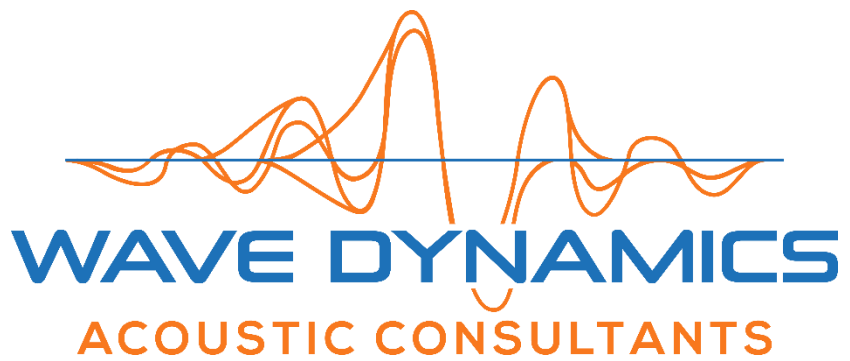




Cabra PBSA

Acoustic Design Statement
08 January 2026

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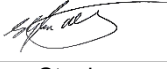
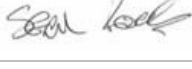
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Executive Summary

Wave Dynamics were engaged by R & D Developments Ltd. (in Receivership) Grant Thornton as the acoustic consultants for the planning stage application for Cabra PBSA, Faussagh Avenue, Cabra, Dublin 7.

The proposed development provides for a Large-Scale Residential Development, which in summary, shall consist of:

- a) Demolition of the former 'Matts of Cabra' public house and associated structures (approx. 376.55 sqm).
- b) Construction of a purpose-built student accommodation scheme consisting of 249 no. student bedspaces arranged in 32 no. clusters of 4, 7, 8, 9 and 10-bedroom units (including 13 no. accessible units and 10 no. studio units) each with associated shared kitchen/living/dining areas in 2 no. blocks ranging in height from 4-6 storeys;
- c) Internal amenity spaces (approx. 347.1 sqm) including a student lounge area, laundry room, postal room and a reception / office / kitchen / tearoom across the ground floor and first floor levels;
- d) External amenity areas (approx. 2,971.4 sqm) including 1 no. outdoor terrace at fourth floor level of Block A (193.1 sqm);
- e) Approx. 405.5 sqm of public open space in the form of a public plaza fronting Fassaugh Avenue;
- f) Switch room, ESB substation, sprinkler room and bin storage all in a single storey services building along the eastern site boundary;
- g) A total of 308 no. bicycle parking spaces at surface level (258 no. long term, covered bicycle parking spaces including 12 no. cargo bicycle parking spaces and 50 no. visitor bicycle parking spaces);
- h) Vehicular access to be provided from Fassaugh Avenue;
- i) 1 no. accessible car parking space proposed within the site;
- j) It is proposed that the development will be used for short term tourist or visitor accommodation outside of academic term times, in accordance with the definition of student accommodation.

The development will also provide for all associated service connections, public lighting, cold water storage and thermal store room, hard and soft landscaping, planting, formal activity equipment, removable bollards, tactile paving, boundary treatments, nature-based SuDS features, green and blue roofs, and all associated site clearance, excavation and development works above and below ground.

Inward Noise Impact Assessment

A Stage 1 and Stage 2 ProPG assessment have 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 the baseline noise survey a site noise model of the road and rail noise impact was produced and calibrated with the site measurements. A review of the noise levels on the site was conducted, this included the L_{AFmax} and L_{Aeq} , the site has subsequently been characterised as low to medium risk due to the relatively low noise levels throughout the day and nighttime periods.

Break-in noise calculations to predict the internal noise levels from road and rail traffic noise were conducted as part of the assessment. Consideration has also been given to the future growth of the road and rail network. Following the assessment, the building envelope performance requirements were determined to achieve adequate internal noise levels. The performance specification for the building envelope has been provided in this report which includes the external walls, glazing, roof and ventilation requirements.

External Amenity Noise Levels

The external amenity spaces on the development include a roof terrace on fourth floor level of block A and a ground level courtyard space at the northern boundary. Appropriate amenity has been provided on the development for occupants using a combination of these amenity spaces. This is in line with element 3(v) of ProPG.

Based on the recommendations in this report it is predicted that the internal and external noise levels will achieve the targeted noise levels in line with BS 8233:2014 and ProPG 2017 guidance.

Vibration Impact Assessment

A vibration survey was undertaken on the site to measure the vibration levels from train pass-bys in terms of VDV (Vibration Dose Value). The purpose of the survey was to measure the existing vibration levels and predict its impact on the amenity of the future occupants.

The vibration impact on the resident's amenity has been assessed based on a worst-case scenario. Based on the measurements taken onsite it is not predicted that the vibration impact from train pass-bys will have any negative impact on the amenity of the occupants of the proposed development. The measurements found a very low level of vibration from train pass-bys.

Construction Noise Impact

The construction noise impact is predicted to exceed the BS 5228 requirements **without any mitigation** measures for the Site Set Up, Substructure, Superstructure and External Finishes 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 on the information provided to WDA.

In addition to the mitigation measures, guidance has been provided in this report for construction noise monitoring during the construction period to manage noise levels to manage construction noise.

Operational Noise

An operational noise impact assessment has been undertaken considering the noise generated in the communal amenity space, and the plant and equipment on the rooftop. **It is predicted that the development will not cause a negative noise impact on the nearby noise sensitive locations.**

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1 Introduction

Wave Dynamics were engaged by R & D Developments Ltd. (in Receivership) Grant Thornton as the acoustic consultants on Cabra PBSA, Faussagh Avenue, Cabra, Dublin 7.

The proposed development provides for a Large-Scale Residential Development, which in summary, shall consist of:

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- b) Construction of a purpose-built student accommodation scheme consisting of 249 no. student bedspaces arranged in 32 no. clusters of 4, 7, 8, 9 and 10-bedroom units (including 13 no. accessible units and 10 no. studio units) each with associated shared kitchen/living/dining areas in 2 no. blocks ranging in height from 4-6 storeys;
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- j) It is proposed that the development will be used for short term tourist or visitor accommodation outside of academic term times, in accordance with the definition of student accommodation.

The development will also provide for all associated service connections, public lighting, cold water storage and thermal store room, hard and soft landscaping, planting, formal activity equipment, removable bollards, tactile paving, boundary treatments, nature-based SuDS features, green and blue roofs, and all associated site clearance, excavation and development works above and below ground.

A review of the existing noise environment is required to quantify the existing noise levels and establish the project's acoustic requirements to ensure the amenity of future occupants. A baseline noise survey was undertaken to measure the existing noise levels. This report outlines the project criteria, baseline survey results, assessment, and recommendations for;

- Building envelope sound insulation,
- Ventilation requirements,
- External amenity noise levels,
- Construction noise and vibration, and
- Operational noise.

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 Ireland, the UK, and Europe.

This assessment and report were completed by Stephen McDonagh, Acoustic Consultant with Wave Dynamics. Stephen's qualifications include a Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Certificate of Competence in Building Acoustics Measurements. Stephen is a member of the Institute of Acoustics (AMIOA).

The report has been peer-reviewed by Sean Rocks, Director | Senior Consultant, Sean has experience with numerous planning stage assessments. Sean's qualifications include a BEng (Hons) in Mechanical and Manufacturing Engineering, a Diploma in Acoustics and Noise Control (Institute of Acoustics), an IOA Certificate of Competence in

Environmental Noise Measurement and SITRI certified sound insulation tester. Sean is a member of both Engineers Ireland and the Institute of Acoustics.

2 Site Description

The site is located at Faussagh Avenue, Cabra, Dublin 7. The development is bounded by residential premises to the east, a rail line to the west and St. Finbars GAA club to the south, as shown in Figure 1.



Figure 1: Site Location, measurement locations L1, A1-A3, V1 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,
- Reasonable vibration from train passbys,
- External amenity noise levels,
- Construction noise and vibration, and
- Operational noise.

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

- Façade sound insulation performance,
- Ventilation requirements,
- External amenity requirements,
- Vibration from train passbys,
- 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 A12014 Noise and Vibration Control of Open Sites.
- ✓ BS 5228-2 2009 A12014 Noise and Vibration Control of Open Sites.
- ✓ 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.

3.1 Inward Noise Impact Assessment Criteria

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

Dublin Agglomeration Noise Action Plan

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 of 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 on 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 follow in coming to their conclusions based on the recommendations of the Acoustic Design Statement. Figure 2 illustrates the ProPG approach.

