

# Everest House, Sopers Road Cuffley

Planning Compliance Review  
Report 20765.BS4142.01

Papa Architects Ltd  
222 Archway Road  
Highgate, London  
N6 5AX

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Written by:		Checked by:		Approved by:	
<b>Gonçalo Lemos MIEEnvSc MIOA</b> Senior Acoustic Consultant		<b>Aidan Tolkien MIOA</b> Senior Acoustic Consultant		<b>Kyriakos Papanagiotou MIOA</b> Managing Director	
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20765. TH1-3	Environmental Background Noise Time Histories
20765.Daytime.LA90	Statistical analysis for representative daytime $L_{A90}$ at MP.1
20765.Night-time.LA90	Statistical analysis for representative night-time $L_{A90}$ at MP.1
20765.Operatinghours.LA90	Statistical analysis for representative daytime $L_{A90}$ at MP.1
20765.Daytime.LA90	Statistical analysis for representative daytime $L_{A90}$ at MP.2
20765.Night-time.LA90	Statistical analysis for representative night-time $L_{A90}$ at MP.2
20765.Operatinghours.LA90	Statistical analysis for representative daytime $L_{A90}$ at MP.2
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20765.Night-time.LA90	Statistical analysis for representative night-time $L_{A90}$ at MP.3
20765.Operatinghours.LA90	Statistical analysis for representative daytime $L_{A90}$ at MP.3
Appendix A	Glossary of Acoustics Terminology
Appendix B	BS4142 Acoustic Calculations

## 1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Papa Architects Ltd. 222 Archway Road, Highgate London, N6 5AX, to undertake a noise impact assessment of the of the existing neighbouring industrial units’ operations affects on the proposed residential development at Everest House, Sopers Road, Cuffley, Potters Bar, who currently operate as office use.

Environmental noise surveys and manual noise source measurements have been undertaken on site to prepare a noise impact assessment in accordance with BS4142:2014 ‘Method for rating and assessing industrial and commercial sound’.

This report presents the methodology and results from the environmental survey, followed by calculations in accordance with BS4142 to provide an indication as to the likelihood of the noise emissions from the existing neighbouring industrial units operations having an adverse impact on the future closest noise sensitive receiver. Mitigation measures will be outlined as appropriate.

## 2.0 SITE SURVEYS

### 2.1 Site Description

As shown in Figure 2.1, the site is bounded by residential building and Car Park to the North, existing industrial units to the South and West and a Car Park and Land to the East.

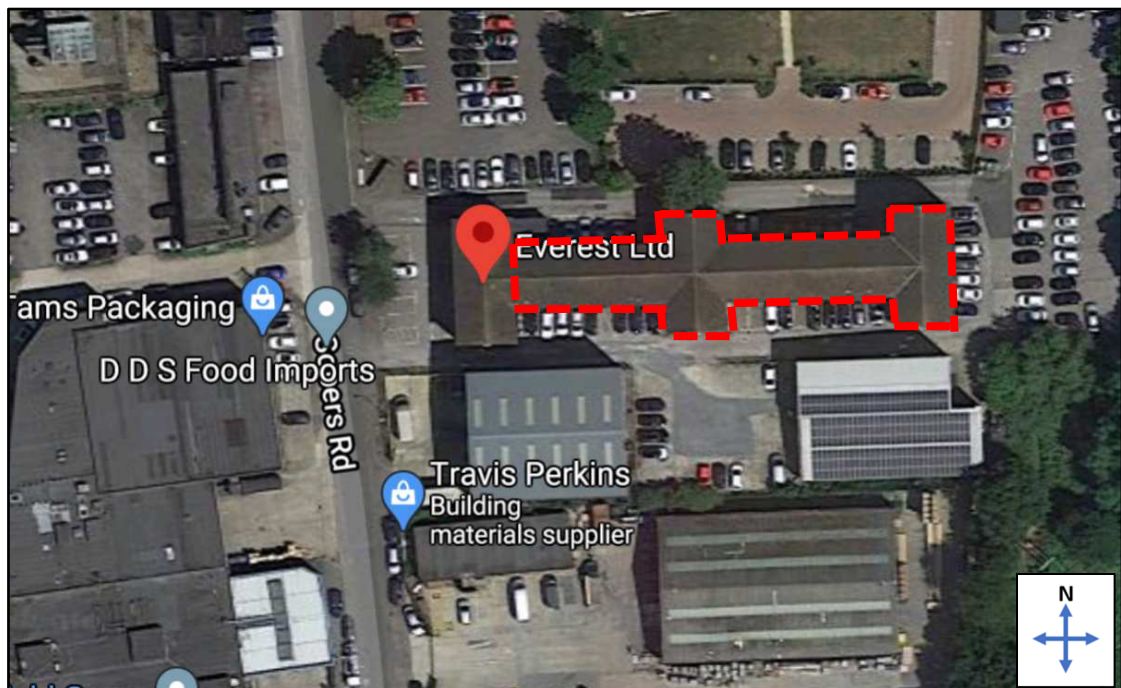


Figure 2.1 Site location plan (Image Source: Google Maps)

Initial inspection of the site revealed that the background noise profile at the monitoring location was typical of an urban environment, with the dominant noise source being road







traffic noise from Station Road and Sopers Road, with sporadic noise events associated with the operations of the existing industrial units and construction noise from temporary works being undertaken to the Southwest of the proposed development.


**2.2 Environmental Noise Survey Procedure**

Continuous automated monitoring were undertaken for the duration of the environmental noise surveys between 12:48 on 17/07/2020 and 11:41 on 20/07/2020. The choice of the monitoring location was based on collecting representative noise data in relation to the future nearest noise sensitive receivers relative.

In order to accurately assess the noise emissions of the neighbouring industrial units operations at Sopers Road, attended noise measurements were undertaken to the operations of Trux Storage warehouse, Travis Perkins, Cuffley Motors and Tams Packing. The choice of the positions were based both on collecting representative noise data of the industrial units operations at the worst-case points such as delivery areas and entrance areas of the industrial units. Attended noise measurements were undertaken between 07:47 and 11:09 on 20/07/2020 at the entrance gate area of Travis Perkins, on the delivery areas of Trux Storage warehouse, Tams Packing and on the entrance area of Cuffley Motors, as shown in Figure 2.2.

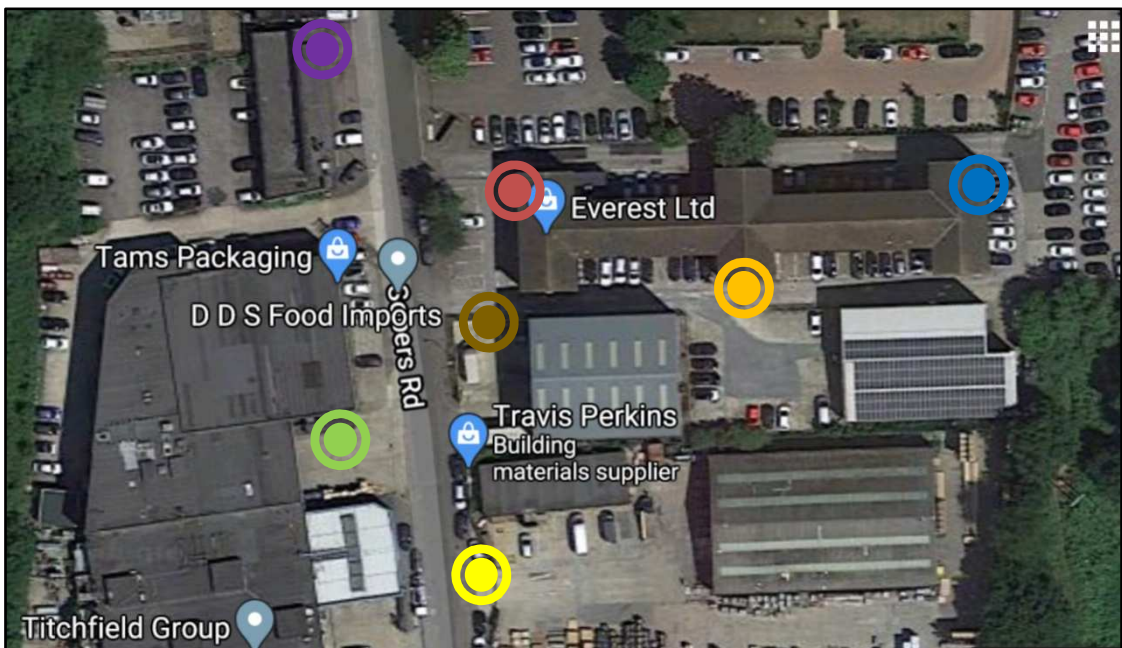
The measurement positions are described in Table 2.1 and shown in Figures 2.2 and 2.3.

Icon	Descriptor	Location Description
	Environmental Noise Measurement Position 1	The microphone was installed on a window on the 2 <sup>nd</sup> floor of the Sopers Road elevation. A correction of 3dB has been applied to account for non-free field conditions
	Environmental Noise Measurement Position 2	The microphone was installed on a window on the 1 <sup>st</sup> floor of the South elevation. A correction of 3dB has been applied to account for non-free field conditions
	Environmental Noise Measurement Position 3	The microphone was installed on a window on the 1 <sup>st</sup> floor of the East elevation. A correction of 3dB has been applied to account for non-free field conditions
	Source Noise Measurements at Tams Packing delivery area	The microphone was installed on tripod at 1.2 metres above ground in the Tams Packing delivery area, as shown in Figures 2.3.
	Source Noise Measurements at Cuffley Motors entrance area	The microphone was installed on tripod at 1.2 metres above ground in the Cuffley Motors entrance area, as shown in Figures 2.6.
	Source Noise Measurements at Travis Perkins entrance gate	The microphone was installed on tripod at 1.2 metres above ground in the Travis Perkins entrance gate, as shown in Figures 2.3.

Icon	Descriptor	Location Description
	Source Noise Measurements at Trux Storage delivery area	The microphone was installed on tripod at 1.2 metres above ground in the Trux Storage delivery area, as shown in Figures 2.4.

**Table 2.1 Measurement positions and descriptions**

Weather conditions during all surveys were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2007 Acoustics ‘Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels’.



**Figure 2.2 – Site measurement positions (Image source: Google Maps)**



Figure 2.3 – Image showing the environmental noise measurement position at Travis Perkins (Image source: Google Maps)



Figure 2.4 – Site photo showing the environmental noise measurement position at Trux Storage



Figure 2.5 – Image showing the environmental noise measurement position at Tams Packing (Image source: Google Maps)



Figure 2.6 – Image showing the environmental noise measurement position at Cuffley Motors (Image source: Google Maps)

Further discussions with the Client, it is understood that the industrial units were fully operational and there are no external plant units serving the industrial units.

It should be noted that no additional noise measurements have been undertaken at the industrial unit' entrance, shown in Figure 2.7 below, as all noise associated with this activity was captured by the measurement position 2. Further to the site visit and inspection, it is



understood that the noise sources on the delivery/car-park area are associated to vehicles movements.

