



Trinity
Consultants

awnconsulting

Noise & Vibration Assessment

Project Title: Woodbrook Dart Gateway

CLIENT

Castlethorn and Dún
Laoghaire-Rathdown
County Council

DOCUMENT REFERENCE

257501.0995NR01a



DATE

16 June 2026

DOCUMENT CONTROL SHEET

Document Control Sheet	
Our Reference	257501.0995NR01a
Original Issue Date	14 April 2026
Client:	Castlethorn and Dún Laoghaire-Rathdown County Council

Revision	Revision Date	Description
A	16 June 2026	Updated links

Details	Written by	Approved by
Signature		
Name	Abe Scheele	Dominic Wright
Title	Acoustic Consultant	Senior Acoustic Consultant
Date	16 June 2026	

Disclaimer

This report considers the specific instructions and requirements of our client. It is not intended for third-party use or reliance, and no responsibility is accepted for any third party. The provisions in this report apply solely to this project and should not be assumed applicable to other developments without review and modification.



TABLE OF CONTENTS

1. INTRODUCTION	1-1
2. ASSESSMENT METHODOLOGY	2-2
2.1 Assessment Overview	2-2
2.2 Criteria for Rating of Impacts	2-2
2.2.1 Criteria and Guidelines – Construction Phase	2-2
2.2.2 Assessment of Criteria and Guidelines – Operational Phase	2-6
2.2.3 Criteria for Assessing Inward Noise Impacts	2-9
3. BASELINE ENVIRONMENT	3-1
3.1 Baseline Noise and Vibration Environment.....	3-1
3.1.1 Measurement Locations	3-1
3.1.2 Survey Periods.....	3-2
3.1.3 Measurement Parameters	3-2
4. CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	4-1
4.1 Construction Phase	4-1
4.2 Operational Phase.....	4-1
5. POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT	5-3
5.1.1 Closest NSLs and Noise Thresholds	5-3
5.1.2 Source Noise Levels	5-4
5.2.1 Operational Phase – Additional Traffic on Public Roads	5-7
5.2.2 Operational Phase – Mechanical Plant and Services	5-7
5.2.3 Operational Phase – Inward Impact Assessment	5-8
5.2.4 Operational Phase – Inward Vibration Assessment	5-15
6. MITIGATION MEASURES	6-16
6.1 Construction Phase	6-16
6.1.1 Selection of Quiet Plant	6-16
6.1.2 Noise Control at Source	6-16
6.1.3 Screening.....	6-17
6.1.4 Hours of Work	6-17
6.1.5 Liaison with the Public	6-17
6.1.6 Monitoring.....	6-17
6.1.7 Vibration Control.....	6-17
6.2 Operational Phase.....	6-18
6.2.1 Traffic Along Surrounding Road Network	6-18
6.2.2 Mechanical Plant and Services	6-18
6.2.3 Inward Impact.....	6-18
7. RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT	7-19
7.1 Construction Phase	7-19
7.2 Operational Phase.....	7-19
7.3 Inward Impact.....	7-19
7.4 Cumulative Impact.....	7-19
8. MONITORING	8-20
8.1 Construction Phase	8-20
8.2 Operational Phase.....	8-20
9. CONCLUSIONS	9-21

LIST OF FIGURES

Figure 1-1 Proposed Development Site Layout (Source: O'Mahony Pike Architecture, 2026, Drawing No: 1618G-OMP-00-SP-DR-A-1000)	1-1
Figure 2-1. ProPG Stage 1 – Initial Noise Risk Assessment	2-10
Figure 3-1 Baseline Noise Monitoring Locations.	3-1
Figure 3-2 Baseline Noise Levels Recorded at UTT01.	3-3
Figure 3-3 Night-time Baseline Noise Levels Recorded at UTT01.	3-4
Figure 3-4 Baseline Noise Levels Recorded at UTT02	3-5
Figure 3-5 Night-time Baseline Noise Levels Recorded at UTT02.	3-6
Figure 5-1 Nearest NSLs in Relation to the Proposed Development	5-3
Figure 5-2 Façade Noise Levels	5-11
Figure 5-3 Proposed Façade Treatment Areas	5-12

LIST OF TABLES

Table 2-1. Threshold of Potential Significant Effect at Dwellings	2-3
Table 2-2. Construction Noise Significance Ratings	2-4
Table 2-3. Recommended Construction Vibration Threshold for Control of Building Damage	2-5
Table 2-4. Guidance on Effects on Human Response to PPV Magnitudes	2-5
Table 2-5. Classification of Magnitude of traffic noise changes for Construction Traffic	2-6
Table 2-6. Likely Impact Associated with Change in Traffic Noise Level	2-7
Table 2-7. BS 8233 Recommended Internal Noise Levels	2-8
Table 2-8 VDV (m/s-1.75) above which various degree of adverse comment may be expected in residential buildings.	2-9
Table 2-9. ProPG Internal Noise Levels	2-10
Table 3-1 Baseline Noise Levels Recorded at ATT01.	3-2
Table 3-2 Daytime Baseline Noise Levels Recorded at UTT01.	3-3
Table 3-3 Night-time Baseline Noise Levels Recorded at UTT01	3-4
Table 3-4 Daytime Baseline Noise Levels Recorded at UTT02.	3-5
Table 3-5 Night-time Baseline Noise Levels Recorded at UTT02	3-5
Table 3-6 VDV Levels During Daytime and Night Time Periods	3-6
Table 5-1. Description of NSLs Closest to Proposed Development	5-3
Table 5-2 Indicative Construction Noise Levels at distances from the works.	5-5
Table 5-3 Sound insulation performance requirements for glazing, SRI (dB)	5-13

1. INTRODUCTION

AWN Consulting, a Trinity Consultants Company, has been commissioned to prepare a noise and vibration impact assessment relating to a proposed new LRD (Large Scale Residential Development). The site is located in the at Woodbrook, Shankill, Co. Dublin. The proposed development is shown in Figure 1-1.

This report includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development, during both the short-term construction phase and the long-term operational phase. The assessment of direct, indirect and cumulative noise and vibration effects on the surrounding environment have been considered in this report.

This Report has been prepared by AWN Consulting Ltd (AWN) to assess the potential noise and vibration effects of the proposed development in the context of current relevant standards and guidance.

The lands in question are in the jurisdiction of Dun Laoghaire Rathdown County Council (DLRCC). The location of the Proposed Development is illustrated within Figure 1-1 below.



Figure 1-1 Proposed Development Site Layout (Source: O'Mahony Pike Architecture, 2026, Drawing No: 1618G-OMP-00-SP-DR-A-1000)

Noise and vibration are considered in terms of two aspects. The first is the outward effect of the proposed development on its surrounding environment, and the second is the inward effect of existing noise and vibration sources in the surrounding environment on the development itself.

2. ASSESSMENT METHODOLOGY

2.1 Assessment Overview

The following methodology has been prepared based on AWN's experience of preparing the noise and vibration reports for similar developments. The following approach has been used for this assessment:

- ▶ Baseline noise monitoring has been undertaken at the development site in order to characterise the existing noise environment;
- ▶ A review of the most applicable standards and guidelines has been reviewed in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- ▶ Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the proposed development at the nearest Noise sensitive Locations (NSLs) to the site;
- ▶ Predictive calculations have been performed to assess the potential effects associated with the operation of the proposed development at NSLs surrounding the site;
- ▶ An assessment has been completed of potential cumulative effects that may arise as a result of the proposed development and other existing or proposed plans and projects;
- ▶ A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and
- ▶ The inward effect of noise from the surrounding environment into the proposed residential buildings has also been assessed to determine the requirements, for additional noise mitigation to ensure a suitable internal noise environment for residential amenity.

2.2 Criteria for Rating of Impacts

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. There are no statutory standards in Ireland relating to noise and vibration limit values for construction works or for environmental noise relating to the operational phase. In the absence of specific statutory Irish guidelines, the assessment has made reference to non-statutory national guidelines, where available, in addition to international standards and guidelines relating to noise and / or vibration impact for environmental sources.

2.2.1 Criteria and Guidelines – Construction Phase

There is no published statutory Irish guidance relating to the maximum permissible noise or vibration level that may be generated during the construction phase of a project. Dun Laoghaire Rathdown County Council (DLRCC), does, however operate a risk-based approach to the control of noise and vibration from construction sites and the relevant guidelines and standard to be used when setting appropriate limit values.

The risk-based approach takes into account the locality, nature of the work and the expected duration of the work.

The local authority typically controls construction activities by imposing limits on the hours of construction and consider noise limits at their discretion. Construction noise sources include construction plant and machinery, and construction related traffic on surrounding roads. Reference is made to the following guidelines and standards to inform the most appropriate construction noise and vibration significance thresholds and assessment methodologies:

- ▶ British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 *Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise* (hereafter referred to as BS 5228-1) (BSI 2014a);
- ▶ BS 5228-2:2009+A1:2014 *Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration* (hereafter referred to as BS 5228 – 2) (BSI 2014b);
- ▶ BS 7385: 1993 *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration* (hereafter referred to as BS 7385-2) (BSI 1993);
- ▶ BS 6472-1: 2008 *Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting* (hereafter referred to as BS 6472-1) (BSI 2008);
- ▶ UK Highways England (UKHE) *Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2* (hereafter referred to as DMRB Noise and Vibration) (UKHE 2020); and

2.2.1.1 Construction Noise

2.2.1.1.1 BS 5228

The British Standard BS 5228-1 (BSI 2014a) 'ABC' method is referenced here for the purposes of setting appropriate construction noise limits for the development. This is the most widely accepted standard for this purpose in Ireland.

The approach adopted calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. This then sets a threshold noise value that, if exceeded at this location, indicates a potential significant noise effect is associated with the construction activities, depending on context. Note that, in accordance with the BS5228-1 guidance, this assessment criterion is only applicable to residential receptors.

Table 2-1 sets out the construction noise thresholds (CNTs) at the façade of residential receptors for the different baseline noise categorises from BS 5228-1.

Table 2-1. Threshold of Potential Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A ^A	Category B ^B	Category C ^C
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends ^D	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Notes from BS5228-1

- a. Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.
- b. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.
- c. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.
- d. 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

2.2.1.1.2 Proposed Threshold Noise Levels

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 3), BS 5228-1 has been used to inform the assessment approach for construction noise.

