



Noise Impact Assessment

Report: 4387-R1 – Euston TE, London Road, London, NW1 2BH

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1. Introduction

Clover Acoustics Ltd has been appointed by M.J. Quinn Integrated Services Ltd to carry out a noise assessment in preparation for air handling equipment to be installed at Euston TE, London Road, London, NW1 2BH.

A noise assessment has been carried out during a representative night period commencing on Thursday 21st May 2020 in order to establish the existing background levels.

The purpose of this report is to advise on noise limits required for the installation in the context of minimizing any noise impact from the operation of the proposed units.

2. Scope

BS4142:2014 Methods for rating and assessing industrial and commercial sound.

BS4142 gives a method for rating sound from industrial and commercial sources affecting people inside or outside dwellings or premises used for residential purposes. An initial estimate of the significance of the sound from the industrial/commercial nature can be assessed by subtracting the measured background noise level from the rating level (this is the specific sound level of the source with any corrections or penalties for distinctive acoustic characteristics). Typically, the greater the difference, the greater the magnitude of the impact.

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. 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.

3. Site Description

Euston TE is a large sized telephone exchange building situated in a mixed residential and commercial area in London. The current drawings identify new air handling equipment to be installed on the 2nd floor level of the exchange building including:

- 2 x WFA4.0 air handling units (AHU) on the northern elevation.
- 1 x Exhaust units on the south-west elevation
- 1 x Exhaust units on the south-eastern elevation.

Background sound measurements of the existing noise climate were taken prior to the installation of the proposed equipment. Subjectively the existing background sound was low with road traffic noise from the surrounding area, there was a general hum apparent in the close vicinity of the exchange building.

- The receiver to the north of the exchange is approximately 71 meters from the nearest proposed air handling unit identified as '172 Euston Road'.
- The receiver to the south-west of the exchange is approximately 23 meters from the nearest proposed extract unit identified as 'Lesley Foster House'.

Figure 1 shows the site location and background monitoring locations; Figure 2 shows the proposed floor layout plan.



Figure 1 – Site Location



4. Survey Information

Measurement Instrumentation

The measurement instrumentation used on the survey was as follows:

Equipment	Manufacturer & Type	Serial Number	Calibration Certificate
Sound Level Meter	Norsonic 118	30559	18/2083
Acoustic Calibrator	Norsonic 1251	32856	20/1286

The equipment was calibrated to comply with section 4.2 of BS7445:1-2003 before and after the surveys. The calibration was as follows:

Meter	Serial	Before		After	
Norsonic 118	30559	113.9	-25.6	113.9	-25.6

Measurements & Timescales

During the background survey 5-minute measurements were made during a typical night period commencing on Thursday 21st May 2020 at locations representative of the nearest sensitive receivers to the exchange building. The installation of exhaust equipment to the north-east is enclosed within a compound area facing commercial premises and should not affect residential dwellings therefore is not assessed.

The following measurements are reported: $L_{Aeq,T}$, $L_{A90,T}$, $L_{Amax,T}$

The measurements and their interpretation shall be in accordance with BS 7445: Parts 1 and 2. All sound pressure levels are in dB (re 20 μ Pa).

