



Noise Impact Assessment

Site Address: 248 Basingstoke Road, Reading, RG2 0HN

Client Name: Cohanin Architecture

Project Reference No: 8881CA



Authorisation and Version Control

Revision	Date	Reported By	Checked By	Approved By
001	14/02/2023	S Chesney, MSc, MIOA	P Soler, BEng, MIOA	A Martin, MSc, MIOA

Amendment History

Revision	Summary of Amendments
001	First Draft
002	Updated Proposed Development Plans

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Contact Details

NOVA Acoustics Ltd,
Suite 13, Crown House,
94 Armley Road,
Leeds,
LS12 2EJ

0113 322 7977

www.novaacoustics.co.uk
technical@novaacoustics.co.uk

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1. Introduction

NOVA Acoustics Ltd has been commissioned to prepare a noise impact assessment for a proposed car garage ('the Proposed Development') at 248 Basingstoke Road, Reading, RG2 0HN ('the Site').

The applicant is preparing a planning application ('the Application') to be submitted to Reading Borough Council. This technical report has been prepared to support the planning application.

A noise survey has been undertaken to establish the prevailing background sound levels at the closest Noise Sensitive Receptors ('NSRs'). The report details the existing background sound climate and the predicted noise emissions associated with the Proposed Development. Measures required to mitigate noise impact from the Proposed Development have been recommended where necessary and assessed in accordance with the relevant performance standards, legislation, policy and guidance.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.1 ***Standards, Legislation, Policy & Guidance***

The following performance standards, legislation, policy and guidance have been considered to ensure good acoustic design in the assessment:

- The Local Planning Authority's (LPA) policies and guidance, specifically; '*Reading Borough Local Plan (Adopted November 2019)*'
- National Planning Policy Framework (2021)
- Noise Policy Statement for England (2010)
- British Standard BS4142:2014+A1:2019 – 'Methods for rating and assessing industrial and commercial sound'

Further information on the legislation can be found in Appendix B.

1.2 Proposal Brief

The current use of the site is a car garage facility with retail at the front with repairs and upgrades to customer cars over the rest of the premises and the 3no. existing workshops.

The Proposed Development will consist of the demolition of the existing site and the erection of 1no. new warehouse building where repair and upgrade works to cars will be undertaken. In addition, there will be retail facilities at ground floor level and admin/office spaces at first floor level.

To the front of the development there will be car parking facilities with up to 18no. bays (7no. customer bays, 4no. staff bays, 2no. disabled bays and 5no. business visitor bays). The proposed car parking facilities remain relatively unchanged from those associated with the existing use. It is also understood that there will be no HGV deliveries to the site.

The proposed operational hours are:

- 09:00 to 17:30, Tuesday to Friday
- 09:0 to 17:00, Saturday
- Closed, Sunday and Monday

The figure below shows the Proposed Development.

