WAVE DYNAMICS
ACOUSTIC CONSULTANTS

Whitestown Way LRD

Acoustic Design Statement
13 May 2026

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Executive Summary

Wave Dynamics were engaged by ARP 4.2 Sustainable Communities (Ireland) Fund as the acoustic consultants to undertake an inward noise impact and external amenity noise assessment, a construction noise and vibration assessment and operational noise assessment for the 'Large-Scale Residential Development' (LRD) proposed at Whitestown Way, Tallaght, Dublin 24.

Inward Noise Impact Assessment

A Stage 1 and Stage 2 ProPG assessment has been undertaken. As part of the stage one assessment to categorise the site, a baseline noise survey was undertaken to measure the existing noise levels. Following a review of the noise levels on the site, including the L_{AFmax} and $L_{Aeq,}$ the site has been characterised as low risk for daytime noise and medium risk for nighttime noise, therefore mitigation measures are required to control the onset noise levels. Both internal noise levels and external noise levels in amenity areas have been considered in the ProPG assessment, as summarised below.

Internal Noise Levels: Following the baseline survey, a noise impact assessment was undertaken, this included break-in noise calculations to predict the internal noise levels from road traffic noise. Consideration has also been given to the future growth of the roads. Following the assessment, the building envelope performance requirements were determined. The performance specification for the building envelope has been provided in this report which includes the external walls, glazing, roof and ventilation requirements.

External Noise Levels: The external amenity spaces on the development includes balconies, a podium level courtyard garden, public open space and ground level plaza. Appropriate amenity has been provided for residents using the available amenity space across the development. This is in line with element 3(v) of ProPG. Based on the measured noise levels at the site it is predicted that all of the external noise levels in external amenity spaces, aside from the majority of the ground level plaza and balconies facing onto Whitestown Way, will achieve the ProPG recommendations for desirable external amenity noise levels of 50-55dB $L_{Aeq,16hour}$.

Construction Noise & Vibration Impact

The construction noise impact is predicted to exceed the BS 5228 significance thresholds without any mitigation measures for the Site Set Up, Substructure and Superstructure stages of the project.

General and site-specific mitigation measures have been provided in this report to bring the construction noise levels down within the limits of BS 5228. Following the noise mitigation recommendations in this report, the construction phase is expected to meet the requirements of BS 5228, based upon the information provided to WDA. In addition to the mitigation measures, recommendations have been provided in this report for construction noise monitoring.

Operational Noise Emissions

An operational noise impact assessment has been conducted to assess noise generated from building services plant, external amenity spaces, car parking and an outdoor play area. It is predicted that operational noise from the proposed development will not cause a negative noise impact on the nearby noise sensitive locations during both daytime and nighttime operations The final mechanical plant and equipment selections have not been made at this stage of the project. Specific noise limits have been provided in this report for mechanical plant and equipment, at design development stage once the plant and equipment information are available it should be assessed for compliance with the criteria outlined in this report.

Table of Contents

1 Introduction

Wave Dynamics were engaged by ARP 4.2 Sustainable Communities (Ireland) Fund as the acoustic consultants to undertake an inward noise impact and external amenity noise assessment, a construction noise and vibration assessment and operational noise assessment for the 'Large-Scale Residential Development' (LRD) proposed development at Whitestown Way, Tallaght, Dublin 24.

The description of the proposed development is provided below:

> *ARP 4.2 Sustainable Communities (Ireland) Fund intends to apply for permission for the development of a 'Large-Scale Residential Development' (LRD) at a site of approximately 1.32 Ha principally located at Whitestown Way, Dublin 24. The site is generally bound: to the east by Whitestown Way; to the south by Riverside Business Park; to the west by Whitestown Road / Whitestown Industrial Estate, undeveloped lands and the Vita Actives premises; and to the north by, the Vita Actives premises and The Arena mixed-used development. It also extends to include part of Whitestown Way for junction, road infrastructure and landscape works.*
>
> *The proposed development principally comprises the construction of a mixed-use development in 2 No. blocks (Block A to the east and Block B to the west) with a gross floor area of 14,976.5 sq m (excluding undercroft car parking area of 1,975.8 sq m) and ranging in height from 1 No. storey to 6 No. storeys. The blocks are connected via a single-storey undercroft/podium level. The development includes: 169 No. residential units (80 No. 1-bed, 85 No. 2-bed and 4 No. 3-bed); 2 No. class 1 / class 2 commercial units (totalling 356.5 sq m); and a crèche (162.8 sq m) with external play area.*
>
> *The development also comprises: new street and turning head at the site's southern side and junction with Whitestown Way to the east; 77 No. car parking spaces, with 66 No. within the undercroft car parking area and 11 No. on-street; 2 No. set-down bays; cycle parking; hard and soft landscaping, including public open space, communal amenity space and incidental spaces; private amenity spaces (as balconies and terraces facing all directions); boundary treatments; sub-station; plant/operational rooms; bin stores; public lighting; green roofs; rooftop plant, PV arrays, lift overruns, telecommunications infrastructure and automatic opening vents; and all associated works above and below ground.*

Appendix A outlines a glossary of the acoustic terminology used in this report.

1.1 Statement of Competence

This report was completed by Wave Dynamics, an acoustic consultancy that specialises in noise and vibration. Our consultants have completed numerous similar projects in the Ireland the UK and Europe.

This assessment and report were completed by Cathal Reck | Acoustic Consultant, Cathal has experience of numerous planning stage assessments. Cathal's qualifications include; BSc (Hons) in Music Technology & Production, IOA Certificate of Competence in Environmental Noise Measurement and a Certificate in Building Acoustics and Noise Control. Cathal is a member of the Institute of Acoustics and a SITRI certified sound insulation tester.

This report was peer reviewed by James Mangan, Director (Acoustics) with Wave Dynamics who has over 25 years experience in planning stage noise impact assessments and noise complaint investigation. He holds a Diploma in Acoustics and Noise Control (Institute of Acoustics) and is a Member of the Institute of Acoustics (MIOA). James is the former Chair of the Irish Branch of the Institute of Acoustics.

2 Site Description

The site is located at Whitestown Way, Tallaght, Dublin 24. The site is bounded by commercial and industrial developments to the northwest, south and east. Residential and hotel receptors to the north and east.

Figure 1: Site Location, Measurement Location A1-A3 and the Surrounding Area.

3 Project Criteria

The acoustic criterion for the project is set out in this section, the purpose of the criteria is to ensure reasonable:

- Internal noise levels,
- External amenity noise levels.
- Construction noise and vibration, and
- Operational noise.

To provide adequate conditions Wave Dynamics have developed the project criteria for:

- Façade sound insulation performance,
- Ventilation requirements,
- External amenity requirements,
- Construction noise and vibration, and
- Operational noise.

Assessment Standards

The criteria for the project have been developed based on the following industry standards:

- ✓ BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.
- ✓ Dublin Agglomeration Noise Action Plan 2024 – 2028.
- ✓ ProPG Professional Practice Guidance on Planning & Noise.
- ✓ BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings.
- ✓ BS 5228-1 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- ✓ BS 5228-1 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration
- ✓ BS 4142 2014-A1 2019: Methods for rating and assessing industrial and commercial sound.
- ✓ EPA NG4: Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities.
- ✓ ISO 1996-1:2016 Acoustics — Description, measurement, and assessment of environmental noise — Part 1: Basic quantities and assessment procedures
- ✓ Previous experience on similar projects.
- ✓ S32D LRD Opinion.

3.1 S32D Opinion

The opinion relates to the large-scale residential development proposed at Whitestown Way and outlines the following in relation to noise:

> *"A comprehensive Acoustic Design Statement, as per current relevant guidance, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out within. The applicant should give due regard to any existing commercial/industrial/mixed-uses and their associated operational parameters within the final analysis submitted."*

The request for a comprehensive Acoustic Design Statement as per relevant guidance and regard for any existing commercial and industrial noise sources has been considered as part of this report.

3.2 Inward Noise

The internal ambient noise levels requirements have been developed from the following standards:

Dublin Agglomeration Noise Action Plan 2024 - 2028

The Dublin Agglomeration Noise Action Plan 2024 – 2028 states the following with respect to the prevention of excessive noise levels for proposed new developments:

> *"Applications for new residential developments in the Agglomeration will be assessed in accordance with the policies and goals outlined in the relevant City and County Development Plans. Where applicable, these include adoption of the principles of Professional Planning Guidance (ProPG) on Planning & Noise: New Residential Development, as described in Section 7.5.1.*
>
> *Where the assessment outcome determines the likelihood of an adverse noise impact, planning applications should be supplemented by an Acoustic Design Statement carried out by appropriately qualified acousticians and competent persons."*

ProPG: Professional Practice Guidance on Planning & Noise

ProPG 2017 is used to assess airborne noise from transport sources including road, rail and aircraft noise. The aim of the document is to provide a good design process which considers the internal acoustic environment at an early stage in the design process. The guidance was prepared by the Institute of Acoustics, the Association of Noise Consultants and the Chartered Institute of Environmental Health and is based on the findings by the World Health Organisation in relation to noise impact on humans. Its adoption is considered best practice for assessing the potential noise impact on the future occupants for residential developments.

The guidance is primarily designed for residential developments however it can be applied to other development types including developments where people require appropriate noise levels for rest and sleep. This includes residential care homes, hospitals etc. The guidance advocates a holistic design process which considers the site, its location and likely suitability for the development at an early stage.

The two primary stages of the ProPG design approach are summarised as follows:

Stage 1 – The first stage is to undertake an initial high-level noise risk assessment of the proposed site considering the noise levels (measured and or predicted) to identify any noise risks. This would include consideration of the current noise environment, future use and future noise levels ; and,

Stage 2 –The second stage is a full detailed assessment of the proposed development covering the "*Four Key Elements*":

1. *"Good Acoustic Design Process,*
2. *Internal Noise Level Guidelines,*
3. *External Amenity Area Noise Assessment; and*
4. *Assessment of Other Relevant Issues."*

As part of the process an Acoustic Design Statement is produced and submitted to the planning authority. This document sets out the design process used to come to the conclusions and recommendations in the report.

Following the ProPG the following conclusions are recommended by ProPG in relation to the findings of the Acoustic Design Statement based one the recommendations of the Acoustic Consultant:

a. *"Planning consent may be granted without any need for noise conditions;"*
b. *"Planning consent may be granted subject to the inclusion of suitable noise conditions; "*

c. *"Planning consent should be refused on noise grounds in order to avoid significant adverse effects ("avoid"); or, "*
d. *"Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects ("prevent")."*

Section 3 of the ProPG outlines the recommended approach decision makers should following in coming to their conclusions based on the recommendations of the Acoustic Design Statement Figure 2 illustrates the ProPG approach.

