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**GUARD HUT
HAMPSTEAD LANE
PLANT NOISE ASSESSMENT**

Technical Report: R10141-1 Rev 0

Date: 30th June 2023

For: Compton Avenue Management Ltd
Guard Hut
Compton Av
N6 4LH

24 Acoustics Document Control Sheet

Project Title: Guard Hut, Compton Avenue – Plant Noise Assessment

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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been instructed by Compton Avenue Management Ltd to undertake an assessment of noise from proposed new plant at the Guard Hut, Compton Avenue, London.
- 1.2 This report presents the results of the assessment, following site visits and background noise surveys undertaken between 21st and 28th June 2023.
- 1.3 All noise levels in this report are presented in dB relative to 20µPa.

2.0 SITE DESCRIPTION AND PROPOSALS

- 2.1 The Guard Hut at Compton Avenue is located to the north of Hampstead Heath in London. It is proposed to replace the existing guard hut, constructed from insulated panelling, with a new brickwork building. The new building will be located to existing guard hut's footprint, adjacent to Hampstead Lane (B519) to the south with residential properties to the east, west and north, on Compton Avenue.
- 2.2 A new condensing unit is proposed to serve the replacement Guard Hut, to be located at the rear of the building within a bin compound.
- 2.3 The nearest noise sensitive receptors to the proposed new plant are the residential properties known as Esterel, approximately 8m to the west, and The Red House, approximately 38m to the east, and are identified in Figure 1.

3.0 CRITERIA

- 3.1 The National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should aim to:
 - Mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development and avoid noise giving rise to significant adverse impacts on health and quality of life.
 - Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'.

3.4 The Planning Practice Guidance (PPG) [Reference 3] is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The NPPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.

3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

3.6 The documents described above do not refer to specific noise criteria. When considering the impact of noise from new plant 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria from British Standard 4142:2014 [Reference 4] are adopted.

BS 4142: 2014+A1:2019 Methods for Rating Industrial and Commercial Sound

3.7 BS 4142:2014 provides a method for rating the effects of industrial and commercial sound on residential areas. The standard advocates a comparison between the typical measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction of up to 15 dBA is applied.

- 3.8 The standard states that a difference between the rating level and the background level of around +10 dBA is an indication of a significant adverse impact, depending on the context and a difference of around +5 dBA is likely to be an indication of an adverse impact again depending on the context. Where the rating level does not exceed the background noise level, this is an indication of the specific sound source having a low impact (depending upon the context).

Summary

- 3.9 Based on the above, and in line with planning conditions for similar proposals in the area, it is considered reasonable to target a BS 4142 plant noise rating level of at least 5 dBA below the typical background noise level during all periods at the nearest receptor locations.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

Measurement Instrumentation and Procedure

- 4.1 An environmental noise survey was undertaken between the 21st and 28th June 2023 in order to determine the typical background noise levels in the area.
- 4.2 The measurement location was to the rear of the guard hut, approximately 8m from the nearest residential property (Esterel), in free-field conditions. This measurement location is representative of the nearest receptor location and is identified in Figure 1.
- 4.3 The instrumentation was setup to monitor background noise levels and store data in 5-minute intervals of the overall A-weighted L_{90} using fast time weighing. The following instrumentation was used during the survey:
- Rion NL32 Type 1 sound level meter;
 - Brüel & Kjær type 4231 acoustic calibrator.
- 4.4 Calibration of the equipment was checked before and on completion of the measurements and no drift was recorded. Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use' [Reference 5].
- 4.5 Weather conditions during the measurements were variable with short periods of rainfall and wind speeds exceeding 5m/s. Measurements affected by meteorological conditions have been omitted from the overall representative background noise levels.

Background Noise Measurements – Results

- 4.6 The measured background noise levels are summarised in Table 1 and shown graphically in Appendix B.

