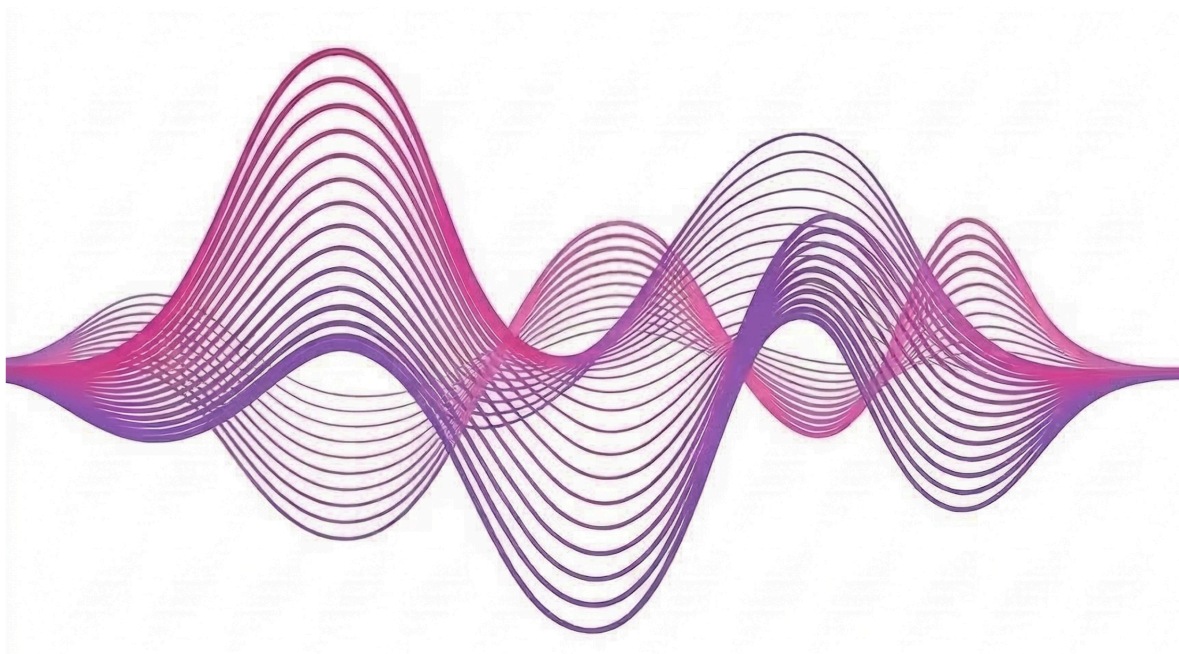


ACOUSTIC TECHNICAL NOTE: **ENVIRONMENTAL NOISE IMPACT** **ASSESSMENT**



Project: Proposed Installation of Cosy 12 Air Source Heat Pump
Site Address: 8 Tiptree Close
Date: 10th of April, 2026

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1. INTRODUCTION AND EXECUTIVE SUMMARY

1.1. This formal Acoustic Technical Note has been prepared to accompany the planning application regarding the installation of a **Cosy 12 Air Source Heat Pump (ASHP)** at **8 Tiptree Close**. This document serves to quantify, via computational modeling, the potential acoustic impact of the proposed mechanical plant on the residential amenity of the neighbouring properties, **6 and 10 Tiptree Close**

1.2. The primary objective of this assessment is to demonstrate, that the proposed installation will not result in any "Significant Adverse Impact" as defined by the **Noise Policy Statement for England (NPSE)**. To ensure the absolute robustness of this application, the assessment methodology strictly adheres to the internationally recognized **ISO 9613-2:1996** standard for the attenuation of sound during propagation outdoors.

1.3. Acknowledging the necessity for a definitive prediction, this report employs a **Sensitivity Analysis** approach. By applying a **+3 dB tonality correction** to the Specific Sound Level (L_s). This is the standard correction for sound sources that may exhibit minor, tonal characteristics which is appropriate for modern Inverter-Driven Compressors found in this specific air source heat pump. This report demonstrates that even with the theoretical penalization, the proposed unit will not result in any Significant Adverse Impact.

1.4. The computational modeling confirms that the predicted external **Rating Noise Level (L_{Ar,Tr})** at the critical first-floor assessment window of the neighboring property is **37 dB(A)**.

1.5. This level is observed to be **within the range** of the prevailing ambient noise climate indicated by DEFRA strategic mapping (40-50 dB). Furthermore, the calculated internal noise level within the nearest habitable room is **27 dB(A)**, which is 3 dB below the **BS 8233:2014** target of 30 dB for sleeping conditions. Consequently, the proposal is shown to preserve residential amenity and complies fully with the **National Planning Policy Framework (NPPF)**.

2. LEGISLATIVE AND STANDARDS FRAMEWORK

This assessment has been prepared with strict reference to the following national standards and planning guidance documents to ensure the protection of residential amenity. Detailed definitions are provided in **Appendix A.4**.

2.1. National Planning Policy Framework (NPPF) (2024)

Paragraph 198 mandates that planning decisions must "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development". This report demonstrates compliance by proving the unit operates substantially below the background noise floor.

2.2. British Standard BS 8233:2014

This standard establishes internal ambient noise level targets to safeguard rest and sleep. The relevant criterion for this application is **30 dB LAeq, 8hr** for sleeping conditions in bedrooms.

2.3. British Standard BS 4142:2014+A1:2019

This standard provides methods for rating and assessing industrial and commercial sound. It introduces the concept of the Rating Level (L_{Ar}, Tr), which is the specific sound level of the source corrected for acoustic features such as tonality, impulsivity, or intermittency.

The standard mandates that the assessment of impact be considered within the specific **context** of the site. Specifically, **Section 11 (Assessment of the impacts)** states:

"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

This report utilizes this provision to demonstrate that while a numerical margin may exist, the absolute sound levels generated by the plant are sufficiently low as to maintain the existing acoustic amenity of the area.