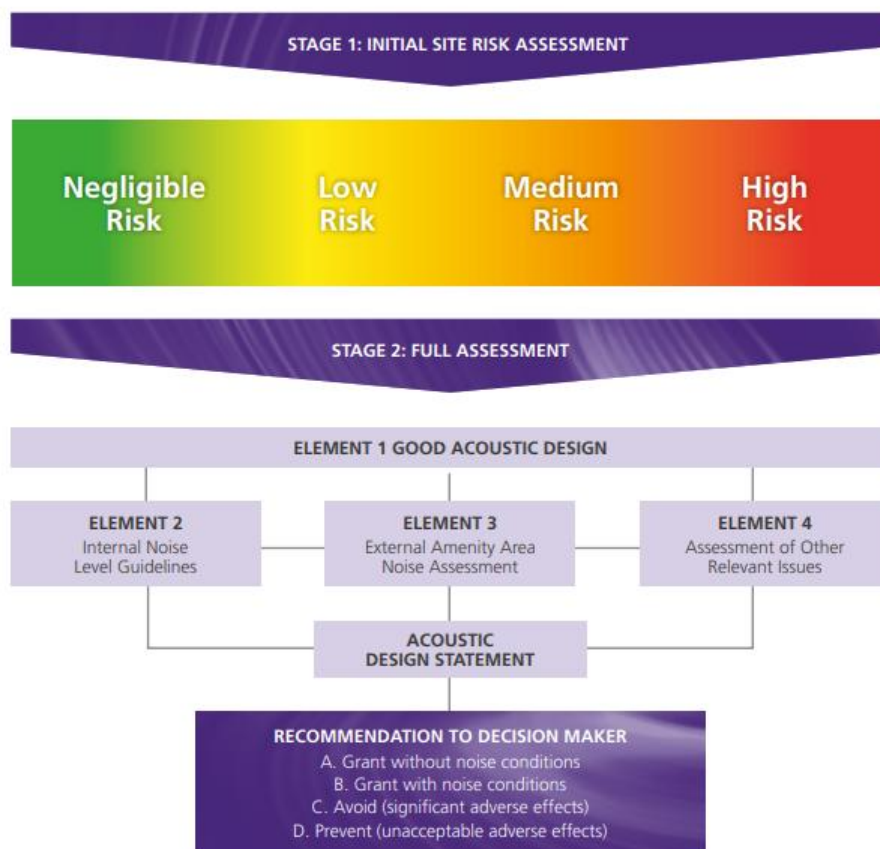


Figure 2: Summary of overall ProPG approach

Internal Noise Levels

Table 1 below details 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 $L_{Aeq, 16 \text{ hour}}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq, 16 \text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16 \text{ hour}}$	30 dB $L_{Aeq, 8 \text{ hour}}$ 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, publicly 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-minute 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.

3.2 Vibration Assessment Criteria

There are no specific vibration criteria for buildings in Ireland. The vibration criteria for this project are based on BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings.

The criteria are based on VDV (Vibration Dose Value) which is the appropriate measurement to measure/predict the impact of vibration on the occupants of the building. The standard offers vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings as shown in Table 2.

Table 2: Project Vibration Criteria

Place and Time	Low probability of adverse Comment (m.s ^{-1.75})	Adverse Comment Possible (m.s ^{-1.75})	Adverse Comment Probable (m.s ^{-1.75})
Residential Buildings 16hr Day	0.2 - 0.4	0.4 - 0.8	0.8 - 1.6
Residential Buildings 8hr night	0.1 - 0.2	0.2 - 0.4	0.4 - 0.8

3.3 Construction Noise Assessment Criteria

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 70dB(A) criterion for
- non-residential locations it is considered appropriate to adopt the higher category values of 75dB(A) during the day. These will only be assessed as noise sensitive during office hours.

For the purpose of this assessment, buildings other than dwellings which have a residential function will be considered for the lower noise limit, this includes Hotels, B&B's, Student Accommodation, Co Living Developments etc. This is in line with the guidance and definition of noise sensitive residences of EPA NG4. Table 3 below outlines the project criteria in tabular form.

Table 3: BS 5228 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.

3.4 Construction Vibration Criteria

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 4: Likely Construction Noise Impact

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

4 ProPG Stage 1 – Assessment

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 2 below 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.

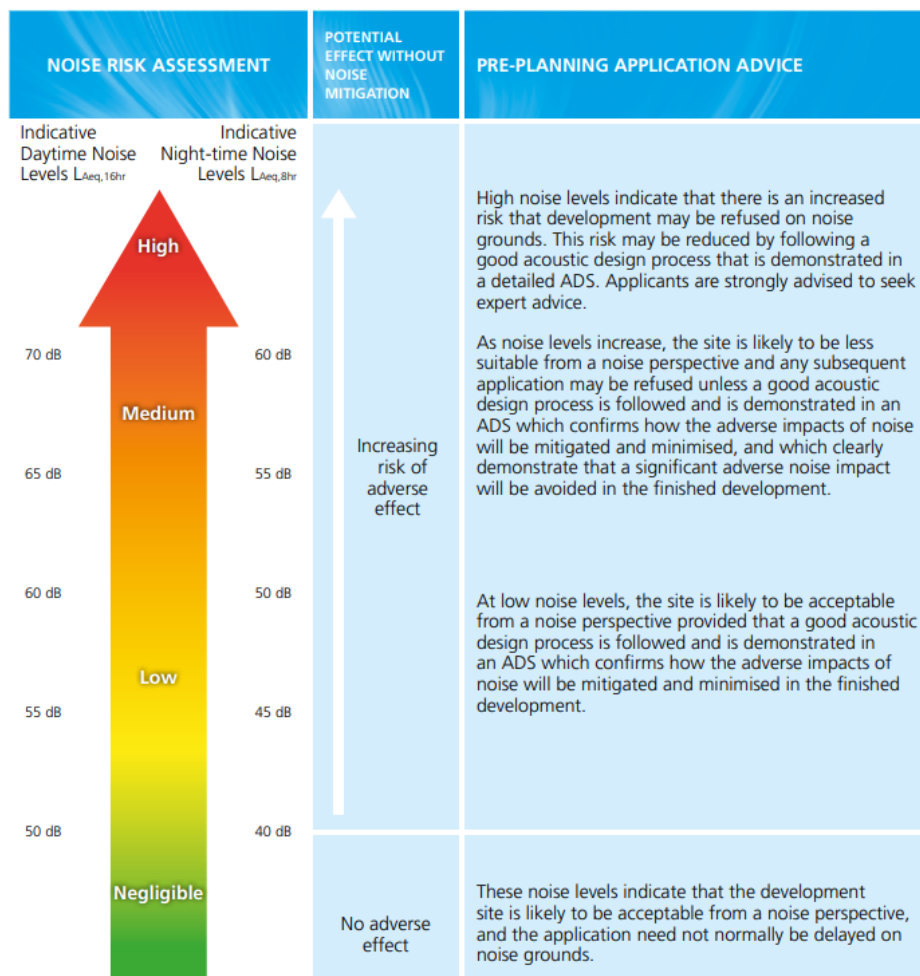


Figure 3: ProPG Risk Analysis

4.1 Baseline Noise Survey

The baseline noise and vibration surveys were undertaken at Faussagh Avenue, Cabra, Dublin 7. This included attended and unattended measurements to assess the impact of surrounding noise sources. The purpose of the survey was to quantify the existing noise environment to predict its impact on nearby noise premises.

4.1.1 Site Description and Measurement Locations

The site is located at Faussagh Avenue, Cabra, Dublin 7. The development is bounded by residential premises to the east, Faussagh Avenue and St. Finbars GAA club to the south and a rail line to the west, as shown in Figure 4.



Figure 4: Site location, measurement locations, noise sensitive receptors and the surrounding area.

4.1.2 Survey Methodology and Personnel

The attended survey was completed by Dan Cousins (Field Engineer) on the 26th of March 2025, 28th of March and 3rd of April 2025. The unattended noise logger was deployed by Dan Cousins (Field Engineer) at 10:18hrs on the 26th of March 2025 and collected at 10:21hrs on the 3rd of April 2025. The vibration deployment was completed by Dan Cousins (Field Engineer) on the 26th of March 2025 and collected on the 28th of March 2025.

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 for a duration of 15 minutes in the locations A1-A2 and L1 as noted in Figure 4 with a measurement of 60 minutes taken at A1. Additional measurements of shorter duration were also taken of trains passing by and aircraft flyovers and take offs at A3. 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 1.2m 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.

Unattended Noise Measurements

An unattended noise logger was deployed in location L1 as per Figure 5. The noise logger was placed at what was predicted to be the busiest part of the site at the point near to where Faussagh Avenue and the trainline cross. The logger was deployed at a height of approximately 3m above the ground. Measurements were filtered for periods of unsuitable weather conditions where appropriate. The noise logger was calibrated before and after the survey and no significant drift was noted.



Figure 5: Noise Logger Setup

4.1.3 Survey Period

The noise logger was deployed on the 26th of March 2025 at 10:18 hrs and collected at 10:21 hrs on the 3rd of April 2025. The vibration logger was deployed by Dan Cousins (Field Engineer) on the 26th of March 2025 at 10:06 hrs and collected on the 28th of March 2025 at 09:05 hrs.

4.1.4 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.

4.1.5 Subjective Noise Environment

During the attended noise survey and logger deployment, the following noise sources were identified:

- Road traffic noise including from local roads, Faussagh Avenue and parking cars,
- Trains passing by (dominant while present),
- Pedestrians passing,
- School children playing in nearby school ground,
- Distant construction noise,
- Birdsong,
- Aircraft.

4.1.6 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 5 below summarises the measurement equipment used.

Table 5: Noise Measurement Equipment

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Sound Level Meter	SLM7	Nor 140	1405924	U48184/ U47386	25/07/2026
Sound Level Meter	SLM8	Nor 140	1403345	U44270/ U44269	16/05/2025
Sound Level Meter	SLM4	Nti XL2-TA	A2A-23316-E1	UK-23-100	01/09/2025
Calibrator	CAL3	Nor 1251	32096	AC240251	03/07/2025
Weather Enclosure (Mic in enclosure)	WE1	Nor1211	14155	48186	25/06/2026

4.1.7 Vibration Measurement Equipment

Table 6 below summarises the vibration measurement equipment used.

