APPENDICES TO CHAPTER 10

WAVE DYNAMICS
ACOUSTIC CONSULTANTS

Dunboyne LRD JCL

Acoustic Design Statement
16 August 2024

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Notice

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Executive Summary

Wave Dynamics were engaged by John Connaughton Ltd as the acoustic consultants to undertake an Inward Noise Impact Assessment for the planning application for a Large-Scale Residential Development in Dunboyne, Co. Meath.

John Connaughton Ltd. intend to apply to Meath County Council for a 10-year planning permission for development of a Large-Scale Residential Development on a sites of approx 21.9 ha in total and 15.74 ha net developable area respectively, at Lands at Station Road and Pace Line, Dunboyne, Co. Meath in the townlands of Dunboyne, Clonee, Castle Farm and Loughsallagh.

The principle application site is generally bounded by Station Road (L2228) to the south, Dunboyne Train Station and the Iarnród Éireann rail line to the West, a cluster of detached houses to the southeast, greenfield lands to north and east. The application includes also 2 no. roundabouts on the R147 (Old Navan Road).

As the development is adjacent the Dublin – M3 Parkway rail line, centred around the proposed Dunboyne Distributor Road and is located in Dublin Airport Noise Zone C an acoustic design statement is required to ensure the future resident's amenity is protected.

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 a review of the noise levels on the site, including the L_{AFmax} and $L_{Aeq,}$ the site has been characterised as medium risk for night and medium to low risk for the daytime period therefore, mitigation measures are required to control the onset noise levels.

Internal Noise Levels

Following the baseline survey, a noise impact assessment was undertaken, this included break-in noise calculations to predict the internal noise levels from road traffic noise, noise from the Dublin – M3 Parkway rail line and aircraft noise. Consideration has also been given to the future growth of the roads, train line and Dublin airport. Following the assessment, the building envelope performance requirements were determined. The performance specification for the building envelope has been provided in this report which includes the external walls, glazing, roof and ventilation requirements.

External Amenity Noise Levels

The external amenity spaces on the development include rear gardens, balconies, communal open spaces and public open spaces. Appropriate amenity has been provided on the development for residents using a combination of the rear gardens, balconies, communal and public open spaces. This is in line with element 3(v) of ProPG.

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 residents.

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 residents of the future development. The measurements found a very low level of vibration from train pass-bys.

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 82233:2014 and ProPG 2017 guidance.

Based on the measurements of surface vibration from train passbys it is not anticipated that a negative vibration impact will be experienced.

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1 Introduction

Wave Dynamics were engaged by John Connaughton Ltd as the acoustic consultants to undertake an Inward Noise Impact Assessment for the planning application for the new Large-Scale Residential Development in Dunboyne, Co. Meath.

John Connaughton Ltd. intend to apply to Meath County Council for a 10-year planning permission for development of a Large-Scale Residential Development on a sites of approx 21.9 ha in total and 15.74 ha net developable area respectively, at Lands at Station Road and Pace Line, Dunboyne, Co. Meath in the townlands of Dunboyne, Clonee, Castle Farm and Loughsallagh.

The principle application site is generally bounded by Station Road (L2228) to the south, Dunboyne Train Station and the Iarnród Éireann rail line to the West, a cluster of detached houses to the southeast, greenfield lands to north and east. The application includes also 2 no. roundabouts on the R147 (Old Navan Road).

Permission is sought for a 10-year planning permission for a Large-Scale Residential Development, which in summary, will consist of the following: -

a) Construction of 853 no. residential units as follows:
    a. 398 no. Apartment Units in 3 no. 2-6 storey blocks (A-C) consisting of 121 no. 1-bedroom apartments; 258 no. 2-bedroom apartments; and 19 no. 3-bedroom apartments. All apartment units will be provided with private open space areas in the form of balconies/terraces.
    b. 112 no. Duplex Units in 6 no. 2-4 storey blocks (D-H & J) and partially in 2-6 storey blocks (A-C) consisting of 60 no. 2-bedroom units, 52 no. 3-bedroom units. All duplex units will be provided with private open space areas in the form of balconies/terraces.
    c. 343 no. 1-3 storey houses consisting of 4 no. 2-bedroom units, 308 no. 3-bedroom units, 31 no. 4-bedroom units. Each house will have an associated rear private garden.
b) Residential amenity spaces in Block A (approx. 212 sqm), Block B (approx. 284 sqm) and Block C (approx. 81 sqm);
c) The proposed development also includes a proposed café (approx. 196sqm) with associated outdoor seating area, medical unit 1 (197 sqm), retail unit 2 (approx. 217 sqm), retail unit 3 (approx. 170 sqm), community room (approx. 52 sqm), 2 no. creche facilities (approx. 394 sq m and approx. 400 sqm);
d) Provision of 1192 no. car parking spaces across the development site (inclusive of accessible parking spaces (27 no.) and 1,634 no. bicycle parking spaces for residents and visitors of the scheme provided throughout the development site.
e) 13 no. landscaped public open space amenity areas (approx. 23,925 sqm total);
f) 7 no. communal open spaces associated with the proposed apartments and duplexes will be provided in the form of landscaped areas located in the vicinity of these units (approx. 6,029 sqm total);
g) Section of the Dunboyne Eastern Distributor Road (approx. 865 m long) from the southern site boundary with Station Road (L2228) to the northern boundary of the site. This includes all associated vehicular and pedestrian accesses, carriageways, paths and junctions;
h) New vehicular, pedestrian and cycle connections to Dunboyne Train Station and closure of the existing vehicular access from Station Road (L2228);
i) Upgrade of Station Road (L2228) – proposed Distributor Road junction;
j) Alterations to 2no. roundabouts on the R147 (Old Navan Road):
    a. Roundabout at the junction of Station Road (L2228) and Old Navan Road (R147).

b. Roundabout at the entrance to Clonee Village on the R147, at the Ard Cluain apartment scheme and Dunboyne Tennis Club.

k) All associated site development works, services provision, infrastructural and drainage works, internal access roads, homezones and cycle and pedestrian infrastructure, provision of ESB substations, bin stores, public lighting, landscaping, and boundary treatment works.

l) Temporary areas allowing for construction: 5m buffer zone along the Distributor Road, compound and spoil storage area.

Previous applications have been made or permitted on lands within the red line boundary of the subject proposal: Reg. ref. 24/60063, Reg. ref. 23849, ABP NA29S.314232 DART+ West, Reg. ref. 212395 (ABP 304842), Reg. ref. RA180561 refers. The subject application does not materially amend any of these existing, permitted, or proposed development with only minor works proposed to same.

