Amplitude Acoustics

Hayden's Lane, Adamstown, Lucan, Co. Dublin

Planning Stage Acoustic Design Statement

D220308RP1 R0

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Document Information

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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_{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, Leq (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, Leq (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, Leq (equivalent noise level) over the 8-hour night period of 23:00-07:00 hours, also known as the night noise indicator.

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Executive Summary

Amplitude Acoustics have been engaged to conduct an acoustic assessment for the planning application of a proposed new residential development consisting of 66 apartments spread over three blocks ranging from three to five storeys high at Hayden's Lane, Adamstown, Lucan, Co. Dublin.

In order to quantify the noise climate daytime measurements were undertaken across the development. It was noted that the site is exposed to subjectively low noise levels with the dominant noise sources being train movements and to a lesser extent distant road traffic noise, with the occasional car passing the site. Measurements were conducted at attended locations on Wednesday 23rd and Thursday 31st March 2022.

Using the worst case measured SEL noise levels for Intercity and Commuter trains the likely daytime and night-time noise levels have been determined by allowing for the number of trains passing the site over a typical day and night-time period.

Based on these trains pass-bys and measured data a noise model has been developed. A 'Stage 1: Initial Site Noise Risk Assessment' and a 'Stage 2: Full Assessment', in line with advice on Professional Practice Guidance (ProPG) – Planning & Noise were undertaken.

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 7 are implemented. Sleep disturbance due to the predicted internal noise levels is unlikely to occur.

The main external amenity area and private balconies/terraces are predicted to comply with the desirable external amenity noise level criteria.

Traffic volumes along Hayden's Lane are expected as a worst-case to double in volume, as such an increase of 3dB in noise level is expected the route, which relates to a medium impact.

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1 Introduction

Amplitude Acoustics have been engaged to conduct an acoustic assessment for the planning application of a proposed new residential development consisting of 66 apartments spread over three blocks, ranging from three to five storeys high. The site is located at Hayden's Lane, Adamstown, Lucan, Co. Dublin.

As the site is located in the vicinity of the railway line north of the site, South Dublin County Council (SDCC) have requested a noise impact assessment to determine the noise impact on the site and any subsequent mitigation. In addition, SDCC have requested a noise impact assessment of the traffic noise impacts in Hayden's Lane due to the development.

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

2.1 Existing Site

The site is located at Hayden's Lane, Adamstown, Lucan, Co. Dublin. The site lies immediate east of the Hayden's Lane which is a cul de sac which provides access to the residential units north and west of site. The site is bound to south and east by Griffeen Valley Park and to the north and north east by residential buildings. Approximately 200m to the southern boundary lies the railway line which serves both commuter and Intercity trains

Figure 1: Site Location Map Image © Google Earth

2.2 Proposed Development

The proposed development comprises of 66 apartments spread over three blocks which range from three to five storeys. Figure 2 beow presents the proposed development.

