



42 Portman Rd, Reading RG30 1EA

Commercial Noise Investigation Report

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42 Portman Rd, Reading RG30 1EA

Commercial Noise Investigation Report

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42 Portman Rd, Reading RG30 1EA
Commercial Noise Investigation Report

Introduction

Aulos Acoustics has been appointed by Soni.Me Ltd to investigate commercial noise impact with respect to a prior approval application of 42 Portman Rd, Reading RG30 1EA.

Proposal

The project is a proposed change of use from Class B1a (offices) to private residential Class C3 Dwellinghouses under the provisions of The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016, which states:-

“O.2.—(1) Development under Class O is permitted subject to the condition that before beginning the development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

- (a) transport and highways impacts of the development,
- (b) contamination risks on the site,
- (c) flooding risks on the site, and
- (d) impacts of noise from commercial premises on the intended occupiers of the development, and the provisions of paragraph W (prior approval) apply in relation to that application.”

In the explanatory notes associated with the above amended order, the opportunity for Local Planning Authorities to consider noise impacts from commercial premises as they affect future residential occupants is confirmed.

The consequence of such an assessment is twofold: to protect the future amenity of residential property and to safeguard the existing commercial amenity of neighbouring businesses. The approach aligns with the requirements of the current National Planning Policy Framework (1) with respect to noise.

There is no stated opportunity to consider noise impacts due to other sources of noise, such as transportation or other environmental noise.

Reading Borough Council is the Local Planning Authority. In line with normal requirements consideration has been given to the guidance of Planning Practice Guidance – Noise (1) and BS8233:2014 (2).

The technical report provides the results of the scoping assessment of commercial noise to determine if further investigations are necessary.

Information Used

The Prior Approval Application Drawings have been used in preparation of the report.

Reference has been made to Google Maps® to identify commercial and other uses. Google Maps states current imagery.

Description

The proposal for permitted development includes 16 residential flats comprising 12 one-bedroom flats and four two-bedroom flats.

The current building is used as offices over two principal floors.



The application premises are located alongside Portman Road and are accessed by road from Loverock Road and Albury Close.

Portman Road is a relatively busy local road providing access to the commercial areas and residential areas to the south and is approximately 17m from the application site. The mainline railway (Great Western Route) runs parallel some 170m north of the application site.

The areas north, west and east of 42 Portman Road are commercial in nature with varying uses and occupants.

The nearest residential property is 50m south of the application site on the far side of Portman Road.

The current building envelope will be retained and refurbished.

There are visible mechanical plant installations in direct sight of the application site to the north and north-west. There is car parking and a car sales forecourt to the east. The commercial neighbour with the greatest potential for adverse impact is expected to be the waste processing and recycling facilities to the north-west, although 42 Portman Road does not have a view of any open areas or service bays.

Observations made in the vicinity of the commercial units did not identify noisy uses in close proximity and vehicle workshops were significantly more distant and screened by other buildings.

Environmental Noise Survey

An environmental noise survey has been completed in general accordance with the requirements of the following documents:-

-) BS 7445-1:2003 *Description and measurement of environmental noise. Guide to quantities and procedures* (10)
-) BS 7445-2:1991, ISO 1996-2:1987 *Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use* (11)
-) BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* (8)

Measurement of the following sound pressure level (L_p) parameters has been completed:-

-) Continuous equivalent sound pressure level $L_{eq,T}$
-) Statistical L_p indices L10, L50, L90
-) Maximum L_p Lmax

Primary frequency weightings are "A" and all time weightings are FAST. Secondary frequency weighting is "C". Frequency band spectra have been measured and some measurements have equivalent SLOW time-weighted results: these may not be reported and are for use in design or detailed analysis.

-) Continuous measurement:-
-) Period of measurement, T, was notionally 15-minutes (900 seconds)
-) Sample resolution, t, was 30 seconds

A sample measurement is made and recorded every 30 seconds and the reference results reported for each 15-minute period. The result may be expressed as $L_{eq,T(t)}$ but normally omits the bracketed reference.

Normalisation may be applied for comparison in some circumstances, but if not stated then samples may be presumed to be part of a continuous signal suitable for direct comparison.



The recorded measurement positions are shown on the site measurement location plan 3130/SP2. The positions are described as follows:-

	Description	Source	Meter
1	First floor; north; approx. 5m above local ground level & 30m from road A/C units below & opposite	Road traffic	Norsonic 118 ID: 6128736+GRAS 41AL microphone
2	Ground floor; west; approx. 3m above local ground level & 17m from road	Road traffic	Norsonic 118 ID: 6216003 +GRAS 41AL microphone

Table 0 – Measurement Equipment

All measurement locations are shown below.



Site Measurement Location Plan 2052/SP2



Residential property



Measurement location



Commercial uses



Continuous measurements were made:-

-) 02 March 13.30h to 03 March 13.30h 2020 at Position 1
-) 02 March 14.03h to 03 March 13.10h 2020 at Position 2

Complete results have been obtained for these periods and analysed results are reported below.

All results have consistent day, evening and night results and include the quietest night-time period. There are no apparent instances of extraneous disturbing sound typical of industrial or commercial activity.

There is one period of elevated sound level at 04.00 hours at Position 1 which is not clearly replicated at Position 2, so is not road traffic or the nearest major commercial units to the west. The period will be examined below.

No faults or errors were recorded. Site calibration was consistent. The period of measurement is considered sufficiently representative of the road and the commercial area under the conditions noted.

Results

The results of the measurements and subsequent analysis are reported below and in

-) Appendix C Sound

Time periods are defined as follows:-

-) T the duration of the assessment period, e.g. 12 hours / 12h for 07.00-19.00h
-) (t) the duration of the measurement from which the level calculated (e.g. t=15min for ambient sound levels) or the period of interest for background sound levels (t=1h day/evening t=15min night).

So $L_{Aeq,T(t)}$ for 07.00-19.00h based on 15-minute periods is $L_{Aeq,12h(15min)}$

Continuous Monitoring

Continuous monitoring results demonstrate the progression of outside sound level over time.

Time history graphs and standard period data have been generated for Position 1 and 2. These are reported in Appendix C.1 and C.2, respectively.

Typical background sound level data and statistical distribution have been generated for Position 1 and 2. These are reported in Appendix C.1 and C.2, respectively. Typical Background Sound Level has been determined in accordance with the directions of BS4142+A1 (6).

The key standard period data reported here are as follows:-

Period, hh.mm	Description	Period, T	Note	Sensitivity
07.00-19.00	Day	12h		Moderate
19.00-23.00	Evening	4h	Key Period	High
23.00-07.00	Night	8h	Key Period	Very High
07.00-23.00	Day 16h	16h		Moderate – High
24h 07-07.00h	24h	24h		-
07.30-18.30	Working Day + Variation	11h		Low – Moderate

Table 1 – Continuous Hours Periods



Where continuous periods are unavailable the data has been determined from combined results.

Ambient Sound Level, L_a

The ambient sound level describes the general varying sound climate experienced in the absence of extraneous or atypical events and any noise source being introduced.

It is determined using the Continuous Equivalent Sound Pressure Level, $L_{Aeq,T}$ over a reference time, T. For the purposes of the assessment the value of T is as stated in Table 1.

	07.00-19.00	19.00-23.00	23.00-07.00	07.00-23.00		07.00-07.00h	00.00-00.00h
	12h	4h	8h	16h	den	24h AM	24h
Position	Day $L_{Aeq,12h}$	Evening $L_{Aeq,4h}$	Night $L_{Aeq,8h}$	Day $L_{Aeq,16h}$	Lden	$L_{Aeq,24h}$ night	$L_{Aeq,24h}$
1	52.9	49.6	49.4	52.5	61.2	52.2	51.5
2	63.8	61.4	56.5	63.3	70.5	62.6	62.0

Table 2 – Average Ambient Sound Level, L_a

The sound levels are low at the rear (Position 1) and moderate at the front (Position 2) of 42 Portman Road.