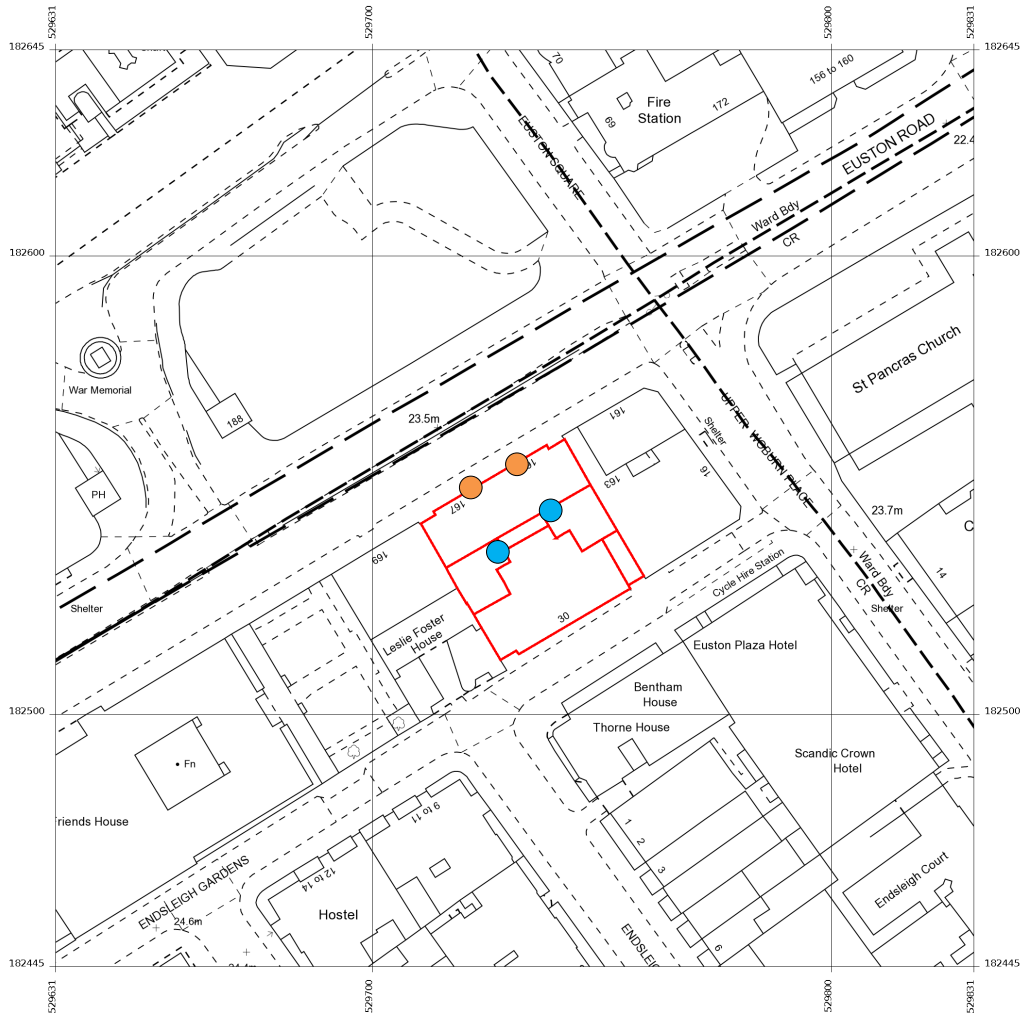
Meteorology

Wind speed measurements were recorded during the background survey close to the noise monitoring location. Throughout the measurement period; average wind speed measurements were below 5m/s⁻¹.

Temperature was recorded at 15-17°C with no precipitation during the measurement period.

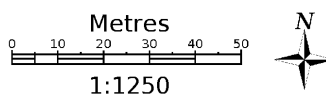
Position of Monitoring Equipment

The equipment was mounted free field 1.5m from the ground. Figure 3 shows the site location plan with the location of the proposed installations.



Produced 06 Jul 2020 from the Ordnance Survey MasterMap(Topography)Database and incorporating surveyed revision available at this date.

The representation of a road, track or path is no evidence of a right of way. The representation of features as lines is no evidence of a property boundary.



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NW1 2BH

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Reference: OI1406545
Centre coordinates: 529731 182545

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Figure 3 – Site Location Plan

	AHU Installation		Exhaust Installation
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5. Survey Results