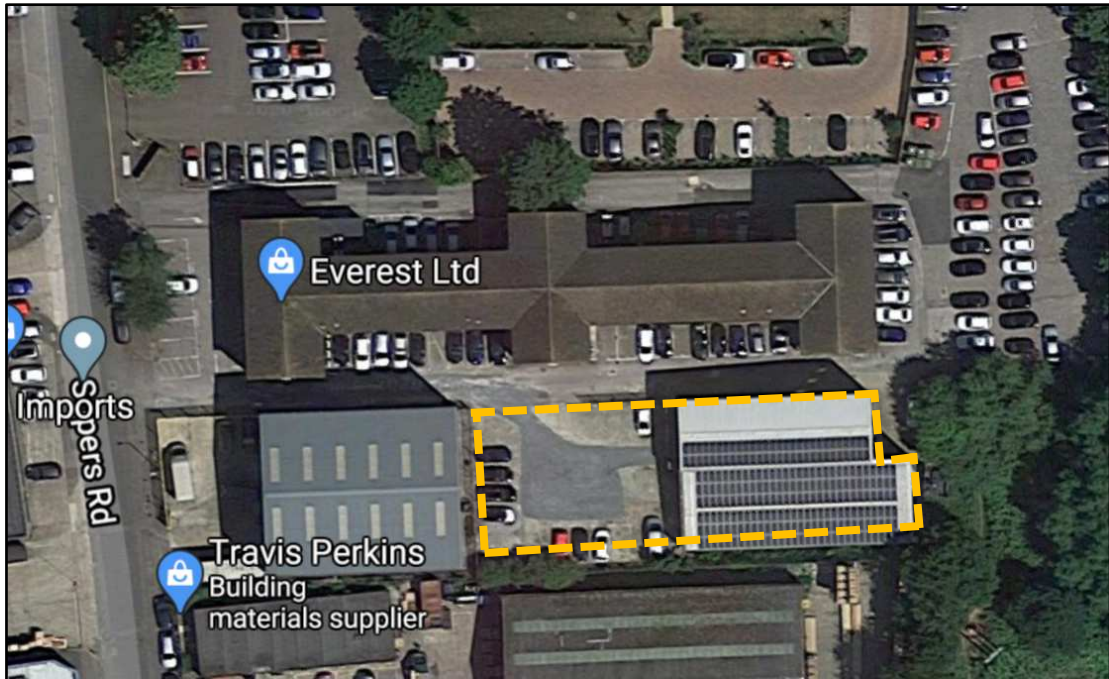


Figure 2.7– Image showing the industrial unit located to the South (Image source: Google Maps)

Furthermore, it is understood that the Titchfield Group industrial units, shown in Figure 2.8 below, located to the Southwest of the proposed development, are currently being converted into Offices. Therefore, the future operations of the office building would not be expected to have an adverse impact in the amenity of the proposed residential development.

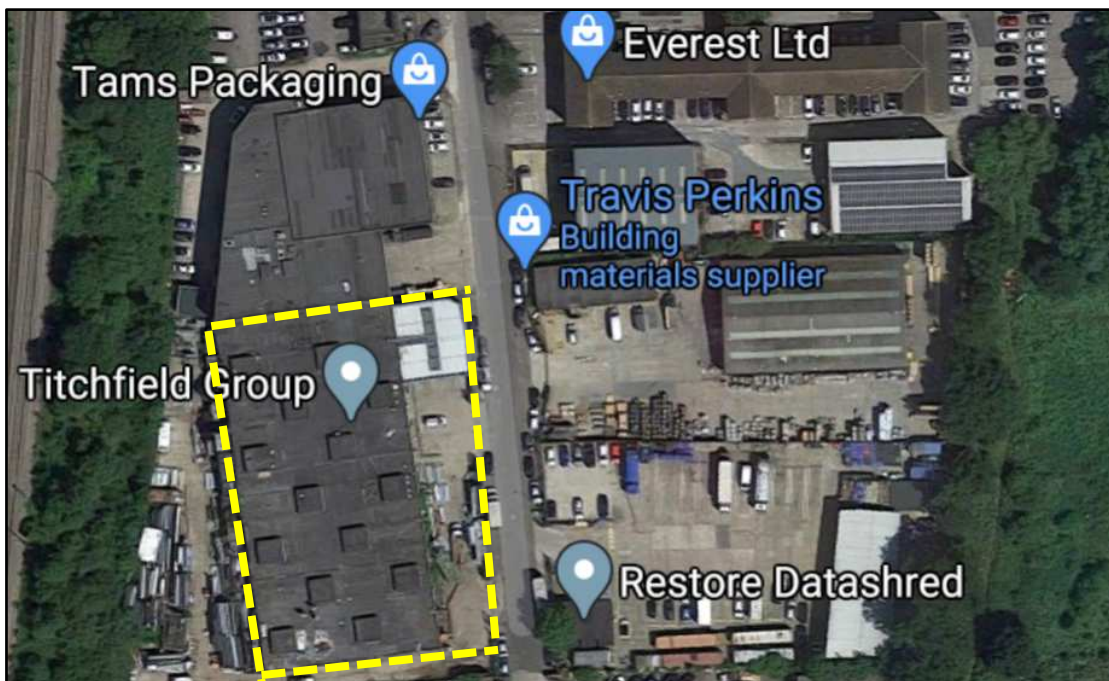


Figure 2.7– Image showing the industrial unit located to the Southwest (Image source: Google Maps)

### 2.3 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.3.

Measurement instrumentation		Serial no.	Date	Cert no.
Noise Kit 3	Svantek Type 977 Class 1 Sound Level Meter	34104	12/03/2020	14015015-2
	Free-field microphone Aco Pacific 7052E	66830		
	Preamp Svantek 2v12L	17293		
	Svantek External windshield	-	-	-
Noise Kit 4	Svantek Type 977B Class 1 Sound Level Meter	36453	27/02/2020	14015014-1
	Free-field microphone Aco Pacific 7052E	54143		
	Preamp Svantek 2v12L	41508		
	Svantek External windshield	-	-	-
Noise Kit 5	Svantek Type 977 Class 1 Sound Level Meter	46459	9/05/2019	14012954
	Free-field microphone Aco Pacific 7052H	43114		
	Preamp Svantek 2v12L	18929		
	Svantek External windshield	-	-	-
Noise Kit 6	Svantek Type 977A Class 1 Sound Level Meter	59632	26/09/2019	14012956
	Free-field microphone Aco Pacific 7052E	76533		
	Preamp Svantek 2v12L	64847		
	Svantek External windshield	-	-	-
Larson Davis CAL200 Class 1 Calibrator		8932	11/02/2020	04624/2

**Table 2.3 Measurement instrumentation**

### 3.0 RESULTS

#### 3.1 Environmental Background Noise Survey

The  $L_{Aeq: 5min}$ ,  $L_{Amax: 5min}$ ,  $L_{A10: 5min}$  and  $L_{A90: 5min}$  acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figures 20765.TH1-3.

Average and representative background noise levels are shown in Table 3.1 for daytime and night-time and operating hours of the existing industrial units.

It should be noted that the representative background noise level has been derived from the most commonly occurring  $L_{A90,5 min}$  levels measured during the environmental noise surveys undertaken for each monitoring position on site (MP.1, MP.2 and MP.3), as shown in 20765.Daytime.LA90, 20765.Night-time.LA90 and 20765.operating hours.LA90 attached.

Time Period	Representative background noise level $L_{A90}$ dB(A)	Average ambient noise level $L_{Aeq}$ dB(A)
Daytime (07:00-23:00)	44	57
Night-time (23:00-07:00)	40	52
Operating hours (07:00-18:00)	46	58

**Table 3.1 Representative background noise levels at MP.1**

Time Period	Representative background noise level $L_{A90}$ dB(A)	Average ambient noise level $L_{Aeq}$ dB(A)
Daytime (07:00-23:00)	42	49
Night-time (23:00-07:00)	36	43
Operating hours (07:00-18:00)	42	50

**Table 3.2 Representative background noise levels at MP.2**

Time Period	Representative background noise level $L_{A90}$ dB(A)	Average ambient noise level $L_{Aeq}$ dB(A)
Daytime (07:00-23:00)	42	51
Night-time (23:00-07:00)	30	44
Operating hours (07:00-18:00)	42	51

**Table 3.3 Representative background noise levels at MP.3**

### 3.2 Source Noise Measurements of Industrial Units Operations

To assess the noise emissions from the neighbouring industrial units' operations, attended noise measurements for different operations have been undertaken on site between 07:47 and 11:09 on 20/07/2020. This data is shown in Table 3.4 to Table 3.8 below.

Operation/Machinery	Location/Comments	L <sub>Aeq</sub> , dB(A)
Forklift Truck	Forklift truck manoeuvring within the premises area of Travis Perkins, measured at 10m	64
	Forklift truck loading goods, measured at 10m	64
Lory	Lory accessing Travis Perkins premises area, measured at 1m	77
Trailer Truck reversing	Trailer Truck reversing, measured at 1m	80
Van accessing the premises	Van accessing the premises, measured at 1m	64
Van leaving Travis Perkins premises	Van leaving Travis Perkins premises area, measured at 1m	63

**Table 3.4 Overall measured L<sub>Aeq</sub> for different Travis Perkins operations**

Operation/Machinery	Location/Comments	L <sub>Aeq</sub> , dB(A)
Portable pressure washer jet operation	Company cars being washed within the delivery area, measured at 2m	66
Lory	Lory accessing Trux Storage delivery area, measured at 2m	72
Van accessing the premises	Van accessing the Trux Storage delivery area, measured at 1m	64
Forklift loading in the deliveries area	Loading goods within the Trux Storage delivery area, measured at 3m	64
Background music played within the Trux Storage building	Background music played within the Trux Storage building and it was audible at the delivery area boundary	65

**Table 3.5 Overall measured L<sub>Aeq</sub> for different Trux Storage operations**

Operation/Machinery	Location/Comments	L <sub>Aeq</sub> , dB(A)
Forklift Truck	Forklift truck manoeuvring within the delivery area of Tams Packing, measured at 2m	64
	Forklift truck unloading goods, measured at 2m	64
Lory	Lory accessing Tams Packing delivery area, measured at 2m	72
Lory collecting industrial waste	Lory collecting commercial waste within the delivery area, measured at 2m	74
Trailer Truck reversing	Trailer Truck reversing, measured at 1m	80
Van accessing the premises	Van accessing Tams Packing delivery area, measured at 1m	64

**Table 3.6 Overall measured L<sub>Aeq</sub> for different Tams Packing operations**

Operation/Machinery	Location/Comments	L <sub>Aeq</sub> , dB(A)
Car accessing the MOT garage	Car accessing the entrance of the MOT garage, measured at 1m	61
Car repairs operations	Car repairs operations measured at the garage entrance	66
Cordless Impact Wrench	Tyre change operation, measured at the garage entrance	80
Van accessing the MOT garage	Van accessing the entrance area, measured at 1m	64

**Table 3.7 Overall measured L<sub>Aeq</sub> for different Cuffley Motors operations**

Furthermore, in order to assess the noise emissions from the existing industrial building operations located to the South of the proposed development, as shown in Figure 2.7, worst-case L<sub>Aeq, 1 hour</sub> noise levels are presented in Table 3.2 measured between 13:04 and 18:00 on 17/07/2020.