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- ▶ For residential NSLs in proximity to the main site development works, Category A values are deemed appropriate using the ABC method.
- ▶ For commercial premises, a fixed daytime CNT of 70 dB (A) is considered an appropriate threshold value based on the development being within a suburban area.
- ▶ There is no scheduled night-time construction work proposed as part of the proposed development.

2.2.1.1.3 Significance of Construction Noise Levels (CNL)

In order to assist with interpretation of significance relating a calculated construction noise level (CNL), Table 2-2 includes guidance as to the likely magnitude of impact associated with construction noise, relative to the CNT. This guidance is derived from DMRB: Noise and Vibration (UKHA 2020).

Table 2-2. Construction Noise Significance Ratings

Guidelines for Noise Impact Assessment Significance (DMRB)	Construction Noise Level	Determination
Negligible	Below or equal to baseline noise level	Depending on CNT, duration & baseline noise level
Minor	Above baseline noise level and below or equal to CNT	
Moderate	Above CNT and below or equal to CNT +5 dB	
Major	Above CNT +5 dB	

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely effects during the construction stage.

2.2.1.2 *Construction Vibration*

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of the proposed development, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Peak Particle Velocity (PPV) is a measure of the velocity of vibration displacement in terms of millimetres per second (mm/s). It is defined as follows within BS 7385-2 (BSI 1993) as 'the maximum instantaneous velocity of a particle at a point during a given time interval'.

2.2.1.2.1 Building Response

There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- ▶ British Standard BS 5228-2 (BSI 2014b), and;
- ▶ British Standard BS 7385-2 (BSI 1993).

BS7385-2 (BSI 1993) and BS5228-2 (BSI 2014b) advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2 (BSI 2014b) might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges.

For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects. The recommend transient vibration thresholds from BS5228-2 (BSI 2014b) for the avoidance of cosmetic damage to light framed and residential buildings are summarised in Table 2-3

Table 2-3. Recommended Construction Vibration Threshold for Control of Building Damage

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of -		
Less than 15Hz	15 to 40Hz	40Hz and above
15mm/s	20mm/s	50mm/s

2.2.1.2.2 Human Response

Human response to vibration stimuli occurs at orders of magnitude below those associated with any form of building damage, hence vibration levels lower than those indicated in Table 2-3 can lead to concern. Table 2-4 presents the significance table relating to potential effects to building occupants during construction based on guidance from BS5228-2 (BSI 2014b), the DMRB Noise and Vibration (UKHA 2020) document.

Table 2-4. Guidance on Effects on Human Response to PPV Magnitudes

PPV Range	BS 5228-2 (Note A, B, C)	DMRB Impact Magnitude
≥10 mm/s PPV	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.	Very High
≥1 to 10 mm/s PPV	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents	High
≥0.3 to <1 mm/s PPV	Vibration might be just perceptible in residential environments.	Medium

PPV Range	BS 5228-2 (Note A, B, C)	DMRB Impact Magnitude
<0.3 mm/s PPV	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Low

Notes from BS5228-2

- A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.
- B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
- C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472 (BS1 2008), and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

2.2.1.3 Construction Phase Traffic Noise

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following guidelines are referenced: DMRB Noise and Vibration (UKHA 2020). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB Noise and Vibration (UKHA 2020) document.

Table 2-5 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 2-5. Classification of Magnitude of traffic noise changes for Construction Traffic

Change in Sound Level (dB)	Subjective Reaction	DMRB Impact Magnitude (Short-term)
Less than 1 dB	Inaudible	Negligible
1 – 2.9	Barely Perceptible	Minor
3 – 4.9	Perceptible	Moderate
≥ 5	Up to a doubling of loudness	Major

2.2.2 Assessment of Criteria and Guidelines – Operational Phase

The main potential source of outward noise from the proposed development will be limited to traffic flows to and from the development site onto the public roads. There may also be an element of mechanical and electrical plant required to service the apartment buildings also. The relevant guidance documents used to assess potential operational noise, and vibration impacts on the surrounding environment are summarised below.

- ▶ BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* (hereafter referred to as BS 8233) (BSI 2014c);
- ▶ British Standard BS EN 12354-3: 2000: Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound (hereafter referred to as BS EN 12354-3)
- ▶ BS 4142: 2014 +A1 2019 *Methods for Rating and Assessing Industrial and Commercial Sound* (hereafter referred to as BS 4142) (BSI 2019);
- ▶ ISO 1996-1:2016 *Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures* (hereafter referred to as ISO 1996 – 1) (ISO 2016);

- ▶ ISO 1996-2:2016 Acoustics - *Description, measurement and assessment of environmental noise. Part 2: Determination of environmental noise levels* (hereafter referred to as ISO 1996 – 2) (ISO 2016);
- ▶ The UK Department of *Transport Calculation of Road Traffic Noise* (hereafter referred to as the CRTN) (UK Department of Transport 1988).
- ▶ UK Highways Agency (UKHA) *Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2* (UKHA 2020);
- ▶ International Organization for Standardization (ISO) 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors (ISO 2024).
- ▶ ANC, IOA & CIEH (2017). *ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development* (hereafter referred to as ProPG: Planning and Noise).
- ▶ BS 6472-1 : 2008 *Guide to evaluation of human exposure to vibration in buildings*

2.2.2.1 Operational Phase – Traffic Noise

Vehicular movement to and from the proposed development will make use of the existing road network and new junction arrangement. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to consider the increase in traffic noise level that arises as a result of any additional vehicular movements associated with the development.

In order to assess the potential impact of additional traffic on the human perception of noise, the following guidelines are referenced DMRB Noise and Vibration (UKHA 2020) . For the operational phase, traffic noise impacts are assessed against the 'long term' magnitude ratings from the DMRB. These are discussed in Table 2-6.

Table 2-6. Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB)	Subjective Reaction	DMRB Impact Magnitude (Long -term)
0	Inaudible	No impact
0.1 – 2.9	Barely Perceptible	Negligible
3 – 4.9	Perceptible	Minor
5 – 9.9	Up to a doubling of loudness	Moderate
10+	Doubling of loudness and above	Major

2.2.2.2 Operational Phase – Mechanical and Electrical Services Criteria

2.2.2.2.1 Receptors Outside the Proposed Development

The most appropriate standard used to assess the impact of a new continuous source (i.e. plant items) to a residential environment is BS 4142. This standard describes a method for assessing the impact of a specific noise source at a specific location with respect to the increase in “background” noise level that the specific noise source generates. The standard provides the following definitions that are pertinent to this application:

- ▶ “Specific sound level, $L_{Aeq, Tr}$ ” is equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T. This level has been determined with reference to manufacturers information for specific plant items.
- ▶ “Rating level” $L_{Ar, Tr}$ is the specific noise level plus adjustments for the character features of the sound (if any), and;
- ▶ “Background noise level” is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

The assessment procedure in BS 4142: 2014 is outlined as follows:

1. determine the specific noise level;
2. determine the rating level as appropriate;
3. determine the background noise level, and;
4. subtract the background noise level from the rating level in order to calculate the assessment level.

2.2.2.2.2 Receptors Inside the Proposed Development

In order to determine an appropriate noise criterion for residential receptors within the proposed development that will be built in future, guidance is taken from BS 8233. Recommended internal noise levels for residential settings are set out in the standard as follows:

Table 2-7. BS 8233 Recommended Internal Noise Levels

Activity	Location	Day (07:00 to 23:00hrs) dB LAeq,16hr	Night (23:00 to 07:00hrs) dB LAeq,8hr
Resting	Living room	35 dB LAeq,16hr	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr

For the purposes of this assessment, it is appropriate to derive external limits based on the internal criteria noted in the above. This is done by factoring in the degree of noise reduction afforded by a partially open window and typical 15 dB attenuation is noted in this British Standard. Using this correction value across an open window, the following external noise levels would achieve the internal noise levels noted in Table 2-7 above.

- ▶ Daytime (07:00 to 23:00 hours) 50 dB LAeq,1hr
- ▶ Night-time (23:00 to 07:00 hours) 45 dB LAeq,15min

2.2.2.3 *Operational Phase – Vibration Criteria*

The development is residential in nature; therefore it is not anticipated that there will be any outward sources of vibration from the development itself during the operational phase.

However, areas of the proposed development sites are adjacent to an active rail line and as such the inward impact of rail vibration on the future occupants of the development must be considered. Guidance relating to human response to vibration is contained within BS 6472 Guide to evaluation of human exposure to vibration in buildings (2008): Part 1 - Vibration sources other than blasting.

BS 6472 uses the Vibration Dose Value (VDV) which is measured or forecast over the day or night-time periods in terms of m/s-1.75. The VDV parameter takes into account how people respond to vibration in terms of frequency content, vibration magnitude and the number of vibration events during an assessment period.

The following Table, as set out in the standard, details the values of VDV where various comments from occupiers are possible. The standard notes that the values are applicable for both vertical and horizontal vibration with the appropriate weighting applied.

Table 2-8 VDV (m/s-1.75) above which various degree of adverse comment may be expected in residential buildings.

Building Type	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential building – Day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building – Night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

2.2.3 Criteria for Assessing Inward Noise Impacts

2.2.3.1 Dublin Agglomeration Noise Action Plan 2024 – 2028

The Dublin Agglomeration Noise Action Plan 2024 – 2028, addresses the requirements of the European Noise Directive 2002/49/EC for local authorities for managing environmental noise. The Noise Action Plan (NAP) states the following in regard to planning guidance ‘The appropriate use of the planning system can be used to help avoid, or minimise, the adverse impacts of noise without placing unreasonable restrictions on development’.

The action plan outlines various guidance to minimise the impact in relation to noise on new developments. Both ProPG *Planning and Noise: Professional Practice Guidance on Planning and Noise* and BS 8233: *Guidance on Sound Insulation and Noise Reduction for Buildings* are recommended as guidance to be employed in areas where people are being brought to noise in the form of existing transport noise.

In accordance with the guidance recommended as the NAP policy, the following Acoustic Design Statement (ADS) has been prepared to comply with the requirements of this policy.

