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Site Address:	Viscount Way, Woodley, Reading, RG5 4DZ
Report no:	T 2425-675
Date of Report:	10/02/2025
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Scope of Work:	Noise assessment and comparison to fulfil the requirements for the temporary extension of workings hours.

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1.0 Introduction

- 1.1 REDFAN Solutions have been instructed to carry out a Noise Impact Assessment for a temporary extension of hours at Viscount Way, Woodley, Reading, RG5 4DZ.
- 1.2 This report details the results of 2 noise surveys carried out at the nearest noise sensitive receptors and assesses level difference to determine the impact of the works being performed. A full methodology of the surveys performed can found in section 4.
- 1.3 The site is located on an existing commercial and industrial area that is being redeveloped and modernised that as per the "Goya Green" initiative, the scheme will be targeting top ESG credentials to include EPC A+ and BREEAM Excellent. The site is close to several residential areas that border it to the south and east. The newly constructed facilities are located in close proximity to Junction 10 of the M4, this development provides occupiers immediate access to the M4 via A329(M).
- 1.4 The purpose of this assessment is to determine appropriate noise limits at the nearest noise sensitive receptors for the proposed temporary later operating hours for the finishing and curing of poured concrete in the newly constructed warehouses. The extension of working hours will be the week commencing the 1st of April 2025 and will last for 2 weeks.

2.0 Criteria

2.1 Part 1 of BS 7445 establishes guidelines to quantities and procedures for environmental noise measurements. Guidance provided on instrumentation and calibration, measurement positions, meteorological effects, and information to be recorded.

2.1.1 All equipment shall be calibrated and the configuration for calibration shall be in accordance with the manufacturer's instructions.

2.1.2 A comprehensive recalibration at certain time intervals may be prescribed by authorities responsible for the use of measurement results.

2.1.3 A field check shall be made by the user at least before and after each series of measurements, preferably including an acoustic check of the microphone.

2.1.4 "Outdoor measurements near buildings": these measurements shall be carried out at places where the noise to which a receiver is exposed is of interest. If not otherwise specified, the preferred measurement positions are 1m to 2m from the façade and 1.2m to 1.5m above the ground.

2.1.5 Measurements indoors. These measurements shall be carried out in enclosures where the noise is of interest. At least 1m away from walls and 1.2m to 1.5m above the ground.

2.2 Government guidelines for planning assessment is the National Planning Policy Framework (NPPF) which came into force in March 2012, in July 2018 and the National Planning Policy Guidance (NPPG). This was undated and in the main replaces previous PPG and PPS documentation.

2.3 The NPPF 2021 sets out the Government's economic, environmental and social planning policies for England and Paragraph 174 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.

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 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;

2.4 BS 4142: 2014+A1:2019 "Method for rating and assessing industrial and commercial sound".

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises;
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The significance of sound impact is to be determined according to the following summary process:

- Determine the background sound levels, in terms of the index LA90, at the receptor locations of interest.
- Determine the specific sound level of the source being assessed, in terms of its LAeqT level (T = 1 hour for day or 15 minutes for night), at the receptor location of interest.
- Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent, or other characteristics which attract attention.
- Compare the rating sound level with the background sound level; the greater the difference between the two, the higher the likelihood of adverse impact.
- A difference (rating – background) of around +10 dB is an indication of significant adverse impact, depending on the context; a difference of +5 dB is an indication of an adverse impact, depending on the context. 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 upon context.

2.5 BS 4142 introduced the concept of 'context' to the process of identifying noise impact. Section 11 of BS 4142: 2014+A1:2019 explains "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" (our emphasis). An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context" (our emphasis).

There are many context points to consider when undertaking an assessment of sound impact including:

- The absolute level of sound;
- The character and level of the specific sound in the context of the existing noise climate; for example, is the sound to occur in a location already characterised by similar activities as those proposed?
- The sensitivity of the receptors;
- The time and duration that the specific sound is to occur;
- The conclusions of assessments undertaken using alternative assessment methods, for example, WHO guidelines noise values or change in noise level;

2.6 BS4142:2014+A1:2019 notes that:

"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact." BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014+A1:2019 provides the following with respect to the application of penalties to account for *"the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention"*.