Location	L <sub>Aeq, 1-hour</sub> dB(A)
Delivery area /car park area	63

**Table 3.8 L<sub>Aeq, 1 hour</sub> worst-case noise levels of rear industrial activity for operating hours**

The noise survey undertaken at monitoring position 2 is expected to incorporate the full range of operations, including the following noise sources:

- Cars accessing/leaving the delivery area/Carpark
- Vans accessing/ leaving the delivery area/Carpark

## 4.0 NOISE ASSESSMENT GUIDANCE

### 4.1 BS4142: 2014 'Methods for rating and assessing industrial and commercial sound'

British Standard BS4142:2014 'Methods for rating and assessing industrial and commercial sound' describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

This Standard compares the Rating Level due to the noise source/s under assessment for a one-hour period during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours) with the existing background noise level in terms of an  $L_{A90}$  when the noise source is not operating.

It should be noted that the Rating Level is the Specific Sound Level in question ( $L_{Aeq, T}$ ), including any relevant acoustic feature corrections, as follows:

- **Tonality** – *'For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 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 the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible'*
- **Intermittency** – *'If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied'*

- **Other sound characteristics** – *‘Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied’*

Once the Rating Level has been obtained, the representative background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact, as follows:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5 dB could 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 there will be 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 having a low impact, depending on the context

*NOTE: Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

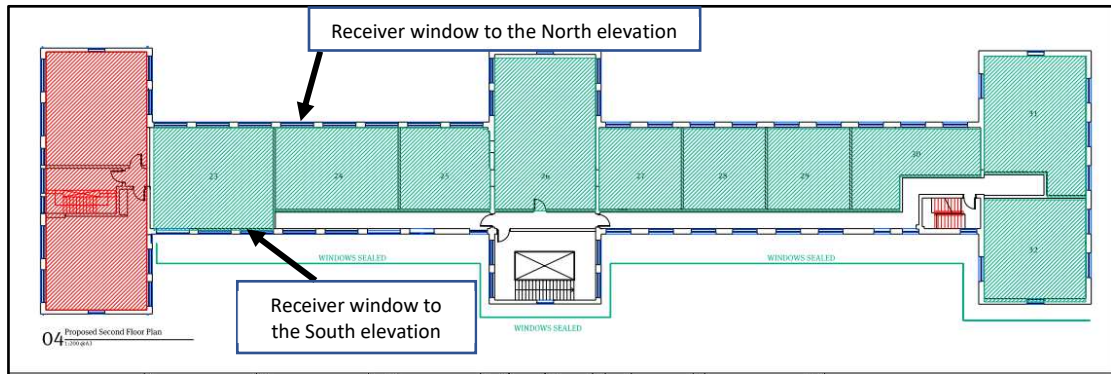
#### **4.2 Local Authority Criteria**

The Local Authority criteria for this specific assessment is currently unknown. Therefore, we would recommend that the criteria for this assessment would be that noise associated with the operations of the neighbouring industrial units should not exceed the representative background noise level at the proposed residential development windows at South and North elevation, as shown in Figure 5.1.

**5.0 BS4142 ASSESSMENT**

**5.1 Proposed Site and Receiver Windows Location**

Figure 5.1 below shows the proposed residential development and the closest residential windows potentially affected by the noise emissions from the nearby industrial units’ operations.



**Figure 5.1– Image showing the closest residential windows and site layout (Drawing source: Papa Architects)**

It should be noted that for the purpose of this assessment the noise levels measured at the noise monitoring position 3, are considered representative of noise exposure levels expected to be experienced by all façades of the proposed development as the measurements were noted to be not affected by noise from any of the adjacent industrial units operations.

Further discussions with the Client, it is understood that the operating hours of the neighbouring industrial units of the proposed development are as follows:

Industrial Unit	Operating hours
Cuffley Motors	Wednesday 9:30am–5:30pm
	Thursday 9:30am–5:30pm
	Friday 9:30am–5:30pm
	Saturday 9:30am–5pm
	Sunday 11am–3pm
	Monday 9:30am–5:30pm
	Tuesday 9:30am–5:30pm
Travis Perkins	Wednesday 7:30am–5pm
	Thursday 7:30am–5pm
	Friday 7:30am–5pm



Industrial Unit	Operating hours
	Saturday Closed Sunday Closed Monday 7:30am–5pm Tuesday 7:30am–5pm
Tams Packing	Wednesday 8am–5:30pm Thursday 8am–5:30pm Friday 8am–5:30pm Saturday Closed Sunday Closed Monday 8am–5:30pm Tuesday 8am–5:30pm
Trux Storage	Wednesday 9am–5pm Thursday 9am–5pm Friday 9am–5pm Saturday Closed Sunday Closed Monday 9am–5pm Tuesday 9am–5pm

**Table 5.1 Industrial units operating hours**

The assessment will consider that the existing Industrial units will be operating between the hours of 7:00 and 23:00. Therefore, assessment will be presented for daytime period in order to assess the impact throughout the daytime hours period.

**5.2 Specific and Rating Sound Levels**

The Rating Sound Level of the operation has been calculated at 1m from the closest receivers’ windows using the Specific Sound Level at source, corrected due to different acoustic propagation features and acoustic feature corrections. Calculations of the Specific and Rating Sound Levels are shown in Appendix B.

To assess the impact of the various existing Industrial units during daytime, separate assessments are presented as shown in Tables below.

### 5.3 Calculations

BS4142 Assessment During Daytime		
<b>Source:</b>	Travis Perkins Operations	
<b>Operating Period / Reference time interval (<i>T<sub>r</sub></i>):</b>	Daytime / 1 hr	
<b>Receiver:</b>	Residential window at South elevation, as shown in Figure 5.1	
Element	Level (dB)	Comment
Rating Level	39	Rating Level = Specific Sound Level + Acoustic Feature Corrections
Representative Background Noise Level $L_{A90, T}$	42	Sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, <i>T</i> . Derived using the most common occurring levels $L_{A90, 5min}$ during the environmental noise survey undertaken on site over daytime hours
Excess of rating over background sound level	-3	

**Table 5.2 BS4142 assessment during daytime hours due to Travis Perkins Operations**

BS4142 Assessment During Night-time		
<b>Source:</b>	Trux Storage Operations	
<b>Operating Period / Reference time interval (<math>T_r</math>):</b>	Daytime / 1 hr	
<b>Receiver:</b>	Residential window at South elevation, as shown in Figure 5.1	
Element	Level (dB)	Comment
Rating Level	42	Rating Level = Specific Sound Level + Acoustic Feature Corrections
Representative Background Noise Level $L_{A90, T}$	42	Sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, $T$ . Derived using the most common occurring levels $L_{A90, 5min}$ during the environmental noise survey undertaken on site over daytime hours
Excess of rating over background sound level	0	

**Table 5.3 BS4142 assessment during daytime hours due to Trux Storage Operations**

BS4142 Assessment During Night-time		
<b>Source:</b>	Tams Packing Operations	
<b>Operating Period / Reference time interval (<math>T_r</math>):</b>	Daytime / 1 hr	
<b>Receiver:</b>	Residential window at South elevation, as shown in Figure 5.1	
Element	Level (dB)	Comment
Rating Level	36	Rating Level = Specific Sound Level + Acoustic Feature Corrections
Representative Background Noise Level $L_{A90, T}$	42	Sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, $T$ . Derived using the most common occurring levels $L_{A90, 5min}$ during the environmental noise survey undertaken on site over daytime hours
Excess of rating over background sound level	-6	

**Table 5.4 BS4142 assessment during daytime hours due to Tams Packing Operations**

BS4142 Assessment During Night-time		
<b>Source:</b>	Cuffley Motors Operations	
<b>Operating Period / Reference time interval (<math>T_r</math>):</b>	Daytime / 1 hr	
<b>Receiver:</b>	Residential window at North elevation, as shown in Figure 5.1	
Element	Level (dB)	Comment
Rating Level	42	Rating Level = Specific Sound Level + Acoustic Feature Corrections
Representative Background Noise Level $L_{A90, T}$	42	Sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, $T$ . Derived using the most common occurring levels $L_{A90, 5min}$ during the environmental noise survey undertaken on site over daytime hours
Excess of rating over background sound level	0	

**Table 5.5 BS4142 assessment during daytime hours due to Cuffley Motors Operations**

BS4142 Assessment During Night-time		
<b>Source:</b>	Rear industrial unit operations (Eduzone)	
<b>Operating Period / Reference time interval (<math>T_r</math>):</b>	Daytime / 1 hr	
<b>Receiver:</b>	Residential window at South elevation, as shown in Figure 5.1	
Element	Level (dB)	Comment
Rating Level	42	Rating Level = Specific Sound Level + Acoustic Feature Corrections
Representative Background Noise Level $L_{A90, T}$	42	Sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, $T$ . Derived using the most common occurring levels $L_{A90, 5min}$ during the environmental noise survey undertaken on site over daytime hours
Excess of rating over background sound level	0	

**Table 5.6 BS4142 assessment during daytime hours due to Rear industrial unit operations (Eduzone)**

#### 5.4 Discussion

Noise emissions from the Tams Packing and Travis Perkins operations at the proposed residential unit would be 6dB and 3dB, respectively, below the background sound level at 1m from the façade of the closest residential receiver at South elevation during daytime hours.

Furthermore, the noise emissions from the rear industrial unit operations (Eduzone), Trux Storage and Cuffley Motors operations at the proposed residential unit would be similar to the representative background sound level at the of the closest residential receiver at South and North elevations during daytime hours.

As the Rating Sound Level does not exceed the representative background noise level during daytime, the recommended criterion set on section 4.2 would be met.

The guidance provided within BS4142 states that the context of the area must be taken into consideration when assessing the likelihood of adverse impact.

The context in this case is that the existing industrial site is used for light industrial purposes, with several different industrial operations in use on site. These include a car repair (MOT), Warehouses and Offices.

Furthermore, the local environment is an area near to a busy road located to the North and a Road to the East which is the only access to the Industrial area. Considering that the front area of the existing building (as shown in Figure 5.1) will be retained as office use, the building itself would provide additional screening to the proposed residential development due to the industrial operations located to the West.

It would be expected that the noise levels received from the proposed development would be anticipated to have a low adverse impact on the amenity of nearby noise sensitive receivers.

Further calculations have been undertaken to assess whether the noise emissions from the Cuffley Motors operation would be expected to meet the recognised British Standard recommendations internally within the closest residence at North elevation, in order to further ensure the amenity of nearby noise sensitive receivers.

The calculated noise Rating Sound Levels of 42dB(A) during daytime for the noise sensitive receiver at North elevation due to Cuffley Motors Operations is to be considered externally at 1m from the receiving window. Windows may be closed or partially closed leading to further attenuation, as follows.