Table 6: Vibration Measurement Equipment

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Vibroek Vibration Logger	NVMV1	V9000	SN2151	04242151	01/04/2026

4.2 Noise Measurement Results

This section outlines the results of both the unattended and attended noise measurements.

Attended Measurement Results

Table 7 outlines the results of the attended measurement survey.

Table 7: Attended Noise Measurement Results

Measurement				Measured Noise Levels		
Location	Date	Time (hrs)	Duration (mins)	L _{Aeq} dB	L _{AFmax} dB	L _{A90} dB
L1	26/03/2025	09:45	15:00	61	74	51
A1	26/03/2025	10:40	60:00	49	75	43
A3	26/03/2025	10:50	15:00	49	68	44
A2	26/03/2025	11:10	15:00	47	70	44
A3	26/03/2025	11:39	15:00	49	68	44
A3	26/03/2025	12:50	15:00	51	70	44
A2	26/03/2025	13:00	15:00	54	76	44
A2	26/03/2025	13:15	15:00	52	72	44
A1	28/03/2025	06:02	15:00	50	65	45
A1	28/03/2025	06:17	15:00	48	60	46
A3	28/03/2025	06:21	15:00	49	60	47
A2	28/03/2025	06:34	15:00	52	68	47
A2	28/03/2025	06:49	15:00	53	69	47
A2	28/03/2025	07:04	15:00	50	65	47
A2	28/03/2025	07:19	15:00	52	71	47
A2	28/03/2025	07:34	15:00	56	74	48
L1	03/04/2025	11:22	15:00	62	79	50

Unattended Monitoring Results

Table 8 outlines the results of noise measurements at the unattended monitoring location L1.

Table 8: Unattended Measurement Results at Location L1

Start Date	$L_{Aeq,16hour}$ (07:00 – 23:00) dB	L_{night} ($L_{Aeq,8hour}$ 23:00 – 07:00) dB ¹	L_{den} (00:00 - 00:00) dB	10th highest night-time ¹ L_{AFmax}	L_{A90} (23:00 - 07:00) dB ^{1,2}
26/03/2025	61 ³	55	63 ³	73	41
27/03/2025	64	57	65	82	42
28/03/2025	63	55	66	72	40
29/03/2025	62	57	64	74	48
30/03/2025	60	57	64	74	39
31/03/2025	61	58	64	72	43
01/04/2025	61	57	65	72	42
02/04/2025	61	57	65	73	41
03/04/2025	62 ³	N/A	66 ³	N/A	N/A

- (1) Where night-time period is referred to the date is the date the measurement commenced on at 23:00 hrs and finished at 07:00 hrs on the following calendar day.
- (2) Arithmetic average of L_{AF90} .
- (3) Shortened measurement duration.

Rail Noise Levels

Table 9 outlines the train passby noise levels, the train sound exposure levels have been calculated from the measured L_{Aeq} levels.

Table 9: Train Passby Noise Levels

Measurement				Train Direction	Measured Noise Levels	Sound Exposure Level
Location	Date	Time (hrs)	Duration (sec)		L_{Aeq} dB	L_{AX} dB
A3	26/03/2025	10:48	20	West	58	71
A3	26/03/2025	11:07	16	East	58	70
A3	26/03/2025	11:38	41	West	68	84
A3	26/03/2025	13:18	77	East	60	79
A3	28/03/2025	06:57	24	East	53	67
A3	28/03/2025	07:23	18	East	62	75
A3	28/03/2025	07:39	27	East	65	79
A3	28/03/2025	07:45	24	West	62	76

To calculate the impact of the train noise source on the façade of the proposed building it is possible to predict the noise impact using the measured L_{Aeq} from train passbys and calculating the sound exposure level using the following equation:

$$L_{Aeq} = L_{Ax} + 10 \cdot \log_{10}(N) - 10 \cdot \log_{10}(T)$$

Where:

L_{Ax} measured SEL
N number of vehicle movements
T time (seconds)

Following a review of the information on the train line regarding number of trains servicing the Connolly to Hazelhatch/Celbridge line –timetables indicate there are approximately 47 total trains carrying passengers per day and 2 total trains carrying passengers per night. This is based on a typical weekday.

Total Movements:

Day (07:00 -23:00hrs): 47 movements

Night (23:00-07:00hrs): 2 movements

Activity	Period	Number of Passbys	Predicted Façade Noise Level from train passes
Train Movements	Day	47	48 L_{Aeq} 16 hr
	Night	2	37 L_{Aeq} 8 hr

The predicted day and night noise levels show that the unattended noise monitoring results are dominated by road traffic noise rather than train noise.

Aircraft Sound Exposure Measurement Results

Table 9 outlines the results of the attended measurements for aircraft flyover noise levels at location A1. The flyover sound exposure levels have been calculated from the measured L_{Aeq} levels.

The sound exposure level (SEL) from aircraft flyovers has been calculated using the following equation:

$$L_{Ax} = L_{Aeq} - 10 \cdot \log_{10}(N) + 10 \cdot \log_{10}(T)$$

Where:

L_{Ax} measured SEL
N number of vehicle movements
T time (seconds)

Table 10: Aircraft Flyover Noise Levels

Measurement				Aircraft Type	Measured Noise Levels		Sound Exposure Level
Location	Date	Time (hrs)	Duration (s)		L_{Aeq} dB	L_{AFmax} dB	L_{Ax} dB
A3	28/03/2025	06:00	51	Boeing B737-8AS	55	63	72
A3	28/03/2025	06:06	43	Boeing B737-8AS	52	59	68
A3	28/03/2025	06:10	43	Boeing B737-8AS	55	62	71
A3	28/03/2025	06:41	41	ATR72-600	60	69	76
A3	28/03/2025	06:44	28	B737-8AS	53	61	68
A3	28/03/2025	06:49	16	B737-8AS	49	54	61
A3	28/03/2025	06:51	19	B737-8AS	51	56	64
A3	28/03/2025	06:52	42	B737-8AS	58	67	74
A3	28/03/2025	06:53	19	B737-8AS	48	53	61

Measurement				Aircraft Type	Measured Noise Levels		Sound Exposure Level
Location	Date	Time (hrs)	Duration (s)		L _{Aeq} dB	L _{AFmax} dB	L _{AX} dB
A3	28/03/2025	06:56	34	A320-214	51	57	66
A3	28/03/2025	06:58	24	A320-214	53	57	67
A3	28/03/2025	07:03	36	A320-214	54	61	70
A3	28/03/2025	07:19	33	A320-214	50	53	65

4.2.1 L_{AFmax} Noise Levels

Based on the project criteria outlined in Section 3, the internal L_{AFmax} 15min inside the student bedrooms cannot exceed 45 dBA more than 10 times per night. With regard to the maximum noise levels ProPg states:

“A site should not be regarded as negligible risk if the L_{Amax,F} exceeds, or is likely to exceed 60 dB more than 10 times a night. A site should be regarded as high risk if the L_{Amax,F} exceeds, or is likely to exceed 80 dB more than 20 times a night.”

Figure 6 below highlights the average number of L_{AFmax} events recorded on the noise logger per night based on a 15min measurement interval. Based on the ProPG risk assessment of the L_{AFmax} noise levels, the site is considered low to medium risk as there are less than 20 occurrences exceeding 80dB L_{AFmax}. Overall, the nighttime L_{AFmax} noise levels recorded at the monitoring location were considered medium.

The façade specification outlined in Section 5.2 below has been determined in accordance with achieving the internal noise levels for both L_{Aeq} and the L_{AFmax} incident noise levels below.

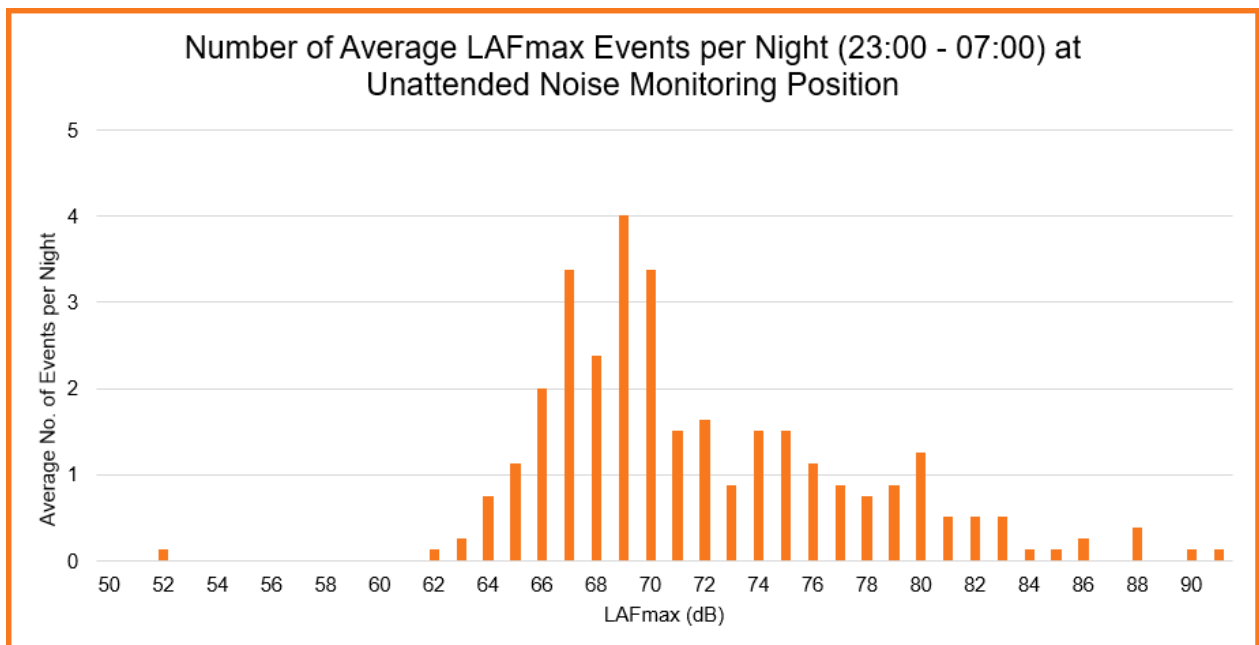


Figure 6: Average recorded L_{AFmax} events per night based on 15 min measurement intervals.

