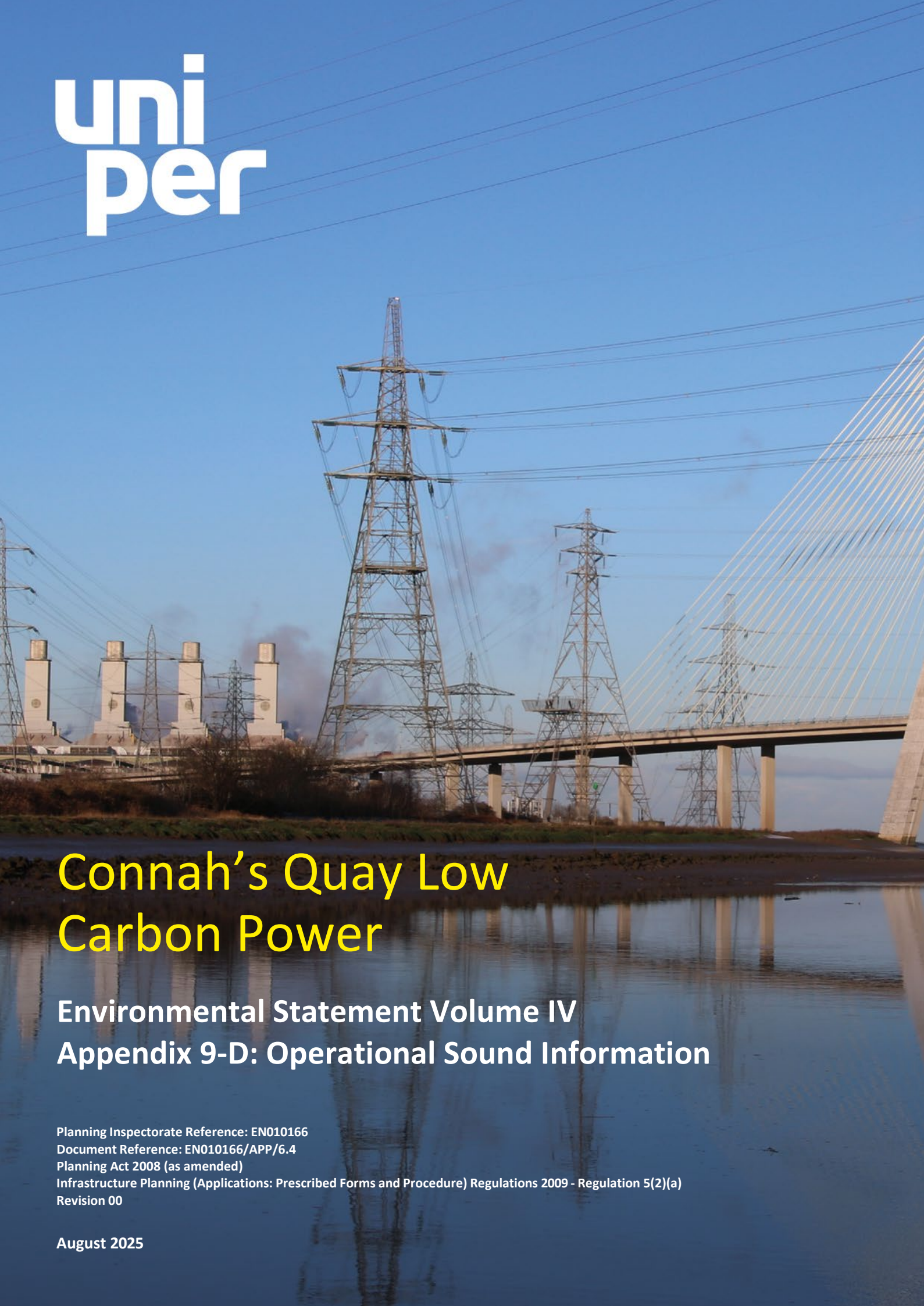

Connah's Quay Low Carbon Power

Environmental Statement Volume IV
Appendix 9-D: Operational Sound Information

Planning Inspectorate Reference: EN010166
Document Reference: EN010166/APP/6.4
Planning Act 2008 (as amended)
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
Revision 00

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Prepared by:
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Table of Contents

Tables

1. Operational Sound Information

1.1 Noise Model Settings

1.1.1 The Proposed Development has been constructed in CadnaA (version 2025) acoustic modelling software. This software implements the sound propagation calculation methodology set out in International Organization for Standardization (ISO) (Part 2: 2024). ISO 9613 Acoustics - Attenuation of sound during propagation outdoors (Ref 1).