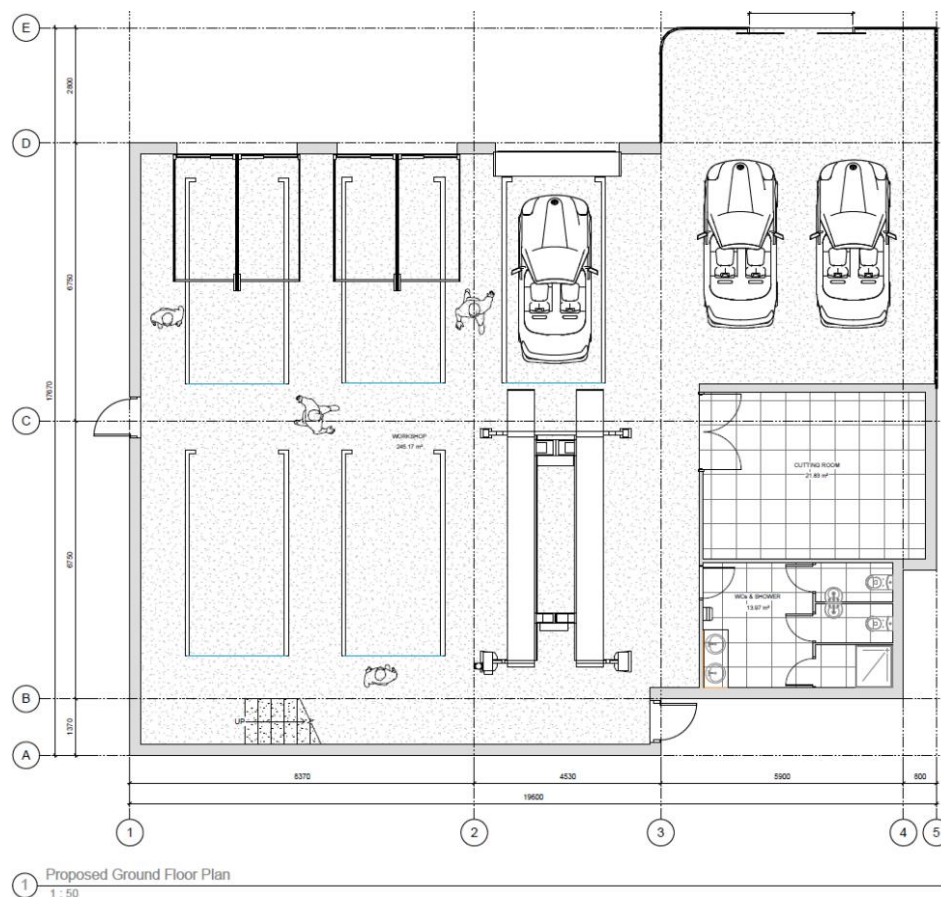


Figure 1 – Proposed Development Ground Floor Layout

1.3 Local Planning Authority

The following policies, in relation to noise, are outlined in 'Reading Borough Local Plan (Adopted November 2019)'.

Policy CC8: Safeguarding Amenity

Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

- Noise and disturbance
- Vibration

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.

As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes.

Policy EN17: Noise Generating Equipment

Where noise generating equipment is proposed, the noise source specific⁶¹ level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor.

⁶¹ *The noise source specific level is the measured noise level, as opposed to the rating level, which is the specific level with correction factors included.*

It is considered that should the conditions of policy EN17 be achieved, then the amenity of existing residential dwellings will be protected (as required in policy CC8).

It is also noted that the assessment methodology and criteria for assessing noise generating equipment/sites, as per policy EN17, requires the specific sound level to be assessed. Therefore, no additional rating or acoustic feature penalties are included in the following BS4142 assessment.