Background Noise Summary

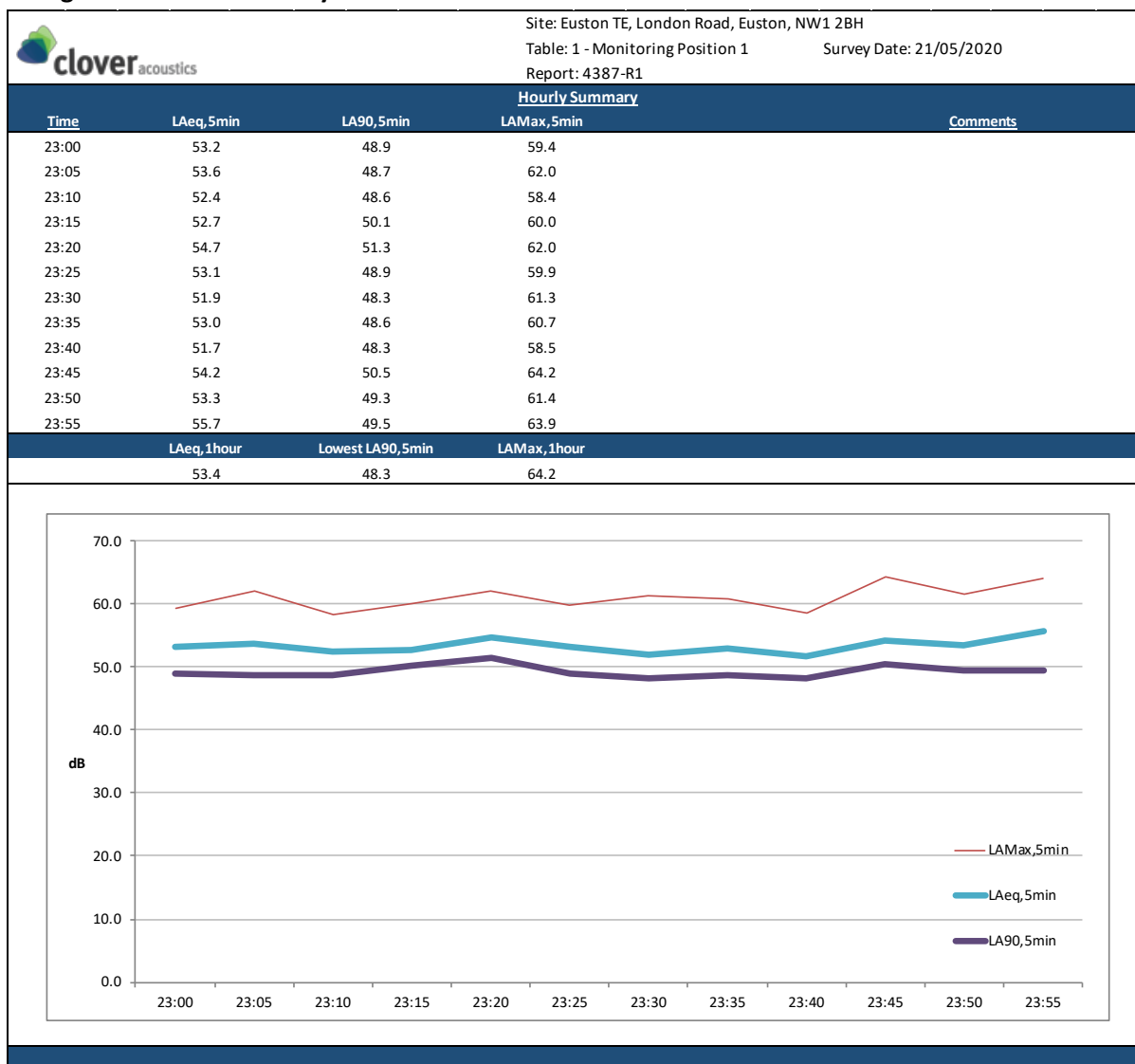


Table 1 – Monitoring Position 1 – Northern Receiver

Hourly Summary

Time	LAeq,5min	LA90,5min	LAMax,5min	Comments
00:15	55.0	53.0	59.7	
00:20	54.8	53.0	62.4	
00:25	56.7	53.8	63.9	
00:30	55.6	53.9	59.0	
00:35	56.9	53.9	64.7	
00:40	54.9	52.9	60.1	
00:45	56.8	53.9	61.3	
00:50	55.9	53.9	61.0	
00:55	55.7	53.8	60.2	
01:00	56.7	52.8	61.2	
01:05	54.5	52.7	58.2	
01:10	55.6	53.8	58.9	
LAeq,1hour	Lowest LA90,5min	LAMax,1hour		
55.8	52.7	64.7		