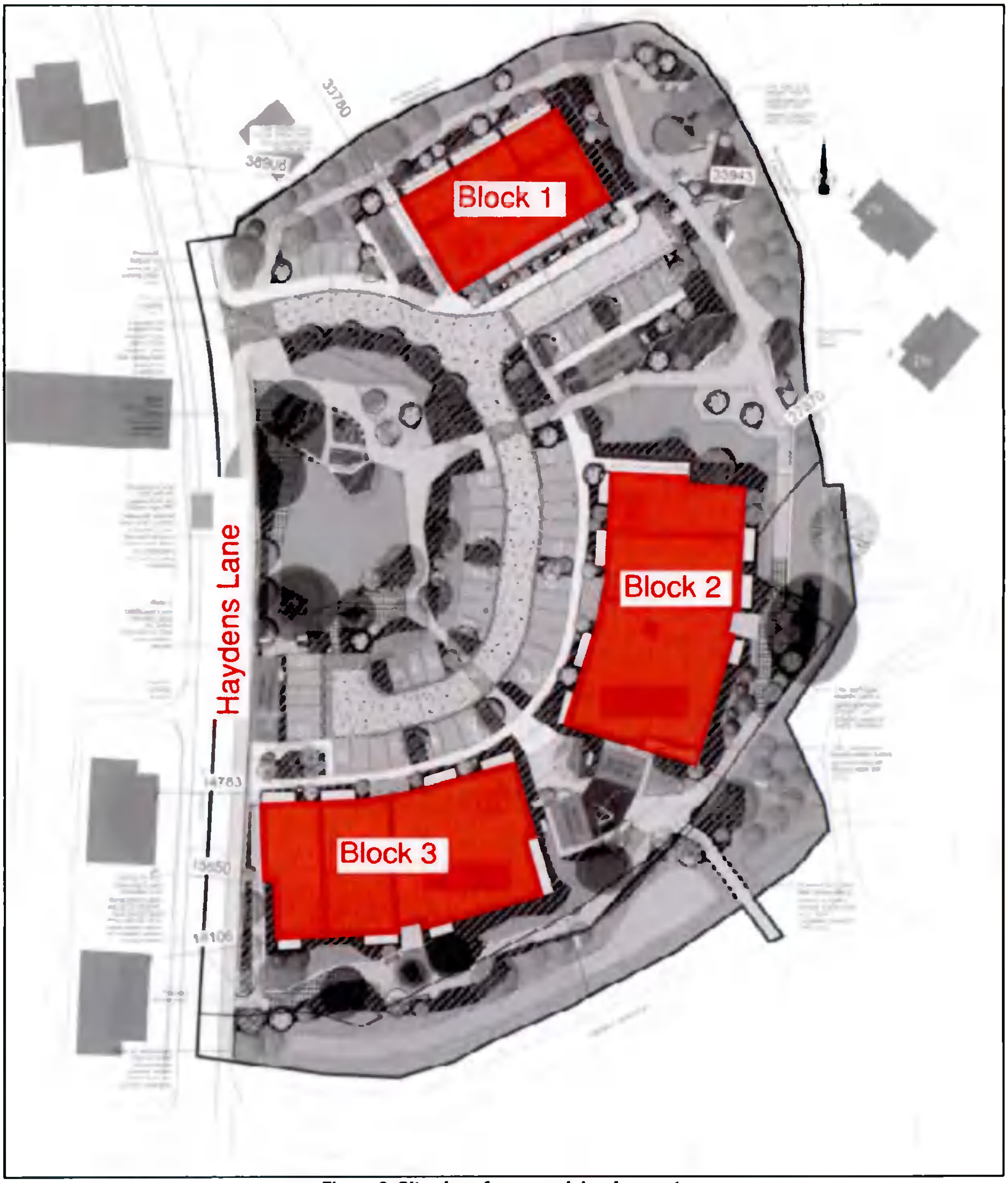

Figure 2: Site plan of proposed development

3 Acoustic Criteria

The criteria for the project have been developed based on the SDCC additional information request detailed within the decision document SD21A/0359 Decision Order Number 0255 and shown below:

> (a) A noise impact assessment, carried out by appropriately qualified acoustician and competent persons, must be submitted in order to assess the potential impact of environmental noise from traffic on Haydens Lane if the proposed development is completed.
> (b) In addition the proposed noise assessment must assess if noise from the nearby train line will impact on the proposed development. Where deemed necessary a statement outlining recommended acoustic control measures that should be incorporated into the design and construction of the proposed residential units and/or site to ensure against adverse noise impacts on the occupiers must be included.
> (c) The South Dublin County Council Environmental Noise Action Plan 2018 – 2023 recommends that the noise impact assessment should demonstrate that all facets of the UK 'Professional Practice Guidance on Planning & Noise' (2017) (ProPG) have been followed.

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.

