



**Amplitude
Acoustics**

Bancroft View SHD

Planning Stage Acoustic Design Statement

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Disclaimer: The design guidance outlined in this document is specific to the acoustic design only. Additional advice should be sought for disciplines as appropriate including but not limited to Fire Engineering, Structural Engineering, Safety, Conservation and Construction amongst others.

Glossary

| | |
|-------------------------|--|
| A-weighting | A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies. |
| dB | Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of that sound level. |
| dB(A) | Units of the A-weighted sound level. |
| Frequency (Hz) | The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second. |
| L_{eq} | Equivalent Noise Level—Energy averaged noise level over the measurement time. |
| L_{AFmax} | The maximum Sound Level with 'A' Frequency weighting and Fast Time weighting during the measurement period. |
| L_{90} | Noise level exceeded for 90 % of the measurement time. The L_{90} level is commonly referred to as the background noise level. |
| R_w | Weighted Sound Reduction Index—A laboratory measured value of the acoustic separation provided by a single building element (such as a partition). The higher the R_w the better the noise isolation provided by a building element. |
| Reverberation Time (RT) | Of a room, for a sound of a given frequency or frequency band, the time that would be required for the reverberantly decaying sound pressure level in the room to decrease by 60 decibels. |
| $D_{n,e,w}$ | Element normalised level difference, weighted - A laboratory measured value of the acoustic separation provided by a small building element. |
| L_{den} | (day-evening-night noise level) is the A-weighted, L_{eq} (equivalent noise level) over a whole day, but with a penalty of +10 dB(A) for night-time noise (22:00-07:00) and +5 dB(A) for evening noise (19:00-23:00). |
| L_{day} | (day noise level), is the A-weighted, L_{eq} (equivalent noise level) over the 16-hour day period of 07:00-23:00 hours, also known as the day noise indicator |
| L_{night} | (night noise level), is the A-weighted, L_{eq} (equivalent noise level) over the 8-hour night period of 23:00-07:00 hours, also known as the night noise indicator. |

Executive Summary

Amplitude Acoustics have been engaged to conduct a planning stage acoustic assessment for the planning application of a proposed new residential development at Greenhills Road, Tallaght, Dublin 26. We understand the development will consist of 197no. residential dwellings across four blocks which range in height from 8 storeys on the western façade to 7 storeys on the eastern façade.

As the land is located adjacent Greenhills Road, an acoustic report is required assessing the noise intrusion from road noise on the proposed development. This report details the acoustic assessment of the site including internal and external amenity noise levels based on traffic noise levels measured at the site and predicted noise levels based on future traffic growth.

Assessment Criteria

The criteria for the project have been developed with regard to the requirements of *BS 8233:2014 Guidance on sound insulation and noise reduction for buildings* and *ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development May 2017*. This includes an assessment of both the steady noise levels (L_{Aeq}) during the day and night, and the maximum noise levels (L_{AFmax}) for during the night.

It should be noted that the recommended internal levels of BS8233 and ProPg 2017 are similar to those in the *WHO Guidelines for Community Noise 1999* and *WHO Night Noise Guidelines for Europe 2009*. Furthermore, these internal noise levels are also aligned with the objectives of *EU Noise Policy* implemented through the *EU Noise Directive* and associated *Dublin Noise Action Plan*.

The design advice provided for the building façade is suitable for achieving the recommended internal levels with the windows closed and appropriate acoustic ventilation systems installed. Open windows typically provide a reduction of approximately only 10dB - 15dB and should not be relied on for the ventilating strategy for the building, except for rapid or purge ventilation. It is generally accepted that a higher level of noise from outside the building is accepted by residents when they have a degree of control over the noise intrusion i.e. they can close the windows.

Covid 19 restrictions and the effects of the lower traffic volumes on the traffic noise during the logger deployment were taken into consideration.

Conclusion

The interior noise levels for the whole development are predicted to comply with recommended interior sound levels from BS 8233 and ProPG 2017 provided that the construction requirements detailed in Section 6 are implemented.

Sleep disturbance during the night-time period due to the predicted internal noise levels (L_{Aeq} and L_{AFmax}) is unlikely to occur.

Balconies on the west elevations of Block A and B, north elevations of Block B and C and south elevation of Block A are predicted to exceed the desirable noise levels for external amenity spaces. Adequate alternate external spaces have been provided for the development through roof garden, open space and courtyard at ground level which comply with Element 3(v) of ProPG External Amenity Area Assessment. Nearby Bancroft Park also offers a large outdoor public park within a 5-minute walk from the development.

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1 Introduction

Amplitude Acoustics have been engaged to conduct a planning stage acoustic assessment for the planning application of a proposed new residential development at Greenhills Road, Tallaght, Dublin 24. We understand the development will consist of:

(i) demolition of existing substation and removal of existing advertisement structure on site; (ii) construction of a residential development of 197 no. apartments (79 no. one-bedroom, 105 no. two-bedroom and 13 no. three-bedroom) in 4 no. blocks (ranging in height from seven to eight storeys with eighth floor level roof garden) as follows:

- Block A containing 41 no. apartments (6 no. one bedroom, 34 no. two bedroom and 1 no. three-bedroom) and measuring eight storeys in height (with eighth floor roof garden);
- Block B containing 79 no. apartments (33 no. one bedroom, 34 no. two bedroom and 12 no. three bedroom) and measuring eight storeys in height;
- Block C containing 42 no. apartments (24 no. one bedroom and 18 no. two bedroom) and measuring seven storeys in height; and,
- Block D containing 35 no. apartments (16. no one bedroom and 19 no. two bedroom) and measuring seven storeys in height.

(iii) all apartments will have direct access to an area of private amenity space, in the form of a balcony, and will have shared access to internal communal amenities including 2 no. resident lounges (114.7sq.m), gym (98sq.m) external communal amenity space (1,490.8sq.m) and public open space (1,667sq.m); (iv) provision of 78 no. vehicular parking spaces (including 3 no. car-share parking spaces, 4 no. mobility parking spaces, and 8 no. electric vehicle parking spaces), 4 no. set-down vehicular parking spaces (including 1 no. mobility parking space) and 448 no. bicycle parking spaces (including 100 no. visitor parking spaces) at ground floor/ground level accessible via new vehicular entrance gate off access road off Greenhills Road; (v) provision of 4 no. commercial units (871.5sq.m total) and 1 no. childcare facility (329.7sq.m) with associated external amenity space (168.8sq.m) located at ground floor level; and, (vi) all ancillary works including public realm/footpath improvements, landscaping, boundary treatments, internal footpaths/access roadways, bin storage, foul and surface water drainage, green roofs, removable solar panels, ESB substation and all site services, site infrastructure and associated site development works necessary to facilitate the development. As the land is located adjacent Greenhills Road, an acoustic report is required assessing the noise intrusion from road noise on the proposed development. This report details the acoustic assessment of the site including internal and external amenity noise levels based on traffic noise levels measured at the site and predicted noise levels based on future traffic growth.

Implementing the acoustic design guidance in this report is predicted to achieve acceptable internal noise levels for the proposed use of the site.

2 Site Description

The proposed development is located at Greenhills Road, Tallaght, Dublin 24. The development will consist of the construction of 197no. residential dwellings across four blocks. The site is bounded by:

- Mixed-use commercial units to the north.
- Mixed-use commercial units to the east.
- Playing fields to the south.
- R819 Greenhills Road followed by commercial premises and Kilmanagh Tymon Primary Care Centre to the west.

The R819 road adjacent is composed of single carriageways consisting of one north bound and one south bound lane with footpaths on both sides and a section speed limit of 50km/hr. The section of R819 adjacent the site is located close to a traffic light junction (to the west) which reduces the average speed of vehicles on the road. Figure 1 below shows an aerial view of the proposed development site in relation to the surrounding area and the R819 Greenhills Road.