The character and progression of results indicates a sound climate determined by road traffic noise with a strong diurnal character and no significant variation in progression over the period. Position 1 is considered to be affected by railway noise and some noise from parking cars. The loudest events are considered to be due to cars parked in close proximity to the measurement Position 1, which would not occur in future once the office workers do not use the space.

A single anomalous measurement period occurred at or around 04.00 hours for approximately 19 minutes. The character and detailed results of the period are reviewed in Appendix C.3.

The long cycling times tend to indicate the measurement is a slow-moving servicing vehicle or railway works, or similar, rather than goods vehicles, loading / unloading or mechanical equipment.

For the purposes of the assessment, the effect of the anomalous measurement will be considered as a hypothetical commercial source of noise, such as building services equipment or idling vehicles.

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

The background sound level describes the underlying sound climate experienced – the average lowest sound levels. It tends to be determined by continuous or regular elements of the noise climate, such as the general influence of road traffic over a wide area.

It is determined using the 10th centile of the Sound Pressure Level L_{pA} over a reference time, T – it is the level above which 90% of all measurements occur and, for that reason, is known as the $L_{A90,T}$.

For the purposes of the assessment the value of T is as stated in Table 1.

Time, h	07.00-19.00	19.00-23.00	23.00-07.00	07.00-23.00	07.00-07.00	00.00-00.00
	12h	4h	8h	16h	24h AM	24h
Position	Day $L_{A90,12h}$	Evening $L_{A90,4h}$	Night $L_{A90,8h}$	Day $L_{A90,16h}$	$L_{A90,24h}$	$L_{A90,24h}$
1	46.2	38.8	36.4	38.8	36.4	36.4
2	52.5	40.5	34.8	46.5	43.7	36.8

Table 4 – Minimum Background Sound Level, $L_{A90,T}$

The minimum background sound level is not a representative descriptor of the noise climate experienced subjectively.

The approach to Background Sound Levels in relation to design criteria is the approach to assessment defined by BS4142 which states:

Commentary on 8.1

*"... 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. ...*

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."

Additionally, BS4142+A1 states at 8.1.4 that:

*"...the background sound level used for the assessment should be **representative of the period** being assessed."*

Note 1 to 8.1.4 states that:

*"...A representative level should account for the **range of background sound levels** and should **not automatically be assumed to be either the minimum or modal value.**"*

[All bold emphases the author's]

By inference, the representative level should not be assumed to be minimum, modal, median, mean or any other statistical descriptor without careful consideration of the measured levels.

The Typical Background Sound Levels have been determined based on statistical analysis of all 15-minute measurements and review of the time history graphs. These results are reported in Appendix C.1 and C.2.

The typical background sound levels are determined to be as follows:

Position	Day LA90,12h	Evening LA90,4h	Night LA90,8h	Day LA90,16h	LA90,24h
1	48	43	38	48	47
2	57	47	36	55	53

Table 5 – Typical Background Sound Level, $L_{A90,T}$

BS4142 indicates that an intruding source of commercial, industrial or mechanical equipment noise having a Rating Level equal to the Typical Background Sound Level represents a low risk of adverse impact and avoids significant effects on residential amenity and activity.

Rating Level is determined by adjusting for the subjective characteristics of the introduced sound relative to the expected noise climate may include sound character features:

-) Tonality – range from +2dB just perceptible to +6dB highly perceptible
-) Impulsivity – range from +3dB just perceptible to +9dB highly perceptible
-) Intermittency – correct by +3dB if readily distinctive
-) Other sound characteristics – correct by +3dB if readily distinctive against noise climate



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Other characteristics may include a readily distinctive sound, such as equipment drone or hum which is not otherwise tonal, for example.

All rating assessment must take account of context, whether that be positive or negative characteristics of the noise climate and location. Considering sound level in isolation will not provide a representative assessment of impact or adverse effects.

The Background Sound Levels are moderate to high. They contain significant characteristics of mechanical noise due to the widespread influence of road traffic noise.

Consequently, there is a lower risk of adverse effects from existing or new sources of noise affecting future residents than would be the case in an environment with lower sound levels (e.g. in sheltered suburban or urban edge areas, for example)

Provided existing levels of ambient noise from commercial uses are controlled adequately by the design then there is a relatively low risk of adverse impact on future residents.

Analysis of Road Traffic Noise Influence

The influence of road traffic noise on Position 1 can be determined by analysis of the Position 2 results, which are determined by full exposure to road traffic.

The daytime ambient sound level at Position

	07.00-19.00	19.00-23.00	23.00-07.00	07.00-23.00			
Position	Day LAeq,12h	Evening LAeq,4h	Night LAeq,8h	Day LAeq,16h	Distance		
2	63.8	61.4	56.5	63.3	17m	Unscreened	Free field
					Facade	+2.5	
					30m	-2.5	
					Screened; reflection	-12	
1 Road	51.8	49.4	44.5	51.3	Influence of road traffic at Position 1		
1	52.9	49.6	49.4	52.5	Facade		
1 Other	46.4	36.1	47.7	46.3	Influence of other sources at Position 1		

Table 6 – Typical Posn. 1 Other Sources Specific Sound Level, L_s

If it is assumed that screening to the rear façade is greater but not more than 15dB then the following applies:

	07.00-19.00	19.00-23.00	23.00-07.00	07.00-23.00			
Position	Day LAeq,12h	Evening LAeq,4h	Night LAeq,8h	Day LAeq,16h			
1 Road	48.8	46.4	41.5	48.3	Influence of road traffic at Position 1		
1	52.9	49.6	49.4	52.5	Facade		Facade
1 Other	50.8	46.8	48.6	50.4	Influence of other sources at Position 1		
a	+4.4	+10.7	+0.9	+4.1			

Table 7 – Worst Posn. 1 Other Sources Specific Sound Level, L_s

Due to the reflection from adjacent buildings to the north and open views to the road to east and west (i.e. no barrier at either end of the building), it is highly unlikely that such sound levels are attained by



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other sources of noise. The increase in Evening sound level does seem realistic, if greater than would be expected.

For the purposes of assessment, a reference Specific Sound Level due to other sources of $L_{Aeq,T}$ 48dB is assumed which is comparable to the night-time value in Table 6 and greater than other periods in Table 6.

The analysis confirms there is influence other than road traffic, which is assumed to be due to the combination of commercial buildings, equipment and vehicles. It must be noted there will be some influence from the mainline railway line also.

Primary Mitigation Assessment

The primary mitigation measures relate to the building envelope and ventilation strategy for control of environmental noise.

Whilst environmental noise sources are excluded from the scope of a Class O review and are not a material consideration, it is worth noting that impact should be minor to moderate, based on the conditions expected.

Internal sound levels with partially open windows will exceed the general criteria of Table 4 BS8233:2014. Internal sound levels with closed windows will attain the criteria, assuming thermal double glazing or secondary glazing is provided as follows:

-) North Weighted Sound Reduction Index R_w 29dB or greater
-) South Weighted Sound Reduction Index R_w 36dB or greater
-) East, West Weighted Sound Reduction Index R_w 33dB or greater

Position	Day $L_{Aeq,12h}$	Evening $L_{Aeq,4h}$	Night $L_{Aeq,8h}$	Day $L_{Aeq,16h}$	Window	Elevations
1	35	32	32	35	Open	North
2	49	46	42	48	Open	South
-	46	43	39	45	Open	East, West
1	25	22	22	25	Closed	North
2	34	31	27	33	Closed	South
-	34	31	27	33	Closed	East, West

Table 8 – Indoor Ambient Sound Level, $L_{a,inside}$

NB: Adjusted for façade effect where applicable

It has been recommended, therefore, that where feasible windows are replaced with thermal double glazing of Weighted Sound Reduction Index as above or equivalent secondary glazing systems.