Discussion of Measurement Results

The measurements were taken over weekday and weekend periods to provide an understanding of the noise climate around the site. From the noise levels recorded it can be seen that the levels were steady for the duration of the full

survey with an increase in levels later in the day (07:00 hrs – 23:00 hrs) and lower levels at night (23:00 hrs – 07:00 hrs).

The ambient noise consisted of traffic noise from Faussagh Avenue, and rail noise when trains were passing. Aircraft noise was intermittent and masked by the local noise environment.

Based on the ProPG risk assessment of the L_{AFmax} noise levels, the site is considered low to medium risk as there are less than 20 occurrences exceeding 80 dB L_{AFmax} .

4.3 Vibration Measurement Results

This section outlines the results of both the unattended and attended vibration measurements.



Figure 7: Vibration monitor setup.

Unattended Measurement Results

Table 11 outlines the results of the vibration measurement results for the logger measurements at location V1.

Table 11: Vibration Measurement Results

Date	16 Hour VDV $ms^{-1.75}$ (07:00 - 23:00)			8 ¹ Hour VDV $ms^{-1.75}$ (23:00 – 07:00)		
	Axis			Axis		
	X	Y	Z	X	Y	Z
26/03/2025	0.006 ¹	0.008 ¹	0.024 ¹	0.006	0.007	0.015
27/03/2025	0.004	0.005	0.025	0.005	0.006	0.014

(1) Shortened measurement duration to 10:06hrs-23:00hrs.

Discussion of Measurement Results

The vibration levels were dominated by train pass-bys, there were no other vibration sources noted onsite. The logger location was specifically chosen to ensure there was no interference with the vibration measurement survey.

4.4 Future Noise Levels

Road Traffic Noise

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.

Rail Noise

Plans have recently been released in relation to an upgrade of the adjacent rail line with a new station constructed approximately 250 m south of the proposed site. While no details have been released in relation to increased frequency of trains on the line, a 50% of train passes along this route is expected to increase noise levels at the façade by approximately 1.7 dB which is negligible. Any upgrade is not expected to have a negative impact on the proposed development.

4.5 ProPG Stage 1 – Initial Risk Assessment

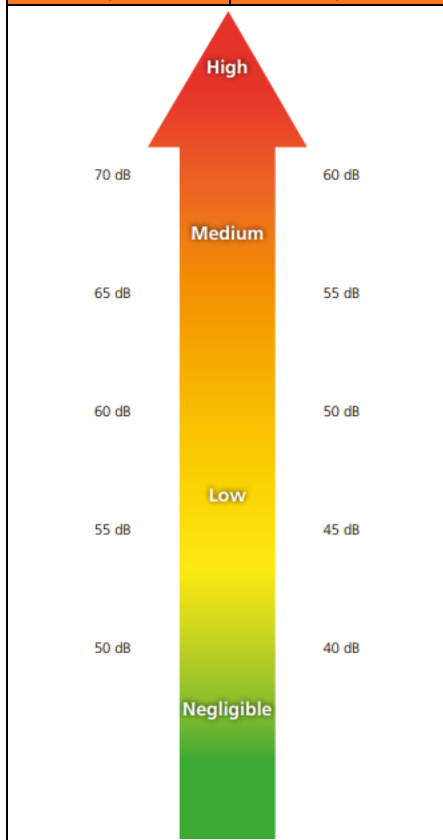
The measured noise levels on the site and future noise levels have been predicted for, road and railway noise.

Table 12 below identifies the Noise Risk Categorisation of the site based on the predicted free field façade noise levels. The site has been categorised as medium to high risk. Considering this risk categorisation of the development mitigation measures will be required to mitigate the noise risk in following with ProPG guidance and good acoustic design process.

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 12: 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	N/A The Southern façade of the development is considered medium risk of noise during the nighttime period.
		Low Risk	Low Risk
		The development is at low risk of noise in the daytime.	The remainder of the development is at low risk of noise in the nighttime.
		Negligible Risk	Negligible Risk
		N/A	N/A

5 ProPG Stage 2- Full Assessment

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

5.1 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."*

5.1.1 Discussion of Good Acoustic Design

Mitigation of Sources

The development is located close to road and rail 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 western elevation will be the most exposed to rail noise while the southern elevation is most likely to be impacted by road noise. The southern elevation impact is minimal, due to internal layout designs using this façade as a buffer with no glazing and utilised as a communal gathering area. The western elevation uses minimal glazing (larger areas on the eastern façade) and thus limits potential for noise impact within living spaces.

Construction Methods

Section 5.2.3 considers the construction methods required to meet the building performance control measures. The construction measures are in general robust, providing standard external wall and façade details to meet thermal, fire and weathertightness requirements will in general 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 5.2.3. 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 build-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 LAeq,16hr.”

The external amenity source noise levels are considered in section 5.3.

5.2 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 and Rail 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 and Railway 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.

5.2.1 Road and Rail 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 architect's drawings.
- Google Maps terrain and elevation data of surrounding area.
- Traffic speed as per local signage of surrounding roads.
- Annual traffic growth rate of 3.9%.
 - This has been assessed based on pre-covid traffic growth data.
- Information including drawings etc provided by the design team.

5.2.2 Predicted Façade Levels

Incident noise levels have been predicted across all façades of the development for both the day and nighttime period. The contours outlined in this section are the free-field predicted noise levels and do not include façade reflections.

Daytime Noise Levels

Figure 8, Figure 9 and Figure 10 below outline the predicted road and rail traffic noise levels across the proposed site for the day time period at 1.5 m, 4 m and 6.5 m height respectively.



Figure 8: Predicted $L_{Aeq,16hour}$ (07:00 Hrs – 23:00 Hrs) contour at 1.5m height for the future development.



Figure 9: Predicted $L_{Aeq,16hour}$ (07:00 Hrs – 23:00 Hrs) contour at 4m height for the future development.

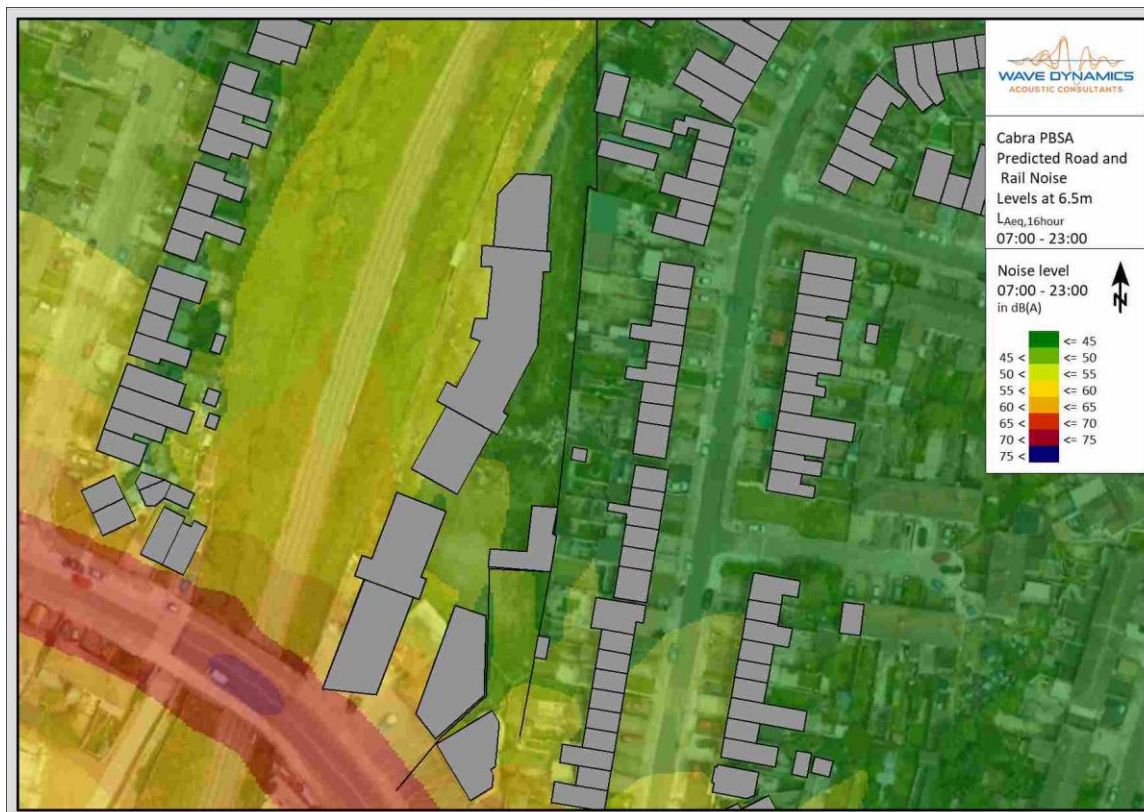


Figure 10: Predicted $L_{Aeq,16hour}$ (07:00 Hrs – 23:00 Hrs) contour at 6.5m height for the future development.