- **Tonality** – *"For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;*
- **Impulsivity** – *A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and*

the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;

• **Intermittency** – *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 3dB can be applied; and*

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

2.7 It is therefore entirely possible that whilst the numerical outcome of a BS 4142: 2014+A1:2019 assessment is indicative of adverse or significant adverse impact, when the proposal is considered in context the significance of the impact is reduced to an acceptable level.

2.8 The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

Table 1: Noise Exposure Hierarchy Perception Examples

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Noticeable and Intrusive	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
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	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			

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.	Unacceptable Adverse Effect	Adverse Effect Prevent

2.9 In March 2010 the Department for Environment, Food and Rural Affairs (DEFRA) produced "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"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; and
- where possible, contribute to the improvement of health and quality of life."

2.10 The "Noise Policy Statement for England", (NPPF) and (NPPG) state that no significant adverse impact should occur through development, but where noise levels fall between a lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

2.11 BS8233:2014 Local Authorities usually stipulate internal noise criteria for new build residential uses based on British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.

2.12 BS 8233:2014 provides references and guideline values for desirable indoor ambient noise levels for dwellings as shown in Table 2.9 below.

2.13 BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings

Table 4 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

2.14 The table is noted to apply to external noise as it affects the internal acoustic environment from sources without a specific character.

2.15 The above internal ambient noise levels are therefore considered appropriate within this assessment.

2.16 BS 8233:2014 states that 'for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed an upper guideline value of 55dB L_{Aeq} , which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances...in higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited'.

2.17 The following table summarises the response to changes in noise level (known as the Semantic Scale).

Table 2: Change in noise level – response and impact.

Change in noise level L_{AeqT} dB	Response	Impact
<3	Imperceptible	None
3 – 5	Perceptible	Slight
6 – 10	Up to a doubling	Significant
11 – 15	More than a doubling	Substantial
> 15	-	Severe

2.18 For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10–15 times per night.

3.0 Site Description and Observations

3.1 The project is a purpose-built green commercial and industrial site that will consist of 10 modern units.

3.2 This document is to seek approval for a 2-week extension of working hours to allow the pouring of concrete for floors on the north side of the development.

3.3 The nearest noise sensitive receptors (NNSR) to the units that will have the concrete poured into are the rear gardens on Gemini Road. NNSR will be used as an abbreviation at times when referring to rear gardens of Gemini Road.

3.4 The proposed site plan below and testing positions.



3.5 The noise survey was unmanned. Therefore, a subjective assessment of background and ambient noise sources could not be undertaken for the whole monitoring duration. While onsite the dominant noise source was traffic and local residents. Secondary noise was from bird song and the general background city hum.

3.6 Units 1-5 are considered the worst-case scenarios for the works being performed and therefore these units are subject to this impact assessment.

4.0 Noise Survey Measurements and Methodology

Environmental noise survey on 14/01/2025

- 4.1 The first survey was performed on the 14/01/2025 in four positions (see 3.4)
- 4.2 Measurements have been made to determine the existing noise climate that occurs at the nearest noise sensitive receptors, no construction work was undertaken during the measuring period. Measurements were taken from 18:00 till 23:00.
- 4.3 All measurements were made with a calibrated precision grade sound level meter in accordance with BS EN 60651 and BS 7445. The meter was calibrated before and after use. No significant drift was recorded.
- 4.4 Equipment used for the survey.