British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' provides recommendations for acceptable internal noise levels in residential properties, as shown in Table 5.7.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB(A)	-
Dining	Dining Room/area	40 dB(A)	-
Sleeping (daytime resting)	Bedrooms	35 dB(A)	30 dB(A)

**Table 5.7 BS8233 recommended internal background noise levels**

It should be noted that the recommended internal noise levels outlined above are not applicable under "purge ventilation" conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally (E.G. to remove odour from painting or burnt food).

It is understood that mechanical ventilation (MVHR) is proposed to be installed within the development so that windows do not have to be opened. Moreover, it is also understood that an alternative means of cooling is provided so that windows will not need to be opened to mitigate against overheating. However, in an event of a purge ventilation, Table 5.8 below shows the resulting internal noise levels due to the industrial unit's operation.

Assuming worst case conditions, of the closest window being for a bedroom, BS8233 recommends 35dB(A) for internal resting conditions during daytime hours.

With a calculated external level of 42dB(A), the residential window itself would need to provide additional minimum attenuation of 7dB, for the recommended internal noise conditions to be achieved.

However, in

According to BS8233:2014, even a partially open window offers 10-15dB attenuation, thus leading to a further reduced interior noise level as shown in Table 5.8.

Receiver	BS8233 Criterion for Daytime	Noise Level Inside Nearest Residential Receiver
Inside nearest residential flats at North elevation	35dB(A)	27-32dB(A)

**Table 5.8 Noise levels and criteria inside nearest residential space at North elevation**

Moreover, with the calculated external noise levels at South elevation, the residential windows itself would need to provide additional minimum attenuation of 7dB, for the recommended internal noise conditions to be achieved.

It is understood that proposed windows located to the South elevation would be sealed and the minimum octave band sound reduction index (SRI) values required for the glazed elements to be installed are shown in Table 5.9.

Elevation	Octave band centre frequency SRI, dB						R <sub>w</sub> (C;C <sub>tr</sub> ), dB
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	
South Elevation	35	46	46	46	56	65	49 (-1;-4)

**Table 5.9 Required glazing performance (Ref: 20765.NIA.01 Rev. A, date 09/06/2020)**

The predicted internal noise levels considering the above glazing specification and the sealed window system shows that the resulting internal noise levels are non-significant. Therefore, the internal noise level due to Industrial noise is deemed to be low enough such that complaints are unlikely.

**6.0 CONCLUSION**

Environmental noise surveys and a BS4142 assessment have been undertaken to determine the internal noise intrusion due to industrial noise on the proposed residential development at Everest House, Sopers Road, Cuffley.

The calculations have allowed the assessment of the likelihood of any adverse impact upon the closest residential receivers to be predicted.

Current calculations have shown that noise emissions of the existing industrial units would be indicative of a low likelihood of adverse impact on nearby receivers and would meet the recommended requirements of the Local Authority.

Further calculations have been undertaken with regards to British Standard 8233 and it has been ensured that the amenity of nearby residential receivers will be protected.

Everest House, Sopers Road, Cuffley, Potters Bar  
Environmental Noise Time History  
From 17 July 2020 To 20 July 2020

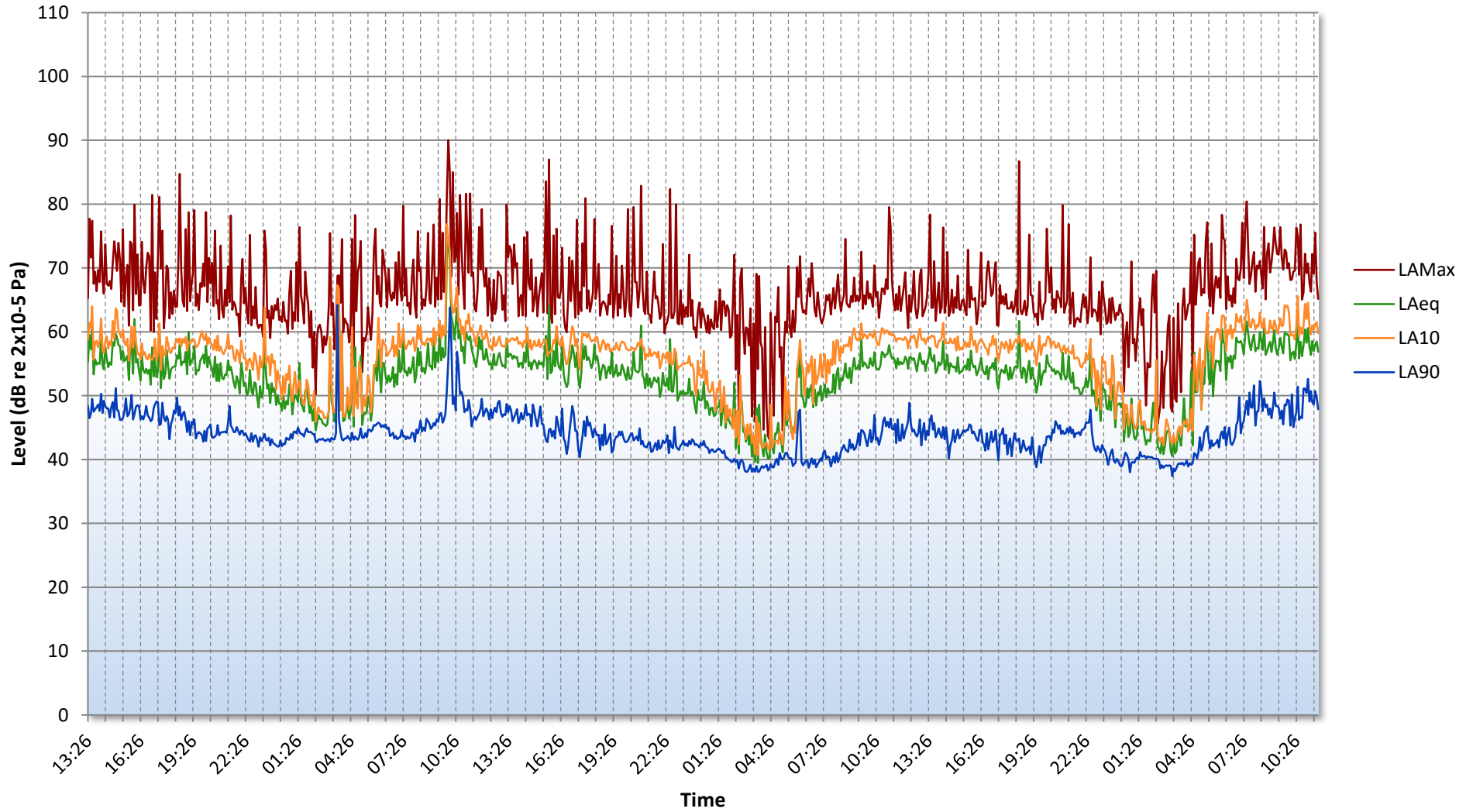


Figure 20765.TH1



Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Daytime Background Noise Level  
From 17 July 2020 To 20 July 2020

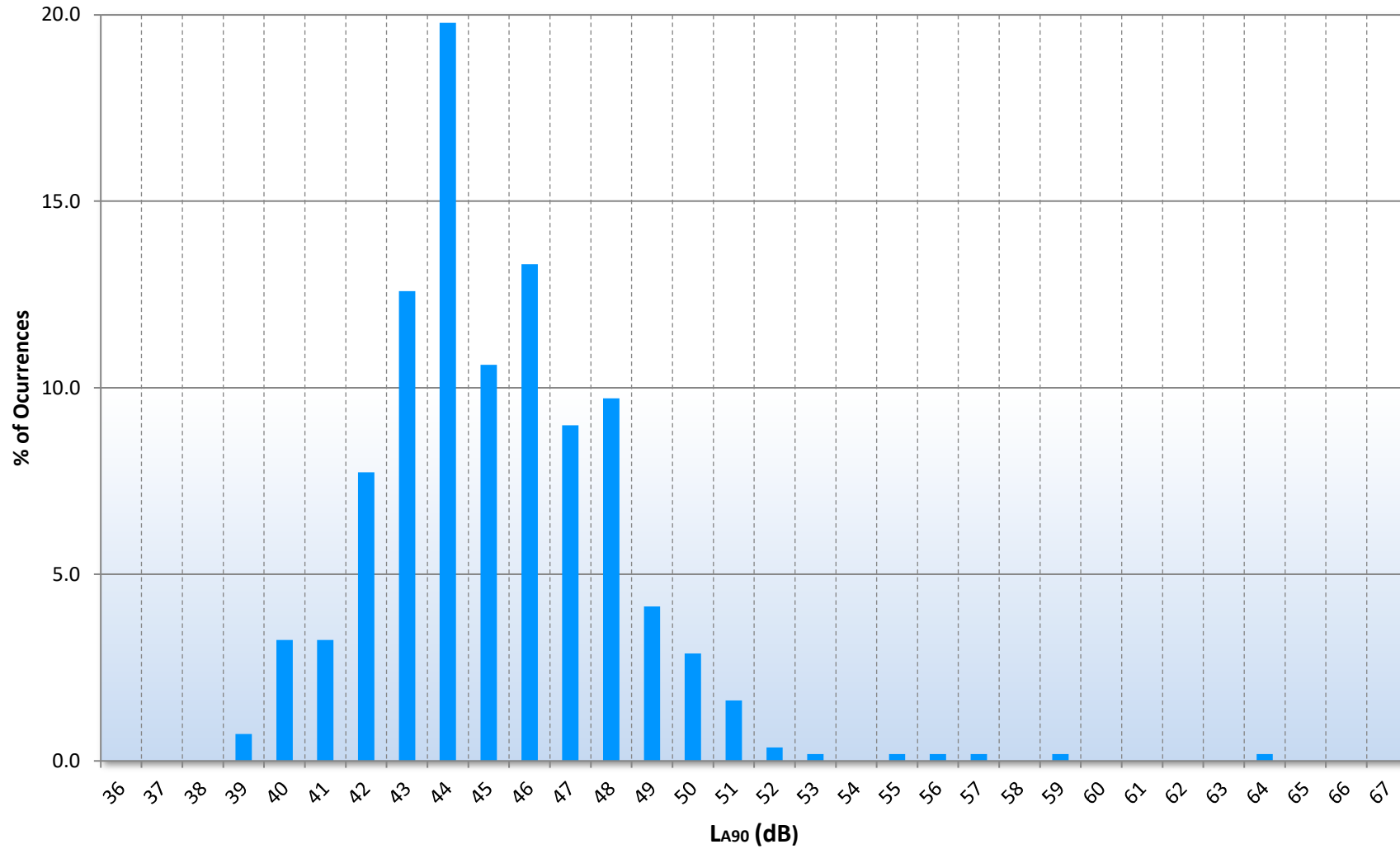


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Night-time Background Noise Level  
From 17 July 2020 To 20 July 2020

