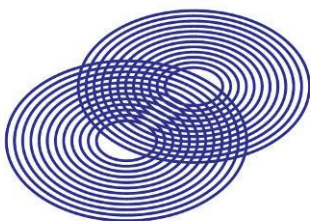


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**Report** 2032/ENS/R1b-  
**Issue Date** 14 June 2019

**Project** **UCL BEAMS**  
20 Gordon Street London WC1H 0AJ

**Title** **Environmental Noise Survey**  
**Sub Title**


**Client** Estates Capital Projects  
UCL Estates University College London (UCL)  
3rd Floor Bidborough House  
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**Case No**

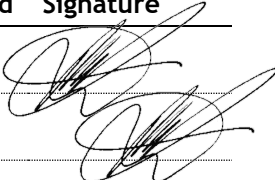
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Revision	Reason	Checked	Signature
A	Revised discussion of criteria	RA	
B	Discussion point removed	RA	

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Appendix A: GLOSSARY OF ACOUSTIC TERMS

Figure 2032/ TH 1: Time History of Automated Noise Monitoring (Position P1)

Figure 2032/ TH 2: Weather Time History

Figure 2032/ SP 1: Site Plan Showing Measurement Locations

## 1. INTRODUCTION

- 1.1 A noise background assessment and report have been commissioned through Elementa Consulting for a project to refurbish part of the UCL Christopher Ingold Building at 20 Gordon Street WC1H 0AJ.
- 1.2 An automated background noise survey was undertaken at the boundary of the proposed development and the results assessed against the local authority requirements.
- 1.3 This report has been prepared as part of the planning process and is not intended to be used for the detailed design of the proposed building.
- 1.4 As this is a technical report it will make reference to some technical terms. To assist the reader a glossary has been included in Appendix A.

## 2. ACOUSTIC DESIGN CRITERIA

2.1 The following standards and guidance have been used in producing the acoustic design criteria for this development:

- National Planning Policy Framework (NPPF)
- Camden Local Plan 2017
- British Standard BS 4142:2014 - “Methods for rating and assessing industrial and commercial sound”

### *National Planning Policy*

2.2 Since March 2012 national planning policy has been governed by the National Planning Policy Framework (NPPF). The July 2018 version of the NPPF states:

#### **Paragraph 170**

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- (e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

#### **Paragraph 180**

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) 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 the quality of life;
- b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason...

#### **Paragraph 182**

Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.

2.3 Further guidance with regard to the phrases “significant adverse impacts” and “adverse impacts” is given in the Noise Policy Statement for England (NPSE) which provides the following guidance.

*“There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:*

NOEL - No Observed Effect Level

*This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*

LOAEL - Lowest Observed Adverse Effect Level

*This is the level above which adverse effects on health and quality of life can be detected.*

*Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*

SOAEL - Significant Observed Adverse Effect Level

*This is the level above which significant adverse effects on health and quality of life occur.”*

2.4 The NPSE further clarifies that due to the complex and subjective nature at which noise impacts are perceived by individuals or groups of individuals that:

*“It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”*

2.5 A hierarchy of noise impacts has been published by the Department for Communities and Local Government as part of the National Planning Practice Guidance (NPPG). This hierarchy is presented as a table and has been reproduced below.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life	No Observed Adverse Effect Level (NOAEL)	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Significant Observed Adverse Effect	Prevent

Table 2032/T1 - National Planning Practice Guidance with regards to Noise

### British Standard BS 4142:2014

- 2.6 BS 4142:2014 provides the following guidance on determining typical background noise levels.

*“The background sound level is an underlying level of sound over a period, T, and might in part be an indication of relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.*

*In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.*

*Among other considerations, diurnal patterns can have major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes. Furthermore, in this general context it can also be necessary to separately assess weekends and weekday periods.*

*Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.”*

### Local Planning Requirements

- 2.7 Camden Local Plan 2017 sets out the Camden Policy as:

#### **Policy A4 Noise and vibration**

*The Council will seek to ensure that noise and vibration is controlled and managed.*

*Development should have regard to Camden’s Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:*

- a. development likely to generate unacceptable noise and vibration impacts; or*
- b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

*We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.*

*We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.*

2.8 We have reviewed Appendix 3 of the Camden Plan which sets out Camden’s thresholds for noise and vibration and makes reference to BS4142:2014.

