Bowdun Offshore Wind Farm, Onshore EIA Report

Volume 2, Appendix 13.3: Operational Noise Assessment

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Glossary

Defined term	Definition
Decibel (dB)	The ratio of sound pressures which we can hear is a ratio of 106:1. For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L_p) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
dB(A)	The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz. In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{pA10}, L_{pA90}, and L for the 'A' weighted equivalent continuous noise level.
Equivalent continuous sound level	An index for assessment for overall noise exposure is the equivalent continuous sound level, L_{peq}. This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.
Freefield	An external sound field in which no significant sound reflections occur (apart from the ground).
On-time	In this instance On-time is defined as the period of the assessment period that the equipment is operating at full operational power.
Sound Pressure Level	The sound power emitted by a source result in pressure fluctuations in the air, which are heard as sound. The sound pressure level (L_p) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2×10^{-5}Pa (the threshold of hearing). Thus L_p (dB) = 10 log $(P1/P_{ref})^2$ where Pref, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. $2x10^{-5}$ Pa). The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBLpA and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Acronyms

Acronym	Definition
3D	Three-dimensional
HGV	Heavy Goods Vehicle
L_{Aeq}	This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.
$L_{Aeq,T}$	A-weighted average noise level over time period, T
L_{A90}	Indicates the underlying background noise level in an area, excluding short-term events. This parameter, often used in planning and environmental noise assessments, provides a measure of the ambient or residual sound that remains when specific noise sources are absent.
L_{WA}	The sound power level is a measure of the total acoustic energy emitted by a sound source in Watts, independent of the environment or the listener's location. It's expressed in decibels (dB) and serves as an intrinsic property of the noise-emitting object, allowing for objective comparison of different sound sources without being affected by room acoustics or distance.

Table of Units

Units	Definition
dB	Decibel
kV	Kilovolt
L_{Aeq}	A-weighed average noise level
$L_{Aeq,T}$	A-weighted average noise level over time period, T
L_{WA}	Sound Power Level
m	Metre
MLWS	Mean Low Water Springs
TWP	Thistle Wind Partners Limited

1 Operational Noise Assessment

1.1 Introduction

1.1.1 This Appendix presents the operational noise methodology and assessment for the onshore infrastructure of the Bowdun Offshore Wind Farm ('the Project'). The onshore infrastructure of the Project, landward of Mean Low Water Springs (MLWS), is referred to as the 'Proposed Development'.

1.2 Operational Noise Calculations

1.2.1 This Section presents the information required for the assessment of the impacts from operational noise of the Substation.

1.2.2 Table 1.1 shows the plant and equipment assumed to be installed at the Substation, their heights and the Sound Power Level (L_{WA}) of each item of noise generating equipment within the Substation. This information was supplied by Thistle Wind Partners Limited (TWP).

Table 1.1: Substation Plant and Equipment

Plant and Equipment to be Installed	No.	Equipment Height (m)	L_{WA}, dB
400/220 kV Super Grid Transformer	3	5.5	95
400 kV Shunt Reactor	2	5.5	93
220 kV Shunt Reactor	3	5.5	89
400 kV Harmonic Filter	2	10	91
220 kV Harmonic Filter	3	10	86
220/66 kV STATCOM Transformer	2	5.5	90
66 kV Shunt Reactor	4	4	85
66 kV STATCOM	2	5	80
66/0.4 kV Auxiliary Transformer	2	3	80
Control Building Heating, Ventilation & Air Conditioning Units (1 x bank of 5 coolers) if barriers used then (2 x bank of 5 coolers)	1	3	80
STATCOM cooling	2	3	80

1.2.3 The predicted operational noise levels at the closest receptors to the Substation are presented in Table 1.2. With the Substation operating 24 hours a day, these predicted noise levels would be the same for day and night.

Table 1.2: Predicted Operational Noise Levels

Receptor	Operational Noise (dB)
COTTAGES AND STEADINGS BURN OF DAY	44
SMIDDY COTTAGE	40
CLACHANSHIELDS	40
UPPER BAULK	34
WHITEHILL	40

1.2.4 The operational noise assessment in accordance with BS 4142 is presented in Table 1.3 to Table 1.7 for the daytime, and Table 1.8 to Table 1.12 for the night-time. These assessments use the predicted noise level (called the Specific sound level) at each receptor and background noise levels (L_{A90}) from the baseline noise survey. All levels noted in the assessments below are reported in dB(A).