The option to close windows to exclude noise means that ventilation rates could be limited. An alternative system and strategy to openable windows as the sole means of ventilation has been recommended.

Note – the walls and roof are estimated to have a baseline sound insulation performance of R_w 45-47dB.

In general terms this would consist of a system complying with Approved Document F of The Building Regulations including but not limited to:



- J System 3 Mechanical Extract Ventilation with acoustic treatment of intake ventilation openings and extract ventilation ducts
- J System 4 Mechanical Ventilation Heat Recovery with intrinsic acoustic ventilation on intake and supply ducts

Any ventilation route to outside shall have a Weighted Normalised Element Level Difference of $D_{ne,w}$ 32dB minimum. If using more than one ventilator where employing room by room ventilation performance shall increase as follows:

One ventilator $D_{ne,w}$ 32dB

Two ventilators $D_{ne,w}$ 35dB

Three ventilators $D_{ne,w}$ 37dB

Straight through ventilation without acoustic treatment, including wall, sill and frame ventilators in windows, including trickle vents, shall be excluded.

With a secondary glazed system, it is theoretically possible to achieve the reasonable conditions of BS8233 where internal sound levels are not exceeded by more than 5dB. With a carefully designed system, then compliance with the criteria may be feasible. This would require allowance to be made for primary and secondary panes that open at opposite ends of the cavity. These openings may be staggered horizontally or vertically, but must be separated by at least half the length of the cavity.

Only staggered openings in secondary glazed windows and complex proprietary ventilators would enable natural ventilation and compliant sound levels.

The recommended design target is a level difference for the external building envelope of 25dB(A) to the north and 32-35dB(A) to the south, east and west.

If feasible within the context of an existing building, the scheme shall aim to replicate noise control measures on other new or re-purposed developments to maintain consistent housing stock quality in the area.

The above design recommendations are included here solely to illustrate the sound insulation performance included within the design. These are for the control of environmental noise to ensure the property provides a reasonable internal noise climate and is comparable to other saleable or lettable property in the area. There is no regulatory requirement for reasonable internal noise levels due to environmental noise under the scope of the Class O review.

Commercial Noise Assessment

External commercial noise is not expected to affect the application site significantly as any other sound levels are generally comparable to environmental noise.

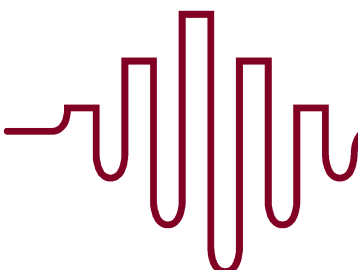
The recommended sound insulation measures and need for an alternative ventilation strategy to openable windows are expected to be sufficient to control noise ingress due to “Other” sources, as described in *Analysis of Road Traffic Noise Influence* above.

To illustrate, the Specific Sound Level due to Other Sources is $L_{Aeq,T}$ 48dB in any reference period.

The recommended sound insulation of windows would be expected to result in internal sound levels of $L_{Aeq,T}$ 23dB, which is markedly lower than the night-time criterion of 30dB for internal noise in BS8233.

Even worst-case sound levels (Table 7) would be expected to result in internal sound levels of no greater than $L_{Aeq,8hour}$ 24dB at night and $L_{Aeq,T}$ 26dB at any other time.

Even with windows partially open, the internal sound level would be approximately $L_{Aeq,T}$ 33dB, which is reasonable and tolerable even at night. The future residents would have the option of closing windows should it prove to be obtrusive at times.



Based on the detailed analysis of measured sound levels over the reference periods in BS8233:2014, the indoor ambient sound level would be reasonable and would not result in adverse effects on the amenity of either future residential or existing commercial properties.

There is an anomalous early morning sound level, although this is not representative of the night-time noise climate and not repeated even during the active daytime or evening period. If this is transportation noise (e.g. railway or logistics road traffic) or general servicing noise (e.g. street cleaning, rubbish collection, etc.) then it does not fall within the remit of the Commercial Noise Assessment.

On the presumption that the event is due to commercial or equipment noise then it should be noted that the overall sound level is determined by mid and high frequency sound focussed on 1.6KHz one-third octave band with only a minor contribution from lower frequency sound.

The sound insulation and mitigation measures will be most effective in the range of loudest sound level, increasing the effective sound level difference of the building envelope.

With a basic sound level difference of 25dB(A), the internal sound level is expected to be $L_{Aeq,15min}$ 29-33 dB, which is reasonable given the context of an active road traffic noise climate even at night.

It would be advantageous to increase the sound insulation of the building envelope slightly for bedrooms to address the intermittent nature of the sound and the overall sound level.

If the source of sound is commercial or equipment sound, then the following window sound insulation performance shall be attained:

-) Weighted Sound Reduction Index R_w 33dB or greater

The ventilation strategy should retain the same performance as recommended above.

Inclusion of such increased mitigation is dependent on confirmation of the source of sound, which can be undertaken by simple observation once the Covid-19 restrictions on business activity are complete.

At present, the design will assume:

-) the anomalous sound is commercial or equipment noise;
-) the sound occurs regularly, and;
-) it is due to a legally permitted or licensed activity

For the purposes of mitigation design, it is assumed also that the sound is not due to operation of mechanical equipment at 42 Portman Road.

Consequently, the mitigation measures detailed below are included in the design for control of environmental noise and commercial noise.

With these in place, the impact on future residential amenity due to existing commercial noise is expected to be minor to negligible. The impact on existing commercial amenity due to the presence of residential property is expected to be minor to negligible.

No commercial units are proposed within the building and impact is negligible, therefore.

Analysis of Potential Other Noise

It is not feasible to complete a normal commercial noise assessment under BS4142 for commercial or equipment noise where the sources cannot be clearly separated or allocated to commercial sources.

It can be stated that road traffic noise at the North elevation is 11dB greater than Typical Background Sound Level. Also, noise from Other Sources (described above) is 2dB less than Typical Background Sound Level at best and 9dB greater than Typical Background Sound Level at worst.



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The night-time value for sound level may be considered a typical average of the 15-minute sound levels over the whole night and will tend toward the highest values. During the majority of the night ambient sound levels will remain below 45dB or 7dB above Typical Background Sound Level, or less, for all sources.

As the mitigation measures are determined to overcome all sources of noise, they will ensure an acceptable indoor noise climate whatever the source of noise.

The assessment of potential anomalous results in isolation is not useful other than to confirm that additional building envelope sound insulation and acoustic ventilation will be needed for bedrooms at night.

The determination of effective mitigation is dependent on frequency-based characteristics of sound insulation and ventilation attenuation. As the key contribution to the increased sound level found at 04.00-04.30 hours are in the ranges 250-1000Hz, the sound insulation of the envelope will be at its most effective. Window sound insulation is weakest in the low frequency bands.

The sound level differences considered above are based on sound controlled by low frequency components (i.e. road traffic) and will be more effective to control the anomalous source noise by approximately 5-6dB(A) by estimate, as mid and high frequency determine the sound level.

The provision of increased mitigation and sound level difference of 30dB(A) approximately for North Bedrooms will result in an effective sound level difference for the anomaly of approximately 35dB(A).

As the $L_{Aeq,15min}$ range is 56-61dB for the anomaly indoor sound levels are expected to be 21-26dB(A). These are below the night-time criteria for bedrooms at night in Table 4 of BS8233 by at least 5dB(A) and, so, are considered acceptable for protecting residential amenity.