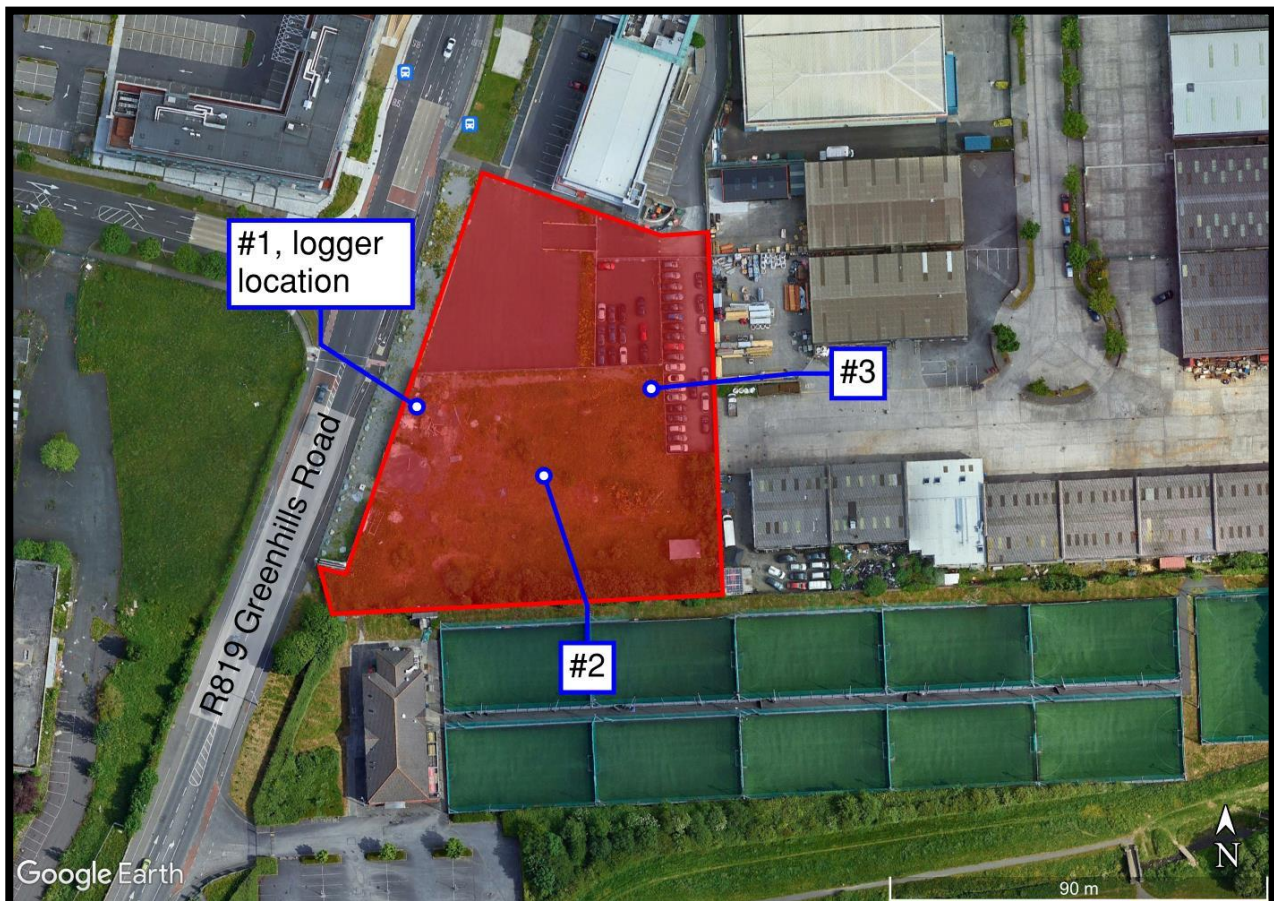


Figure 1: Aerial view showing the proposed development site in relation to the surrounding area, R819 Greenhills Road, attended measurement locations and unattended monitoring location (#1) Image © Google Earth

3 Acoustic Criteria

A summary of the relevant policy, standards and guidance documents used to inform the noise impact assessment of the scheme is provided below.

- Dublin Agglomeration Noise Action Plan 2018 — 2023
- BS 8233: 2014 Guidance on Sound Insulation and Noise reduction for Buildings.
- ProPG Professional Practice Guidance on Planning & Noise.
- ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures

3.1 ProPG: Professional Practice Guidance on Planning & Noise

ProPG was published on 22 June 2017 and the scope is restricted to new residential development exposed predominantly to airborne noise from transport sources. The guidance encourages better acoustic design for new residential development and aims to protect people from the harmful effects of noise. The guidance was prepared by the Institute of Acoustics, the Association of Noise Consultants and the Chartered Institute of Environmental Health. It encourages a holistic design process where acoustics is integral to the living environment. This covers careful site layout and better orientation of rooms within dwellings. ProPG acknowledges and reflects the Noise Policy Statement for England, the National Planning Policy Framework and Planning Policy Guidance – Noise.

The recommended approach for new residential development is in two stages; Stage 1 is an initial noise risk assessment of the proposed development site for an early indication of the initial suitability of the site for new residential development.

3.1.1 Stage 1 Assessment

For reference, the indicative noise levels for the initial site noise risk assessment as presented in ProPG are illustrated below.

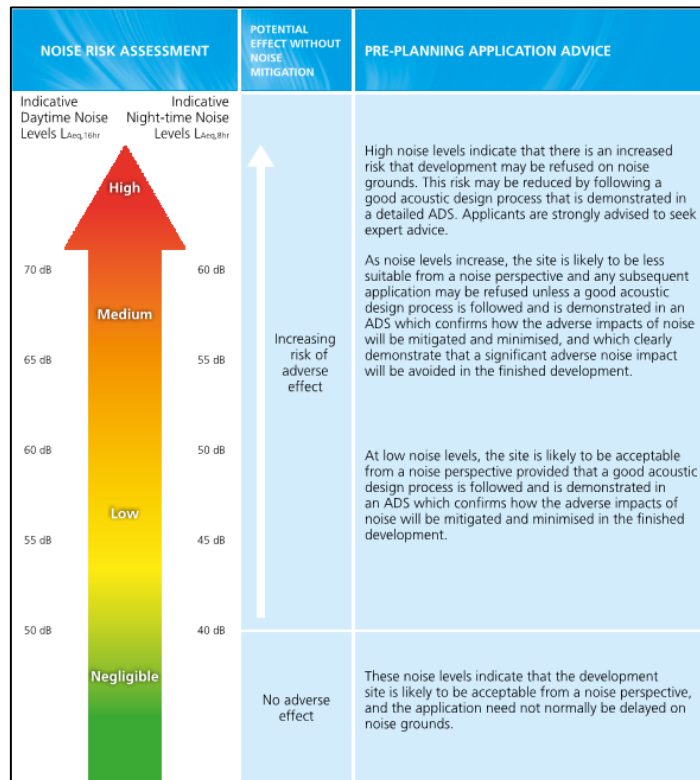


Figure 2: Stage 1 – Initial Site Noise Risk Assessment

3.1.2 Stage 2 Assessment

Stage 2 is a systematic consideration of four key elements:

- Demonstrating a “Good Acoustic Design Process”.
- Observing internal “Noise Level Guidelines”.
- Undertaking an “External Amenity Area Noise Assessment”.
- Consideration of “Other Relevant Issues”.

