does not take account of ground absorption, topographical factors, acoustic screening, reflections from buildings or structures, meteorological conditions, or detailed source and receptor heights.

15B.3.5 With the implementation of standard good practice and additional mitigation, it is anticipated that adverse significant effects would be minimised or removed. The details of these will be confirmed at the ES stage.

³ Night-time background sound level estimated using the unattended monitoring data from A_U1, in the absence of location-specific night-time monitoring data for A_A1. This assumption will be reviewed at the ES stage.

15B.4 Further Assessment

- 15B.4.1 A detailed operational noise assessment will be undertaken at the ES stage for both proposed substations. This will include the development of a more detailed noise model using confirmed plant sound power levels, plant locations, source heights, receptor heights, ground conditions, topography, screening and reflection effects, as appropriate.
- 15B.4.2 It is proposed the ES stage assessment will also incorporate baseline sound survey data for WMEL-B and confirm the requirement for any embedded design and standard measures to avoid or reduce likely significant operational noise effects, and whether any additional mitigation measures are required.
- 15B.4.3 Until such information is available, the operational noise results presented in this appendix should be treated as preliminary and indicative only.

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