*For industrial and commercial noise sources, when determining values for LOAEL and SOAEL for non-anonymous noise British Standard 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142) should be used. For such cases a ‘Rating Level’ of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion.*

<b>Existing Noise sensitive receptor</b>	<b>Assessment Location</b>	<b>Design Period</b>	<b>LOAEL (Green)</b>	<b>LOAEL to SOAEL (Amber)</b>	<b>SOAL (Red)</b>
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	‘Rating level’ 10dB* below background	‘Rating level’ between 9dB below and 5dB above background	‘Rating level’ greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	‘Rating level’ 10dB* below background and no events exceeding 57dB <sub>L<sub>Amax</sub></sub>	‘Rating level’ between 9dB below and 5dB above background or noise events between 57dB and 88dB L <sub>Amax</sub>	‘Rating level’ greater than 5dB above background and/or events exceeding 88dB <sub>L<sub>Amax</sub></sub>

2.9 However, we believe this guidance may be inconsistent with BS4142:2014 and the NPPF/PPG.

2.10 BS4142:2014 states in Clause 11:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.

*NOTE 1 More than one assessment might be appropriate.*

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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 a 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.

2.11 On this basis, a Rating Sound Level that is equal to the existing background sound is '*an indication of the specific sound source having a low impact, depending on the context*'.

2.12 We believe, therefore, that a Rating Level equal to the background level meets the Camden Policy of:

*Not generating unacceptable noise and vibration impacts;*

*And ...plant and machinery, that can be operated without causing harm to amenity.*

2.13 In this case, we will present the measured background sound level and a Rating Level in accordance with the Camden policy.



### 3. THE SITE AND ITS SURROUNDINGS

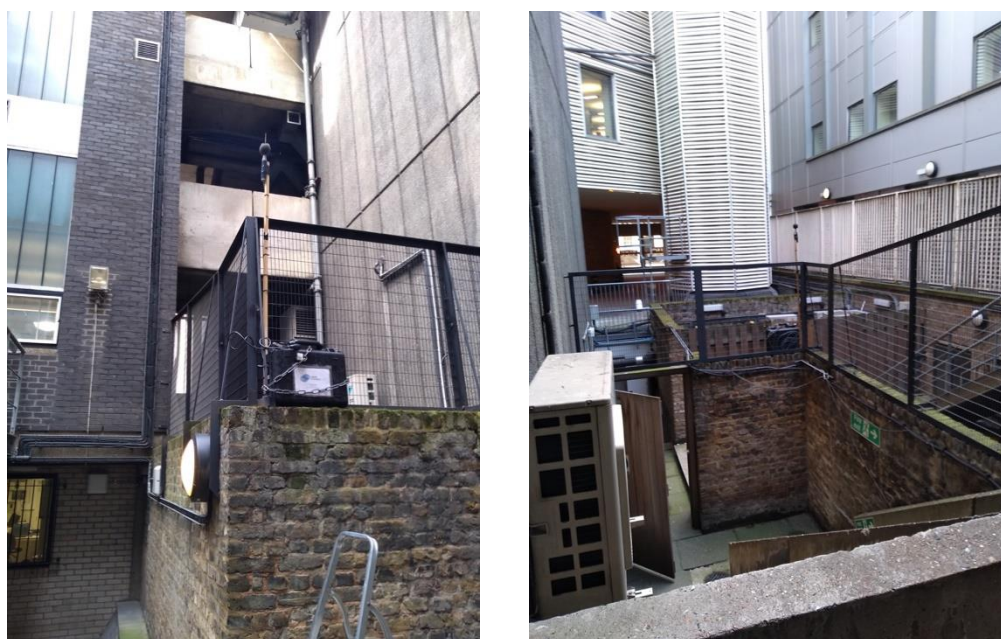
- 3.1 The site address is UCL Christopher Ingold Building 20 Gordon Street London WC1H 0AJ. The proposal is to re-purpose the lower ground floor workshop to provide a laser facility.
- 3.2 The existing noise environment has been found to be dominated by noise emitted from existing Dx units at the location.
- 3.3 The nearest noise sensitive receptors have been identified to be the adjacent university buildings. The nearest residential properties are located at approximately 55m away from the measurement position P1 across Taviton Street. These are shown in Figure 1 below.