Mitigation Summary

The mitigation measures recommended for environmental noise include sound insulation of windows and an acoustic ventilation strategy as follows:

Thermal double glazing or secondary glazing is provided as follows:

-) North Weighted Sound Reduction Index R_w 29dB or greater
-) South Weighted Sound Reduction Index R_w 36dB or greater
-) East, West Weighted Sound Reduction Index R_w 33dB or greater

Walls and roof estimated to have Weighted Sound Reduction Index R_w 45-47dB

Ventilation system providing alternative to open windows which, in general terms, would consist of a system complying with Approved Document F of The Building Regulations including but not limited to:

-) System 3 Mechanical Extract Ventilation with acoustic treatment of intake ventilation openings and extract ventilation ducts
-) System 4 Mechanical Ventilation Heat Recovery with intrinsic acoustic ventilation on intake and supply ducts

Any ventilation route to outside shall have a Weighted Normalised Element Level Difference of $D_{ne,w}$ 32dB minimum. If using more than one ventilator where employing room by room ventilation performance shall increase as follows:

- One ventilator $D_{ne,w}$ 32dB
- Two ventilators $D_{ne,w}$ 35dB
- Three ventilators $D_{ne,w}$ 37dB



Straight through ventilation without acoustic treatment, including wall, sill and frame ventilators in windows, including trickle vents, shall be excluded.

Natural ventilation options would require staggered secondary glazing openings or proprietary acoustically-treated ventilators.

The above measures are not subject to Class O review.

The noise mitigation strategy above is sufficient to control sound levels due to sources other than road traffic as assessed above, whether or not these are commercial. No improvement of the strategy would be required to attain reasonable indoor ambient sound levels over the standard periods referenced in BS8233:2014.

An anomalous, short-term result at 04.00-04.30 hours indicates higher sound levels at the north elevation dominated by high and mid frequency sound. There is no confirmation this is due to commercial noise, but a precautionary approach is taken.

On the basis the results are commercial or equipment noise as described above then a slight improvement to the noise mitigation strategy is required as follows:

-) Bedrooms North Elevation to have increased sound insulation
-) Weighted Sound Reduction Index R_w 33dB or greater
-) Acoustically-treated ventilation strategy to be maintained to bedrooms

No further mitigation of noise is required specific to the control of commercial noise.

The above will be subject to confirmation of the anomalous noise source, but at present for the purposes of the application it is assumed that:

-) the anomalous sound is commercial or equipment noise;
-) the sound occurs regularly, and;
-) it is due to a legally permitted or licensed activity

If these conditions are not met, then the case for increased sound insulation will be subject to review.

Aulos Acoustics has completed an investigation of the noise exposure expected at the application site at 42 Portman Rd, Reading RG30 1EA.

The site details, noise maps, imagery and expected building uses have been reviewed.

With the mitigation measures recommended for environmental noise, commercial noise impact is expected to be minor to negligible. As such, a reasonable noise climate would be expected with respect to the scope of O.2.—(1)(d) of The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016.

The provisions of the PPG – Noise (2) and the NPPF (1) would be achieved with respect to avoiding significant impacts or adverse effects from commercial noise.

The noise mitigation and acoustic ventilation strategy recommended for control of environmental noise is sufficient to control sound levels due to all other sources of noise over the relevant periods.

As a precautionary measure, a slight increase to the noise mitigation performance has been recommended for North elevation Bedrooms as a precaution against anomalous, short-term noise in the early morning, on the assumption this is due to commercial operation or equipment.

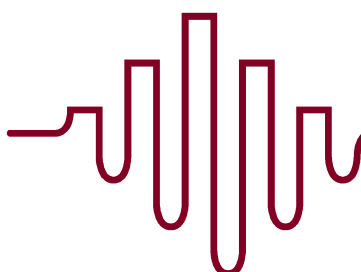
The presence and source of such noise will be confirmed following the end of Covid-19 restrictions, as a number of businesses in the area are currently closed or on limited operation. The character of the noise is atypical for commercial process, machinery or servicing noise.

If feasible within the context of an existing building, the scheme shall aim to replicate environmental noise control measures on other new or re-purposed developments, to maintain consistent housing stock quality in the area. Such measures are understood to be excluded from consideration under Class O Prior Approval applications.

James Tomalin MIOA



Term	Description
Sound	Physical oscillation of air or other material which is normally detected by the ear as a complex, time-varying and detailed description of the environment around the listener. Interpretation and subjective filtering of sound by the brain results in comprehension, emotional response and physical reactions to sound. Sound can also be detected by touch when transmitted in a solid medium and be perceived as motion at very low frequencies (i.e. vibration).
Noise	Generally defined as unwanted sound, which as a highly subjective description is subject to wide interpretation. Some describe noise as harsh or dissonant conditions, but such descriptions tend to be value-based and will vary from person to person.
Ambient Noise	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.
Ambient Noise Level	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. $L_{eq,T}$ or $L_{Aeq,T}$ dB(A) or dB Expressed in decibels / A-weighted decibels
Note:	Used in the reports generically to represent both current noise climate and noise level of vehicle noise to encourage direct comparison
$L_{eq,T}$	the notionally steady sound level having the same acoustic energy as the time varying sound pressure level over the same period
Background Noise	The underlying noise climate in the absence of an introduced or extraneous noise. Describes the quieter periods in the noise climate.
Background Noise Level	Describes the “average minimum” level of the background noise climate over a stated period of time Parameter: A-weighted Statistical Index 90% Sound Pressure. The quietest decile of the sound pressure levels, or level exceeded for 90% of the time period, T $L_{90,T}$ or $L_{A90,T}$ dB(A) or dB Expressed in decibels / A-weighted decibels
Acoustic screening	Physical barrier to sound formed by fence, wall, building or other structure, which has the effect of reducing the sound transmitted.
Individual Event Noise	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.
Event Noise Level	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 $L_{Amax,FAST}$ or $L_{Amax,F}$ $L_{Amax,SLOW}$ or $L_{Amax,S}$ dB(A) or dB Expressed in decibels / A-weighted decibels
Event Frequency	The number of times an individual event of a similar type occurs in the time period under consideration. Important descriptor as the impact of Individual Event Noise is dependent on changes in both level and event frequency.
Time Weighting	The sampling rate at which a sound level meter measures the time-varying sound pressure level: originally described how fast the needle moved on analogue meters. Ensures the measurements respond to the type of noise source accurately and are representative. FAST = 125ms sampling rate = 480 samples / minute SLOW = 1s sampling rate = 60 samples / minute



1. **HM Government.** *National Planning Policy Framework*. Ministry of Housing, Communities and Local Government, HMG. London : HMG, 2019. Policy. ISBN 978-1-5286-1033-9 .
2. —. *Planning Practice Guidance – Noise ID30*. DCLG. London : HM Government, 2014. Guidance. Active guidance.
3. **BSI.** *BS 8233:2014 Guidance on sound insulation and noise reduction for buildings*. London : BSI, 2014. Standard.
4. —. *BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures*. London : BSI, 2003. Standard. BS 7445-1:2003.
5. —. *BS 7445-2:1991, ISO 1996-2:1987 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use*. London : BSI, 1991. Standard. Current UK standard. EN ISO standard is updated. BS 7445-2:1991.
6. —. *BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'*. EH/1/3, BSI. London : BSI, 2019. p. 76, Standard. Amended 2019. ISBN 978 0 539 02069 4.
7. **World Health Organization.** *Guidelines for Community Noise*. SDE, PHE, OEH, WHO. Geneva : World Health Organization, 1999. Guidelines.
8. **World Health Organization Europe.** *Night Noise Guidelines for Europe*. Regional Office for Europe, WHO. Geneva : WHO, 2009. p. 154, Guidelines. ISBN 978 92 890 4173 7.
9. **BSI.** *BS 7445-3:1991, ISO 1996-3:1987 Description and measurement of environmental noise. Guide to application to noise limits*. London : BSI, 2003. Standard. ISO edition already updated.
10. **HM Government.** *Noise Policy Statement for England (NPSE)*. London : DeFRA, 2010. p. 10, Policy. NPSE2010.

