Noise Impact Assessment

Proposed Residential Development
Chepstow Rd, Langstone

Reference: 11147/CP

Client

harmoni homes

Document Control					
Version:	**Revision Description:**	**Date:**	**Author:**	**Reviewed by:**	**Approved by:**
1.0	First Issue	12/03/2025	Chandi Petro	James Abbass	James Abbass

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Dafydd Cantwell appointed Acoustic Consultants Ltd to undertake a noise impact assessment for the proposed residential development west of Stockwood View, Langstone, Newport NP18 2NS.

This report provides a noise impact assessment of the external noise sources, primarily road traffic, in relation to the proposed development.

An on-site noise survey has been undertaken and noise data collected of the external noise sources.

Noise mitigation measures in the form of façade build up, glazing and ventilation strategy are provided in order to suitably reduce external noise ingress within habitable rooms of the redevelopment. The floor plans are not fixed at this stage and as such the advice is outline.

The noise impact assessment has been undertaken in accordance with the guidance in BS8233:2014, Planning Policy Wales (PPW) and Technical Advice Note Wales 11 (TAN11).

2. The Site

The site is west of Stockwood View, Langstone, Newport NP18 2NS, in a predominantly residential area. It is proposed to construct nine new residential dwellings within the vacant land.

The site overlooks Chepstow Road (A48) to the south, which is the primary noise source.

The site location and drawing are provided in the figures below.

Figure 1: A Google satellite image annotated to show site location (in red) and the A48 (in blue)

Figure 2: A drawing of the proposed residential development

3. Planning and Noise

3.1. Planning Policy Wales (PPW)

Planning Policy Wales (PPW) Edition 12 dated February 2024 sets out the land use planning policies of the Welsh Government. Section 1 states:

1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs1, MTANs2 and policy clarification letters comprise national planning policy.

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:
- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- *not create areas of poor air quality or inappropriate soundscape; and*
- *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- *traffic management and road safety;*
- *ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- *supporting low or zero emissions public transport;*
- *providing active travel infrastructure; and*
- *incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of people to pollution will be unacceptable. Whilst some uses may be appropriate with *the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.*

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications.

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. Technical Advice Note (Wales) - Noise

The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction states:

"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources".

Table 1 provides Noise Exposure Categories (NECs), which relate to proposed residential developments near to a transportation and mixed noise sources. NECs are addressed in ranges according to the free-field equivalent noise levels ($L_{Aeq, T}$) measured at the position of the proposed dwellings.

Table 1: TAN 11 noise exposure categories

NOISE SOURCE	**NOISE EXPOSURE CATEGORY**			
Road Traffic	**A**	**B**	**C**	**D**
07.00 - 23.00 hours	<55	55 – 63	63 – 72	>72
23.00 - 07.00 hours	<45	45 – 57	57 – 66	>66

The Technical Advice Note (Wales) 11 gives advice to Local Planning Authorities on assessing proposals for residential developments near a source of noise, depending upon which of the four Noise Exposure Categories the proposed site falls into:

NEC A. *Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.*

NEC B. *Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection.*

NEC C. *Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.*

NEC D. *Planning permission should normally be refused.*

In addition, it states: *"Night-time noise levels (23.000 - 07.00): sites where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D)."*

Where the Noise Exposure Category for a site falls into NEC B, C or D mitigation will be necessary to control external noise observed within a dwelling.

4. Assessment Criteria

The below informative section is based on British Standard 8233:2014 and WHO 1999. By meeting the below criteria, the residential amenity should not be adversely affected. The below criteria would apply to all plots which fall into NEC B - D. Where a site were to fall into NEC A, then no specific noise control measures would be required.

4.1. Internal Equivalent Noise Levels

British Standard 8233:2014 entitled "Guidance on sound insulation and noise reduction for buildings" came into effect on 28th February 2014.

Section 7.7.2 Table 4 of the British Standard 8233:2014 provides internal ambient noise levels for dwellings from noise sources 'without a specific character'.

The British Standard guideline states that noise levels should not exceed those as noted in Table 2 of the British Standard. These criteria are based on the guidance provided within WHO 1999 and are summarised below:

Table 2: British Standard 8233:2014 Internal Noise Criteria

Activity	Location	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Resting	Living Room	35 dB $L_{Aeq,16\ hour}$	-
Dining	Dining Room/area	40 dB $L_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\ hour}$	30 dB $L_{Aeq,8\ hour}$

4.2. Maximum Noise Levels

Section 7.7.2 Note 4 of the British Standard states "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".

British Standard BS8233 provides no definitive criteria for maximum noise levels from individual events ($L_{Amax,F}$). Section 3.4 of the "Guidelines for Community Noise" published by the World Health Organisation in 1999 (WHO 1999) states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 L_{Amax} more than 10-15 times per night (Vallet & Verbey 1991)".*

As such, maximum noise levels would be considered acceptable if the maximum noise level from individual events does not exceed 45 dB $L_{Amax(F)}$ no more than 10 to 15 times during the night-time period.