Item	Make/Model	Serial no	Calibration Cert no
Calibrator	Norsonic 1255	125526735	U48992
Sound Level Meter	Norsonic 140	1404520	U48312
Microphone	Norsonic 1211-C	14141	48315
Sound Level Meter	Norsonic 140	1404818	U46539
Sound Level Meter	Norsonic 145	14529446	U48994/U48995
Sound Level Meter	Norsonic 145	14530554	U49742

- 4.5 The Noise Survey and measurements were conducted, BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BS 4142: 2014+A1:2019 gives a method for rating sound from industrial and commercial sources and BS 7445:2003 establishes guidelines to quantities and procedures for environmental noise measurements.
- 4.6 Weather conditions over the survey periods were overcast, 4-9°C with a gentle north wind (<5m/s) and 80% -90% cloud cover were generally fine and dry with low wind speed and suitable for environmental noise measurement.

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Environmental noise survey on 04/02/2025 & 05/02/2025

- 4.7 The second survey was performed on the 04/02/2025 & 05/02/2025 just at position 4.
- 4.8 Measurements have been made to determine the noise generated by the finishing and curing of concrete in units 9 & 10 that occurs at the nearest noise sensitive receptors. Measurements were taken from 18:00 till 23:00 on each day.
- 4.9 All measurements were made with a calibrated precision grade sound level meter in accordance with BS EN 60651 and BS 7445. The meter was calibrated before and after use. No significant drift was recorded.

4.10 Equipment used for the survey.

Item	Make/Model	Serial no	Calibration Cert no
Calibrator	Norsonic 1255	125526735	U48992
Sound Level Meter	Norsonic 140	1404520	U48312
Microphone	Norsonic 1211-C	14141	48315

4.11 The Noise Survey and measurements were conducted, BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BS 4142: 2014+A1:2019 gives a method for rating sound from industrial and commercial sources and BS 7445:2003 establishes guidelines to quantities and procedures for environmental noise measurements.

4.12 Weather conditions over the survey periods were clear 0-3 °C with a gentle wind (<5m/s) and 50% -80% cloud cover and was suitable for environmental noise measurement.

5.0 Uncertainty

5.1 All measurements onsite were taken with a sound level meter manufacturer's margin of uncertainty at typically +/- 1.1dB. It is due to the tolerances associated with Class 1 sound level meters and calibrator equipment used to measure background noise.

6.0 Results

Environmental noise survey on 14/01/2025

6.1 Testing was carried out under free field conditions at positions 1-3 and therefore no adjustments are required for façade reverberation sound. Testing at position 4 was not carried out under free field conditions therefore a 3dB adjustment for façade reverberation sound has applied.

6.2 Results of noise survey.

Date	Time	position	Average Sound pressure level dB (L_{Aeq}) 1hr
14/01/25	18:00 - 23:00	1	43
14/01/25	18:00 - 23:00	2	43
14/01/25	18:00 - 23:00	3	42
14/01/25	18:00 - 23:00	4	41

6.3 The average-ambient and noise levels at the measurement position during the survey has been based on an analysis of the monitoring data.

Environmental noise survey on 04/02/2025 & 05/02/2025

6.4 Testing was carried out at position 4 only, the survey was not carried out under free field conditions therefore a 3dB adjustment for façade reverberation sound has applied.

6.5 All doors and openings in the warehouses were closed or had either acoustic curtains or barriers installed at all times during the working process.

6.6 Results of noise survey.

Date	Time	position	Average Sound pressure level dB (L _{Aeq}) 1hr
04/02/25	18:00 - 23:00	4	51
05/02/25	18:00 - 23:00	4	50

6.7 The average-ambient and noise levels at the measurement position during the survey has been based on an analysis of the monitoring data.

7.0 Noise Impact

7.1 Only the noise levels between 18:00 and 23:00 will be assessed as these are the required hours of work extension.

7.2 There is a 10dB difference in Leq 1hr between the 2 surveys at position 4.

7.3 As well as a comparison of noise levels from surveys, an assessment of noise from equipment used in the finishing and curing of the correct will also be assessed.

7.4 Mechanical equipment being used.

Make and Model	No	Sound Pressure dB(A)
Ride-On Trowel CRT 48	2	91 @ operators' position
F24 EDGER TROWEL	2	85 @ operators' position
MQ WHITEMAN RIDE-ON TROWEL MODEL HTX6H	2	91 @ operators' position

7.5 The process of finishing and curing the concrete requires that only 4 machines will be operated and any one time. The ride on trowels are used to begin with and the edger trowel is used at the end.