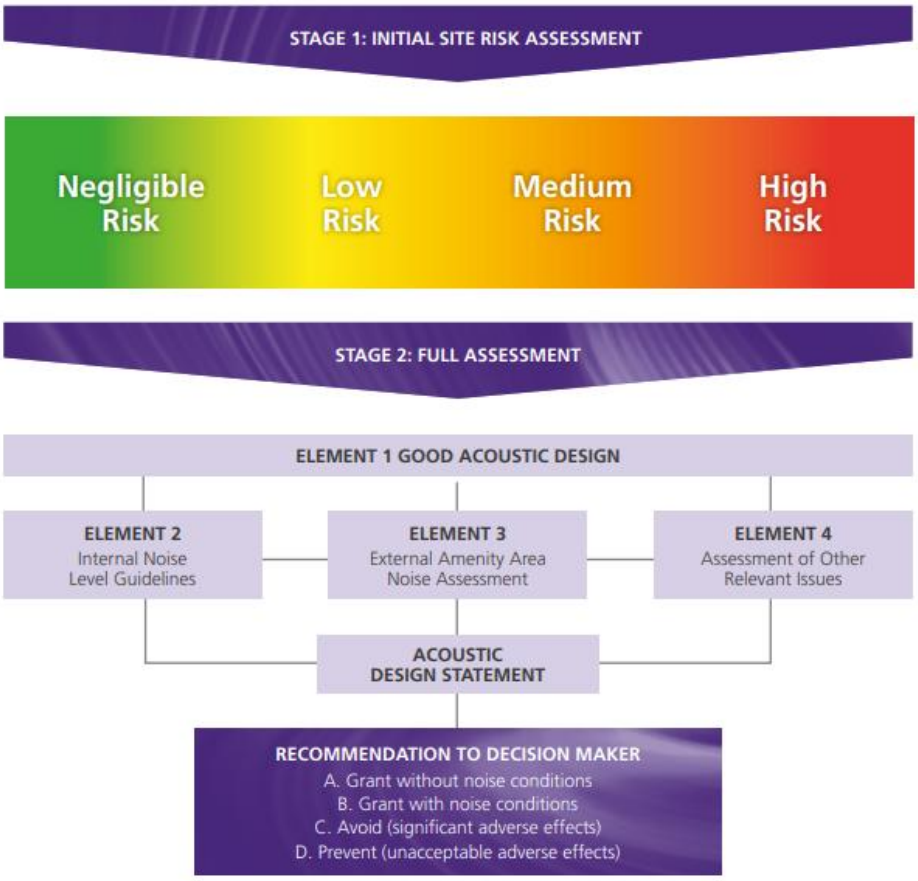


Figure 2: Summary of overall ProPG approach

Internal Noise Levels

Table 1 outlines the recommended internal noise levels from BS 8233:2014 within living accommodation for residential buildings for dining, resting and sleeping. These limits are in line with the ProPG and the World Health Organisation Guidelines.

Table 1: BS 8233:2014 internal noise criteria –Residential Buildings.

Activity	Location	07:00 to 23:00 Hrs	23:00 to 07:00 Hrs
Resting	Living Room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$ 45dB L_{AFmax} (See Note 1)

1: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could

require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB L_{AFmax} more than 10 times a night.

External Amenity Space Noise Levels

With regard to noise levels in external amenity spaces ProPG 2017 refers to the BS8233:2014 guidance which states that:

> "*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 $L_{Aeq,16hr}$".*

It also states that:

> *"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."*

After mitigation/with mitigation if the adverse noise impacts are still above the recommended noise levels they can be offset by providing an alternative amenity space to partially offset the noise impact by providing access to:

- *"a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or*
- *a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations."*

BS 8233:2014 elaborates on this further, it acknowledges that it may not always be necessary or feasible to ensure that noise levels remain within the guideline values. In respect of gardens and patios, BS 8233:2014 states:

> *"however it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."*

Both BS8233:2014 and ProPG 2017 do not advise that development should be restricted in areas with undesirable noise levels. The standards recommend that mitigation measures are put in place where practicable to achieve the recommended noise levels for the external amenity spaces. It notes that this may not be practical in all situations and local or governmental policy should take precedence in these situations.

Noise Emissions from Nearby Industrial Units to the Proposed Development

Section 2.13 – 2.15 of ProPG provides guidance for a scenario where a proposed new residential development is proposed in an area where future residents may be exposed to industrial and/or commercial noise. In this instance ProPG states:

> *2.13 As stated in the Introduction, the scope of this ProPG is restricted to sites that are exposed predominantly to noise from transportation sources.*
> *The key concerns regarding new residential development near existing industrial and/or commercial land uses are:*
>
> - *The future occupants of the new noise sensitive development may be subject to adverse effects of noise, and*
> - *The existing industrial and/or commercial business may become subject to complaints from future occupants of the new noise sensitive development and at risk of having to modify operations and/or incur additional costs.*
>
> *2.14 In the special case where industrial or commercial noise is present on the site but is "not dominant" (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk (and if included, this should be clearly stated).*
>
> *2.15 Where industrial or commercial noise is present on the site and is considered to be "dominant" (i.e. where the impact would be rated as adverse or greater (subject to context) if a BS4142:2014 assessment was to be carried out), then the risk assessment should not be applied to the industrial or commercial noise component and regard should be had to the guidance in BS4142:2014. The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient*

In this instance, a separate BS 4142 assessment of industrial noise to future apartment occupants is not deemed necessary, due to industrial noise not being the dominant source. The contribution of industrial noise to the measured and modelled noise levels are therefore included in the ProPG risk assessment.

3.3 Construction Noise & Vibration

3.3.1 Construction Noise

There is currently no statutory Irish guidance for construction noise requirements from noise during the construction phase of a project.

In the absence of specific noise limits, the appropriate criteria for the allowable construction noise levels may be found in British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.

The standard (BS5228-1:2009+A1) provides examples of acceptable limits for construction and/or demolition noise in both subjective and objective form. For example, paragraph E.2 of the standard states:

> *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."*

Paragraph E.2 goes on to state:

> *"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:*
>
> - *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
> - *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

Typically, the local councils refer to BS 5228 Part 1 as a method to control construction noise from sites on the local environment. This standard is therefore the de facto appropriate standard in the absence of regulatory guidance.

Based on paragraph E.2 of BS 5228 the following criteria is adopted for this project:

- For residential properties it is considered appropriate to adopt the 65dB(A) criterion.

Table 2 below outlines the project criteria in tabular form.

Table 2: BS 8233:2014 threshold levels.

Assessment category and threshold value period	Threshold value, in decibels (dB) (L_{Aeq})		
	Category A[1]	Category B [2]	Category C[3]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 14:00)	65	70	75
Evenings and weekends [4]	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

1) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
2) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
3) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category B values.
4) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

3.3.2 Construction Vibration

Best practice guidance is taken from British Standard BS 5228:2009 + A1 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2 Vibration.

The standard recommends that for a soundly constructed residential property and similar structures (in good repair), the threshold for minor or cosmetic (i.e. non- structural) damage should be taken as a Peak Particle Velocity (PPV) (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:

Table 3: Likely Construction Noise Impact

Allowable vibration (in terms of peak practice velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:			
Building Type	**Less than 15 Hz**	**15 to 40 Hz**	**40 Hz and above**
Light framed structures/ residential buildings	15mm/s	20 mm/s	50 mm/s

3.4 Operational Noise

Local authorities can set noise limits from typical residential developments pertaining to noise however there is currently no national policy for operational noise limits from residential developments for planning noise assessments. Noise limits for new developments are typically sought from local council's noise action plan, EPA NG4 or BS4142. On review of the Dublin Agglomeration Noise Action Plan no specific guidance has been outlined for noise limits from residential premises and therefore the criteria from EPA NG4 and BS4142 has been adopted for the project.

BS 4142:2014+A1:2019

The standard describes a method for the assessment of commercial, industrial and background noise to quantify its impact on persons outside of a residential dwelling. BS 4142 has become the de facto standard for compliance investigation. In addition to the specified broadband noise levels the standards provide objective and subjective methods for the assessment of the impulsivity and tonality of the noise sources. This allows for a penalty/ correction to be applied to the measured noise level of the source (L_{Aeq}) to give the rating level ($L_{Ar,T}$).

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

Adverse impacts include, but are not limited to, annoyance and sleep disturbance.

- Response to sound can be subjective and is affected by many factors, both acoustic and non-acoustic. The significance of its impact, for example, can depend on such factors as the margin by which a sound exceeds the background sound level, its absolute level, time of day and change in the acoustic environment, as well as local attitudes to the source of the sound and the character of the neighbourhood.

EPA NG4

EPA NG4 outlines that noise attributable solely to onsite activities from a licenced premises should not exceed the following limits:

- *Daytime (07:00hrs – 19:00hrs) – 55dB $L_{Ar,T}$*
- *Evening (19:00hrs – 23:00hrs) – 50dB $L_{Ar,T}$*

- *Night time (23:00hrs – 07:00hrs) – 45dB $L_{Aeq,T}$*

During daytime and evening periods rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations. A penalty of 5dB for tonal and/or impulsive elements is to be applied to the daytime and evening measured $L_{Aeq,T}$ values to determine the appropriate rating level ($L_{Ar,T}$). In all cases, an assessment by a competent person will be required.

During the night-time period no tonal or impulsive noise from the facility should be clearly audible or measurable at any NSL.

4 Baseline Noise Survey

An attended noise survey was conducted to quantify the existing noise environment and current noise levels experienced at Whitestown Way and the surrounding existing residential areas. The purpose of the measurements is to quantify the existing noise environment to assess the break in noise.

4.1 Survey Details

4.1.1 Site Description and Measurement Locations

The site is located at Whitestown Way, Tallaght, Dublin 24. The site is bounded by commercial and industrial developments to the northwest, south and east. Residential and hotel receptors to the north and east.

Figure 3: Site Location, Measurement Location A1-A3 and the Surrounding Area.

4.1.2 Description of Measurement Locations

This section outlines the description of the measurement locations chosen during the baseline noise survey.

A1: Measurements undertaken at location A1 encompass the noise climate to the north of the development, and directly capture noise emissions from Whitetstown Way to the east of the development, along with operational noise from the Arena Retail Park to the north, this includes noise from cars entering and exiting the premises.

A2: Measurements undertaken at location A2 encompass the noise climate to the south of the development which captures noise from Whitestown Way and operational noise from Riverside Business Park to the south of the development.

A3: Measurements undertaken at A3 directly capture operational noise from the Riverside Business Park located to the south and west of the development.

4.1.3 Survey Methodology and Personnel

The attended survey was completed by Joe Potter (Technical Engineer) on the 19th of November 2025 between the hours of 05:00hrs – 08:00hrs.

Attended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using ISO Class 1 sound analysers. Attended measurements were taken at A1-A3 as seen in Figure 3. Care was taken to avoid any effect on the measurement of extraneous noise, acoustic vibration, or interference. During the attended noise measurements, the sound level meter was positioned at approximately 1.5m above the ground level. The weather conditions were calm (wind less than 5m/s) with no rain, a wind shield was used for the duration of the attended surveys. The noise logger was calibrated before and after the survey and no significant drift was noted.

Figure 4: Attended Measurement Location A1.

Figure 5: Attended Measurement Location A2.

Figure 6: Attended Measurement A3.

4.1.4 Survey Period

The attended noise measurements were undertaken on the 19th of November 2025.

4.1.5 Noise Measurement Equipment

A Class 1 sound level meter/noise logger in general accordance with IEC 61672-1:2013 was used for the attended measurements. Table 4 below summarises the measurement equipment used.

Table 4: Noise Measurement Equipment

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Sound Level Meter	SLM1	Nor140 Sound Level Meter	1405554	TCRT25/1709	17/09/2027
Sound Level Meter	SLM 8	Nor 140 Sound Level Meter	1403345	SLM250258	09/05/2027
Calibrator	CAL7	Cirrus CR 515	107358	45748-107358-CR515	31/03/2026

4.1.6 Subjective Noise Environment

During the attended noise survey, the following noise sources were identified:

- Road traffic noise from Whitestown Way and Whitestown Road,
- Operational noise from industrial units in the locality.

4.1.7 Weather Conditions for Monitoring Period

Good weather conditions were noted in general during the deployment and collection during the attended survey, with winds of less than 5 m/s and no rain.

Where weather conditions during the unattended survey impacted on the results they were filtered where required.

4.2 Noise Measurement Results

Attended measurements were taken to measure the noise levels across the site. This section outlines the results of the attended noise measurements.

4.2.1 Attended Measurement Results

Table 5 outlines the results of the attended measurement survey.