Good Acoustic Design Process

General principles (in order of preference):

- Maximising spatial separation of noise sources and receptors.
- Reducing existing noise levels or relocating noise sources, if possible.
- Using existing topography and existing structures.
- Incorporating noise barriers as part of the scheme.
- Using layout to reduce noise propagation across the site.
- Using orientation to reduce noise exposure of sensitive rooms.
- Using building envelope to mitigate noise.

3.1.3 Internal Noise Levels

ProPG guidance is based on BS 8233:2014 and World Health Organisation recommendations. Internal ambient noise levels (IANL) are provided in Table 1. In addition to these values, there is a recommendation for individual noise events to not normally exceed 45 dB $L_{Amax,F}$ more than ten times a night in bedrooms.

Table 1: BS 8233:2014 internal noise criteria – Commercial and 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 | 35 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) |
| Working | Office | 40 dB $L_{Aeq, 16 \text{ hour}}$ | - |

Note 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.

For the purposes of this assessment we have determined glazing requirements on the basis of achieving internal noise criteria as shown in Table 1 the living, sleeping and working areas of the proposed development.

3.1.4 External Amenity Areas

Guidance on noise levels for external amenity areas is provided by BS 8233:2014, ProPG 2017 and Dublin Agglomeration Noise Action Plan December 2018-July 2023. 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 $L_{Aeq, 16hr}$ ”. 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.”

The Dublin Agglomeration Noise Action Plan 2018 – 2023 defines desirable and undesirable noise levels as:

“In line with the previous noise action plan, the following are the target values for desirable low and undesirable high sound levels in the Noise Action Plan 2018-2023:

Desirable Low Sound levels

< 50 dB(A) L_{night}

< 55 dB(A) L_{day}

Undesirable High Sound levels

> 55 dB(A) L_{night}

> 70 dB(A) L_{day} ”

It should be noted that both BS8233:2014 and ProPG 2017 do not advise that development should be restricted in areas with undesirable noise levels, however it does recommend that appropriate mitigation measures are put in place and planning should not be restricted on this basis. Where required, design guidance has been provided to ensure lowest practicable external noise levels are achieved in line with ProPG 2017.

3.1.5 Consideration of Other Relevant Issues

The fourth and final element of Stage 2 is an assessment of other relevant issues. This element seeks to build upon relevant national and local planning and noise policies (item 4(i)) to provide a systematic list of recommendations for the issues that should be considered before making a judgement about the noise aspects of a particular planning proposal for new residential development. Other issues also considered as part of this assessment:

- Compliance with relevant national/local policy.
- Magnitude and extent of compliance with ProPG.
- Likely occupants of the development.
- Acoustic design versus unintended adverse consequences.
- Acoustic design versus planning objectives.

4 Noise Measurements

4.1 Details

Attended noise measurements were conducted between on 12:00hrs and 14:30hrs on 1st April 2022. An unattended noise logger was deployed to continuously record traffic noise levels at the traffic noise monitoring position #1 indicated in Figure 1 from 28th March to 1st April 2022.

4.2 Instrumentation

A Class 1 sound level meter/noise logger in general accordance with IEC 61672-1:2013 was used for all measurements. Table 2 below summarises the measurement equipment used.

Table 2: Measurement Equipment

| Description | Manufacturer | Model | Serial no |
|---------------------|-------------------|------------|-----------|
| Acoustic Calibrator | Larson Davis | CAL200 | 18194 |
| Sound Level Meter | Norsonic | NOR140 | 1402707 |
| Noise Logger | Sinus Messtechnik | Tango Plus | 1813 |

All equipment has calibration certificates traceable back to the relevant Standard. A calibration check of the sound level meter was conducted prior to and following the assessment using an external acoustic calibrator, with no significant drift in calibration measured.

4.3 Procedure

Noise measurements were undertaken in accordance with the following:

- Attended measurements were taken at the proposed site to assess the level of noise from the adjacent road and existing background noise levels.
- Measurements were taken for a duration of 15 minutes. The noise monitor was positioned approximately 1.2 metres above the ground level and at known distances from the road and any façade.
- A wind shield was used during all measurements, and the attended measurements were undertaken during a calm, still period (for which the wind velocity did not exceed 5 m/s).
- Extraneous noise due to wind exceeding 5m/s and/or rain was filtered from the logger data.
- Care was taken to avoid any effect on the measurement of extraneous noise, acoustic vibration or electrical interference.

4.4 Weather Conditions During Survey

Weather conditions during the attended and unattended survey were as follows:

- Wind: little to no wind observed/measured.
- Precipitation: Light rainfall on the evening of 30th March 2022 from 20:00hrs to 21:00hrs. This data has been omitted for its duration.
- Other: no additional weather effects noted.

4.5 Results

4.5.1 Unattended Noise Monitoring Results

A summary of the relevant day and night-time measured levels at location #1 is presented in Table 3 below. Days which were affected by long periods of rainfall and weekend data are not shown in the table.

Table 3: Traffic noise measurements for 28th March – 1st April 2022 at noise monitor location (#1).

| Start Date | Daytime L_{Aeq} (07:00 – 23:00) dB | Night-time L_{Aeq} (L_{night}) (23:00 – 07:00) dB | 10 th Highest Night- time L_{Amax} (23:00 – 07:00) dB | L_{den} dB |
|----------------------|--|--|---|-----------------|
| Monday 28/03/2022 | N/A | 59 | 76 | N/A |
| Tuesday 29/03/2022 | 66 | 60 | 77 | 68 |
| Wednesday 30/03/2022 | 66 | 60 | 80 | 69 |
| Thursday 31/03/2022 | 66 | 60 | 77 | 69 |
| Friday 01/04/2022 | N/A | N/A | N/A | N/A |
| Average | 66 | 60 | N/A | 69 |

Figure 3 below highlights the distribution of magnitude of average L_{AFmax} events recorded at the logger position during the night time period from 28th March – 1st April 2022 (weekday data only) with the omission of any data affected by extraneous sources or weather. Examination of the figure indicates that the maximum noise level typically does not exceed L_{AFmax} 77dB more than 10 times (as per ProPG criteria) in a given night-time period (23:00 – 07:00).