Table 1.3: BS 4142 Daytime Assessment at the Cottage and Steadings Burn of Day - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	44 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	53 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	53-34 = **+19 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have a significant adverse noise impact

Table 1.4: BS 4142 Daytime Assessment at Smiddy Cottage - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	40 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	49 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	49-34 = **+15 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have a significant adverse noise impact

Table 1.5: BS 4142 Daytime Assessment at Clachanshiels - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	40 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	49 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	49-34 = **+15 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have a significant adverse noise impact

Table 1.6: BS 4142 Daytime Assessment at Upper Baulk - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	34 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	43 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	43-34 = **+9 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have a significant adverse noise impact

Table 1.7: BS 4142 Daytime Assessment at Whitehill - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	40 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	49 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	49-34 = **+15 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have a significant adverse noise impact

Table 1.8: BS 4142 Night-Time Assessment at the Cottage and Steadings Burn of Day - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	44 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	53 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	53-27 = **+26 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have a significant adverse noise impact

Table 1.9: BS 4142 Night-Time Assessment at Smiddy Cottage - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	40 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	49 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	49-27 = **+22 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have a significant adverse noise impact

Table 1.10: BS 4142 Night-Time Assessment at Clachanshiels - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	40 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	49 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	49-27 = **+22 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have a significant adverse noise impact

Table 1.11: BS 4142 Night-Time Assessment at Upper Baulk - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	34 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	43 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	43-27 = **+16 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have a significant adverse noise impact

Table 1.12: BS 4142 Night-Time Assessment at Whitehill - Unmitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	40 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	49 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	49-27 = **+22 dB**	11	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
Assessment of outcome	Significant adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have a significant adverse noise impact

1.2.5 At all five of the receptors, the assessment for the daytime and night-time is predicted to have a significant adverse noise impact due to the rating level being above the background level. To reduce the rating level to below the background level, mitigation in the form of barriers and enclosures has been agreed with TWP. This agreed mitigation is shown in Table 1.13 alongside the plant and equipment details.

Table 1.13: Substation Plant and Equipment with Proposed Mitigation

Plant and Equipment to be Installed	No.	Equipment Height (m)	Barrier Height (m)	Enclosure Height (m)	L_{WA} dB(A)
400/220 kV Super Grid Transformer	3	5.5	7.5	6	95
400 kV Shunt Reactor	2	5.5	7.5	6	93
220 kV Shunt Reactor	3	5.5	7.5	6	89
400 kV Harmonic Filter	2	10	12	n/a	91
220 kV Harmonic Filter	3	10	12	n/a	86
220/66 kV STATCOM Transformer	2	5.5	7.5	6	90
66 kV Shunt Reactor	4	4	6	4.5	85
66 kV STATCOM	2	5	7	7	80
66/0.4 kV Auxiliary Transformer	2	3	5	3.5	80
Control Building Heating, Ventilation and Air Conditioning Units (1 x bank of 5 coolers) if barriers used then (2 x bank of 5 coolers)	1	3	5	n/a	80
STATCOM cooling	2	3	5	n/a	80

1.2.6 The predicted operational noise levels with mitigation at the closest receptors to the Substation are presented in Table 1.14. With the Substation operating 24 hours a day, these predicted noise levels would be the same for day and night.

Table 1.14: Predicted Operational Noise Levels with Mitigation

Receptor	Operational Noise (dB)
COTTAGES AND STEADINGS BURN OF DAY	18
SMIDDY COTTAGE	15
CLACHANSHIELS	15
UPPER BAULK	8
WHITEHILL	15

1.2.7 Table 1.15 to Table 1.19 show the results of the BS 4142 assessment with the inclusion of agreed mitigation in the form of barriers and enclosures.

Table 1.15: BS 4142 Daytime Assessment at the Cottage and Steadings Burn of Day - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	18 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	27 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	27-34 = -7 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have no adverse impact

Table 1.16: BS 4142 Daytime Assessment at Smiddy Cottage - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	15 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	24 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	24-34 = -10 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have no adverse impact

Table 1.17: BS 4142 Daytime Assessment at Clachanshiels - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	15 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	24 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	24-34 = -10 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have no adverse impact

Table 1.18: BS 4142 Daytime Assessment at Upper Baulk - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	8 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	17 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	17-34 = -17 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have no adverse impact

Table 1.19: BS 4142 Daytime Assessment at Whitehill - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	34 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	8 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	17 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	17-34 = -17 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for daytime hours is predicted to have no adverse impact