3. SOURCE NOISE DATA SPECIFICATION

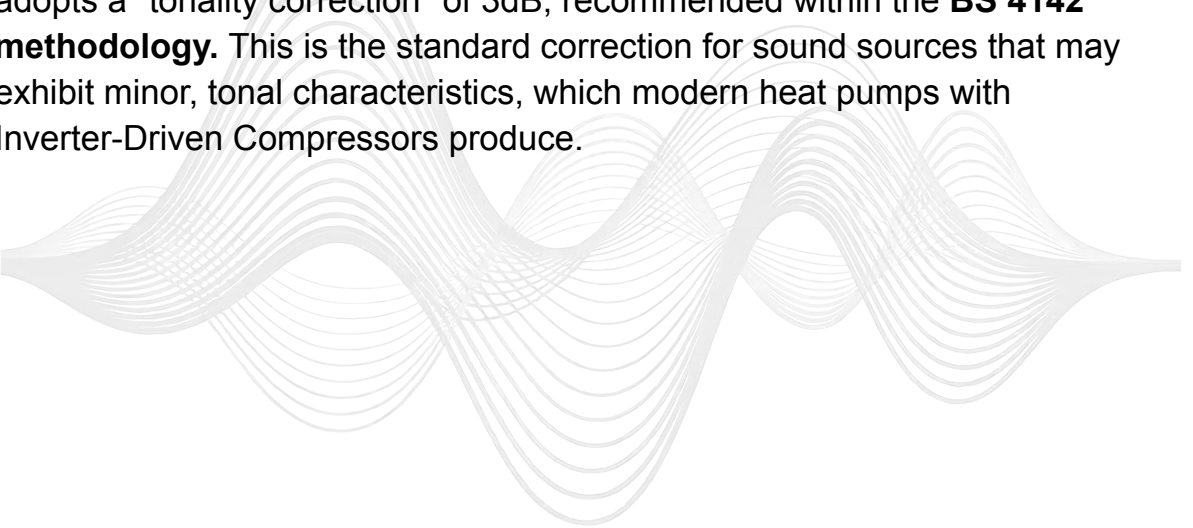
3.1. Unit Specification

The assessment is based on the **Cosy 12** Air Source Heat Pump.

- **Sound Power Level (LWA):** 61 dB(A).
- **Distance to Host Facade:** 250mm.
- **Source Data Reference:** See **Appendix A.1**

3.2. Spectral Data Limitations and the "Tonality Correction" Approach

It is noted that full octave band data (125Hz - 8kHz) was unavailable for this specific unit configuration at the time of assessment. To preclude any challenge regarding the spectral character of the noise source, this report adopts a "tonality correction" of 3dB, recommended within the **BS 4142 methodology**. This is the standard correction for sound sources that may exhibit minor, tonal characteristics, which modern heat pumps with Inverter-Driven Compressors produce.



4. COMPUTATIONAL MODELING METHODOLOGY

The noise map and propagation calculations were generated utilizing the **ISO 9613-2:1996** standard. To ensure the assessment remains robust and impervious to technical challenge, the following "worst-case" parameters were locked into the calculation method (detailed in **Appendix A.1**):

4.1. Facade Reflection (Coefficient 0.982)

A reflection coefficient of **0.982** was strictly applied to all vertical surfaces (brickwork/glazing). This parameter assumes that **98.2%** of sound energy is reflected back into the environment, with only a negligible ~2% absorption. This effectively models the building envelope as a near-perfect acoustic mirror, maximizing the calculated sound pressure levels at the receiver.

4.2. Ground Factor (G=0)

A global Ground Factor of **G=0 (Hard Ground)** was applied to the entire propagation path. This assumption effectively treats the intervening ground as concrete or paving, completely negating the attenuation that would undeniably be provided by soft garden turf (G=1). This ensures the predicted levels are highly conservative.

4.3. Directivity (Q=2)

Hemispherical radiation (Q=2) is assumed to account for the source directivity resulting from its installation in close proximity (250mm) to the reflective host facade.

5. PREDICTED RESULTS AND ANALYSIS

Predictions were calculated at the critical receiver locations at **6 and 10 Tiptree Close**. The values below represent the **Rating Level (L_{Ar,Tr})** for all of the properties.

5.1. Comparative Results Table

Property Address	Assessment Position	Ground Floor	First Floor
6 Tiptree Close	Position 1	29 dB(A)	37 dB(A)
	Position 2	-	32 dB(A)
	Position 3	13 dB(A)	25 dB(A)
	Position 4	26 dB(A)	-
	Position 5	28 dB(A)	-
	Position 6	15 dB(A)	-
610 Tiptree Close	Position 7	25 dB(A)	34 dB(A)
	Position 8	23 dB(A)	27 dB(A)
	Position 9	24 dB(A)	27 dB(A)

5.2. Internal Noise Level Calculation

The critical receptor is the closest First Floor Window at 6 Tiptree Close. When utilizing the +3dB tonal correction, there is a result of 37dB(A).

It is standard acoustic practice (accepted by the World Health Organization and BS 8233) to assume that a partially open window provides 10-15 dB of attenuation from external noise sources. A conservative attenuation factor of **10 dB** has been adopted.