Table 5: Attended Noise Measurement Results

Measurement					Measured Noise Levels (re 20µPa)		
Location	Coordinates	Date	Time (hrs)	Duration (mins)	L_{Aeq} dB	L_{AFmax} dB	L_{A90} dB
A3	53°16'54.9N 6°22'33.5W	19/11/2025	05:15	15	59	75	58
A1	53°16'57.4N 6°22'31.1W	19/11/2025	05:23	15	55	74	50
A2	53°16'54.7N 6°22'30.9W	19/11/2025	05:36	15	49	55	48
A1	53°16'57.4N 6°22'31.1W	19/11/2025	05:41	15	65	79	52
A3	53°16'54.9N 6°22'33.5W	19/11/2025	05:56	15	55	62	50
A2	53°16'54.7N 6°22'30.9W	19/11/2025	06:00	15	58	66	52
A1	53°16'57.4N 6°22'31.1W	19/11/2025	06:14	15	62	72	54
A3	53°16'54.9N 6°22'33.5W	19/11/2025	06:19	15	57	69	53
A2	53°16'54.7N 6°22'30.9W	19/11/2025	06:31	15	59	66	54
A1	53°16'57.4N 6°22'31.1W	19/11/2025	06:38	15	63	72	55
A3	53°16'54.9N 6°22'33.5W	19/11/2025	07:03	60	56	78	52
A1	53°16'57.4N 6°22'31.1W	19/11/2025	07:23	15	60	69	56
A1	53°16'57.4N 6°22'31.1W	19/11/2025	07:40	15	60	68	55
A1	53°16'57.4N 6°22'31.1W	19/11/2025	07:56	15	58	69	53
A2	53°16'54.7N 6°22'30.9W	19/11/2025	08:06	60	61	76	55
A1	53°16'57.4N 6°22'31.1W	20/11/2025	05:25	15	62	74	48
A3	53°16'54.9N 6°22'33.5W	20/11/2025	05:30	15	52	65	50
A2	53°16'54.7N 6°22'30.9W	20/11/2025	05:45	15	58	66	52
A3	53°16'54.9N 6°22'33.5W	20/11/2025	05:50	15	53	67	51
A1	53°16'57.4N 6°22'31.1W	20/11/2025	06:03	15	61	71	51
A3	53°16'54.9N 6°22'33.5W	20/11/2025	06:05	15	53	64	51
A1	53°16'57.4N 6°22'31.1W	20/11/2025	06:20	15	62	74	54
A3	53°16'54.9N 6°22'33.5W	20/11/2025	06:22	15	54	63	53
A2	53°16'54.7N 6°22'30.9W	20/11/2025	06:40	15	59	65	57
A3	53°16'54.9N 6°22'33.5W	20/11/2025	06:43	15	55	61	51

4.2.2 Spectral Analysis

This section outlines the spectral analysis undertaken on the A3 measurement locations which were taken along the proposed façade boundary facing the industrial estate to the west of Whitestown Way. The analysis considers 1/3 Octave spectra of the measurements undertaken at A3 on the 20th of November 2025, which were noted as containing a contribution to noise from the nearby industrial premises. Figure 7 outlines the spectral analysis and it can be observed that there is no tonal characteristics present (ref. the EPA NG4 method of "*Identification and Rating of Tonal Noise Emissions*"). The presence of tonal noise characteristics would indicate unwanted sound characteristics from plant and equipment, such as a whine, hiss, screech, or hum etc., that would increase the likelihood of future complaint. Additionally, based on site observations the dominant noise source in the area was road traffic which indicates that noise from the industrial premises is not a dominant or significant source. This can be verified in Figure 7 which outlines a steady rise in measured noise levels in 'Measurement 5' which was taken closer to the morning rush hour than the previous 4 measurements, the increase indicates elevated road traffic is the dominant noise source.

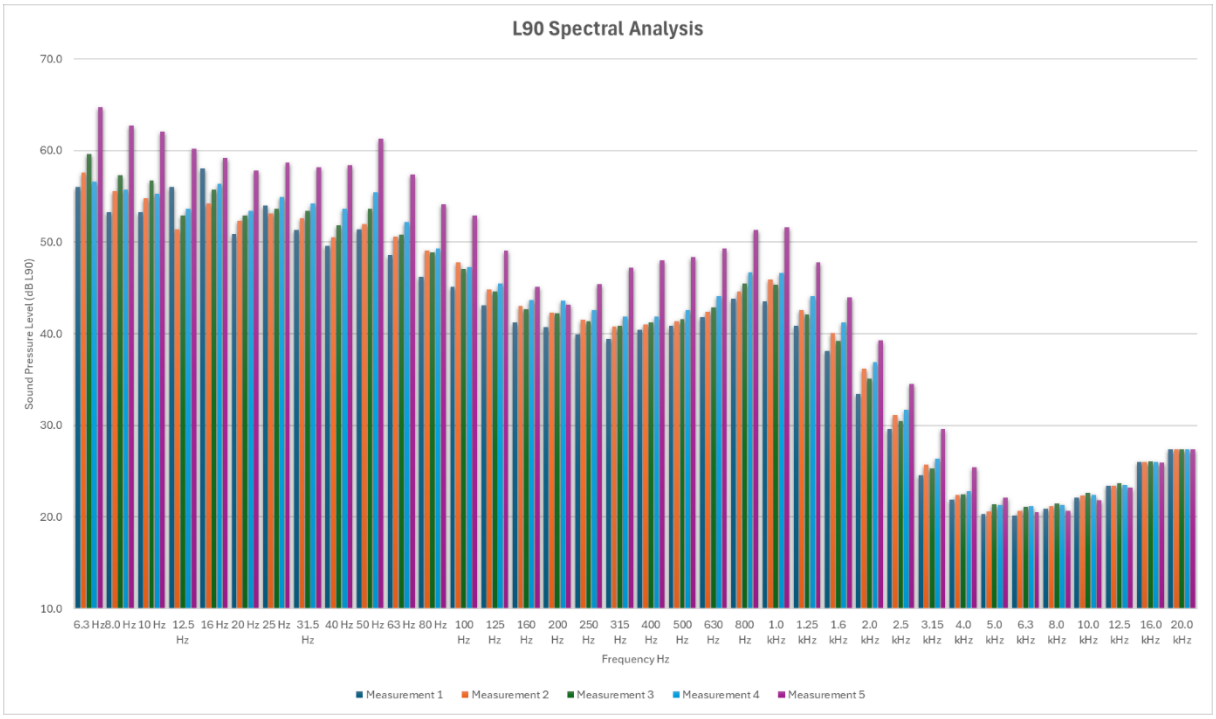


Figure 7: L90 Spectral Analysis.

As outlined in ProPG guidance industrial and commercial noise sources have been included in the assessment where the noise is present but not dominant, as outlined above it can be seen that the industrial noise is not dominant in the area due to the evident increase in levels due to road traffic noise. Therefore, a separate BS 4142 assessment for industrial noise is not deemed required under ProPG guidance due to industrial noise not being the dominant source.

5 ProPG Assessment

5.1 ProPG Stage 1

The stage one risk assessment is used to assess the site for potential risks that may occur in terms of noise impact. The ProPG sets out four categories of risk:1) negligible, 2) low, 3) medium or 4) high risk. Figure 8 illustrates the ProPG risk assessment and the values associated with each risk category.

The risk assessment also considers the risk based on the number of L_{AFmax} events per night as follows;

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

Paragraph 2.9 of ProPG states that,

> *"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."*

To assess the noise impact with the ProPG risk categories a baseline noise survey was undertaken on the site to quantify the existing noise environment.

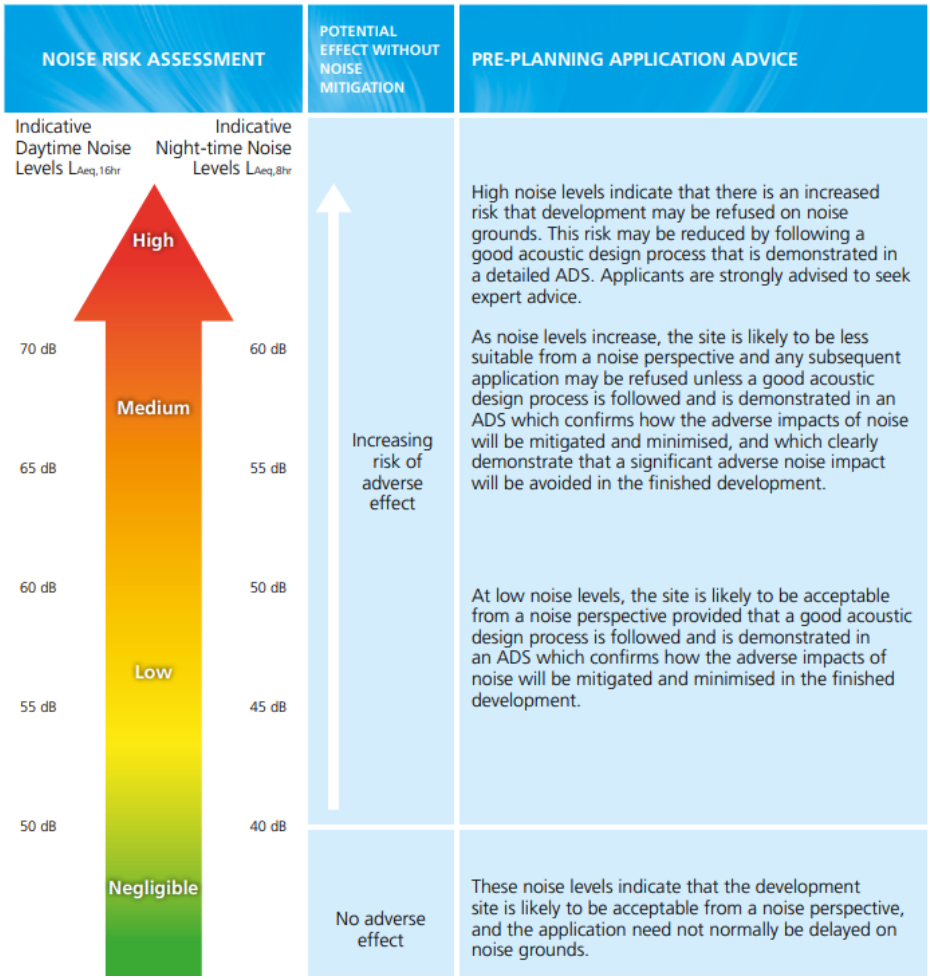


Figure 8: ProPG Risk Analysis

5.1.1 Stage 1 Assessment

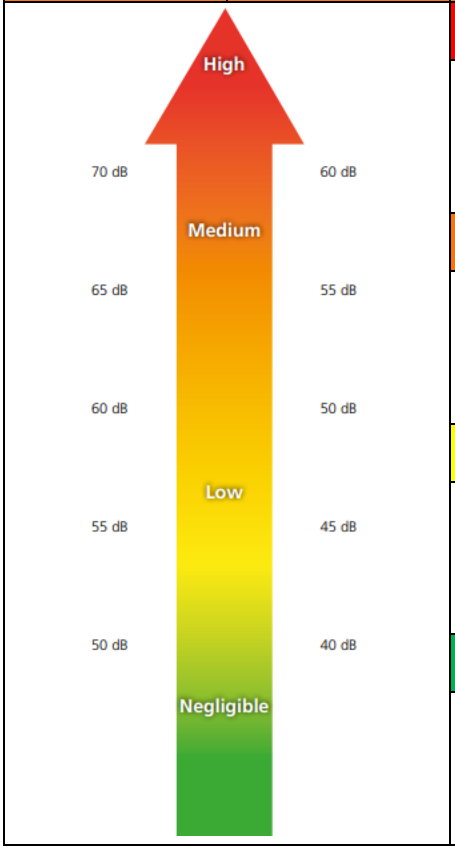
The measured noise levels on the site and future noise levels have been predicted for road and the existing residential noise to assess the probability of an adverse impact.

Table 6 below identifies the Noise Risk Categorisation of the site based on the predicted free field façade noise levels. The site has been categorised as low risk for daytime noise and medium risk for nighttime noise. The glazing and ventilation element specifications to achieve required internal noise levels are outlined in Section 5.2.4.