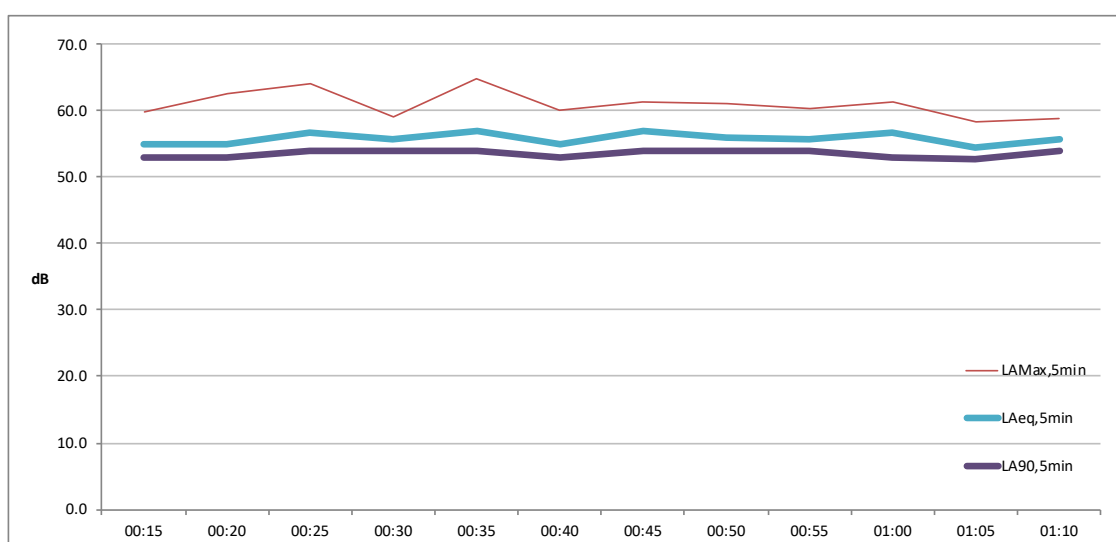


Table 2 – Monitoring Position 2 – South-West Receiver

6. Noise Assessment

BS4142:2014 – Methods for rating and assessing industrial and commercial sound

Specific Noise Source

It is proposed to install air handling equipment to the northern and south-west elevations of the exchange building. As the proposed equipment is a bespoke installation the noise output specification is not available therefore this report seeks to establish a noise emissions limit to ensure that there is no significant impact at the nearest receivers. The AHU receivers are approximately 71m away from the northern elevation at the closest point and exhaust receivers 23m away to the south west at the closest point. It is anticipated the exhaust equipment to the south-east will not impact on residential dwellings. The lowest background noise level monitored during the night time monitoring period was 48dB $L_{A90,5min}$ at the AHU receivers and 53dB $L_{A90,5min}$ at the exhaust receivers.

Acoustic Feature Correction

BS4142:2014 allows a character correction to be applied to the specific sound level where acoustic features are present at the assessment location. BS4142 considers that certain acoustic features can increase impact of a new noise source over that expected from a straight comparison between the specific noise level and the background noise level.

These features and the penalties applied to calculate a rating level when assessing subjectively as defined by BS4142 are as follows:

Tonality: For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 and +6dB for tonality.

- 2dB for a tone that is just perceptible
- 4dB where it is clearly perceptible
- 6dB where it is highly perceptible

Impulsivity: A correction of up to 9dB can be applied for sound that is highly impulsive, considering both the rapidity of change in sound level and the overall change in sound level.

- 3dB just perceptible impulsivity
- 6dB clearly perceptible impulsivity
- 9db highly perceptible impulsivity

Distinctive: Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive from the residual acoustic environment a 3dB penalty can be applied.

Intermittency: Where the specific sound has identifiable on/off conditions the specific sound level should be representative of the time period of length equal to the reference time period which contain the greatest amount of 'on' time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.