4.3. Amenity Spaces

Section 7.7.3.2, Table 4 of the British Standard provides the following for external noise levels:

"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 50 dB $L_{Aeq,T}$*, with an upper guideline value of 55 dB* $L_{Aeq,T}$ *which would be acceptable in noisier environments."*

4.4. Approved Document O

Approved Document O (ADO) is a building regulations requirement in Wales from November 2022. ADO (Wales) states:

2.2 High levels of external noise could limit the use of cross-ventilation to mitigate the risk of summer overheating. External noise is a material consideration considered when applying for Planning permission and mitigating measures may be required in the design in order to obtain Planning permission and controlled through a condition imposed on the consent. In exceptional cases, this could include non-openable windows. More commonly, windows will be openable in order to enable natural ventilation to occur at less sensitive times of day, when there is lower noise, when people are not present in the room, or when they are present but not engaged in noise-sensitive activities. But those windows may need to be kept closed at times to maintain acceptable indoor acoustic conditions, for example when people are using the rooms for sleep or office work. A noise issue may be identified at the Planning stage but rely on occupants to close windows at noise sensitive times rather than prevent them from ever opening them, and in those cases overheating strategies should assume windows will be closed during noise-sensitive periods even if they are not fixed closed.

2.3 When the removing excess heat as part of the overheating strategy, noise levels in bedrooms should be kept to a minimum during the sleeping hours of 23:00-07:00. Building control bodies may accept as evidence that this requirement is satisfied:

> *a. documentation to demonstrate that the local planning authority did not consider external noise to be an issue at the site at the planning stage or;*
>
> *b. if the local planning authority did consider external noise to be an issue that should be controlled through a condition at planning stage, then documentation to demonstrate that the proposals for heat removal (during the sleeping hours of 23.00 – 07.00) are accommodated within or do not conflict with documentation provided to the local planning authority to satisfy any related planning permission condition(s). (For example any expectation that windows on one or more façade, or in certain rooms, will need to be kept closed during noise-sensitive periods.)"*

ADO (Wales) does not apply any clearly defined noise limits. ADO (Wales) relies on the noise criteria within planning conditions or documentation submitted at planning stage. As such it is our opinion that the most relevant guidance for overheating noise limits (at night) is ADO (England) which states:

> *3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*
>
> *a.* ***40dB $L_{Aeq,T}$,*** *averaged over 8 hours (between 11pm and 7am).*
>
> *b.* ***55dB L_{AFmax},*** *more than 10 times a night (between 11pm and 7am).*

5. Baseline Noise Monitoring

A partially attended noise survey was undertaken between 14:00, 26th February 2025 to 15:00, 28th February 2025. This was to determine the existing noise climate during the daytime and night-time at the proposed site.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Figure 3: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-11053-E0	14/05/2024	1508623-1
Pre-Amp, NTI, MA220	5871	14/05/2024	1508623-1
Microphone, NTI, MC230A	9276	14/05/2024	1508623-1
Calibrator, Nor-1251	35227	27/02/2025	1511387-1
SLM, NTI, XL2	A2A-17200-E0	14/05/2024	1508624-1
Pre-Amp, NTI, MA220	8848	14/05/2024	1508624-1
Microphone, NTI, MC230A	A22973	14/05/2024	1508624-1
Calibrator, Cirrus Research, CR:515	84377	16/08/2024	220541

The measurement systems were checked before and after use with the calibrators and no significant drift was detected.

5.2. Weather Conditions

The weather conditions during the survey are provided in the table below. These were taken from data from timeanddate.com.

Table 3: Weather Conditions at Monitoring Location

Date and Time	Temperature °C	Wind Speeds (m/s)	Wind Direction	Precipitation (Y/N)
26 / 02 / 25 (14:00 – 18:00)	7 - 9	8	W	No
26 /02 / 25 (18:00 – 00:00)	6 - 7	7	W	No
27 / 02 / 25 (00:00 – 06:00)	3 - 6	5	WNW	No
27 / 02 / 25 (06:00 – 12:00)	2 - 10	4	WNW	No
27 / 02 / 25 (12:00 – 18:00)	7 - 11	4	N	No
27 / 02 / 25 (18:00 – 00:00)	3 - 6	3	N	No
28 / 02 / 25 (00:00 – 06:00)	1 - 3	2	N	No
28 / 02 / 25 (06:00 – 12:00)	0 - 8	2	N	No
28 / 02 / 25 (12:00 – 15:00)	7 - 9	2	SSE	No

Wind speeds on 26th February exceeded general monitoring requirements. Data from this day has been omitted from the assessment dataset.