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

1.1 Statement of Competence

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

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

This report was peer reviewed by James Cousins, Managing Director | Principal Consultant with Wave Dynamics who has extensive experience in assessing noise and vibration from road and rail infrastructure on commercial and residential developments. James is an experienced consultant. His qualifications include; BSc (Hons) in Construction Management and Engineering, Pg Cert in Construction Law and Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Competence Cert in Building Acoustic Measurements. James is a member of both Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA) and is the current SITRI Chairman.

2 Site Description

The site is located in Dunboyne, Co. Meath. The development is adjacent the Dublin – M3 Parkway rail line, centred around the proposed Dunboyne Distributor Road and is located in Dublin Airport Noise Zone C. It is surrounded on all sides by mostly agricultural farmland with residential developments and Dunboyne nearby. The site includes the Meath-Dublin railway line to the East.

Figure 1: Site Location, measurement locations A1-A11, logger location L1 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 and
- Onset vibration from train passbys.
- External amenity noise levels.

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

- Façade sound insulation performance,
- Ventilation requirements and,
- Vibration from train passbys.
- External amenity requirements.

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.
- ✓ Meath County Council Noise Action Plan 2019
- ✓ 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
- ✓ British Standard BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings.
- ✓ Previous experience on similar projects.

3.1 Noise Assessment Criteria

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

Meath County Council Noise Action Plan

The Meath County Council Noise Action Plan 2019 states the following with respect to assessing the noise impact on new residential development within the Dublin Airport noise zones:

> "*It is the policy of Meath County Council:*
>
> *'to strictly control inappropriate development and require noise insulation where appropriate within the Outer Noise Zone, and actively resist new provision for residential development and other noise sensitive uses within the Inner Noise Zone. Under no circumstances shall any dwelling be permitted within the predicted 69dB L_{Aeq} 16 hours noise contour. Comprehensive noise insulation shall be required for any house permitted. Any planning application shall be accompanied by a noise assessment report produced by a specialist in noise assessment which shall specify all proposed noise mitigation measures together with a declaration of acceptance of the applicant with regard to the result of the noise assessment report.' "*

There is no specific guidance in the Meath County Council Noise Action plan for internal or external noise levels therefore criteria has been sought from ProPG and BS8233.

ProPG: Professional Practice Guidance on Planning & Noise

ProPg 2017 is used to assess airborne noise from transport sources including road, rail and aircraft noise. The aim of the document is to provide a good design process which considers the internal acoustic environment at an early stage in the design process. The guidance was prepared by the Institute of Acoustics, the Association of Noise Consultants and the Chartered Institute of Environmental Health and is based on the findings by the World Health Organisation in

relation to noise impact on humans. Its adoption is considered best practice for assessing the potential noise impact on the future occupants for residential developments.

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

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

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

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

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

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

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

a. *"Planning consent may be granted without any need for noise conditions;"*
b. *"Planning consent may be granted subject to the inclusion of suitable noise conditions; "*
c. *"Planning consent should be refused on noise grounds in order to avoid significant adverse effects ("avoid"); or, "*
d. *"Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects ("prevent")."*

Section 3 of the ProPG outlines the recommended approach decision makers should following in coming to their conclusions based on the recommendations of the Acoustic Design Statement. Figure 1 on the next page illustrates the ProPG approach.

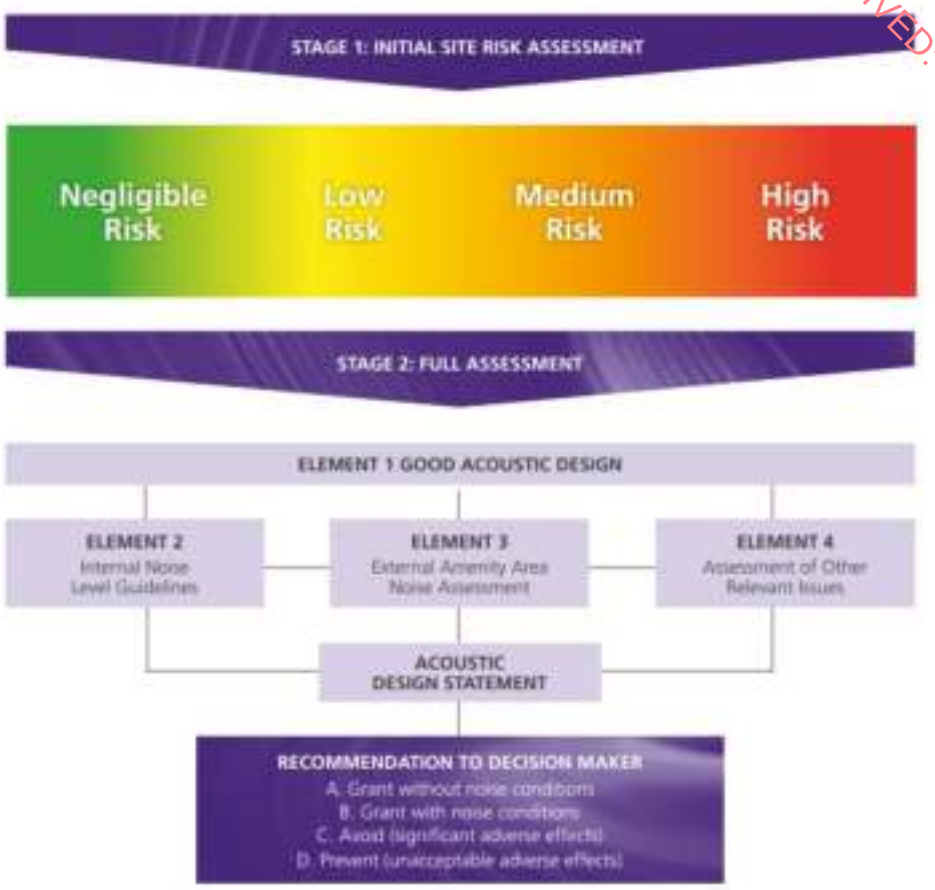


Figure 2: Summary of overall ProPG approach

Internal Noise Levels

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

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

Activity	Location	07:00 to 23:00 Hrs	23:00 to 07:00 Hrs
Resting	Living Room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room/Area	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)

1: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB L_{AFmax} more than 10 times a night.

External Amenity Space Noise Levels

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

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

It also states that:

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

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

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

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

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

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

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

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 3 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.