Figure 1 : The nearest residential properties are located at approximately 60m away from the measurement position P1

## 4. MEASUREMENT METHODOLOGY

- 4.1 In order to establish the environmental noise climate around the proposed site, an ambient noise survey was undertaken between 9 May 2019 - 15 May 2019. The survey consisted of one long-term monitoring position.
- 4.2 The meter was located in the proposed site at the ground level at Position marked P1. The microphone was positioned at 3m from the floor and about 2 - 2.5m from facades in semi-reverberant conditions. Therefore, it cannot be considered to be in free-field conditions and a correction of -2 dB was applied. Such values are considered typical of background levels at the nearest noise sensitive façade line (overlooking offices).



**Figure 2 : Microphone measurement Location (Position P1)**

- 4.3 The location of the noise survey equipment along with the approximate development boundary are shown on the attached site plan Figure 2032/SP 1 which is appended to this report.
- 4.4 The acoustic parameters  $L_{Aeq}$ ,  $L_{A90}$  and  $L_{AFMax}$  were measured automatically every 15 minutes during the survey as shown in Figure TH/1 appended to this report.
- 4.5 Survey measurements were carried out in accordance with guidelines laid down in BS 7445:1991 Part 2 and other relevant standards.

### ***Measurement Equipment***

- 4.6 The equipment used during the survey is detailed in the equipment schedule provided below. A sensitivity check was undertaken on the sound level meters before and after the measurements and the variation was within 0.5dB. Calibration certificates are available on request.

Description	Manufacturer/Model	Serial Number	Last Calibration Date	Certificate Number
Integrating Sound Level Meter	Cirrus Optimus Green CR:171A	G061843	19/07/2018	262090
Microphone	Cirrus MK224	20045639	12/07/2018	120871
Acoustic Calibrator	Cirrus CR:515	64313	19/07/2018	120874
Table 2032/T2 - Noise Survey Equipment				

### ***Weather Conditions***

- 4.7 The weather during the noise survey has been assessed using a locally based weather station in Leicester Square in London, about 1 mile away from the site, gps coordinates: 51.51°N 0.13°W. The weather conditions were generally dry with little rain on May 9 and wind speed above 5 m/s on May 9-10 and May 14 (determined in open space 10 m above ground). These intervals were excluded from assessment. The location of the measurement position was enclosed within the building courtyard and therefore wind speed had no adverse effect on collected data. The full weather time history is attached at the end of the report as Figure E19032/TH 2.

### ***Noise Survey Results***

- 4.8 Table 2032/T3 below presents a summary of the results from the ambient noise survey. To assist in interpretation, the results have been summarised in terms of the daytime (07:00hrs - 23:00hrs) and night-time (23:00hrs - 07:00hrs).

Position	Measurement Period	Ambient Noise Level ( $L_{Aeq,T}$ , dB)	Typical Maximum Noise Level ( $L_{AFMax}$ , dB)	Typical Background Noise Level ( $L_{A90, 15mins}$ , dB)
P1	Daytime (07:00 - 23:00)	57	61	56
	Night-time (23:00 - 07:00)	57	61	56
Table 2032/T3 - Summary of Automated Noise Measurements Results (Position P1)				
* All values shown in this table are corrected by 2 dB for semi-reverberant condition and correspond to free-field values.				

A graphical representation of these results may be found in Figure 2032/TH1 which is appended to this report.

## 5. MECHANICAL PLANT NOISE ASSESSMENT

5.1 Local Planning Requirements are determined by the Camden Local Plan 2017. For industrial and commercial noise sources, when determining values for LOAEL and SOAEL for non-anonymous noise British Standard 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142) should be used. For such cases a ‘Rating Level’ of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion.