It should be noted that the ProPG 2017 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."*

Table 6: ProPG Stage 1 Risk Assessment of Existing Noise Levels

Noise Risk Assessment		**Risk Assessment Rating**	
Indicative Daytime Noise Levels $L_{Aeq,16hour}$	**Indicative Night-time Noise Levels $L_{Aeq,8hour}$**	**Daytime Noise Levels**	**Night-time Noise Levels**
		**High Risk**	**High Risk**
		N/A.	N/A
		Medium Risk	**Medium Risk**
		N/A	The site is within the medium risk contour for nighttime noise. Good acoustic design should be considered.
		Low Risk	**Low Risk**
		The entire site is at low risk for daytime noise levels.	N/A
		Negligible Risk	**Negligible Risk**
		N/A	N/A

Future Noise Levels

Based on data from the TII (2017) the average rate of growth on Irish roads is a 3.9%, assuming linear growth of 3.9% over the next 10 years an increase in noise levels from road traffic of 1-2 dB would be expected. WDA have allowed for this growth in our assessment.

5.2 ProPG Stage 2 - Full Assessment

This section outlines the full acoustic design assessment in line with ProPG guidance.

5.2.1 Element 1: Good Acoustic Design Process

ProPG States the following in relation to Good Acoustic Design Process:

> *"A good acoustic design process takes a multi-faceted and integrated approach to achieve optimal acoustic conditions, both internally (inside noise-sensitive parts of the building(s)) and externally (in spaces to be used for amenity purposes)."*
>
> *"Good acoustic design should avoid "unreasonable" acoustic conditions and prevent "unacceptable" acoustic conditions (these terms are defined in Element 2). Good acoustic design does not mean overdesign or gold plating of all new development but seeking to deliver the optimum acoustic outcome for a particular site"*

The following considerations are recommended by ProPG:

- *"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.*
- *Assess external amenity area noise."*

5.2.2 Discussion of Good Acoustic Design

Mitigation of Sources

The development is located close to the road noise sources which are not on or part of the development therefore it is not possible to reduce or relocate the relevant noise sources.

Site Layout and Orientation

The eastern boundary is the most exposed to road traffic noise from Whitestown Way, the remainder of the site benefits from screening from units along the eastern boundary.

Construction Methods

Section 5.2.4 considers the construction methods required to meet the building performance control measures. The construction measures are robust, providing standard external wall and façade details to meet thermal, fire and weathertightness requirements will provide adequate performance to achieve good levels of sound insulation.

Impact of Noise Control Measures

The effects for noise control measures on other building elements including ventilation are considered in Section 5.2.4. It is generally impractical to provide ventilation via openable windows in urban/built up areas. An open window will provide 10-15dB of attenuation which in built up urban areas is not practical. In general, the good acoustic design process in these areas is to provide ventilation via attenuated natural vents or mechanical ventilation. This allows the occupants to have adequate ventilation with adequate noise levels.

External Amenity

ProPG states the following with regard to external amenity spaces:

> "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* $L_{Aeq,16hr}$". The standard continues… "*These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited*".

5.2.3 Element 2 – Assessment of Internal Noise Levels

This section outlines the assessment of the building envelope including the façade noise modelling, and specification of the glazing requirements.

A noise intrusion assessment for the proposed development has been completed in accordance with the methodology outlined International Standard *ISO EN 12354-3:2017 Building acoustics — Estimation of acoustic performance of buildings from the performance of elements — Part 3: Airborne sound insulation against outdoor sound*. The standard provides a method for calculating the indoor noise levels due to for instance Road Traffic Noise.

The calculation method accounts for multiple factors including:

- The external noise level at the affected building façade.
- The frequency characteristics of the specific noise source (i.e. road traffic noise).
- The sound insulation performance of each façade element (i.e. Windows, Walls, Roof…).
- The area of each façade element.
- Direct and flanking transmission paths.

Noise Prediction Modelling

Following the survey, a computational noise model of the development using SoundPLAN 9.1 modelling software was developed to establish the noise levels from the development in a worst-case scenario. The software implements the algorithms contained in ISO 9613-1 and ISO 9613-2. The noise model considers:

- Distance attenuation,
- Source and receptor locations,
- Barrier effects (buildings, walls etc)
- Topographical elevations,
- Ground effects and absorption,
- Source sound power levels,
- Directivity and orientation of the source,
- Atmospheric attenuation and meteorological effects,

The noise model has been calibrated against the attended and unattended noise measurements. SoundPLAN 9.1 software predicts road traffic noise levels in accordance with *Calculation of Road Traffic Noise* (UK Department for Transport, 1998). This is the recognised appropriate standard for road traffic noise prediction as per TII (Transport Infrastructure Ireland).

The following information was input into the model:

- Development layout provided by architects drawings.
- Google Maps terrain and elevation data of surrounding area.
- Traffic speed of 50km/hr as per local signage and onsite observation.
- Percentage of HGV assumed at 4% based on assessment of similar local roads.
- Assessment conducted during peak traffic times.
- Annual traffic growth rate of 3.9%.

- This has been assessed based on pre-covid traffic growth data.

Predicted Road Noise Levels

Incident road traffic noise levels have been predicted across all facades of the development for both the day and nighttime period.

Daytime Noise Levels

Figure 9 and Figure 10 outline the predicted road traffic noise levels across the proposed development façades over the 16-hour daytime period.

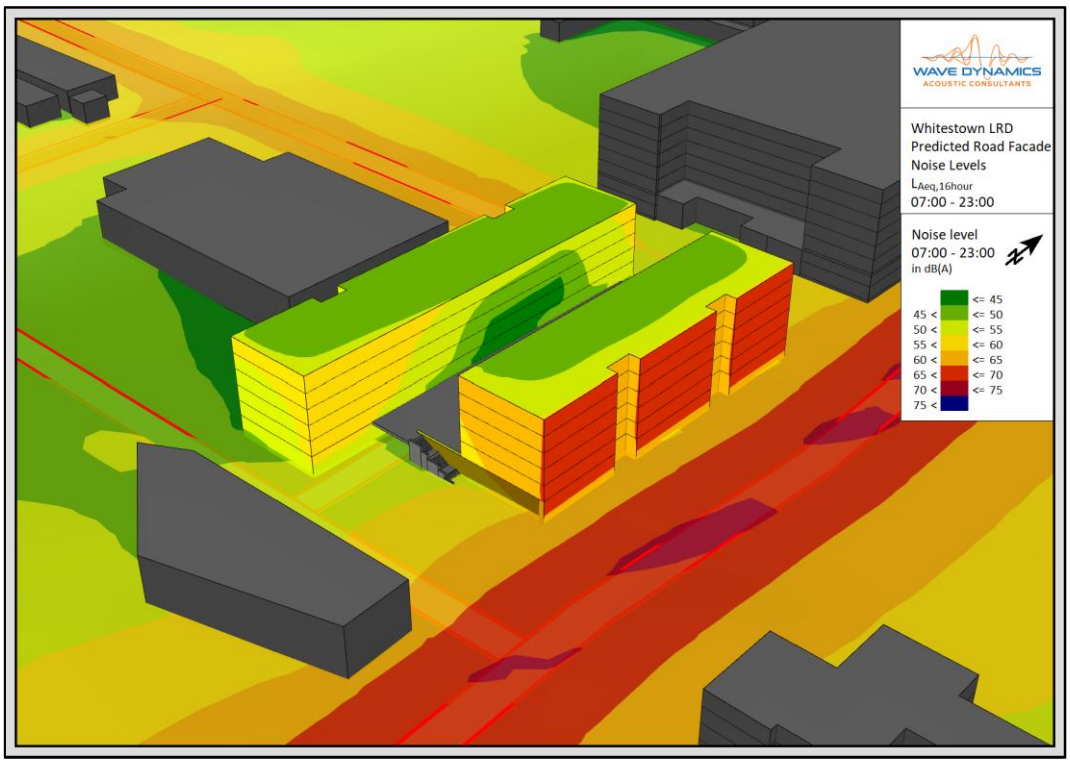


Figure 9: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) Facade Noise Levels for the Future Development.

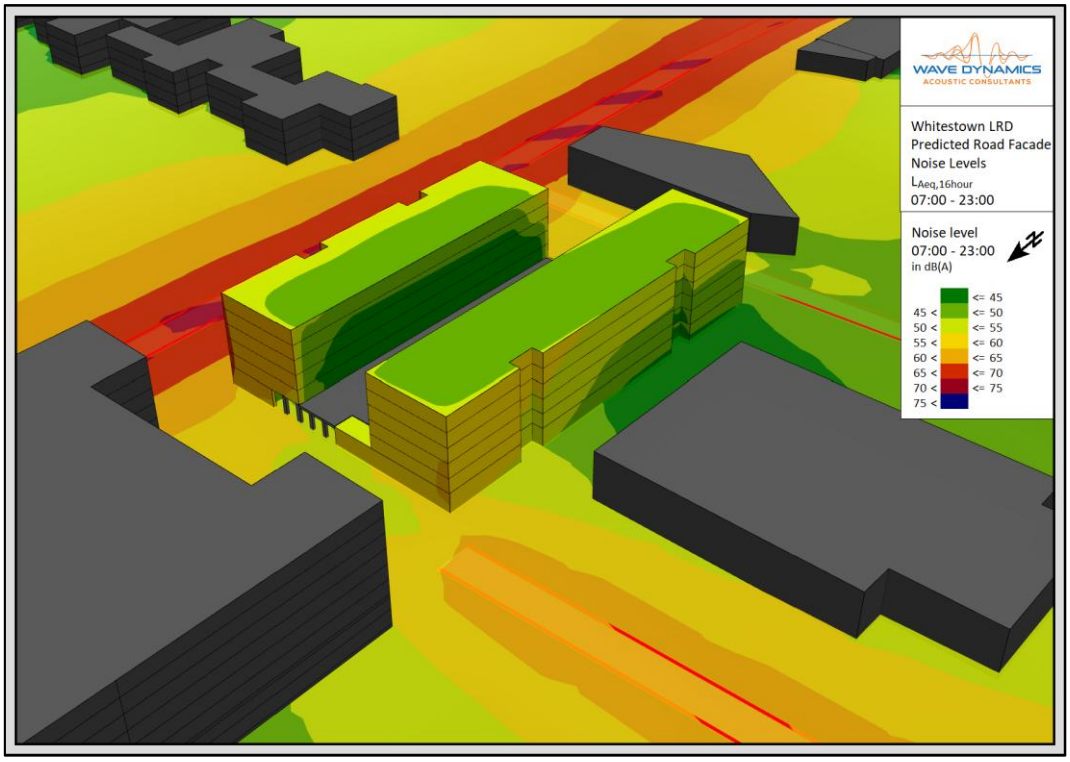


Figure 10: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) Façade Noise Levels for the Future Development.

Nighttime Noise Levels

Figure 11 and Figure 12 outline the predicted road traffic noise levels across the proposed development façades during the 8-hour nighttime period.