2.2.3.2 Professional Practice Guidance on Planning and Noise (ProPG:2017)

The Professional Practice Guidance on Planning & Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk-based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- ▶ Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- ▶ Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include:
 - Element 1 - Good Acoustic Design Process;
 - Element 2 - Noise Level Guidelines;
 - Element 3 - External Amenity Area Noise Assessment
 - Element 4 - Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 2-1 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 2-9 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Figure 2-1. ProPG Stage 1 – Initial Noise Risk Assessment

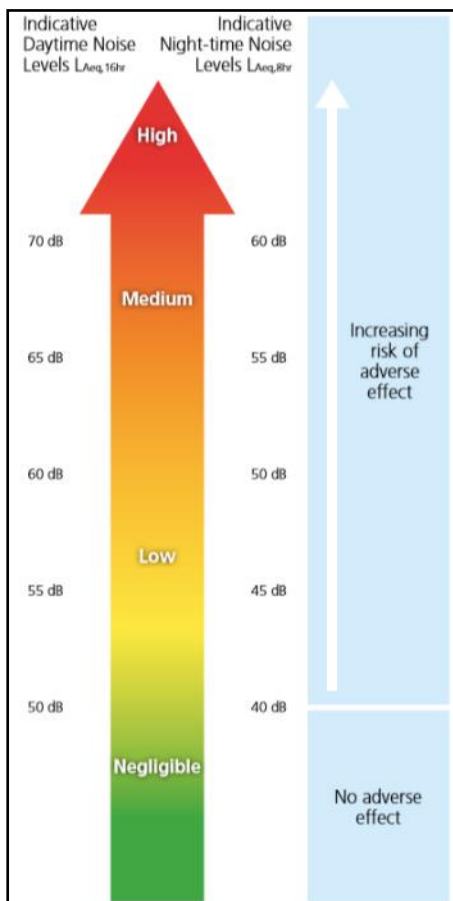


Table 2-9. ProPG Internal Noise Levels

Activity	Location	Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$	Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$
Resting	Living room	35 dB $L_{Aeq,16hr}$	--
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}$ ^{e.}

e. The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$.”

3. BASELINE ENVIRONMENT

The proposed development is located north of Bray Town and south of Shankill on lands currently occupied by open fields. The lands in question are generally bounded to the north by Shanganagh Cemetery and Shanganagh Park, to the south by Woodbrook Golf Course, and south and west by Woodbrook Phase 1 and Phase 2 residential developments and to the east is the Dublin – Rosslare railway line.

3.1 Baseline Noise and Vibration Environment

An environmental noise and vibration surveys have been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*. Specific details are set out below.

3.1.1 Measurement Locations

Four measurement locations were undertaken including one attended noise (ATT01), two unattended noise (UTT01 – UTT02) and one attended vibration survey (VM1) were selected as shown in Figure 3-1 and described below.

Figure 3-1 Baseline Noise Monitoring Locations.



ATT01: This monitoring location located to the south of the proposed development within Woodbrook phase 1 residential development. The position was chosen to represent baseline noise levels associated with existing residential properties to the south of the proposed development, screened from ongoing construction activities.

UTT01: This monitoring position was located within the eastern grounds of the Woodbrook Residential Phase 2 development at a position representative of the nearest residences to the Dublin to Rosslare rail line .

UTT02: This monitoring position was located within the eastern grounds of the Woodbrook Residential Phase 3 development at a position representative of the nearest residences to the Dublin to Rosslare rail line.

VM1: This monitoring position was located within the eastern grounds of the proposed Woodbrook Residential Phase 3 development at a position representative of the nearest residences to the Dublin to Rosslare rail line.

3.1.2 Survey Periods

Measurements were conducted over the course of the following survey periods: -

Attended Noise Measurements, AT1

- 15:45 to 18:20 hrs on 6 March 2024.

Unattended Noise Measurements UTT01

- 13:23 on 15 March 2024 to 07:00 on 19 March 2024.

Unattended Noise Measurements UTT01

- 15:50 on 4 February 2026 to 07:00 on 5 February 2026.

Attended Vibration Measurements VM1

- 15:30 on 4 February to 07:00 5 February 2026.

3.1.3 Measurement Parameters

The survey results are presented in terms of the following three parameters: -

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing.

VDV Vibration Dose Value (PPV) is a cumulative measurement of the vibration level received over an 8-hour or 16-hour period.

3.1.3.1 Measurement Results

ATT01

Survey results for monitoring position ATT01 are presented in Table 3-1.

Table 3-1 Baseline Noise Levels Recorded at ATT01.

Start Time	L _{Aeq}	L _{Afmax}	L _{Af90}
15:49	52	68	50
16:44	51	59	47
17:30	50	62	48

During the daytime survey, the noise climate at the location was influenced by distant road traffic noise from the M11 and R119, intermittent distant construction noise activity, birdsong and occasional distant airplane pass-by overhead. Ambient noise levels were measured in the range of 50 to 52 dB LAeq. Background noise levels were in the range 48 to 50 dB LA90. Maximum dB LAFmax levels were due to passing vehicles and distant aircraft.

During the daytime survey, the noise climate at this location was dominated by road traffic along the old Dublin Road (R119) and birdsong. Occasionally bicycle pass-by and distant construction noise could be heard. Ambient noise levels were measured in the range of 65 to 66 dB LAeq. Background noise levels were in the range 56 to 58 dB LA90. Maximum dB LAFmax levels were due to passing vehicles.

UTT01

Survey results for the logged monitoring position UTT01 are summarised in Figure 3-2. Table 3-1 summarises the daytime periods (07:00 to 23:00hrs).

Figure 3-2 Baseline Noise Levels Recorded at UTT01.

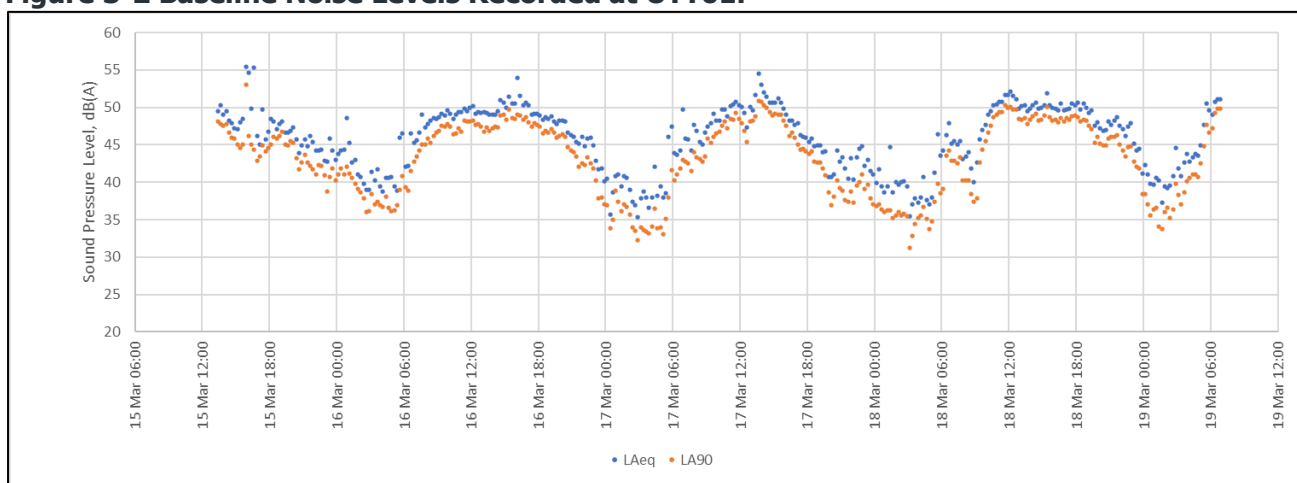


Table 3-2 Daytime Baseline Noise Levels Recorded at UTT01.

Date	Scenario	LAeq	LAF90
15 March 2024 (07:00 – 23:00hrs)	Highest	56	53
	Lowest	43	41
	Average	49	45
16 March 2024 (07:00 – 23:00hrs)	Highest	54	50
	Lowest	45	42
	Average	49	47
17 October 2024 (07:00 – 23:00hrs)	Highest	55	51
	Lowest	40	37
	Average	48	45
18 October 2024 (07:00 – 23:00hrs)	Highest	52	50
	Lowest	40	37
	Average	49	47

The baseline noise monitoring results at this position were influenced by activities within the golf club grounds, passing trains along the Dublin to Rosslare rail line, overhead aircraft, occasional and rustling foliage. Average daytime noise levels were measured in the range of 48 to 49dB LAeq.

Survey results for the logged monitoring position UTT01 are summarised in Table 3-3 for night-time periods (23:00 to 07:00hrs).

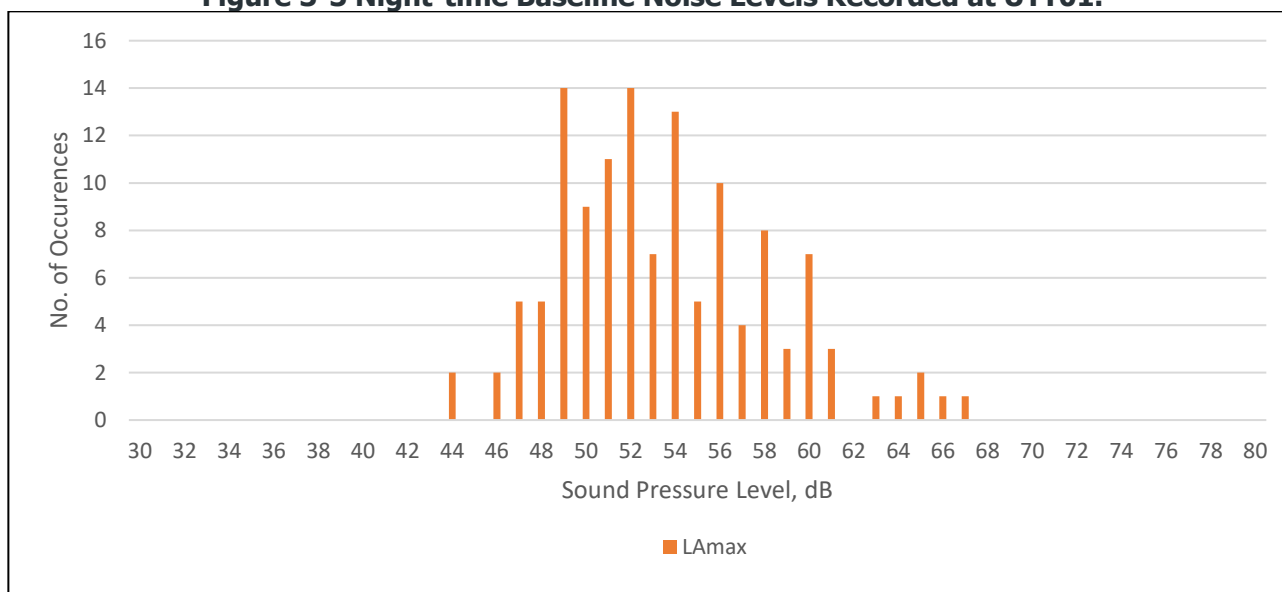
Table 3-3 Night-time Baseline Noise Levels Recorded at UTT01