Date (June 2023)	Measured Typical Background Noise Level		
	Daytime (07:00 to 19:00) dB LA90 1 hour	Evening (19:00 to 23:00) dB LA90 1 hour	Night-time (23:00 to 07:00) dB LA90 15 min
Wednesday 21st	48*	43	33
Thursday 22nd	48	44	37
Friday 23rd	49	43	37
Saturday 24th	45	44	38
Sunday 25th	45	44	34
Monday 26th	49	42	36
Tuesday 27th	49	41	37
Wednesday 28th	51*	-	-
Representative Level	45	42	35

Table 1 - Measured Typical Background Noise Levels

*partial measurement period

- 4.7 24 Acoustics' interpretation of the typical background noise level is the average of the range of levels less one standard deviation.

Plant Noise Limits

- 4.8 Following the criteria outlined in Section 3 (plant noise limit 5 dBA below the representative background noise level), Table 2 sets out the proposed maximum external plant noise levels for the daytime, evening and night-time operational periods, to be achieved by the new plant at the nearest noise sensitive property.

Maximum External Plant Noise Limits		
Daytime (07:00 to 19:00 hours) dB LA90 1 hour	Evening (19:00 to 23:00 hours) dB LA90 1 hour	Night-time (23:00 to 07:00 hours) dB LA90 15 min
40	37	30

Table 2 - Recommended Maximum Plant Noise Limits

5.0 PLANT NOISE ASSESSMENT

- 5.1 The new plant will comprise a single condensing unit, located to the rear of the replacement Guard Hut within a bin store at ground level. Adjacent garden boundary walls (both wooden fence and brickwork construction - approximately 2m high) will provide screening to the nearest receptor locations. Plant locations are shown in Figure 2.
- 5.2 The condensing unit is expected to operate on a 24-hour basis.
- 5.3 The proposed condensing unit will comprise a Fujitsu AOYG14KMCC outdoor unit. The heating mode operation of the unit presents the highest noise levels and has been used in the assessment.
- 5.4 Table 3 shows the manufacturer's published sound pressure level data for the proposed unit.

Fujitsu AOYG14KMCC Condensing Unit Manufacturer's Stated Sound Pressure Level (dB) at 1m A-weighted Octave Band Centre Frequency (Hz)								dBA
63	125	250	500	1k	2k	4k	8k	
43	48	49	48	46	42	38	33	55

Table 3 - Manufacturer's Stated Sound Pressure Level at 1m

- 5.5 Based on the manufacturer's noise data, the plant is not expected to contain tonal or otherwise distinctive noise characteristics sufficiently perceptible at the nearest residential property.

Assessment

- 5.6 Calculations have been undertaken, based on the manufacturer's stated plant noise levels, to determine the level of noise from the proposed condensing unit at the nearest residential properties.
- 5.7 Calculations include losses due to distance, reflections and screening provided by neighbouring garden boundary fences. To provide a robust assessment, it is assumed that all plant will be operating concurrently for a full 1 hour daytime period and 15 min night-time period.
- 5.8 Resultant plant noise levels at the nearest residential receptor locations during all periods are summarised below:

- Esterel (approximately 8m to the west): 29 dB $L_{Aeq T}$
- The Red House (approximately 37m to the east): 26 dB $L_{Aeq T}$

5.9 Based on the above predicted plant noise level, a BS 4142 assessment has been undertaken and is summarised in the following section.

BS 4142:2014 Assessment

5.10 A BS 4142 assessment for the proposed condensing unit has been undertaken and is shown in Tables 4 and 5. Based on the manufacturer's noise data, the proposed plant is not considered to contain any tonal or otherwise distinctive noise characteristics that would be perceptible at the receptor location.

Esterel Receptor Location: BS:4142 Plant Noise Assessment			
	Daytime Operation 07:00 to 19:00	Evening Operation 19:00 to 23:00	Night-time Operation 23:00 to 07:00
Representative Background Noise Level	45 dB L_{A90} 1 hour	42 dB L_{A90} 1 hour	35 dB L_{A90} 1 hour
Specific Source Noise Level	29 dB L_{Aeq} 1 hour	29 dB L_{Aeq} 1 hour	29 dB L_{Aeq} 1 hour
Rating Correction	0 dB	0 dB	0 dB
Rating Noise Level	29 dBA	29 dBA	29 dBA
BS 4142 Assessment Level	-16	-13	-6

Table 4 - Esterel Receptor Location, BS:4142 Plant Noise Assessment.