Nighttime Noise Levels

Figure 11, Figure 12 and Figure 13 below outline the predicted road and rail traffic noise levels across the proposed site for the nighttime period at 1.5 m, 4 m and 6.5 m height respectively.

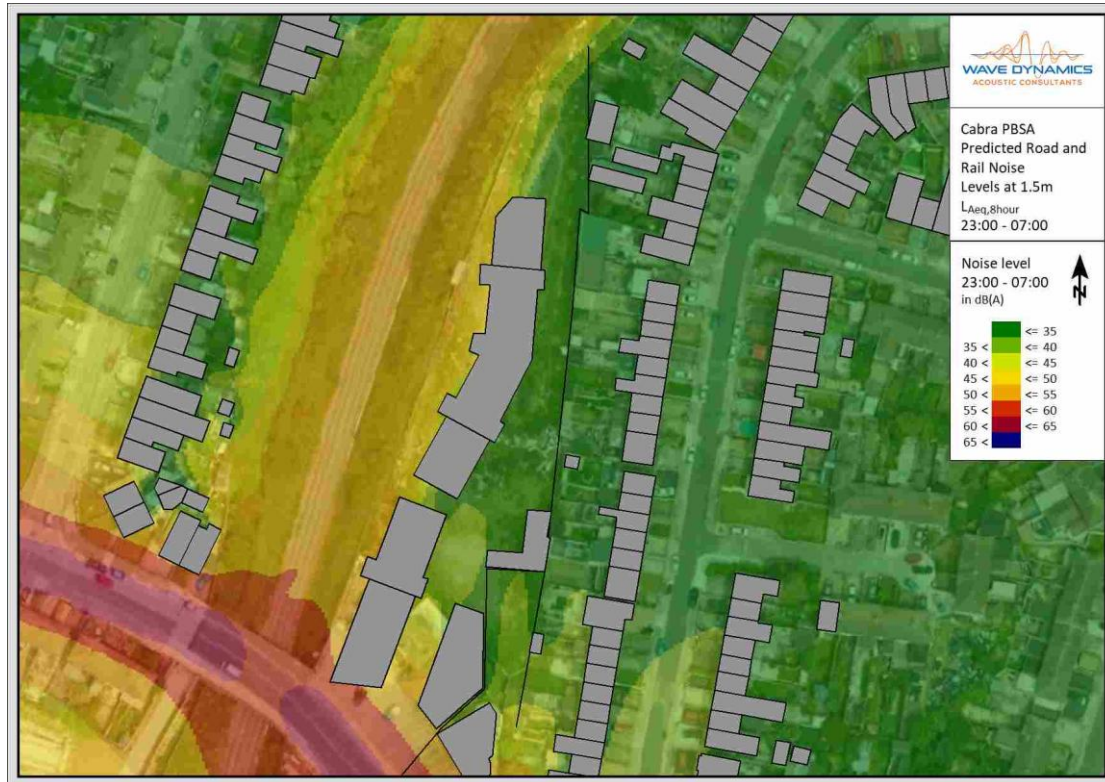


Figure 11: Predicted $L_{Aeq,8hour}$ (23:00 Hrs – 07:00 Hrs) contour at 1.5 m height for the future development.

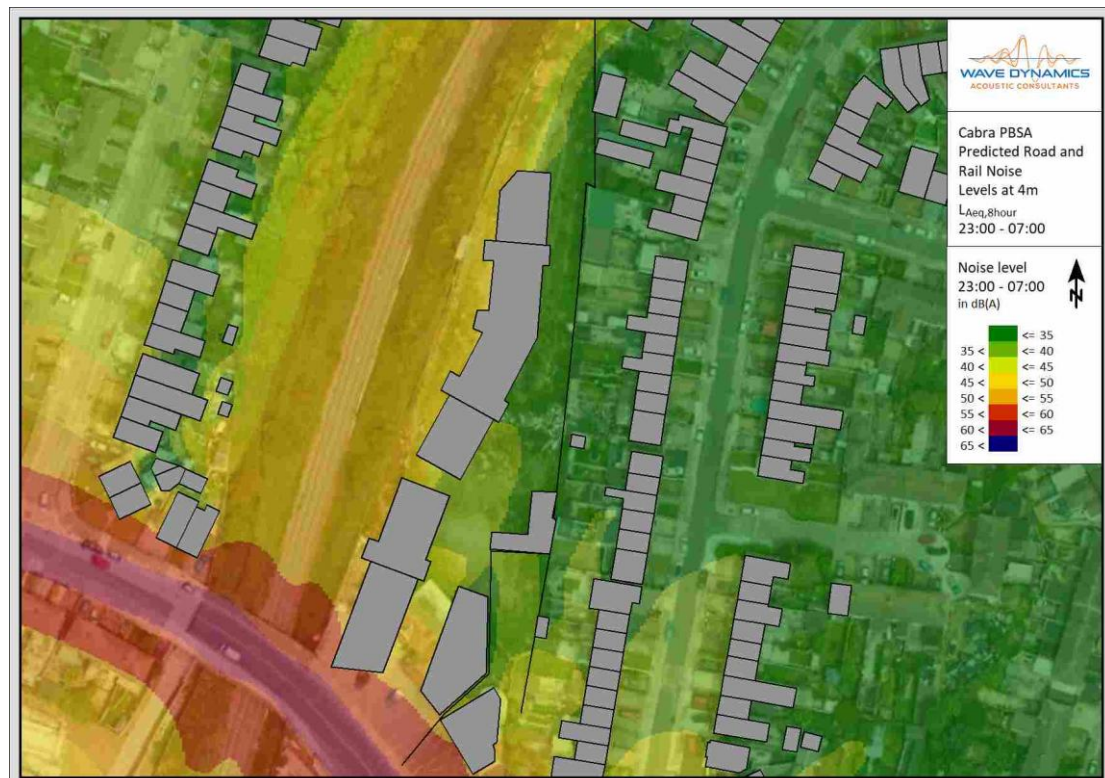


Figure 12: Predicted $L_{Aeq,8hour}$ (23:00 Hrs – 07:00 Hrs) contour at 4 m height for the future development.

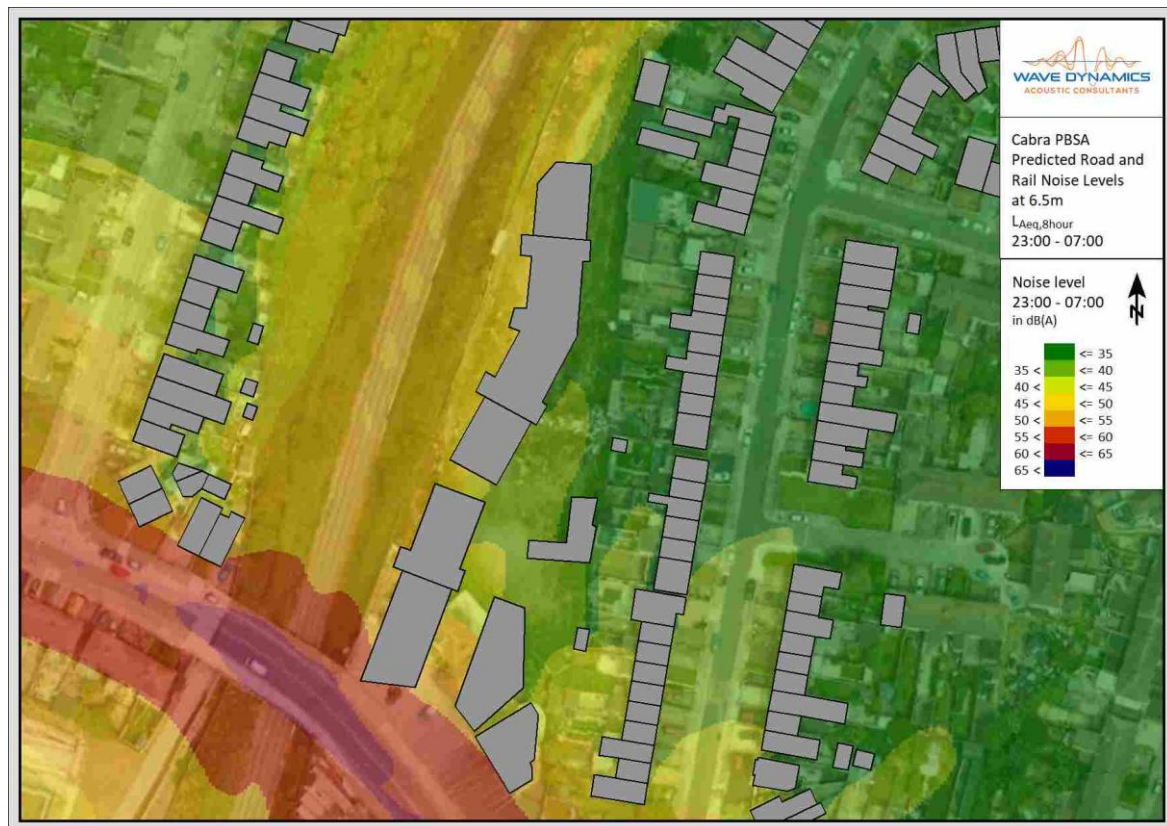


Figure 13: Predicted $LA_{eq,8hour}$ (23:00 Hrs – 07:00 Hrs) contour at 6.5 m height for the future development.