Date	Scenario	L _{Aeq}	L _{AF90}
15 March 2024 (23:00 – 07:00hrs)	Highest	49	43
	Lowest	39	36
	Average	43	39
16 March 2024 (23:00 – 07:00hrs)	Highest	50	43
	Lowest	35	32
	Average	42	36
17 October 2024 (23:00 – 07:00hrs)	Highest	48	44
	Lowest	36	31
	Average	42	37
18 October 2024 (23:00 – 07:00hrs)	Highest	51	50
	Lowest	37	34
	Average	46	41

The baseline noise monitoring results at this position were influenced by golf club grounds, passing trains along the Dublin to Rosslare rail line, overhead aircraft and rustling foliage. Average night-time noise levels were measured in the range of 42 to 46 dB L_{Aeq}. Highest noise levels were recorded during periods of passing trains, commencing from 05.30hrs and up until 23:30hrs at night. Between 23:30 and 05:30hrs, ambient noise levels were typically between 39 to 43 dB L_{Aeq}.

Figure 3-3 below, presents the number of L_{Amax} occurrences of recorded noise levels during the night time measurement period.

Figure 3-3 Night-time Baseline Noise Levels Recorded at UTT01.



UTT02

Survey results for the logged monitoring position UTT02 are summarised in Figure 3-4. Table 3-4 summarises the daytime periods (15:50 to 23:00hrs).

Due to the monitoring equipment being installed at the distance of the proposed nearest facades to the rail line boundary, noise levels measured represent worst case noise levels influenced by passing DART, Intercity and commuter trains.

Figure 3-4 Baseline Noise Levels Recorded at UTT02

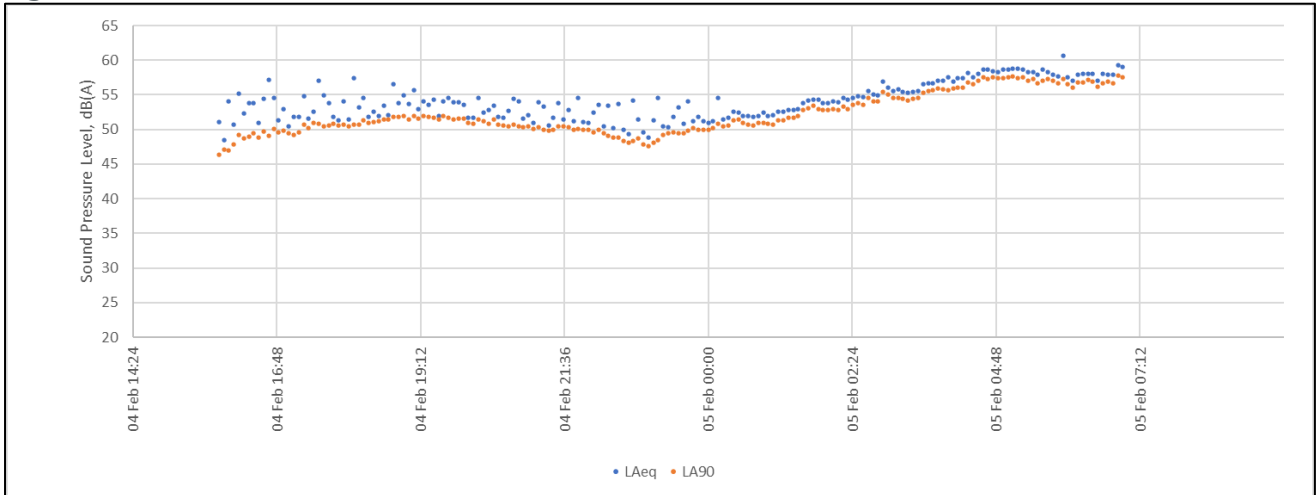


Table 3-4 Daytime Baseline Noise Levels Recorded at UTT02.

Date	Scenario	LAeq	LAF90
4 February 2026 (15:50 – 23:00hrs)	Highest	57	52
	Lowest	49	46
	Average	53	50

The baseline noise monitoring results at this position were influenced by activities within the golf club grounds, passing trains along the Dublin to Rosslare rail line, overhead aircraft and occasional vehicular movements. Average daytime noise levels were measured of the order of 53 dB LAeq.

Survey results for the logged monitoring position UTT02 are summarised in Table 3-5 for night-time periods (23:00 to 07:00hrs).

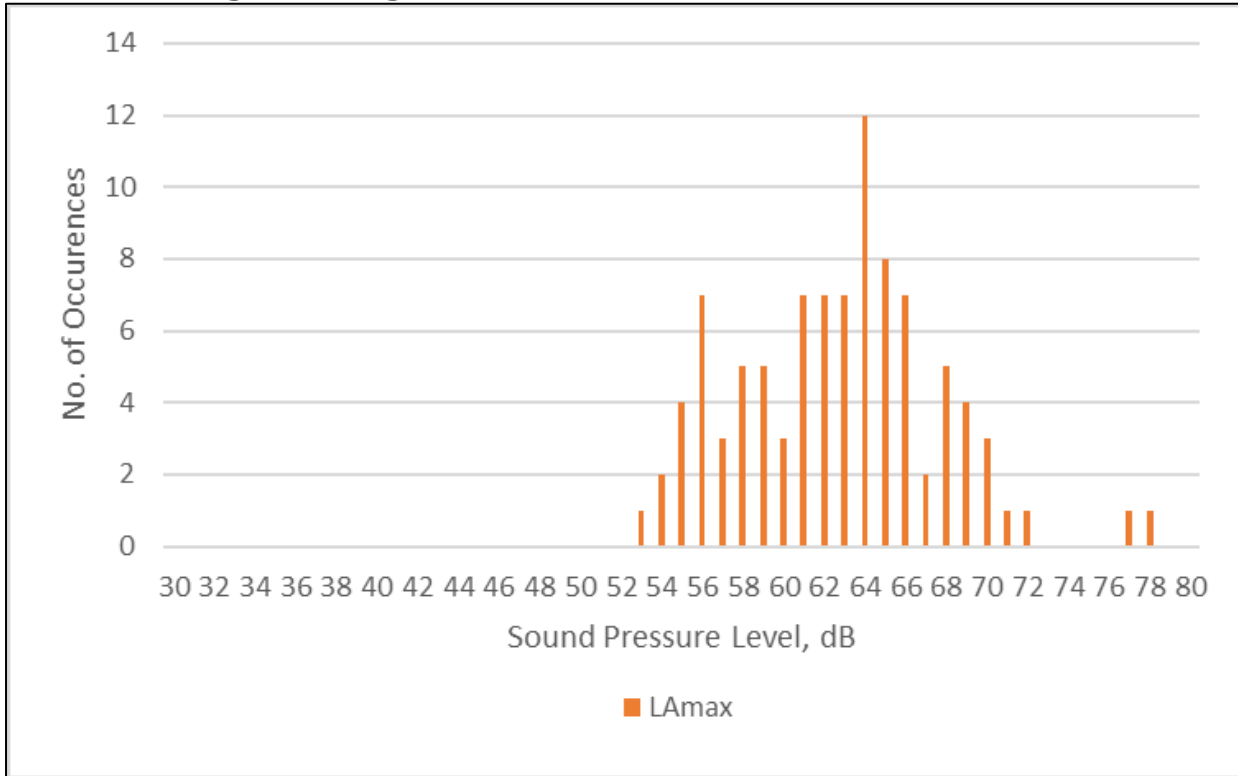
Table 3-5 Night-time Baseline Noise Levels Recorded at UTT02

Date	Scenario	LAeq	LAF90
4 – 5 February 2026 (23:00 – 07:00hrs)	Highest	61	58
	Lowest	49	48
	Average	56	54

The baseline noise monitoring results at this position were influenced by activities within the golf club grounds, passing trains along the Dublin to Rosslare rail line, overhead aircraft and occasional vehicular movements. Average night-time noise levels were measured of the order of 56 dB LAeq.

Figure 3-5 below, presents the number of L_{max} occurrences of recorded noise levels during the night time measurement period.

Figure 3-5 Night-time Baseline Noise Levels Recorded at UTT02.



Vibration - Location VM1

Vibration Dose Value (VDV)

Measurement of vibration dose value was undertaken during rail pass by's. The results are summarised in Table 3-6. Night time VDV values are presented based on the measured VDV, over the night time period. The daytime VDV values are calculated based on the worst case maximum passby VDV measured in an hour period. A 16 hour day-time average has been calculated, using a conservative assumption that the worst case hour occurs every hour during the daytime period. Calculations have been made in line with the guidance provided in BS6472-1:2008.

Table 3-6 VDV Levels During Daytime and Night Time Periods

Period	VDV (mm/s)		
	Horizontal	Horizontal	Vertical
	X_VDV	Y_VDV	Z_VDV
VDV _{b, day}	0.02	0.03	0.01
VDV _{b, night}	0.01	0.01	0.01

3.1.3.2 Summary of the Noise Environment

The proposed site for the mixed-use and residential development is primarily located within zoned development lands on a greenfield site between the suburbs of Bray town to the south and Shankill to the north. There are a small number of noise sensitive properties located in close proximity to the development, predominately located along the western boundary. The noise environment at the off-site noise monitoring locations was noted to be influenced by road traffic along the Old Dublin Road, rustling foliage, birdsong and intermittent local sources from vehicles in residential areas. Overhead aircraft was also audible in the distance.

Along the eastern boundary of the proposed development site immediately against the rail line, passing rail dominated the ambient noise environment, along with distant noise associated with golfing activities, distant construction noise and rustling of trees and vehicular movements.

4. CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The site is ca. 2.63-hectares at lands south of the Shanganagh cemetery and east of Woodbrook Dart Station, within the Woodbrook Local Area Plan (LAP) boundary, Shanganagh, Shankill, Cork Little, Dublin.

The Proposed Development comprises primarily of a residential development, with 359no. residential units, consisting of 353 no. apartment units and 6no. duplex units proposed in a mix of 1, 2 and 3-bedroom units accommodated within 2 no. apartment blocks, ranging in height of 2-8 storeys, including balconies and terraces. The Proposed Development also includes:

- ▶ Public open space;
- ▶ Communal open space serving the blocks;
- ▶ Internal road networks;
- ▶ Pedestrian and cycle facilities;
- ▶ Car and bicycle parking spaces;
- ▶ ESB substations; and
- ▶ All associated ancillary site development and infrastructural works, hard and soft landscaping and boundary.

The site under consideration When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- ▶ the construction phase, and;
- ▶ the operational phase.

4.1 Construction Phase

The highest potential noise and vibration impact of the proposed development will occur during the construction phase due to the activity of mobile and construction plant items with high noise levels.

During the construction phase, activities will involve site clearance and excavation, and foundation works during the early-stage clearance and ground works. The structural and building works associated with the house and apartment buildings and associated infrastructure will then be undertaken. Following the main ground and structural works, internal fit out works, and landscaping will occur. For each stage there will be on-site plant and equipment operating in addition to construction traffic including movement of machinery and materials within and to and from the construction site.

A variety of items of plant will be in use for the purposes of site preparation, construction of buildings, piling and road works.

Vibration associated with the proposed construction site activities will be low due to the distance between the works and the nearest structures and buildings.

The potential impact associated with these activities are discussed in the following sections.

4.2 Operational Phase

Once operational, there are no major noise sources associated with the proposed development which is residential in nature. The range of operational activities are in line with those in the surrounding environment at nearby existing and planned residential areas (e.g., local vehicle movements, parking, amenity etc.). None of these activities are associated with any significant noise impacts to the surrounding noise environment.

The main potential source of outward noise from the proposed development is associated with traffic flows to and from the development site on the surrounding road network. There will also be potential for an element of mechanical and electrical plant required to service apartment buildings and other spaces within the proposed development.

There is also the impact of Inward noise incident on the development from existing and future noise sources, namely road traffic noise and rail noise this has also been assessed within Section 5.2.3.

5. POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

5.1 Construction Phase – Noise

5.1.1 Closest NSLs and Noise Thresholds

Figure 5-1 illustrates the location of the closest NSLs in the surrounding environment. These NSLs are also discussed below in Table 5-1 in relation to their position and distance to the proposed development site.

Figure 5-1 Nearest NSLs in Relation to the Proposed Development

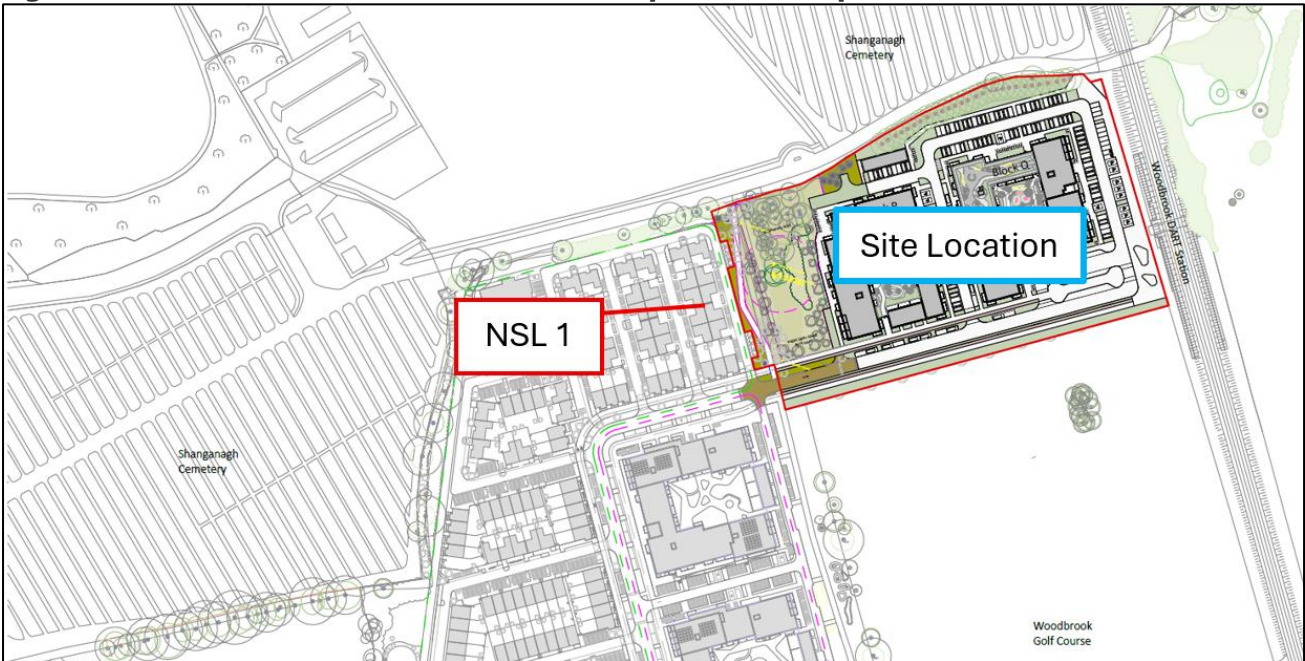


Table 5-1. Description of NSLs Closest to Proposed Development

NSLs	Description	Approximate distance from NSL to closest Proposed Development Construction Works
1	NSL1 is the group of residential NSLs situated to the west of the proposed development in the permitted Woodbrook Phase 2 development (LRD24A/0382). The nearest of these NSLs is approximately 60m from any major construction works associated with the proposed development.	60m

The construction noise threshold is determined by referring to Table 2-1 (BS 5228-1) and the baseline ambient noise levels (as referred to in Section 3), as outlined in the assessment criteria section.

Working hours for the proposed development site are set within the CEMP. Sunday or Bank Holiday work will only take place periodically at the agreement with DLRCC. Similarly, any other out of hours working will be only permitted by arrangement with site management and DLRCC.

On occasions it may prove necessary to carry out noisy activities outside of normal working hours. In such instances prior consultation will be carried out with DLRCC and local residents outlining the nature and reason for the work and their likely duration.

Based on the prevailing noise environment measured, the construction noise thresholds are defined from Category A for all residential receptors within the vicinity of the development sites as defined within Table 2-1.

The appropriate daytime noise criteria for construction noise are as follows:

Residential Receptors 65 dB $L_{Aeq,T}$

Commercial Receptors 70 dB $L_{Aeq,T}$

A night-time threshold is not included as construction work will not be taking place at night.

5.1.2 Source Noise Levels

5.1.2.1 Construction Noise

A variety of items of plant will be in use for the purposes of site preparation, construction of buildings, piling and road works. There will be vehicular movements to and from the site that will make use of existing and temporary roads.

The impact at nearby noise sensitive buildings will depend upon a number of variables, the most notable of which are: -

- ▶ the amount of noise generated by plant and equipment being used at any one time, expressed in terms of sound pressure or sound power;
- ▶ the periods of operation of the plant at the development site, known as the “on-time”;
- ▶ the distance between the noise source and the receptor, and;
- ▶ the attenuation due to ground absorption or barrier screening effects from walls, buildings, site hoarding etc.

The construction phase will be controlled through the use of construction noise limits which the contractor will be required to work within. In this regard, the choice of plant, scheduling of works on site, provision of localised screening and other best practice control measures will be employed in order to ensure noise limits are not exceeded. Given the construction phase involves a number of various phases which will encompass a range of different activities on a day to day and week to week basis, it is not possible to calculate with a high degree of accuracy the specific levels of noise associated with each phase. It is possible, however, to determine a range of likely scenarios which represent the key construction phases. These can be used to identify potential phases which will require noise mitigation.

The Phase 2 works will be undertaken over a number of staged phases which include development of the temporary haul road, neighbourhood centre and initial residential phased buildings within the southern portion of the phase 2 site. The works will then progress in the western and north-east in different zoned areas which will include development of the residential buildings, green corridor and the northern link road.

Using guidance set out in BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1 – Noise*, calculations have been made at distance of 25m, 50m, 260m and 650m from construction activities representing noise levels at the nearest noise sensitive locations to the site boundaries. It must be stated that for most of the time, plant and equipment will be a greater

distance from the nearest noise sensitive locations than those used within the calculations in Table 5-2 and consequently will have lower impact. Our assessment is therefore representative of a “worst-case” scenario representing construction activities at a minimum distance from the noise sensitive areas. For the purposes of the calculation, it is assumed that equipment will operate for 66% of the 12-hour working day (i.e. 8 hours).

It has been assumed that a standard 2.4m high solid site hoarding will be erected along the boundary of the site for the duration of the construction programme. Table 5-2 summarises the construction noise prediction calculations.

Table 5-2 Indicative Construction Noise Levels at distances from the works.

Phase	Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m (dB LAeq)	Predicted Noise Level, (dB LAeq,1hr) at varying distances			
			60m	100m	150m	250m
Site Preparation	Wheeled loader x1 (C3.51)	74	60	55	52	47
	Dozer x2 (C.3.30)	76				
	Tracked excavator x1 (C3.92)	76				
	Dumper x2 (C3.98)	77				
Foundation Laying	Compressor x2 (C6.19)	72	58	53	50	45
	Poker Vibrator x2 (C6.40)	73				
	Cement Mixers x2 (C6.6)	71				
Piling	Dump Truck (C2.30)	79	62	58	55	50
	Large Rotary Bored Piling Rig (C3.14)	83				
	Tracked excavator (D2.21)	71				
Steel Erection	Crane x1 (C7.120)	76	55	51	47	43
	Lorry x2 (C7.121)	70				
General Construction	Compressor x2 (C7.70)	70	55	57	54	49
	Diesel Hoist x1 (C7.97)	73				
	Hand Tools x3	75				
	Generator x2 (C7.51)	72				
Roadworks/Landscaping	Surfacing (C8.26)	80	62	53	50	45

Highest noise levels are calculated at a distance of 60m from construction activities assuming all works are taking place at this distance. The distance of 60m has been calculated to represent the closest distance of construction works to the dwellings to the west of the development site. The calculations have indicated the recommended construction noise level of 65dB $L_{Aeq,1hr}$ is not likely to be exceeded when activities are taking place at this distance. During the construction stage and during periods of works at these set back distances, the effect of impact is predicted to be Minor.