Corrections Applied: No frequency data is available to assess potential tonality of the specific unit, therefore it would in our view be prudent to apply a 4dB penalty for a clearly perceptible tone at the receivers. Typically air handling equipment would not be considered impulsive. In normal operation the equipment would not switch on/off several times within the reference time period and as such would not be considered intermittent.

Context

The dominant noise source is road traffic noise from the surrounding area to the north and existing exchange noise to the south western receiver. A general background hum is apparent in the close vicinity of the exchange building. The proposed equipment will be in addition to existing air handling equipment within the exchange building and is typical for this type of installation.

Distance Attenuation

The nearest sensitive receivers identified will be approximately 71m from the nearest proposed AHU installation and approximately 23m from the nearest proposed exhaust installation. Distance attenuation has been calculated using the following formula:

$$L_{p2} = L_{p1} + 20 \log \left(\frac{r_1}{r_2} \right) + 3$$

BS4142 Assessment 1 – 172 Euston Road – 2 x WFA4.0 Air Handling Unit

The individual air handling units should be limited to a noise output of 65dB(A) at 1m from the external louver. Applying the factors discussed above would predict a noise rating level of 38dB(A) at the receiver. This would give an assessment level -10dB below the lowest measured existing background noise level. BS4142 advises, *“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact”*.

BS4142 Assessment 1 – Northern Receivers		dB(A)
Single Unit (SPL at 1m)		65
Acoustic Feature Correction		4
Multiple Unit x2		3
Distance Attenuation		-34
Rating Level at Receiver		38
Background Level L_{A90}		48
Rating Below Background		-10

BS4142 Assessment 2 – Lesley Foster House – 1 x Extract Unit

The individual extract unit should be limited to a noise output of 63dB(A) at 1m from the external louver. Applying the factors discussed above would predict a noise rating level of 43dB(A) at the receiver. This would give an assessment level -10dB below the lowest measured existing background noise level. BS4142 advises, *“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact”*.

BS4142 Assessment 2 – South-West Receivers	dB(A)
Single Unit (SPL at 1m)	63
Acoustic Feature Correction	4
Distance Attenuation	-24
Rating Level at Receiver	43
Background Level L_{A90}	53
Rating Below Background	-10

7. Conclusion

A noise assessment has been carried out at the Euston TE, London Road, London, NW1 2BH to assess the impact of a proposed installation of air handling equipment. A background noise survey was conducted commencing on Thursday 21st May 2020 at a location representative of the nearest sensitive receivers.

A prediction assessment has been made in accordance with BS4142:2014 which has shown a rating level for the proposed installation of 10dB below the existing background noise level monitored can be achieved through limiting new installation noise as prescribed in section 6 of this report.

According to BS4142, *"The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. 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"*.



Steve Clow MIOA
Acoustic Consultant

8. Appendix

Glossary of Terms

Specific Noise Source

The noise source under investigation for assessing the likelihood of complaints.

Specific Noise Level, $L_{Aeq,T}$

The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.

Rating Level, $L_{A,T}$

The specific noise level plus any adjustment for the characteristic features of the noise.

Background Noise Level, $L_{A90,T}$

The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 % of a given time interval, T.

Residual Noise

The ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

Ambient Noise

Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

Reference Time Interval, T

The specified interval over which an equivalent continuous A-weighted sound pressure level is determined.

$L_{Aeq,T}$

The A-weighted equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as the fluctuating sound over a specified measurement period, T.

$L_{A10,T}$

The A-weighted sound level exceeded for 10% of the specified measurement period, T.

L_{Amax}

The highest short duration A-weighted sound level recorded during a noise event.

A-Weighting

The 'A' weighting is a correction term applied to the frequency range in order to approximate to the sensitivity of the human ear to noise. It is generally used to obtain an overall noise level from octave or third octave band frequencies.

Octave Band

A frequency band in which the upper limit of the band is twice the frequency of the lower limit.

One-third-octave Band

A frequency band in which the upper limit of the band is 1/3 times the frequency of the lower limit.