7.6 The units are positioned 5m from the nearest noise sensitive receptor on Gemini Road.

7.7 There is a wooden and brick fence that is 2.2m high to the gardens of the properties. (As below)

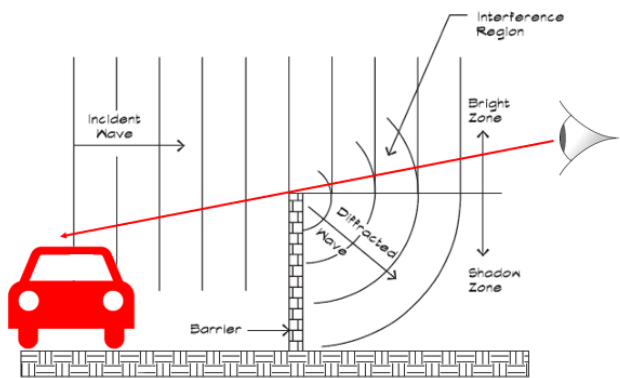


7.8 Although the barrier will not completely screen the units, it will offer a degree of attenuation.

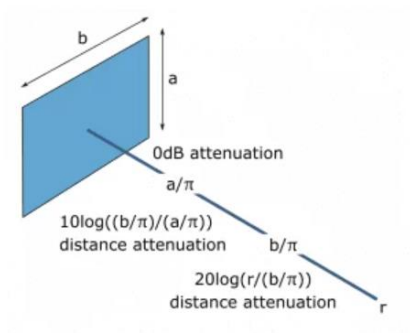
7.9 The Institute of Acoustics use a field based "Rule of Thumb" to determine the impact of barriers on the diffraction of sound waves as the diagram below shows. If a barrier cuts the line of sight from the point source a 5dB reduction can be calculated to the results.

BARRIERS - RULE OF THUMB

If it just cuts the line of sight a **5 dB reduction** might be expected



- 7.10 There will also be a sound propagation over the distance to the NNSR.
- 7.11 Due to the size of the unit, the calculation for noise propagation will treat the warehouses as plane sources.
- 7.12 This calculation will allow for the radiation of noise breakout from the full façade of the building.
- 7.13 The calculation for the propagation of sound from plane sources is below.



- 7.14 Using this noise propagation over the 5m to the NNSR a reduction of 2dB has been achieved.
- 7.15 The fabric of the walls of the warehouse are 7mm outer skin, 180mm mineral wool insulation and 4mm inner layer. The build make up has a sound reduction R_w of:-

Key	Construction	Single figure rating R_w
■	19/1000 liner	41 dB
	180 mm glass mineral wool 15 Kg/m ³	
	32/1000 outer	

7.16 Taking into consideration the building fabric sound reduction and the difference between the levels of noise recorded at position 4 during the 2 separate surveys, it can be determined that the combined sound pressure of noise produced by the concrete finishing equipment is 91dB(A) 1hr. Given that the equipment noise varies depending on the load and speed of the equipment as well as being at different places in the warehouses and that the equipment is unlikely to all be running all the time, this figure can be considered accurate.

7.17 A calculation to determine the sound Leq T from works undertaken in the warehouses can be produced to a relative degree of accuracy.

7.18 Calculation of noise Impact.

Calculation step	dB(A)
Source level	51 dB(A)
Distance Correction (5m)	-2
Acoustic Noise Barrier	-5
Rating Level at residential façade – Leq T	44

7.19 BS 8233:2014 states that 'for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed an upper guideline value of 55dB LAeq.

8.0 Conclusions

8.1 The surveys carried out at this site have determined the general ambient noise climate at the nearest dwellings of the site and the impact the noise produced by the finishing and curing of concrete inside warehouses 9 and 10.