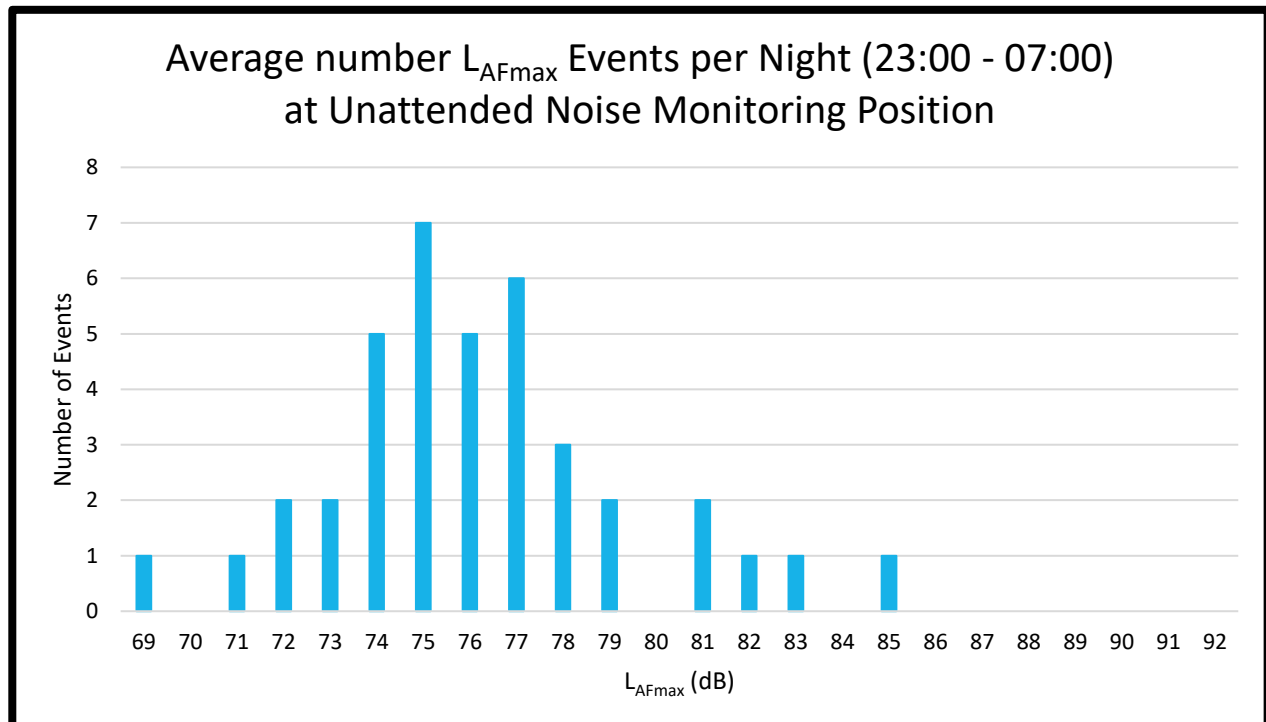


Figure 3: Distribution of average number of L_{AFmax} events per night at the unattended noise monitoring position.

4.5.2 Attended Noise Survey Results

A summary of the attended measurements taken on 1st April 2022 to establish variation in noise levels across the site can be seen in Table 4. Road traffic noise on Greenhills Road was observed to be the dominant noise source in the area for the duration of the site visit.

Table 4: Summary of attended noise measurements on 1st April 2022

| Date | Start Time | Location | Duration | Noise Levels |
|------------|------------|----------|----------|---------------------|
| | | | | L _{Aeq} dB |
| 01/04/2022 | 12:57 | #1 | 15 min | 66 |
| 01/04/2022 | 13:01 | #2 | 15 min | 52 |
| 01/04/2022 | 13:21 | #2 | 15 min | 49 |
| 01/04/2022 | 13:23 | #3 | 15 min | 52 |
| 01/04/2022 | 13:38 | #3 | 15 min | 49 |

5 Assessment

Noise emissions on the proposed site have been modelled using SoundPLAN 8.2 which implements the 'Calculation of road traffic noise (CORTN) algorithm'. The model accounts for the following factors:

- Traffic Flow in terms of Annual Average Daily Traffic (AADT).
- Percentage Heavy Vehicles.
- Traffic Speed and road gradient.
- Distance attenuation, including source and receptor heights.
- Barrier effects due to facility structures and other buildings.
- Ground effects and absorption.
- Atmospheric attenuation.

There was no traffic data available for Greenhills Road. Traffic volumes were estimated based on the noise measurements and attended traffic count taken during the site visit. The model has been calibrated and validated using the results of both the unattended monitoring, and the spatially distributed attended calibration measurements shown in Figure 1. Good agreement between measured and predicted existing noise levels was found.

Table 5: Parameters used to model Greenhills Road.

| Parameter | Value |
|--|--------------|
| Percentage Heavy Vehicles ⁽¹⁾ | 4.3% |
| Traffic Speed ⁽²⁾ | 50 km/hr |
| Annual traffic growth ⁽³⁾ | 3.9% |
| Terrain | Google Earth |

1. Model input data estimated based on other similar roads assessments by Amplitude.
2. Observed local signage.
3. <https://www.tii.ie/tii-library/strategic-planning/nra-road-network-indicators/TII-National-Roads-Network-Indicators-2017.pdf>

5.1 COVID-19 Traffic Impact

Available TII traffic data¹ indicates there was ≈10% reduction in traffic at the time of the assessment. This equates to a difference in noise levels of approximately 1dB which has been applied as a correction factor to the noise model.

5.2 ProPG Risk Assessment

The predicted existing noise contour bands, validated by real site measurements, across the proposed development site enable a ProPG Noise Risk Assessment to be conducted for the site. The range of predicted noise levels within the site boundary are as follows:

- L_{day}: 45 – 70dB L_{Aeq, 16 hour}
- L_{night}: 40 – 60dB L_{Aeq, 8 hour}

The ProPG Noise Risk Assessment for the proposed development is presented in Table 6 on the next page.

¹ <https://www.tii.ie/roads-tolling/operations-and-maintenance/traffic-count-data/>

Table 6: ProPG Stage 1- Initial Noise Risk Assessment for the proposed development site.

| Indicative Daytime Noise $L_{Aeq, 16 \text{ hour}}$ | Site Traffic Noise Level Range Measured/predicted | Indicative Night-time Noise $L_{Aeq, 8 \text{ hour}}$ | Site Traffic Noise Level Range Measured/predicted |
|--|---|--|---|
| 75 High | X | 65 High | X |
| 70 | X | 60 | X |
| 65 Medium | X | 55 Medium | X |
| 60 | X | 50 | X |
| 55 Low | X | 45 Low | X |
| 50 | X | 40 | X |
| Negligible | X | Negligible | X |

It can be seen from Table 6 above that traffic noise levels for the development site are classified as Low to High risk across the site during the daytime (Figure 4), and Low to High risk across the site during the night-time (Figure 5). The section of site which is considered high risk during the daytime is immediately adjacent the R819 road and the proposed dwellings are approximately 10m further back from the road. This indicates that traffic noise is a key issue for the site and that measures are required to ensure that internal and external noise levels comply with the guidance of ProPG 2017, BS8233 and WHO Guidelines.

5.3 Predicted Traffic Noise Contours

Using the acoustic model, the predicted traffic noise levels across the site have been predicted. Figure 4 below illustrates the predicted daytime traffic noise levels, L_{day} , over the site. Examination of the figure and model predicted results indicates that the road traffic noise levels attenuate with increasing distance from the R819 and are predicted to be L_{day} 68dB at the most exposed façade and floor level of the proposed development. The development also provides acoustic screening with the L_{day} 45dB on the least exposed façade.