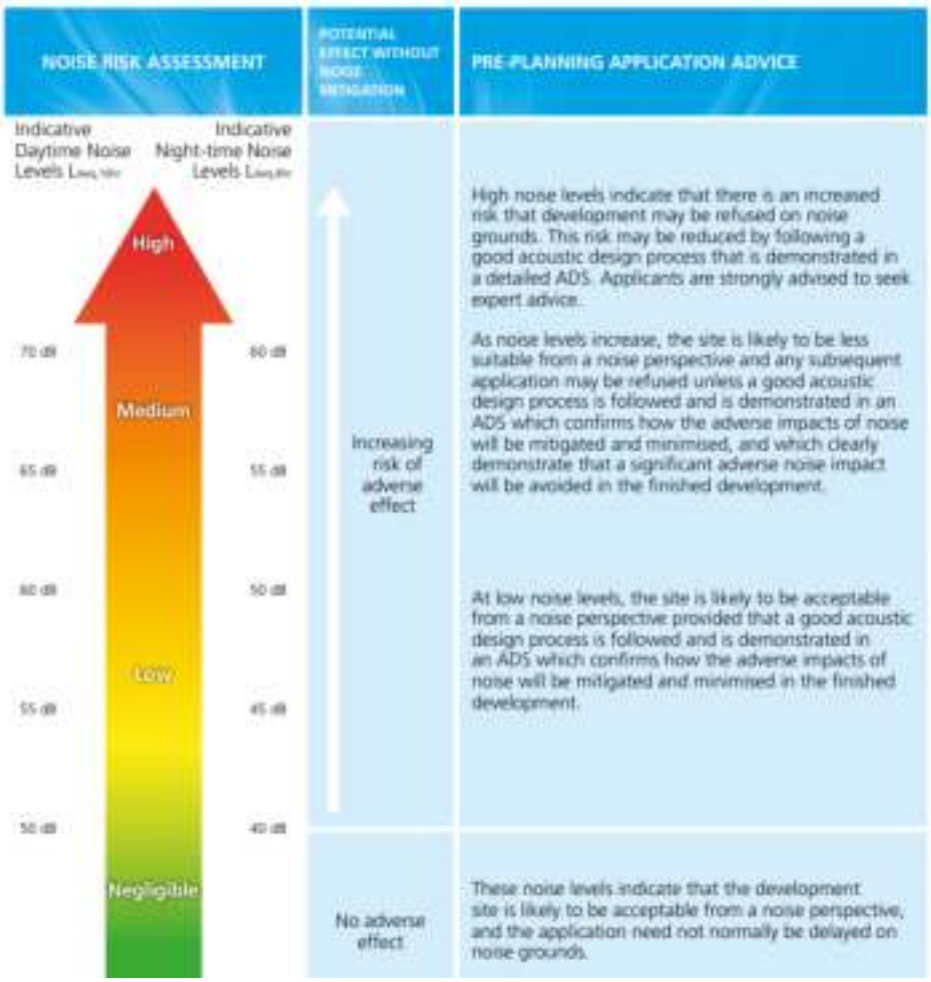


Figure 3: ProPG Risk Analysis

4.1 Baseline Noise Survey

A baseline noise survey was conducted at Dunboyne, Co. Meath, to assess the impact of road noise. The purpose of the survey was to quantify the existing noise environment to predict its impact on the future occupants of the development.

An unattended and attended noise survey was conducted to quantify the existing noise environment. The attended measurement survey also included measurements across the site for calibration of the distance attenuation calculations and noise model. The attended noise measurements were undertaken on the 6th of April 2023 and the 28th of August 2023. The noise logger was deployed on the 6th of April 2023 at 15:34hrs and collected on the 11th of April 2023 at 08:08hrs.

4.1.1 Site Description and Measurement Locations

The site is located in Dunboyne, Co. Meath. It is surrounded by agricultural farmland with residential developments and the Meath (Navan) – Dublin Rail line to the West and the M3 motorway to the East.

Figure 4: Site location and measurement locations L1 and A1-A11.

4.1.2 Survey Methodology and Personnel

The attended surveys and unattended logger deployment were completed by James Cousins (Principal Consultant), Cathal Reck (Technical Engineer), Wil Oshoke (Senior Technical Engineer) and Dan Cousins (Field Engineer).

Unattended Noise Measurements

An unattended noise logger was deployed in location L1. The logger was calibrated before and after the measurements and no significant drift was noted. The logger was deployed at a height of approximately 1.2m above the ground and measurements were filtered for periods of unsuitable weather conditions. Additionally, an unattended vibration logger was deployed in location A4 to record the vibration levels caused by train passbys.

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-A11 as noted in Figure 4. Care was taken to avoid any effect on the measurement of extraneous noise, acoustic vibration, or interference. During the attended noise measurements, the sound level meter was positioned at approximately 1.5m above the ground level. The weather conditions were calm (wind less than 5m/s) with no rain, a wind shield was used for the duration of the attended surveys. The noise logger was calibrated before and after the survey and no significant drift was noted.

Figure 5: Attended Measurement Setup.

4.1.3 Survey Period

The unattended noise measurements were undertaken on the 6th to the 10th of April 2023, and the 28th of May 2024 to the 31st of May 2024 for the vibrometer unattended measurements. Attended measurements were taken on 6th April, 28th of August, 28th November 2023 and the 28th of May 2024.

4.1.4 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 3 below summarises the measurement equipment used.

Table 3: Noise Measurement Equipment

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Calibrator	CAL1	Nor 1251	31056	AC230226	16/10/2024
Sound Level Meter	SLM3	Nor 140	1403082	U44815/SLM23 0219	27/09/2025
Sound Level Meter	SLM4	Nti XL2-TA	A2A-23316-E1	UK-23-100	01/09/2025

4.1.5 Vibration Measurement Equipment

Table 4 below summarises the vibration measurement equipment used.

Table 4: Vibration Measurement Equipment

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Vibrock Vibration Logger	NVMV2	V9000	SN2164	11232164	01/11/2024

4.1.6 Subjective Noise Environment

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

- Traffic noise from nearby roads.
- Noise from train passbys.
- Aircraft overhead

4.2 Noise Measurement Results

Attended and unattended measurements were taken to measure both the onsite noise levels and the noise from train passbys. This section outlines the results of the attended noise measurements.

4.2.1 Attended Measurement Results

Table 5 outlines the results of the attended measurement survey.