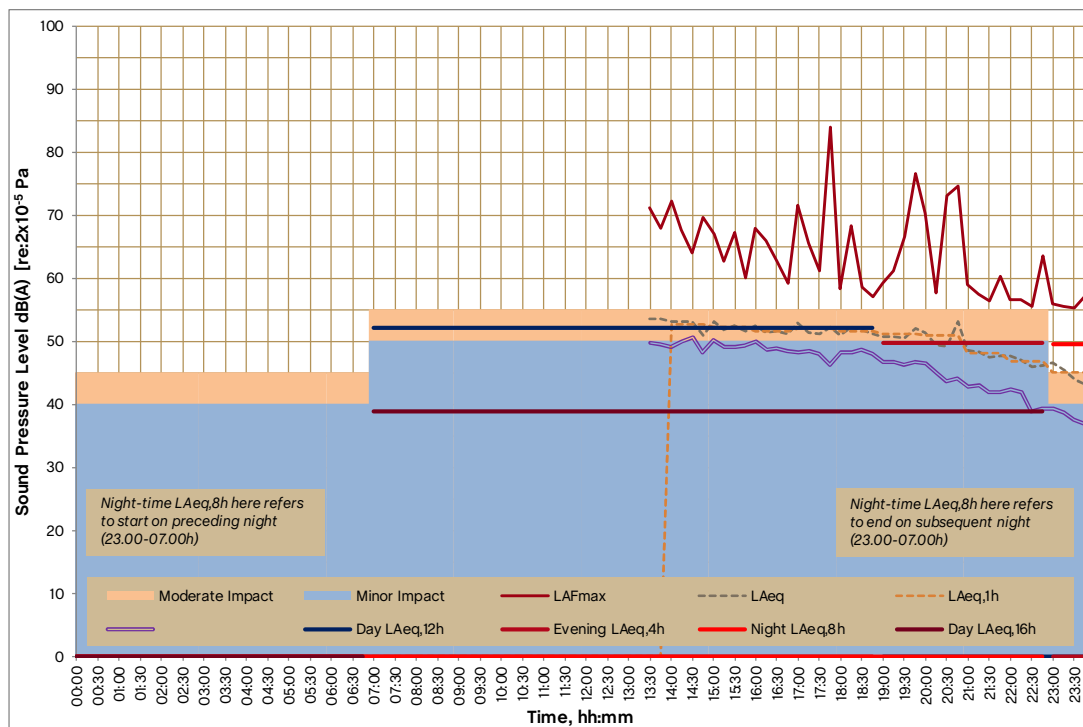


C.1 Position 1

1

Day
Monday
Date

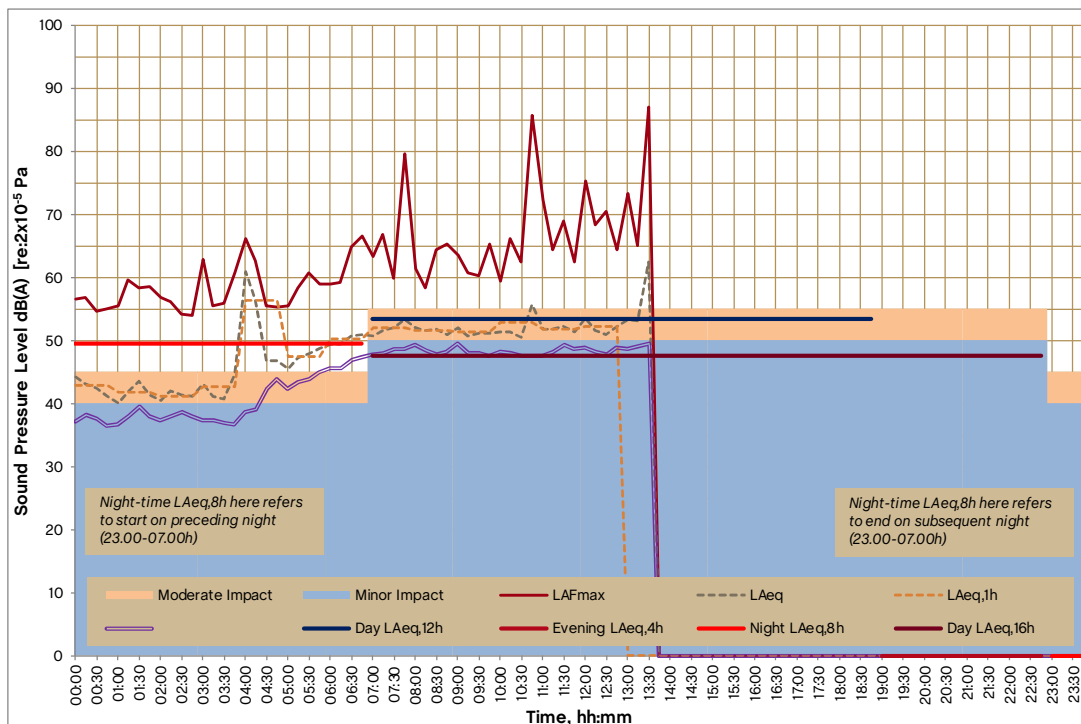
02/03/2020



2

Day
Tuesday
Date

03/03/2020



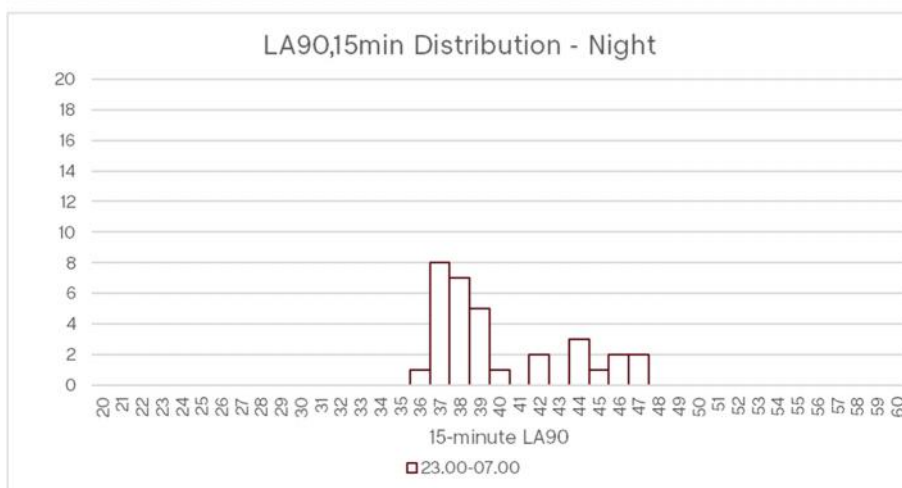
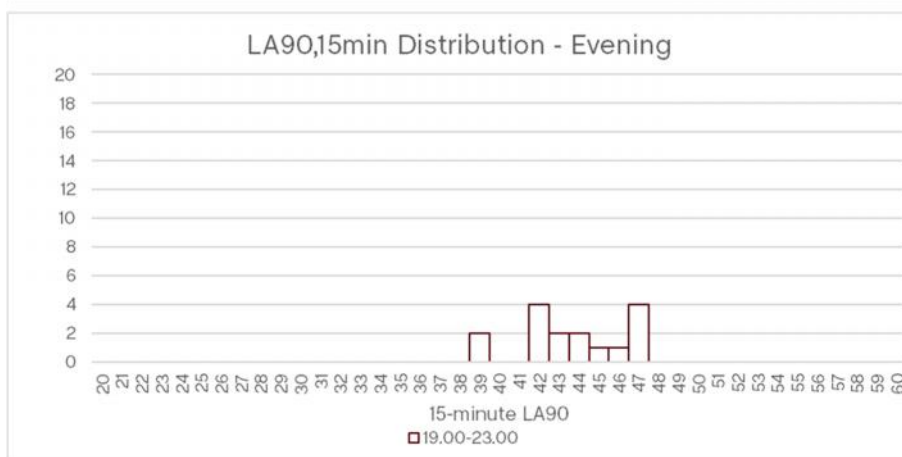
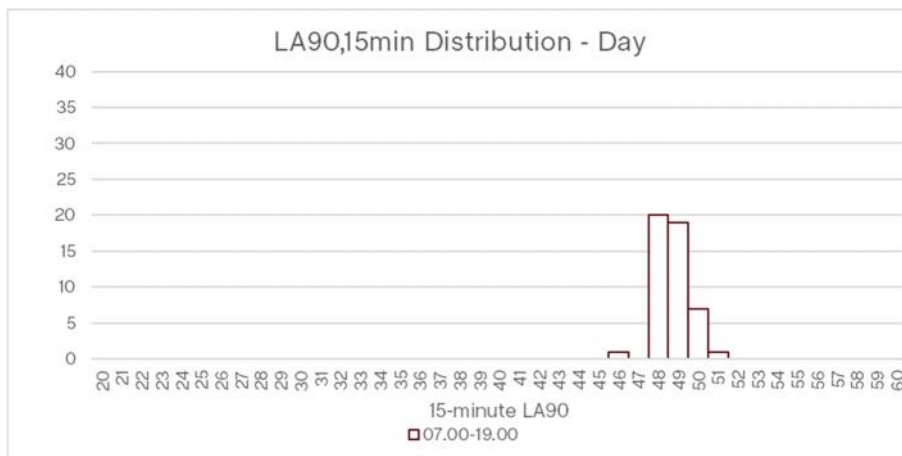
	Standard Periods						
	07.00-19.00 12h	19.00-23.00 4h	23.00-07.00 8h	07.00-23.00 16h	den	24h 07-07.00h 24h AM	24h 00-00.00h 24h
Day	Day LAeq,12h	Evening LAeq,4h	Night LAeq,8h	Day LAeq,16h	Lden	LAeq,24h night	LAeq,24h
1	52.2	49.6	49.4	51.3	61.2	50.5	51.0
2	53.5			53.5		53.5	52.0
Average	52.9	49.6	49.4	52.5	61.2	52.2	51.5
Mean	52.8	49.6	49.4	52.4	61.2	52.0	51.5