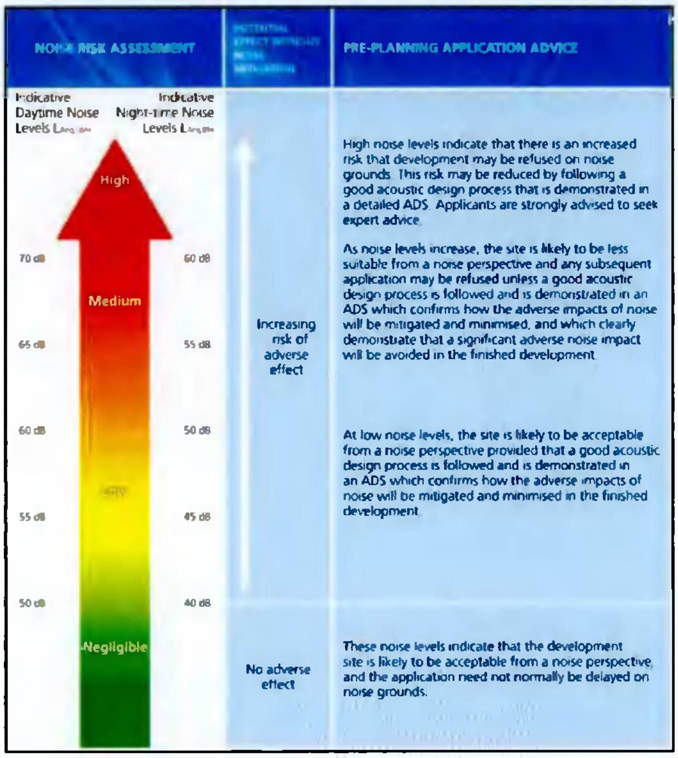

Figure 3: Stage 1 – Initial Site Noise Risk Assessment

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.

Internal Noise Level Guidelines

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 $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room/Area	35 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$ 45dB L_{AFmax} (See Note 1)

External Amenity Areas

External amenity areas which are an intrinsic part of the overall design should ideally not be above 50-55 dB $L_{Aeq,16hr}$; or designed to achieve the lowest practicable noise levels (BS 8233:2014).

If significant adverse noise impacts remain on any private external amenity space, then this is partially off-set if residents are provided with access to a "relatively quiet" alternative external amenity space.

BS 8233:2014 provides a much more detailed narrative on noise levels in external amenity areas and acknowledges that it may not always be necessary or feasible to ensure that noise levels remain within these 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."*

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It is clear from the narrative of BS 8233:2014, that proposed development within noisy environments should be designed to ensure that the recommended internal design standards are achieved, and that noise levels in external amenity areas are designed to effectively control and reduce noise levels, although it acknowledges that in certain circumstances meeting the external design recommendations may not be feasible, or necessary, especially where the provision of such spaces is desirable for other technical, planning or policy reasons.

Consideration of Other Relevant Issues

- 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.

3.2 Potential Impacts from Road Traffic Noise Increase

The impact of any changes in $L_{A10,18hour}$ road traffic noise levels due to the increase in traffic movements from the completed development were assessed in accordance with the principles and guidance presented within the UK Highways Agency Design Manual for Roads and Bridges (DMRB): 2008.

The DMRB states that "The impact of a project at any location can be reported in terms of changes in absolute noise level. In the UK, the standard index used for traffic noise is the $L_{A10,18hour\ level}$, which is quoted in decibels".
In order to determine whether changes in traffic noise levels are likely to occur as a result of the Proposed Development, noise levels were predicted in accordance with the methodology contained within the Calculation of Road Traffic Noise (CRTN).

The calculation method uses a number of input variables to predict the $L_{A10,18hour}$ noise level for any receptor point at a given distance from the road. In this assessment; however, the key factors are changes in traffic flows and the composition of the traffic (i.e., percentage HGVs). Therefore, the likely increase in road traffic noise levels as a direct result of the Proposed Development has been calculated in accordance with the Basic Noise Level (BNL) prediction methodology detailed in CRTN. This methodology considers the relative change in noise level for a notional road-side receptor at a distance of 10m from the kerb and at a height of 1.5m (free-field).