5.2.3 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. It is assumed that the proposed ventilation strategy will consist of an MVHR system to all bedrooms and there will be no façade ventilation via trickle ventilators.

Based on the attended noise measurements, predicted façade noise levels, ventilation strategy and proposed façade construction, the minimum façade requirements have been determined and are outlined in Table 13 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 13 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 13: Sound Insulation performance requirements for glazed elements and ventilation

Façade	Glazed Elements (Frame & Glazing) Sound Insulation Requirements (Indicative requirements equal or approved)							Façade Ventilation Proposed ¹
	Octave Band Frequency Requirements R dB						Glazing Acoustic Performance dB Rw	
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz		
BLUE	22	25	28	35	36	27	33	Mechanical Ventilation or 36 dB D _{new} Natural Ventilation

1) The performance cited for the ventilator (for natural ventilation) is in the open position. The calculation assumes a maximum of 1 ventilation opening per bedroom at the above specification.

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.

The assessment has been based on the use of either a mechanical ventilation system or natural ventilation through wall/trickle vents. Typically, the use of a fully sealed mechanical ventilation strategy will lead to a reduced glazing specification compared to a naturally ventilation system therefore the above glazing specification may be reduced if the ventilation strategy changes to natural. This assessment is based on the windows in closed position.

It is recommended that the facade supplier provide laboratory tests confirming the airborne sound insulation performance in the absence of suitable laboratory data a composite sound reduction index calculation undertaken by a suitably qualified acoustic consultant can be used to demonstrate compliance.

External Wall Construction

The façade wall construction has been assumed to achieve a minimum sound insulation performance of 56dB R_w. Based on inspection of the existing brick and concrete façade, the existing façade is expected to achieve this requirement.

Roof Construction

The roof construction has been assumed to achieve a minimum sound insulation performance of 45dB R_w. Any skylights and glazing in the roof system to corridor or communal areas should be of standard double-glazed construction. If there are any skylights to habitable bedrooms Wave Dynamics should be informed to provide specific guidance in each case.

5.3 Element 3- External Amenity Spaces

There is an external amenity space utilised on the fourth-floor roof space of block A located on the Southern boundary of the site and an additional ground level amenity area located at the northern most part of the site consisting of a basketball court and table tennis facilities. The terrace located at fourth floor level faces south towards Faussagh Avenue and the rail line. The ground floor amenity space is bound by existing residential units to the east and the rail line to the west.

Based on the measured noise levels at the site and the predicted future noise levels it is predicted that the external noise levels in the external amenity spaces will achieve the ProPG recommendations for desirable external amenity noise levels of 50-55dBA L_{Aeq,16hour}, with the exception of a small portion of the southernmost section of the terrace fourth floor roof space which is predicted to exceed the criteria by no more than 2dB. Alternate suitable amenity has been provided on the ground floor northern boundary as well as the entire eastern walkway of the site. This is in line with ProPG Element 3. Figure 14 and Figure 15 below highlight the proposed external amenity spaces across the site.



Figure 14: Location of external amenity space located at the northern boundary.

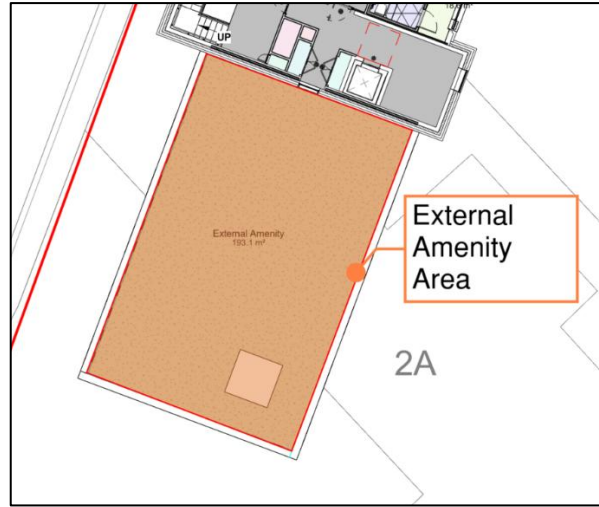


Figure 15: Location of external amenity space located at fourth floor level of Block A.

5.4 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, these 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.

5.4.1 Compliance with Relevant National and Local Policy

There are no specific noise guidance or policy documents for mixed-use student accommodation developments. The Dublin Agglomeration Noise Action Plan refers to the ProPG as the relevant document for assessment of the noise impact on new mixed-use student accommodation developments as followed in this acoustic design statement.

5.4.2 Magnitude and Extent of Compliance with ProPG

This report demonstrates that all dwellings (student accommodation bedrooms, communal living/kitchen area and studios) 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.

5.4.3 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.

5.4.4 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.

5.4.5 Acoustic Design v Wider Planning Objective

Where possible the wider planning objectives have been considered including the need for mixed-use student accommodation with good transport links. It is assumed that the wider planning objectives have been adhered to by following the ProPG guidance.

5.5 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 Vibration Assessment

The vibration dose value levels (VDV) were measured onsite at approximately 1m closer to the train line than the nearest façade of the existing building. As can be seen from Table 14 below, the highest measured daytime VDV, 16 hour was $0.013 \text{ m/s}^{-1.75}$ and the highest night-time VDV, 8 hour was $0.012 \text{ m/s}^{-1.75}$. These results are significantly below the VDV value range for low probability of adverse comment when assessed under BS 6472:2008.

Table 14: Project Vibration Criteria vs the highest measured vibration levels

Place and Time	Low probability of adverse Comment ($\text{m.s}^{-1.75}$)	Adverse Comment Possible ($\text{m.s}^{-1.75}$)	Adverse Comment Probable ($\text{m.s}^{-1.75}$)	Highest measured level for each period ($\text{m.s}^{-1.75}$)
Residential Buildings 16hr Day	0.2 - 0.4	0.4 - 0.8	0.8 - 1.6	0.013 (Z Axis)
Residential buildings 8 hr night	0.1 - 0.2	0.2 - 0.4	0.4 - 0.8	0.012 (Z Axis)

Based on the measured vibration levels on the site, vibration impacts on the development from train movements are not expected to have a negative effect on the amenity of the occupants of the development.

7 Construction Noise Assessment

7.1 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 15. Reference to the baseline survey results and guidance contained in BS 5228 Part 1 for construction noise levels threshold for significance affect from construction activities is set as follows for the closest noise sensitive locations:

Table 15: Project Criteria

Construction Noise Limits			
Noise Sensitive Location	Approximate Distance to the Centre of The Site (m)	Ambient Noise dB(A) L_{Aeq}	Noise Limit dB(A) L_{Aeq}
NSL1	30	52	65
NSL2	30	52	65
NSL3	40	62	65
NSL4	64	52	65

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.

7.2 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 16. The noise sources are assumed to be located at the centre of the development site. 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 16: 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	Diggers	77	4 Hours
	Carpentry Tools	78	3 Hours
	Skill Saw	84	2 Hours
Demolition	Excavators	77	2 Hours
	Concrete Breaker	92	2 Hours
	Pulveriser Mounted on Excavator	80	2 Hours
	Handheld Pneumatic Breaker	83	2 Hours
	Drills (into Concrete	89	2 Hours
	Lorry Idling	81	5 Hours
	Dumper 7T	80	3 Hours
	Telescopic Handler	71	5 Hours

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
Substructure	Excavators	77	2 Hours
	Con saws	84	3 Hours
	Rail saws	85	2 Hours
	Drills (into concrete)	89	2 Hours
	Dumper 7t	81	2 Hours
	Cement Mixer	75	4 Hours
	Telescopic Handler	71	4 Hours
	Concrete Pump	78	3 Hours
Superstructure	Drills (into concrete)	89	2 Hours
	Power tools	70	3 Hours
	Impact steel	69	2 Hours
	Hammer	69	1 Hour
	Dumper 7t	81	3 Hours
	Cement Mixer (Discharging)	75	2 Hours
	Telescopic handler	71	5 Hours
External finishes	Hand tools	70	5 Hours
	Power Tools	70	2 Hours

1) Internal finishes generally consist of low noise equipment which will be screened by the completed façade system and therefore the noise contribution during internal finishes stage is negligible at the noise sensitive locations. Table 17 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 all stages of the development.

Table 17: Predicted noise levels **without** mitigation for each stage.

Location	Noise Limit	Predicted noise level (construction noise + ambient) with <u>no</u> mitigation L_{Aeq} , dB				
		Site Set Up	Demolition	Substructure	Superstructure	External finishes
NSL1	65	70	83	76	74	60
NSL2	65	70	83	76	74	57
NSL3	65	69	82	74	72	55
NSL4	65	63	80	70	67	51

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 18: Attenuation required based on the construction noise predictions.

Location	Noise Limit	Noise reduction required at each stage of works to meet criteria (L_{eq} dBA)				
		Site Set Up	Demolition	Substructure	Superstructure	External finishes
NSL1	65	5	18	11	9	N/A
NSL2	65	5	18	11	9	N/A
NSL3	65	4	17	9	7	N/A
NSL4	65	N/A	15	5	2	N/A

Noise mitigation measures will be required at all stages of construction. A combination of the mitigation measures outlined in section 7.3 should be used to reduce the levels of construction noise by the values listed in Table 18 above.

7.3 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.

7.3.1 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 occupants 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 undertaken at periodic sample periods on the boundary with the nearest noise sensitive receptors.