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

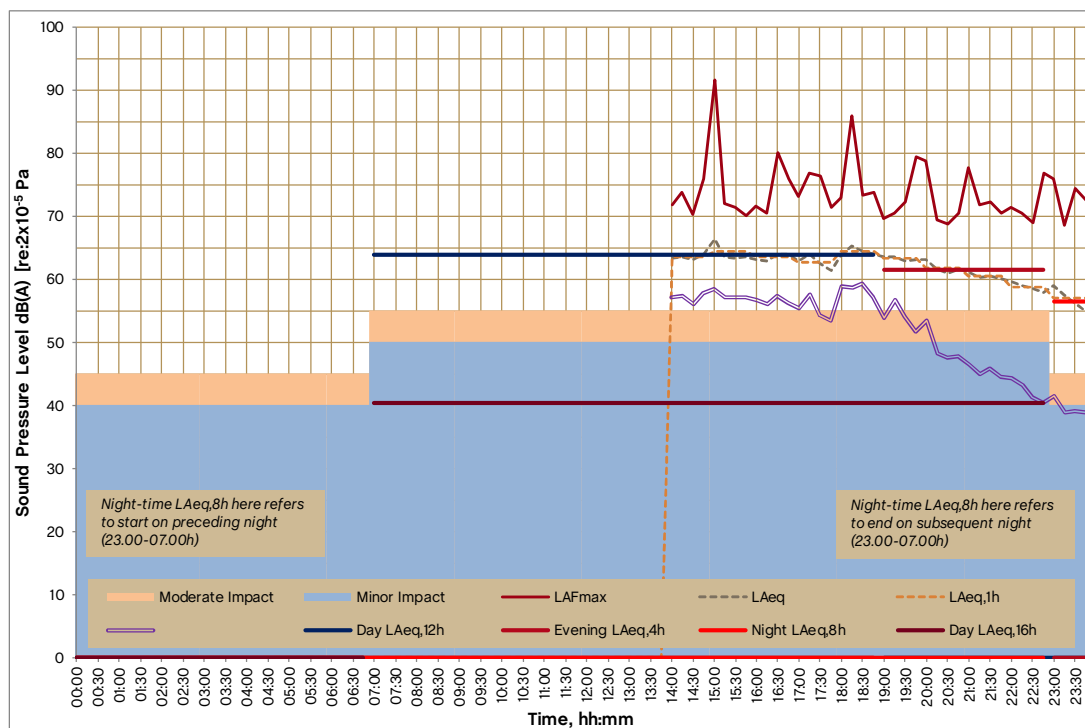
	Standard Periods						
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	Day LA90,12h	Evening LA90,4h	Night LA90,8h	Day LA90,16h		LA90,24h night	LA90,24h
1	46.2	38.8	36.4	38.8		36.4	37.0
2	47.6			47.6		47.6	36.4
Average	47.0	38.8	36.4	45.1		44.9	36.7
Mean	46.9	38.8	36.4	43.2		42.0	36.7

Level Statistics	00.00-00.00	07.00-19.00	19.00-23.00	23.00-07.00	07.00-23.00	07.30-18.30
	LA90,24h	Day LA90,12h	Evening LA90,4h	Night LA90,8h	Day LA90,16h	LA90,11h
Mean	44.9	48.6	43.6	39.9	47.4	48.6
Median	47.3	48.6	43.3	38.4	48.2	48.6
Mode	48.2	48.2	46.7	38.0	48.2	48.2
10th Centile	37.5	47.8	40.6	37.0	42.8	47.7
Minimum	36.4	46.2	38.8	36.4	38.8	
St Dev	4.5	0.8	2.5	3.4	2.6	0.8
CI [0.95]	0.9	0.2	1.2	1.2	0.6	0.2
Size	97.0	48.0	16.0	32.0	65.0	45.0
Typical	47	48	43	38	48	48