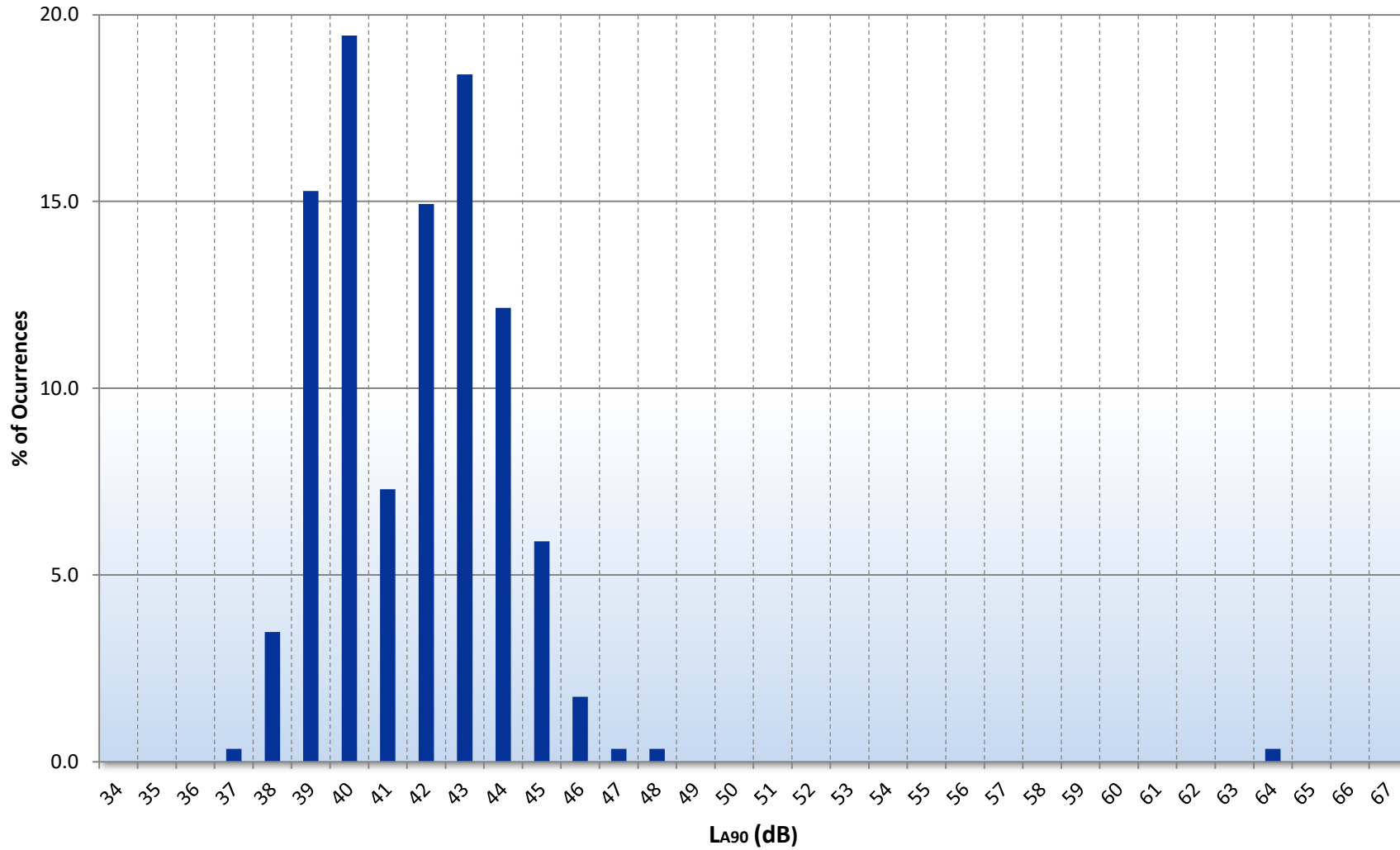


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Background Noise Level  
From 17 July 2020 To 20 July 2020  
Between 07:00 and 18:00

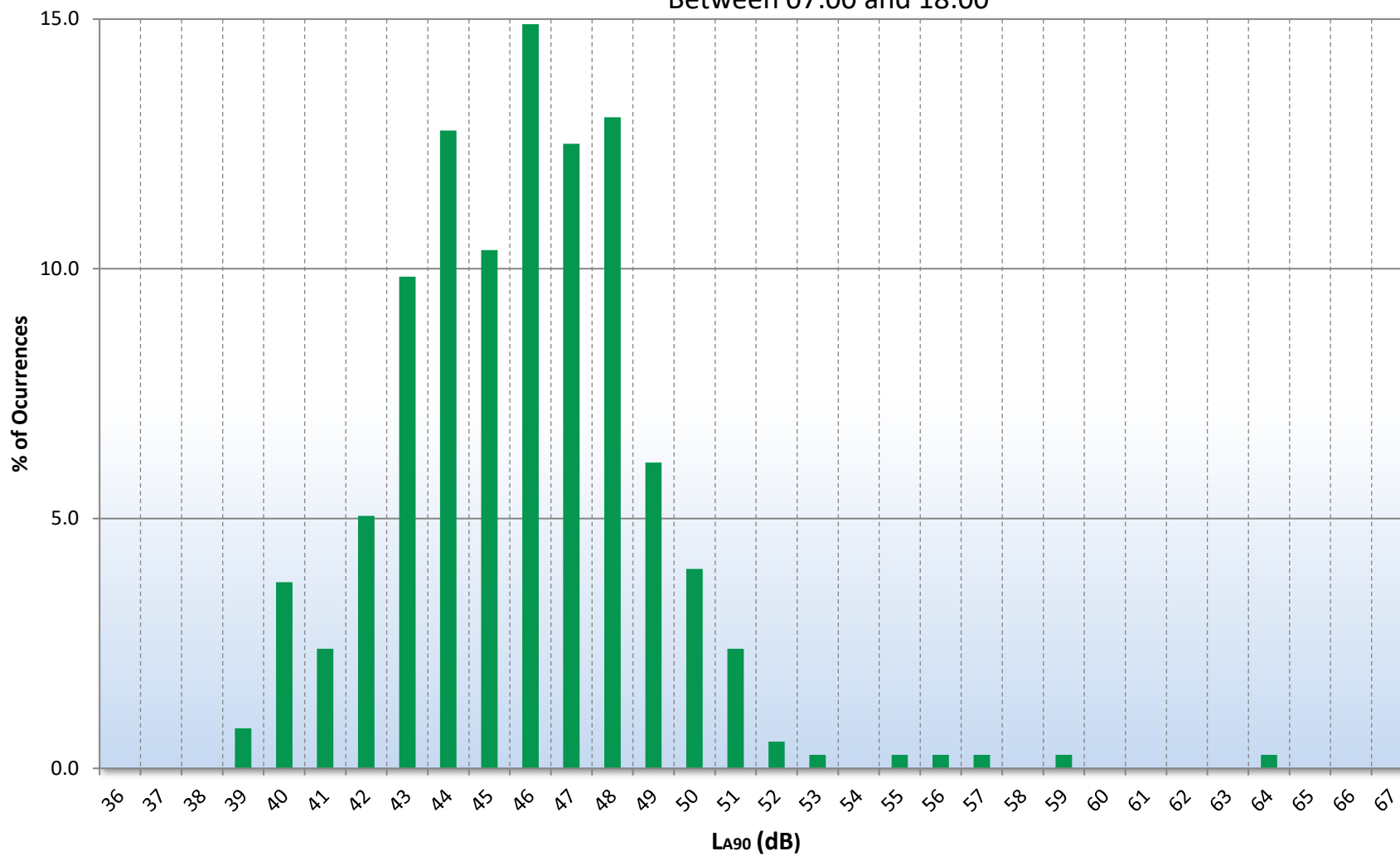


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Environmental Noise Time History  
From 17 July 2020 To 20 July 2020

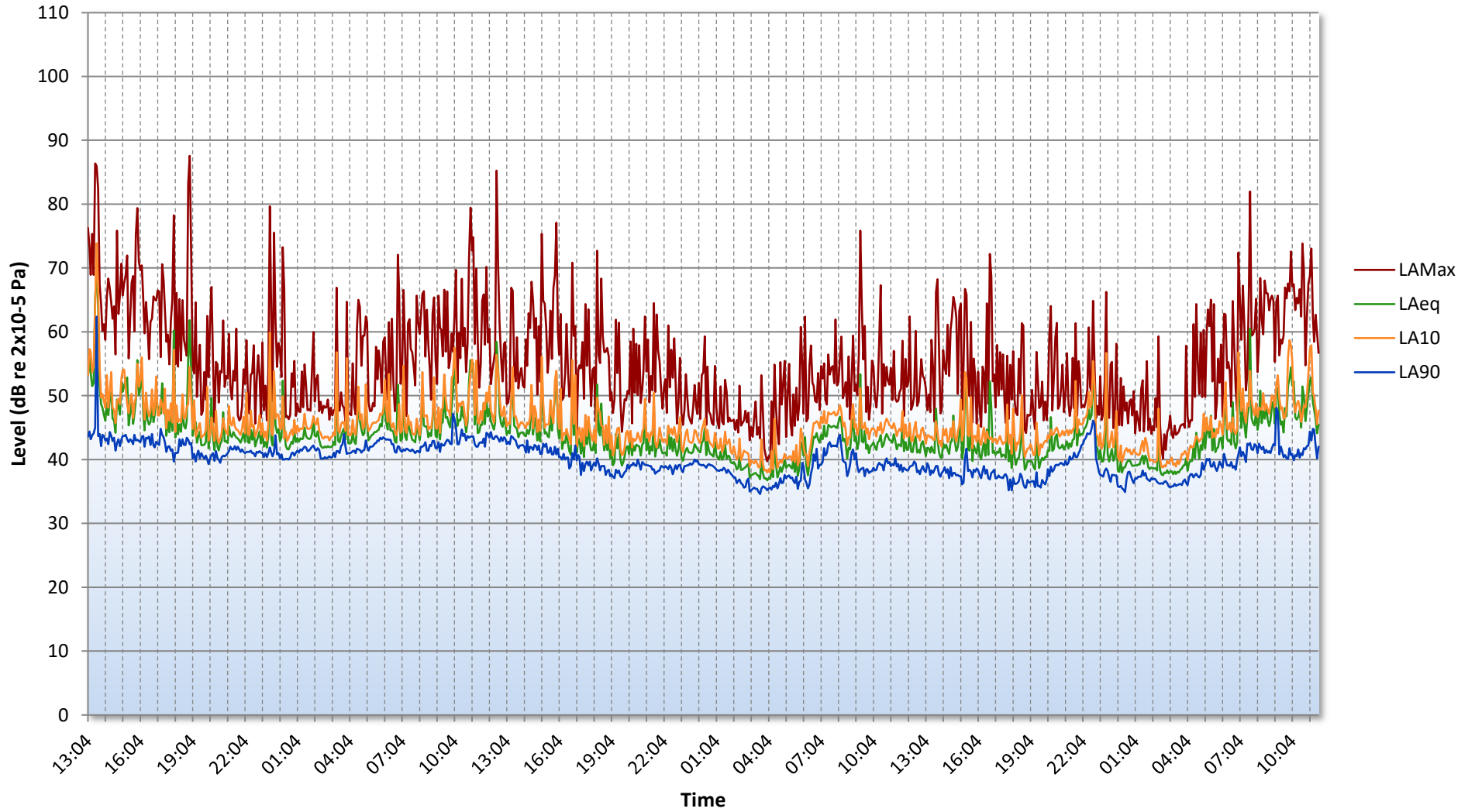


Figure 20765.TH2

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Daytime Background Noise Level  
From 17 July 2020 To 20 July 2020