Table 5: Attended Noise Measurement Results

Measurement				Measured Noise Levels		
Location	Date	Time (hrs)	Duration (mins)	L_{Aeq} dB	L_{AFmax} dB	L_{A90} dB
A4	06/04/2023	12:37	15:00	59	83	46
A5	06/04/2023	14:07	15:00	51	59	47
A6	06/04/2023	13:50	15:00	52	74	47
A4	28/08/2023	10:47	15:00	46	58	43
A4	28/08/2023	11:49	15:00	45	59	41
A6	28/08/2023	12:29	15:00	52	64	47
A6	28/08/2023	12:44	15:00	50	64	45
A3	28/11/2023	07:21	15:00	60	83	52
A2	28/11/2023	07:44	15:00	60	75	52
A1	28/11/2023	08:41	15:00	53	61	51

4.2.2 Sound Exposure Level Measurements

This section outlines the instances where an aircraft was recorded flying overhead or train passby during the daytime hours only.

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

$$L_{AX} = LAeq + 10*\log_{10}(d1/d2) - 10*\log_{10}(N) + 10*\log_{10}(T)$$

Where:

L_{Aeq} is the measured level of the event
N number of vehicle movements
T time (seconds)
d1 distance from the source to the receiver
d2 distance from the source to the measurement

Train Passes

Table 6 below outlines the sound exposure levels for train passes on the Dublin-M3 Parkway rail line adjacent the proposed development.

Table 6: Measured SEL Data for train passes

Type	Date	Location	Time	Duration (seconds)	L_{Aeq} dB	L_{AFmax} dB	SEL dB
Train	11/04/2023	L1	08:19	15	79	82	91
Train	28/11/2023	A1	08:18	11	75	79	85
Train	28/11/2023	A1	08:31	12	77	83	88
Train	28/11/2023	A1	08:39	12	78	85	89
Train	28/11/2023	A1	09:03	11	75	80	85

Aircraft

Table 7 below outlines the measured sound exposure levels for aircraft passes overhead at the development.

Table 7: Measured SEL Data for aircraft

Aircraft Movement / Direction	Date	Location	Time	Duration (seconds)	L_{Aeq} dB	L_{AFmax} dB	SEL dB
Westerly Takeoff	11/04/2023	L1	08:11	26	60	66	74
Westerly Takeoff	11/04/2023	L1	08:14	26	64	69	78
Easterly Landing	28/11/2023	A1	08:58	16	51	52	63

4.2.3 Unattended Monitoring Results

Table 8 outlines the results of noise measurements at the unattended monitoring location L1. A full breakdown of all of the unattended measurement results are provided in Appendix A of this report.

Table 8: Unattended Measurement Results

Start Date	$L_{Aeq,16hour}$ (07:00 - 23:00) dB	L_{night} ($L_{Aeq,8hour}$ 23:00 - 07:00) dB	L_{den} (00:00 - 00:00) dB	10th highest night-time L_{AFmax}	L_{AF90} (23:00 - 07:00) dB
06/04/2023	63[2]	54	-	64	43
07/04/2023	61	53	62	66	42
08/04/2023	61	52	62	68	39
09/04/2023	59	46	60	55	33
10/04/2023	60	55	59	65	33

(1) Where night-time period is referred to the date is the date the measurement commenced on at 23:00hrs and finished at 07:00hrs on the following calendar day.

(2) Shortened measurement duration

(3) Measurements which have been affected by periods of bad weather have been filtered.

4.2.4 L_{AFmax} Noise Levels

Based on the project criteria outlined in Section 3, the internal $L_{AFmax\ 15min}$ inside the dwelling bedrooms cannot exceed 45dBA 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 not considered high risk as there are not typically more than 20 occurrences exceeding 80dB L_{AFmax}.

The façade specification outlined in 5.2.3 has been determined in accordance with achieving the internal noise levels for both L_{Aeq} and the L_{AFmax} incident noise levels below.

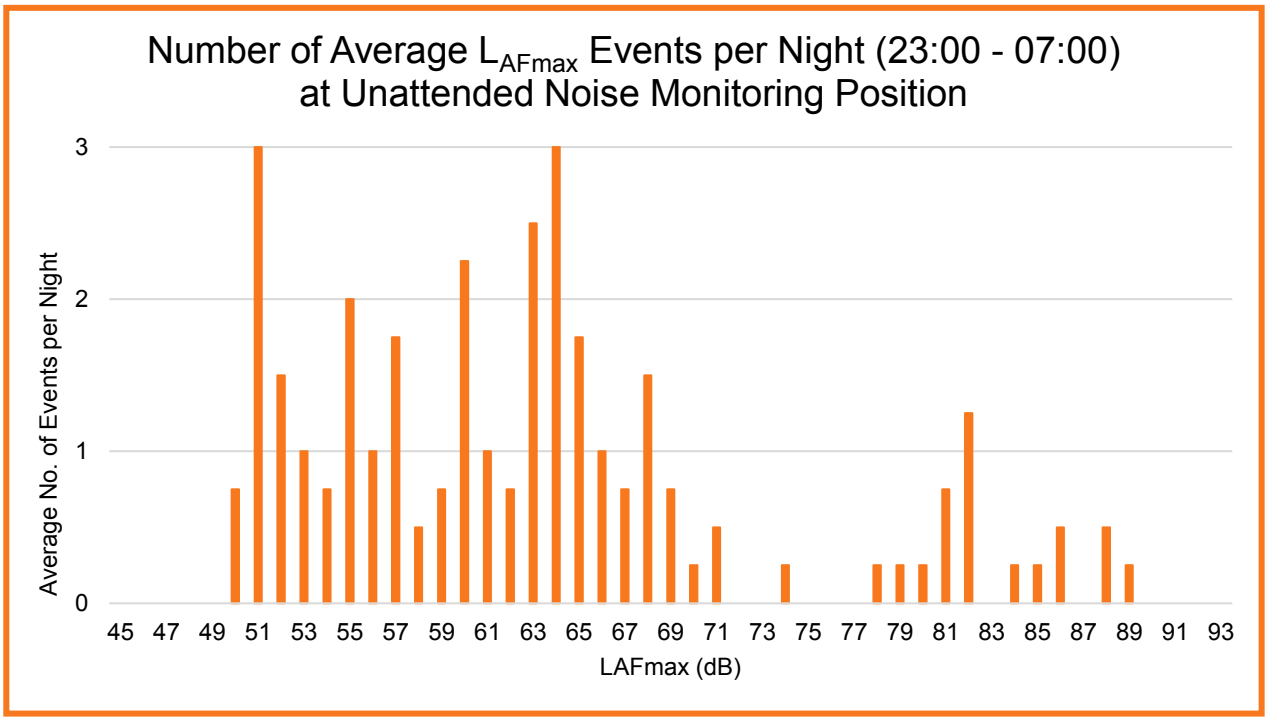


Figure 6: Average recorded L_{AFmax} events per night based on 15min measurement intervals.