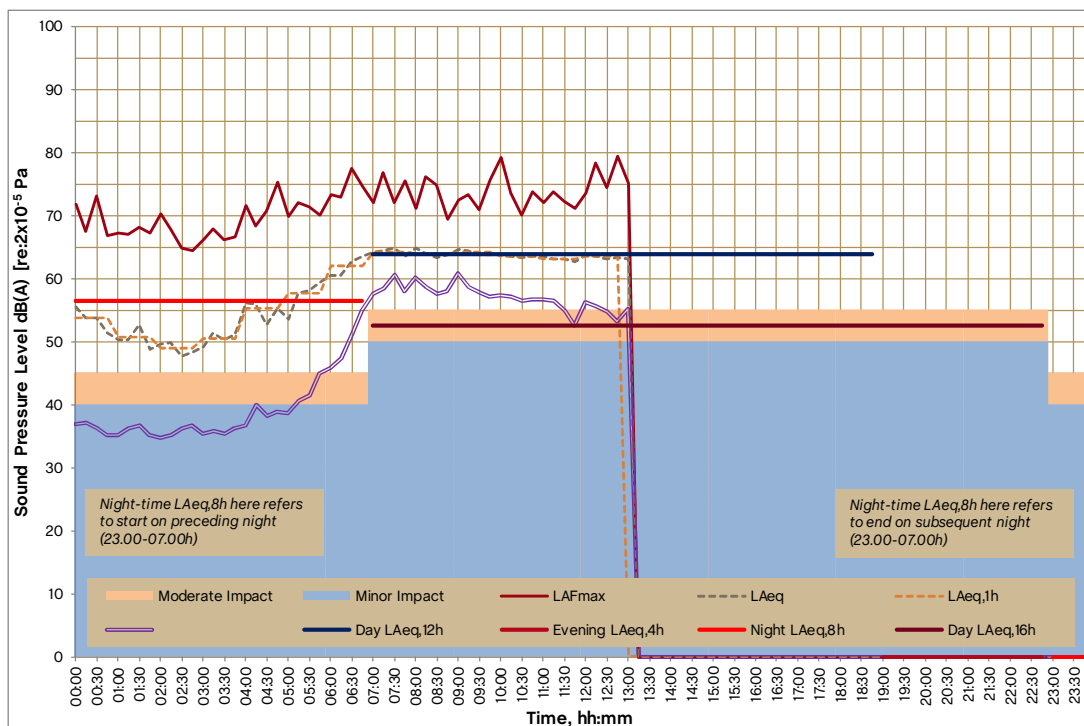




1
Day
Monday
Date
02/03/2020



2
Day
Tuesday
Date
03/03/2020



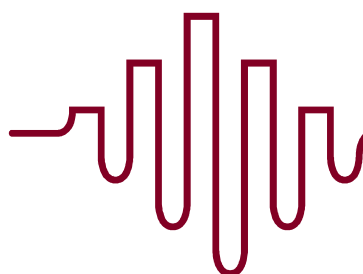
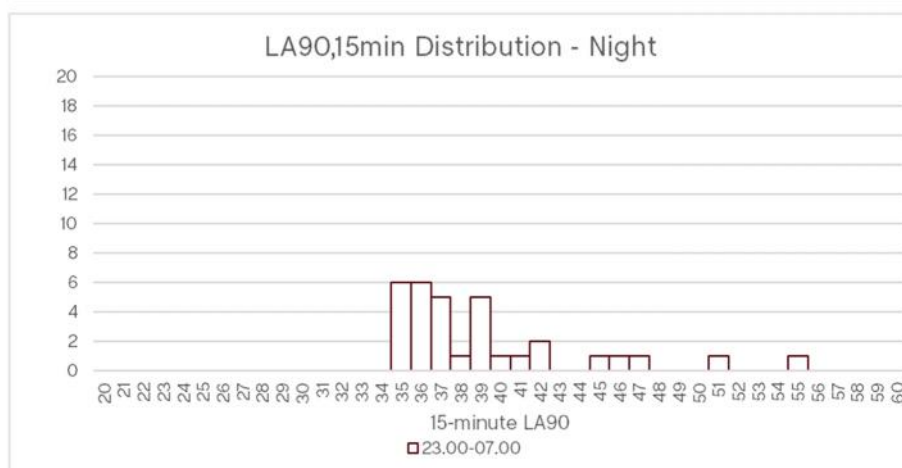
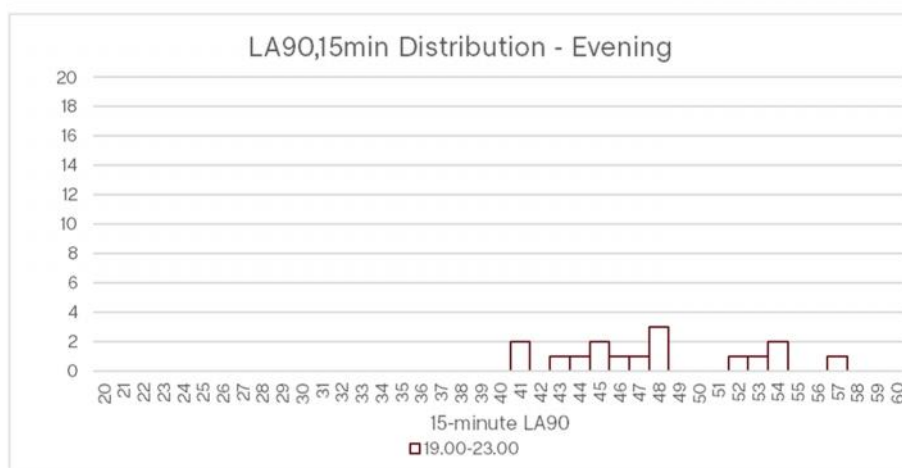
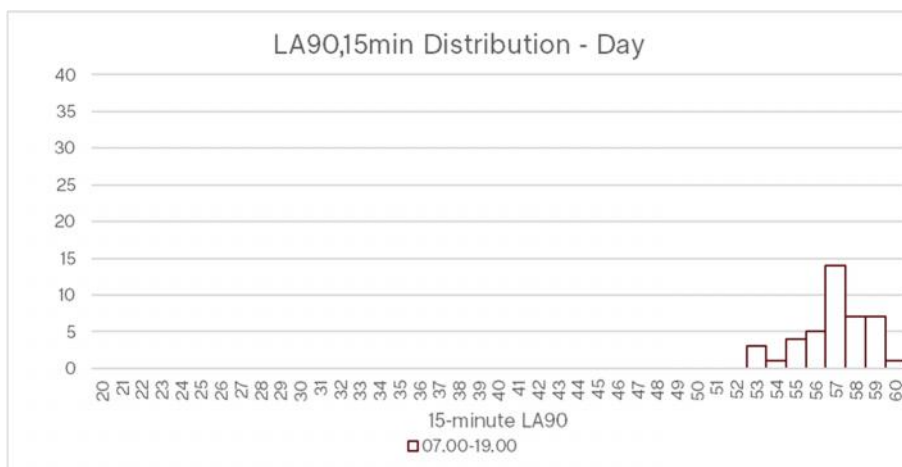
	Standard Periods						
	07.00-19.00 12h	19.00-23.00 4h	23.00-07.00 8h	07.00-23.00 16h	den	24h 07-07.00h 24h AM	24h 00-00.00h 24h
Day	Day LAeq,12h	Evening LAeq,4h	Night LAeq,8h	Day LAeq,16h	Lden	LAeq,24h night	LAeq,24h
1	63.8	61.4	56.5	62.9	70.5	60.9	62.5
2	63.8			63.8		63.8	61.3
Average	63.8	61.4	56.5	63.3	70.5	62.6	62.0
Mean	63.8	61.4	56.5	63.3	70.5	62.3	61.9

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

	Standard Periods						
	07.00-19.00 12h	19.00-23.00 4h	23.00-07.00 8h	07.00-23.00 16h	den	24h 07-07.00h 24h AM	24h 00-00.00h 24h
	Day LA90,12h	Evening LA90,4h	Night LA90,8h	Day LA90,16h		LA90,24h night	LA90,24h
1	53.4	40.5	34.8	40.5	54.5	34.8	38.8
2	52.5			52.5		52.5	34.8
Average	53.0	40.5	34.8	49.8	54.5	49.6	37.2
Mean	53.0	40.5	34.8	46.5	54.5	43.7	36.8

Level Statistics	00.00-00.00	07.00-19.00	19.00-23.00	23.00-07.00	07.00-23.00	07.30-18.30
	LA90,24h	Day LA90,12h	Evening LA90,4h	Night LA90,8h	Day LA90,16h	LA90,11h
Mean	49.3	57.0	47.8	39.1	54.6	56.9
Median	53.4	57.1	47.0	37.1	56.6	57.1
Mode	57.1	57.1	#N/A	36.3	57.1	57.1
10th Centile	36.3	54.8	42.3	35.2	45.8	54.7
Minimum	34.8	52.5	40.5	34.8	40.5	52.5
St Dev	8.8	1.8	4.7	4.8	5.0	1.8
CI [0.95]	1.8	0.5	2.3	1.7	1.2	0.5
Size	93.0	44.0	16.0	32.0	61.0	41.0
Typical	53	57	47	36	55	57





ACOUSTICS

C.3 Position 1 Early Morning Event

There is an apparent anomalous event or measurement at 04.00 hours at Position 1.

The detailed sample measurements have been compiled and the time history is shown here.

The granular results shown (30 second samples) do not indicate the stepped ramping characteristic of building services equipment or the steady-state noise level characteristic of such equipment

No other events of this type appear in the results as would be expected for such equipment.

The narrow difference between maximum and ambient sound level do indicate a mechanical or continuous sound of some form.

There is no indication of individual event noise peaks one would expect with loading or unloading vehicles, for example.

Similar activity noise includes gritting/de-icing railways, street cleaning and some waste collection where there is minimal movement noise from bins.