All other weather conditions are not expected to affect the noise data obtained.

5.3. Monitoring Procedure

Two monitoring locations were chosen to represent the application site. The microphones were positioned on a tripod 1.5m above the ground in a free-field position in the locations provided in the following figure.

ML1 is representative of the proposed southern façade of the nearside building.

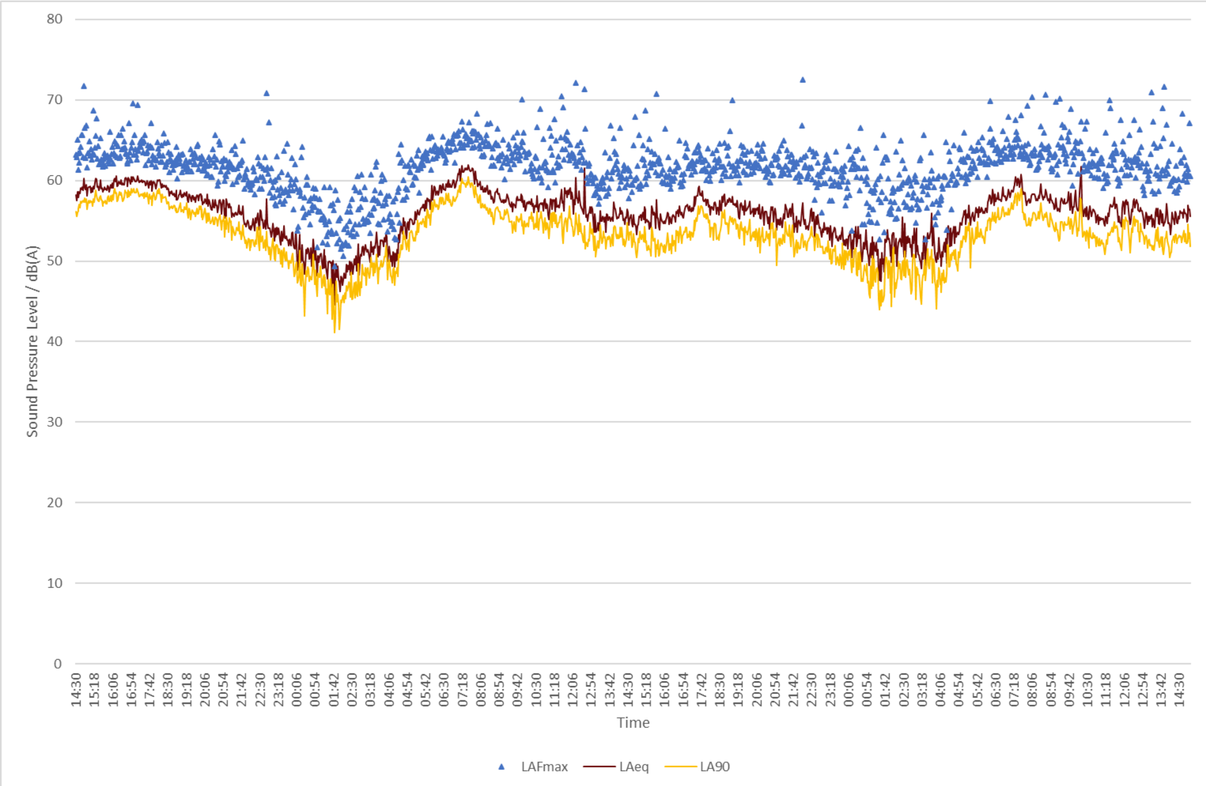
Figure 4: A Google satillite image annotated to show monitoring location 1 (ML1) and monitoring location 2 (ML2)

5.4. Measured Noise Levels

5.4.1. ML1

A chart of the variation in ambient noise levels for the equivalent (L_{Aeq}), maximum (L_{AFmax}) and statistical (L_{A90}) is provided in the chart below.

Chart 1: Variation in noise levels at ML1 at the south side of the site near A48



The table below summarises the measured background sound levels at the site.