Given the variation of on-site activities and number of plant items during any one phase and the likelihood of works operating along the closest areas of construction for a limited duration of the works, the calculated noise levels presented are considered to present a worst-case scenario.

At further distances of 250m and beyond, the construction noise levels are well below the adopted limit value of 65dB $L_{Aeq,1h}$ and result in noise levels in line with or below the prevailing noise environment such that the noise impact at these distances will be negligible and short term.

5.1.2.2 Construction Vibration

The main potential source of vibration during the construction phase is associated with piling activities associated with apartment buildings, which will be undertaken using rotary bored piles.

For the purposes of this assessment the expected vibration levels during piling have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of vibration of rotary bored piling using a 600 mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- ▶ 0.54mm/s at a distance of 5m, for auguring;
- ▶ 0.22mm/s at a distance of 5m, for twisting in casing;
- ▶ 0.42mm/s at a distance of 5m, for spinning off, and;
- ▶ 0.43mm/s at a distance of 5m, for boring with rock auger.

Considering the low vibration levels at very close distances to augured piling rigs, vibration levels at the nearest off-site buildings will be orders of magnitude below those associated with cosmetic or structural damage buildings (Refer to Table 2-3). Due to the distances involved and magnitudes detailed above, vibration levels will also be below those likely to be perceptible to occupants of buildings adjacent to the site (Refer to Table 2-3).

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that these properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible.

Notwithstanding the above, with consideration to protected and vulnerable structures in the vicinity any construction activities undertaken on the site will be required to operate below the recommended vibration threshold set out in Table 2-4 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 6.1.

5.1.2.3 Construction Phase – Traffic

During the construction phase, traffic associated with the Proposed Development would consist of a mix of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) travelling to and from the site.

In terms of the additional construction traffic on local roads that will be generated as a result of the Proposed Development, the following comment is presented: As stated in the DMRB Noise and Vibration (UKHE 2020), Volume 11, Section 3, Part 7, in order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction phase associated with various phases of the development will introduce a level of traffic that will be negligible. However, a series of mitigation measures within Section 6 will be implemented to ensure that noise from vehicle movements during construction are reduced to a minimum.

5.2 Operational Phase – Noise and Vibration

5.2.1 Operational Phase – Additional Traffic on Public Roads

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

The Woodbrook Phase 3 development is only two apartment blocks of the much larger Woodbrook masterplan. An increase of 25% of road traffic is required in order to create a 1 dB increase in traffic noise.

The resultant change in noise level in relation to operational traffic of the development is calculated to be less than 1 dB(A). With reference to Table 2-6, the resulting change in noise related to operational traffic will be inaudible with no impact predicted.

5.2.2 Operational Phase – Mechanical Plant and Services

Once operational, there will be building services plant items required to serve the residential aspect of the development. These will typically be limited to heating and cooling plant and extract units, depending on the building design and user requirements. Given the use of these buildings, the majority of plant items are likely to be required during daytime hours only, however, there may be requirement for night-time operational plant, depending on specific requirements.

In this instance, it is best practice to set appropriate noise limits that will inform the detailed design during the selection and layout of building services for the development. The noise limits will ensure that any items selected at a later stage will be designed and located so that there is no negative impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the development (e.g. apartments, etc.) will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods as set out in this assessment.

Based on the baseline noise data collected for this assessment it is considered an appropriate design criterion is the order of **45 dB LAeq, 1hr** during daytime periods and **40 dB LAeq, 15min** at night at the façade of any noise-sensitive receptor. This limit is set in order to achieve acceptable internal noise levels within residential spaces based on prevailing noise levels in the area.

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site.

Any mechanical ducts associated with the apartments and underground car parks will be designed such that cumulative noise emissions associated with them do not exceed the adopted design goals of **45dB LAeq, 1hr** during daytime periods and **40dB LAeq, 15min** at night at the facades of the residential units within

the development itself. Adopting these design goals within the development will result in no significant impacts within the development itself or at existing off site noise sensitive locations remote from the site.

5.2.3 Operational Phase – Inward Impact Assessment

The development lands in question are in proximity to the Dublin to Rosslare rail line. Noise from the adjacent rail have the potential to impact the residential developments proposed for the site itself.

The following sections outline the inward impact of noise on the proposed development.

5.2.3.1 Stage 1 Noise Risk Classification of the Site

Noise levels across the proposed development have been identified through noise surveying and have been categorised for both the 16 hour daytime (07:00 to 23:00hrs) $L_{Aeq,16hr}$ and the 8 hour night-time period (23:00 to 07:00hrs), $L_{Aeq,8hr}$. Giving consideration to the measured noise levels, the initial site noise risk assessment has concluded that the level of risk across the site falls into the high noise risk category along the western site boundary. At the location of the closest residential buildings noise levels are reduced to the medium risk category, and noise levels are further reduced to Low risk within the remainder of the site.

ProPG: Planning and Noise states the following with respect to medium and high risks:

- Low Risk *"At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development."*
- Medium Risk *"As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development."*
- High Risk *"High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice."*

Given the high risk category along the site boundary adjacent to the Dublin to Rosslare rail line, an Acoustic Design Strategy (ADS) will be required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

It should be noted that ProPG: Planning and Noise states the following with regard to how the initial site noise risk is to be used,

"2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A

potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design.”

Therefore, following the guidance contained in ProPG: Planning and Noise does not preclude residential development on sites that are identified as having medium and high risk noise levels. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk sites are suitable designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG: Planning and Noise is to ensure that the best possible acoustic outcome is achieved for a particular site.

5.2.3.2 Stage 2: Noise Assessment

5.2.3.2.1 Noise Levels Across Development Buildings

As demonstrated in the previous section, current noise across the site are categorized as low to medium to high risk. Due to the site's position along the Dublin to Rosslare rail line, the nearest residential properties to this rail will experience the highest noise levels. For the purposes of this assessment, the surveyed noise levels have been used to inform the inward impact noise assessment.

A noise model has been developed incorporating the measured noise levels and has been adapted within the following sections.

5.2.3.2.2 Element 1 – Good Acoustic Design Process

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. Section 2.23 of the ProPG: Planning and Noise outlines the following checklist for Good Acoustic Design:

- ▶ Check the feasibility of relocating or reducing noise levels from relevant sources;
- ▶ Consider options for planning the site or building layout;
- ▶ Consider the orientation of proposed building(s);
- ▶ Select construction types and methods for meeting building performance requirements;
- ▶ Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc;
- ▶ Assess the viability of alternative solutions; and,
- ▶ Assess external amenity area noise.

In the context of the proposed development, each of the considerations listed above have been addressed in the following subsections.

Relocation or Reduction of Noise from Source

Noise sources incident upon the development site have been determined to be low to medium to high risk. Control of noise at source from rail traffic is outside of the site boundary and hence is outside of the scope of the proposed development.

Planning, Layout and Orientation

As part of the project design, the overall majority of residential buildings within the proposed development are set back from the road boundary. The closest properties to the Dublin to Rosslare rail line will

experience highest potential noise levels with reduced noise levels further into the site. The furthest eastern facades of the site are set back from the rail line and orientated such that they act as a barrier for the other noise sensitive locations within the site thus reducing the number of noise sensitive facades impacted by rail noise. The development buildings themselves also screen the external community courtyard amenity areas further into the site.

Select Construction Types for meeting Building Regulations

The design of all buildings is required to meet with all relevant parts of the Building Regulations. The specific detail of which will be completed at detailed design stage. In terms of the building sound insulation, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade.

Consideration will therefore be given to the provision of sound insulation performance for glazing and ventilation systems, where required to achieve suitable internal noise levels within the development. This is specified within Table 5-3 and Figure 5-3 below. Achievement of acceptable internal ambient noise levels does not form part of building regulation requirements. However, this will be incorporated into the building design in line with best practice and compliance with the guidance set out in ProPG: Planning and Noise

Impact of Noise Control Measures on fire, health and safety

The good acoustic design measures that have been implemented on site, e.g., locating properties away from the road are considered to be cost neutral and do not have any significant impact on other issues.

Assess External Amenity Area Noise

ProPG: Planning and Noise provides the following advice with regards to external noise levels for amenity areas in the development:

"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."

Based on the measured noise levels at UTT01 and UTT02, the distance of the proposed buildings from the adjacent road network, screening from proposed buildings, and the location of amenity areas, and community external amenity areas noise levels within the site, the majority of the external amenity areas are predicted to fall within this range.

Summary

Considering the constraints of the site, insofar as possible and without limiting the extent of the development area, the principles of Good Acoustic Design have been applied to the development.

5.2.3.2.3 Element 2 – Internal Noise Levels

Internal Noise Criteria

Element 2 of the ProPG: Planning and Noise document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 2-7 and are based on annual average data.

ProPG: Planning and Noise and BS 8233 notes that where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

ProPG: Planning and Noise specifically noted that the more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form.