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

7.3.2 Site Specific Recommendations

Table 19 below outlines the recommended site-specific noise mitigation measures based on the attenuation required in Table 18.

Table 19: 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/m²). 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 7.3.1 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 be placed on the boundary with each of nearest noise sensitive locations closest to the works.
Demolition	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 new buildings to screen noise from works where possible. Noise monitoring as above
External finishes	Local screening around hand tools. Noise monitoring as above

7.4 Vibration

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

7.4.1 Vibration Monitoring

Where required vibration monitors can be erected during the substructure 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 20 and major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in Table 20. Definitions of the damage categories are presented in BS 7385-1:1990.

Table 20: 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

Note2: It should be noted that these values are at the base of the building.

8 Operational Noise Impact

This section includes an assessment of the operational noise impacts for noise from the plant and equipment and the external amenity spaces.

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 development has been developed based on the noise survey, 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 amenity spaces on the nearby residential receptors.

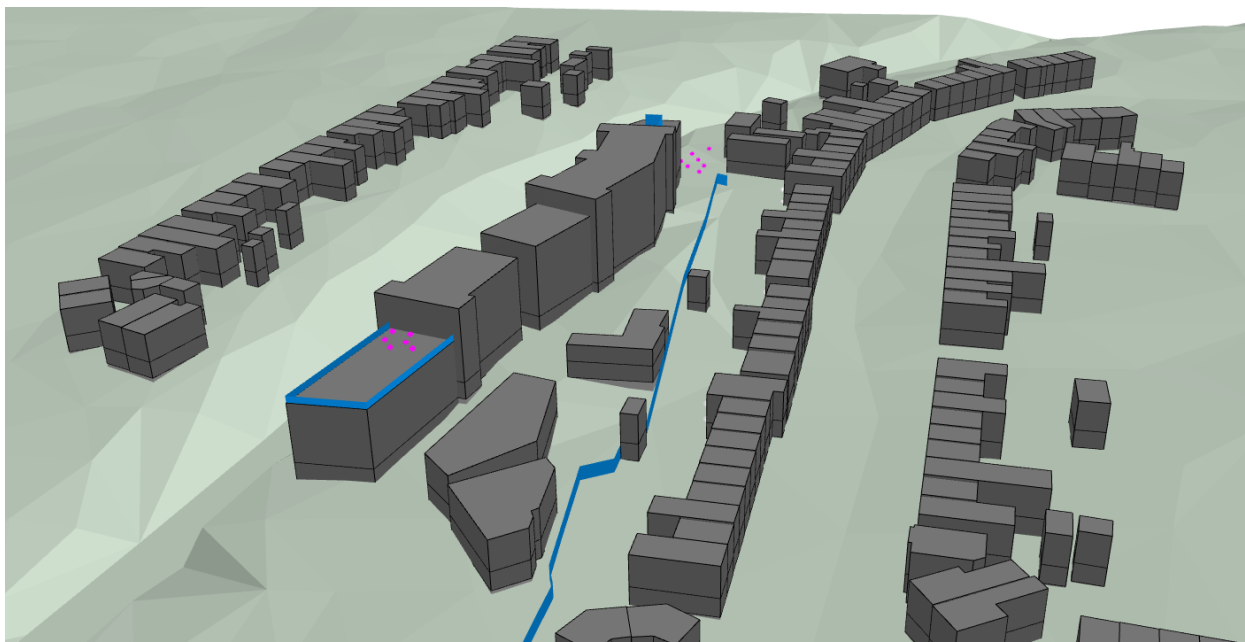


Figure 18: Screenshot from the model showing the roof plant and external amenity spaces.

8.1 Noise Sources

Plant and Equipment Noise

Based on the information provided by OCSC, it is understood that the rooftop plant and equipment for the development will consist of 2 heat pump units (to be located internally within the 4th floor plant room enclosure). The sound power spectrum used in the assessment for both heat pumps is outlined in Table 21 below. It is assumed that the heat pumps will run at full capacity, continuously as a worst-case assessment and any louvred element of the enclosure is located on the western facade.

Table 21: Heat pump sound power levels used to predict the noise impact.

Description	Source Sound Power Level L_w (dB) at Octave Band Centre Frequency, Hz								L_{wA} (dBA)
	63	125	250	500	1000	2000	4000	8000	
Iridium100_RaDa	88	89	90	91	89	87	83	77	94

The heat pumps are to be located in a plant room on the 4th floor of the development. It has been assumed for the assessment that the plant room will have a solid wall on the north, east and south façade. The wall should be solid to its full extent with no holes/gaps. The wall should be constructed from a suitably dense material to adequately screen noise from the heat pumps, such as blockwork or concrete. The proposed wall construction should be reviewed by an acoustic consultant at detail design stage.

Patron Noise Levels

An allowance has been made for the noise from tenants in the outdoor amenity spaces, speaking with normal voice as per Table 22.

Table 22: AAAC Patron noise levels at 1m distance for the outdoor communal space.

Description	Source Sound Pressure Level L_{eq} (dB) at Octave Band Centre Frequency, Hz							Overall dBA
	125	250	500	1000	2000	4000	8000	
1 male talker with normal voice	47	56	58	52	48	44	39	58

8.2 Noise Impact Assessment

This section outlines the operational noise impact from the occupants using the communal outdoor spaces and the noise from plant and equipment on the closest noise sensitive receptors.

8.2.1 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:

- Use of the external amenity spaces at ground and fourth floors during the hours of 12:00-23:00hrs, with the assumed occupancy below.
 - Fourth Floor: Occupancy of 18 with 6 talking at a time.
 - Ground Floor: Occupancy of 27 with 8 talking at a time.
- Assumed the 2no. heat pumps operational 100% of the time.

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 NSL 1 due to its proximity to the development. The BS4142 at NSL1 is outlined in Table 23 below.

Table 23: BS4142 Assessment for daytime period

Results		Relevant BS 4142 Clause	Commentary
Predicted specific sound level (daytime)	$L_{Aeq(15min)} = 42\text{dB}$	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)	$L_{Aeq(15min)} = 52\text{dB}$	7.3.2	The residual sound level was dominated by road traffic noise on the nearby roads and passing trains. Background location A2 assessed as this is representative for worst case receptor (NSLs).
Background sound level (daytime)	$L_{A90(15min)} = 44\text{dB}$	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	$L_{Aeq(15min)} = 42\text{dB}$	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.
Rating level	$(42 + 0) \text{ dB} = 42\text{dB}$	9.2	
Background sound level	$L_{A90(15min)} = 44\text{dB}$	8	
Excess of rating over background sound level	$(44 - 42) \text{ dB} = -2\text{dB}$	11	Assessment indicates that no adverse impact is likely on the noise sensitive locations as the specific sound is 2dB below the background levels and is significantly lower than the residual sound. Context has also been considered.
Uncertainty of the assessment	Not significant	10	The specific sound is a worst-case prediction as the assessment assumes large groups of persons occupying the amenity space during evening hours and one in three speaking with raised voice and the plant and equipment operating 100% of the time.

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 during the daytime period.

EPA NG4

EPA NG4 recommends a daytime criteria of (07:00 hrs – 19:00 hrs) 55 dB $L_{Aeq,T}$, the predicted noise emissions from the development are 42 dBA L_{Aeq} , with no tonality or impulsivity, therefore the NG4 criteria is expected to be achieved.

The more onerous EPA NG4 evening time criteria of 50 dB $L_{A,T}$ is also predicted to be achieved.

8.2.2 Night-time Scenario

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

The night-time situation assumes the following noise sources:

- Use of the external amenity spaces at ground and fourth floors during the hours of 23:00-01:00hrs, with the assumed occupancy below.
 - Fourth Floor: Occupancy of 18 with 6 talking at a time.
 - Ground Floor: Occupancy of 27 with 8 talking at a time.
- Assumed the 2no. heat pumps operational 100% of the time.

BS4142 Nighttime Assessment

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 24 below.

Table 24: BS4142 Assessment for night-time period

Results		Relevant BS 4142 Clause	Commentary
Predicted specific sound level (nighttime)	$L_{Aeq(15min)} = 42$ dB	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)	$L_{Aeq(15min)} = 57$ dB	7.3.2	The residual sound level was dominated by road traffic noise on the nearby roads. Background location L1 assessed as this is representative for worst case receptor (NSLs).
Background sound level (nighttime)	$L_{A90(15min)} = 41$ dB	8.1.2 8.4	The L_{A90} sound level was arithmetically averaged using position L1 with the source absent.
Assessment made during the night-time, so the reference time interval is 15 minutes		7.2	
Specific sound level as predicted	$(15min) = 42$ dB	7.3.6	The specific sound has been predicted by calculation alone as the

Results		Relevant BS 4142 Clause	Commentary
			new development was not existing at the time of the survey.
Acoustic feature correction	+0 dB	9.2 9.3.2	It is not anticipated that the specific sound will have any impulsive, tonal or intermittent characteristics.
Rating level	(42 + 0) dB = 42 dB	9.2	
Background sound level	$L_{A90(15min)} = 42$ dB	8	
Excess of rating over background sound level	(42 - 41) dB = 1 dB	11	Assessment indicates that no adverse impact is likely on the noise sensitive locations at nighttime as the specific sound is 1 dB above background levels and is significantly lower than the residual sound. Context has also been considered.
Uncertainty of the assessment	Not significant	10	The specific sound is a worst-case prediction as the assessment assumes plant and equipment operating 100% of the time.

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 during the nighttime period.