The completed development assessment years used in this section cover the existing base year, for validation purposes, plus a comparison between the "without development" and "with development" scenario for the year 2036. The DMRB presents a significant matrix for assessing the magnitude of changes in noise level, which is reproduced in 0 below and has been utilised in this assessment to consider the effect of any changes in road traffic noise levels. An increase in noise level represents an adverse effect whilst a reduction in noise represents a beneficial effect. The descriptors have been modified to suit this assessment.

Table 2: Road traffic noise increase magnitude of change

Change in Noise Level, dB(A)	Magnitude of Change
0.0	No Change
0.1 - 0.9	Negligible
1.0 - 2.9	Low
3.0 - 4.9	Medium
>5.0	High

4 Noise Measurements

4.1 Details

It was not possible to undertake long term continuous measurements at the site as a secure location was not available. In order to quantify the noise climate daytime measurements were undertaken across the development. It was noted that the site is exposed to subjectively low noise levels with the dominant noise sources being train movements and to a lesser extent distant road traffic noise, with the occasional car passing the site. In order to quantify the noise levels impacting on the site further measurements of train pass-bys were undertaken at onsite locations and also at a location on the other side of the railway as this location provided a clearer view of the trains as there was little to no foliage obscuring the line of sight.

Measurements were conducted at attended locations on Wednesday 23rd and Thursday 31st March 2022.

4.2 Measurement Locations

Attended sound measurements were undertaken at a total of 4 locations. For each measurement location the sound level meter was attached to a tripod with microphone approximately 1.5m above ground floor. Each measurement was considered to be free field.

The measurement position is described below and shown in Figure 4.

Figure 4: Measurement Positions Image © Google Earth

- MP1 – Located at southern boundary of site overlooking Griffeen Park
- MP2 – Located at the western boundary of the site overlooking Hayden's Lane
- MP3 – Located at the northern boundary of the site

- MP5 - Located at the entrance to a public footpath with direct line of sight with the railway line. This position selected specifically for obtaining noise data from train movements.

4.3 Noise Survey Methodology

At locations 1 to 3 noise monitoring was undertaken over sequential 15-minute periods. Then subsequent measurements were undertaken of specific train pass-bys at Location 1 and 4. A wind shield was used during all measurements, where appropriate extraneous noise due to wind exceeding 5m/s and/or rain was filtered from the measured data.

The sound indices measured during the sound survey are shown below:

- $L_{Aeq,T}$ - The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{Amax,T}$ - The A-weighted maximum sound pressure level that occurred during a given measurement period; Measured using the fast time weighting in accordance with the requirements of BS8233:2014.
- $L_{A10,T}$ - The A-weighted sound pressure level exceeded for 10% of the measurement period.
- $L_{A90,T}$ - The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Third octave band L_{Aeq} sound pressure levels were also measured during the survey period.

4.3.1 Instrumentation

A Class 1 sound level meter/noise logger in accordance with IEC 61672-1:2013 was used for all measurements. Table 3 below summarises the measurement equipment used.

Table 3: Measurement Equipment

Description	Manufacturer	Model	Serial No.
Sound Level Meter	SVAN	971	87014
Sound Level Meter	Sinus	Tango Plus	907004.2
Acoustic Calibrator	Larson Davis	CAL200	18194

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.

4.3.2 Subjective Impression on Noise Climate

The subjective noise climate across the site (MP1 to 3) was dominated by train pass-bys (at low level), distant traffic movements, with occasional car accessing the adjacent residential dwelling and birdsong. Subjectively the site was exposed to low levels of noise.

4.4 Environmental Noise Monitoring Results

Table 4 below presents a summary of the measured daytime and night-time L_{Aeq} noise levels and the 10th highest L_{Amax} night-time noise level.

Table 4: Environmental noise measurements at noise monitor locations.

Location	Date and Time	Measured Sound Pressure Levels		
		L_{Aeq} dB	L_{Amax} dB	L_{A90} dB
1	Thursday 31/03/22 08:35 – 08:50 2x train pass-bys	52	64	49
2	Thursday 31/03/22 08:52 – 09:07 2x car pass-by 1x train pass-by	52	71	48
3	Thursday 31/03/22 09:10 – 09:25 1x train pass-by	52	69	50

Comparison of the levels in the table above with the those of the ProPG Stage 1 assessment in **Figure 3** indicate that the measured noise levels are relatively low across the site.