Table 4: Summary of the measured noise levels at ML1 at the south side of the site near A48

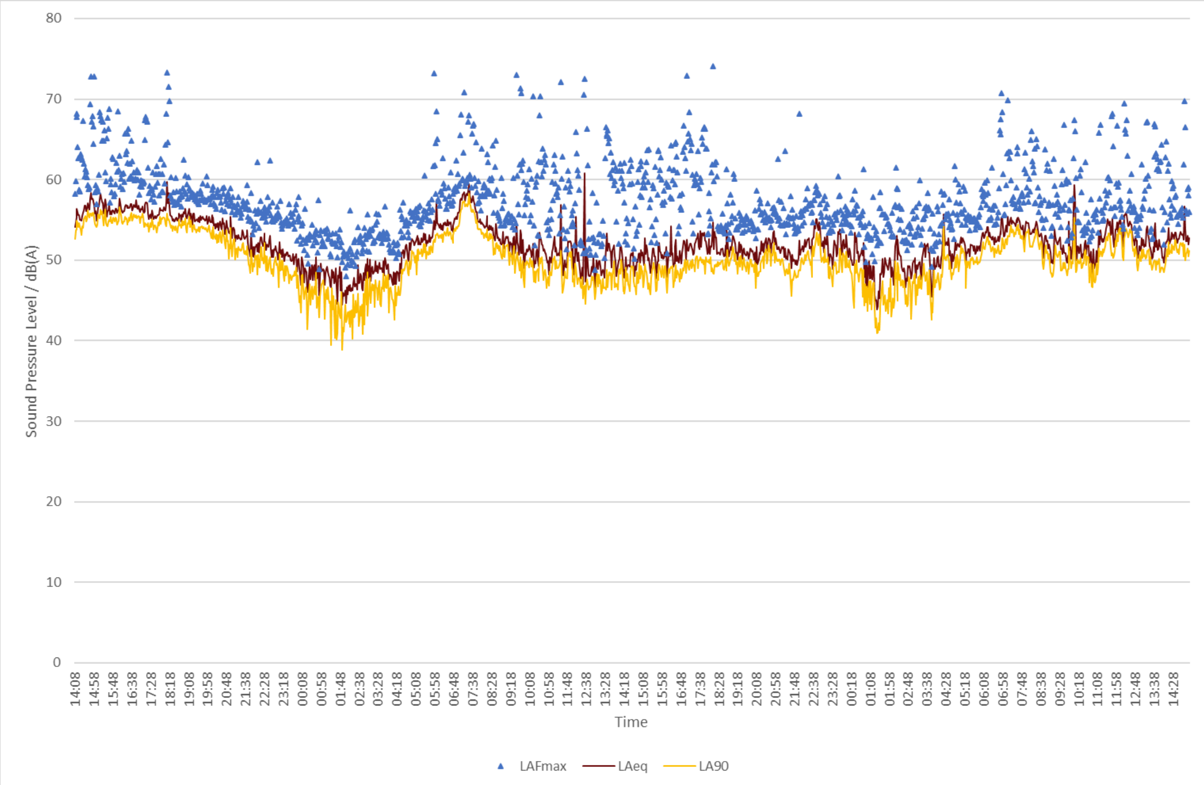
Period	dB / Octave Frequency Band (Hz)								
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
Daytime $L_{eq(16hrs)}$	59	55	52	52	55	47	42	37	57
Night Time $L_{eq(8hrs)}$	53	49	45	51	52	43	38	32	54
Night-time L_{maxF} (1)	65	60	56	62	63	54	37	29	65

(1) This is the 10^{th} highest L_{AFmax} noise level from 2-minute periods.

5.4.2. **ML2**

A chart of the variation in ambient noise levels for the equivalent (L_{Aeq}), maximum (L_{AFmax}) and statistical (L_{A90}) is provided in the chart below.

Chart 2: Variation in noise levels at ML2 at the north side of site



The table below summarises the measured background sound levels at the site.

Table 5: Summary of the measured noise levels at ML2 at the north side of the site

Period	**Frequency (Hz)**								
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
Daytime $L_{eq(16hrs)}$	56	52	50	50	52	44	42	38	55
Night Time $L_{eq(8hrs)}$	49	45	41	47	49	39	32	27	51
Night-time L_{maxF} (1)	59	54	49	56	58	48	30	25	60

(1) This is the 10th highest L_{AFmax} noise level from 2-minute periods.

6. Noise Assessment

6.1. Noise Modelling

To determine noise levels across the site, noise modelling has been undertaken using computer modelling package Cadna:A by DataKustik and the measured data noted above.

Road traffic noise is the dominant noise source in the area and therefore this was the main noise source used to build the noise model.

The software predicts road and rail traffic noise propagation using the method of 'The Calculation of Road Traffic Noise 1988' (CRTN'88), and a verification model has been created to ensure the measured and predicted levels are comparable.

6.2. Noise Modelling Parameters

The noise predictions have been undertaken using the supplied drawings and the following general modelling parameters:

- The site layout is based on Google Maps imagery and the provided plans.
- The site is considered flat as a worst-case scenario.
- The noise sources considered in the modelling were road traffic. The noise sources were calibrated to the measured levels at receivers positioned at the monitoring locations shown in Figure 4.
- Building heights are based on Google Street View observations for the surrounding buildings and measured on the elevations for the proposed dwellings.
- The ground is considered hard and reflective.
- Third order reflections have been calculated.
- The noise maps below show noise levels across the site from the noted noise sources at a height of 4.5 metres above the ground (first floor height). The residential dwellings are located at first floor height and above.
- Building evaluation levels are reported as the worst-case level per façade.