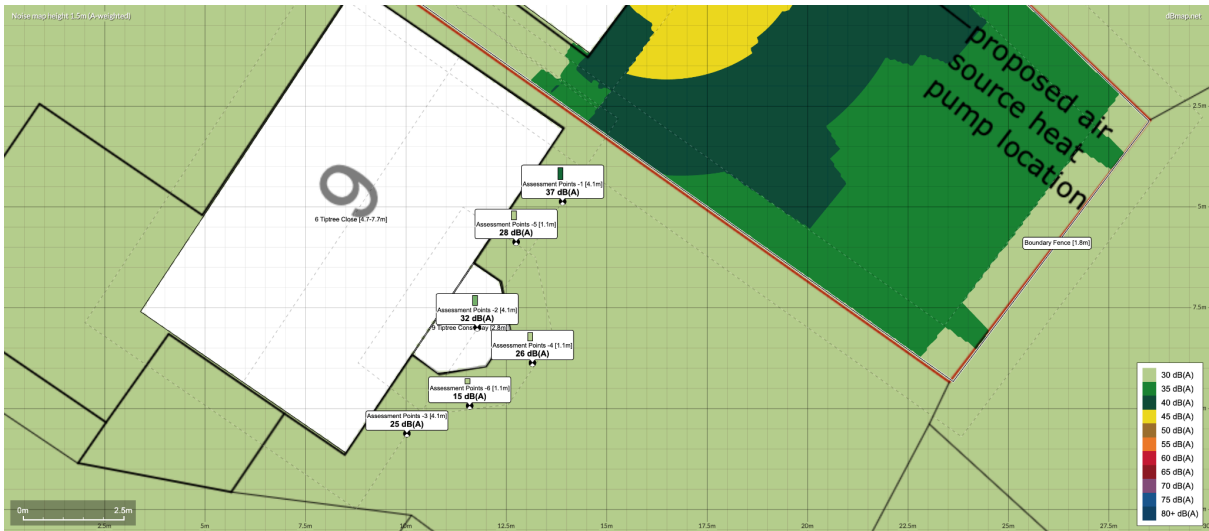
**Internal Level = External Rating Level (Stress Test)
- Open Window Attenuation**

Internal Level = 37 dB(A) - 10dB

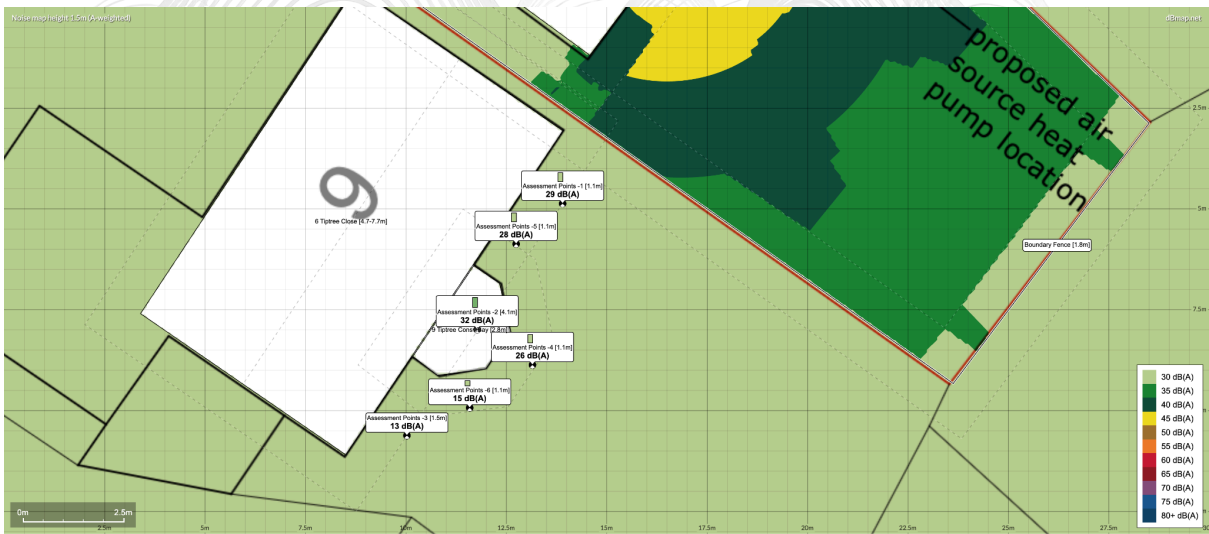
Internal Level = 27 dB(A)

Compliance: The calculated internal level of **27 dB(A)** is **3 dB lower** than the BS 8233 target of 30 dB.

ISO 9613-2 6 Tiptree Close First Floor +3dB Results



ISO 9613-2 6 Tiptree Close Ground Floor +3dB Results



ISO 9613-2 10 Tiptree Close First-Floor +3dB Results

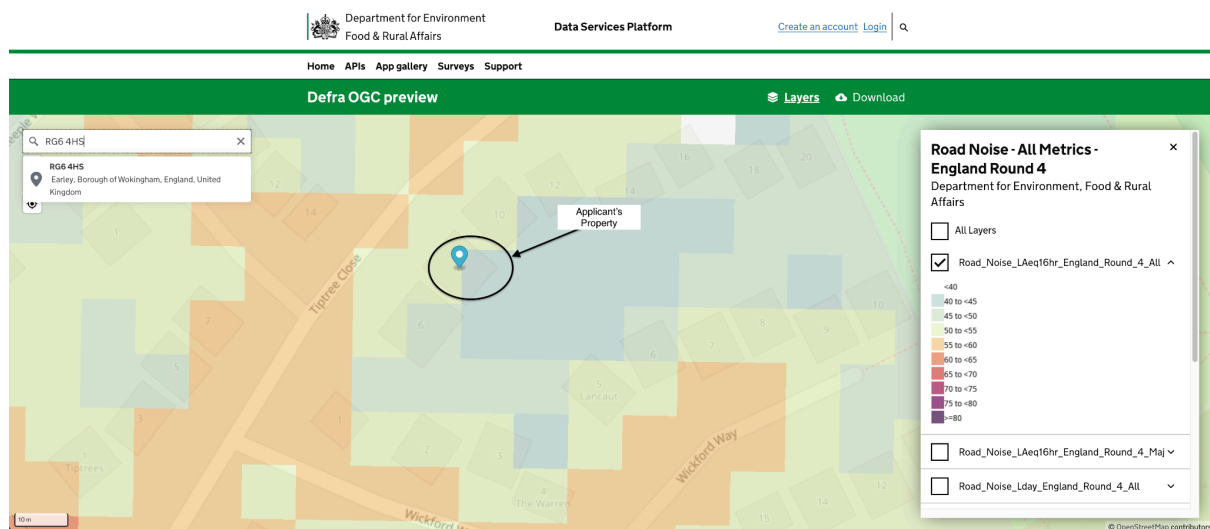


ISO 9613-2 10 Tiptree Close Ground Floor +3dB Results



6. CONTEXTUAL ASSESSMENT AND ACOUSTIC MASKING

6.1. Ambient Noise Climate (DEFRA Round 4) Strategic noise data from DEFRA identifies the ambient noise baseline for this specific location (LAeq, 16hr) as falling within the 40 to 50 dB(A) band (See Appendix A.5).