2. Environmental Noise Survey

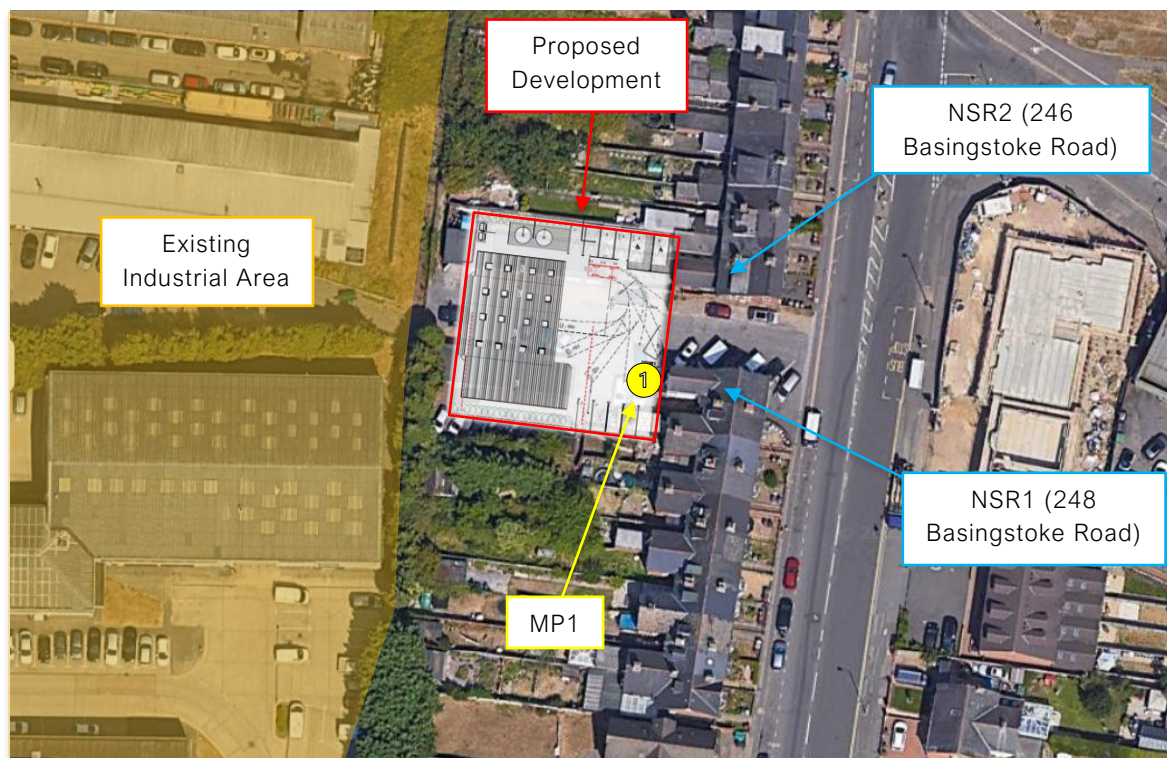
2.1 Measurement Methodology

The following table outlines the measurement dates and particulars.

Location	Survey Dates	Measurement Particulars
MP1	09/01/23 – 11/01/23	Equipment mounted to a drainpipe to the rear of 248 Basingstoke Road. The meter was positioned 1m from the building façade and approximately 4m above the ground at least 3.5m from any other large reflective surface.

Table 1 – Measurement Methodology

The figure below outlines the site surroundings and measurement location:



Imagery ©2023 Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2023

Figure 2 – Measurement Locations and Site Surroundings

2.2 Context & Subjective Impression

The Proposed Development Site is located on the fringe of an existing industrial area. To the east of the development are residential dwellings, situated off Basingstoke Road, the closest of which are approximately 15m from the proposed new warehouse building (NSR1 and NSR2).

The noise profile at the measurement location (MP1) was dominated by road traffic along Basingstoke Road. It was noted that the existing car garage was in operation but noise emanating from the site was only barely audible over the prevailing road traffic noise.

2.3 Environmental Noise Survey Results

Background Sound Level Analysis

The following section outlines the measured background sound levels that have been used as the baseline for the subsequent BS4142 noise assessment. As the existing site was still in operation, the noise levels immediately before and after the current operational hours were used in the assessment. The figure below shows a histogram graph of the measured background sound levels. The complete time history results can be found in Appendix C.

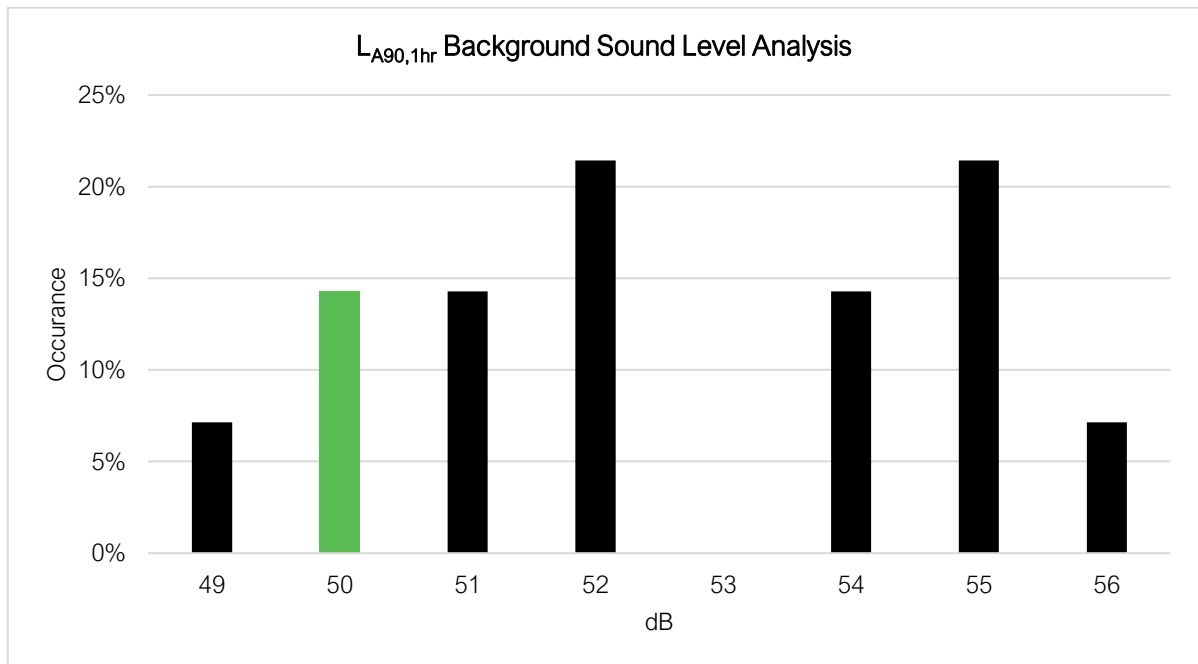


Figure 3 – MP1 Operational Hours Background Sound Level Analysis

From the figure above, a 'typical lowest' background sound level of 50dB $L_{A90,1hr}$ is considered appropriate to provide a robust assessment of the Proposed Development.