Noise maps have been generated to determine the required Noise Exposure Category across the site for 'mixed noise' sources. The noise maps are colour-coded to show the Noise Exposure Categories and equivalent noise level.

The NEC noise maps are provided in Figures 4-6. The colour key is as follows:

Table 6: NEC noise map colour coding key

NEC A	Daytime equivalent noise levels up to 55 dB $L_{Aeq\ (16\ hour)}$, night-time equivalent noise levels up to 45 dB $L_{Aeq\ (8\ hour)}$.
NEC B	Daytime equivalent noise levels of between 55-63 dB $L_{Aeq\ (16\ hour)}$, night-time equivalent noise levels of between 45-57 dB $L_{Aeq\ (8\ hour)}$.
NEC C	Daytime equivalent noise levels of between 63-72 dB $L_{Aeq(16\ hour)}$, night-time equivalent noise levels of between 57-66 dB $L_{Aeq(8\ hour)}$. Night-time maximum noise levels in excess of 82 dB $L_{Amax\ (slow)}$. No part of the site falls into this category.
NEC D	Daytime equivalent noise levels in excess of 72 dB and night-time equivalent noise levels in excess of 66 dB.

6.3. Noise Modelling Results

Predicted noise emission maps for equivalent noise levels during the daytime ($L_{Aeq,16hour}$) and night-time ($L_{Aeq,8hour}$) and maximum noise level (L_{AFMax}) during the night-time are provided below in the figures below.

Figure 5: Predicted Daytime $L_{Aeq,\ 16hours}$, Noise Map

Figure 6: Predicted Night Time $L_{Aeq, 8hours}$ Noise Map

Figure 7: Predicted Night Time L_{AFmax} Noise Map

7. Noise Exposure Category

From the noise modelling provided above, the application site falls into noise exposure category B (See Table 1), which states the following:

"NEC B. *Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection."*

8. Internal Ambient Noise Levels

Based on the obtained noise modelling results, it will be necessary to design the building fabric of the residential properties to control road traffic noise levels internally.

8.1. Calculation Method

Calculations for the internal ambient noise levels due to external noise have been undertaken using the calculation method provided in Annex G Section G.2 of British Standard 8233:2014.

The calculations have been undertaken using the building façade constructions specified below and measured octave band noise levels.

As we do not have drawings outlining the interior of the residencies yet, calculations are based on standard room dimensions with the ceiling height described within the floor plans provided from the architect and the following typical room details:

- Room size: Bedrooms have a floor area of 3x4m, with ceiling height of 2.4m.
- Room size: Living rooms have a floor area of 4x5m, with a ceiling height of 2.4m
- Assumed bedrooms have 2m^2 of windows, living rooms have 3m^2 of windows,
- Assumed bedrooms have 2 vents, and living rooms have 3 vents.
- To assess the worst-case scenario, it is assumed that there will be no continuous mechanical extract ventilation (MEV) systems installed.

If the room dimensions vary significantly from those stated in any updated drawings, a recalculation of the following results will be required.

Alternative constructions to those noted below could be used, especially if the bedrooms turn out to be much different in dimension to standard dimensions, however they are required to meet the minimum sound reduction spectra stated below.

8.2. Building Façade Construction

Alternative constructions to those noted below could be used, however they would need to be assessed to ensure they control external noise to within the recommended internal ambient noise level criteria.

8.2.1. External Wall Construction

All external walls could comprise either a lightweight or masonry construction.

- The masonry construction could comprise of at least two skins of block (one of density 1880 kg/m^3, 100mm cavity, 100mm block (density of 400 kg/m^3). Room side of the block work would be plastered or have plaster on dabs.
- The lightweight construction could comprise a single frame construction with an external leaf of 100mm brick or block (density 1600 kg/m^3), 100mm timber stud with 50 millimetres of mineral wool insulation within the cavity and inner lining comprising two layers of dense plasterboard (minimum total surface mass 16 kg/m^2).

The below constructions are expected to achieve the following sound reduction indices:

Table 7: Required minimum sound insulation performance of external walls

Construction Type	Sound Reduction Index per Octave Band / dB								R_w
	63	125	250	500	1k	2k	4k	8k	
Masonry	31	38	46	45	55	66	77	70	52
Lightweight	25	40	45	46	53	60	65	60	

Any alternative constructions must achieve the above noted performance.

8.2.2. Roof Construction

The roof could be constructed using traditional techniques, such as a timber construction with concrete tiles (minimum density 30 kg/m^2) with a loft space and a plasterboard ceiling above the habitable rooms.