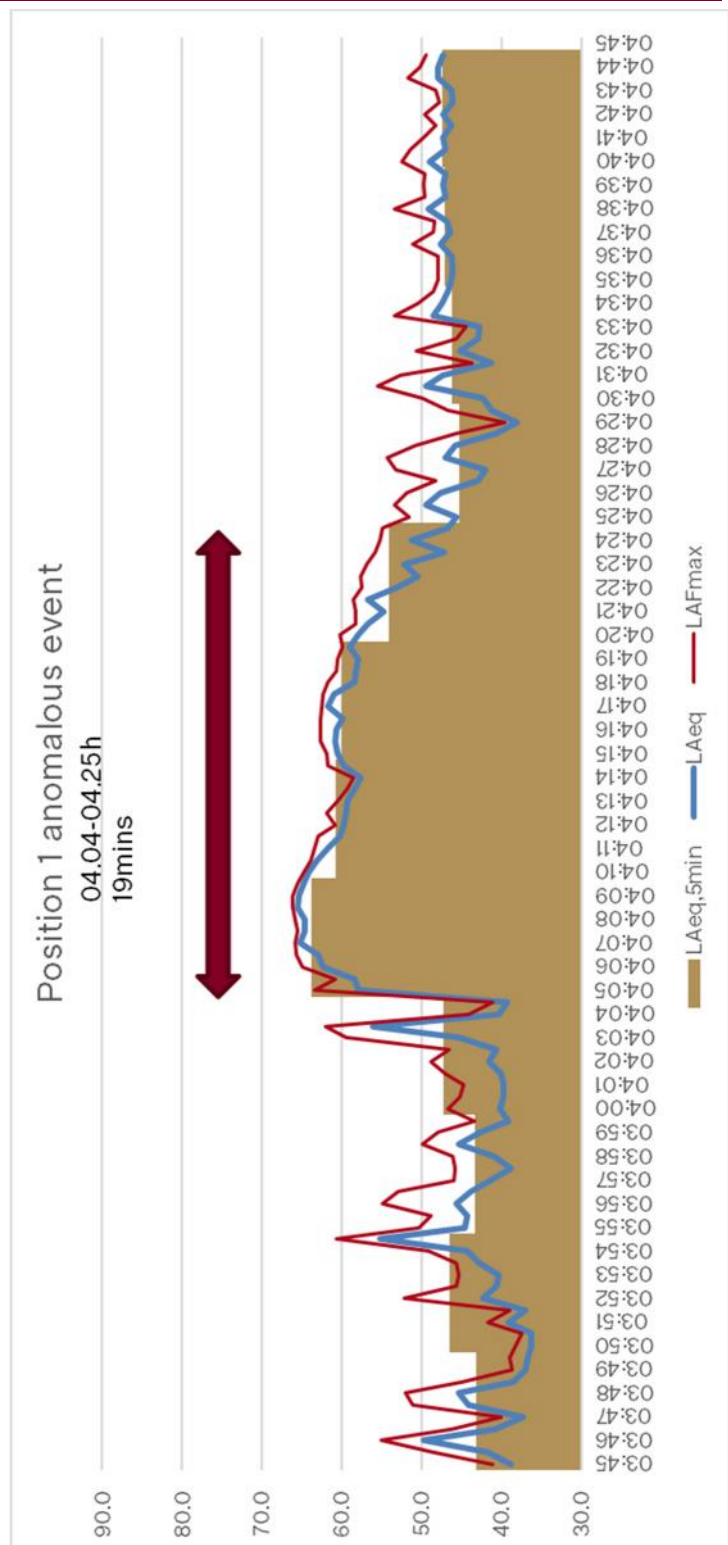
Standing, idling goods vehicles may also display such noise, but there are no indications of manoeuvring or loading noise. The long reduction in sound level would not be indicative of vehicles moving away, which takes seconds not several minutes.

In the absence of other information and as a precautionary approach, it will be assumed that the event is commercial or associated with commercial use.

Prolonged slow activity such as street cleaning or railway noise is considered more likely given the timing and character.

Periodic road traffic increase such as associated with bus depots, logistics and delivery services when services start may affect local traffic flows, but the correlated measurement at Position 2 shows lower sound levels and a slight increase only.

The sound occurs north or east of the application site.



ACOUSTICS

The frequency content of the sound in the period provides additional information to characterise the sound.

The 04.00 and 04.15 series in the frequency spectra below indicates the one-third octave band content for the 15-minute measurements. These periods show slightly increased low frequency (50-80 Hz) sound energy compared to the average night-time sound level (Night 1:3) and the preceding 15-minute periods.

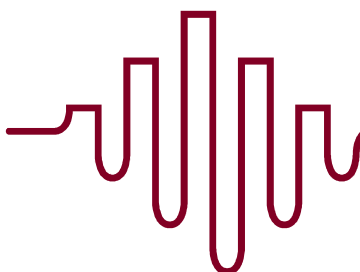
The 04.00 series shows substantially increased mid-frequency sound energy and it is this which dominates the increased $L_{Aeq,15min}$ value.

The subsequent 04.30 series does not show a significant deviation at low frequency but has the highest sound levels at 1600 Hz.

All measurements demonstrate a significant 63Hz and 125Hz octave band and 2kHz octave band content. Road traffic noise is considered to be the most likely source, although certain types of mechanical equipment can cause some similar characteristics.



As a precautionary approach and for the purposes of further assessment, the elevated period will be considered to represent commercial mechanical noise from either goods vehicles or building services equipment.



ACOUSTICS

D Envelope Design Sound Spectra

The building envelope will be subject to sound insulation design outside the process for Prior Approval.

The determining factor for external sound levels over the day, evening and night is **road traffic noise** and is not subject to review under The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016.

Consideration will need to be given to other sources of noise if these are demonstrably due to commercial noise.

The design frequency spectra for the Application Site are:

Position 1

f, Hz	31.5	63	125	250	500	1000	2000	4000	8000	Measured A	Calculated A	D
Day 1:1	55.5	66.9	57.2	58.0	56.4	53.7	49.7	42.7	38.8	49.6	58.5	-8.9 dB
Evening 1:1	56.3	56.4	49.5	46.6	45.8	46.4	41.3	33.1	31.2	49.4	49.7	-0.3 dB
Night 1:1	49.1	69.8	61.6	53.8	50.7	54.4	60.5	47.2	42.3	52.5	62.8	-10.3 dB
16h Day 1:1	54.5	65.9	56.4	57.2	55.8	53.3	49.3	42.2	38.5	52.5	57.9	-5.4 dB

Position 2

f, Hz	31.5	63	125	250	500	1000	2000	4000	8000	Measured A	Calculated A	D
Day 1:1	58.1	67.4	61.4	60.0	59.4	58.9	56.3	50.0	45.7	61.4	63.2	-1.8 dB
Evening 1:1	58.7	58.4	56.8	56.8	55.8	59.3	52.9	43.4	34.2	56.5	61.5	-5.0 dB
Night 1:1	49.5	72.5	60.5	58.7	58.2	55.1	58.7	52.1	50.8	63.3	63.1	0.2 dB
16h Day 1:1	57.5	66.7	60.9	59.5	58.9	58.5	56.0	49.6	45.0	63.3	62.8	0.5 dB

Position 1 where 04.00-04.30h is taken into account

The only potential source of anomalous noise is limited to the following. A precautionary approach is taken and these are assumed to control North elevation Bedroom noise mitigation.

f, Hz	31.5	63	125	250	500	1000	2000	4000	8000	Measured A	Calculated A	D
04.00 1:1	43.0	75.3	65.0	52.4	52.5	52.7	56.4	45.9	41.6	56.4		dB
04.15 1:1	43.1	71.6	63.2	53.8	45.6	53.2	58.2	44.1	39.1	49.4		dB
Night 1:1	43.1	71.6	63.2	53.8	45.6	53.2	58.2	44.1	39.1	52.5		dB