8.2 Using the methodology outlined in BS4142:2014+A1:2019 to assess the potential noise, an (LAeq) T of 44db(A) has been predicted using data gathered when the same process is performed in units 1-5.

8.3 As outlined in BS 8233:2014, an upper guideline value of 55dB LAeq 'for traditional external areas is desirable. The calculated sound level of noise produced would be considerably lower than this level.

8.4 Should the extension of working hours be granted a noise plan should be created. The plan should in brief include.

- All openings into the warehouse should either be closed or covered with acoustically relevant materials.
- A designated person should be onsite at all times who is aware and implements the noise plan.

- All workers should take breaks at the designated welfare areas and not close the warehouses.
- Entering and exiting the warehouse should be kept to a minimum when equipment is in use.
- Should larger doors or opening be required to be opened all works should cease till the door or barrier is closed.
- All workers cars should be parked in an area that will least acoustically affect the NNSR when finishing.
- No equipment should be running outside during the hours of 18:00-23:00
- No music or radios are to be played after 18:00 on site anywhere.

8.5 A full noise plan can be created if required.

Appendices

1. Site Plan



2. These are the main noise indices in use in the UK.

- dB(A): The human ear does not hear all frequencies with the same intensity. It is most sensitive to sounds in the 500Hz-8kHz range. Above and below this range the ear becomes progressively less sensitive. To compensate for this, sound level meters

incorporate electronic filtering to correspond with the varying sensitivity of the ear. This filtering is called A-weighting and Sound Pressure Levels obtained with this weighting are referred to as A-weighted and signified as dB(A).

- LA90: The sound level (in dBA) exceeded for 90% of the time. This unit gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background noise level" of an area.
- LAeq,T: The equivalent continuous sound pressure level over a period of time, T; (in dBA) This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the varying noise in question". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as road traffic, aircraft and trains.
- LA1: The sound pressure level (in dBA) exceeded for 1% of the time. This unit can give an indication of a regular maximum noise level from such activities as dance music.
- LAe: The sound exposure level, (previously denoted SEL) is the noise level of an event, such as a train or aircraft event, normally expressed in a 1 second time period.
- LAmin: The minimum sound pressure level (in dBA) measured over the time period.
- LAmx: The maximum level of sound (in dBA), i.e. the peak level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.
- LArT: sound rating level, the a-weighted, leq sound level of an industrial noise during a specified time period, adjusted for tonal character and impulsiveness.
- Tmf: The mean value of reverberation time in the octave bands 500Hz, 1kHz and 2kHz.

2. Measured Sound Pressure Levels.

14/01/25

	position 1	position 2	position 3	position 4
18:00	46	46.8	47.5	42.8
18:15	48.5	42.6	47	46.5
18:30	45.5	42.3	41.9	43.6
18:45	46.4	41.4	41.2	42.3
19:00	46.1	43.6	39.2	42.4
19:15	43.9	44.1	41.5	40
19:30	43.5	44.2	43.1	39.2
19:45	44.4	42.2	41.1	42.5

20:00	41.5	44.2	39.6	39.4
20:15	45.9	43.2	45.4	42.9
20:30	41.5	43.5	39.3	36.5
20:45	41.6	42.2	40.5	38.4
21:00	43.3	41.2	43	42
21:15	42.4	40.4	39.7	38.1
21:30	41.4	42.4	41.6	38.5
21:45	40.8	42	39.7	35.3
22:00	40.4	40.7	41.7	36
22:15	39.5	41	39.1	35.3
22:30	41.8	42.6	41.6	39.6
22:45	41.6	42.6	44.8	41.4

04/02/25-05/02/25

04/02/2025	05/02/2025
53.9	53.1
56.5	55.4
54.3	52.6
53.3	54.1
52.2	51.7
51.9	48.8
50.1	53.4
50.7	50.7
51	51.4
50.7	51.3
50.7	49.6
50.9	50.1
50.1	47.5
49	46.6
49.2	44.8
49.4	47.5
48	48.8
47.3	46.3
46.9	45
47.3	46.9