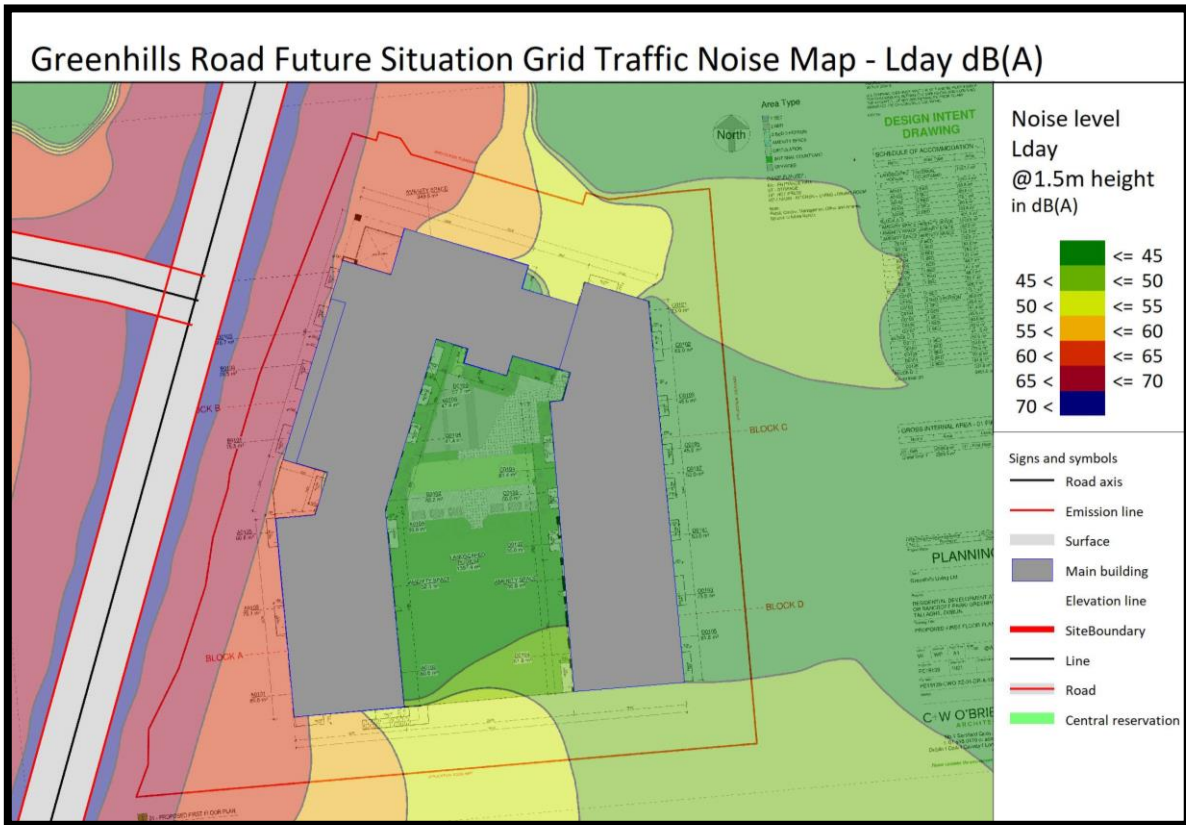


Figure 4: Predicted Lday noise levels across the proposed development site.

Figure 5 on the next pages similarly illustrates the predicted night-time traffic noise levels, L_{night} , over the site. Examination of the figure and model predicted results indicates that the road traffic noise levels attenuate with increasing distance from the R819 and are predicted to be L_{night} 62dB at the most exposed façade of the proposed development. The development also provides acoustic screening with the L_{night} 40dB on the least exposed façade.

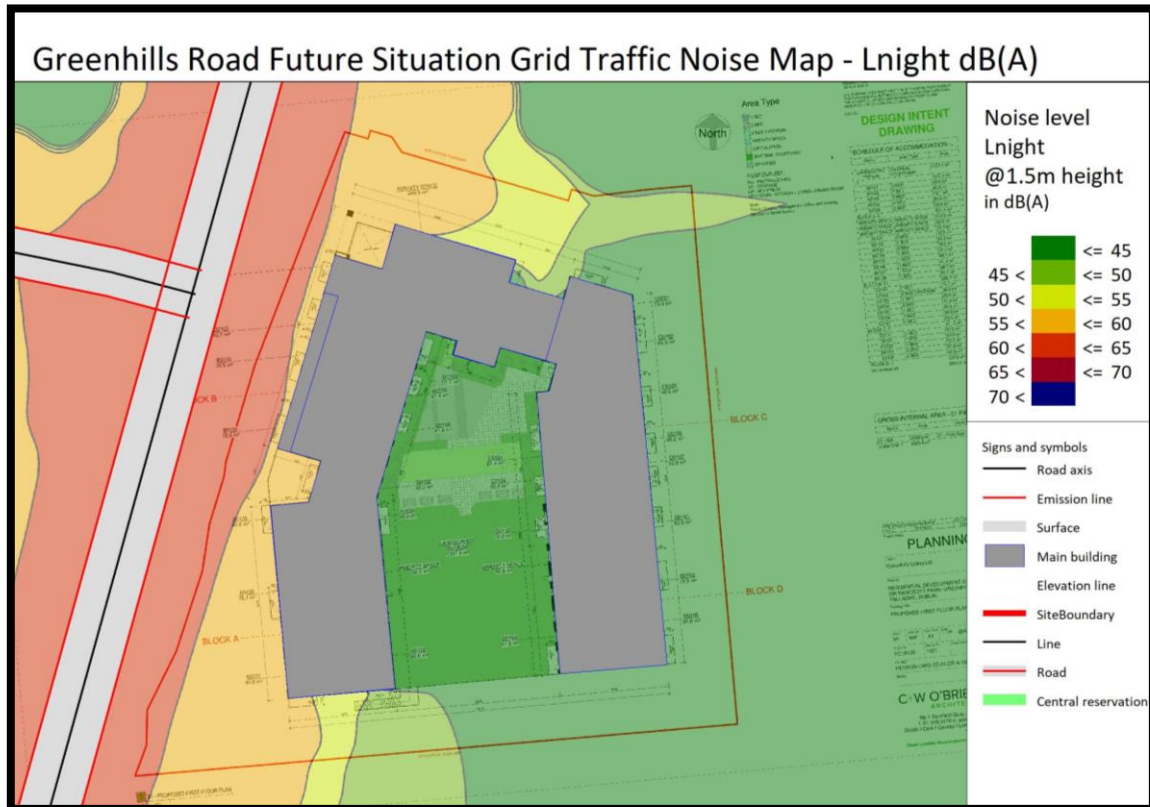


Figure 5: Predicted night time noise levels across the proposed development site

5.4 Internal Noise Levels

Construction details required to achieve internal noise levels within the project criteria are outlined in Section 6 of this report.

5.5 External Amenity Areas

Some of the external amenity noise levels on the west, north and south sides of the development, particularly for balconies, are predicted to be outside of the 'desirable external amenity levels' due to the traffic levels on the R819 Greenhills Road.

The area of the site along the west boundary is the most exposed to noise from the R819. Under existing conditions, this area of the site is exposed to noise levels in the range 55 – 69dB L_{day} (L_{Aeq,16hr}). ProPG 2017 states that areas intended for external amenity should ideally have noise levels in the range of 50 – 55dB L_{day} (L_{Aeq,16hr}). It also states, however:

“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.”

The noise levels across the rooftop garden and ground level courtyard area are predicted to fall within the 'desirable external amenity levels' provided the mitigation measures outlined in Section 6.5 are implemented in the design.

5.6 Future Noise Levels

The current average rate of growth of vehicles on Irish roads is 3.9%² based on this the noise levels across the development are expected to rise by 1-2 dB over the next 10 years. A 1-2dB change in noise levels is generally considered an imperceptible change and therefore is not considered significant.

5.7 Assessment of L_{AFmax}

ProPG states:

In noise-sensitive rooms at night (e.g. bedrooms) individual noise events (from all sources) should not normally exceed 45dB L_{AFmax} more than 10 times a night as this represents a threshold below which the effects of individual noise events on sleep can be regarded as negligible.

Based on the façade construction details outlined in Section 6, an external level of 83dB L_{AFmax} is required to produce an internal level of 45dB L_{AFmax} . Analysis of the distribution of L_{AFmax} events measured at the monitoring position averaged over the night-time period in Figure 3 indicate that there was one event which exceeded this threshold during the night-time period over the entire monitoring period (four nights). Further examination of the data indicates that the maximum noise level typically does not exceed L_{AFmax} 78dB more than 10 times (as per ProPG criteria) in a given night-time period (23:00 – 07:00). In addition to this, the noise logger was located closer to the Greenhills Road than the proposed façade will be and therefore the L_{AFmax} noise levels at the façade are predicted to be lower than those measured at the monitoring location.

Therefore, the L_{AFmax} internal noise levels is predicted to be within the criteria as outlined in Table 1 for all residential dwellings at the site indicating that sleep disturbances due to the maximum noise levels unlikely to occur.