6.2. Assessment of Impact (Acoustic Masking)

When the predicted plant noise is compared against the prevailing background, the lack of impact becomes evident:

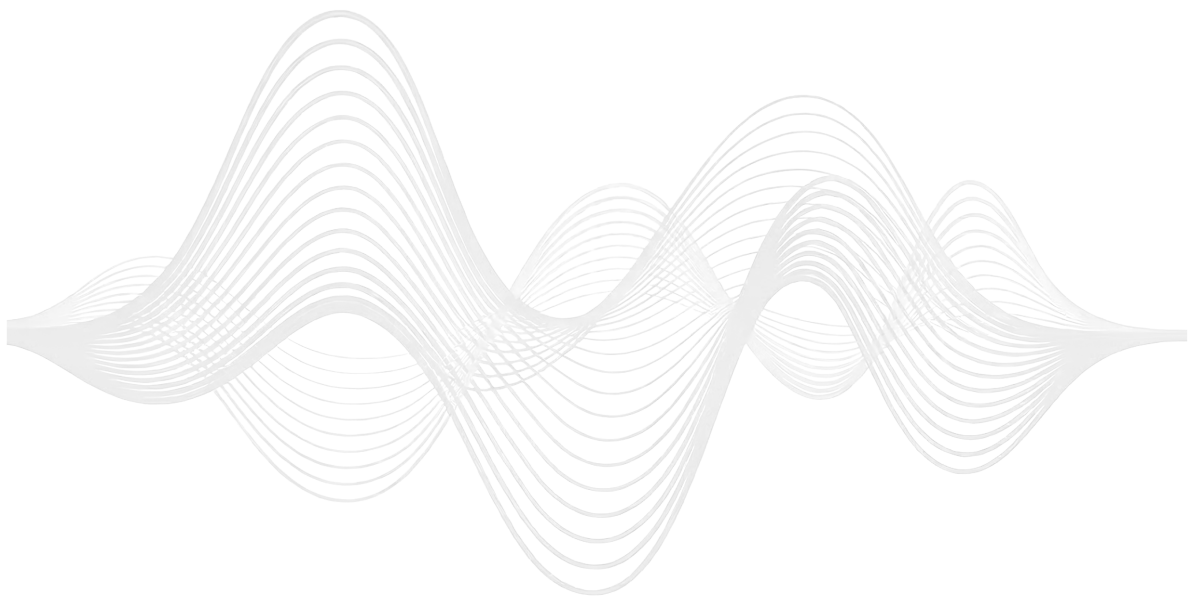
- Prevailing Ambient Noise Climate: 40 - 50 dB(A)
- Plant Rating Level (+3dB): 37 dB(A)
- Differential: 3 to 13 dB

6.3. Discussion

The proposed unit operates at a level which is below the lowest end of the existing background noise climate (40 dB(A)). Since the Rating Level is observed to be within the existing prevailing ambient noise climate of 40-50 dB(A) (a differential of 3 to 13 dB), the introduction of the heat pump is considered a minor addition that does not significantly alter the established acoustic character of the area.

The phenomenon of Acoustic Masking dictates that the existing and variable broadband noise of the area (up to 50 dB(A)) will serve to integrate the

steady-state sound of the heat pump (37 dB(A)) into the prevailing environment. Therefore, the proposal preserves residential amenity as its noise levels are demonstrably within the established ambient baseline.



7. CONCLUSION

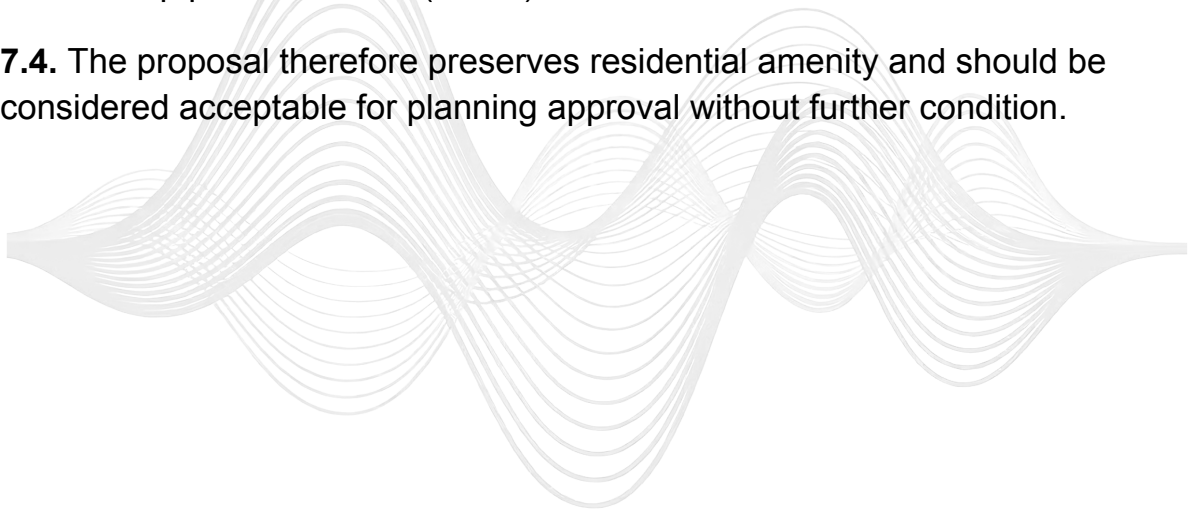
7.1. This assessment demonstrates that the proposed installation of the Cosy 12 ASHP at 8 Tiptree Close complies with all relevant national and local planning policies regarding noise.