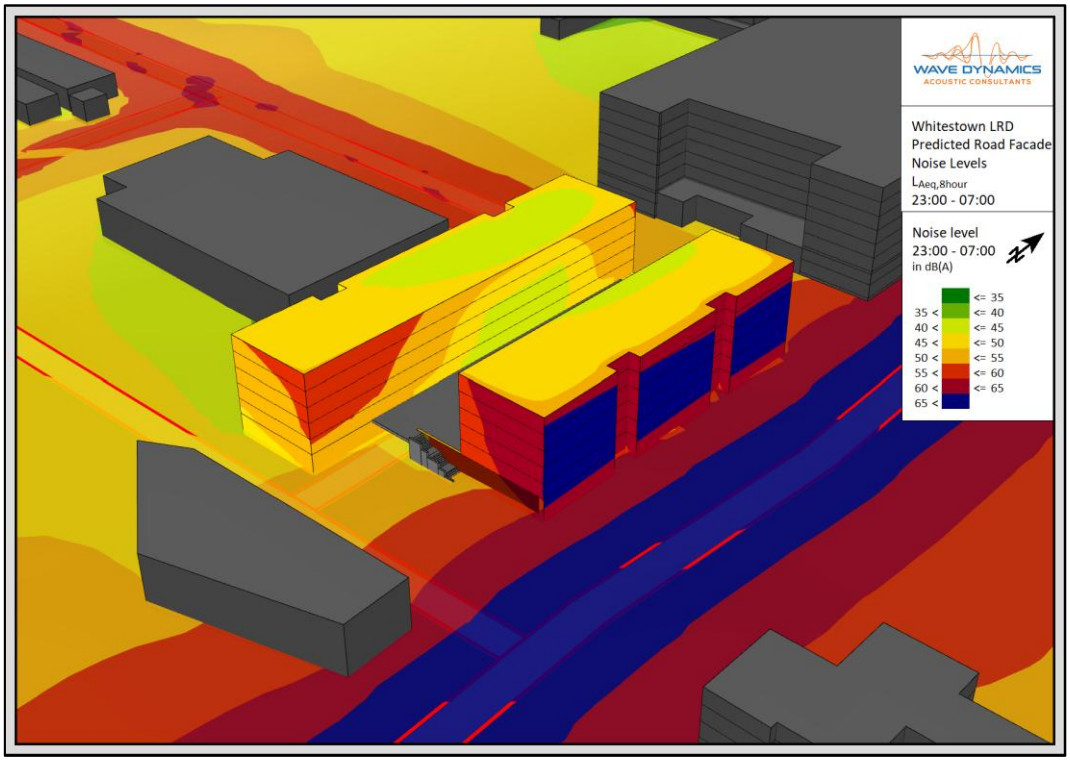


Figure 11: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) Façade Noise Levels for the Future Development.

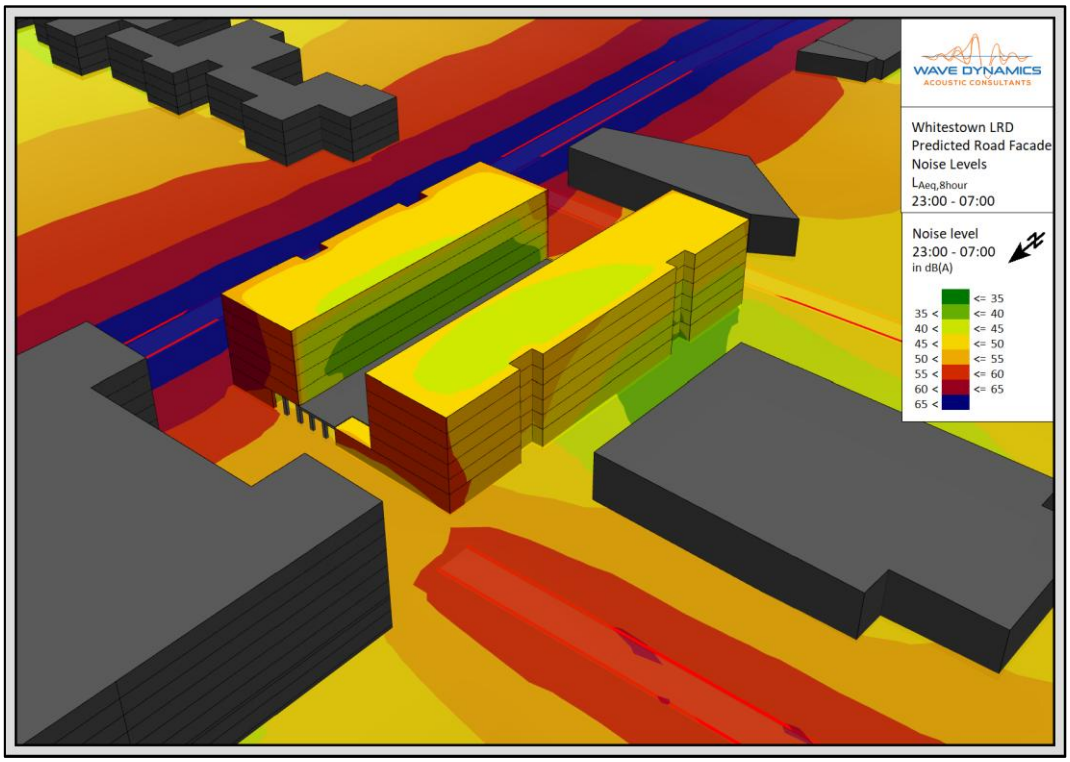


Figure 12: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) Façade Noise Levels for the Future Development.

5.2.4 Building Envelope Specification

This section outlines the building envelope requirements based on the measurements outlined in Section 3. Facade, wall, glazing, roof and ventilation specifications have been determined to achieve the internal noise level criteria for the development. The specification has been determined in accordance with EN ISO 12354-3: 2017 based on the predicted façade day and night noise levels, the room and facade dimensions from the drawings provided.

The building envelope specification should be confirmed by the acoustic consultant at design stage once the internal layouts and design development has been completed. Any changes to the assumed ventilation strategy and glazing requirement should be considered as part of the review and it should be based on the internal noise levels cited in this report.

Glazed Elements and Ventilation

The glazed elements and ventilation openings are typically the acoustically weakest elements of any façade. The required sound insulation performance of façade glazed elements and ventilation openings is outlined in Table 7 below.

It is required that the glazing, frame and seals as a whole achieve the performance when the window is in the closed position. The performance requirements outlined in Table 7 below are considered to provide adequate sound insulation to achieve the relevant day and night internal design goals respectively. A markup outlining the performance requirements for each façade are included in Appendix B.

Table 7: Sound Insulation Performance Requirements for Glazed Elements and Ventilation.

Façade	Glazed Elements (Frame & Glazing) Sound Insulation Requirements (Indicative requirements equal or approved)							Façade Ventilation Requirement[2]
	Octave Band Frequency Requirements[1] R dB						Glazing Acoustic Performance dB R_W	
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz		
RED	28	28	29	38	38	34	35dB R_W	Mechanical Ventilation

(1) Fully sealed mechanical ventilation assumed throughout. Should this change to a naturally ventilated strategy, the above specification may be increased. An acoustic consultant should be engaged to assess the appropriate specification to maintain the internal noise level criteria.

(2) The calculation assumes a fully sealed mechanical system.

It is important to note that the requirements outlined above are minimum requirements for the glazed element as a whole. The octave band values are indicative and specific to the assessed glazing type, equal or approved to meet the minimum project requirements is acceptable.

We understand the ventilation strategy for the development has been proposed as a mechanical ventilation system at this stage of the design. Should the ventilation strategy change to a naturally ventilated strategy Wave Dynamics should be notified. Typically, the use of a natural ventilation strategy will lead to an enhanced glazing specification compared to a sealed mechanical ventilation system.

Sound insulation performance of the ventilation system should achieve a performance of equal to or greater than the glazing specification in order to adequately control noise ingress. This is particularly important for the units facing the industrial premises to the west at upper floors with direct line of sight to roof level mechanical equipment featured in the industrial premises.

External Wall Construction

The façade wall construction has been assumed to achieve a minimum sound insulation performance of 56dB R_W. Typical façade construction such as concrete, blockwork, timber frame and brick offer high levels of sound insulation and will meet this requirement.

Roof Construction

The roof construction has been assumed to achieve a minimum sound insulation performance of 50dB R_W. If there are any skylights to habitable bedrooms Wave Dynamics should be informed to provide specific guidance in each case.

5.2.5 Element 3- External Amenity Spaces

The external amenity spaces on the development includes balconies, a podium level garden between Block A and Block B apartments, a small ground level plaza to the south of the development, and a public open space to the east of the development. All external amenity spaces have been assessed in line with the ProPG desirable external noise levels, with the exception of the plaza which a portion of is in exceedance of the recommended external amenity criteria by as much as 5dB(A), sufficient additional amenity space has been provided elsewhere on the development which satisfies ProPG guidance. Figure 13 and Figure 14 outline the external amenity space compliance with the use of a grid noise map at ground and first floor levels.

Figure 13: External Amenity Space Grid Noise Contour at 1.5m ($L_{Aeq,16hour}$)

Figure 14: External Amenity Space Grid Noise Contour at 4m ($L_{Aeq,16hour}$)

It can be concluded that all of the remaining external amenity spaces will achieve the desirable external noise levels of ≤55dB $L_{Aeq,16hour}$ (07:00hrs – 23:00hrs). This is in line with element 3(v) of ProPG which states:

"Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:" ….

"a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location; and/or"

"a relatively quiet protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings"

Based on the measured noise levels at the site it is predicted that all of the external noise levels in external amenity spaces, aside from the majority of the ground level plaza and balconies facing onto Whitestown Way, will achieve the ProPG recommendations for desirable external amenity noise levels of 50-55dB $L_{Aeq,16hour}$.

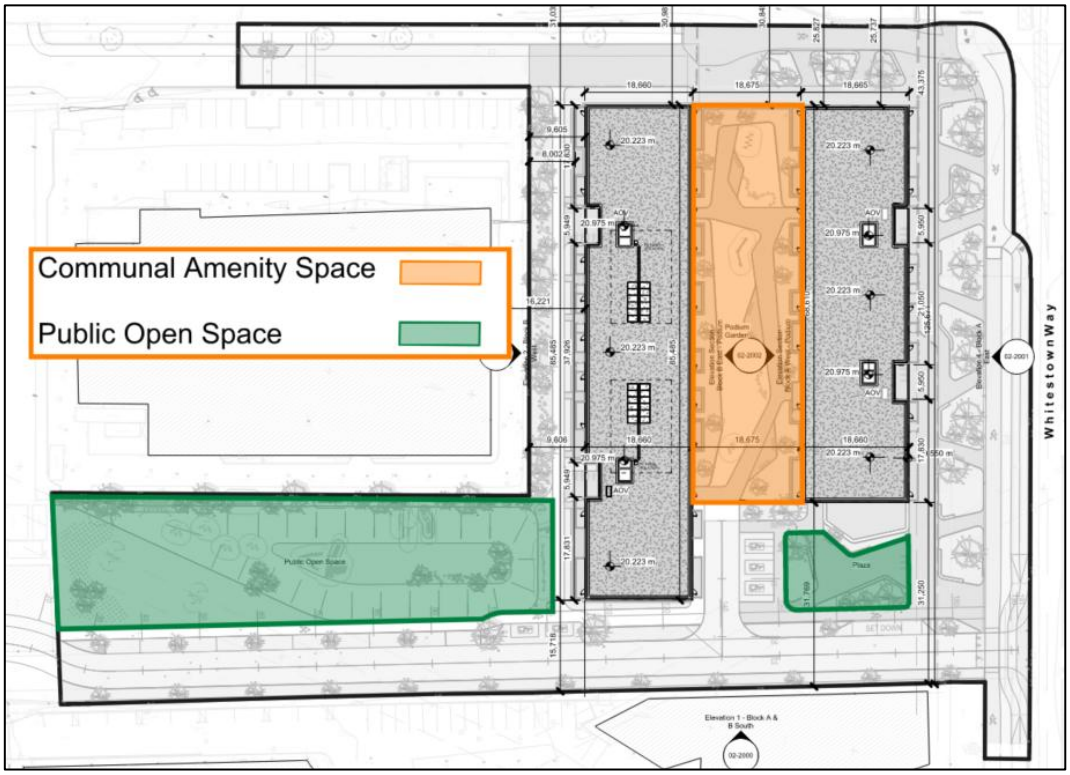


Figure 15: External Amenity Spaces.

5.2.6 Element 4- Assessment of Other Relevant Issues

This section of the acoustic design report considered the other relevant issues. Element 4 considers other issues which may remain relevant to the assessment, this issues are as follows:

- 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 and;
- 4(v) acoustic design v wider planning objectives.

Compliance with Relevant National and Local Policy

There are no specific noise guidance or policy documents for residential developments. The Dublin Agglomeration Noise Action Plan refers to the ProPG as the relevant document for assessment of the noise impact on new residential developments as followed in this inward noise impact assessment.

Magnitude and Extent of Compliance with ProPG

This report demonstrates that all dwellings will meet the specified internal noise level requirements provided the guidance in this report is followed. External amenity spaces have been provided in line with the guidance set out in ProPG. Based on this the development is in general compliance with the ProPG requirements.