The Red House Receptor Location: BS:4142 Plant Noise Assessment			
	Daytime Operation 07:00 to 19:00	Evening Operation 19:00 to 23:00	Night-time Operation 23:00 to 07:00
Representative Background Noise Level	45 dB L_{A90} 1 hour	42 dB L_{A90} 1 hour	35 dB L_{A90} 1 hour
Specific Source Noise Level	26 dB L_{Aeq} 1 hour	26 dB L_{Aeq} 1 hour	26 dB L_{Aeq} 1 hour
Rating Correction	0 dB	0 dB	0 dB
Rating Noise Level	26 dBA	26 dBA	26 dBA
BS 4142 Assessment Level	-19	-16	-9

Table 5 - The Red House Receptor Location, BS:4142 Plant Noise Assessment.

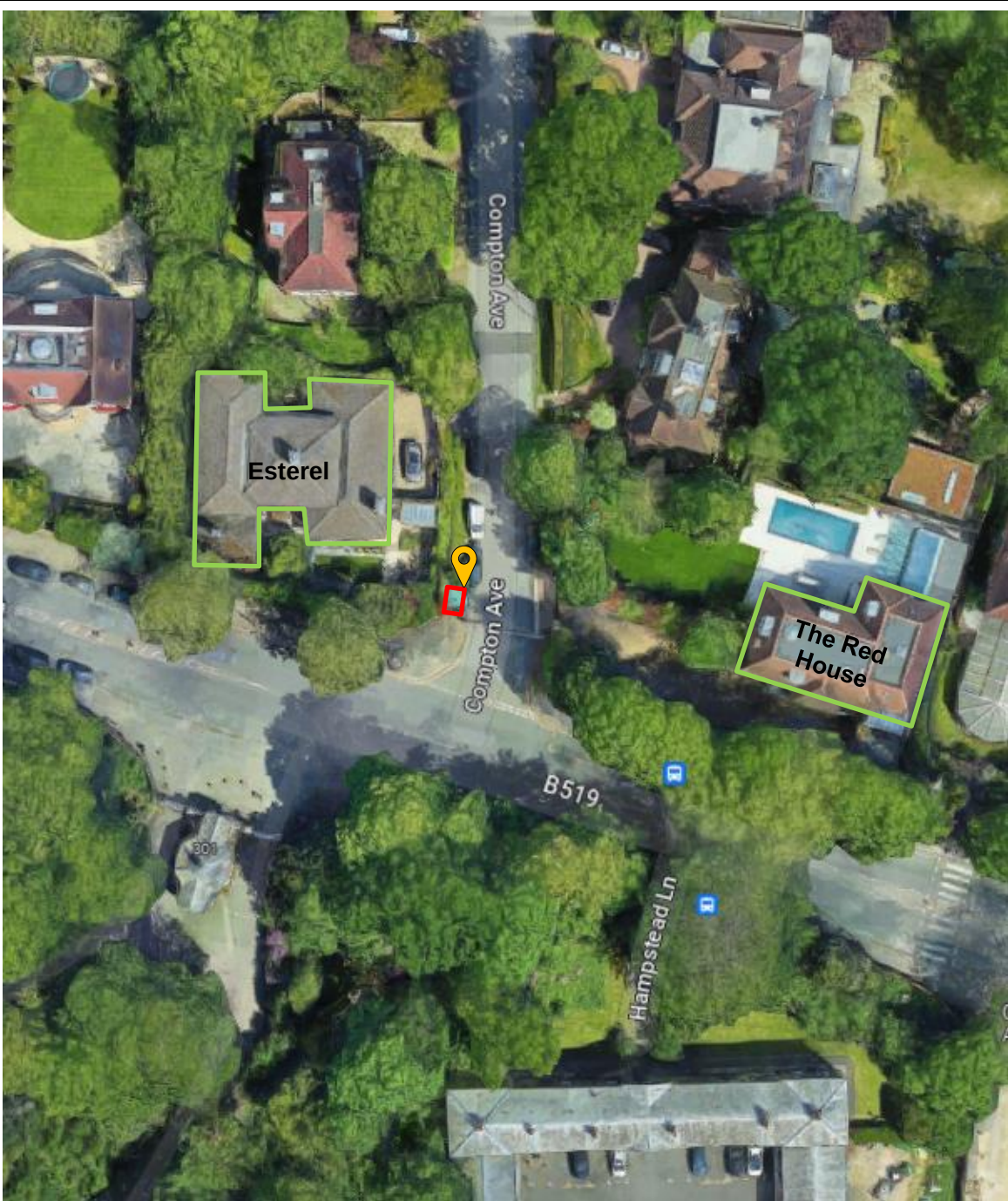
- 5.11 The above tables show that the BS 4142 rating noise levels at the residential receptor locations will be lower than the representative background noise level during all periods of operation. This is a 'low' impact under BS 4142.
- 5.12 Additionally, the predicted plant noise assessment achieves the recommended plant noise limit of 5 dBA below the representative background noise level and is acceptable.