² <https://www.tii.ie/tii-library/strategic-planning/nra-road-network-indicators/TII-National-Roads-Network-Indicators-2017.pdf> .

6 Construction Requirements

Based on the results of the measured noise levels, glazing requirements have been calculated to achieve the required internal noise levels in accordance with BS 8233 (Table 1) at the proposed development.

6.1 Proposed Glazed Elements, Windows and External Doors

The indicative façade glazing requirements for the development are shown in Table 7. Appendix A shows a mark-up of the required glazing types with regard to layout of the proposed the development. It is a requirement that the full composite system including the window frame has as a minimum, the same sound insulation performance as the glazing specified.

Table 7: Glazed elements, windows and external doors requirements.

| Type | Glazed Elements, Windows and External Doors Acoustic Performance R_w^1 | 1/1 Octave Band Indicative Performance Requirements (equal or approved) R dB | | | | | |
|--------|--|---|--------|--------|-------|-------|-------|
| | | 125 Hz | 250 Hz | 500 Hz | 1k Hz | 2k Hz | 4k Hz |
| Type A | 38 | 31 | 27 | 34 | 43 | 46 | 35 |
| Type B | 34 | 22 | 24 | 30 | 38 | 39 | 27 |

1. The performance of a double and triple-glazed system is significantly improved by varying the pane thicknesses, e.g. 1 x 4mm pane + 2 x 6 mm panes. Different glazing options which achieve the acoustic performance requirements can be considered.

Internal noise level predictions are based on the sound transmission loss performance of typical glazing where no manufacturer is nominated. The glazing configurations presented in Table 7 are indicative only. Glass from various manufacturers is available that will meet the acoustic performance requirements, however any proposed glazing should be approved by an acoustic consultant prior to selection.

It is acoustically preferable for windows to be of a hinged (awning) construction and have cam locks to ensure a compression seal is achieved. In this case, windows are to have compression rubber seals around the perimeter.

Where glazed sliding doors and windows are located on facades, the glazing and framing of the doors is required to match the acoustic performance of fixed glazing.

6.2 Ventilation Systems

Ventilation systems have the potential to impair the acoustic performance of a façade system. Open windows have been considered but provide insufficient attenuation to achieve internal noise levels. Standard passive ventilation grilles offer minimal acoustic performance and are not suitable for some facades on this development. Should natural ventilation be selected on other facades all ventilation will need to be acoustically rated. Ventilation systems (including trickle and room vents) will be required to achieve:

- Facades with Type A glazing should have ventilation systems which achieve a $D_{n,e,w}$ of 41 dB
- Facades with Type B glazing should have ventilation systems which achieve a $D_{n,e,w}$ of 37 dB

All facades are suitable for mechanical ventilation. For natural ventilation the façade and ventilation requirements are based on the achieving the ventilation requirements with the windows closed and a maximum of one (1) trickle vent in the bedrooms and a maximum of two (2) in the living areas with the above referenced acoustic performance. Should any additional vents be required to achieve the ventilation requirements the acoustic consultant should be advised.

6.3 External Wall Constructions

The external wall construction of the proposed development should be designed to achieve an acoustic performance of R_w 55dB or above. Typical brick and timber framed constructions normally achieve this value.

6.4 Roof Constructions

The roof construction should be designed to achieve an acoustic performance of R_w 55 dB or above. All penetrations through the roof/ceiling system should be filled with insulation, faced with plasterboard and sealed with a resilient acoustic sealant.

6.5 External Amenity Spaces

6.5.1 Balconies

All of the balconies on the western façade are predicted to exceed the recommended desirable external amenity levels by 5 – 15dBA due to their vicinity and direct line of sight to the road.

On review of the predicted daytime noise levels across all facades of the development, some of the balconies on the west elevations of Block A and B, north elevations of Block B and C and south elevation of Block A will not comply with the ProPG and BS8233 criteria for desirable levels of external amenity noise due to their proximity to the roads. The noise levels are predicted to be in the range 55 – 69dB L_{day} ($L_{Aeq,16hr}$) on these facades. BS8233 notes that desirable external amenity levels are not always achievable on balconies on all levels of all facades and other external amenity spaces should be available as part of the development with lower noise levels.

ProPG External Amenity Area Noise Assessment Element 3(v) specifically 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 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 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; 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 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.”*

The development includes a large outdoor rooftop garden areas on ninth floor of Block A, and a large open space/courtyard area at the centre of the development which offer suitable alternate external amenity areas for balconies throughout the development. Details of outdoor rooftop terrace can be seen in Sections 6.5.2 below.

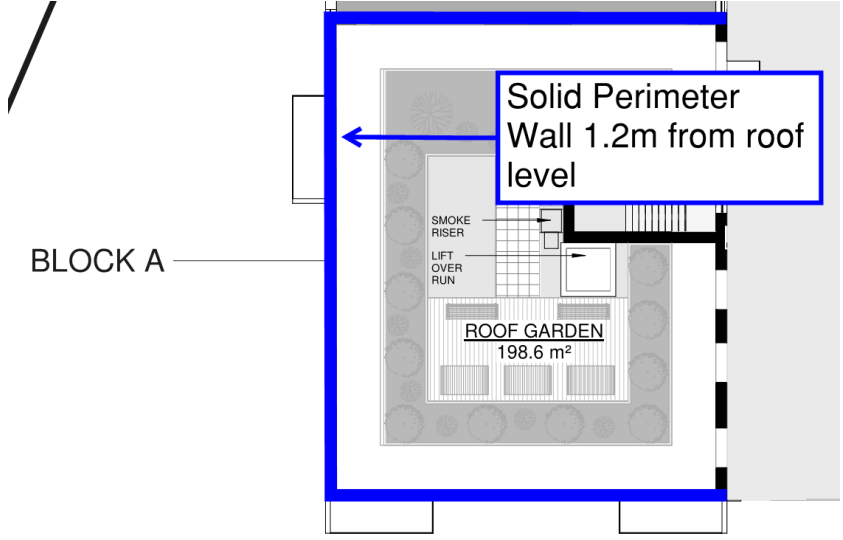
In addition to this, the development is situated a short 5-minute walk from nearby Bancroft Park which offers a large outdoor public park space with increased distance from any major/minor road and therefore lower noise levels would be anticipated which offers another form of suitable alternate amenity.

6.5.2 Rooftop Garden

There is a proposed rooftop garden on the ninth floor level of Block A on the development. The external amenity noise levels have been assessed across the rooftop garden and are predicted to be marginally over the ProPG and BS8233 criteria of 55dBA L_{day} by 0-5dB along the western edge of the garden. There are currently steel balustrades proposed along the perimeter of the rooftop garden. It is recommended that a solid barrier is used in place of the balustrades to match the same height. The effect of the solid barrier has been assessed and is predicted to reduce the noise levels across the full rooftop garden to within the ProPG external amenity noise levels.

Details of the proposed perimeter wall are seen below in Table 8.

Table 8: Noise barrier details and extent.

| Treatment | Description | Location |
|-------------------|--|---|
| Noise Wall | <p>Height: 1.2m above Roof Level</p> <p>Proximity: As shown by Blue Line</p> |  <p>The diagram shows a floor plan of Block A. A blue rectangular line represents the 'Solid Perimeter Wall 1.2m from roof level'. Inside this wall is the 'ROOF GARDEN' with an area of 198.6 m². Other features labeled include 'SMOKE RISER' and 'LIFT OVER RUN'. A line points from 'BLOCK A' to the main structure.</p> |
| Noise wall | | <p>The noise wall should be constructed of a material with a surface density of typically 15kg/m², unless otherwise noted. Examples of suitable materials to construct the noise wall include:</p> <ul style="list-style-type: none"> • 125mm thick concrete block. • Multivario Transparent Noise Barrier • Hoesch Isorock® Akustik (Soundtec, http://www.acousticgrg.ie/suppliers/hoesch/.) <p>There should be no cracks or gaps between individual barrier elements, between the barrier or ground, or where the ends of the barrier join another structure.</p> |

6.5.3 Open Space Noise Levels

The main public open space located in the centre of the development benefits greatly from the proposed layout of the development which provides a high degree of screening from Greenhills Road traffic noise to the open space. The open space and courtyard area have been assessed and are predicted to comply with the ProPG recommended external amenity noise levels of 55dBA L_{day} .