7.2. Through the application of a +3 tonality correction, this report has tested the proposal to account for spectral uncertainty.

7.3. The results are:

- 1. External Impact:** The worst-case Rating Level (37 dB) is below the range of the prevailing ambient noise climate (40-50 dB).
- 2. Internal Amenity:** The indoor noise level (27 dB) is below the BS 8233 sleep protection limit (30 dB).

7.4. The proposal therefore preserves residential amenity and should be considered acceptable for planning approval without further condition.



APPENDIX A: TECHNICAL REFERENCES AND MODELING DATA

A.1. SOURCE NOISE DATA SPECIFICATION

- **Unit Model:** Cosy 12 Air Source Heat Pump.
- **dB Rating:** 61.

A.2. LEGISLATIVE AND STANDARDS FRAMEWORK

- **NPPF (2024):** Paragraph 198 mandates that planning decisions must "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development".
- **NPSE:** Defines NOAEL (No Observed Adverse Effect Level); results place this development within this acceptable range where no significant adverse impact occurs.
- **BS 8233:2014:** Recommends a criterion of 30dB LAeq,8hr for sleeping conditions in bedrooms.
- **BS 4142:2014:** Methodology for rating and assessing industrial and commercial sound.

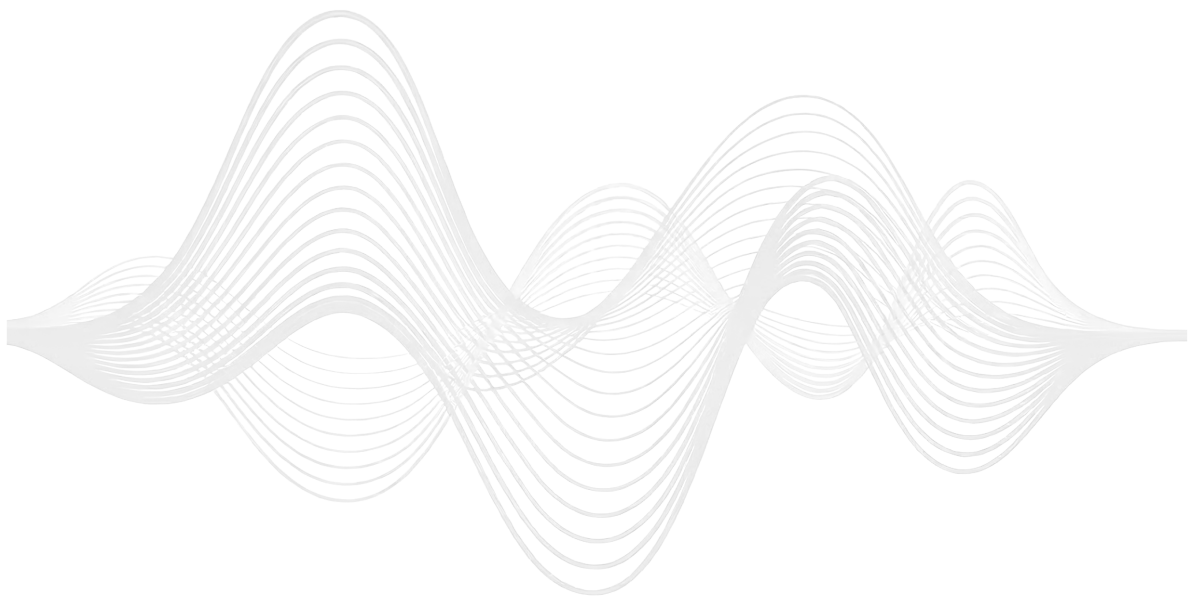
A.3. COMPUTATIONAL MODELING ASSUMPTIONS (ISO 9613-2)