The below construction is expected to achieve the following sound reduction indices:

Table 8: Required minimum sound insulation performance of roof

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	R_w
R (dB)	25	39	47	53	58	56	60	55	56

Any alternative constructions must achieve the above noted performance.

8.2.3. Window Construction

The windows on all elevations could be openable at occupier discretion. The windows should be constructed housed in sturdy and good quality frames with airtight compression seals.

The minimum sound reduction indices required of the windows are as follows:

Table 9: Required Minimum Sound Reduction Indices of windows

Room Type	Minimum Sound Reduction Index (dB) per Octave Band								R_w	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
Bedrooms	20	24	20	25	35	38	35	36	31	Double Glazed 4/12/4
Living Rooms	20	24	20	25	35	38	35	36	31	Double Glazed 4/12/4

8.3. Ventilation Provisions

8.3.1. Background Ventilation

The habitable rooms will need to be ventilated via attenuated means. The ventilation should include the necessary sound attenuation in order that the ingress of external noise is controlled to be compatible with the building fabric.

The vents are required to achieve the following element normalised level difference ($D_{n,e}$) in the open position. The supplier of any chosen ventilation product should provide test data confirming that the ventilation system meets the following performance data. There should be no unattended vents or openings in the façade.

The following table shows the required sound reduction of ventilation for all habitable rooms on all floors. The minimum number of vents is also provided, to achieve the minimum equivalent area criteria of Approved Document F (≥8000mm2 per habitable room).

Please note that if the dwelling only has one exposed façade, then expert advice is required, and the above noted minimum ventilation performance is subject to change.

Table 10: Required Minimum Sound Insulation Performance of Vents

Room Type	Required Ventilator Sound Insulation Performance, $D_{n,e,w}$ per Octave Band (Hz)								$D_{n,e,w}$ (dB)	Typical Construction	Minimum No. of Vents
	63	125	250	500	1k	2k	4k	8k			
Bedrooms	20	24	20	2	35	38	35	36	32	Standard Trickle e.g. XS13 4400 EA	2
Living Rooms	20	24	20	2	35	38	35	36	32	Standard Trickle e.g. XS13 4400 EA	3

The ventilation supplier should confirm the above performance is achievable when tested to the current British Standards.

8.4. Overheating Conditions: Night-time Hours

It should be noted that under overheating conditions the windows may need to be opened. Where this is the case, the requirements of Approved Document O (ADO) will need to be met.

The following table gives the maximum equivalent area of an open window, or vent, permittable for each volume range to achieve the ADO internal noise level criteria. This is calculated following the method outlined in section 5.2 of the ADO Noise Guide Version 1.1, issued November 2024. It should be noted that any stated areas should be communicated to an overheating assessor.

Table 11: Maximum Required Equivalent Area Per Room Volume

Maximum total Equivalent Area (m^2) per Room Volume (m^3)									
15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
0.057	0.076	0.095	0.114	0.133	0.152	0.171	0.190	0.210	0.229

Where these open window equivalent areas are exceeded, an alternative attenuated form of ventilation/cooling will be required. This could be achieved with a suitably designed domestic MVHR system.

If mechanical cooling is required to mitigate overheating within bedrooms on these façades (dependent on the overheating assessment), the sound level difference between the level of external noise at the atmospheric terminal and the level within the room, 1.5 metres from the grille should be $\geq$ 34 dBA.

This sound level difference would be required of the full mechanical cooling system, and the final performance would be dependent on the chosen cooling system and on numerous factors such as atmospheric terminal location, duct layout, number of bends etc. If a mechanical cooling system is used, it should be designed so that generated noise from the system does not exceed the internal noise level criteria.

8.5. Effect of Mitigation Measures

With the mitigation measures installed to habitable rooms in the areas noted above, the predicted internal ambient noise levels are suitably controlled and within the BS8233:2014 criteria. The predictions for the worst-case rooms are provided in the figures below.

Figure 8: Mitigation Predictions for Worst Case Bedroom

Site Name:	Chepstow Road Langstone	
Date:	04/03/2025	
Room Type/Location	Bedroom	<<<< If Open Plan living room and kitchen, a minimum of 3no. vents must be used
Continuous MEV? (YES / NO)	NO	
Single / Multi-Storey Dwelling	Multi-Storey	
Minimum total Equivalent Area of Vents (m2)	8000	
Criteria	35 dB $L_{Aeq,16hour}$, 30dB $L_{Aeq,8hour}$, 45dB L_{AFmax}	

Reverberation Time Calculation

Room Dimensions		Room Volume	0.16*Volume
Room Height (m)	2.4	28.8	4.608
Length (m)	4		
Width (m)	3		

Free Field Level at Façade

Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{Aeq,16hour}$	61	57	54	54	57	49	44	39	59
Night $L_{Aeq,8hour}$	55	51	47	53	54	45	40	34	56
Night-time L_{AFmax}	67	62	58	64	65	56	39	31	67