7 Conclusions

Amplitude Acoustics have been engaged to conduct a planning stage acoustic assessment for the planning application of a proposed new residential development at Greenhills Road, Tallaght, Dublin 26. We understand the development will consist of 197no. residential dwellings across four blocks which range in from 8 storeys on the western façade to 7 storeys on the eastern façade.

The traffic noise at the site has been measured using a noise logger as well as attended measurements. A traffic noise model has been developed and calibrated using the measured noise levels. The traffic noise model was modified to predict the 10-year forecast traffic noise levels based on a forecast traffic volume increase. The effect of lower traffic volumes due to Covid 19 restrictions has been considered and found to be marginal. Using the measured noise levels, the acoustic performance requirements for the building have been developed to achieve the internal noise levels defined in BS 8233 and ProPG.

Interior noise levels for the whole development are predicted to comply with interior noise level criteria (including both L_{Aeq} and L_{AFMax}) from BS 8233 and ProPG provided that the construction requirements detailed in Section 6 are implemented. Sleep disturbance due to the predicted internal noise levels is unlikely to occur.

Balconies on the west elevations of Block A and B, north elevations of Block B and C and south elevation of Block A are predicted to exceed the desirable noise levels for external amenity spaces. Adequate alternate external spaces have been provided for the development through roof garden, open space and courtyard at ground level which comply with Element 3(v) of ProPG External Amenity Area Assessment. Nearby Bancroft Park also offers a large outdoor public park within a 5-minute walk from the development.

Appendix A – Glazing Mark Up

Title:
Glazing Mark Up
Bancroft View SHD
Ground Floor
Client:
Greenhills Living Ltd

Legend

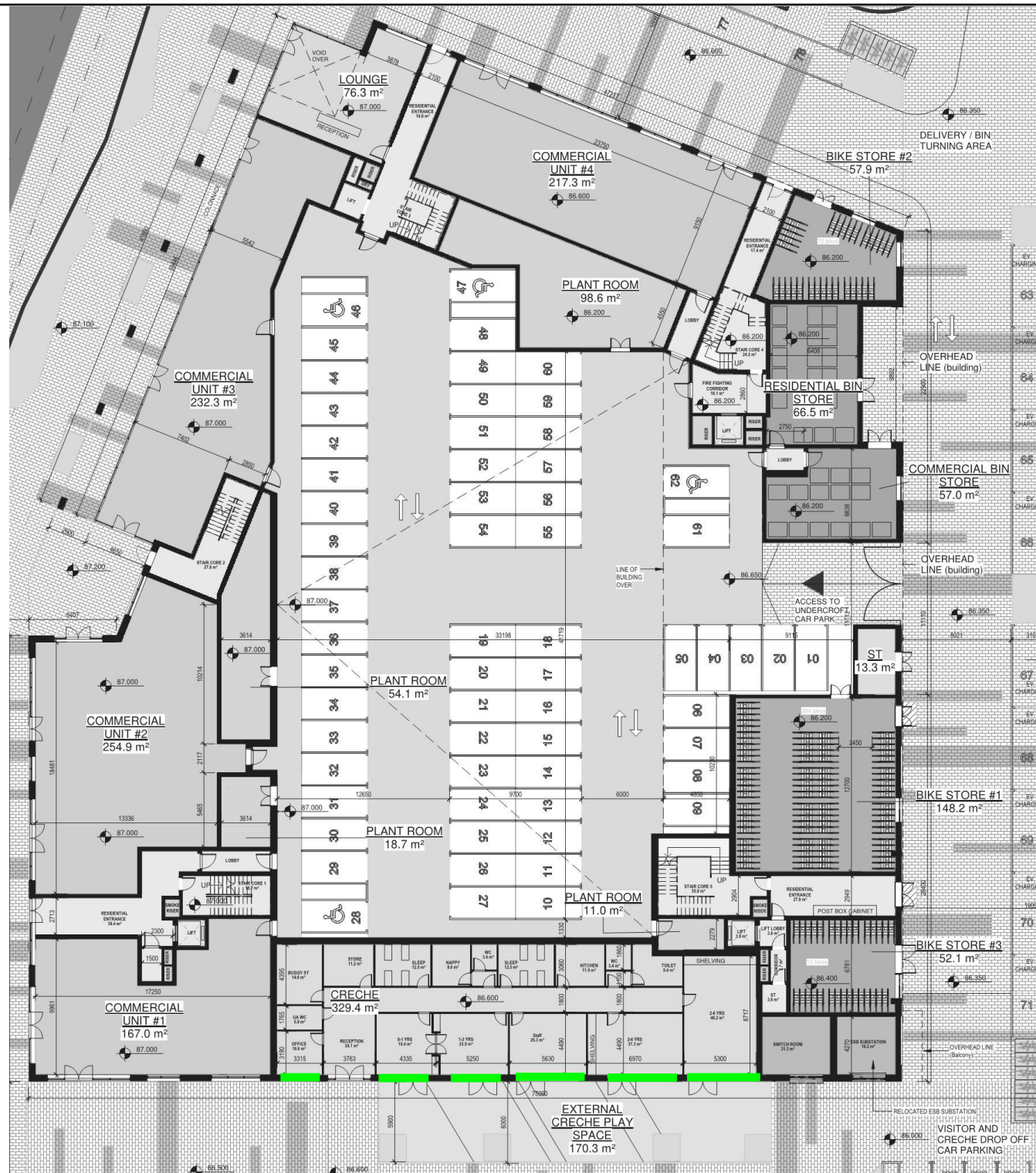
Glazing Performance

- Rw 38 dB
- Rw 34 dB

AMPLITUDE REVIEW

Date: 04/05/2022
Revision: 1
Project Number: D220202

G2 The Steelworks
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Title:
Glazing Mark Up
Bancroft View SHD
First Floor
Client:
Greenhills Living Ltd