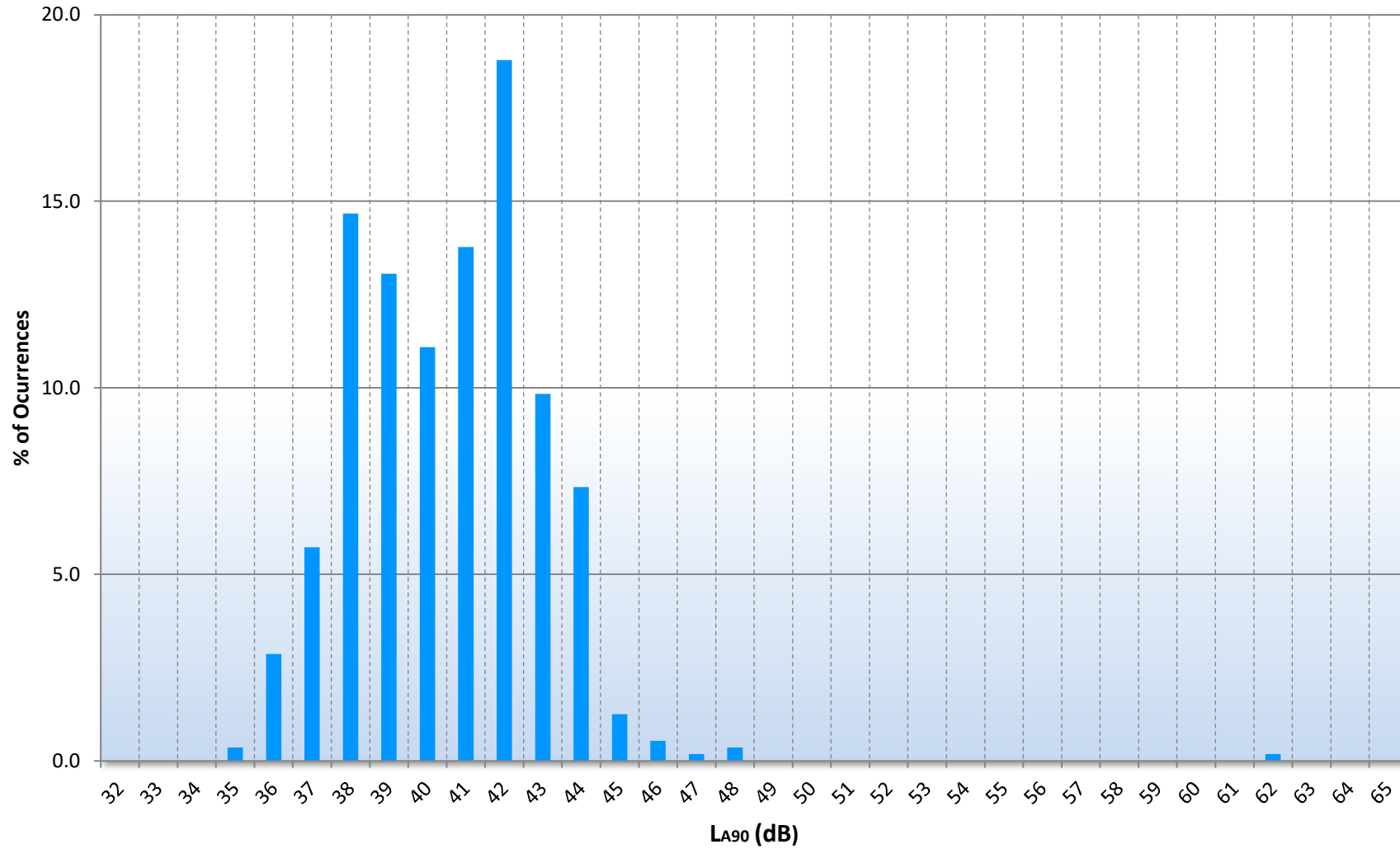


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Night-time Background Noise Level  
From 17 July 2020 To 20 July 2020

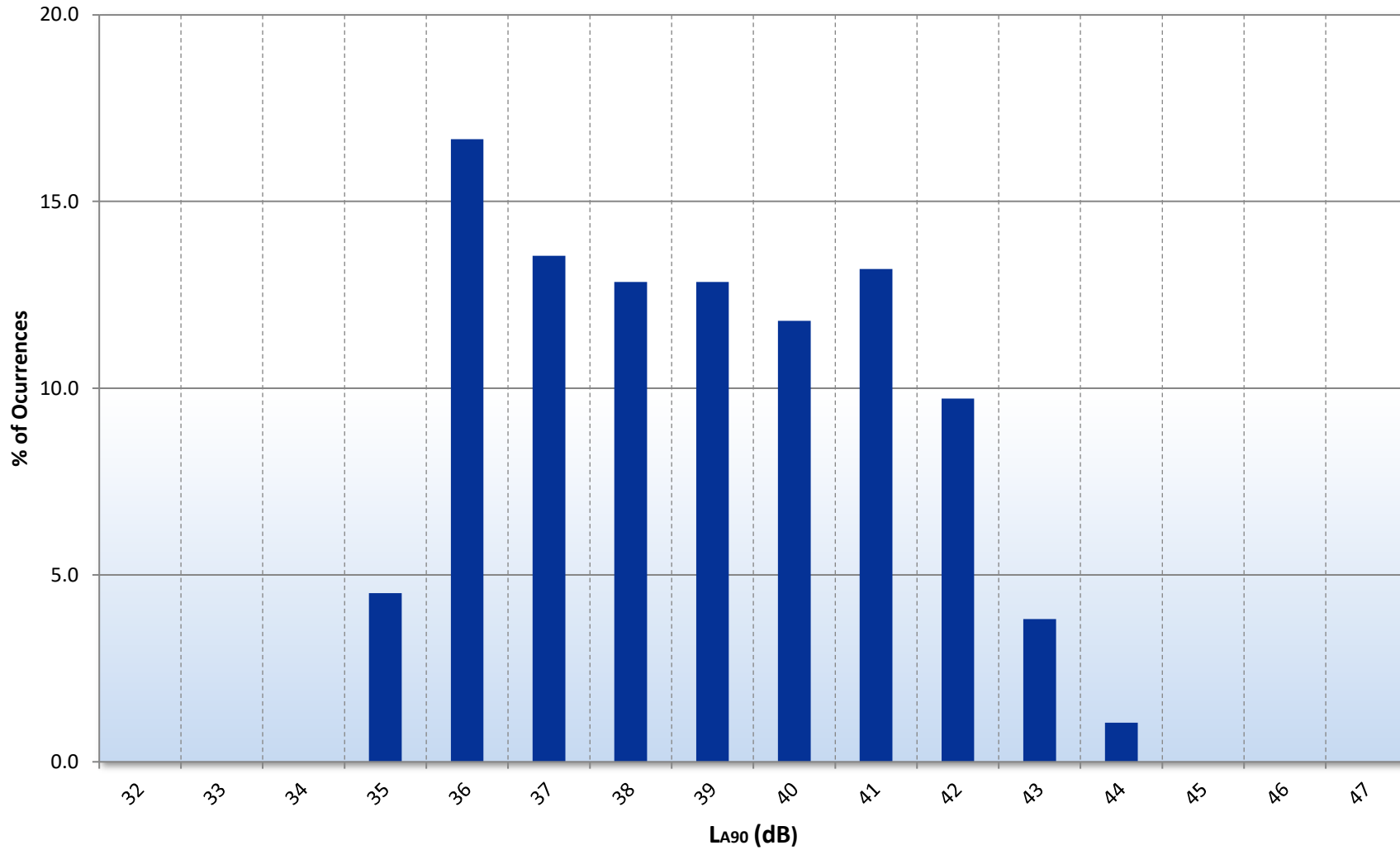


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Background Noise Level  
From 17 July 2020 To 20 July 2020  
Between 07:30 and 18:00

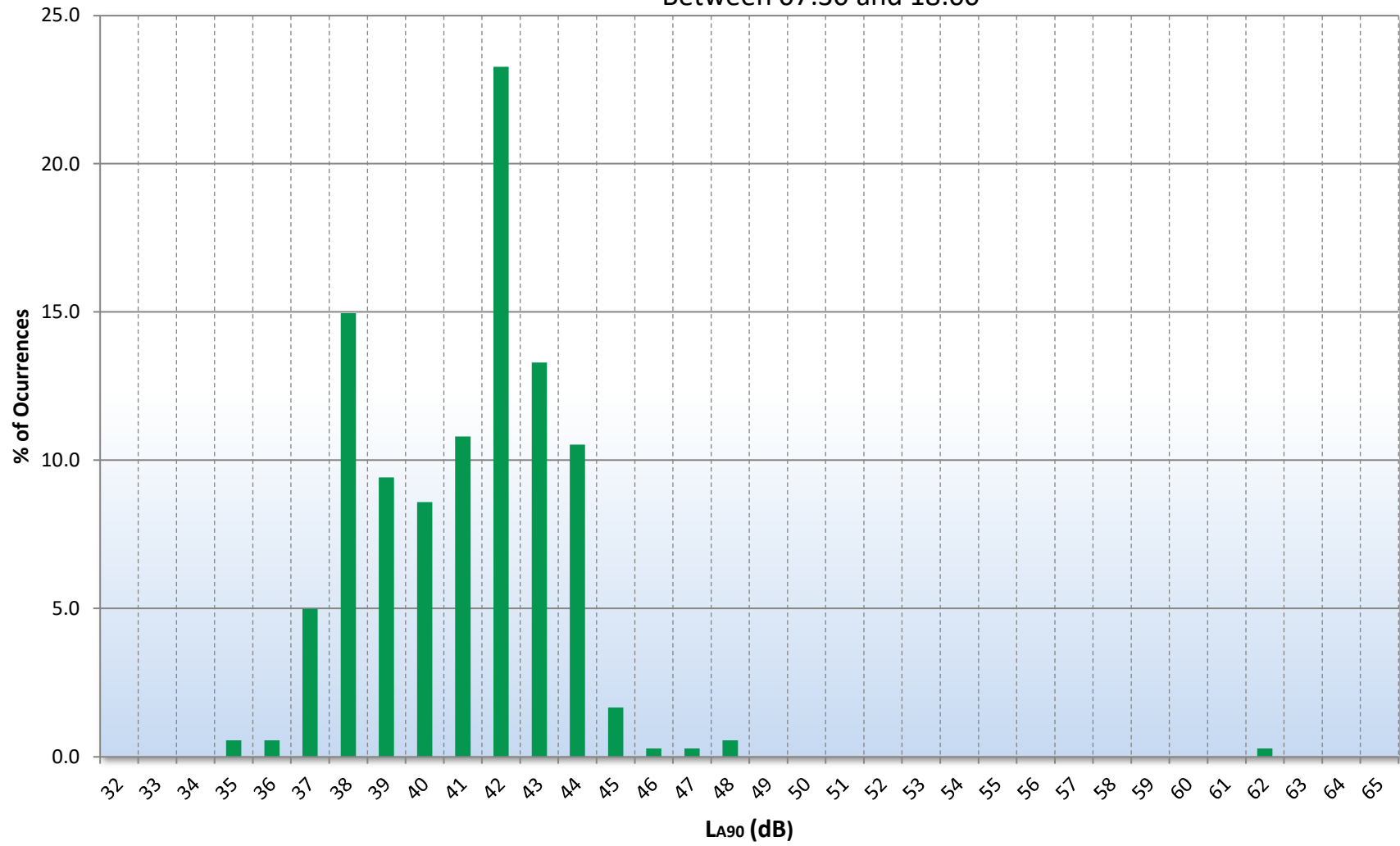


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Environmental Noise Time History  
From 17 July 2020 To 20 July 2020