Discussion of Measurement Results

The ambient noise consisted of traffic noise from Dunboyne and the surrounding areas. The noise from train passbys affected the L_{Afmax} events and also increased the overall SPL for the monitoring period. For the road noise calibration purposes the impact of train passbys was considered on the overall SPL and average noise levels for the day and night.

Based on the ProPG risk assessment of the L_{AFmax} noise levels, the site is not considered high risk as there are not typically more than 20 occurrences exceeding 80dB L_{AFmax}.

4.3 Vibration Measurement Results

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

Unattended Measurement Results

Table 9 outlines the results of the vibration measurement results for the logger measurements at location A4.

Table 9: 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
28/05/2024	0.006	0.009	0.068	0.007	0.009	0.055
29/05/2024	0.006	0.008	0.073	0.007	0.008	0.056
30/05/2024	0.006	0.007	0.079	0.007	0.008	0.063
31/05/2024(2)	0.011	0.015	0.089	-	-	-

(1) Where night-time period is referred to the date is the date the measurement commenced on at 23:00hrs and finished at 07:00hrs on the following calendar day.

(2) Shortened measurement duration.

Attended Measurement Results

Table 10 outlines the result of the vibration measurement result for the logger measurement at location A5 for a train travelling North.

Table 10: Attended V*ibration 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
28/05/2024	0	0.009	0.007	-	-	-

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. The logger location was selected as it was representative of the closest houses to the rail line.

4.4 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 for the attended surveys.

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

4.5 Future Noise Levels

Road Traffic Noise

The road traffic noise predictions at the site have been undertaken based on the AADT numbers predicted for the new Dunboyne Distributer Road for 2041 road traffic volumes as outlined in the noise impact assessment undertaken for the Distributer Road outlined in WDA report "*WDA230212RP_B_01_Noise Impact Assessment*".

Rail Noise

The existing rail line to the West of the site is used for transit between Dublin Connolly / Docklands and M3 Parkway. There is currently a total of 47 scheduled commuter train passes on the line per day, 25 southbound and 22 northbound mostly concentrated around the morning/evening peak commuting hours and 1 pass each direction outside of these hours based on information from Iarnrod Eireann website. There are a total of 5 passes scheduled for the nighttime period currently.

We understand that Iarnrod Eireann are currently engaging in planning for a new expansion project Dart+ West which will increase the frequency of transit services between Dublin and M3 parkway stations. The Dart+ West project also plans to electrify the majority of the fleet which services these stations. Based on our experience of previous similar developments, the use of the dart will lead to lower onset noise levels over commuter and intercity type trains.

Based on the information in Appendix D of the Iarnrod Eireann Public Consultation Brochure the number of proposed trains that will transit the rail line adjacent the proposed site is not currently available. An allowance of up to 100% increase in train passes has been allowed for in the assessment.

Aircraft Noise

The development currently resides just inside the Dublin Airport Noise Zone C:

- Zone C – ≥ 54 dB L_{Aeq},16hr and < 63 dB L_{Aeq},16hr and ≥ 48dB Lnight and < 55 dB L_{night}.

Noise contour maps presented in the most recently submitted EIAR supplement by DAA provided to ABP place the development outside the lowest predicted noise contour of 51 dB $L_{Aeq,16hr}$ for the 2025 year scenario as can be seen in Figure 7 below. The location of the development is also shown on the contour to put the site location into context.

This shows that the development is outside the lowest predicted contour of 51 – 53dB $L_{Aeq,16hour}$ from aircraft noise and therefore can be considered as low risk.

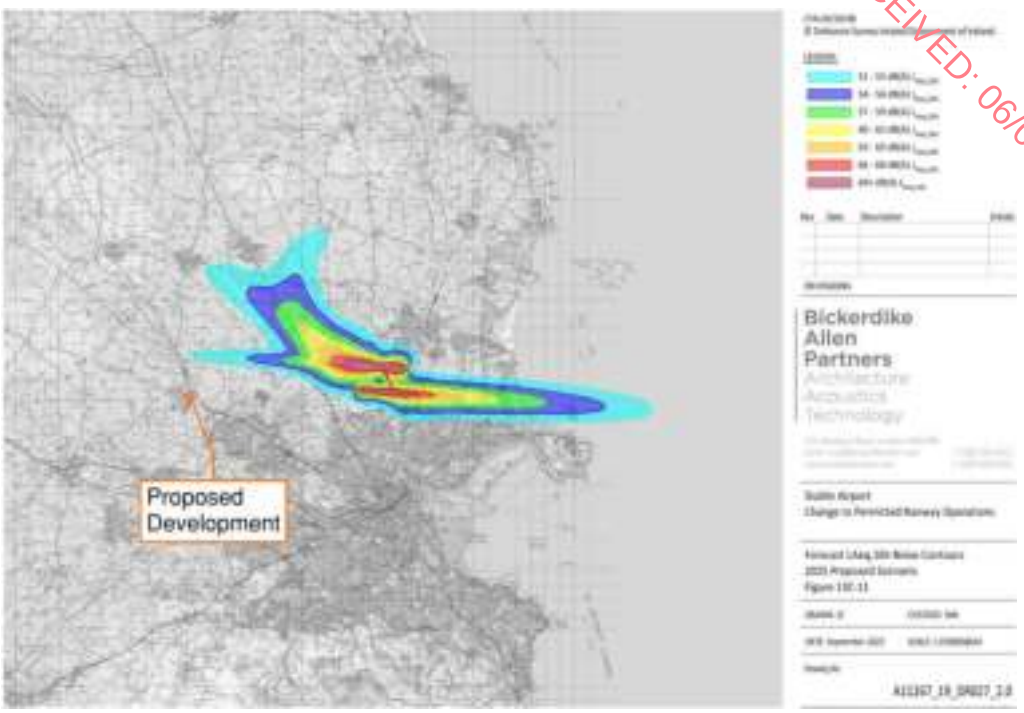


Figure 7: DAA predicted proposed $L_{Aeq,16hour}$ (07:00 - 23:00) airport noise contours for 2025.

The proposed development is at greater risk of nighttime aircraft noise due to the current nighttime take off procedure.

Noise contour maps presented in the most recently submitted EIAR supplement by DAA provided to ABP place the development within the 40 – 44dB L_{night} noise contour for the 2025 year scenario as can be seen in Figure 8 below. The location of the development is also shown on the contour to put the site location into context.

This shows that the development can be considered as low risk also for nighttime aircraft noise.