6.0 CONCLUSIONS

- 6.1 Compton Avenue Management Ltd has instructed 24 Acoustics Ltd to undertake a noise impact assessment for a proposed condensing unit at a replacement Guard Hut, Compton Avenue, London.
- 6.2 An environmental noise survey has been undertaken to determine the existing background noise levels representative of nearby residential receptor locations.
- 6.3 Calculations have been undertaken, based on manufacturer's noise data, to determine the plant noise levels at the nearest noise sensitive receptors.
- 6.4 The assessment demonstrates that noise from the proposed condensing unit at the nearest residential receptor locations will be below the measured background noise levels and is a 'low' impact when assessed in accordance with the guidance of BS 4142. Therefore, noise from the proposed new plant is acceptable.

REFERENCES

1. Department for Communities and Local Government. National Planning Policy Framework, March 2012.
2. DEFRA, Noise Policy Statement for England, March 2010.
3. Planning Practice Guidance, Department of Communities and Local Government (revised December 2014).
4. British Standards Institution. British Standard 4142: Methods for rating and assessing commercial and industrial sound, 2014. BS 4142:2014+A1:2019
5. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.

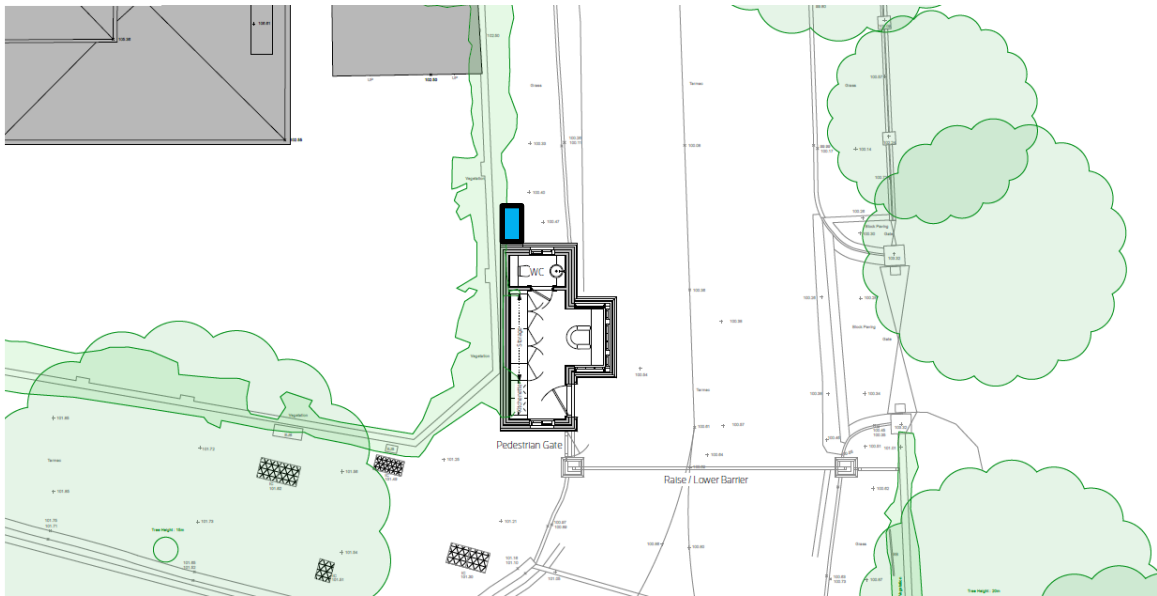


 Measurement Location

 The Guard House

 Residential Receptor Locations

Project: Guard Hut, Compton Avenue, London	Title: Site, Receptor and measurement Location		 24Acoustics
DWG No: Figure 1	Scale: N.T.S.	Rev: -	
Date: June 2023	Drawn By: KE	Job No: 10141	



Project: Guard Hut, Compton Avenue, London	Title: Proposed Guard Hut and Plant Location		
DWG No: Figure 2	Scale: N.T.S.	Rev: -	
Date: June 2023	Drawn By: KE	Job No: 10141	

APPENDIX A – SOUND INSULATION TERMINOLOGY

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and, as such, it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed (0.0002Pa to 20Pa) to a more manageable range of numbers. The threshold of hearing occurs at approximately 0dB and the threshold of pain is around 120dB.

Airborne Sound Insulation