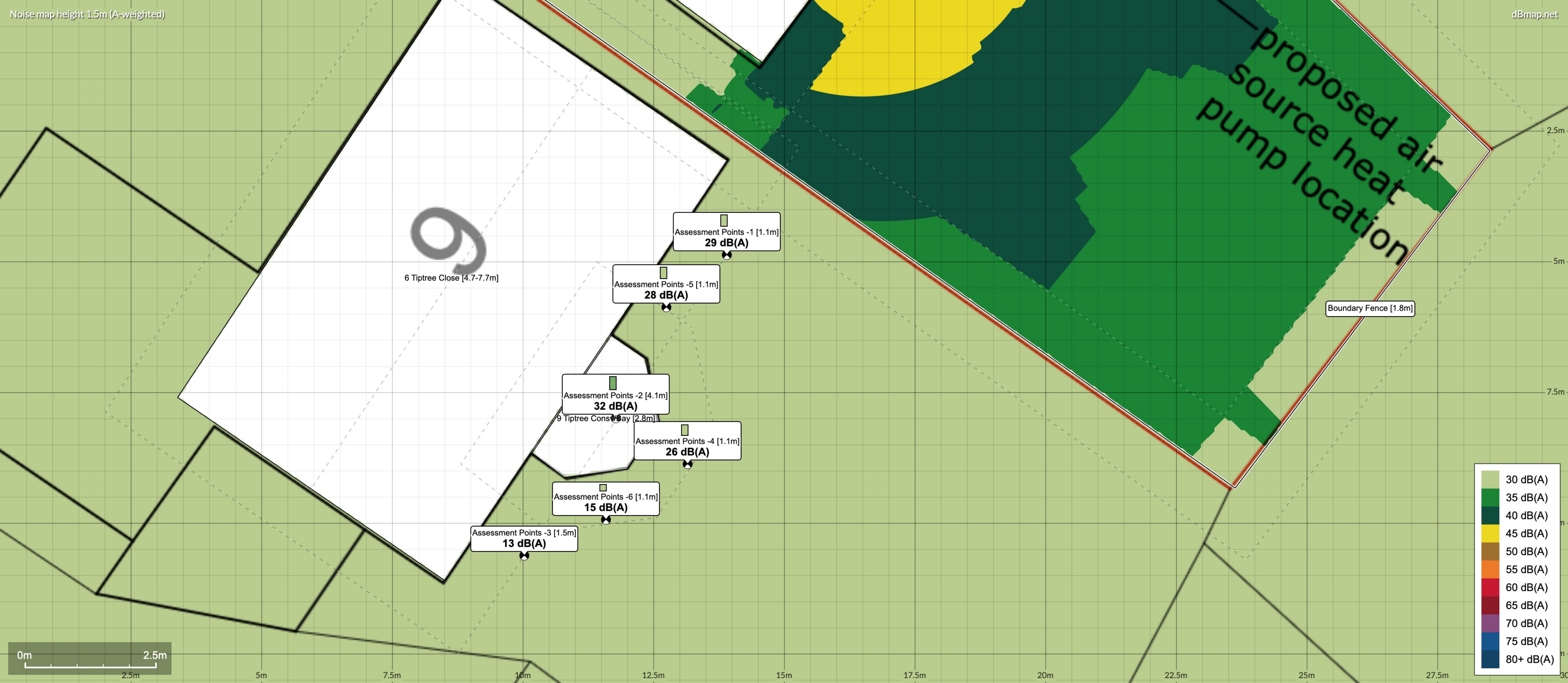
- **Reflection Coefficient (0.982):** Applied to all vertical surfaces, assuming 98.2% of sound energy is reflected back into the environment.
- **Ground Factor (G=0):** Hard ground applied to the entire propagation path to negate soft ground attenuation, ensuring the predicted levels are conservative.
- **Directivity (Q=2):** Hemispherical radiation assumed due to proximity (250mm) to the reflective host facade.
- **Atmospheric Absorption:** Standard ISO conditions (10°C, 70%RH) applied.

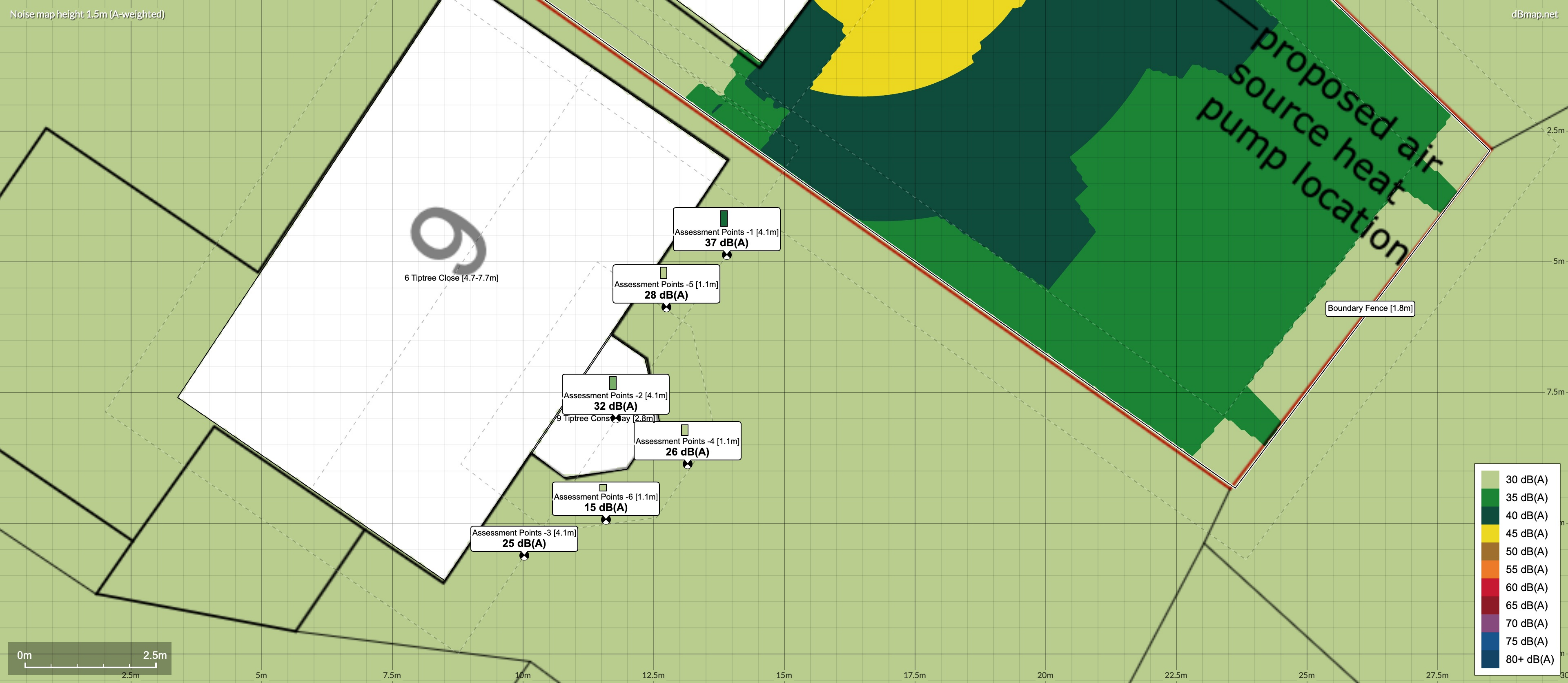
A.4. GLOSSARY OF ACOUSTIC TERMS

- **dB(A):** A-weighted decibels; a logarithmic scale reflecting the frequency response of the human ear.
- **LAeq,T:** The "Equivalent Continuous Sound Level" over a specified time period "T".
- **Rating Level (LAr, Tr):** The specific noise level of the source plus any adjustment for characteristic features.