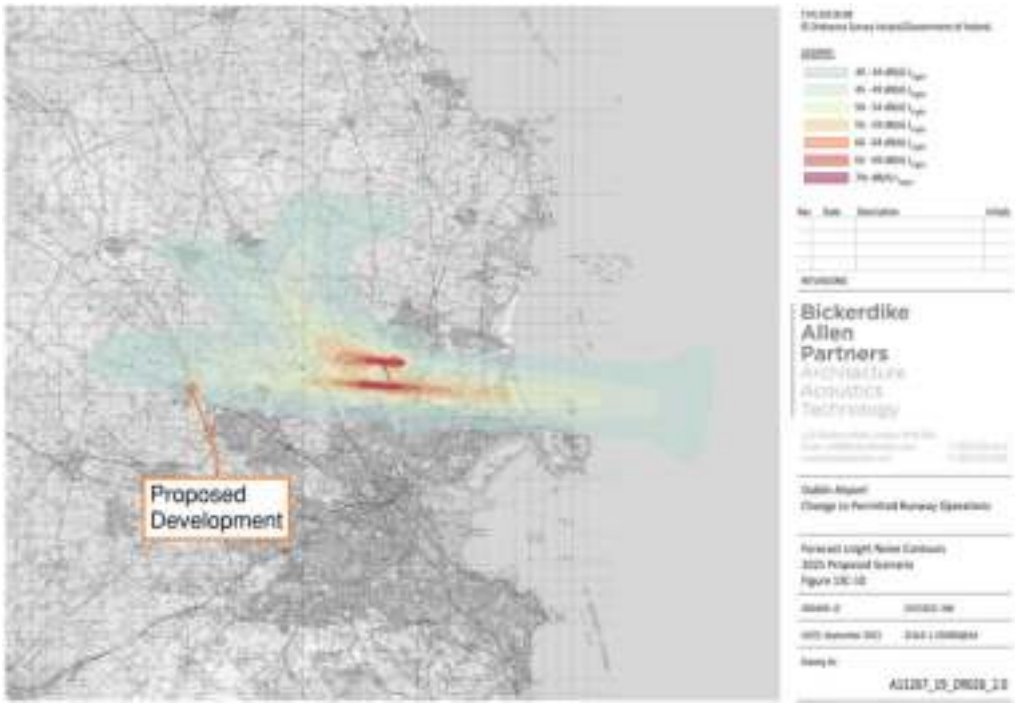


Figure 8: DAA predicted proposed L_{night} airport noise contours for 2025.

4.6 ProPG Stage 1 – Initial Risk Assessment

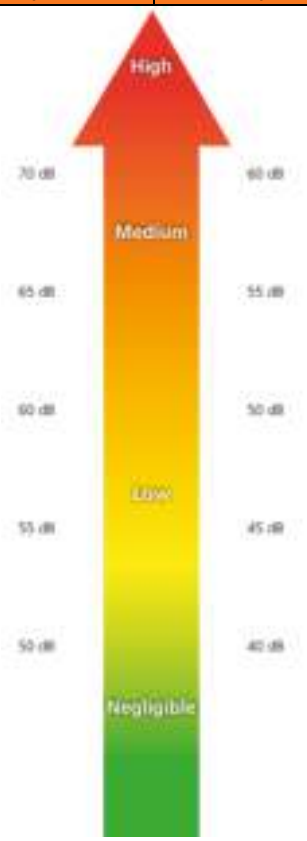
The measured noise levels on the site and future noise levels have been predicted for road traffic noise to assess the probability of an adverse impact.

Table 11 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 in accordance with the ProPg risk assessment. 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 11: ProPG Stage 1 Risk Assessment of Existing Noise Levels

Noise Risk Assessment		Risk Assessment Rating	
Indicative Daytime Noise Levels $L_{Aeq,16hour}$	**Indicative Night-time Noise Levels $L_{Aeq,8hour}$**	**Daytime Noise Levels**	**Night-time Noise Levels**
		**High Risk**	**High Risk**
		N/A	N/A
		Medium Risk	**Medium Risk**
		N/A	The majority of the existing site is at medium risk at nighttime, however due to the proposed distributer road and rail line, good acoustic design should be considered.
		Low Risk	**Low Risk**
		The majority of the existing site is at low risk at daytime, however due to the proposed distributer road and rail line, good acoustic design should be considered.	N/A
		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, rail and aircraft noise sources which are not on or part of the development therefore it is not possible to reduce or relocate the relevant noise sources.

Site Layout and Orientation

The Eastern and Southern parts of the site is the most exposed to road traffic noise as the proposed Dunboyne Distributor Road will be located to the East of the site. The Western boundary of the site is most exposed to rail noise. The site layout has been maximised to orientate the buildings in such a way as to provide screening from road traffic noise to the dwellings and amenity spaces further behind.

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 Noise Prediction Modelling

Following the survey, a computational noise model of the development using SoundPLAN 9.0 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 9.0 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 information for the new proposed distributor road has been adapted from the planning application (planning reference 2460063) and Wave Dynamics report "*WDA230212RP_B_01_Noise Impact Assessment*" and are based on the 2041 Do Something Scenario.

Additional information for local roads input to the model is as follows:

- Development layout provided by architects drawings.
- Google Maps terrain and elevation data of surrounding area.
- Traffic speed as per local signage and onsite observation.
- Annual traffic growth rate of 3.9%.
    - This has been assessed based on pre-covid traffic growth data.

5.2.2 Predicted Road Noise Levels

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

Daytime Noise Levels

Given the size of the development the site has been split in half so that the grid noise maps are clearly visible. The grid noise maps outlined below are indicative road and rail noise in Zones 1 and 2 of the John Connaughton Limited development during the daytime period at 1.5m, 4.5m and 6.5m heights respectively.

Figure 9: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) at 1.5m height for Zone 1 future development.

Figure 10: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) at 4.5m height for Zone 1 future development.

Figure 11: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) at 6.5m height for Zone 1 future development.

Figure 12: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) at 1.5m height for Zone 2 future development.

Figure 13: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) at 4.5m height for Zone 2 future development.

Figure 14: Predicted $L_{Aeq,16hour}$ (07:00Hrs – 23:00Hrs) at 6.5m height for Zone 2 future development.

Nighttime Noise Levels

Given the size of the development the site has been split in half so that the grid noise maps are clearly visible. The grid noise maps outlined below are indicative road and rail noise in Zones 1 and 2 of the JOHN CONNAUGHTON LTD development during the nighttime period at 1.5m, 4.5m and 6.5m heights respectively.

Figure 15: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) at 1.5m height for Zone 1 future development.