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL <sub>Amax</sub>	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L <sub>Amax</sub>	'Rating level' greater than 5dB above background and/or events exceeding 88dBL <sub>Amax</sub>

5.2 As discussed in Section 2, this policy may be inconsistent with BS4142:2014 and the NPPF/PPG.

5.3 Table 2032/T4 below, presents the measured background sound level and a Rating Level in accordance with the Camden policy. Rating Levels to apply at 1m from the nearest window of the neighbouring building.

Position	Measurement Period	Typical Background Noise Level (L <sub>A90, 15mins</sub> , dB)	Camden Policy Rating Level dB
University Buildings	Daytime (07:00 - 23:00)	56	46
	Night-time (23:00 - 07:00)	56	46

Table 2032/T4 - Summary of Automated Noise Measurements Results (Position P1)

\* All values shown in this table correspond to free-field values.

## **6. CONCLUSION**

- 6.1 The proposed site is located in a confined space surrounded by tall buildings.
- 6.2 Measured noise levels are typical of a city centre location and we do not consider the noise sensitive premises are in a 'quiet background area' and so the main condition should be used.
- 6.3 We have presented, therefore, the measured background sound level and a Rating Level in accordance with the Camden policy. Rating Levels to apply at 1m from the nearest window of the neighbouring building.

**Juan L. Rioperez BEng(Hons) AMIOA**

**for ADNITT ACOUSTICS**

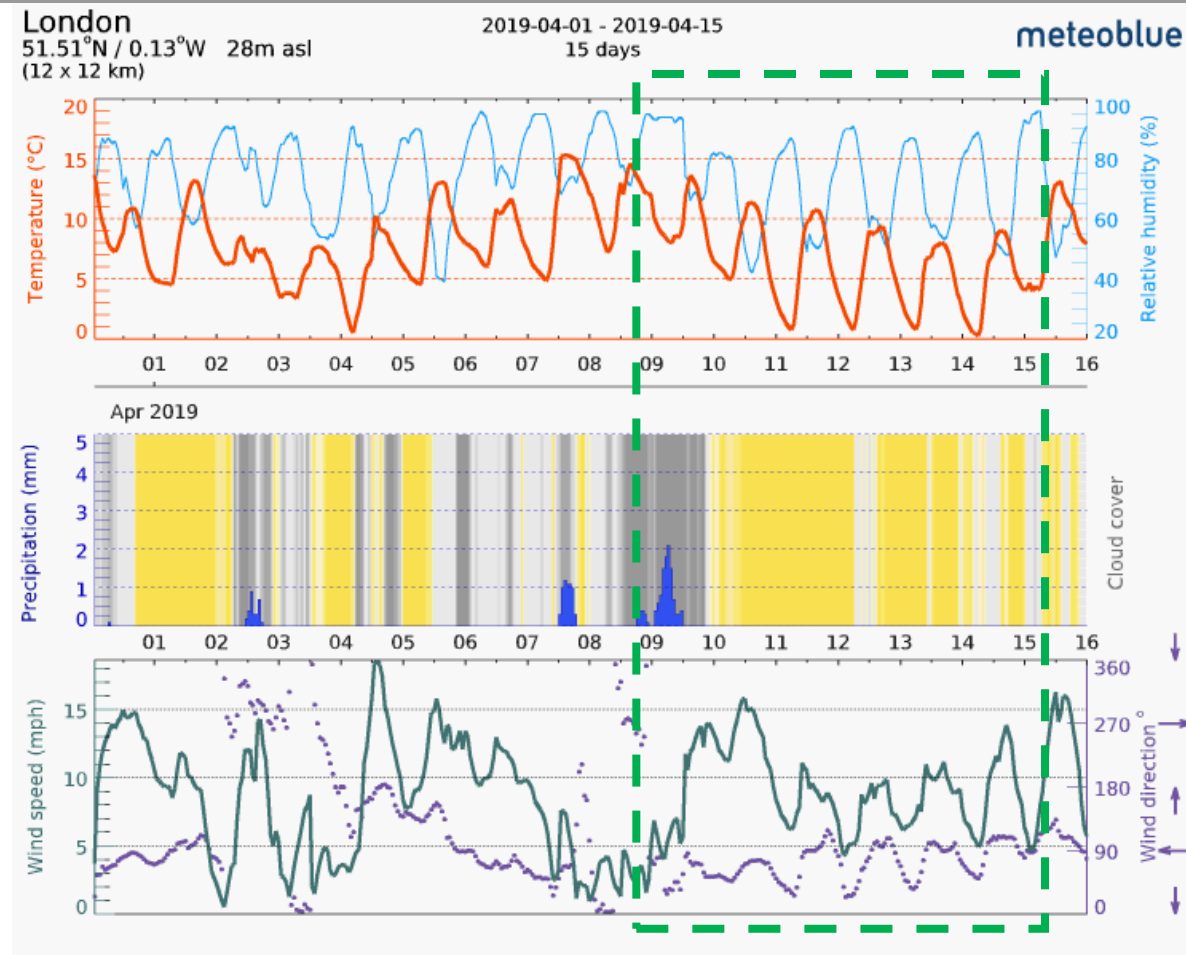
## APPENDIX A: GLOSSARY OF ACOUSTIC TERMS