Likely Occupants of The Development

Additional needs of the future occupants are not known at this stage however the needs of all potential occupants have been considered with the assessment of adequate internal noise levels and provision of adequate external amenity spaces to meet the needs of potential occupants.

Acoustic Design v Unintended Adverse Consequences

The design has considered the impact of adverse consequences, mitigation has been provided by specification of the sound insulation and ventilation requirements.

Acoustic Design v Wider Planning Objective

Where possible the wider planning objectives have been considered including the need for residential housing with good transport links. It is assumed that the wider planning objectives have been adhered to by following the ProPG guidance.

5.2.7 Stage 2 Assessment Conclusion

The stage 2 assessment considers all four (4) elements, the principals of good acoustic design have been followed.

The element 2 assessment has considered the measures required to provide an adequate acoustic environment with appropriate noise levels for internal spaces. The sound insulation and ventilation requirements have been specified based on the predicted façade noise levels.

The element 3 assessment of external amenity spaces has considered the noise impact on the development and the external amenity spaces. Appropriate provision of external amenity space has been provided in line with the ProPG guidance.

Other relevant issues have been considered including, local policy, unintended consequences and the wider planning objectives.

6 Construction Noise & Vibration Assessment

6.1 Noise Sensitive Locations and Noise Limits

Based on the location of the site, the construction works and its proximity to the residential receptors the following noise sensitive receptors have been identified:

Figure 16: Site location and noise sensitive locations 1-3.

Noise Limits

The criteria for the project based on the criteria outlined in section 3 and the background noise in the area the project criteria for construction noise is outlined below in Table 8. Reference to the baseline survey results and guidance contained in BS 5228 Part 1 for construction noise levels threshold for significance affect from constriction activities is set as follows for the closest noise sensitive locations:

Table 8: Project Criteria

Construction Noise Limits			
Noise Sensitive Location	**Distance To the Centre of The Site (m)**	**Ambient Noise dB(A)**	**Noise Limit dB(A) [1]**
NSL1	65	61	65
NSL2	85	61	65
NSL3	325	61	65

(1) 65 dB (A) lower threshold limit

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. If the noise generated by construction activities exceeds the appropriate category value, then a significant effect is deemed to occur.

For this project a limit of 65dB(A) is set as the appropriate upper limit for construction noise. Given the urban location of the development and its proximity to local transport infrastructure, this is considered an appropriate limit for construction noise.

6.1.1 Construction Noise Predictions

Construction noise for the site has been predicted based on the information provided. A summary of the expected equipment, durations and operating times are provided in Table 9. The noise sources are assumed to be located at the centre of the new developments. The prediction methodology in BS5228 has been used to calculate the noise level over a typical day for each of the main construction stages.

Table 9: Proposed construction equipment, noise levels and duration.

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level (L_{Aeq} at 10m dB(A))	On Time of 10 hr day
Site Setup	Digger	77	4 hours
	Carpentry tools	78	4 hours
	Skill saw	84	3 hours
Substructure	Excavators	77	4 Hours
	Con saws	84	3 Hours
	Rail saw	85	2 Hours
	Drills	89	3 Hours
	Dumper 7t	81	4 Hours
	Cement Mixer	75	4 Hours
	Lorry Idling	80	2 Hours
	Telescopic Handler	71	4 Hours
	Concrete Pump	78	3 Hours
Superstructure	Drills	89	2 Hours
	Power tools	70	3 Hours
	Impact steel	69	2 Hours
	Hammer	69	4 Hours
	Dumper 7t	81	3 Hours
	Cement Mixer	75	2 Hours
	Lorry Idling	80	2 Hours
	Telescopic Handler	71	5 Hours
External finishes	Tools	70	5 hours
	Con saw	84	2 hours

Table 10 summarises the predicted construction noise level at the noise sensitive locations. Examination of the results indicate the construction noise without mitigation is predicted to exceed the noise limits during the site set up, substructure and superstructure stages of the development.

*Table 10: Predicted noise levels **without** mitigation for each stage.*

Location	Noise Limit	Predicted noise level (construction noise + ambient) with no mitigation L_{Aeq}, dB			
		Site Set Up	Substructure	Superstructure	External finishes
NSL1	65	66	71	68	62
NSL2	65	65	69	67	61
NSL3	65	51	62	62	61

The calculations set out above are based on assumed site construction works and a combination of the plant operating at the same time i.e. worst-case scenario.

Table 11: Attenuation required based on the construction noise predictions.

Location	Noise Limit	Noise reduction required at each stage of works to meet criteria (dBA)			
		Site Set Up	Substructure	Superstructure	External finishes
NSL1	65	1	6	3	0
NSL2	65	0	4	2	0
NSL3	65	0	0	0	0

Noise mitigation measures will be required at all stages of construction except for the external finishes stage. A combination of the mitigation measures outlined in section 6.2 should be used to reduce the levels of construction noise by the values listed in Table 11 above.

6.2 Noise Mitigation Recommendations

Best practice control measures for noise from construction sites are found within BS 5228 (2009 +A1 2014) part 1. Construction noise impacts are expected to vary during the construction phase of the project, this impact will depend on the distance between the construction activities and noise sensitive receptor. The contractor will ensure that all best practice noise and control methods will be used, to ensure any negative noise impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Part 1 includes guidance on several aspects of construction site mitigation measures, this includes the

- selection of quiet plant and equipment;
- noise control at source of the noise;
- screening, and;
- public liaison.

6.2.1 General Recommendations

This section of the report sets out noise mitigation options and detailed comment on each one specifically for this site.

Selection of Plant and Equipment

The noise impact of all plant and equipment should be assessed prior to selection of plant for the project. Where an item of plant is identified as noisy with the potential to cause a negative noise impact it should be reviewed to check if there is an alternative quieter version of the same plant to undertake the same construction task.

Noise Control at Source

Where replacing a noisy item of plant is not viable or practical, consideration should be given to control that noise at source. This includes modifying the piece of plant or equipment to generate less noise, using dampening to control vibration induced noise or rattling. Example best practice mitigation measures to be considered are as follows:

- All plant and equipment to be switched off when idling.
- The use of white noise reversing alarms.
- Restriction on the dropping and loading of materials to less sensitive hours.
- The use of local screening for noisy activities or works with hand tools
- Not dropping materials onto hard surfaces and using rubber mats etc for the dropping of materials.
- Ensure all plant and equipment is well maintained and cleaned, all lubrication should be in line with manufacturers guidelines.

Screening

Screening when used correctly can be an effective method of reducing the construction noise impact on the NSL's. The use of site hoarding and careful selection of areas for noise works, using buildings on the site, site offices and the building being constructed to screen noise from the works.

Local screening of noisy works with the use of temporary acoustic barriers, examples are provided below:

- https://ventac.com/acoustic-products/noisebreak-acoustic-barrier/
- https://echobarrier.com/

Figure 17: Temporary Construction Noise Barrier © Ventac

Public Engagement

It is recommended that a public liaison officer should be put forward by the contractor to liaise with the local residents on matters relating to noise. Occupants should be informed of any noise works scheduled where there is the potential to generate high levels of construction noise or if specialist works etc need to be conducted out of the working hours. This person should also be the point of contact for all complaints and be responsible for reviewing the noise monitoring results and exceedances.

Construction Noise Monitoring

Construction noise monitoring should be carried out, on the boundary with the nearest noise sensitive locations at NSL1, for the duration of the construction phase.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

6.2.2 Site Specific Recommendations

Table 12 below outlines the recommended site-specific noise mitigation measures based on the attenuation required in Table 11.

Table 12: Attenuation required based on the construction noise predictions.

Construction Stage	Recommended Noise Mitigation Measure
Site Setup	Erect a minimum 2.4m high site hoarding that blocks the line of sight between noise source and receiver. Example construction for the site hording would be as follows: • A 2.4m high and 9mm plywood (4.5 kg/m^2). Barrier must be solid and not contain gaps at the bottom or between adjacent panels Local screening using the examples provided in General Recommendations section 6.2.1 are required around hand tools in addition to hoarding. An absorptive lining should be considered for screening around hand tools will need to have an absorptive lining to avoid reflections increasing noise at other receivers. On this project 3 NSL's have been identified it is recommended that a noise monitor should be placed on the boundary with each of nearest noise sensitive locations closest to the works.
Substructure	Site hoarding to block line of sight. Local screening around noisy plant and equipment. An absorptive lining should be considered for screening around large plant that will need to have an absorptive lining to avoid reflections increasing noise at other receivers Noise monitoring as above
Superstructure	Local screening around saws/hammers where possible. Use external new building to screen noise from works where possible. Noise monitoring as above
External finishes	Local screening around hand tools. Noise monitoring as above

6.3 Vibration

Prediction of vibration levels at receptors is complex and dependent on a number of factors. Precautionary vibration monitoring at the boundary with the nearest sensitive receptors will be undertaken as required during construction (for vibration generating works).

6.3.1 Vibration Monitoring

Where required vibration monitors can be erected during the substructure and superstructure phase of the development between the site and the noise sensitive locations as these are closest vibration sensitive locations on the boundary of the site.

The Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with BS ISO 4866: 2010: Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures.

Vibration Limits

The recommended vibration limits to avoid cosmetic damage to buildings, as set out in:

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

The standards note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented in Table 13 and major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in Table 13. Definitions of the damage categories are presented in BS 7385-1:1990.

Table 13: Transient vibration guide values for cosmetic damage

Vibration PPV at the closest part of sensitive property to the source of vibration Frequency		
4 to 15 Hz	**15 to 40Hz**	**40Hz and above**
15 mm/s	20 mm/s	50 mm/s

Note 1: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded
Note 2: It should be noted that these values are at the base of the building.

7 Operational Noise Impact Assessment

This section includes an assessment of the operational noise impacts for noise from plant and equipment, car parking, proposed access road, and creche play area.

7.1 Noise Prediction Modelling

Following the survey a model of the development using SoundPLAN 9.1 modelling software was developed to establish the noise levels from the development in a worst-case scenario. The software implements the algorithms contained in ISO 9613-1 and ISO 9613-2. The noise model considers:

- Distance attenuation,
- Source and receptor locations,
- Barrier effects (buildings, walls etc)
- Topographical elevations,
- Ground effects and absorption,
- Source sound power levels,
- Directivity and orientation of the source,
- Atmospheric attenuation and meteorological effects,

The acoustic model for the new development has been developed based on the attended noise survey and the proposed site location and predicted noise sources. As the site has potential to create noise impact at both day and nighttime, a worst-case scenario has been developed for both predicting the noise impact at the nearest noise sensitive locations. The assessment considers the noise impact of the plant and equipment, creche play area, traffic movements on the development on the nearby residential receptors.