Figure 16: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) at 4.5m height for Zone 1 future development.

Figure 17: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) at 6.5m height for Zone 1 future development.

Figure 18: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) at 1.5m height for Zone 2 *future development.*

Figure 19: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) at 4.5m height for Zone 2 future development.

Figure 20: Predicted $L_{Aeq,8hour}$ (23:00Hrs – 07:00Hrs) at 6.5m height for Zone 2 future development.

Local Access Roads

It should be noted that the development has a local access roads onto the site at various points from the Dunboyne Distributor Road. Break in noise through the façade has been considered as part of this assessment for vehicles entering and leaving the site via the local access roads.

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. The required sound insulation performance of façade glazed elements and ventilation openings is outlined in Table 12 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 12 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 C.

Table 12: Sound Insulation performance requirements for glazed elements and ventilation.

Façade	Glazed Elements (Frame & Glazing) Sound Insulation Requirements (Indicative requirements equal or approved)							Façade Ventilation Requirement[2]
	Octave Band Frequency Requirements[1] R dB						Glazing Acoustic Performance dB Rw	
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz		
RED	32	29	34	37	48	34	39dB R_w	42dB $D_{n,e,w}$ [1]
BLUE	26	26	32	36	42	32	36dB R_w	39dB $D_{n,e,w}$ [1]
GREEN	23	20	28	34	40	30	32dB R_w	35dB $D_{n,e,w}$ [1]

(1) Natural ventilation assumed throughout, the performance cited for the ventilator is in the open position. Should this change to mechanical ventilation the above specification may be reduced. An acoustic consultant should be engaged to assess the level of reduction appropriate to maintain the internal noise level criteria.

(2) 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.

We understand the ventilation strategy for the development has not been confirmed at this stage of the design. It has been assumed that ventilation will be provided via natural ventilation system. Should the ventilation strategy change to mechanical ventilation strategy Wave Dynamics should be notified. Typically, the use of a natural ventilation strategy will lead to an enhanced glazing specification compared to a sealed mechanical ventilation system. 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 60dB R_W. Typical façade construction such as concrete, blockwork, timber frame and brick offer high levels of sound insulation and will meet this requirement.

Roof Construction

The roof construction has been assumed to achieve a minimum sound insulation performance of 50dB R_W. Any skylights and glazing in the roof system to corridor or communal areas should be of standard double-glazed construction to meet a performance of minimum 29 dB R_w. 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

The external amenity spaces on the development include private amenity in the form of balconies for the apartments and duplex units, rear gardens for the houses, and large public open amenity in the form of multiple large green spaces. Based on the assessment of the noise levels, some balconies are predicted to exceed the desirable external amenity recommended noise levels of 50-55dB $L_{Aeq,16hour}$. The balconies which are predicted to exceed the desirable criteria are those on the Eastern and Southwestern elevation of Block C, Southern, Northern, and Eastern elevations of Block A and the Eastern and Southern elevations of Block B. All of the rear gardens to the house types and the open communal spaces located within the development are predicted to comply with the recommended external amenity noise levels of 50-55dB $L_{Aeq,16hour}$.

Despite some balconies exceeding the recommended levels, appropriate amenity has been provided on the development for these residents with large communal open spaces. These spaces are predicted to comply with the recommended external amenity noise criteria as outlined in ProPG and BS8233. This is in line with element 3(v) of ProPG which states:

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

"a relatively quiet, 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)".

Based on the measured noise levels at the site it is predicted that the external noise levels in all rear gardens and the communal open spaces will achieve the ProPG recommendations for desirable external amenity noise levels of 50-55dBA $L_{Aeq,16hour}$.

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 residential developments. The Meath Action Plan does not refer to any specific acoustic criteria therefore ProPG has been used as the relevant document for assessment of the noise impact on new residential developments as followed in this acoustic design statement.

5.4.2 Magnitude and Extent of Compliance with ProPG

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

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 residential housing with good transport links. It is assumed that the winder 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. The appropriate provision of external amenity space has been provided through the use of rear gardens, balconies, communal open spaces and public open spaces 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 10m from the rail line, which is the same distance the closest façade to the railway line is proposed. As can be seen from Table 13 below, the highest measured daytime VDV, 16 hour was 0.089 m/s-1.75 and the highest night-time VDV, 8 hour was 0.063 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 13: Project Vibration Criteria vs the highest measured vibration levels

Place and Time	Low probability of adverse Comment (m.s $^{-1.75}$)	Adverse Comment Possible (m.s $^{-1.75}$)	Adverse Comment Probable (m.s $^{-1.75}$)	Highest measured level for each period (m.s $^{-1.75}$)
Residential Buildings 16hr Day	0.2 -0.4	0.4 - 0.8	0.8 - 1.6	0.089 (Z Axis)
Residential buildings 8 hr night	0.1 - 0.2	0.2 - 0.4	0.4 - 0.8	0.063 (Z Axis)

Based on the measured values vibration impacts on the development from rail movements are not expected to have a negative effect on the amenity of the residents of the new development based on the measurements of surface vibration.

7 Conclusion

Wave Dynamics were engaged by John Connaughton Ltd as the acoustic consultants to undertake an Inward Noise Impact Assessment for the planning application for a Large-Scale Residential Development in Dunboyne, Co. Meath.

John Connaughton Ltd. intend to apply to Meath County Council for a 10-year planning permission for development of a Large-Scale Residential Development on a sites of approx 21.9 ha in total and 15.74 ha net developable area respectively, at Lands at Station Road and Pace Line, Dunboyne, Co. Meath in the townlands of Dunboyne, Clonee, Castle Farm and Loughsallagh.

The principle application site is generally bounded by Station Road (L2228) to the south, Dunboyne Train Station and the Iarnród Éireann rail line to the West, a cluster of detached houses to the southeast, greenfield lands to north and east. The application includes also 2 no. roundabouts on the R147 (Old Navan Road).

As the development is adjacent the Dublin – M3 Parkway rail line, centred around the proposed Dunboyne Distributor Road and is located in Dublin Airport Noise Zone C an acoustic design statement is required to ensure the future resident's amenity is protected.

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 a review of the noise levels on the site, including the L_{AFmax} and $L_{Aeq,}$ the site has been characterised as medium risk for night and medium to low risk for the daytime period therefore, mitigation measures are required to control the onset noise levels.

Internal Noise Levels

Following the baseline survey, a noise impact assessment was undertaken, this included break-in noise calculations to predict the internal noise levels from road traffic noise, noise from the Dublin – M3 Parkway rail line and aircraft noise. Consideration has also been given to the future growth of the roads, train line and Dublin airport. Following the assessment, the building envelope performance requirements were determined. The performance specification for the building envelope has been provided in this report which includes the external walls, glazing, roof and ventilation requirements.