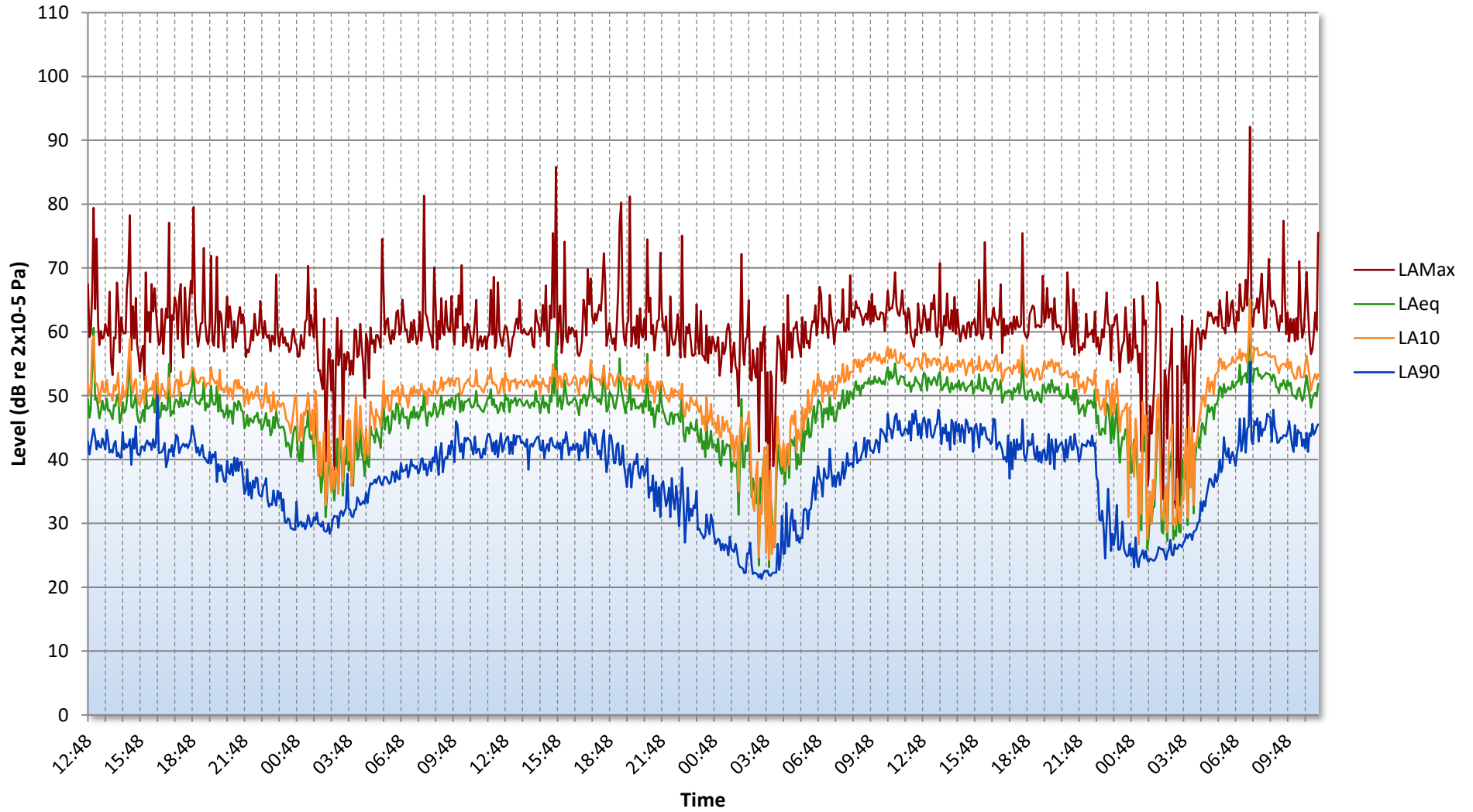


Figure 20765.TH3



Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Daytime Background Noise Level  
From 17 July 2020 To 20 July 2020

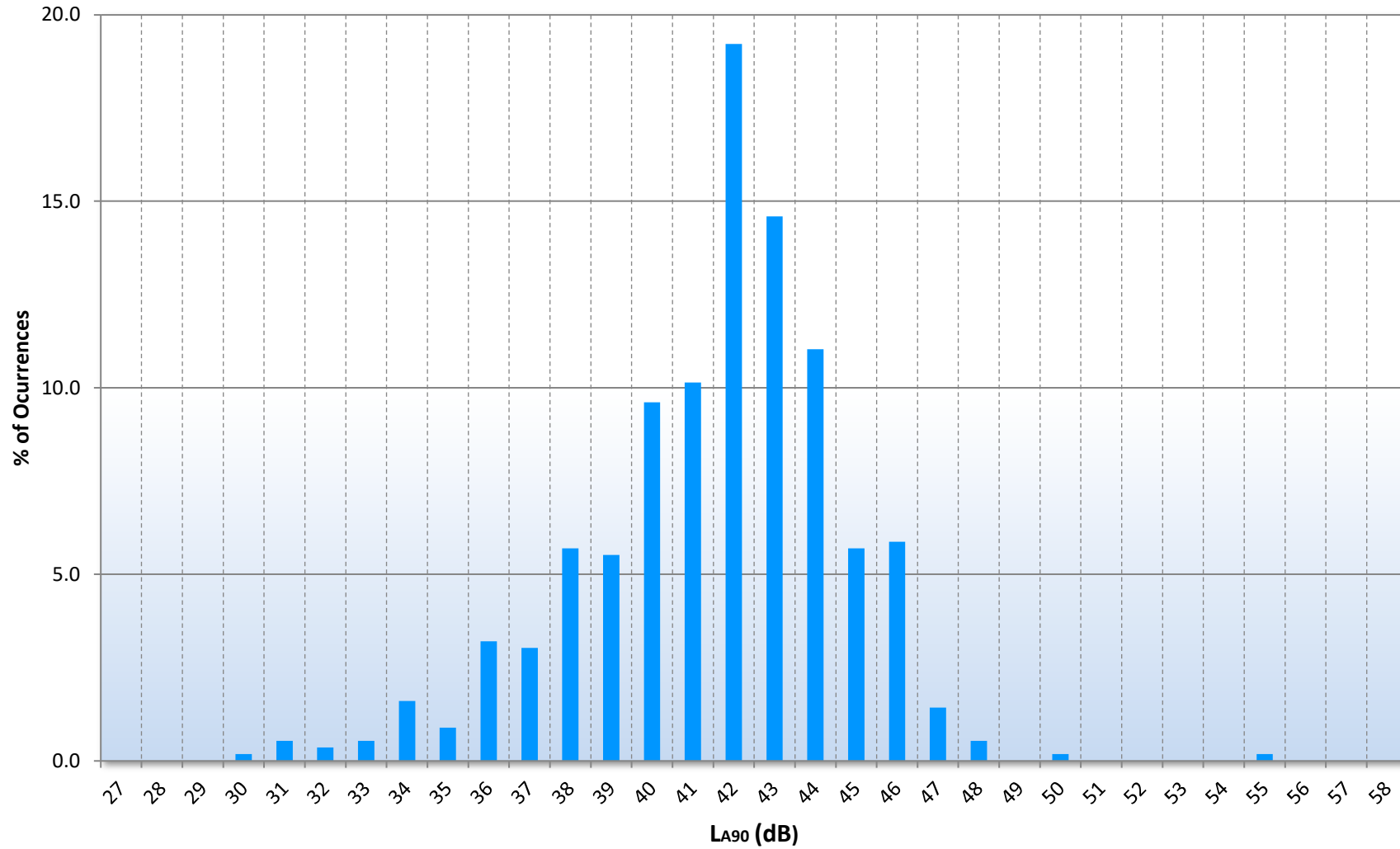


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Night-time Background Noise Level  
From 17 July 2020 To 20 July 2020