Building Façade Construction

External Element		63	125	250	500	1000	2000	4000	8000
Standard Trickle - XS13 4400 EA+XC13 412 Canopy - 32 Dnew (EA 4000mm2)	D_{ne}	30	35	35	36	34	29	33	34
Total EA = 8000	Number of	2							
Approved Document F Compliant		0	0	0	0	0	0	0	0
2x100mm block plastered/render both sides 100mm void, 1880 Kg/m3 + 400 kg/m3 - 52 Rw		31	38	46	45	55	66	77	70
	Area	8							
		0	0	0	0	0	0	0	0
Double Glazed: 4/12/4 - 31 Rw		20	24	20	25	35	38	35	36
	Area	2							
		0	0	0	0	0	0	0	0
Pitched Roof - 56 Rw		25	39	47	53	58	56	60	55
	Area	12							
		0	0	0	0	0	0	0	0

Calculations to BS EN 12354

	63	125	250	500	1000	2000	4000	8000
Sum	0.00368	0.000698641	0.001007752	0.000466828	0.000392644	0.001178168	0.000486586	0.000387856
10log sum	-24.34735048	-31.55746183	-29.96646204	-33.30843469	-34.06000634	-29.28792936	-33.1284079	-34.11329791
10log S/A	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851
correction factor +3	3	3	3	3	3	3	3	3

Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{Aeq,16hour}$	43	32	31	27	30	26	18	12	33
Night $L_{Aeq,8hour}$	37	26	24	26	27	22	14	7	30
Night-time L_{AFmax}	49	37	35	37	38	33	13	4	41
NR Calc:									
Day, $L_{Aeq,16hour}$	10	12	20	24	30	29	23	19	NR30
Night $L_{Aeq,8hour}$	2	5	13	23	27	26	19	14	NR27
Night-time L_{AFmax}	18	17	24	34	38	36	18	11	NR38

Figure 9: Mitigation Predictions for Worst Case Living Room

Site Name:	Chepstow Road Langstone
Date:	04/03/2025
Room Type/Location	Living Room / Kitchen (Open Plan <<<< If Open Plan living room and kitchen, a minimum of 3no. vents must be used
Continuous MEV? (YES / NO)	NO
Single / Multi-Storey Dwelling	Multi-Storey
Minimum total Equivalent Area of Vents (m2)	8000
Criteria	35 dB $L_{Aeq,16hour}$

Reverberation Time Calculation

Room Dimensions		Room Volume	0.16*Volume
Room Height (m)	2.4	48	7.68
Length (m)	4		
Width (m)	5		

Free Field Level at Façade

Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq,16hour}$	61	57	54	54	57	49	44	39	59
Night $L_{eq,8hour}$	55	51	47	53	54	45	40	34	56
Night-time $L_{max(fast)}$	67	62	58	64	65	56	39	31	67

Building Façade Construction

External Element		63	125	250	500	1000	2000	4000	8000
Standard Trickle - XS13 4400 EA+XC13 412 Canopy - 32 Dnew (EA 4000mm	D_{ne}	30	35	35	36	34	29	33	34
Total EA = 12000	Number of	3							
Approved Document F Compliant		0	0	0	0	0	0	0	0
2x100mm block plastered/render both sides 100mm void, 1880 Kg/m3 + 400 kg/m3 - 52 Rw		31	38	46	45	55	66	77	70
33	Area	9							
		0	0	0	0	0	0	0	0
Double Glazed: 4/12/4 - 31 Rw		20	24	20	25	35	38	35	36
	Area	3							
		0	0	0	0	0	0	0	0
Pitched Roof - 56 Rw		25	39	47	53	58	56	60	55
	Area								
		0	0	0	0	0	0	0	0

Calculations to BS EN 12354

	63	125	250	500	1000	2000	4000	8000
Sum	0.00560	0.001904704	0.003309409	0.001442258	0.001076697	0.003187124	0.00133204	0.00105814
10log sum	-22.52141993	-27.2017243	-24.8024961	-28.4095701	-29.6790667	-24.9660101	-28.7548274	-29.7545683
10log S/A	-1.072099696	-1.0720997	-1.0720997	-1.0720997	-1.0720997	-1.0720997	-1.0720997	-1.0720997
correction factor +3	3	3	3	3	3	3	3	3