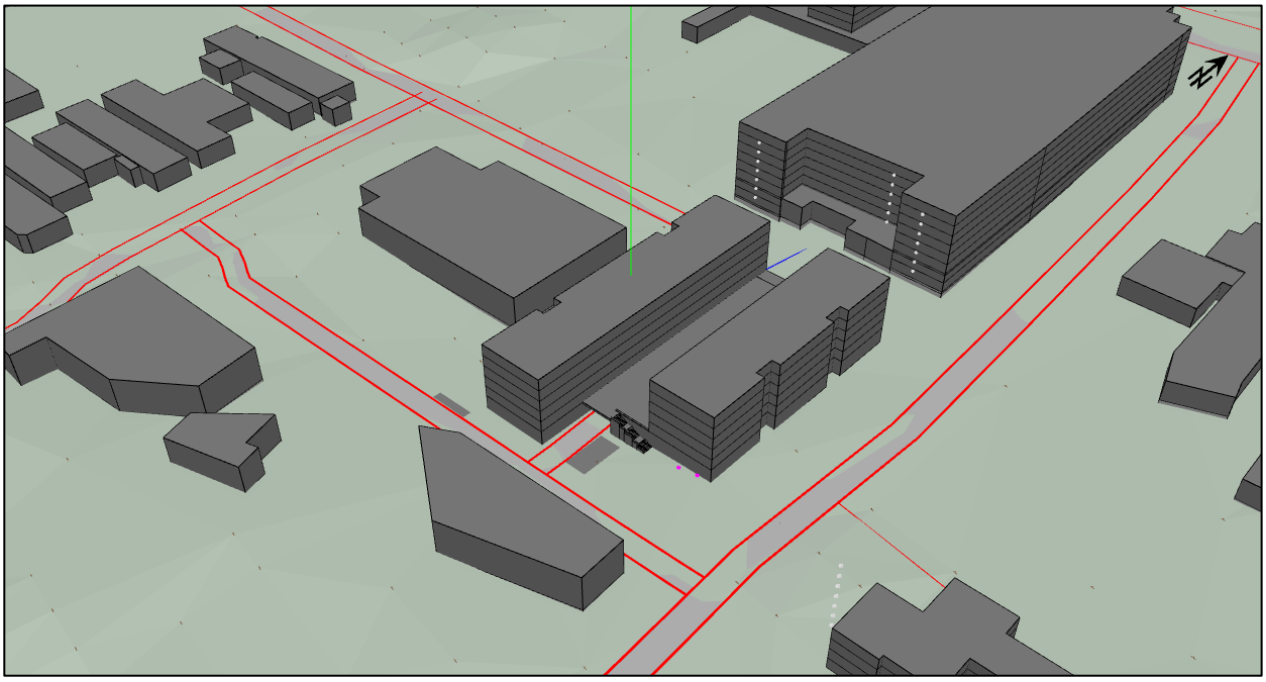


Figure 18: Screenshot from the Model Showing the Proposed Development.

7.1.1 Modelling Assumptions

The following assumptions were made throughout the modelling and assessment:

- Assessment based on the noise measurements undertaken on the 19th and 20th of November 2025.
- Noise source data sourced from WDA library and plant noise spectra has been assumed for the assessment. (To be finalised at detail design stage)
- Model assumes a worst-case operating scenario as outlined in Section 7 above.
- Modelling based on the drawings, layouts and information provided.
- Model based on assumptions outlined in Section 7.1.2.
- Assessment based on proposed new development only.

7.1.2 Noise Sources

Plant and Equipment

There will be no external plant and equipment featured on the proposed development, aside from the inclusion of photovoltaic panels located at roof level of Block B. The apartments will feature internal mechanical ventilation systems to control heating and cooling of each dwelling independently. It is not anticipated that there will be any negative noise impact from the internal mechanical units on the surrounding sensitive receptors. Should the ventilation strategy change, an acoustic consultant should be engaged to ensure compliance with project criteria.

There is retail units associated with the proposed development and located at ground floor level. There will likely be plant and equipment associated with the future occupants of the retail spaces. There is currently no plant specification for the retail units, WDA have allowed for frequently used plant associated with retail units in the acoustic model with sound power levels outlined in Table 14, additionally, WDA have accounted for 4 no. condensers associated with each retail unit, for a total of 8 no. condenser units as outlined by the design team. Figure 19 outlines the assumed location for the AC units for each retail unit located at ground floor level in the undercroft car park.

Table 14: Assumed Retail Plant Sound Power Levels.

Description	Source Sound Power Level L_w (dB) at Octave Band Centre Frequency, Hz								L_{wA} (dB)
	63	125	250	500	1000	2000	4000	8000	
Assumed AC Condenser	61	61	60	59	58	57	56	55	64

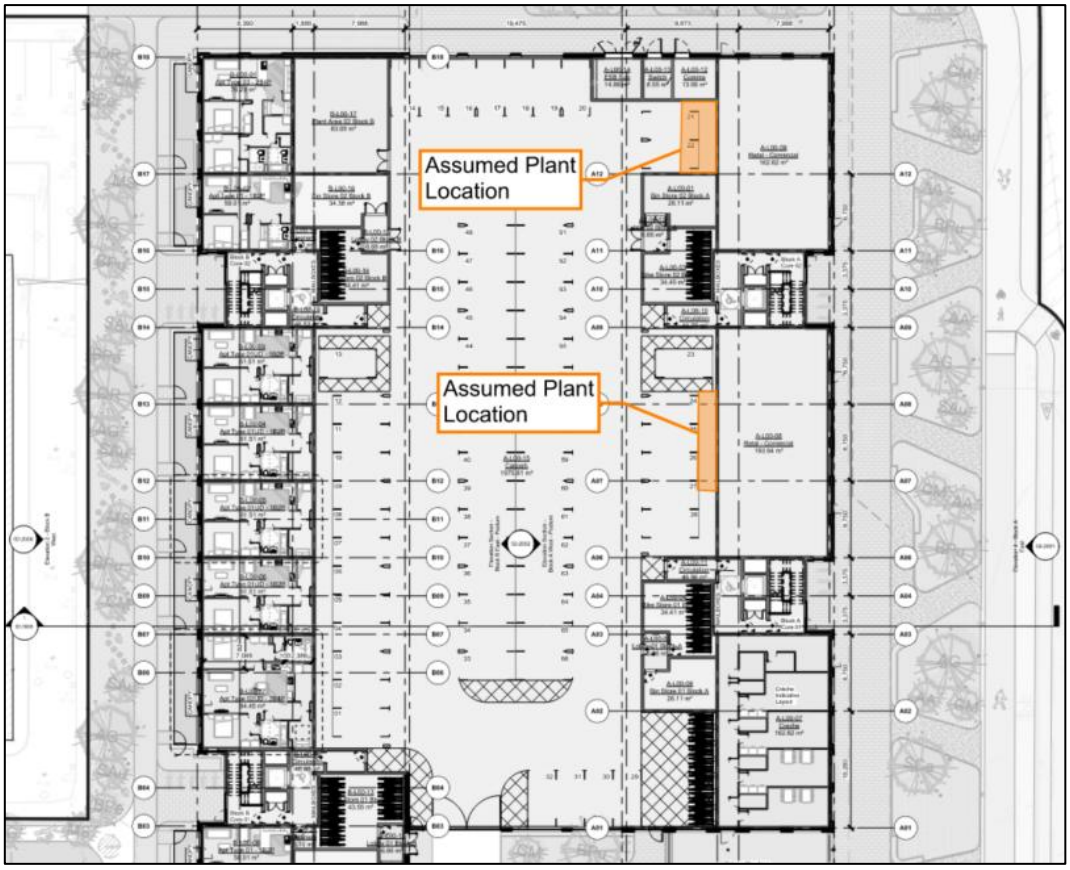


Figure 19: Assumed Retail Unit Plant Location.

Creche Play Area

The proposed creche space at ground floor level of the Block A apartments features an external play area to the south. The noise model accounts for the external play area using indicative noise levels from previously measured creche play areas, and assumed an average of 3 hours of external usage per day. Table 15 outlines the spectra used in the model in sound power format.

Table 15: Creche Play Area - Sound Power Spectra.

Description	Source Sound Power Level L_W (dB) at Octave Band Centre Frequency, Hz								L_W (dBA)
	63	125	250	500	1000	2000	4000	8000	
Creche Play Area	82	78	76	77	75	73	66	56	80

External Amenity

The various external amenity spaces across the development in the form of a first floor courtyard between Block A and Block B apartments, a plaza space at ground floor level and the public open space to the west of the development. Based on the typical usage of these spaces and the distance between the sensitive receptors and the external amenity spaces it is predicted that there will be no negative noise impact from the external amenity spaces on the surrounding noise sensitive receptors.

Additional Traffic and Car Parking

The development will include an undercroft car park at ground floor level with an entrance and exit access road to the south of the development which connects the proposed development to Whitestown Way and Whitestown Road. The effect of the operational noise emissions from the car park and access road in operation is predicted to be minimal and infrequent, and will not result in any adverse noise impact on the noise sensitive receptors.

7.2 Assessment of Operational Noise Impact

This section outlines the operational noise impact from the proposed development, which includes the external amenity spaces, creche play area, proposed access roads and the car parking spaces in the development. The operational noise impact considers the noise impact of all noise sources at the nearest noise sensitive locations.

7.2.1 Daytime Scenario

As the new development has the potential to generate noise with different characteristics for both the day and nighttime, a model has been undertaken for both the day and nighttime operations of the proposed development.

The daytime situation assumes the following noise sources:

- Assumed retail condensers operational 100% of the time, based on spectra outlined in Table 14.
- Creche / external amenity space has not been included in the BS 4142 assessment as the methodology of BS 4142 considers industrial and commercial noise only.
- Carpark and access road operational 10% of the time during daytime hours of 07:00-23:00.

Noise Impact (BS 4142 Assessment) for Daytime Hours

The noise impact at the nearest noise sensitive location (NSL1-NSL3) has been assessed in accordance with BS 4142. The predicted noise from the development is worst case at NSL1 due to its proximity to the development. The BS4142 at NSL1 is outlined in Table 16 below.

Table 16: BS4142 Assessment for daytime period

Results		Relevant BS 4142 Clause	Commentary
Predicted specific sound level (daytime)	$L_{Aeq(16\ hour)}$ = 37dB	7.3.6	As the new development is not yet existing, the noise levels have been predicted using SoundPlan modelling software. Worst case specific sound predicted at NSL1 as this is closest to the proposed development.
Residual sound level (daytime)	$L_{Aeq(60\ min)}$ = 61dB	7.3.2	The residual sound level was dominated by road traffic noise. Measurement location A2 was assessed as this is representative for worst case receptor (NSL1).
Background sound level (daytime)	$L_{A90(60\ min)}$ = 55dB	8.1.2 8.4	The L_{A90} sound level was measured at the noise sensitive location with the source absent.
Assessment made during the daytime, so the reference time interval is 1 hour		7.2	
Specific sound level as predicted	$L_{Aeq(16\ hour)}$ = 37dB	7.3.6	The specific sound has been predicted by calculation alone as the new development was not existing at the time.
Acoustic feature correction	+0dB	9.2 9.3.2	It is not anticipated that the specific sound will have any impulsive, tonal or intermittent characteristics.

Results		Relevant BS 4142 Clause	Commentary
Rating level	(37 + 0) dB = 37dB	9.2	
Background sound level	$L_{A90(60\ min)}$ = 55dB	8	
Excess of rating over background sound level	(37 - 55) dB = -18dB	11	Assessment indicates that no adverse impact is likely on the noise sensitive locations as the specific sound is 18dB below the background levels and is lower than the residual sound. Context has also been considered.
Uncertainty of the assessment	Not significant	10	There is some uncertainty with regards to the specific plant noise levels used in the assessment, given the early stage of design of the project. However, given the assessment outcome of -18dB, any variation in plant type is not expected to affect the assessment outcome. Additional calculations shall be carried out however at the appropriate stage of the assessment to provide an updated BS 4142 assessment of industrial/commercial plant associated with the proposed development

Based on the review of the noise sources and the BS 4142 assessment it is predicted that the noise emanating from the proposed development will not have any adverse impact on the surrounding noise sensitive locations.

Tonality and Impulsivity

Based on the predicted noise emissions from the proposed development during the daytime period, it is unlikely that there will be any tonal or impulsive aspects to the noise. The predicted noise levels are 18dB below existing background noise levels and significantly below residual noise levels in the area. Therefore, tonal and impulsive noise is unlikely to cause impact at the surrounding sensitive receptors. Additionally, a review of the predicted noise levels frequency content at the noise sensitive receptors, which indicates that there will be no tonal characteristics associated with the operational phase of the development at the sensitive receptors.

EPA NG4 Daytime Criteria

NG4 recommends a daytime criteria of (07:00hrs – 19:00hrs) 55dB $L_{Aeq,T}$, the predicted noise emissions from the development are 37 dBA, with no tonality or impulsivity, therefore the NG4 criteria is expected to be achieved. Table 17 below outlines the predicted noise impact at each noise sensitive location, the project criteria and compliance with the project criteria.

Table 17: Model results for each NSL during the daytime period.