Table 1.20: BS 4142 Night-Time Assessment at the Cottage and Steadings Burn of Day - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	18 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	27 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	27-27 = 0 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have no adverse impact

Table 1.21: BS 4142 Night-Time Assessment at Smiddy Cottage - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	15 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	24 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	24-27 = -3 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have no adverse impact

Table 1.22: BS 4142 Night-Time Assessment at Clachanshiels - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	15 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	24 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	24-27 = -3 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have no adverse impact

Table 1.23: BS 4142 Night-Time Assessment at Upper Baulk - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	8 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	17 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	17-27 = -10 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have no adverse impact

Table 1.24: BS 4142 Night-Time Assessment at Whitehill - Mitigated

Item	Assessment	Relevant BS 4142 Clause	Commentary
Background sound level (L_{A90})	27 dB	8.1	Obtained during the baseline noise survey
On time corrections	0 dB	7.3	All plant items assumed to be operating continuously
Specific sound level	15 dB	7.3	Predicted noise level at receptor
Acoustic feature correction	9 dB	9.2	An acoustic feature (penalty) of 9 dB has been chosen (other sounds characteristics) to account for the acoustic frequency characteristics of the noise sources at the site (e.g. broadband and tonal)
Rating level	24 dB	9	Specific + Acoustic feature
Excess of rating level over background sound level	24-27 = -3 dB	11	Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context
Assessment of outcome	No adverse impact	11	Under the assumed scenario the assessment for night-time hours is predicted to have no adverse impact

1.3 Operational Noise Plots

1.3.1 This Section provides two plots which show the output from the noise modelling exercise. The plots indicate the operational noise emissions from the Substation, with and without mitigation; Figure 1.1 and Figure 1.2 respectively. Each plot considers the noise emissions from the Substation with the concentric circles indicating the range of calculated noise levels, reported in each key.