Data Sources

1.1.2 The following data sources have been used:

- surrounding area ground heights – data from the Environment Agency National Light Detection and Ranging (LIDAR) programme - downloaded from Open Survey Data (Ref 2);
- Ordnance Survey (OS) MasterMap Topography Layer of the Order limits and surrounding areas;
- pre-Front-End Engineering and Design (FEED) Environmental Impacts Inputs Summary;
- sound power level data from similar projects which has been reviewed by the Applicant; and
- Proposed Development layout plans.

Modelling Assumptions

1.1.3 The model has been prepared with the following configurations and assumptions:

- building dimensions – taken from the design drawings;
- receptor buildings heights – taken from OS MasterMap Building Height Attribute dataset;
- receptor heights – modelled as 4 m above ground to represent first floor;
- ground effect – industrial areas and hardstanding 0.0, vegetation 1.0, road surfaces 0.0, water bodies 0.0. The locations of each area have been determined from the OS MasterMap Topography Layer;
- source sound levels – as provided by the design team as estimated A-weighted sound power levels or sound pressure levels at 1 m from each sound source, and supplemented with octave band spectra from other comparable projects, as shown in **Table 1**;
- the Proposed Development would operate continually at full load, 24 hours a day, 365 days a year (which would be more than the actual operational duration currently anticipated);
- the sound emitted by each building façade has been calculated based on the total sound power level for the building, distributed according to the surface area of the façade;

- all pumps have been modelled as point sources;
- where sound pressure level data for plant items has been provided inside an enclosure, it has not yet been confirmed what material these enclosures would be constructed from. As a conservative assumption it has been assumed this would be 0.4 mm thick steel cladding; and
- the prediction of sound pressure levels according to ISO 9613 are based on an atmospheric temperature of 10°C and relative humidity of 70%, which is representative of typical average UK conditions in the absence of specific local data, and are based on an assumption of moderate downwind propagation from source to receptor as a worst-case calculation.

Table 1: Sound Power Levels of Operational Equipment

Equipment Item	Linear Sound Power Level Each Frequency Band dB									Number operational in Proposed Development*	L_{WA} dB**
	31	63	125	250	500	1K	2K	4K	8K		
Gas Turbine Building	131	121	96	75	63	55	47	37	44	2	97
Gas Turbine Intake	129	121	113	97	82	95	88	90	87	2	102
Heat Recovery Steam Generator (HRSG) Building	131	121	96	75	63	55	47	37	44	2	97
Flue Gas Blower	-	102	103	112	96	85	77	67	55	4	104
Direct Contact Cooler (DCC)	91	82	79	75	78	61	48	30	32	4	76
Absorber Tower	115	106	105	98	104	96	92	80	82	4	103
Stripping Air Blowers	110	107	93	8	80	80	71	68	60	2	94
Cooling Towers	117	112	115	110	97	89	94	94	90	2	105
Compressor Building	136	125	101	70	52	44	29	26	23	1	101
DCC Circulating Water (CW) Filter Back Wash Pump	75	76	77	79	79	82	79	75	69	2	86
Auxiliary CW Pumps	82	83	84	86	86	89	86	82	76	1	95
Main CW Pumps	84	85	86	88	88	91	88	84	78	6	95
Rich Amine Pump	84	85	86	88	88	91	88	84	78	2	95
Absorber 1st Wash Stage	84	85	86	88	88	91	88	84	78	2	95
Absorber 2nd Wash Stage	84	85	86	88	88	91	88	84	78	2	95

Equipment Item	Linear Sound Power Level Each Frequency Band dB									Number operational in Proposed Development*	L_{WA} dB**
	31	63	125	250	500	1K	2K	4K	8K		
Acid Wash Pump	83	84	85	87	87	90	87	83	77	2	94
Lean Amine Booster Pump	84	85	86	88	88	91	88	84	78	2	95
CO_2 Reflux Stripper Pump	78	79	80	82	82	85	82	78	72	2	89
Low Pressure Condensate	77	78	79	81	81	84	81	77	71	2	88
DCC Circulation Pump	86	87	88	90	90	93	90	86	80	2	97
DCC Produced Water Contactor	77	78	79	81	81	84	81	77	71	2	88
DCC Treated Water Discharge Pump	71	72	73	75	75	78	75	71	65	2	82
Knock-Out Water Pump	60	61	62	64	64	67	64	60	54	4	71
Lean Amine Circulation	83	84	85	87	87	90	87	83	77	2	94
Fresh Amine Storage	55	56	57	59	59	62	59	55	49	2	66
Fire Water Jockey Pumps	55	56	57	59	59	62	59	55	49	1	66
CCS Condensate Return	62	63	64	66	66	69	66	62	56	2	73
NaOH Storage Pump	62	63	64	66	66	69	66	62	56	2	73
Acid Drain Drum Pump	62	63	64	66	66	69	66	62	56	2	73
Acid Storage Pump	62	63	64	66	66	69	66	62	56	2	73
Amine Drain Drum Pump	62	63	64	66	66	69	66	62	56	1	73
Demineralised Water Storage	62	63	64	66	66	69	66	62	56	2	73