NSL	Criteria (07:00hrs – 19:00hrs) EPA NG4	Result ($L_{Aeq,16\ hour}$ dB)	Compliance
NSL1	55	37	Compliant
NSL2	55	37	Compliant
NSL3	55	21	Compliant

EPA NG4 Evening Criteria

EPA NG4 recommends an evening time criteria of (19:00hrs – 23:00hrs) 50dB $L_{Aeq,T}$, the predicted noise emissions from the development are 37 dBA, with no tonality or impulsivity, therefore the NG4 criteria is expected to be achieved.

7.2.2 Night-time Scenario

The proposed development has potential to generate noise impact at nighttime.

The nighttime situation assumes the following noise sources:

- Assumed retail condensers operational 100% of the time, based on spectra outlined in Table 14.
- External amenity space has not been included in the BS 4142 assessment as the methodology of BS 4142 considers industrial and commercial noise only.
- Carpark and access road operational 5% of the time during nighttime hours of 23:00-07:00.

BS4142 Nighttime Assessment

The noise impact at the nearest noise sensitive location (NSL1) has been assessed in accordance with BS 4142.

Table 18: BS4142 Assessment for nighttime period

Results		Relevant BS 4142 Clause	Commentary
Predicted specific sound level (nighttime)	$L_{Aeq(8\ hour)}$ = 34dB	7.3.6	As the new development is not yet existing, the noise levels have been predicted using SoundPlan modelling software. Worst case specific sound predicted at NSL1 as this is closest to the proposed development.
Residual sound level (nighttime)	$L_{Aeq(15min)}$ = 49dB	7.3.2	The residual sound level was dominated by road traffic noise. Measurement location A2 was assessed as this is representative for worst case receptor (NSL1).
Background sound level (nighttime)	$L_{A90(15min)}$ = 48dB	8.1.2 8.4	The L_{A90} sound level was measured at the noise sensitive location with the source absent.
Assessment made during the daytime, so the reference time interval is 15 minutes		7.2	
Specific sound level as predicted	$L_{Aeq(8\ hour)}$ = 34dB	7.3.6	The specific sound has been predicted by calculation alone as the new development was not existing at the time of the survey.
Acoustic feature correction	+0dB	9.2 9.3.2	It is not anticipated that the specific sound will have any impulsive, tonal or intermittent characteristics.
Rating level	(34 + 0) dB = 34dB	9.2	
Background sound level	$L_{A90(15min)}$ = 48dB	8	
Excess of rating over background sound level	(34 - 48) dB = -14dB	11	Assessment indicates that no adverse impact is likely on the noise sensitive locations as the specific sound is 14dB below the background levels and is lower than the residual sound. Context has also been considered.
Uncertainty of the assessment	Not significant	10	There is some uncertainty with regards to the specific plant noise levels used

Results		Relevant BS 4142 Clause	Commentary
			in the assessment, given the early stage of design of the project. However, given the assessment outcome of -14dB, any variation in plant type is not expected to affect the assessment outcome. Additional calculations shall be carried out however at the appropriate stage of the assessment to provide an updated BS 4142 assessment of industrial/commercial plant associated with the proposed development

Based on the review of the noise sources and the BS 4142 assessment it is predicted that the noise emanating from the proposed development may have any adverse impact on the surrounding noise sensitive locations.

Tonality and Impulsivity

Based on the predicted noise emissions from the proposed development during the nighttime period, it is unlikely that there will be any tonal or impulsive aspects to the noise. The predicted noise levels are 14dB below existing background and residual noise levels in the area. Therefore, tonal and impulsive noise is unlikely to cause impact at the surrounding sensitive receptors. Additionally, a review of the predicted noise levels frequency content at the noise sensitive receptors, which indicates that there will be no tonal characteristics associated with the operational phase of the development at the sensitive receptors.

EPA NG4 Nighttime Criteria

EPA NG4 recommends a nighttime criteria of (23:00hrs – 07:00hrs) 45dB $L_{Aeq,T}$, the predicted noise levels from the new development are 34 dBA, with no tonality or impulsivity, therefore the NG4 criteria is expected to be achieved. Table 19 below outlines the predicted noise impact at each noise sensitive location, the project criteria and compliance with the project criteria.

Table 19: Model results for each NSL during the nighttime period.

NSL	Criteria (23:00hrs – 07:00hrs) EPA NG4	Result ($L_{Aeq,8\ hour}$ dB)	Compliance
NSL1	45	34	Compliant
NSL2	45	28	Compliant
NSL3	45	14	Compliant

8 Conclusion

Wave Dynamics were engaged by ARP 4.2 Sustainable Communities (Ireland) Fund as the acoustic consultants to undertake an inward noise impact and external amenity noise assessment, a construction noise and vibration assessment and operational noise assessment for the 'Large-Scale Residential Development' (LRD) proposed at Whitestown Way, Tallaght, Dublin 24.

Inward Noise Impact Assessment

A Stage 1 and Stage 2 ProPG assessment has been undertaken. As part of the stage one assessment to categorise the site, a baseline noise survey was undertaken to measure the existing noise levels. Following a review of the noise levels on the site, including the L_{AFmax} and $L_{Aeq,}$ the site has been characterised as low risk for daytime noise and medium risk for nighttime noise, therefore mitigation measures are required to control the onset noise levels. Both internal noise levels and external noise levels in amenity areas have been considered in the ProPG assessment, as summarised below.

Internal Noise Levels: Following the baseline survey, a noise impact assessment was undertaken, this included break-in noise calculations to predict the internal noise levels from road traffic noise. Consideration has also been given to the future growth of the roads. Following the assessment, the building envelope performance requirements were determined. The performance specification for the building envelope has been provided in this report which includes the external walls, glazing, roof and ventilation requirements.

External Noise Levels: The external amenity spaces on the development includes balconies, a podium level courtyard garden, public open space and ground level plaza. Appropriate amenity has been provided for residents using the available amenity space across the development. This is in line with element 3(v) of ProPG. Based on the measured noise levels at the site it is predicted that all of the external noise levels in external amenity spaces, aside from the majority of the ground level plaza and balconies facing onto Whitestown Way, will achieve the ProPG recommendations for desirable external amenity noise levels of 50-55dB $L_{Aeq,16hour}$.

Construction Noise & Vibration Impact

The construction noise impact is predicted to exceed the BS 5228 significance thresholds without any mitigation measures for the Site Set Up, Substructure and Superstructure stages of the project.

General and site-specific mitigation measures have been provided in this report to bring the construction noise levels down within the limits of BS 5228. Following the noise mitigation recommendations in this report, the construction phase is expected to meet the requirements of BS 5228, based upon the information provided to WDA. In addition to the mitigation measures, recommendations have been provided in this report for construction noise monitoring.

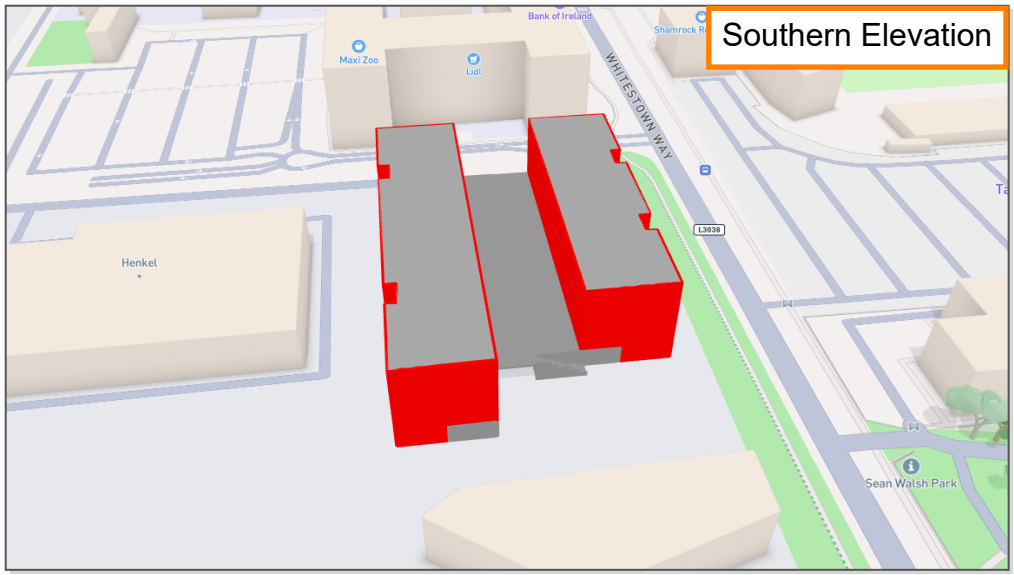
Operational Noise Emissions

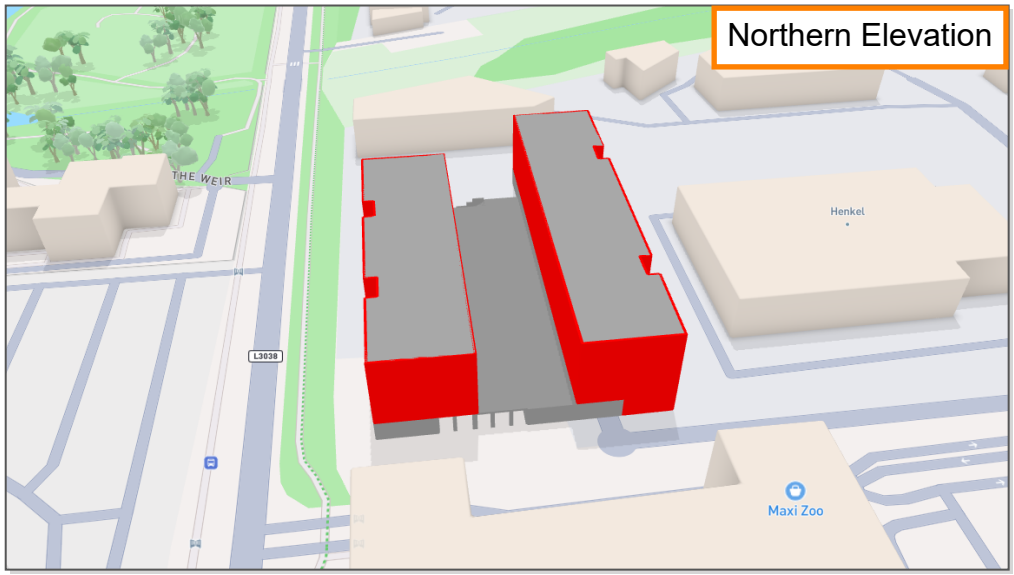
An operational noise impact assessment has been conducted to assess noise generated from building services plant, external amenity spaces, car parking and an outdoor play area. It is predicted that operational noise from the proposed development will not cause a negative noise impact on the nearby noise sensitive locations during both daytime and nighttime operations The final mechanical plant and equipment selections have not been made at this stage of the project. Specific noise limits have been provided in this report for mechanical plant and equipment, at design development stage once the plant and equipment information are available it should be assessed for compliance with the criteria outlined in this report.

Appendix A- Glossary of Terms

Ambient Noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from all the noise sources in the area.
Background Noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).
dB(A)	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Hertz	The unit of sound frequency in cycles per second.
L_{A90}	A-weighted, sound level just exceeded for 90% of the measurement period and calculated by statistical analysis. See also the background noise level.
L_{Aeq}	A-weighted, equivalent continuous sound level.
L_{AFmax}	A-weighted, maximum, sound level measured with a fast time-constant - maximum is not peak
L_{den}	day-evening-night noise level, the A-weighted, Leq (equivalent noise level) over a whole day, but with a penalty of 10 dB(A) for night-time noise (23:00-07:00) and 5 dB(A) for evening noise (19:00-23:00), also known as the day evening night noise indicator

Appendix B- Façade Markup





Glazed Element Specification

35 dB Rw

WAVE DYNAMICS
ACOUSTIC CONSULTANTS
DUBLIN WEXFORD CORK LONDON

Project: Whitestown Way LRD
Title: Facade Sound Insulation Performance
Author: Cathal Reck
Reviewer: James Mangan
Date: 2026-04-22