4.5 Train Pass-bys

The table presents the measured L_{Aeq}, L_{Amax} and derived SEL sound pressure levels. In addition, the noted train type and distance between the measurement location and centre of the railway line is also noted.

Table 5: Sample noise level measurements of train pass-bys.

Location	Train Type	Date and Duration	Distance to Track C/L	Measured Sound Pressure Levels		
				L_{Aeq} dB	L_{Amax} dB	SEL dB
1	Intercity	Wednesday 23/03/22 15:38 – 9 seconds	205	59	62	68
1	Intercity	Wednesday 23/03/22 15:43 – 14 seconds	205	57	62	68
1	Intercity	Wednesday 23/03/22 15:45 – 13 seconds	205	60	65	71
5	Commuter	Thursday 31/03/22 09:52 – 10 seconds	115	46	51	56
5	Commuter	Thursday 31/03/22 09:53 – 9 seconds	115	49	52	59
5	Commuter	Thursday 31/03/22 09:55 – 10 seconds	115	49	53	59
5	Commuter	Thursday 31/03/22 10:05 – 9 seconds	115	48	51	57
5	Commuter	Thursday 31/03/22 10:43 – 12 seconds	115	61	67	72

Location	Train Type	Date and Duration	Distance to Track C/L	Measured Sound Pressure Levels		
				L_{Aeq} dB	L_{Amax} dB	SEL dB
5	Commuter	Thursday 31/03/22 10:53 – 5 seconds	115	52	57	58
5	Intercity (old engine)	Thursday 31/03/22 11:08 – 16 seconds	115	72	79	84
5	Commuter	Thursday 31/03/22 11:10 – 15 seconds	115	60	64	72
5	Commuter	Thursday 31/03/22 11:23 – 19 seconds	115	60	66	73
5	Commuter	Thursday 31/03/22 11:41– 15 seconds	115	61	66	73

5 Supplementary Environmental Noise Data

As previously stated, it was not possible to install a long-term monitor on the site as a secure location was not available. In order to determine the noise levels across the site, measurements have been undertaken of various train events as these were noted as the dominant noise sources of noise impacting site. Based on the amount train pass-bys during a typical day and night-time period the noise levels from trains can be determined.

To ensure a robust assessment, noise levels from a previous survey for the planning application of the Adamstown District Centre were also used for reference. The report 525040-MLM-ZZ-XX-RP-YA-0001-Rev 05 Adamstown District Centre – Phase 1 – Noise and Vibration Assessment Rev 05 dated 06/04/20 produced by MLM Consulting Limited details noise measurements undertaken within close proximity to Adamstown Station. The measurements were undertaken at three locations across the site between Friday 11 and Tuesday 15th October 2019. The figure below taken from the report summarises the results of the noise survey:

Figure 5: Measurement Positions Image © Google Earth

NMP3 details noise measurements at approximately 200m from the railway, although this location is adjacent to a road at the time of measurement the traffic volumes were low volume.

6 Predicted Train Noise Levels

6.1 Predicted Daytime (07:00 – 23:00) and Night-time (23:00 – 07:00) L_{Aeq} Noise Levels

Based on the measured train pass-by noise data given in Table 4 the daytime and night-time noise levels have been predicted at the southern site boundary. These levels have been determined based on a review of Irish Rail Timetables. The railway line south of the site serves the following routes:

- Commuter trains from Dublin to Portlaoise
- Intercity trains Dublin to Cork
- Intercity trains Dublin to Waterford
- Intercity trains Dublin to Galway
- Intercity trains Dublin to Ballina
- Intercity trains Dublin to Limerick
- Intercity trains Dublin to Limerick

Predicted L_{Aeq} noise levels have been determined for daytime and night-time periods based on the train events occurring in any one hour. Train events are summarised in the tables below:

Table 6: Daytime – Train Events

Hour	Train Events	
	Intercity	Commuter
07:00	8	2
08:00	7	5
09:00	3	7
10:00	3	7
11:00	3	6
12:00	4	6
13:00	4	4
14:00	5	3
15:00	5	6
16:00	4	8
17:00	6	9
18:00	7	5
19:00	5	4
20:00	4	5
21:00	3	5
22:00	4	2
Total	**75**	**84**

Table 7: Night-time – Train Events

Hour	Train Events	
	Intercity	Commuter
23:00	3	1
00:00	0	1
01:00	0	0
02:00	0	0
03:00	0	0
04:00	0	0
05:00	1	0
06:00	4	0
Total	**8**	**2**

Using the worst case measured SEL noise levels for Intercity and Commuter trains the likely daytime and night-time noise levels can be determined at the southern boundary by allowing for the number of events and distance correction. This calculation is summarised below for both daytime and night-time events:

Table 8: Predicted daytime L_{Aeq} noise levels

Description	Predicted Train Noise Levels	
	Intercity	Commuter
Worst-case SEL	84dBA at 115m	73dBA at 115m
Distance Correction to Southern Façade 189m from track (10*log(189/115))	-2dB	-2dB
Number of Events 10*log(n)	+19 10*log(84)	+19 10*log(75)
Daytime (07:00 – 23:00) time correction -10*log(57600)	-48dB	-48dB
Subtotal	53dBA	42dBA
Total	**54dBA**	

These levels are comparable to the measured daytime noise levels (52dBA) on site and the measured noise levels for Adamstown District Centre (54 dB $L_{Aeq\ (07:00-23:00)}$ and 46 dB $L_{Aeq\ (23:00-07:00)}$) respectively.

Table 9: Predicted night-time L_{Aeq} noise levels

Description	Predicted Train Noise Levels	
	Intercity	Commuter
Worst-case SEL	84dBA at 115m	73dBA at 115m
Distance Correction to Southern Façade 189m from track (10*log(189/115))	-2dB	-2dB
Number of Events 10*log(n)	+2 10*log(3)	+9 10*log(8)
Daytime (07:00 – 23:00) time correction -10*log(28,800)	-45dB	-45dB
Subtotal	40dBA	35dBA
Total	**42dBA**	

The predicted daytime and night-time L_{Aeq} noise levels from train movements are 54dB and 42dB, respectively.

6.2 Night-time (23:00 – 07:00) L_{AFmax} Noise Levels

The highest measured L_{Afmax} event was 79dBA which was attributed to an Intercity Train being pulled by an older generation of diesel engine. Allowing for distance correction the predicted L_{Afmax} noise level at the southern boundary is 77dBA.

7 Noise Modelling

In order to predict the impact of noise on the proposed development, a detailed 3-dimensional geo-referenced noise model was developed for the site with and without the development. The predicted noise levels as given in Section 6 were used to predict the noise levels across the site and therefore assess the noise risk to the development.

The predictions have been carried out using the noise-modelling suite SoundPLAN 8.2, in accordance with the CRN, CRTN and ISO 9613 prediction methodologies (where appropriate), which allows the modelling of various road, rail and plant noise sources, whilst taking consideration of the effects of the acoustic screening from the topography of the site and any fabricated structures.

8 ProPG Stage 1 – Initial Noise Risk Assessment

The results of the noise model have been used to plot the daytime and night-time $L_{Aeq,T}$ noise levels across the proposed development site in the absence of any buildings.

The noise maps shown in Appendix B identify the noise risk categories across the site for day and night-time periods.

During both daytime and night-time periods, the risk category is low.

From this initial noise risk assessment, it can be concluded that the internal noise levels can be controlled to acceptable levels when allowing for standard acoustic mitigation measures.

9 ProPG Stage 2 – Full Noise Assessment

In accordance with Stage 2 of Professional Practice Guidance (ProPG) – Planning & Noise, a full noise assessment of the proposed development has been undertaken. Elements 1 to 4 of the Stage 2 Assessment have been addressed in this section of the report.