Equipment Item	Linear Sound Power Level Each Frequency Band dB									Number operational in Proposed Development*	L_{WA} dB**
	31	63	125	250	500	1K	2K	4K	8K		
Cooling Tower Make-Up	83	84	85	87	87	90	87	83	77	1	94
Make-Up Transfer Pumps	83	84	85	87	87	90	87	83	77	1	94
Above Ground Installation (AGI)	101	96	85	80	63	45	48	59	63	3	76

*Number operational represents worst-case twin absorber design

** Sound Power Level for each individual item of plant

1.2 Uncertainty

1.2.1 Any sound level predictions have an associated degree of uncertainty. Modelling and measurement processes have been carried out in such a way to reduce such uncertainty, by using indicative design layout and maximum heights for structures and noise sources. In particular, the following sources of uncertainty have been noted:

- sound levels for each sound source have been provided by the design team based on preliminary worst-case data and from similar projects and would be further updated during detailed design;
- the octave band spectra have not been available for each sound source so data have been taken from the same or similar plant items from other similar projects; and
- predictions of sound pressure levels according to ISO 9613-2 are based on moderate downwind propagation from sound source to receptor and can therefore be considered as a reasonable worst-case prediction with respect to wind speed and direction. The standard indicates an estimated accuracy of ±3 dB(A) in predicted levels at the distances and heights relevant to this assessment.

1.3 BS 4142 Assessment

1.3.1 The initial daytime BS 4142 assessments are presented in **Table 2** and the initial night-time BS 4142 assessment are presented in **Table 3**

1.3.2 The magnitude of impact and significance of effect classifications have been included in the tables, to provide context for the initial BS 4142 assessment outcomes, with reference to the semantic scales in **Appendix 9-A: Noise and Vibration Methodology** (**EN010166/APP/6.4**). These initial assessments and potential effects which include embedded mitigation (as described in Section 9.5 of **Chapter 9: Noise and Vibration** (**EN010166/APP/6.4**) but do not include further control and attenuation that additional measures would provide.

1.3.3 Section 9.7 of **Chapter 9: Noise and Vibration** (**EN010166/APP/6.4.9**) provides details of additional mitigation which has been identified to mitigate the adverse effects and meet the operational noise limits, which result in a not significant residual effect.

1.3.4 The values presented are the differences between the representative Background Sound Level $L_{A90,T}$ at each Noise Sensitive Receiver (NSR) and the predicted Rating Level (the Specific Sound Level $L_{Aeq,T}$ plus the character correction). Inclusion of a +3 dB correction for 'other distinctive' character has been included for NSRs where the Specific Sound Level is equal to or greater than the existing Background Sound Level. Positive values in the table indicate an excess of the Rating Level over the Background Sound Level.

Table 2: Daytime BS 4142 Assessment

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), dB	Acoustic feature correction, dB	*Rating level* ($L_{Ar,Tr}$), dB	Representative *background sound level* ($L_{A90,T}$), dB	Excess of rating level over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	Magnitude of impact	Initial classification of effect
R4	38	+3	41	38	3	Very low / Low	**Negligible / Minor Adverse**
R5	38	+3	41	38	3	Very low / Low	**Negligible / Minor Adverse**
R6	39	+0	39	46	-7	Very low	**Negligible**
R7	37	+0	37	46	-9	Very low	**Negligible**
R8	38	+0	38	46	-8	Very low	**Negligible**
R9	37	+0	37	46	-9	Very low	**Negligible**
R10	38	+0	38	43	-5	Very low	**Negligible**
R11	40	+0	40	43	-3	Very low	**Negligible**
R12	38	+0	38	43	-5	Very low	**Negligible**
R13	38	+0	38	43	-5	Very low	**Negligible**
R14	36	+0	36	43	-7	Very low	**Negligible**
R15	40	+0	40	43	-3	Very low	**Negligible**
R16	37	+0	37	38	-1	Very low	**Negligible**