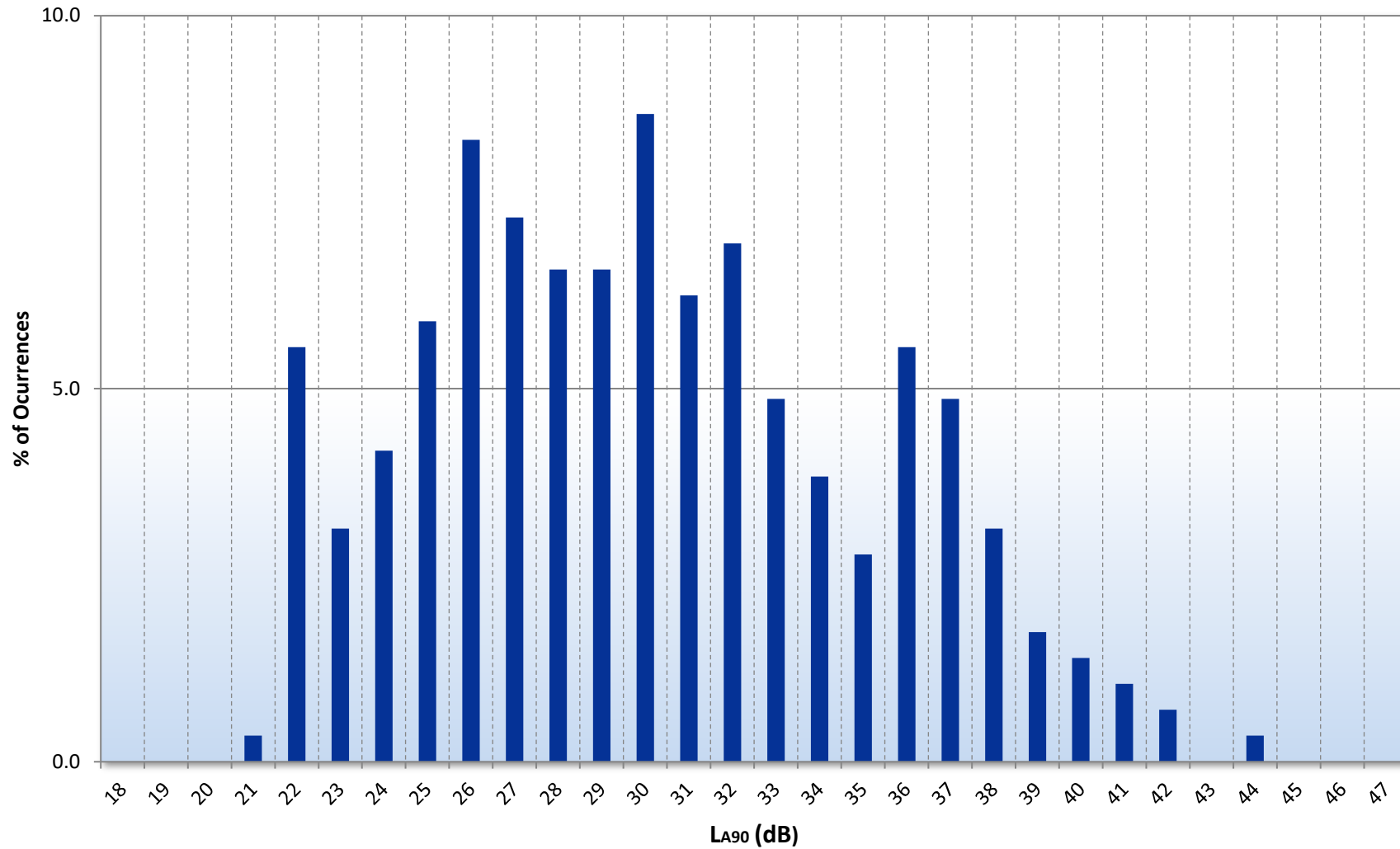


Figure 20765.L90

Everest House, Sopers Road, Cuffley, Potters Bar  
Representative Background Noise Level  
From 17 July 2020 To 20 July 2020  
Between 07:30 and 18:00

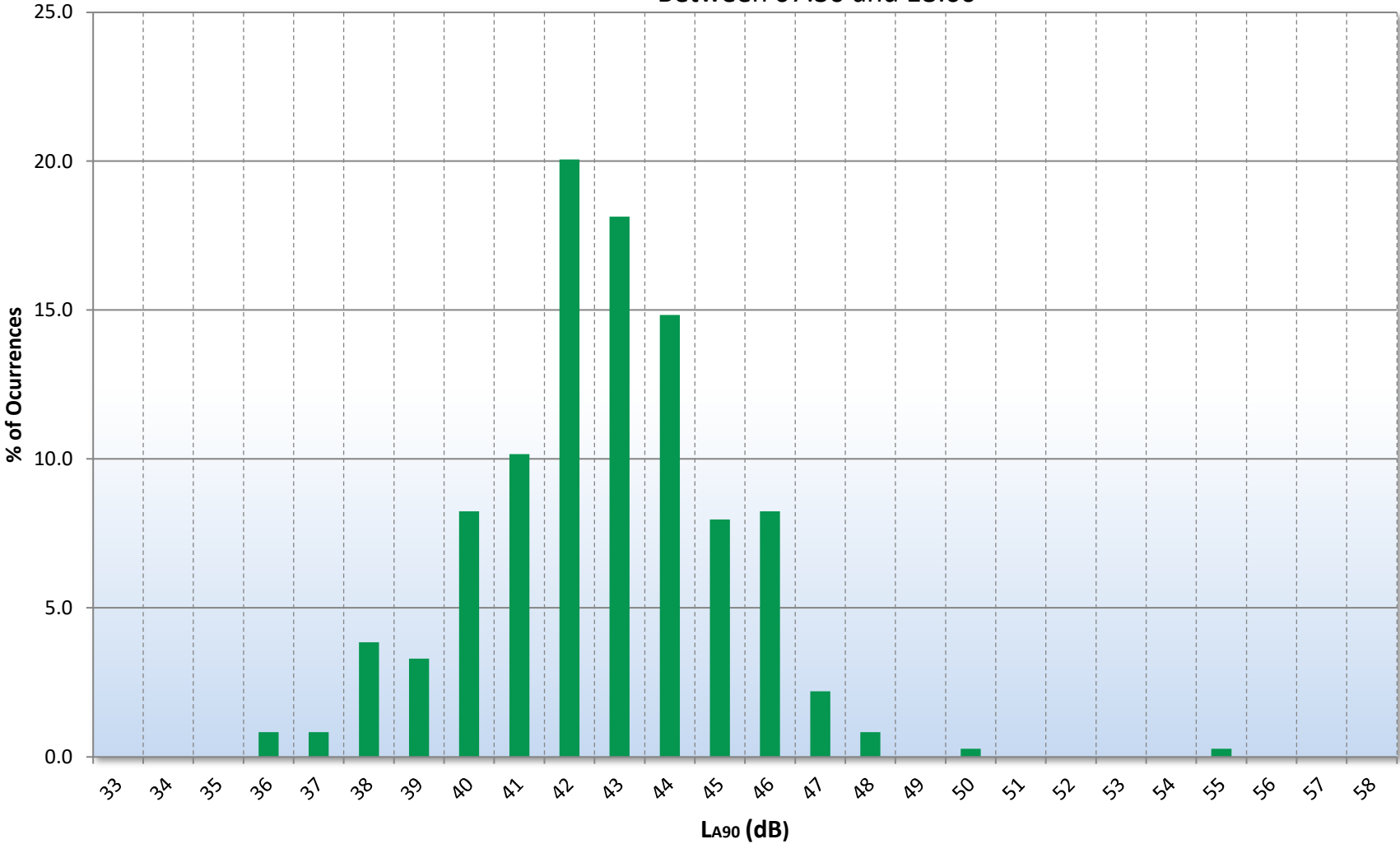


Figure 20765.L90

## GENERAL ACOUSTIC TERMINOLOGY

### Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of  $10^{13}$  units, that only a logarithmic scale is the sensible solution for displaying such a range.

### Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

### $L_{eq}$

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level  $L_{eq}$ . The  $L_{eq}$  is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

### $L_{10}$

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

### $L_{90}$

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

### $L_{max}$

This is the maximum sound pressure level that has been measured over a period.

### Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

## APPLIED ACOUSTIC TERMINOLOGY

### Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

### Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

### Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

### Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

### Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

### Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.

## APPENDIX B

### Everest House, Sopers Road, Cuffley, Potters Bar

#### SPECIFIC AND RATING SOUND LEVEL CALCULATIONS FOR DAYTIME

Source: Travis Perkins operations Receiver: Proposed residential development, South elevation	dB(A)
Forklift truck manoeuvring within the premises area of Travis Perkins	64
Forklift truck loading goods	64
Lorry accessing Travis Perkins premises area	77
Trailer Truck reversing	80
Van accessing the premises	64
Van leaving Travis Perkins premises area	63
<b>Specific Sound Level of Full Operation</b>	<b>82</b>
Attenuation due to distance from source to receiver (46m)	-33
Minimum attenuation provided by building envelope of existing industrial units	-23
<b>Total Specific Sound Level of Full Operation at Receiver</b>	<b>26</b>
<b>BS4142 Acoustic Feature Corrections</b>	
Tonality	4
Impulsivity	6
Intermittency	3
<b>Total Rating Noise Level of Full Operation at Receiver</b>	<b>39</b>

#### SPECIFIC AND RATING SOUND LEVEL CALCULATIONS FOR DAYTIME

Source: Trux Storage operations Receiver: Proposed residential development, South elevation	dB(A)
Portable pressure washer jet operation	66
Lorry accessing Trux Storage delivery area	72
Van accessing the Trux Storage delivery area	64
Forklift loading in the deliveries area	64
Background music played within the Trux Storage building	65
<b>Specific Sound Level of Full Operation</b>	<b>75</b>
Attenuation due to distance from source to receiver (18m)	-25
Minimum attenuation provided by building envelope of existing industrial units	-15
<b>Total Specific Sound Level of Full Operation at Receiver</b>	<b>34</b>
<b>BS4142 Acoustic Feature Corrections</b>	
Tonality	2
Impulsivity	3
Intermittency	3
<b>Total Rating Noise Level of Full Operation at Receiver</b>	<b>42</b>

APPENDIX B (Cont.)

Everest House, Sopers Road, Cuffley, Potters Bar

**SPECIFIC AND RATING SOUND LEVEL CALCULATIONS FOR DAYTIME**

Source: Tams Packing operations Receiver: Proposed residential development, South elevation	dB(A)
Forklift truck manoeuvring within the premises area	64
Forklift truck loading goods	64
Lorry accessing Travis Perkins premises area	72
Lorry collecting industrial waste	74
Trailer Truck reversing	80
Van accessing the premises	64
<b>Specific Sound Level of Full Operation</b>	<b>81</b>
Attenuation due to distance from source to receiver (50m)	-34
Minimum attenuation provided by building envelope of existing industrial units and retained office building	-19
<b>Total Specific Sound Level of Full Operation at Receiver</b>	<b>28</b>
<b>BS4142 Acoustic Feature Corrections</b>	
Tonality	2
Impulsivity	3
Intermittency	3
<b>Total Rating Noise Level of Full Operation at Receiver</b>	<b>36</b>

**SPECIFIC AND RATING SOUND LEVEL CALCULATIONS FOR DAYTIME**

Source: Cuffley Motors operations Receiver: Proposed residential development, North elevation	dB(A)
Car accessing the MOT garage	61
Car repairs operations	66
Van accessing the MOT garage	64
Measured Cordless Impact Wrench - Tyre change operation	80
Correction to on-time (10%) for Cordless Impact Wrench	-8
Cordless Impact Wrench - Tyre change operation corrected to on-time operation	72
<b>Specific Sound Level of Full Operation</b>	<b>74</b>
Nominal attenuation provided by directivity from existing facility opening	-5
Attenuation due to distance from source to receiver (52m)	-34
<b>Total Specific Sound Level of Full Operation at Receiver</b>	<b>34</b>
<b>BS4142 Acoustic Feature Corrections</b>	
Tonality	2
Impulsivity	3
Intermittency	3
<b>Total Rating Noise Level of Full Operation at Receiver</b>	<b>42</b>

## APPENDIX B (Cont.)

Everest House, Sopers Road, Cuffley, Potters Bar

### SPECIFIC AND RATING SOUND LEVEL CALCULATIONS FOR DAYTIME

Source: Rear industrial unit operations (Eduzone) Receiver: Proposed residential development, South elevation	<i>dB(A)</i>
Car accessing the MOT garage	63
<b>Specific Sound Level of Full Operation</b>	<b>63</b>
Attenuation due to distance from source to receiver (23m)	-27
<b>Total Specific Sound Level of Full Operation at Receiver</b>	<b>36</b>
<i>BS4142 Acoustic Feature Corrections</i>	
Tonality	0
Impulsivity	3
Intermittency	3
<b>Total Rating Noise Level of Full Operation at Receiver</b>	<b>42</b>