9.1 Good Acoustic Design Process

ProPG states that *'Good acoustic design should provide an integrated solution whereby the optimum acoustic outcome is achieved, without design compromises.'*

Where feasible and practical, the following measures would provide an acoustic benefit to the scheme and would constitute good acoustic design.

- Maximise the distance between the proposed dwellings and the nearby roads.
- Locate external amenity space behind or between the proposed dwellings, away from the surrounding roads.
- Provide an appropriate ventilation strategy, as detailed later in this report; and
- Provide enough building envelope sound reduction, as detailed later in this report.

It is essential to note that the above recommendations will not be possible in all cases, and that it is possible and acceptable to provide suitable acoustic conditions without having to implement all the guidelines set out above.

Further to the above, in this case further maximising spatial separation of noise sources and receptors is not considered feasible, given the shape and location of the site.

9.2 Predicted Façade Noise Conditions

The site is noted as being low risk.

The daytime L_{Aeq} and night-time L_{Aeq} and L_{Afmax} levels as detailed in Section 6 have been used to determine the façade sound insulation requirements.

9.3 External Building Fabric Assessment

9.3.1 Internal Noise Level Guidelines

In order to achieve appropriate noise levels within internal living spaces, the dwellings themselves need to be considered regarding the level of façade mitigation required. BS 8233:2014 states internal noise level criteria of <35 dB(A) in living rooms and bedrooms during the daytime (07:00 – 23:00) and <30 dB(A) in bedrooms during the night-time (23:00 – 07:00). In addition, ProPG recommends that individual noise events should not normally exceed 45 dB $L_{Amax,F}$ more than ten times a night in bedrooms.

9.3.2 Assumptions

The assessment assumes the following room sizes:

- Bedroom – 4.5m x 3m x 2.7m (l x w x h)
- Living Room/Kitchen – 8m x 4m x 2.7m (l x w x h)

Glazing dimensions have been taken from the supplied drawings. It has also been assumed that bedrooms are to be acoustically 'soft,' with carpets, curtains and other soft furnishings and living rooms to be less acoustically absorptive. For the purposes of analysis, we have assumed the following internal reverberation times:

Table 10: Mid-frequency reverberation time for specific room types.

Room	Mid-Frequency Reverberation Time (Seconds)
Bedroom	0.6
Living Room	0.8

As a reference, the following standard constructions and associated acoustic performance have been considered for the external wall and roof.

Table 11: Sound reduction of example external wall and roof, R (dB)

Description	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								R_w
	63	125	250	500	1k	2k	4k	8k	
External Wall – Brick/Block Cavity	31	36	40	41	45	52	52	46	52
Roof – 300mm composite deck with plasterboard ceiling with a cavity of 100mm	26	35	51	60	65	65	65	65	58

9.4 Façade Mitigation

9.4.1 Glazing Requirements

Based on the predicted noise levels incident on the facades, the following glazing types and the corresponding sound reduction indices have been proposed:

Table 12: Proposed glazing sound insulation performance

Glazing Type	Example Configuration	Sound Reduction Indices (dB) at Octave Band Centre Frequency (Hz)								R_w ($+C_{tr}$)
		63	125	250	500	1k	2k	4k	8k	
GL1	8mm/10mm/5mm	21	28	28	29	38	38	34	34	35 (-3)

The glazing system performance specifications detailed above apply to the glazing package as a whole, inclusive of glazing, framing, spandrel panels, etc. The performance of the glazing systems will depend on many factors, such as the glazing configuration, size of window panels, quality of framing, quality of sealing, etc. Performance specifications are frequency specific. Overall performance values are given for guidance purposes only. Any ventilation element which penetrates the façade will need to be selected to ensure the specified glazing performance values are not compromised.

9.4.2 Background Ventilation Requirements

The table below sets out the performance requirement for the ventilation elements to comply with the 'whole dwelling ventilation' condition when windows need to be closed to avoid noise ingress.