EPA NG4

EPA NG4 recommends a nighttime criterion of 45 dB $L_{Aeq,T}$, the predicted noise levels from the new development are 42 dBA L_{Aeq} , with no tonality or impulsivity, therefore the NG4 criteria is expected to be achieved.

8.3 Modelling Assumptions

The following assumptions were made throughout the modelling and assessment:

- Assessment based on the noise measurements undertaken in March 2025.
- Noise source data for the assessment was based on information provided by the design team.
- Model assumes a worst-case operating scenario as outlined in Section 8 above.
- Modelling based on the drawings, layouts and information provided.
- Assessment conducted to both day and night periods.
- Assumed mechanical plant operating 100% of the time.
- Any louvred section of the plant room located on the western façade.
- Assumed amenity space occupied between the hours of 12:00 – 23:00 as indicated in Sections 8.2.1 and 8.2.2 above.

9 Conclusion

Wave Dynamics were engaged by R & D Developments Ltd. (in Receivership) Grant Thornton as the acoustic consultants for the planning stage application for Cabra PBSA, Faussagh Avenue, Cabra, Dublin 7.

The proposed development provides for a Large-Scale Residential Development, which in summary, shall consist of:

- a) Demolition of the former 'Matts of Cabra' public house and associated structures (approx. 376.55 sqm).
- b) Construction of a purpose-built student accommodation scheme consisting of 249 no. student bedspaces arranged in 32 no. clusters of 4, 7, 8, 9 and 10-bedroom units (including 13 no. accessible units and 10 no. studio units) each with associated shared kitchen/living/dining areas in 2 no. blocks ranging in height from 4-6 storeys;
- c) Internal amenity spaces (approx. 347.1 sqm) including a student lounge area, laundry room, postal room and a reception / office / kitchen / tearoom across the ground floor and first floor levels;
- d) External amenity areas (approx. 2,971.4 sqm) including 1 no. outdoor terrace at fourth floor level of Block A (193.1 sqm);
- e) Approx. 405.5 sqm of public open space in the form of a public plaza fronting Fassaugh Avenue;
- f) Switch room, ESB substation, sprinkler room and bin storage all in a single storey services building along the eastern site boundary;
- g) A total of 308 no. bicycle parking spaces at surface level (258 no. long term, covered bicycle parking spaces including 12 no. cargo bicycle parking spaces and 50 no. visitor bicycle parking spaces);
- h) Vehicular access to be provided from Fassaugh Avenue;
- i) 1 no. accessible car parking space proposed within the site;
- j) It is proposed that the development will be used for short term tourist or visitor accommodation outside of academic term times, in accordance with the definition of student accommodation.

The development will also provide for all associated service connections, public lighting, cold water storage and thermal store room, hard and soft landscaping, planting, formal activity equipment, removable bollards, tactile paving, boundary treatments, nature-based SuDS features, green and blue roofs, and all associated site clearance, excavation and development works above and below ground.

Inward Noise Impact Assessment

A Stage 1 and Stage 2 ProPG assessment have 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 the baseline noise survey a site noise model of the road and rail noise impact was produced and calibrated with the site measurements. A review of the noise levels on the site was conducted, this included the L_{AFmax} and L_{Aeq} , the site has subsequently been characterised as low to medium risk due to the relatively low noise levels throughout the day and nighttime periods.

Break-in noise calculations to predict the internal noise levels from road and rail traffic noise were conducted as part of the assessment. Consideration has also been given to the future growth of the road and rail network. Following the assessment, the building envelope performance requirements were determined to achieve adequate internal noise levels. The performance specification for the building envelope has been provided in this report which includes the external walls, glazing, roof and ventilation requirements.

External Amenity Noise Levels

The external amenity spaces on the development include a roof terrace on fourth floor level of block A and a ground level courtyard space at the northern boundary. Appropriate amenity has been provided on the development for occupants using a combination of these amenity spaces. This is in line with element 3(v) of ProPG.

Based on the recommendations in this report it is predicted that the internal and external noise levels will achieve the targeted noise levels in line with BS 8233:2014 and ProPG 2017 guidance.

Vibration Impact Assessment

A vibration survey was undertaken on the site to measure the vibration levels from train pass-bys in terms of VDV (Vibration Dose Value). The purpose of the survey was to measure the existing vibration levels and predict its impact on the amenity of the future occupants.

The vibration impact on the resident's amenity has been assessed based on a worst-case scenario. Based on the measurements taken onsite it is not predicted that the vibration impact from train pass-bys will have any negative impact on the amenity of the occupants of the proposed development. The measurements found a very low level of vibration from train pass-bys.

Construction Noise Impact

The construction noise impact is predicted to exceed the BS 5228 requirements **without any mitigation** measures for the Site Set Up, Substructure, Superstructure and External Finishes 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 on the information provided to WDA.

In addition to the mitigation measures, guidance has been provided in this report for construction noise monitoring during the construction period to manage noise levels to manage construction noise.

Operational Noise

An operational noise impact assessment has been undertaken considering the noise generated in the communal amenity space, and the plant and equipment on the rooftop. **It is predicted that the development will not cause a negative noise impact on the nearby noise sensitive locations.**

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 μ Pa).
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, L_{eq} (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 Sound Insulation Requirements



Glazed Elements Specification

— 33 dB R_w



Project: Cabra PBSA

Title: Glazing Markup -
Block A Ground Floor

Prepared By: Saoirse Mulvaney

Reviewed By: Arun Kumar

Date: 08/07/2025



Glazed Elements Specification

— 33 dB R_w



Project: Cabra PBSA

Title: Glazing Markup -
Block A First Floor

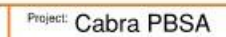
Prepared By: Saoirse Mulvaney

Reviewed By: **Arun Kumar**

Date: 08/07/2025



33 dB R_w



Title: Glazing Markup -
Block A Fourth Floor

Prepared By: Saoirse Mulvaney

Reviewed By: **Arun Kumar**

Date: 08/07/2025



Glazed Elements Specification

— 33 dB R_w



Project: Cabra PBSA

Title: Glazing Markup -
Block B Ground Floor

Prepared By: Saoirse Mulvaney

Reviewed By: Arun Kumar

Date: 08/07/2025



Glazed Elements Specification

— 33 dB R_w



Project: Cabra PBSA

Title: Glazing Markup -
Block B First Floor

Prepared By: Saoirse Mulvaney

Reviewed By: Arun Kumar

Date: 08/07/2025

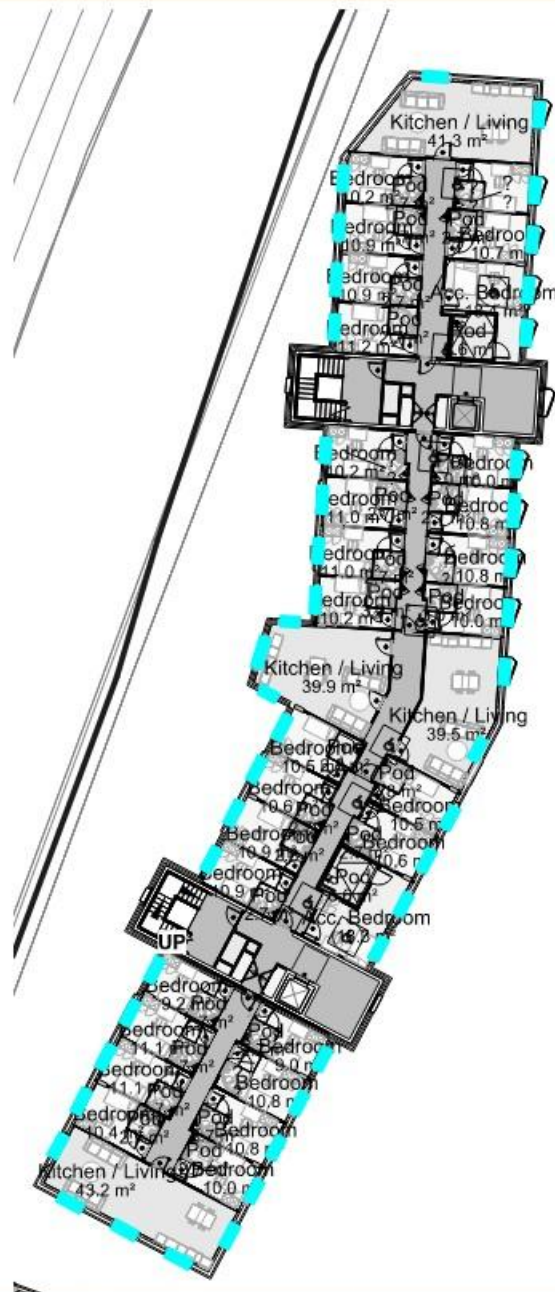


Glazed Elements Specification

33 dB R_w



Project:	Cabra PBSA
Title:	Glazing Markup - Block B Second Floor
Prepared By:	Saoirse Mulvaney
Reviewed By:	Arun Kumar
Date:	08/07/2025





Glazed Elements Specification

— 33 dB R_w



Project:	Cabra PBSA
Title:	Glazing Markup - Block B Fourth Floor
Prepared By:	Saoirse Mulvaney
Reviewed By:	Arun Kumar
Date:	08/07/2025



Glazed Elements Specification

33 dB R_w



Project: Cabra PBSA

Title: Glazing Markup -
Block B Fifth Floor

Prepared By: Saoirse Mulvaney

Reviewed By: Arun Kumar

Date: 08/07/2025