- **Sound Power Level (LW):** The total sound energy radiated by a source per unit of time.













Defra OGC preview

[Layers](#) Download

RG6 4HS

RG6 4HS
Earley, Borough of Wokingham, England, United Kingdom

Road Noise - All Metrics - England Round 4

Department for Environment, Food & Rural Affairs

☐ All Layers

☒ Road_Noise_LAeq16hr_England_Round_4_All ^

<40

40 to <45

45 to <50

50 to <55

55 to <60

60 to <65

65 to <70

70 to <75

75 to <80

>=80

☐ Road_Noise_LAeq16hr_England_Round_4_Maj v

☐ Road_Noise_Lday_England_Round_4_All v

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Noise Mapping Results																	
--- Receiver Results - Summary ---																	
Receiver Name	Height (m)	Total dB(A)	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz							
Assessment Points -1	1.1	28.52				28.52											
Assessment Points -1	4.1	37.4				37.4											
Assessment Points -2	4.1	32.08				32.08											
Assessment Points -3	1.5	13.38				13.38											
Assessment Points -3	4.1	25.02				25.02											
Assessment Points -4	1.1	25.84				25.84											
Assessment Points -5	1.1	27.62				27.62											
Assessment Points -6	1.1	15.36				15.36											
Assessment Points -7	1.1	25.25				25.25											
Assessment Points -7	4.1	33.92				33.92											
Assessment Points -8	1.5	23.26				23.26											
Assessment Points -8	4.1	26.72				26.72											
Assessment Points -9	1.5	24.11				24.11											
Assessment Points -9	4.1	27.44				27.44											
--- Receiver Results - Sources Analysis ---																	
Receiver Name	Height (m)	Total dB(A)	Cosy 12														
Assessment Points -1	1.1	28.52	28.52														
Assessment Points -1	4.1	37.4	37.4														
Assessment Points -2	4.1	32.08	32.08														
Assessment Points -3	1.5	13.38	13.38														
Assessment Points -3	4.1	25.02	25.02														
Assessment Points -4	1.1	25.84	25.84														
Assessment Points -5	1.1	27.62	27.62														
Assessment Points -6	1.1	15.36	15.36														
Assessment Points -7	1.1	25.25	25.25														
Assessment Points -7	4.1	33.92	33.92														
Assessment Points -8	1.5	23.26	23.26														
Assessment Points -8	4.1	26.72	26.72														
Assessment Points -9	1.5	24.11	24.11														
Assessment Points -9	4.1	27.44	27.44														
--- Receiver Results - Full Detail ---																	
Receiver Name	Source Name	Distance to source (m)	Height including ground level (m)	Source height including ground level (m)	Frequency (Hz)	Lw	Ad	Aa	Ag	Ab (total)	Ab (top edge)	Ab (lateral 1)	Ab (lateral 2)	Adjustment	Weighting	Lp	
Assessment Points -1	Cosy 12	7.07	1.1	0.6	500	61	-27.99	-0.02	2.89	-10.03	-10.03	-	-	3	-3.2	25.66	
Assessment Points -1	Cosy 12 (reflected by 8 Tiptree Close)	7.33	1.1	0.6	500	60.91	-28.3	-0.02	2.9	-9.92	-9.92	-	-	3	-3.2	25.37	
Assessment Points -1	Cosy 12	7.87	4.1	0.6	500	61	-28.92	-0.02	2.69	0	-	-	-	3	-3.2	34.55	
Assessment Points -1	Cosy 12 (reflected by 8 Tiptree Close)	8.11	4.1	0.6	500	60.91	-29.18	-0.02	2.71	0	-	-	-	3	-3.2	34.22	
Assessment Points -2	Cosy 12 (reflected by 8 Tiptree Close)	11.56	4.1	0.6	500	60.91	-32.26	-0.03	2.85	-1.72	-1.72	-	-	3	-3.2	29.56	
Assessment Points -2	Cosy 12	11.38	4.1	0.6	500	61	-32.12	-0.03	2.84	-2.97	-2.97	-	-	3	-3.2	28.52	
Assessment Points -3	Cosy 12	14.01	1.5	0.6	500	61	-33.93	-0.03	2.96	-16.42	-16.5	-33.86	-	3	-3.2	13.38	
Assessment Points -3	Cosy 12	14.41	4.1	0.6	500	61	-34.17	-0.03	2.9	-4.47	-4.47	-	-	3	-3.2	25.02	
Assessment Points -4	Cosy 12	11.03	1.1	0.6	500	61	-31.85	-0.03	2.95	-8.92	-8.92	-	-	3	-3.2	22.96	
Assessment Points -4	Cosy 12 (reflected by 8 Tiptree Close)	11.37	1.1	0.6	500	60.91	-32.12	-0.03	2.96	-8.83	-8.83	-	-	3	-3.2	22.7	
Assessment Points -5	Cosy 12	8.52	1.1	0.6	500	61	-29.61	-0.02	2.92	-9.38	-9.38	-	-	3	-3.2	24.71	
Assessment Points -5	Cosy 12 (reflected by 8 Tiptree Close)	8.7	1.1	0.6	500	60.91	-29.79	-0.02	2.93	-9.32	-9.32	-	-	3	-3.2	24.51	
Assessment Points -6	Cosy 12	12.63	1.1	0.6	500	61	-33.03	-0.03	2.96	-17.73	-17.73	-	-	3	-3.2	12.97	
Assessment Points -6	Cosy 12 (reflected by 8 Tiptree Close)	12.88	1.1	0.6	500	60.91	-33.2	-0.03	2.97	-18.83	-18.83	-	-	3	-3.2	11.62	
Assessment Points -7	Cosy 12	7.77	1.1	0.6	500	61	-28.81	-0.02	2.91	-9.64	-9.64	-	-	3	-3.2	25.25	
Assessment Points -7	Cosy 12	8.51	4.1	0.6	500	61	-29.59	-0.02	2.73	0	-	-	-	3	-3.2	33.92	
Assessment Points -8	Cosy 12	11.74	1.5	0.6	500	61	-32.39	-0.03	2.94	-8.06	-8.06	-	-	3	-3.2	23.26	
Assessment Points -8	Cosy 12	12.22	4.1	0.6	500	61	-32.74	-0.03	2.86	-4.18	-4.18	-	-	3	-3.2	26.72	
Assessment Points -9	Cosy 12	14.74	1.5	0.6	500	61	-34.37	-0.03	2.96	-8.14	-8.14	-	-	3	-3.2	21.22	
Assessment Points -9	Cosy 12 (reflected by 10 Tiptree Close)	15.09	1.5	0.6	500	60.91	-34.58	-0.03	2.97	-8.09	-8.09	-	-	3	-3.2	20.97	
Assessment Points -9	Cosy 12	15.13	4.1	0.6	500	61	-34.59	-0.03	2.91	-4.51	-4.51	-	-	3	-3.2	24.57	
Assessment Points -9	Cosy 12 (reflected by 10 Tiptree Close)	15.47	4.1	0.6	500	60.91	-34.79	-0.04	2.91	-4.51	-4.51	-	-	3	-3.2	24.29	
--- Objects ---																	
Receivers	x	y	Height														
Assessment Points -1		57.13	34.18	4.1													
Assessment Points -2		55	37.31	4.1													
Assessment Points -3		53.25	39.94	4.1													
Assessment Points -4		56.38	38.19	1.1													
Assessment Points -5		55.97	35.19	1.1													
Assessment Points -6		54.81	39.25	1.1													
Assessment Points -7		64.81	21.55	1.1													
Assessment Points -8		67.73	18.8	1.5													
Assessment Points -9		69.94	16.72	1.5													
Point Sources	x	y	Height	Lw	Hz	Adjust Level											
Cosy 12		60.42	27.94	0.6	61	500	3										
Barriers	x	y	Height	Reflection Coefficient													
Boundary Fence		57.53	18.58	1.8	0.98	31.5											
-		71.72	32.2	-	0.98	63											
-		66.84375	38.64063	-	0.98	125											
-		52.34375	28.39063	-	0.98	250											
-		53.28125	27.32813	-	0.98	500											
-	-	-	-	-	0.98	1000											
-	-	-	-	-	0.98	2000											
-	-	-	-	-	0.98	4000											
-	-	-	-	-	0.98	8000											
-	-	-	-	-	0.98	16000											
Boundary Fence -2		57.47	18.52	1.8	0.98	31.5											
-		56.78	19.33	-	0.98	63											
-	-	-	-	-	0.98	125											
-	-	-	-	-	0.98	250											
-	-	-	-	-	0.98	500											
-	-	-	-	-	0.98	1000											
-	-	-	-	-	0.98	2000											
-	-	-	-	-	0.98	4000											
-	-	-	-	-	0.98	8000											
-	-	-	-	-	0.98	16000											