<b>Ambient Noise</b>	The noise climate heard over a period of time due to all normal sources, in the absence of extraneous or atypical sounds. Used to describe noise in the absence of the introduced sound, generally.	
<b>Ambient Noise Level</b>	Describes the average noise level of the ambient noise over a stated period of time, e.g. hourly noise	
	Parameter: A-weighted Continuous Equivalent Sound Pressure Level determined over the time period T. Expressed in decibels / A-weighted decibels	$L_{eq,T}$ or $L_{Aeq,T}$  dB(A) or dB
<b>Decibel scale dB</b>	A linear numbering scale used to define a logarithmic amplitude scale, thereby compressing a wide range of amplitude values to a small set of numbers	
<b>dB(A)</b>	An electronic filter in a sound level meter, which approximates under defined conditions the frequency response of the human ear.	
$L_{Aeq,T}$	The equivalent continuous sound level. The steady dB(A) level which would produce the same A-weighted sound energy over a stated period of time as the measured sound pressure level.	
$L_{Amax}$	The maximum dB(A) level measured during a survey period.	
$L_{A10}$	The dB(A) level exceeded for 10% of the survey period, often used as a quantifier of traffic noise level.	
$L_{A90}$	The dB(A) level exceeded for 90% of the survey period. Used in BS 4142:1997/2014 as being representative of the background noise level.	
<b>Acoustic screening</b>	Physical barrier to sound formed by fence, wall, building or other structure, which has the effect of reducing the sound transmitted.	
<b>Individual Event Noise</b>	The noise of a distinctive event with the varying noise climate, usually a transient activity, such as a vehicle pass-by, aircraft flyover or similar, rather than an isolated impulsive noise.	
<b>Individual Event Noise Level</b>	Describes the highest noise level during the event as measured under particular conditions of time-weighting	
	Parameter: A-weighted Maximum Sound Pressure Level with FAST or SLOW time weighting  Expressed in decibels / A-weighted decibels	$L_{Amax,FAST}$ or $L_{Amax,F}$ $L_{Amax,SLOW}$ or $L_{Amax,S}$  dB(A) or dB
<b>Sound Reduction Index <math>R_w</math></b>	Single number rating used to describe the sound insulation of building elements as defined in BS EN ISO 717 1997.	
<b>Weighted element-normalized level difference <math>D_{n,e,w}</math></b>	Single number rating used to describe the sound insulation of building elements as defined in BS EN ISO 717 1997.	