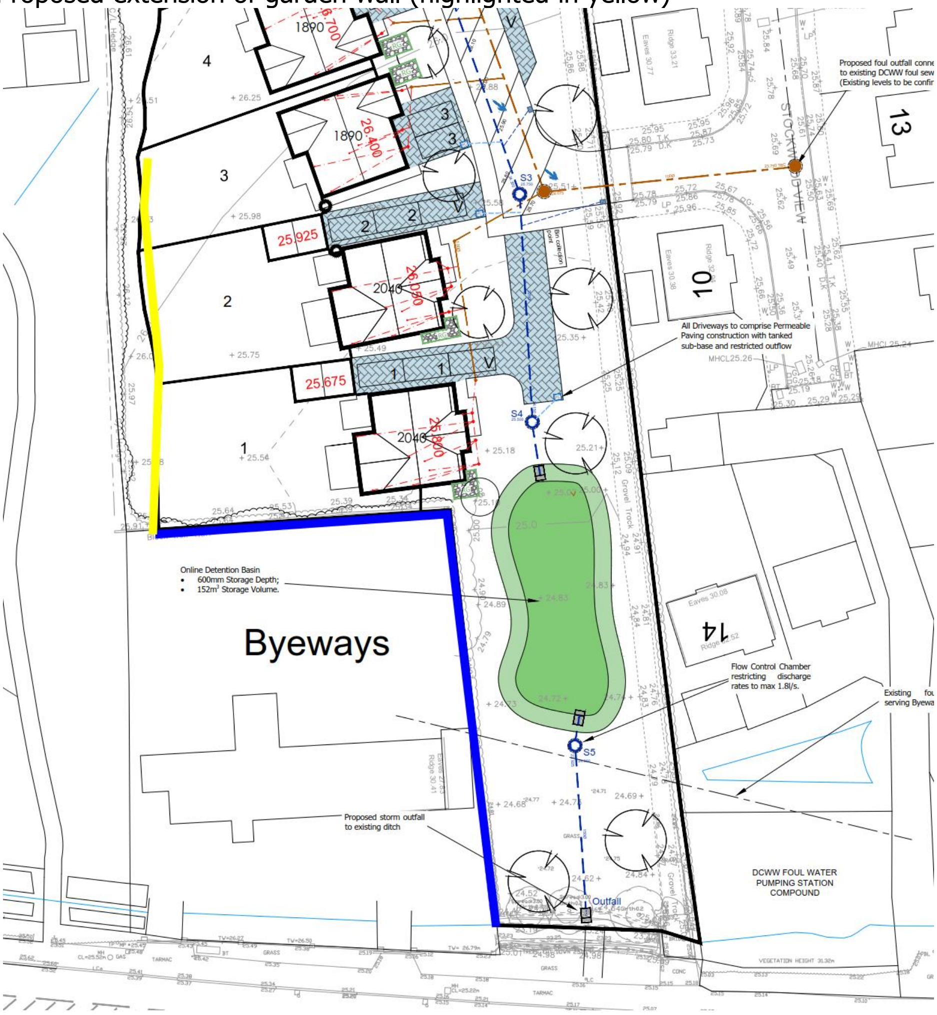
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq,16hour}$	40	32	31	28	29	26	17	11	**33**
Night $L_{eq,8hour}$	34	26	24	27	26	22	13	6	**30**
Night-time $L_{max(fast)}$	46	37	35	38	37	33	12	3	**41**

9. Amenity Spaces

The site drainage drawing indicates that a 1.8m high block wall will be installed to the area marked with a blue line in the figure below.

We proposed this to be extended where the yellow line highlights, to further protect the amenity spaces of the impacted gardens.

Figure 10: Proposed extension of garden wall (highlighted in yellow)



With the above extension of garden barrier implemented into the border, all amenity spaces are predicted to be within the BS8233 upper limit threshold of 55 dB $L_{Aeq,16hour}$.

10. Summary and Conclusions

Dafydd Cantwell appointed Acoustic Consultants Ltd to undertake a noise impact assessment for the proposed residential development off Stockwood View, Langstone, Newport NP18 2NS.

This report provides a noise impact assessment of the external noise sources, primarily road traffic, in relation to the proposed development

An on-site noise survey has been undertaken and noise data collected of the external noise sources.

Based upon the measured noise levels and noise modelling, the site falls into NEC B in terms of Technical Advice Note Wales 11 (TAN11).

With the noted noise control measures implemented into the design of the building, BS8233 criteria can be achieved within the habitable areas of the redevelopment. Standard double glazing and trickle vents are compliant with BS8233 criteria for all rooms in all residencies.

With the extension of the already proposed 1.8 tall block wall (see **Error! Reference source not found.**), noise levels within amenity spaces are expected to fall within BS8233 criteria.

With the above noise control measures applied to the scheme, the aims of TAN11 and PPW can be achieved and acceptable internal conditions met.

11. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 μPa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{\mathrm{Aeq},T} = 10 \lg_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2 / p_0^2] \mathrm{d}t \right\} \qquad (1)$$

where:

p_0 is the reference sound pressure (20 μPa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

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. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

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