Voices, hi-fi systems, television and radio sound and musical instruments are all sources of airborne sound. They excite the air around them and the vibration in the air is transmitted to surrounding surfaces, such as walls, ceilings and floors. This sets these constructions into vibration and this vibration is re-radiated in neighbouring rooms as sound. Energy is lost in the transmission path and this is referred to as transmission loss or more generally, airborne sound insulation. The most simple measure of sound insulation between two rooms is the sound level difference, D , which is the arithmetic difference between the sound level, in dB, in the source room and the sound level in the receiving room.

Other measures of sound insulation include the sound reduction index (R , obtained by laboratory test), the apparent sound reduction index (R' , obtained in field tests) and the standardised level difference (D_{nT} , used mainly in the sound insulation of rooms in dwellings and other cellular rooms). The relevant test procedures are laid down in BS EN ISO 140. The results are obtained over a range of frequencies. A single-figure “weighted” result can be obtained from one-third octave band results measured over the frequency range 100 - 3150Hz by using a curve-fitting procedure laid down in BS EN ISO 717. The subscript “w” is added to the descriptors above, for example; $D_{nT,w}$. The C_{tr} value is a correction factor (normally negative) which takes additional account of low frequency performance of the structure tested.

Impact Sound Isolation

In the case of impact sound, the building construction is caused to vibrate as a result of a physical impact. Footsteps on floors are the most obvious example. The vibration is radiated as sound in neighbouring rooms. Impact insulation is measured using a standard tapping machine, which drops weights cyclically onto a floor. The sound pressure level is measured in the receiving room below and the result is known as the impact level, L_i . This test is used in the evaluation of domestic separating floors. As with airborne sound, the test procedures are set out in BS EN ISO 140 and the single-figure weighting of the results is described in BS EN ISO 717. The descriptor for the final result of a field test is $L'_{nT,w}$.

Reverberation time

The reverberation time is a measure of the rate of decay of sound in a room and this influences the sound pressure level of noise in that room. It is defined as the time taken, in seconds, for the level of sound in a room to decrease by 60 dB (a millionth of its original energy value) after the discontinuation of a sound. A reverberation time of 0.5s is used to standardise sound insulation test results in dwellings. Reverberation time is measured in accordance with the requirements of BS EN ISO 140.

APPENDIX B – MEASUREMENT RESULTS