Figure 2032/ TH 1: Time History of Automated Noise Monitoring (Position P1)



Figure 2032/ TH 2: Weather Time History

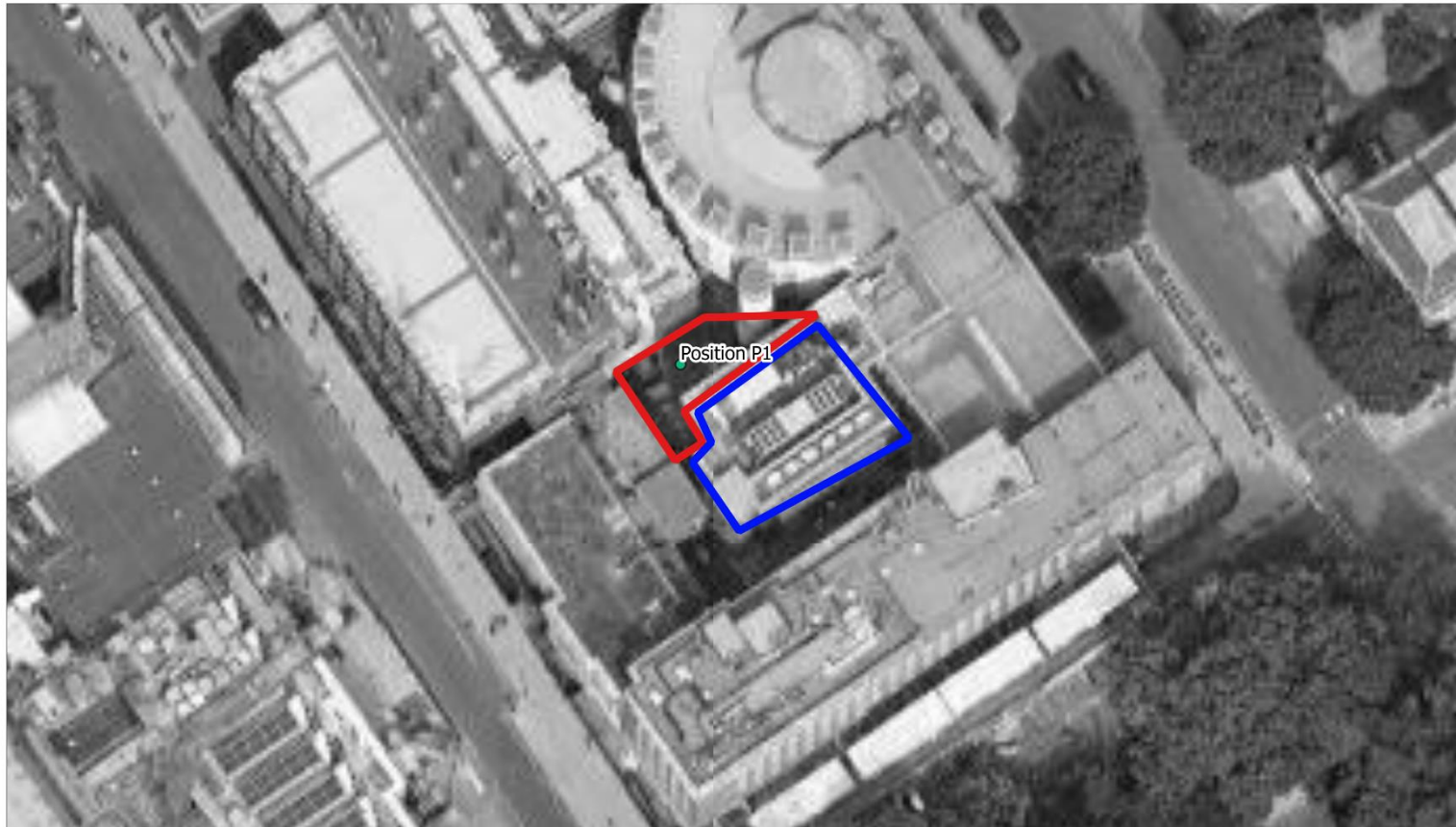


Cited on May 28th:

[https://www.meteoblue.com/en/weather/forecast/archive/london\\_united-kingdom\\_2643743?fcstlength=-15&year=2019&month=4](https://www.meteoblue.com/en/weather/forecast/archive/london_united-kingdom_2643743?fcstlength=-15&year=2019&month=4)




Figure 2032/ SP 1: Site Plan Showing Measurement Locations



**Legend**

- 2032 190528 measurement location
- 2032 190528 The nearest noise sensitive receptor
- 2032 190528 Proposed plant location

CLIENT: Estates Capital Projects	SIZE: A4	TITLE: Site Plan Showing Measurement Locations	
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