Table 13: Acoustic performance of example ventilation options, D (dB)

Ventilation Type	Element Level Difference at Octave Band Centre Frequency (Hz)								$D_{n,ew}$
	63	125	250	500	1k	2k	4k	8k	
Vent Bedroom Areas	25	30	33	38	37	36	36	36	38
Vent Living Room Areas	28	33	34	33	41	29	32	32	34

One trickle ventilator or air inlet has been assumed per bedroom and three per living room. Where more ventilators are used, the acoustic performance of the ventilators would need to be upgraded by 10*log(N); being N the number of ventilators per room.

9.4.3 Opening Windows during Summer Months

Openable windows typically provide a level of 10 to 15dB reduction. Based on the measured and predicted daytime L_{Aeq}, night-time (L_{Aeq}) and L_{Amax} incident noise levels the internal noise criteria are unlikely to be met.

In order to determine the risk of overheating and therefore the likelihood of windows being required to be open on a regular basis a TM59 overheating assessment should be undertaken. TM59 assessment would identify which facades might experience overheating and the necessary measures to mitigate it. If overheating is found to be a frequent risk, then mitigations should be coordinated with acoustics to control excessive noise ingress during the overheating condition.

Typical measures for the mitigation of overheating may include the following:

- Reduced window sizes;
- Increased solar control in the glazing (lower G values);
- Solar shading;
- Enhanced provision of thermal mass.

If additional ventilation is still deemed to be necessary to mitigate overheating, then the following measures may need to be considered:

- Incorporating oversized acoustic ventilators.
- Design a system where windows may be open in unoccupied or quieter rooms.
- Using an MVHR boost system with a heat recovery bypass system for warmer weather.
- Using comfort cooling.

Windows may be openable for purge ventilation purposes at the user's discretion, as this is applicable only to occasional occurrences, such as to remove smoke from burnt food, and not subject to acoustic assessment.

9.5 External Amenity Area Noise Assessment

BS 8233:2014 advise 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 predicted noise levels across the site are predicted to be below 55dB $L_{Aeq,16hr}$ and therefore comply with the desirable external amenity noise level criteria.

10 Potential Impacts due to Additional Road Traffic

Traffic assessment has been undertaken by TPS M Moran & Associates. Based on the data supplied it is understood that the existing traffic numbers along Hayden Lane are expected to double as a worst-case scenario. The doubling of noise source relates to a 3dB increase in noise. With reference to Table 2 a 3dB increase is likely to have a medium impact. It should be noted this is deemed a worst-case scenario.

11 Conclusions

Amplitude Acoustics were commissioned to undertake a noise impact assessment of the proposed residential assessment at Hayden's Lane, Adamstown, Lucan, Co. Dublin.

Noise impacts from train movements have been assessed based on detailed measurements undertaken on-site and adjacent to the railway line south of the site.

A 'Stage 1: Initial Site Noise Risk Assessment' and a 'Stage 2: Full Assessment', in line with advice on Professional Practice Guidance (ProPG) – Planning & Noise were undertaken.

Results of the Stage 1 assessment identifies the site as low risk.

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 7 are implemented. Sleep disturbance due to the predicted internal noise levels is unlikely to occur.

The main external amenity area and private balconies/terraces are predicted to comply with the desirable external amenity noise level criteria.

The worst-case noise impact from increase in traffic volumes along Hayden's Lane is considered to be of medium significance.

Appendix A – ProPG Stage 1 Assessment


N
Amplitude Acoustics
Haydens Lane
ProPG Stage 1
Noise Risk Assessment
Daytime
L_{Aeq} (07:00 - 23:00)
Noise Map
Noise level
in dB(A)
<= 50 Negligible
50 - 55 Low
55 - 60 Low to Medium
60 - 65 Medium
65 - 70 Medium to High
> 70 High
Signs and symbols
Main building
Line source
Site Boundary


N
Amplitude Acoustics
Haydens Lane
ProPG Stage 1
Noise Risk Assessment
Night-Time
L_{Aeq} (23:00 - 07:00)
Noise Map
Noise level
in dB(A)
<= 50 Negligible
50 - 55 Low
55 - 60 Low to Medium
60 - 65 Medium
65 - 70 Medium to High
> 70 High
Signs and symbols
Main building
Line source
Site Boundary