3. BS4142 Noise Impact Assessment

In the following section of the report, the impact of the noise emissions generated by the Proposed Development is assessed.

3.1 Proposed Constructions, Minimum Requirements & Control Measures

The figure below shows the elevation drawing that provides an indication of the industrial unit construction.

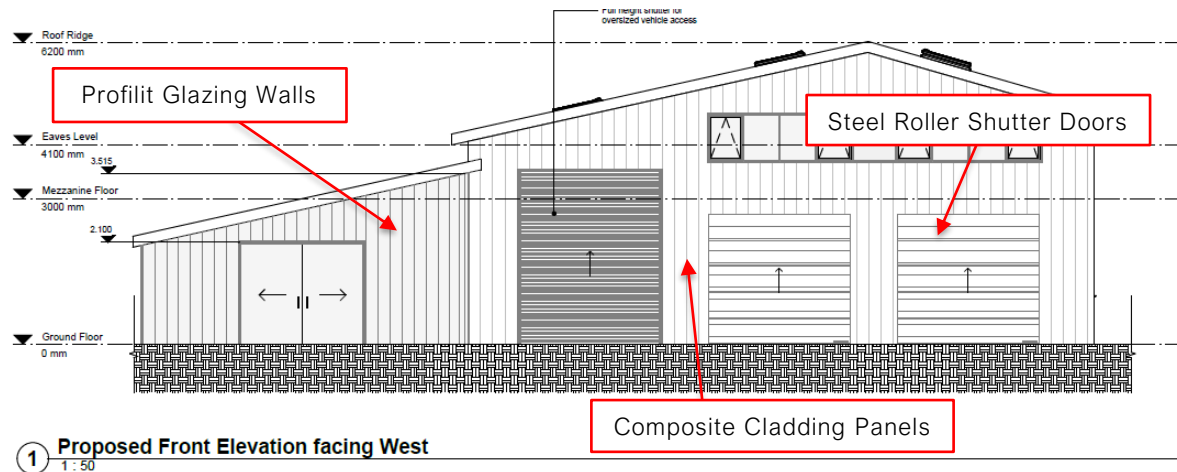


Figure 4 – Indicative Industrial Unit Construction

The following assumptions regarding the building façade elements have been used to inform the model and noise impact assessment:

- The upper façade sections, roofing and any roller shutter doors ('RSD') are constructed from steel, providing the minimum sound reduction values indicated in Table 2 below. It is assumed that RSD will remain closed when repair and upgrade works are being undertaken.
- The walls and roofing are constructed of composite panelling, as detailed in Table 2.
- The glass section of the building is constructed of Profilit glass. For the purposes of the assessment, this is considered to have a similar performance as standard double glazing, as detailed in Table 2 below.

Description	1/1 Octave Frequency Band (Hz, SRI dB)								R _w (dB)
	63	125	250	500	1k	2k	4k	8k	
Garage Doors Steel 0.6mm	8	10	14	19	24	29	34	34	23
Composite Panels Kingspan KS1000 RW 80mm 25mm cavity filled with insulation Kingspan KS1000 RW 30mm 1no. 15mm plasterboard	22	24	25	38	47	49	65	65	40
Profilit Glazing	24	23	24	36	44	49	50	50	38

Table 2 – Required Minimum Sound Reduction of Industrial Unit Building Elements

3.2 Specific Sound Levels & Noise Modelling Assumptions

The Proposed Development has been modelled within SoundPlan 8.2 and the following assumptions have been made within the noise modelling software:

- To accurately model the land surrounding the Proposed Development, the topographical data has been obtained from the EA's 'National LIDAR Programme' on the DEFRA Data Services Platform.
- For the purpose of the assessment, the ground between the source and receivers is considered to be a mixture of acoustically 'hard' surfaces.
- The sound map grid height has been set to 1.5m, however, the noise levels used in the assessment have been taken from the most exposed point of each façade.
- To form a 'robust' scenario, no on-time corrections have been applied to the noise emissions generated by internal operations as they are considered to be continuous over reference time periods of 1-hour during the daytime.
- Based on previously measured data from an MOT centre, an internal noise level of 75dB $L_{Aeq,T}$ has been assumed for the general warehouse area. For the cutting room, an internal noise level of 80 dB $L_{Aeq,T}$ is assumed. Noise breaking out of office and admin areas has not been considered in the noise model.
- The building fabric elements are deemed to behave as area noise sources which is calculated in the software assuming: $L_W = L_{P@1m} + 10*\log(S)$.
- A -3 dB correction to account for the change in reverberant internal conditions to external non-reverberant conditions in accordance with ISO 12354 (scenario 4).
- To the rear of the development there will be 3no. AC units (Mitsubishi SRCZ50ZS-W Outdoor 5kW).

The table below presents the octave band source noise levels utilised in the noise model.

Description	1/1 Octave Frequency Band (Hz, L_{eq} dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Internal Noise Levels from Garage	60	62	62	64	66	70	69	65	75
Internal Noise Levels from Cutting Room	65	67	67	69	71	75	74	70	80
Mitsubishi SRCZ50ZS-W (L_p at 1m)	68	54	53	49	48	40	36	29	52

Table 3 – Internal Sound Pressure Level of Industrial Units

The sound maps showing the specific sound levels emission from the Proposed Development can be seen in the figures below.