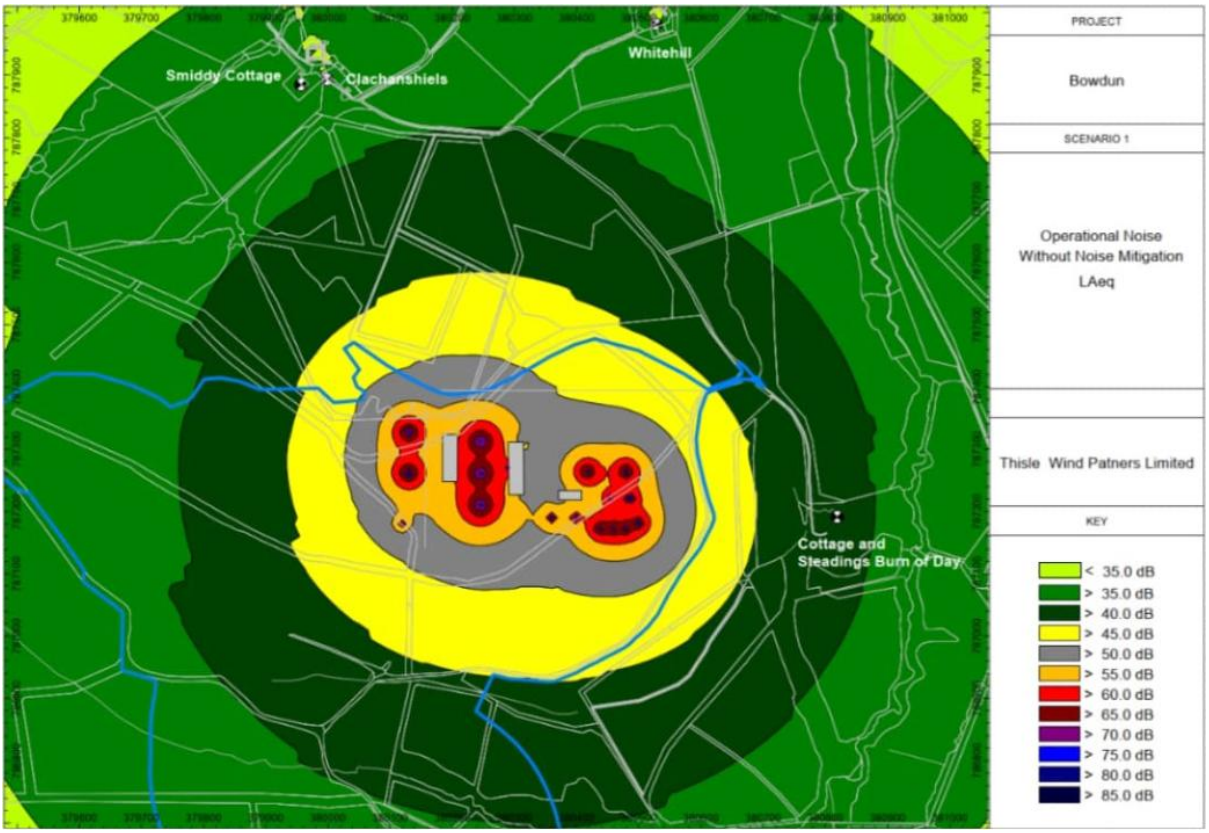

Figure 1.1: Substation Operational Noise Impacts without Mitigation

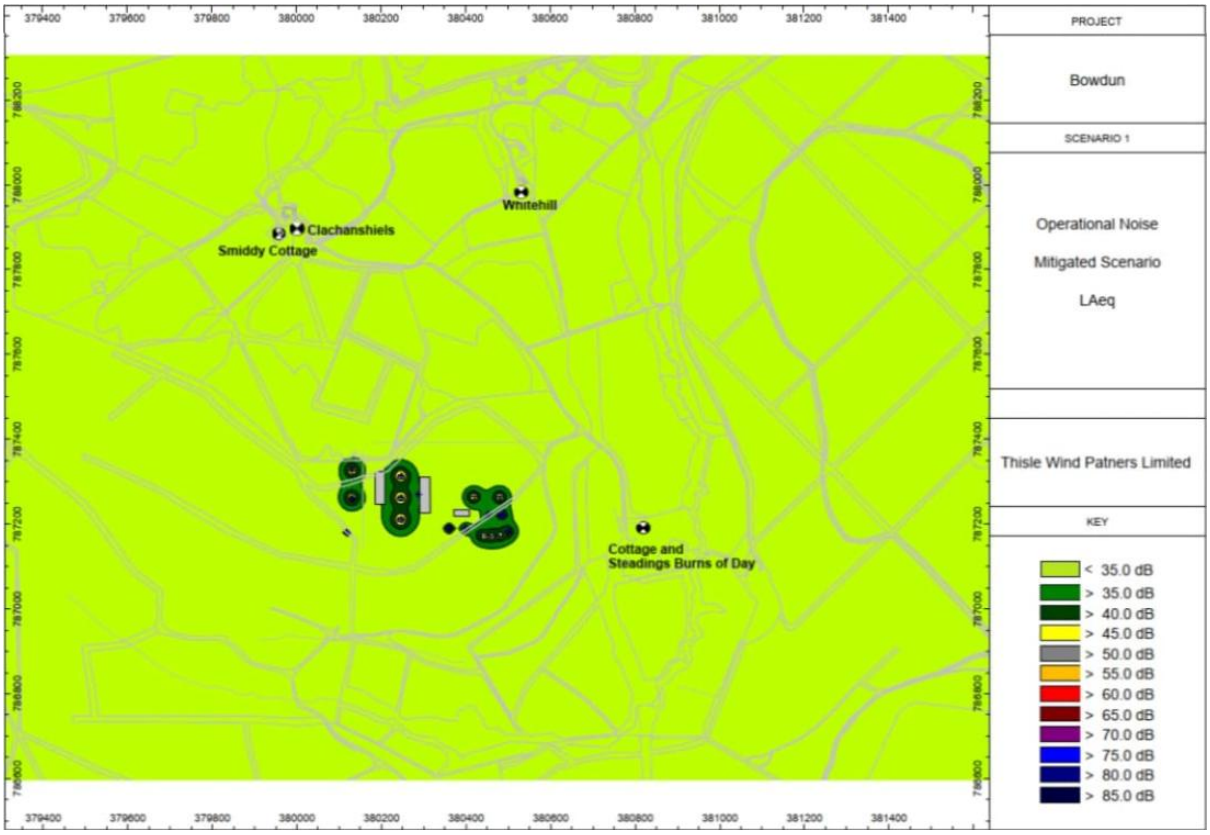

Figure 1.2: Substation Operational Noise Impacts with Mitigation

1.4 References

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

Thistle Wind Partners Limited, Bowdun Offshore Wind Farm Onshore Scoping Report (2024) Available at: Bowdun Offshore Wind Farm (Accessed 17/10/2025)