Legend

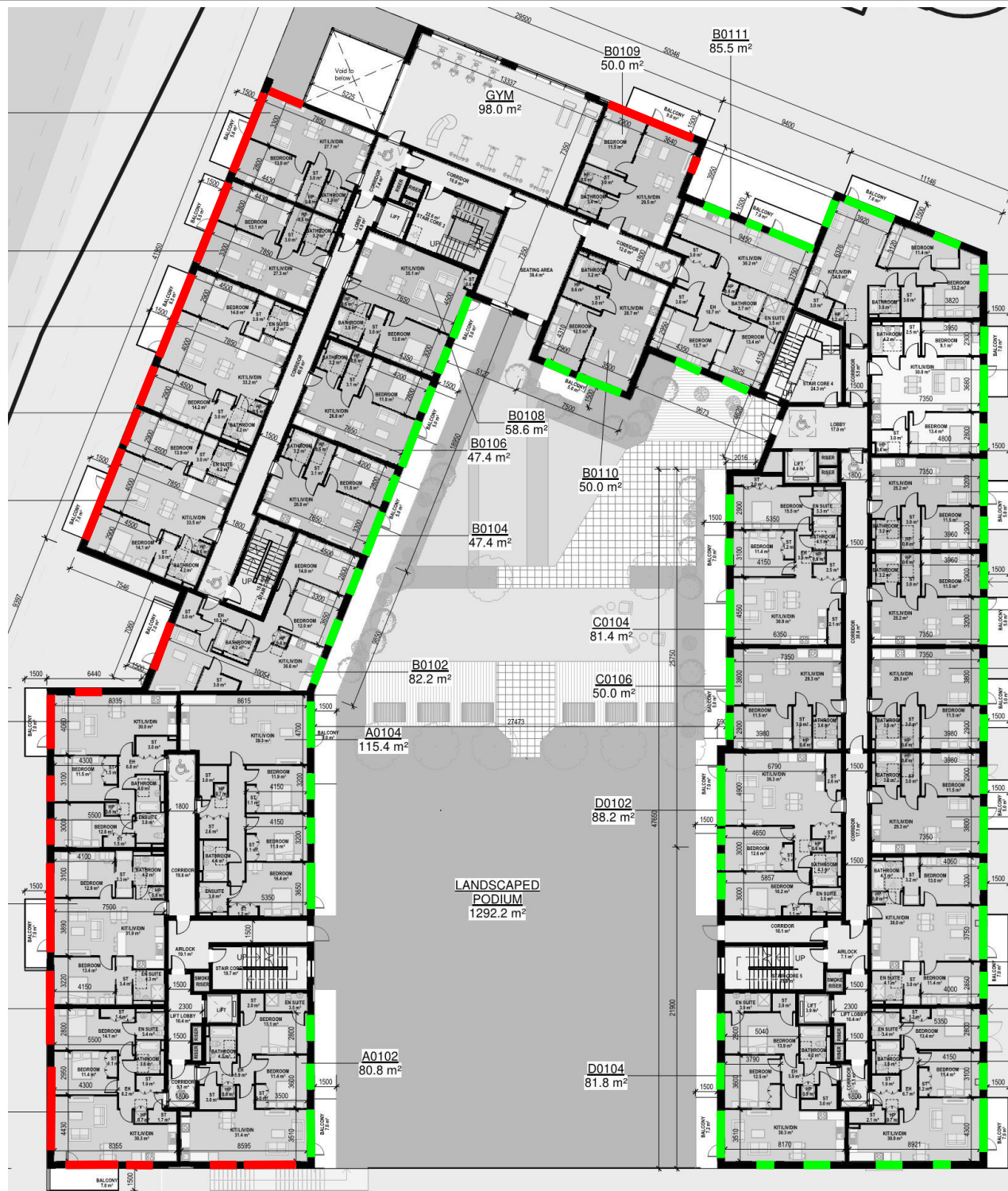
Glazing Performance

- █ Rw 38 dB
- █ Rw 34 dB

AMPLITUDE REVIEW

Date: 13/04/2022
Revision: 0
Project Number: D220202



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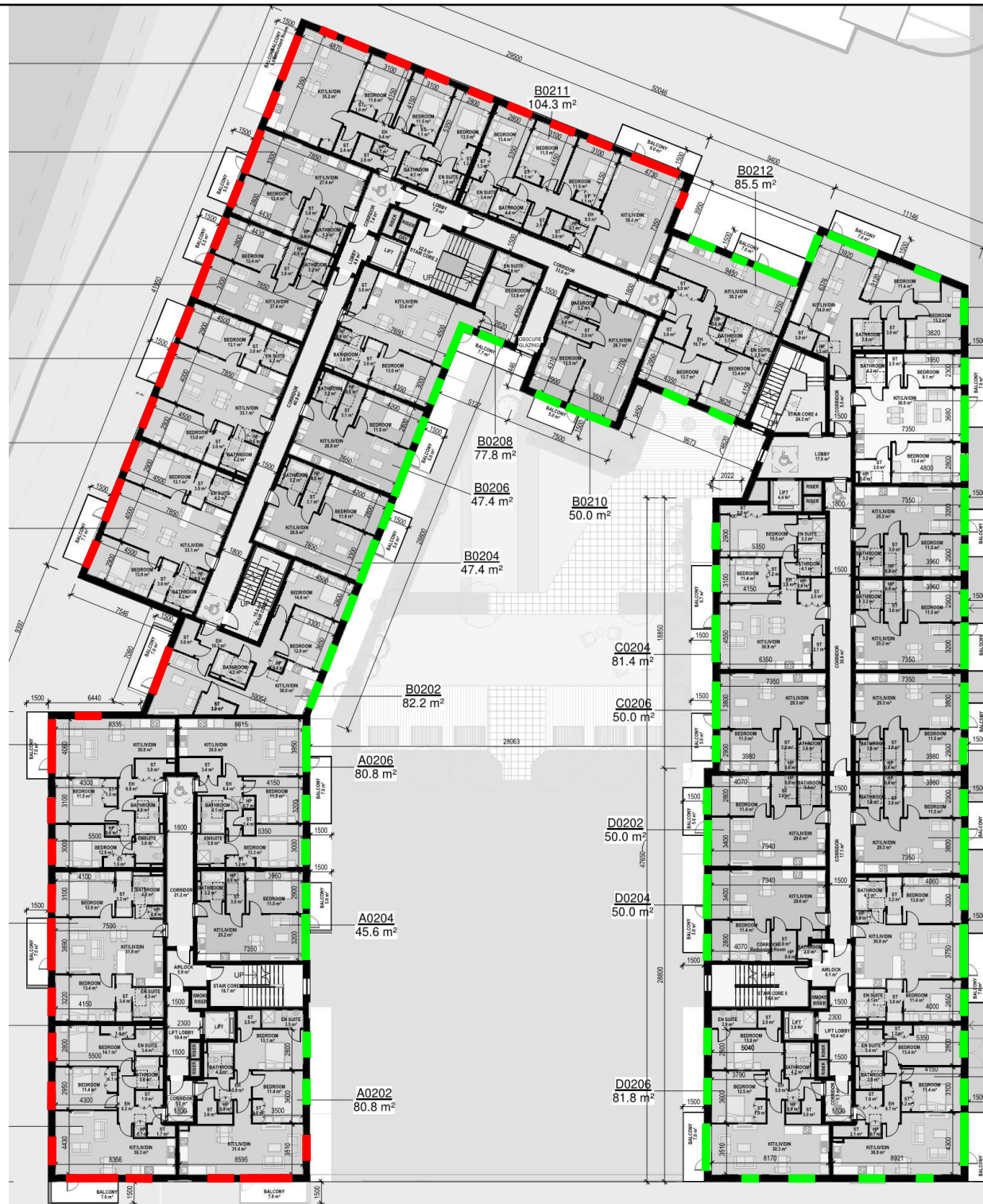


Title:
Glazing Mark Up
Bancroft View SHD
Second to Fifth Floor
Client:
Greenhills Living Ltd

Legend

Glazing Performance

 Rw 38 dB
 Rw 34 dB



AMPLITUDE REVIEW

Date: 13/04/2022
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Project Number: D220202

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Title:
Glazing Mark Up
Bancroft View SHD
Sixth Floor
Client:
Greenhills Living Ltd

Legend

Glazing Performance

- █ Rw 38 dB
- █ Rw 34 dB

AMPLITUDE REVIEW
Date: 13/04/2022
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Project Number: D220202

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Title:
Glazing Mark Up
Bancroft View SHD
Seventh Floor
Client:
Greenhills Living Ltd

Legend

Glazing Performance

- █ Rw 38 dB
- █ Rw 34 dB

AMPLITUDE REVIEW

Date: 13/04/2022
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Project Number: D220202

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