Buildings	x	y	Height	Reflection Coefficient														
8 Tiptree Close		50.49	25.18	4.7	0.98													
-		57.8	30.5	8.2														
-		62.72	23.96															
-		55.41	18.64															
6 Tiptree Close		46.61	36.92	4.7	0.98													
-		51.72	40.42	7.7														
-		57.13	32.39															
-		51.97	28.83															
10 Tiptree Close		56.8	14.84	4.7	0.98	31.5												
-		63.27	21.65	8.2	0.98	63												
-		70.15	15.14	-	0.98	125												
-		63.78	8.4	-	0.98	250												
-	-	-	-	-	0.98	500												
-	-	-	-	-	0.98	1000												
-	-	-	-	-	0.98	2000												
-	-	-	-	-	0.98	4000												
-	-	-	-	-	0.98	8000												
-	-	-	-	-	0.98	16000												
9 Tiptree Consv/Bay		54.91	35.72	2.8	0.98	31.5												
-		55.56	36.17	-	0.98	63												
-		55.82813	37.35938	-	0.98	125												
-		55.20313	38.28125	-	0.98	250												
-		54	38.4375	-	0.98	500												
-		53.39063	37.96875	-	0.98	1000												
-	-	-	-	-	0.98	2000												
-	-	-	-	-	0.98	4000												
-	-	-	-	-	0.98	8000												
-	-	-	-	-	0.98	16000												
--- Configuration ---																		
Calculation Method ISO9613-2:2024 (New)																		
Hard Ground (Ground Factor = 0)																		
15.0°C Temperature																		
70% Humidity																		
Results are A-weighted																		
Second order reflections are included																		
Reflections are only considered at a distance of 1m or greater from a reflector (facade level)																		
ISO9613-2 barrier attenuation limit (20/25dB) is enabled																		
Vertical edges (lateral paths) are included																		
Limited to convex paths																		
Limited in distance (ISO17534-3 recommendation)																		
Ground reflections are not screened (ISO17534-3 recommendation)																		
--- Key ---																		
Lw	Sound Power Level (dB)																	
Lp	Sound Pressure Level (dB)																	
Ad	Distance attenuation (geometric divergence) ISO9613-2 (dB)																	
Ab	Barrier attenuation ISO9613-2 (dB)																	
Ag	Ground effect ISO9613-2 (dB)																	
Aa	Air absorption ISO9613-1 (dB)																	