Noise Levels Across the Proposed Development

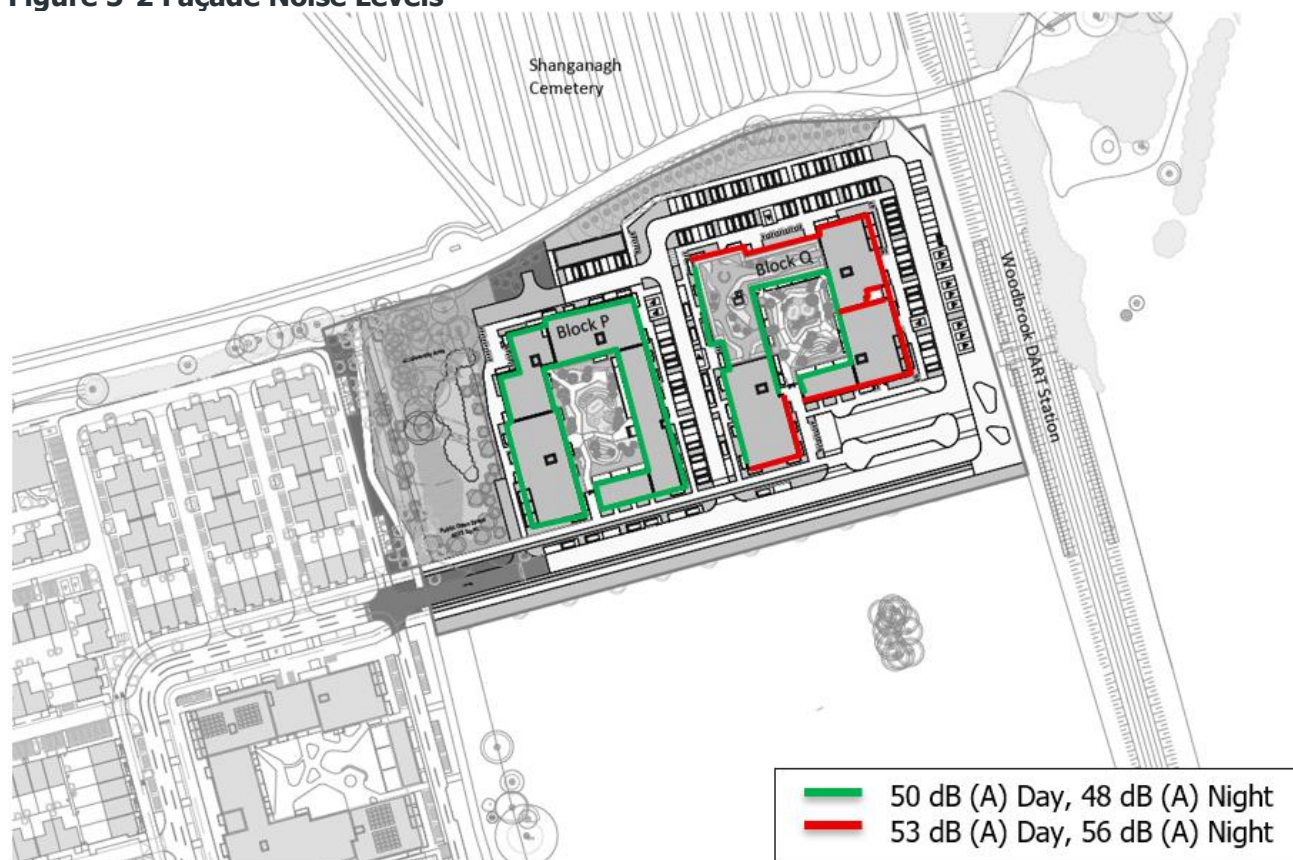
As demonstrated in section 5.2.3.1, the current or potential impact in relation to noise across the site is categorised as low to medium to high noise risk.

Façade Noise Levels

Where façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also ventilating the dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night no further mitigation is required.

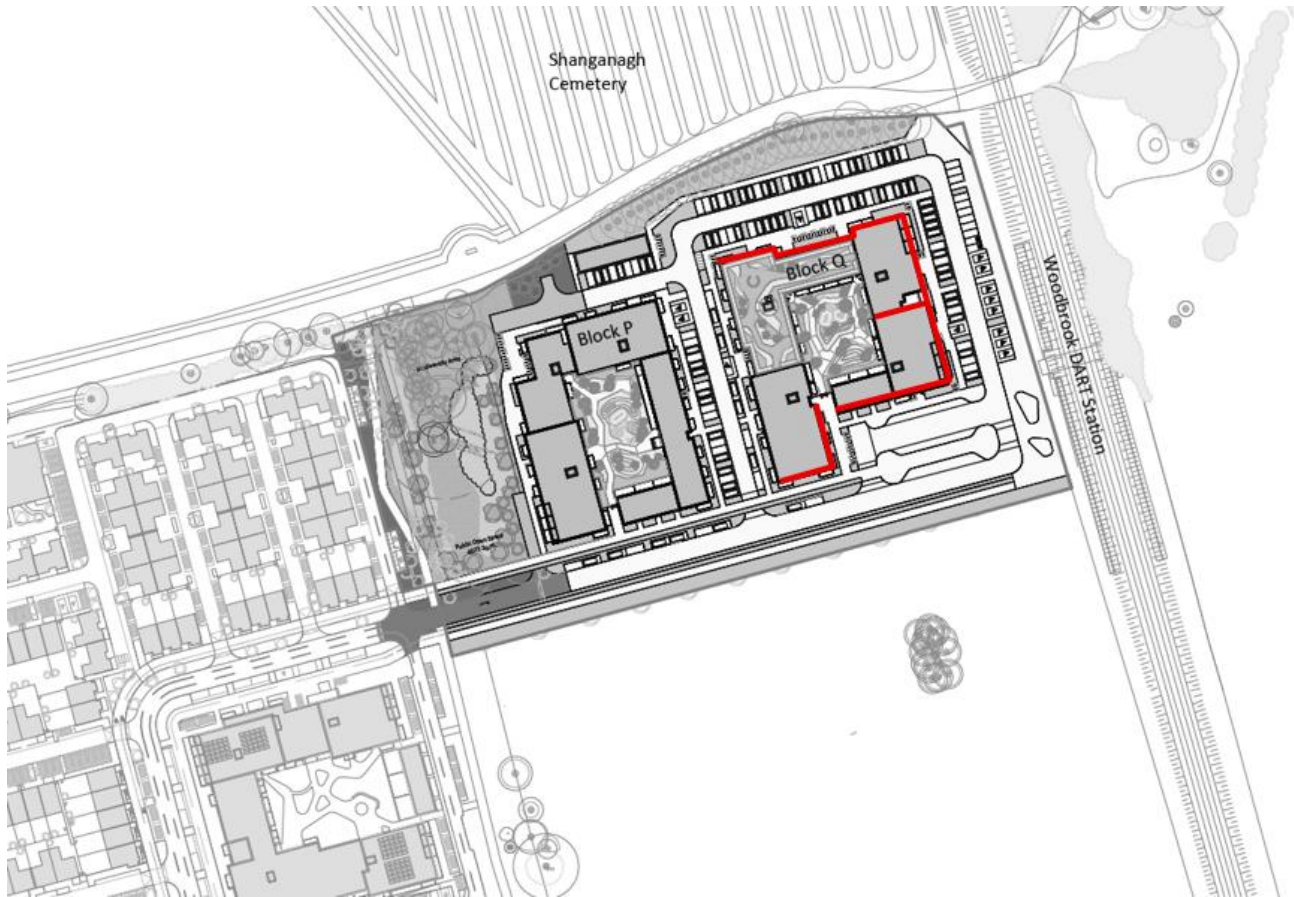
Figure 5-2 outlines the noise level incident on each façade of the proposed building. This has been determined based on the noise measurements taken and includes an estimate of the screening provided by the building themselves to those facades screened from the main roads around the site.

Figure 5-2 Façade Noise Levels



This data will be used to assess intrusive noise levels as part of this review.

Figure 5-3 Proposed Façade Treatment Areas



Proposed Façade Treatment

The British Standard BS EN 12354-3 provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths.

The Standard allows the acoustic performance of the building to be assessed taking into account the following:

- ▶ Construction type of each element (i.e. windows, walls, etc.);
- ▶ Area of each element;
- ▶ Shape of the façade, and;
- ▶ Characteristics of the receiving room.

The principals outlined in BS EN 12354-3 are also referred to in BS 8233 and Annex G¹ of BS 8233 which provides a calculation method to determine the internal noise level within a building using the composite

¹ The methodology contained within Annex G of BS8233 is based on the assumption that the source is a line source (such as a road) and that the building facades are simple, i.e. do not have balconies. These assumptions are considered valid for the purposes of this assessment and have been adopted.

sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS 8233 has been adopted here to determine the required performance of the building facades.

Glazing

As is the case in most buildings, the glazed elements and ventilation elements of the building envelope are typically the weakest element from a sound insulation perspective. In this instance it has been calculated that the various facades are to be provided with glazing that, when closed, achieve the minimum sound insulation performance as set out in Table 2-7.

Table 5-3 Sound insulation performance requirements for glazing, SRI (dB)

Zone	Nominal R_w (dB)	Octave Band Centre Frequency (Hz)					
		125	250	500	1k	2k	4k
Red (see Figure 5-3)	31	24	32	30	30	30	30

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. At this stage, there is no requirement for additional mitigation through glazing. The calculated glazing specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage if there are changes to the design. Consequently, these may be subject to change as the project progresses.

Wall Construction

In general, all wall constructions (i.e. block work, concrete and timber frame) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50 dB R_w for this construction.

Ventilation

Whilst the ventilation strategy for the development has been progressed, the final ventilation strategy will be in accordance with Part F of the Building Regulations and will be finalised at the detailed design stage.

It is understood that the ventilation strategy for the apartments will be mechanical. Therefore, a minimum $D_{n,e,w}$ (element normalised level difference) is not provided for vents serving the proposed residential units. Should the ventilation strategy change, a minimum specification will need to be explored at the detailed design stage to minimise the effects of intrusive noise.

Any penetrations in the façade to facilitate the mechanical ventilation strategy will be suitably designed at the detailed design stage so as not to compromise the overall sound insulation performance of the façade.

5.2.3.2.4 Element 3– External Amenity Area Noise Assessment

There are a variety of external amenity areas within the proposed development. Rooftop amenity areas are proposed along with other communal open spaces, a village square. Measured noise levels at UTT01 and UTT02 indicate that noise levels across the amenity areas are not expected to exceed the upper guideline value of 55 dB $L_{Aeq,16hour}$ outlined within ProPG.

5.2.3.2.5 Element 4– Assessment of Other Relevant Issues

Element 4 gives consideration to other factors that may prove pertinent to the assessment, these are defined in the document as:

- 4(i) compliance with relevant national and local policy
- 4(ii) magnitude and extent of compliance with ProPG
- 4(iii) likely occupants of the development
- 4(iv) acoustic design v unintended adverse consequences
- 4(v) acoustic design v wider planning objectives

Each is discussed in turn.

Compliance with Relevant National and Local Policy

There are no National policy documents relating to the acoustic design of residential dwellings relating to internal noise levels. However, the *Dublin Agglomeration Noise Action Plan 2024 – 2028* defines noise thresholds as discussed in Section 0.