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), dB	Acoustic feature correction, dB	*Rating level* ($L_{Ar,Tr}$), dB	Representative *background sound level* ($L_{A90,T}$), dB	Excess of rating level over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	Magnitude of impact	Initial classification of effect
R17	41	+3	44	39	+5	Low	**Minor Adverse**
R18	49	+3	52	39	+13	Medium / High	**Moderate / Major Adverse**
R19	49	+3	52	45	+7	Low /Medium	**Minor / Moderate Adverse**
R20	52	+3	55	45	+10	Medium	**Moderate Adverse**
R21	57	+3	60	45	+15	High	**Major Adverse**
R22	53	+3	56	45	+11	Medium	**Moderate Adverse**
R23	52	+3	55	45	+10	Medium	**Moderate Adverse**
R24	47	+3	50	45	+5	Low	**Minor Adverse**
R25	45	+3	48	45	+3	Very low / Low	**Negligible / Minor Adverse**
R26	43	+0	43	44	-1	Very low	**Negligible**
R28	41	+0	41	44	-3	Very low	**Negligible**

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), dB	Acoustic feature correction, dB	*Rating level* ($L_{Ar,Tr}$), dB	Representative *background sound level* ($L_{A90,T}$), dB	Excess of rating level over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	Magnitude of impact	Initial classification of effect
R29	40	+0	40	44	-4	Very low	**Negligible**
R30	41	+0	41	44	-3	Very low	**Negligible**
R31	39	+0	39	45	-6	Very low	**Negligible**

Table 3: Night-time BS 4142 Assessment

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), dB	Acoustic feature correction, dB	*Rating level* ($L_{Ar,Tr}$), dB	Representative *background sound level* ($L_{A90,T}$), dB	Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	Magnitude of impact	Initial classification of effect
R4	38	+3	41	36	+5	Low	**Minor Adverse**
R5	38	+3	41	36	+5	Low	**Minor Adverse**
R6	39	+3	42	38	+4	Low	**Minor Adverse**
R7	37	+0	37	38	-1	Very low	**Negligible**
R8	38	+3	41	38	+3	Very low / Low	**Negligible** / **Minor Adverse**
R9	37	+0	37	38	-1	Very low	**Negligible**
R10	38	+3	41	34	+7	Low / Medium	**Minor** / **Moderate Adverse**
R11	40	+3	43	34	+9	Medium	**Moderate Adverse**
R12	38	+3	41	34	+7	Low / Medium	**Minor** / **Moderate Adverse**

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), dB	Acoustic feature correction, dB	*Rating level* ($L_{Ar,Tr}$), dB	Representative *background sound level* ($L_{A90,T}$), dB	Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	Magnitude of impact	Initial classification of effect
R13	38	+3	41	34	+7	Low / Medium	**Minor / Moderate Adverse**
R14	36	+3	39	34	+5	Low	**Minor Adverse**
R15	40	+3	43	34	+9	Medium	**Moderate Adverse**
R16	37	+3	40	36	+4	Low	**Minor Adverse**
R17	41	+3	44	36	+8	Low / Medium	**Minor / Moderate Adverse**
R18	49	+3	52	36	+16	High	**Major Adverse**
R19	49	+3	52	37	+15	High	**Major Adverse**
R20	52	+3	55	37	+18	High	**Major Adverse**
R21	57	+3	60	37	+23	High	**Major Adverse**
R22	53	+3	56	37	+19	High	**Major Adverse**
R23	52	+3	55	37	+18	High	**Major Adverse**
R24	47	+3	50	37	+13	High	**Major Adverse**

NSR	*Specific sound level* L_s ($L_{Aeq,Tr}$), dB	Acoustic feature correction, dB	*Rating level* ($L_{Ar,Tr}$), dB	Representative *background sound level* ($L_{A90,T}$), dB	Excess of *rating level* over *background sound level* ($L_{Ar,Tr}$ - $L_{A90,T}$), dB	Magnitude of impact	Initial classification of effect
R25	45	+3	48	37	+11	Medium	**Moderate Adverse**
R26	43	+3	47	37	+9	Medium	**Moderate Adverse**
R28	41	+3	44	37	+7	Low / Medium	**Minor** / **Moderate Adverse**
R29	40	+3	43	37	+6	Low	**Minor Adverse**
R30	41	+3	44	35	+9	Medium	**Moderate Adverse**
R31	39	+3	42	35	+7	Low / Medium	**Minor** / **Moderate Adverse**

References

Ref 1. International Organization for Standardization (ISO) (Part 2: 2024). ISO 9613 Acoustics - Attenuation of sound during propagation outdoors.

Ref 2. Environment Agency National LIDAR Programme. (Available at: National LIDAR Programme - data.gov.uk) (Accessed 03/07/2025)