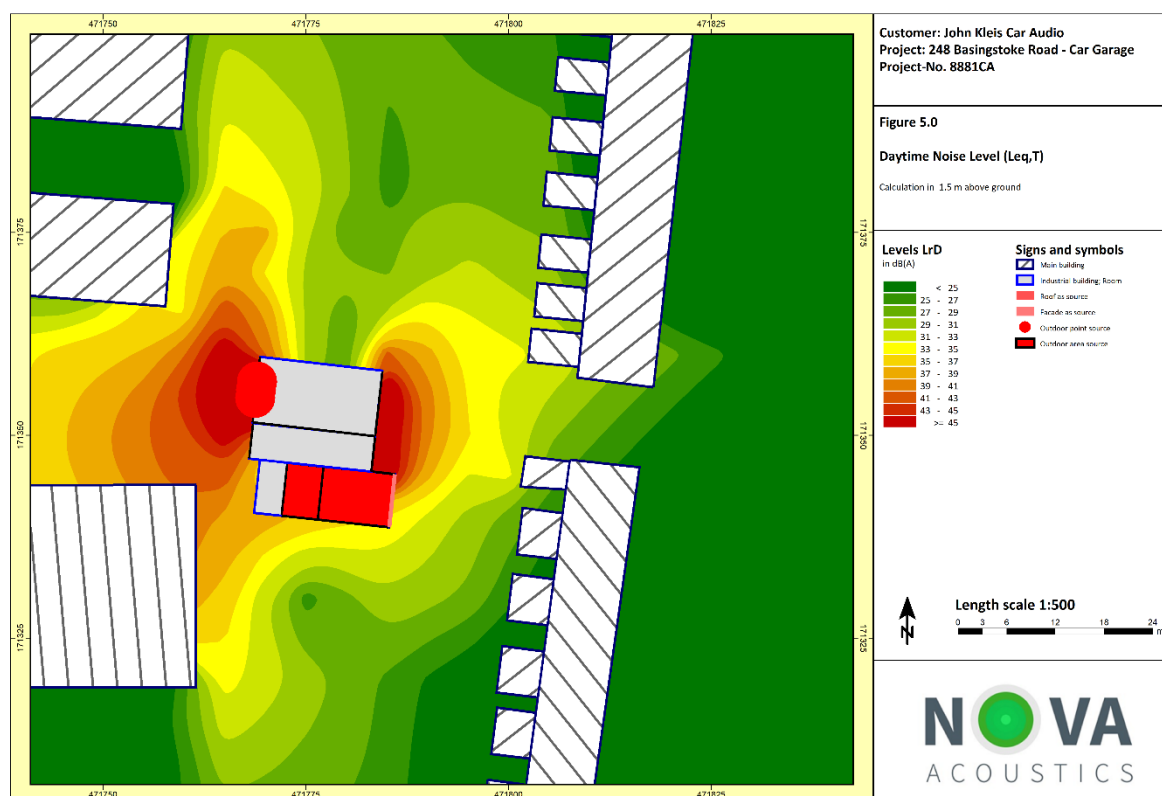


Figure 5 – Daytime Specific Sound Level Map – 1.5m Grid Map Height

3.3 BS4142 Noise Impact Assessment

The BS4142 noise impact assessment at the most affected receptor (NSR1) is presented in the table below.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level at NSR1	39	35	32	28	25	24	17	12	31
Acoustic Feature Correction	Policy EN17 specifies that the 'specific sound level' is used in the assessment. Therefore, no additional corrections or penalties are applied.								0
Rating Sound Level ($L_{A,T}$)									31
Background Sound Level (L_{A90})									50
Exceedance									-19
BS4142 Assessment Outcome	The assessment indicates 'low Impact, dependent on context' in accordance with BS4142 at the most affected receptor (NSR1).								
NPPF & NPSE Outcome	The assessment indicates 'No Observed Effect level ('NOEL') in accordance with the NPPF and NPSE.								

No further mitigation measures are deemed necessary.

Table 4 – BS4142 Noise Impact Assessment (NSR1)

4. Conclusion and Action Plan

The Proposed Development has been assessed against the requirements of BS4142 and the LPA's Local Draft Plan, and a mitigation scheme has been provided to ensure the criteria can be achieved.

The following 'Action Plan' is outlined to ensure the design considerations and specifications from this report are duly implemented:

1. The minimum sound insulation requirements set out in Section 3.1 should be adhered to and retained thereafter.
2. Roller shutter doors to remain closed whilst repair and upgrade works are being undertaken on customer vehicles.
3. Mechanical plant should only operate during the proposed opening hours of the site.

The findings of this report will require written approval from the Local Authority prior to work commencing.

Appendix A – Acoustic Terminology

A-weighted sound pressure level, L_{pA}	Quantity of A-weighted sound pressure given by the following formula in decibels (dBA). $L_{pA} = 10 \log_{10} (pA/p_0)^2$. Where: pA is the A-weighted sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Background Sound	Underlying level of sound over a period, T , which might in part be an indication of relative quietness at a given location
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T , has the same mean-squared sound pressure as the sound under consideration that varies with time
Facade level	Sound pressure level 1 m in front of the facade
Free-field level	Sound pressure level away from reflecting surfaces
Indoor ambient noise	Noise in a given situation at a given time, usually composed of noise from many sources, inside and outside the building, but excluding noise from activities of the occupants
Noise Criteria	Numerical indices used to define design goals in a given space
Noise Rating (NR)	Graphical method for rating a noise by comparing the noise spectrum with a family of noise rating curves
Octave Band	Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit
Percentile Level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting “F”, which is exceeded for $N\%$ of a specified time interval
Rating Level, $L_{Ar,Tr}$	Equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise
Reverberation time, T	Time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped
Sound Pressure, p	root-mean-square value of the variation in air pressure, measured in pascals (Pa) above and below atmospheric pressure, caused by the sound
Sound Pressure Level, L_p	Quantity of sound pressure, in decibels (dB), given by the formula: $L_p = 10 \log_{10} (p/p_0)^2$. Where: p is the root-mean-square sound pressure in pascals (Pa) and p_0 is the reference sound pressure (20 μ Pa)
Weighted sound reduction index, R_w	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies

Appendix B – Standards, Legislation, Policy, and Guidance

This report is to be primarily based on the following standards, legislation, policy and guidance.

B.1 – National Planning Policy Framework (2021)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2021. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 174e, it states:

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 185 states:

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 impact 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; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 – Noise Policy Statement for England (2010)

Paragraph 185 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy 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.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

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. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 – BS4142:2014+A1:2019 – ‘Methods for rating and assessing industrial and commercial sound’

Overview

BS4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ ‘specific sound level’, immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{A,r,Tr}$ ‘rating sound level’. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

Rating Penalty

Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by deriving a rating penalty.

BS4142 states:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

- a) subjective method;*
- b) objective method for tonality;*
- c) reference method.”*

Due to the nature of the development the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

“Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed. Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources.”

BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

a) Tonality

A rating penalty of +2 dB is applicable for a tone which is “just perceptible”, +4 dB where a tone is “clearly perceptible”, and +6 dB where a tone is “highly perceptible”.

b) Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is “just perceptible”, +6 dB where it is “clearly perceptible”, and +9 dB where it is “highly perceptible”.

c) Other Sound Characteristics

BS4142 states that where “the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied.”

d) Intermittency

BS4142 states that when the “specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time ... if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.”

Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the 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.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The purpose has not been to simply select the lowest measured value. Diurnal patterns have also been considered as they can have a major influence on background sound levels, 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.

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.

Assessment of Impact

BS4142 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "Typically, the greater this 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 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 negligible impact, depending on the context."

Interpreting the guidance given in BS4142, with consideration of the guidance given in the NPSE and NPPG Noise, an estimation of the impact of the rating sound is summarised in the following text:

- A rating sound level that is +10 dB above the background sound level is likely to be an indication of a Significant Observed Adverse Effect Level;
- A rating sound level that is +5 dB above the background sound level is likely to be an indication of a Lowest Observed Adverse Effect Level;
- The lower the rating sound 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 sound level does not exceed the background sound level, this is an

indication of the specific sound source having a negligible impact and would therefore be classified as No Observed Adverse Effect Level.

During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of the Standard, are 07.00 to 23.00 and 23.00 to 07.00, respectively.

Appendix C – Environmental Survey

C.1 – Time History Noise Data

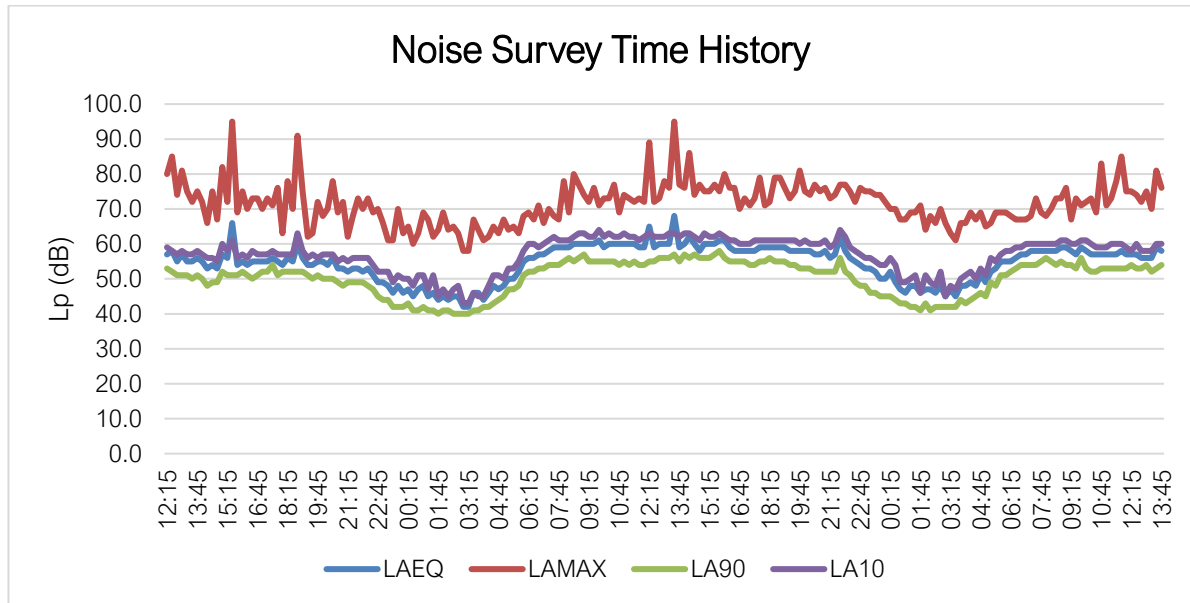


Figure 6 – MP1 Noise Survey Time History

C.2 – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC420 Class 1 Sound Level Meter	T250680	≤0.1
CESVA CB006 Class 1 Calibrator	902441	

Table 5 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

C.3 – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions – Calcot, Reading (Approx. 5.6km W of Site)				
Time Period	Air Temp (°C)	Rainfall (mm/h)	Prevailing Wind Direction	Wind Speed (m/s)
09/01/23 – 00:00 – 23:59	5.4 – 10.3	0.0 – 0.3	W	0.0 – 4.3
10/01/23 – 00:00 – 23:59	3.7 – 14.2	0.0 – 0.3	SWS	0.0 – 5.3
11/01/23 – 00:00 – 23:59	7.0 – 10.9	0.0 – 0.6	W	0.0 – 4.7

Table 6 – Weather Conditions



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