External Amenity Noise Levels

The external amenity spaces on the development include rear gardens, balconies, communal open spaces and public open spaces. Appropriate amenity has been provided on the development for residents using a combination of the rear gardens, balconies, communal and public open spaces. This is in line with element 3(v) of ProPG.

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 residents.

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 residents of the future development. The measurements found a very low level of vibration from train pass-bys.

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 82233:2014 and ProPG 2017 guidance.

Based on the measurements of surface vibration from train passbys it is not anticipated that a negative vibration impact will be experienced.

Appendix A- Glossary of Terms

Ambient Noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from all the noise sources in the area.
Background Noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).
dB(A)	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Hertz	The unit of sound frequency in cycles per second.
L_{A90}	A-weighted, sound level just exceeded for 90% of the measurement period and calculated by statistical analysis. See also the background noise level.
L_{Aeq}	A-weighted, equivalent continuous sound level.
L_{AFmax}	A-weighted, maximum, sound level measured with a fast time-constant - maximum is not peak
L_{den}	day-evening-night noise level, the A-weighted, Leq (equivalent noise level) over a whole day, but with a penalty of 10 dB(A) for night-time noise (23:00-07:00) and 5 dB(A) for evening noise (19:00-23:00), also known as the day evening night noise indicator
VDV	Vibration Dose Value (VDV) is an assessment of the effect of building vibration on the people within. As defined in BS 6472:2008 the VDV is the fourth root of the integral of the fourth power of acceleration after it has been frequency-weighted (as defined in BS6472: 2008). The frequency-weighted acceleration is measured in m/s^2 and the time period over which the VDV is measured is in seconds therefore VDVs is cited in terms of $m/s^{1.75}$.

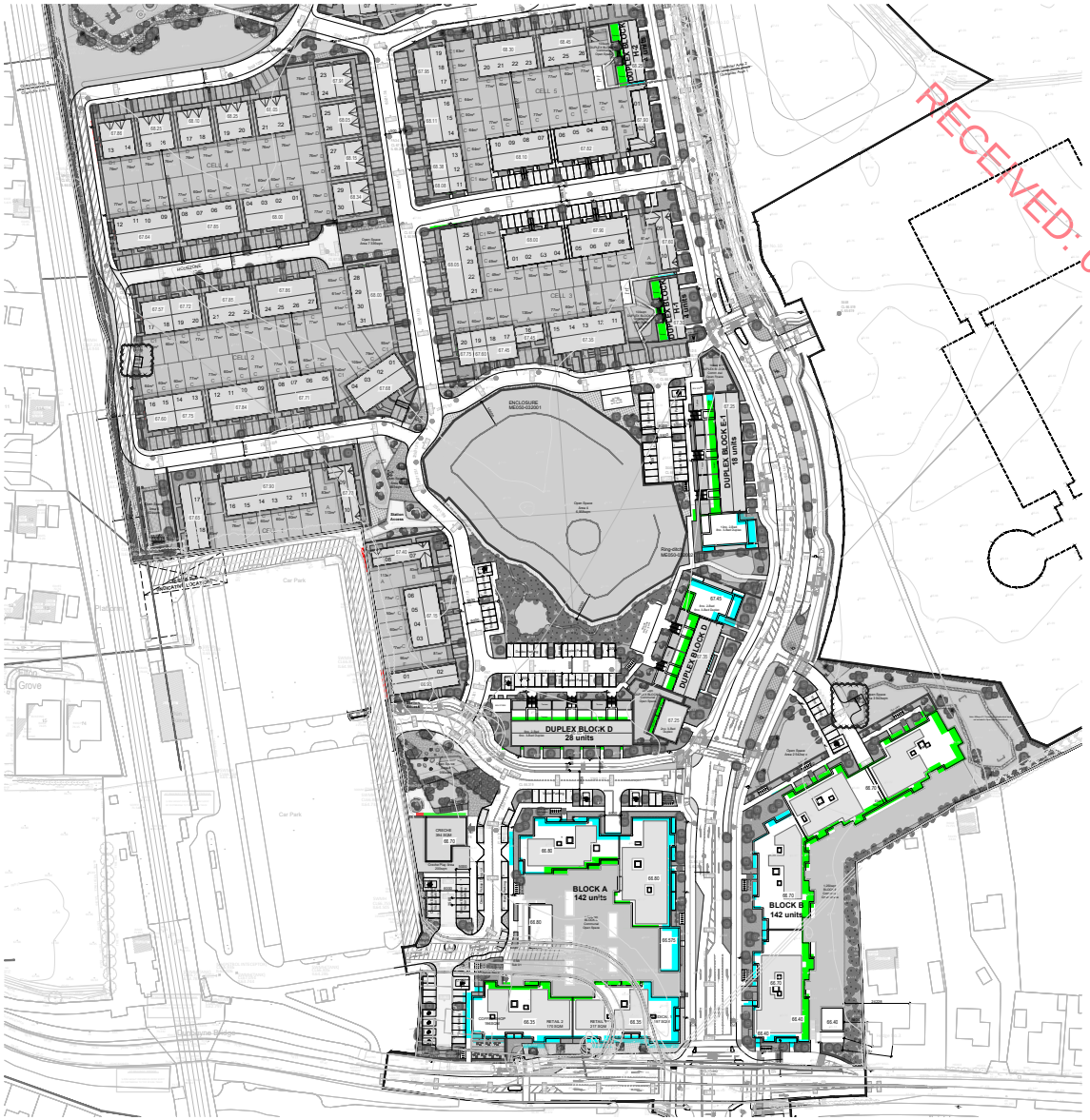
Appendix B- Façade Mark Ups

Glazed Elements Specification

- 39 dB R_w
- 36 dB R_w
- 32 dB R_w

WAVE DYNAMICS
ACOUSTIC CONSULTANTS
DUBLIN WEXFORD CORK LONDON

Project:	Dunboyne JCL
Title:	Glazing Markup - Site Plan Zone 1
Prepared By:	Cathal Reck
Reviewed By:	James Cousins
Date:	15/08/2024



Glazed Elements Specification

- 39 dB R_w
- 36 dB R_w
- 32 dB R_w

WAVE DYNAMICS
ACOUSTIC CONSULTANTS
DUBLIN WEXFORD CORK LONDON

Project:	Dunboyne JCL
Title:	Glazing Markup - Site Plan Zone 2
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