This report has been prepared in compliance with the requirements of ProPG: Planning and Noise and therefore complies with the requirements of local policy.

Magnitude and Extent of Compliance with ProPG: Planning and Noise

As discussed within this report the following conclusions have been drawn with regards to the extent of compliance with ProPG: Planning and Noise:

The majority of bedrooms and living areas within the development have been designed to achieve the good level of internal noise levels specified within ProPG: Planning and Noise with windows closed and vents open. Where there are slight exceedances of the good internal noise levels these are below 5dB and thus a reasonable internal noise level is achieved in all instances.

The external amenity areas achieve the recommended noise design criteria.

Based on the preceding it is concluded that the proposed development is in compliance with the requirements of ProPG: Planning and Noise.

Likely Occupants of the Development

The criteria adopted as part of this assessment are based on those recommended for permanent dwellings, therefore the adopted criteria is considered robust and appropriate for the likely occupants.

Acoustic Design v Unintended Adverse Consequences

Unintended adverse consequences did not occur on this project.

Acoustic Design v Wider Planning Objectives

With reference to the *Dublin Agglomeration Noise Action Plan 2024 – 2028* the proposed development site is within an area where people are being brought to noise in the form of existing road and rail network in Shankill.

Through calculation and assessment this report recommends mitigation through improved glazing which will ensure good internal noise levels are achieved.

This report has demonstrated the noise insulation measures required to ensure that the proposed dwelling units achieve a good internal noise environment.

5.2.4 Operational Phase – Inward Vibration Assessment

The VDV levels in Table 3-6 demonstrate that the day and night VDV exposure level are orders of magnitude lower than the criteria discussed in Section 2.2.2.3.

No additional vibration mitigation measures are therefore required for the proposed development.

6. MITIGATION MEASURES

6.1 Construction Phase

The assessment detailed in Section 5 has determined that construction activities can operate within the adopted construction noise threshold levels at the closest NSLs for the majority of the construction phase, due to the distance from the works and the construction activities involved.

Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in section 2.2.1.2 to avoid any cosmetic damage to buildings.

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- ▶ Selection of quiet plant;
- ▶ Noise control at source;
- ▶ Screening; and
- ▶ Liaison with the Public.

Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, hours of work, and noise monitoring, where required.

6.1.1 Selection of Quiet Plant

The potential for any item of plant to result in exceedance of construction noise thresholds will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g. plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.

The appointed contractor will evaluate the choice of excavation, piling or other working method taking into account various ground conditions and site constraints. Where alternative lower noise generating equipment are available that will provide equivalent structural / excavation results, these will be selected to control noise within the relevant thresholds, where it is practicable to do so.

6.1.2 Noise Control at Source

The following measures will be implemented, if required, by the appointed contractor to control noise at source. These measures relate to specific site considerations:

- ▶ For mobile plant items such as dump trucks, cranes, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and / or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant will be switched off when not in use and not left idling.
- ▶ For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker "tool" and ensuring any leaks in the air lines are sealed.
- ▶ Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.

- ▶ Resonance effects in panel work or cover plates can be reduced through stiffening or the application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact.
- ▶ For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.

6.1.3 Screening

Screening is an effective method of reducing CNLs at a receiver locations and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver. Standard construction site hoarding (2.4 m in height) with a mass per unit of surface area greater than 7 kg/m² can provide adequate sound insulation. This is recommended as a minimum around the northern site boundaries of the proposed development site.

Erection of localised demountable enclosures or screens will be used around piling rigs, breakers or drill bits, as required, when in operation in proximity to NSLs with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (Figures B1, B2 and B3) provides typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on-site from standard materials. A well placed and designed mobile temporary screen around a pile, breaker or excavation can effectively reduce noise emissions by 10 dB(A).

In addition, careful planning of the construction site layout will also be considered. The placement of site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening.

6.1.4 Hours of Work

Working hours for the proposed development site are set within the CEMP. Sunday or Bank Holiday work will only take place periodically at the agreement with DLRCC. Similarly, any other out of hours working will be only permitted by arrangement with site management and DLRCC.

6.1.5 Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity, the CLO will inform the nearest NSLs of the time and expected duration of the noisy works.

6.1.6 Monitoring

During the construction phase the contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017).

6.1.7 Vibration Control

The likely vibration levels associated with construction activities associated with the proposed development are not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to buildings.

Vibration from construction activities will be limited to the values set out in Table 2-3 to avoid any form of potential cosmetic damage to buildings and structures. Monitoring will be undertaken at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values in Table 2-3.

6.2 Operational Phase

6.2.1 Traffic Along Surrounding Road Network

Changes to traffic flows will result in a not significant increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary in this case.

6.2.2 Mechanical Plant and Services

With consideration at the detailed design stage, the selection and location of plant items within the proposed development and associated buildings will ensure that noise emissions from any mechanical and electrical building services plant do not exceed the relevant noise criteria within Section 2.2.2.2; therefore no further mitigation is required. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements.

Once operational noise emissions are controlled within the development site, there will be no perceptible noise impact at sensitive receivers off-site.

6.2.3 Inward Impact

Mitigation is listed by the way of minimum sound insulation requirements within Section 5.2. Notwithstanding this, as part of the detailed design of all residential blocks, the specifics in terms of octave band SRI performances will be reanalysed to take account of the finalised room layouts, room volumes and glazing dimensions.

7. RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

7.1 Construction Phase

The use of best practice noise control measures, hours of operation, scheduling of works within appropriate time periods, and noise monitoring during this phase will be implemented. With the inclusion of the various noise and vibration control measures on site discussed in Section 10.6.1, it is expected that calculated noise levels in Table 5-2 can be reduced by 5 dB.

After the implementation of mitigation measures, construction noise levels are likely to fall within the adopted CNT of 65 dB $L_{Aeq,T}$ at residential receptors during all stages of construction. Referring to Table 2-2, there is therefore potential for a residual minor impact at these NSLs during the construction phase of the proposed development

The residual effect of construction noise and vibration is minor.

7.2 Operational Phase

Noise levels from any building services plant within the development site will be controlled to not exceed the internal noise levels within section 2.2 for residential dwellings within the proposed development.

Traffic along the surrounding road network will not lead to a change in noise level that is unchanged and negligible.

7.3 Inward Impact

Noise levels inwards on the proposed development have been measured, calculated and assessed. Mitigation measures in the way of mechanical ventilation with enhanced glazing have been specified to ensure that good or reasonable internal noise levels are achieved across the proposed development.

7.4 Cumulative Impact

In the event that construction activities at nearby sites are taking place concurrently with the construction of the proposed development, there is potential for cumulative noise impacts to occur. Due to the nature of construction works associated with the proposed development, noise levels from this site will dominate the noise environment when occurring in proximity to the closest noise sensitive locations along its immediate boundary. The noise contribution from other construction sites would need to be equal to those associated with the closest site in order to result in any cumulative effect.

The operational noise limits set for on-site buildings are designed to avoid any significant increase in the prevailing background noise environment external to the site. Operational noise limits included in this report refer to cumulative noise from all fixed installations on site. The design of plant and other fixed installations will be progressed during the design stage to ensure the noise limits at off-site noise sensitive locations are not exceeded.

At operational stage, cumulative noise impacts associated with the proposed development and other developments in the area are most likely to be associated with increase noise associated with traffic. An increase of +3 dB represents a worst case scenario of a doubling in volume of traffic, representing a perceptible minor change, with reference to Table 2-6. In conclusion, there is potential for a temporary increase in cumulative construction noise if various stages of the construction works within the development take place concurrently, or other developments occur at the same time. Residual cumulative effects related to the construction phase, post-mitigation, are likely to be not significant. This is also true for the operational phase, provided that the operational noise levels outlined in section 2.2.2 are adhered to during the detailed design, and the mitigation measures specified in section 6 are followed.

8. MONITORING

8.1 Construction Phase

During the construction phase, the contractor for each site will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017).

8.2 Operational Phase

There are no proposed monitoring requirements associated with the operational phase of the proposed Development.

9. CONCLUSIONS

A comprehensive assessment of potential road and rail noise and vibration intrusion affecting the proposed development has shown that an appropriate environment can be achieved through the use of enhanced glazing specifications and mechanical ventilation on selected building facades at the design stage.

As discussed previously, the intention is to achieve the recommended internal noise criteria. This report has demonstrated that the internal noise criteria can be achieved through careful selection of the façade elements at design stage. However, it should be noted that the above specifications are presented as preliminary specifications, other combinations of façade elements and specifications may also be selected to achieve the internal noise criteria at the design stage.

Noise related effects during the construction phase of the project are predicted to be minor at the nearest noise sensitive locations.

During the operational phase of the project it is predicted that there the impact of the proposed development on the nearest noise sensitive locations will be neutral to negligible.

The resultant situation is considered to represent best Irish practice in keeping with the requirements of the *Dublin Agglomeration Noise Action Plan 2024 – 2028*, the Urban Design Manual and good practice internal noise criteria derived from *British Standard 8233: 2014: Guidance on sound insulation and noise reduction for buildings* and *ProPG Planning and Noise: Professional Practice Guidance on Planning and Noise*.

10. REFERENCES

- ▶ British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise.
- ▶ BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014b).
- ▶ British Standard BS EN 12354-3: 2000: Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound
- ▶ BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (BSI 1993).
- ▶ BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (BSI 2008).
- ▶ BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.
- ▶ BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BSI 2019).
- ▶ UK Highways England (UKHE) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (UKHE 2020).
- ▶ S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018.
- ▶ S.I. No. 241/2006 – European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006.
- ▶ International Organization for Standardization (ISO) 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors (ISO 2024).
- ▶ ISO 1996-1: 2016 Acoustics – Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (ISO 2016).
- ▶ ISO 1996-2:2017 – Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels (hereafter referred to as ISO 1996 – 2) (ISO 2017).
- ▶ The UK Department of Transport Calculation of Road Traffic Noise (UK Department of Transport 1998).
- ▶ The Professional Guidance on Planning & Noise (ProPG): New Residential Document and Supplementary Documents (2017).
- ▶ ISO 9613-2 2024: Part 2 Engineering method for the prediction of sound pressure levels outdoors.